

INFOWATCH

InfoWatch Traffic Monitor

Administration Guide

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1 Introduction

This guide provides information on InfoWatch Traffic Monitor administration: configuration of the system after installation, disaster recovery, routine maintenance.

1.1 Who Should Read this Guide

The guide is intended for InfoWatch Traffic Monitor Server administrators, which are familiar with the basics of Microsoft Windows and Linux and have the skills of Oracle and Postgre SQL DBMS administration.

1.2 Set of Documents

For more information see the following documents:

- «*InfoWatchTraffic Monitor. Installation Guide*».

The document describes how to install, configure, update, and uninstall the InfoWatch Traffic Monitor.

- «*InfoWatch Traffic Monitor. Administration Guide*».

Contains information on System administration (database, server-end).

- «*InfoWatch Traffic Monitor. User Guide*».

The document describes operation with InfoWatch Traffic Monitor: configuration setting, data export/import, creating policies for objects processing.

- «*InfoWatch Traffic Monitor. Configuration files guide*».

The document describes the frequently used configuration files.

1.3 Technical Support

If you cannot resolve issues which arise when using the System or have questions regarding the use of the System, you can contact the Technical Support Service:

- If you purchased the product from an InfoWatch partner, contact the Technical Support Service of this partner company.
- If you purchased the product directly from InfoWatch, you can contact our Technical Support Service at support@infowatch.com.

Technical Support Service is available to assist you Mon-Fri, 7 AM – 9 PM (Moscow time, GMT+3), except weekends and public holidays in Russian Federation.

You can also visit online support at our website at: http://infowatch.com/support.

Before contacting the Technical Support Service, please refer to the Knowledge Base at our web-site: https://kb.infowatch.com/. The knowledge base may already contain the answer to your question or a description of the problem you are having.

2 Traffic Monitor Overview

In this chapter:

- InfoWatch Traffic Monitor Features;
- InfoWatch Traffic Monitor Components;
- Licensing.

2.1 InfoWatch Traffic Monitor Features

InfoWatch Traffic Monitor allows you to control corporate network information flows in order to detect and prevent unauthorized use of confidential data.

Main features of InfoWatch Traffic Monitor:

- In Stream/At The Gateway Traffic Interception - interception of traffic transferred in stream/at the gateway via SMTP, POP3, HTTP, HTTPS, OSCAR (ICQ), NRPC (IBM Notes);
- Traffic intercepted by Device Monitor agents on workstations (see in *"InfoWatch Device Monitor. User Guide"*);
- Processing Traffic, Received from Third-party Systems;
- Analyzing content of intercepted traffic in order to detect violation of the corporate security policy;
- Filtering intercepted traffic by allowing/prohibiting delivery of particular data.

2.1.1 In Stream/At The Gateway Traffic Interception

The chapter contains information about traffic types and their interception schemes:

- SMTP Traffic Interception Scheme;
- POP3 Traffic Interception Scheme;
- HTTP Traffic Interception Scheme;
- HTTPS Traffic Interception Scheme;
- ICQ Traffic Interception Scheme;
- NRPC Traffic Interception Scheme;
- IMAP4 Traffic Interception Scheme.

SMTP Traffic Interception Scheme

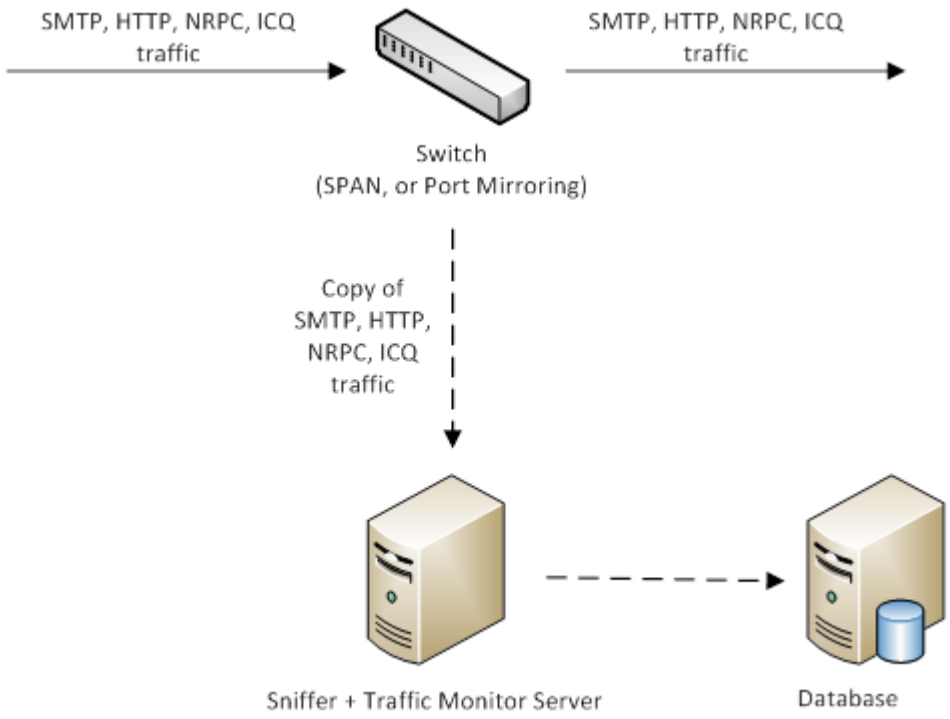
Method 1:

Traffic is being intercepted from a managed switch by using SPAN Port, or Port Mirroring technology.

Big number of managed network switches allows duplicating traffic from one or several ports or VLAN on a separate port.

In this case the customized switch port is being attached to Traffic Monitor Server network interface. Server interface is being switched to promiscuous mode, which allows accepting all incoming packages. This interface does not require an IP-address.

The most effective is to mirror internal switch port or internal proxy-server interface.



For more information on functionality *see* ''SPAN, or Port Mirroring''

Advantages:

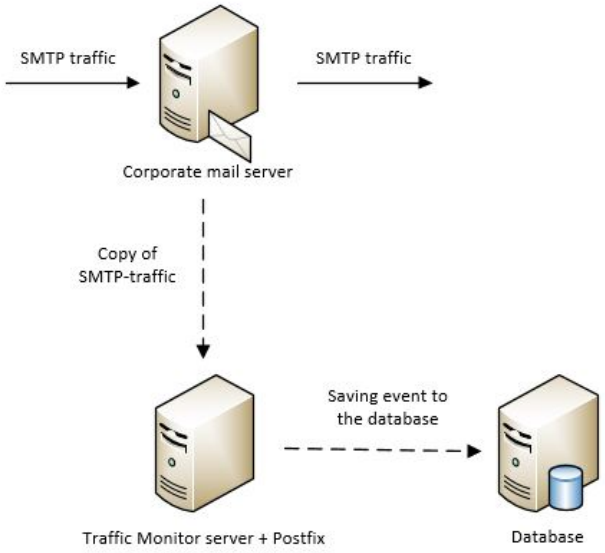
- This method allows to analyze traffic safely even in the isolated network segment. System can never influence analyzed traffic, regardless of Server state.
- SMTP traffic of external servers is being analyzed as well

Shortcomings:

- Under heavy load of switch, packages can be partially lost, especially, when the traffic is being mirrored from two ports to one, therefore we need:
  - switch with corresponding functionality;
  - additional network adapter on Traffic Monitor server.
- Among shortcomings, internal communications are not being controlled.

Method 2:

On a corporate mail server it is necessary to setup a rule, sending shadow copy (BCC) for each sent message. Copy should be sent to mail address with mail domain, which has the same IP-address as Traffic Monitor Server. Most of mail servers have such functionality.



For more information on functionality see "Receiving Copies from Mail Server"

Advantages:

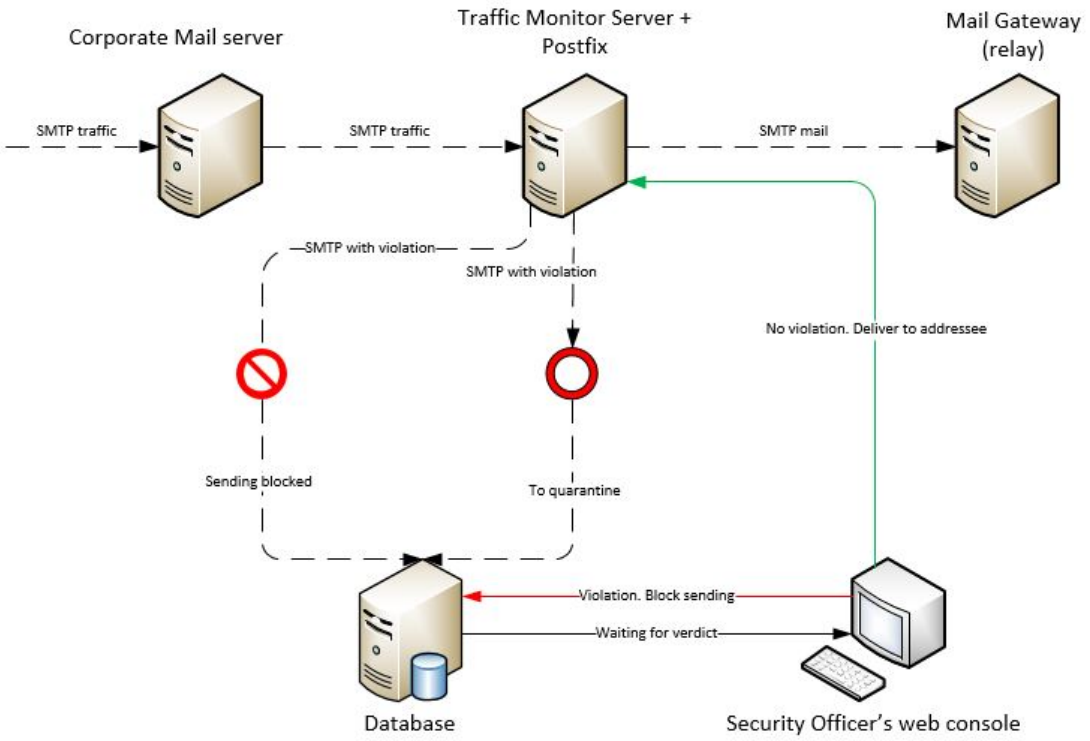
- Apart from external, it allows analyzing company's internal communications;
- When MS Exchange 2007 or newer is used there is functionality to analyze communications of a certain user group;
- Guarantees entire mail analysis.

Shortcomings:

- Requires settings of a corporate mail server to be changed;
- External mail servers (if allowed to use) are not being controlled;
- Upon Traffic Monitor Server inaccessibility, users will receive mail about shadow copy delivery error;
- Additional mail server load.

Method 3:

Traffic Monitor server uses configured Postfix mail server and functions as an SMTP retranslator and operates in Blocking mode.



For more information on the functionality see "Inline Mode".

Advantages:

Allows enabling mail traffic block functionality.

Shortcomings:

- Requires settings of a corporate mail server to be changed;
- External mail servers (if allowed to use) is not being controlled;
- Upon Traffic Monitor server inaccessibility, users cannot send mail, in case server reservation has not been provided (for example, through MX-records).

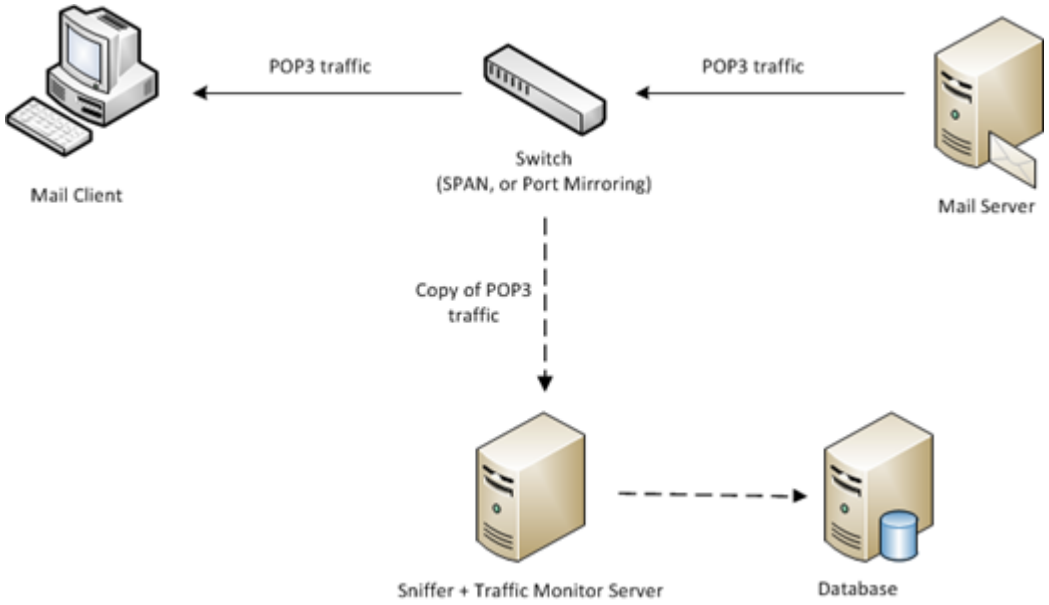
POP3 Traffic Interception Scheme

Traffic is intercepted from a managed switch by using SPAN Port, or Port Mirroring technology.

A large number of managed network switches allows duplicating traffic from one or several ports or VLAN to a single port.

In this case the customized switch port is connected to Traffic Monitor Server network interface. Server interface is switched to promiscuous mode, which allows accepting all incoming packages. This interface does not require an IP-address.

The most effective is to mirror the internal switch port or internal proxy-server interface.



For more information on functionality see "Configuring POP3 Traffic Interception".

HTTP Traffic Interception Scheme

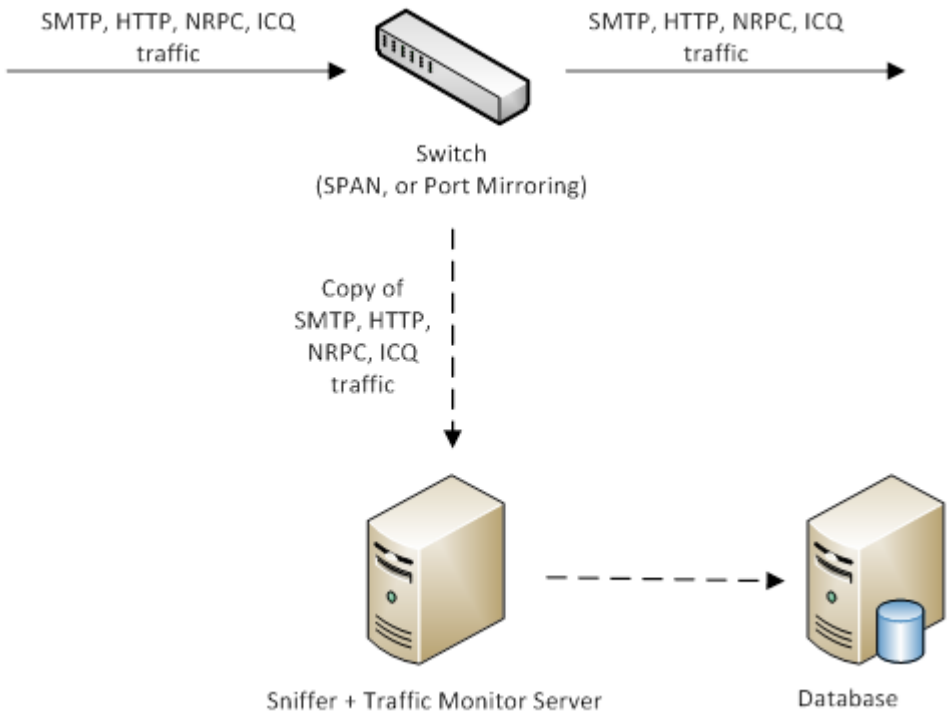
Method 1:

Traffic is intercepted from a managed switch by using SPAN Port, or Port Mirroring technology.

A large number of managed network switches allows duplicating traffic from one or several ports or VLAN to a single port.

In this case the customized switch port is connected to Traffic Monitor Server network interface. Server interface is switched to promiscuous mode, which allows accepting all incoming packages. This interface does not require an IP address.

The most effective is to mirror the internal switch port or internal proxy server interface.



For more information on functionality see "SPAN, или Port Mirroring".

Advantages:

- This method allows to analyze traffic safely even in the isolated network segment. System can never influence the analyzed traffic, regardless of Server state.

Shortcomings:

- Under heavy load on the switch, some packages can be lost, especially, when the traffic is mirrored from two ports to a single port. To prevent the loss of packages, you should use:
  - a switch with corresponding functionality;
  - an additional network adapter on Traffic Monitor server.

Special case 1:

In case Traffic Monitor server is located in virtual environment, in addition to switch port setup, to analyze traffic an individual virtual switch is being created with promiscuous mode enabled. Switch should be connected to an individual physical interface. This method allows you to analyze the traffic of virtual machines running through a virtual switch.

This method works on VMware ESXi servers. On Hyper-V this functionality is implemented with limitations starting with version 2012 Hyper-V.

Special case 2:

Instead of managed switch, HUB can be used. This variant's disadvantage is HUB device's is low transmission capacity, as well as inability to buy a device in connection to removal from production.

Method 2:

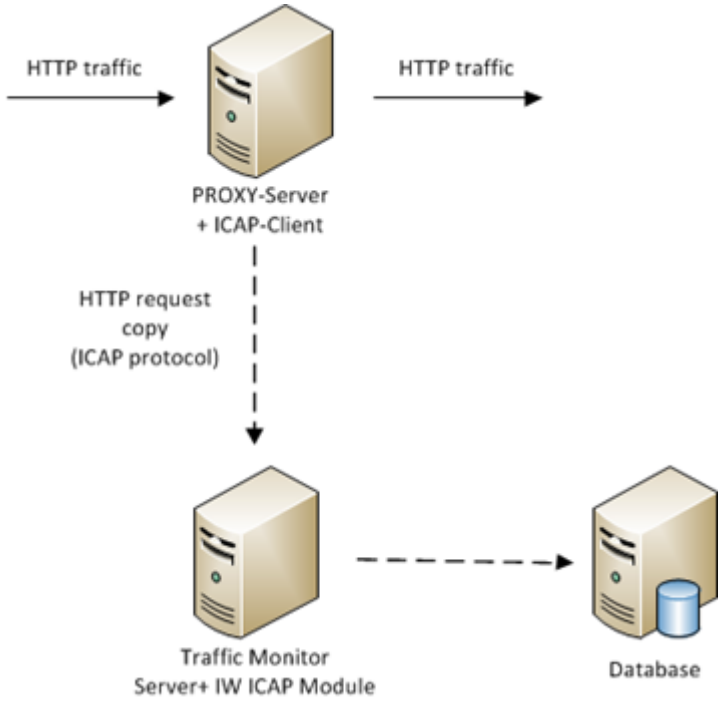
Traffic copy, which is transmitted via ICAP protocol, is intercepted from corporative proxy server.

Traffic Monitor Server is positioned as an ICAP server. In case there is a proxy server in company, which supports ICAP protocol, it is possible to use this functionality for analysis of HTTP traffic.

The following proxy servers support this option:

- Cisco Ironport
- SQUID (given that the package has been compiled including ICAP support)
- Blue Coat SG
- Zimbra Proxy (as a part of Zimbra ZCS)

> **Note:**
>
> To work with other proxy servers maintaining ICAP is possible, but this requires preliminary compatibility test.



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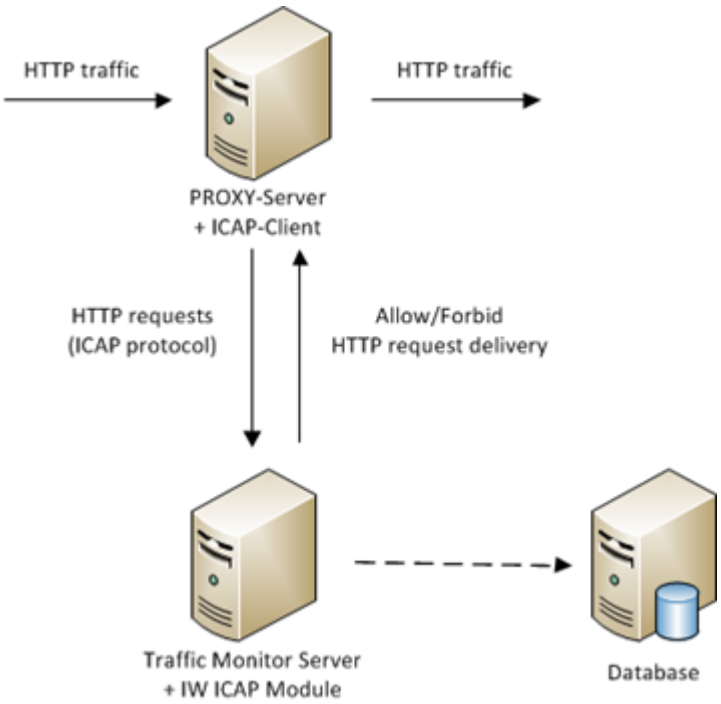

Block
For more information on functionality see "Inline mode".

Advantages:

- Guarantees all packages delivery;
- Traffic Monitor Server can work in blocking mode («inline») with some proxy servers.

Shortcomings:

- Proxy server with corresponding functionality is required;
- Additional proxy server load;
- Changing corporate proxy server setup;
- Slight increase in the response time of Internet resources is possible.

HTTPS Traffic Interception Scheme

> **Warning!**
>
> All methods of analyzing HTTPS traffic should be used with caution. The technology of analyzing HTTPS traffic is based on replacing a certificate of HTTPS session with a certificate issued by the proxy server (**man-in-the-middle attack**). On the user PC, the certificate must be considered a trusted one; otherwise, it will not be able to connect to an HTTPS resource. All HTTPS resources, which use personal certificates for identification (e.g., different client banks), must be excluded from interception.

Method 1:

Corporate proxy-server carries out certificate replacement and HTTPS traffic parsing. After parsing HTTPS traffic, the proxy server sends traffic as HTTP to Traffic Monitor Server via ICAP protocol.

The following proxy servers support this option:

- Cisco Ironport

- SQUID (given that the package has been compiled including ICAP support)
- Blue Coat SG
- Zimbra Proxy (as a part of Zimbra ZCS)

> **Note:**
>
> To work with other proxy servers, maintaining ICAP, is possible, but requires preliminary compatibility test.

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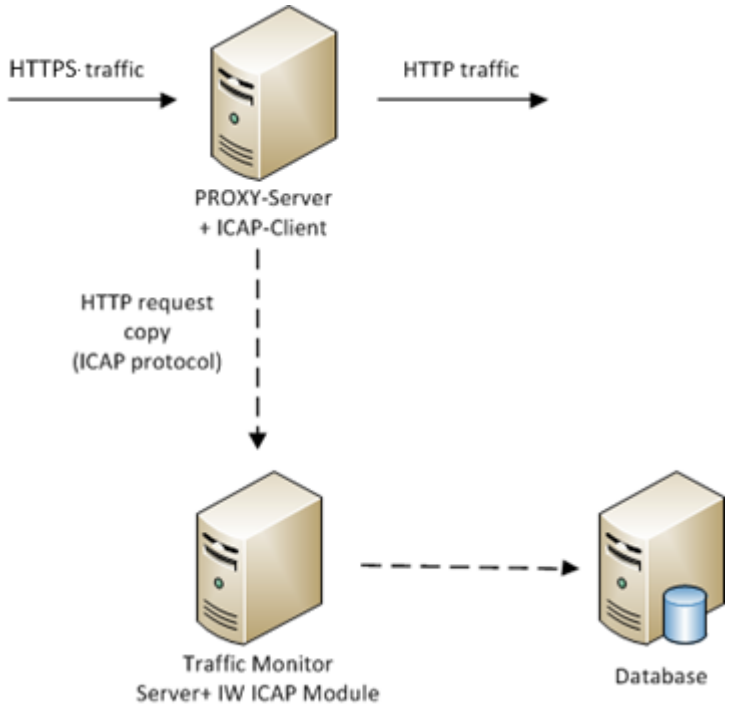
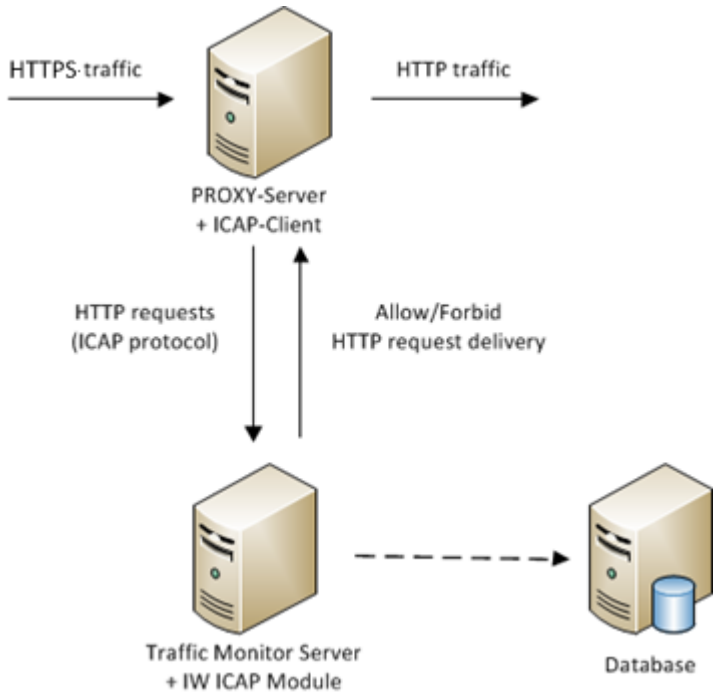


Blocking



For more information on this functionality, see "'В разрыв" 1".

Advantages:

- Entire HTTPS traffic is analyzed.

Shortcomings:

- It is required to take into consideration the needs of all proxy-server users;
- Additional load on a proxy server;
- Need to make some preparations which include creating exclusions list and certificate distribution.

Special case:

InfoWatch engineers can install a free SQUID proxy server on the Traffic Monitor Server.

Advantages:

- It is possible to analyze HTTPS.

Shortcomings:

- SQUID engineer is required to maintain the service.

Method 2:

HTTPS traffic analysis is performed by InfoWatch Device Monitor.

For more information on this functionality see «InfoWatch Device Monitor. User guide».

Advantages:

- An agent automatically puts its certificate to the trusted ones;
- Analysis of HTTPS traffic in company environment can be introduced gradually.

Shortcomings:

- Needs of a particular PC user should be taken into consideration.

ICQ Traffic Interception Scheme

Intercepting the copy of ICQ traffic (OSCAR protocol) which passes through equipment with SPAN technology support. ICQ traffic interception is possible over HTTP.

> **Warning!**
>
> Interception and analysis of encrypted ICQ traffic (including traffic transferred via SSL protocol) is not supported.

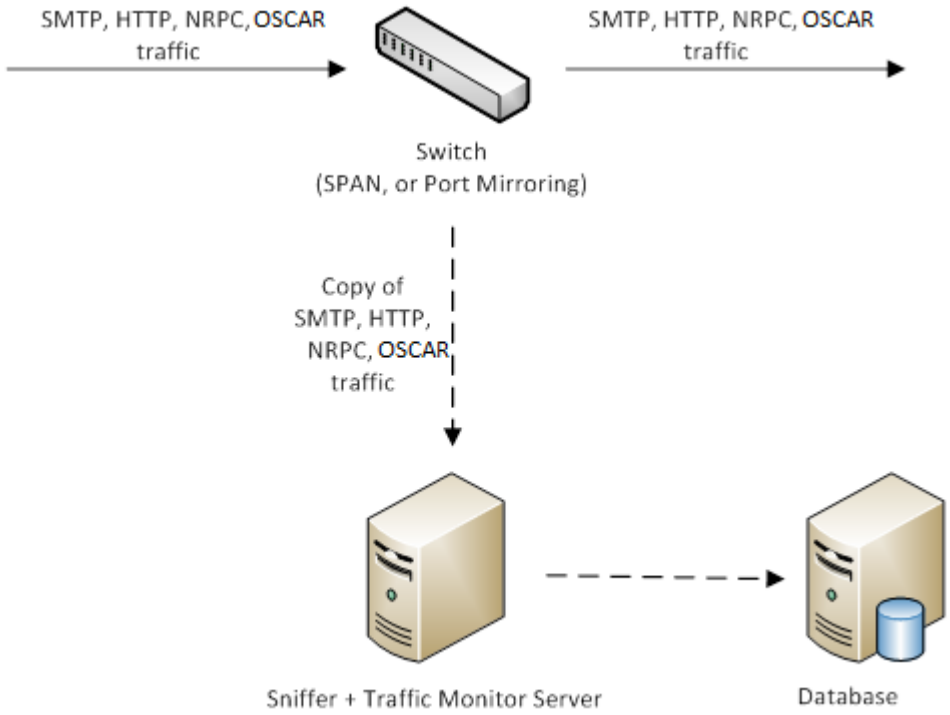
> **Note:**
>
> Direct file transfer is not supported. OSCAR protocol assumes that Traffic Monitor gets the file hosting service reference, from which the file can be loaded.

Traffic is intercepted from a managed switch by using SPAN Port, or Port Mirroring technology.

A large number of managed network switches allow duplicating traffic from one or several ports or VLAN to a single port.

In this case customized switch port is connected to Traffic Monitor Server network interface. Server interface is switched to promiscuous mode, which allows accepting all incoming packages. This interface does not require an IP-address.

It is most effective to mirror internal switch port or internal proxy-server interface.



For more information on functionality see "SPAN, or Port Mirroring".

Advantages:

Allows analyzing traffic safely even in an isolated network segment. System cannot influence the traffic being analyzed regardless of the Server state.

Shortcomings:

Under heavy load on the switch, some packages can be lost, especially, when the traffic is mirrored from two ports to a single port. To prevent the loss of packages, you should use:

- a switch with corresponding functionality;
- an additional network adapter on Traffic Monitor server.

NRPC Traffic Interception Scheme

NRPC traffic copy interception (used in IBM Notes System) which passes through equipment with SPAN technology support.

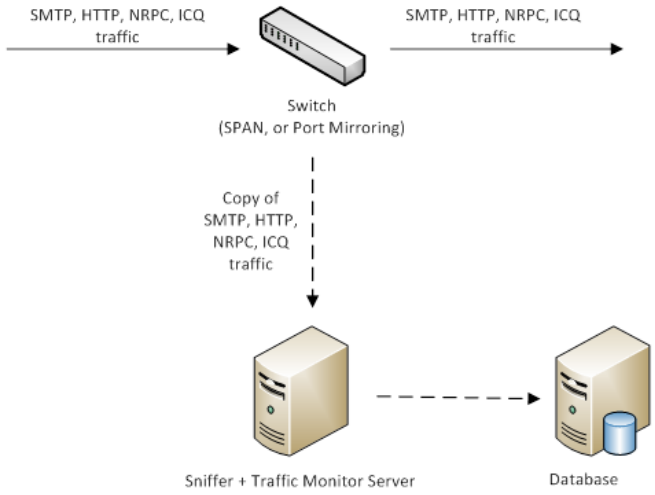
Method 1:

Traffic is intercepted from a managed switch by using SPAN Port, or Port Mirroring technology.

A large number of managed network switches allow duplicating traffic from one or several ports or VLAN to a single port.

In this case customized switch port is connected to Traffic Monitor Server network interface. Server interface is switched to promiscuous mode, which allows accepting all incoming packages. This interface does not require an IP-address.

The most effective is to mirror internal switch port or internal proxy-server interface.



For more information on functionality see "SPAN, or Port Mirroring"

Advantages:

Allows analyzing traffic safely even in an isolated network segment. System cannot influence the traffic being analyzed regardless of the Server state.

Shortcomings:

Under heavy load on the switch, some packages can be lost, especially, when the traffic is mirrored from two ports to a single port. To prevent the loss of packages, you should use:

- a switch with corresponding functionality;
- an additional network adapter on Traffic Monitor server.

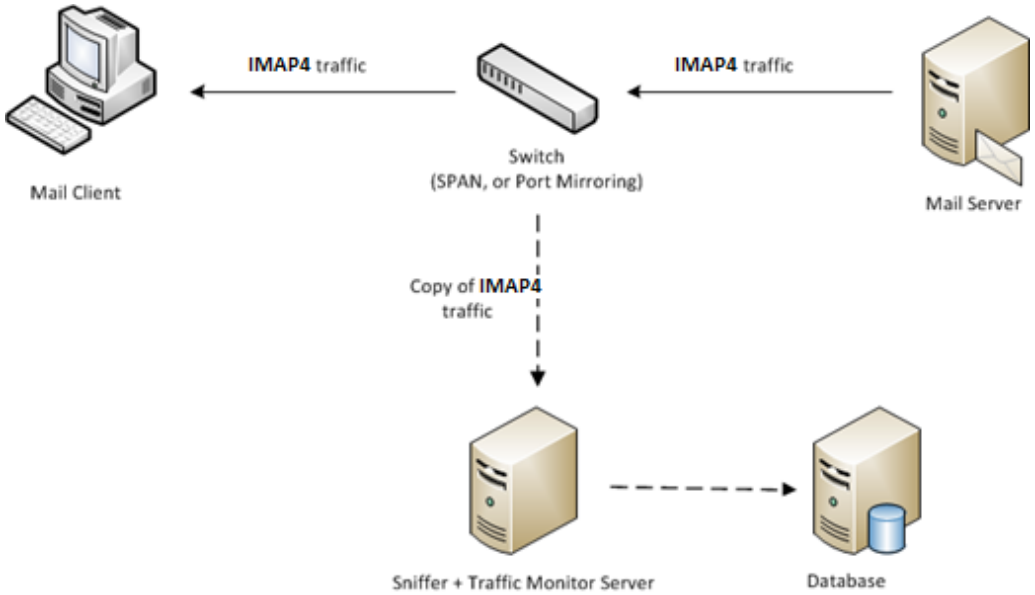
IMAP4 Traffic Interception Scheme

Traffic is intercepted from a managed switch by using SPAN Port, or Port Mirroring technology.

A large number of managed network switches allow duplicating traffic from one or several ports or VLAN to a single port.

In this case customized switch port is connected to Traffic Monitor Server network interface. Server interface is switched to promiscuous mode, which allows accepting all incoming packages. This interface does not require an IP-address.

It is most effective to mirror the internal switch port or internal proxy-server interface.



For more information on functionality see *"SPAN, or Port Mirroring"*.

2.1.2 Processing Traffic, Received from Third-party Systems

Traffic Monitor supports number of adapters, which work under the scheme of data transfer from integrable source and storing it in a database:

- **InfoWatch Lotus Domino Adapter**. Find the recommendations for installation and administration in the document "InfoWatch Lotus Domino Adapter. Installation and administration guide";
- **InfoWatch MS Lync Adapter**. Find the recommendations for installation and administration in the document "InfoWatch MS Lync Adapter. Installation and administration guide";
- **InfoWatch TMG Adapter**. Find the recommendations for installation and administration in the document "InfoWatch TMG Adapter. Installation and administration guide";
- **InfoWatch Device Control Adapter**. Find the recommendations for installation and administration in the document "InfoWatch Device Control Adapter. Installation and administration guide";
- **InfoWatch Cisco UCM Adapter**. Find the recommendations for installation and administration in the document "InfoWatch Cisco UCM Adapter. Installation and administration guide";
- **InfoWatch Smart Logger II**. Find the recommendations for installation and administration in the document "InfoWatch Smart Logger II. Installation and administration guide";
- **InfoWatch HEML Adapter**. Find the recommendations for installation and administration in the document "InfoWatch HEML Adapter. Installation and administration guide";

- **InfoWatch Sample Documents Autoupdate Adapter**. Find the recommendations for installation and administration in the document "InfoWatch Sample Documents Autoupdate Adapter. Installation and administration guide".

2.2 InfoWatch Traffic Monitor Subsystems (Red Hat Enterprise Linux)

InfoWatch Traffic Monitor subsystem	Purpose
Traffic Intercepting subsystem	Intercepts traffic (objects or their copies) and transfers it for processing. Consisting of the following modules: • Sniffer module • ICAP module • Device Monitor module • Mail (SMTP) interception module
Processing subsystem	Extracts significant information and attachments from intercepted objects, determines attachment formats, and transfers extracted texts to the Analysis subsystem. **Note:** together with an object, its XML context is created - a text file including object content and information about the object.
Analysis subsystem	Analysis of text data extracted from intercepted objects (texts of emails, messages, queries as well as text, extracted from attachments). Includes the following technologies: • Categories and terms; • Text objects; • Sample documents; • Vector images; • Blanks; • Stamps; • DB unloadings; • Graphical objects; • Autolinguist.
Policy Application subsystem	Based on results of Analysis and Processing subsystems operations, the Policy Application subsystem makes a decision whether the intercepted object violates the security policy or not. It also associates the sender/recipient data with records on employees and workstations. Consists of the following modules: • Active Directory, Samba DC and Domino Directory Integration module • Decision-Making module

InfoWatch Traffic Monitor subsystem	Purpose
Storage subsystem	A database which stores data on intercepted objects, results of analysis and applying policies. It also enables viewing this data by means of queries in the Management Console. Includes the following modules: • Remote Database Management module • Uploading Objects to Database module • System Settings Storage module • Object Storage module **Note:** before objects are saved to the database, they are converted from one internal format (XML) to another internal one.
Monitoring subsystem	Allows you to remotely monitor the state of the servers where InfoWatch Traffic Monitor components and their services are installed. Also, performs general management operations. The administration works with the subsystem via the web interface.
Audit subsystem	Makes it possible to customize search filters (by persons, actions, objects, dates), view brief information on events and violations based on selected filters, and define the period of storing events in the System. The administration works with the subsystem via the web interface.
Management Console subsystem	Enables GUI operation. The user interface is needed to administrate, configure, and operate Traffic Monitor. Includes the following modules: • Monitoring module • Control module • Configuration module

2.3 Licensing

After the System has been installed, the license should be installed accordingly. For this purpose request for license key file (see the document "InfoWatch Traffic Monitor. User Guide", topic "Requesting license").

The license is intended to specify the duration, number of users, number of interception modules and analysis modules, as well as the ability to integrate with external systems.

A commercial license key is a file in LIC format.

When you install and use the license key, consider the following:

- If the license expires, interceptors stop working. To resume the System operation the new license should be installed.
- If you want to change settings of traffic interception according to a new deployment scheme, replace the license key considering new interceptors.

If you completely reinstall the operating system or InfoWatch Traffic Monitor, you will need to install the license anew. Therefore, we recommend saving the license key file to some data storage.

Warning!

About license validity check and license management you may find in the document "InfoWatch Traffic Monitor. User Guide", section "Managing Licenses".

Modules used in the product are listed below.

Interception modules, designed by InfoWatch

Subsystem	Event type	Protocol
TM	E-mail	POP3 IMAP SMTP NRPC
	Web message	HTTP HTTPS
	Web mail	HTTP HTTPS
	ICQ	OSCAR
	Data Discovery	-
DM	E-mail	POP3 IMAP Outlook SMTP
	Web message	HTTP HTTPS
	Web mail	HTTP HTTPS
	Print	-
	Skype	SKYPE

Interception modules, designed by InfoWatch		
Subsystem	**Event type**	**Protocol**
	XMPP	XMPP
	Mail.Ru Agent	MMP
	FTP	FTP
	Clipboard	-
	Screenshots	-
	Removable devices	-
	Network resources	-
	Terminal session	-
	Cloud storage	HTTPS
	Telegram	-
	Keyboard input	-
	Vkontakte	HTTPS
	Facebook	HTTPS
	WhatsApp	-
Adapters	MS Lync	SIP
	E-mail (Lotus)	NRPC
	Removable devices (Lumension Device Control)	-
	Print (Lumension Device Control)	-
	Web message (ICAP)	ICAP
	Web mail (ICAP)	ICAP

External interception modules	
Event type	**Protocol**
E-mail	POP3 MAPI SMTP/ESMTP IMAP NRPC
Web mail	HTTP HTTPS ICAP
ICQ	OSCAR
Mail.ru agent	MMP
Skype	Skype
XMPP	XMPP
MS Lync	SIP
Web message	HTTP HTTPS ICAP
FTP	FTP
Removable devices	-
Print	-
SmartLogger	XMPP
Cisco UCM	XMPP

Analysis modules:

1. Linguistic analysis
2. Sample documents detector
3. Vector images detector
4. Text objects detector
5. DB unloadings detector
6. Form detector
7. Graphical analysis
8. Stamps detector

9. Autolinguist

Additional possibilities:

1. Modules of sample unloadings update;
2. Export to external analysis systems.

> **Note:**
>
> The technology of blocking leakage channels on workstations based on analysis results is not licensed.

3 System Installation Types

The deployment scheme is chosen based on estimated hardware workload and implementation goals (for details, see the document "*InfoWatch Traffic Monitor. Installation Guide*", "System Deployment Schemes and Installation Types" article). The following installation modes are supported:

- *All-in-one Standard* - the base type of installation, when all System components are installed on the same computer together with PostgreSQL DBMS. For details, see the document "*InfoWatch Traffic Monitor. Installation Guide*", "All-in-one Installation Mode of TM Enterprise and TM Standard" article;
- *All-in-one Enterprise* - System installation type with advanced features including PostgreSQL and Oracle DBMS, scalability, fine control of workstations. For details, see the document "*InfoWatch Traffic Monitor. Installation Guide*", "All-in-one Installation Mode of TM Enterprise and TM Standard" article;
- *Distributed Installation of TM Enterprise (Traffic Monitor Server + Database)* - System installation type for operation under heavy workload and with a large amount of data. For details, see the document "*InfoWatch Traffic Monitor. Installation Guide*", "Distributed Installation of TM Enterprise" article.

Important!

If the System is installed on different servers (and when building a server cluster), pay attention to the following:

- you should configure network parameters of Sphinx searching engine (see "Configuring Sphinx in case of distributed installation")
- some server processes (**iw_adlibitum, iw_bookworm, iw_deliver, iw_licensed, iw_indexer, iw_is, iw_image_autoling, iw_text_autoling**) and user console processes (**iw_kicker, iw_configerator**) should be run on the cluster in a single copy (see "List of Traffic Monitor Server End Processes")

Depending on the purchased license, each installation type may include installation of the following interceptors:

- InfoWatch Device Monitor which is intended to configure security schemes, computer monitoring system, access to the company computers, etc. (see the document "*InfoWatch Traffic Monitor. Installation Guide*", "Installing InfoWatch Device Monitor" article).
- Adapters - interception modules intended for integration with third-party systems.

4 Configuring System After Installation

After installing the System, configure the following settings for proper System operation:

- Configuring Time Synchronization - enables automatic time synchronization on servers;
- Configuring Sphinx in case of distributed installation - settings required for distributed installation;
- Configuring traffic interception - specific settings for different types of intercepted traffic;General settings - the settings order to get traffic from the managed switch using SPAN Port technology, traffic interception, sent via ICAP protocol and system settings to switch the interceptors to "in-line" mode capably for traffic block;
- Process Autorun - the list of system processes and description when and how to enable/disable autorun for these processes;
- Configuring OCR Libraries - the order of installing packages required for text recognition in intercepted events;
- Configuring Email Notifications for Users and Employees - mandatory settings to support mail notifications, sent as a result of triggering policy rules (for details, see the document "*InfoWatch Traffic Monitor. User Guide*");
- Limiting the Number of Found Events - changing the maximum number of events displayed in the Management Console;
- Configuring InfoWatch Device Monitor - configuring separate modules of Device Monitor Server and editing the logging settings (for details, see the document *"InfoWatch Device Monitor. Installation, Configuration and Administration Guide"*);
- Setting data collection in affiliate network - the settings of configuration files services, responsible for collecting data in a branch network;
- Service-to-service cooperation setup (Consul service) - the settings of configuration files services, managing The System processes;
- Detecting Workstations to Install the Agents on - scanning the network in order to detect workstations outside Active Directory (for details, see the document *"InfoWatch Device Monitor. User Guide"*).

We recommend:

- changing passwords pre-configured in the System, as information security rules require (for details, see Changing standard passwords in the System);
- configuring protection against guessing passwords during authorization in Traffic Monitor and Device Monitor consoles (for details, see Configuring protection against password guessing);
- configuring a firewall to prevent unauthorized access to the System components (for details, see Secure Deployment Recommendations).

4.1 Changing the Preset Password

Accounts in the System have a preset password: xxXX1234 (for details, see Pre-installed Server Parameters). When you start using the System, you should change the password to meet the information security requirements. To ensure stable and safe operation of the System, store passwords in a safe, inaccessible place.

You can change the preset password in the System configuration files. To change the preset password:

1. Stop Traffic Monitor processes:
   `iwtm stop`
2. Go to the directory /opt/iw/tm5:

```
cd /opt/iw/tm5
```

3. Run the command:

```
egrep -lir --include=\*.{cfg,conf} 'xxXX1234' | xargs -l sed -i -e 's/xxXX1234/<new_pass>/g'
```

where `<new_pass>` is a new password.

4. Change the preset passwords of the DBMS. See details in the articles "Changing Preset Passwords (Oracle)", "Changing Preset Passwords (PostgreSQL)".

5. Start Traffic Monitor processes:

```
iwtm start
```

When specifying a new password, follow recommendations in the "Appendix A. Username and Password Creation Recommendations" article.

4.2 Configuring protection against password guessing

To protect the System, the following feature is enabled: in the case of repeated unsuccessful authorization attempts, user login is blocked. Protection against password guessing is configured in the database.

By default, the protection is disabled.

Protection for InfoWatch Traffic Monitor and InfoWatch Device Monitor is configured separately.

To enable protection for Traffic Monitor server:

1. Connect directly to the database which is used by the Traffic Monitor server.
2. Find the table `SETTING`.
3. Find 3 parameters responsible for protection configuration:
   - **`web_logon_attempts_count`** - the number of unsuccessful login attempts allowed;
   - **`web_logon_blocking_period`** - the time for which the login will be blocked, in seconds;
   - **`web_logon_attempts_period`** - the period of unsuccessful login attempts, in seconds.
4. Set the values for all three parameters in accordance with security requirements.

   > **Warning!**
   >
   > In case any parameter's value is incorrect or equal to 0, the protection is to be disabled.

5. To apply the settings, save changes in the database. You need no restart the server as protection settings change dynamically.

If login is blocked, a new event is created in the audit log (the **Log** button in the Navigation pane) where the unlocking time is specified.

When the blocked user tries to log into the System again, he/she will be notified that the number of failed login attempts has been exceeded.

An example of protection settings for Traffic Monitor:

- `web_logon_attempts_count - 5`
- `web_logon_blocking_period - 300`
- `web_logon_attempts_period - 120`

How these settings work: if during 2 minutes (120 seconds), the user makes 5 unsuccessful login attempts, then login for this user is blocked for 5 minutes (300 seconds). The countdown period of unsuccessful attempts starts from the first attempt. If during 120 seconds the user makes only 4 unsuccessful login attempts, then the next attempt will relate to a new period.

4.3 Preliminary Settings

Upon System installation the following settings must be performed:

- Configuring Time Synchronization
- Configuring Sphinx in case of distributed installation.

4.3.1 Configuring Time Synchronization

1. Set the system time using `date` command. For example, to set 12 August 2013 13:30 run the command with following parameters:
   `date 12081330`
2. Copy the system time to configure hardware clock with the command:
   `hwclock --systohc`
3. Check if the system and hardware clock are configured properly:
   `hwclock ; date`
4. The time should be almost the same.
   Stop `ntpd` service:
   `systemctl stop ntpd`
5. Define the time synchronization server. You can use any exact time service which uses ntp protocol and is available from your network. It can be both network equipment and Windows domain controllers (Active Directory server).
   To check if the server supports NTP, use ntpdate -q <IP> command (where IP is the address of server to be checked), for example:
   ```
   root@atl-iw:~# ntpdate -q 10.10.0.98
   server 10.10.0.98, stratum 3, offset 9.196765, delay 0.04437
   11 Sep 13:09:02 ntpdate[13819]: step time server 10.10.0.98 offset
   9.196765 sec
   root@atl-iw:~#
   ```
6. Configure the synchronization specifying NTP synchronization server in **/etc/ntp.conf** file. Add entry (specify IP address of your NTP server):
   `server 10.10.0.98`
7. Run `ntpd` service:
   `systemctl start ntpd`
8. Check the current state of ntpd service with the command:
   `systemctl status ntpd`
9. Enable automatic time synchronization:
   `chkconfig --level 345 ntpd on`

4.3.2 Configuring Sphinx for Distributed Installation

Full-text query search in Traffic Monitor is implemented by means of Sphinx search engine. **Sphinx** service is installed in **All-in-one** when using Indexer template. For information on installation, see the document "*InfoWatch Traffic Monitor. Installation Guide*", "Installation from TME distribution" article).

A distributed installation is an installation scheme when Traffic Monitor components are installed on different servers.

Note:

If you use several servers, specify the server IP address where **sphinx** service is running (a server with Indexer template). IP address is specified in `hostname` parameter within `search` section of **web.conf** configuration file on the server with Web console template used.

4.4 General Settings

The chapter contains information on configuring the System and its components for different installation types:

- Configuring Server to Work with SPAN, or Port Mirroring Technology
- Intercepting Traffic, Transmitted via ICAP Protocol
- Configuring Inline Mode for Several Interceptors

4.4.1 Configuring Server to Work with SPAN, or Port Mirroring Technology

Traffic is being intercepted from managed switch via SPAN Port technology, or Port Mirroring.

There are different possible deployment schemas:

Variant 1. Traffic copy interception and analysis are being performed on one computer (**All-in-one kickstart** key). Cluster is not created:

1. Configure Server to work as Sniffer (see "Configuring Traffic Monitor Server as Sniffer", variant 2)
2. Configure traffic reception parameters from Sniffer (see "Configuring Traffic Monitor Server to receive Copy of Traffic from Sniffer").

Variant 2. Traffic copy interception and analysis are being performed on different computers, clusterization is not used:

1. On one computer (**Interceptors** template key):
    a. Configure Server to work as Sniffer (see "Configuring Traffic Monitor Server as Sniffer", variant 1).
2. On the other computer (**All-in-one kickstart** key):
    a. Configure traffic reception parameters from Sniffer (see "Configuring Traffic Monitor Server to receive Copy of Traffic from Sniffer").

Variant 3. Traffic copy interception and analysis are being performed on different computers. To improve the performance, create a cluster of two Traffic Monitor server instances:

1. Install and configure DBMS server (**Database** and **Indexer templates** key).
2. On the computer, where Sniffer will be running (**Interceptors** template key):
    a. Configure it to work as Sniffer (see "Configuring Traffic Monitor Server as Sniffer", variant 1).
3. On the computer, where Traffic Monitor cluster example will be running (**All-in-one** key):
    a. Configure traffic reception parameters from Sniffer (see "Configuring Traffic Monitor Server to receive Copy of Traffic from Sniffer").
    b. Specify clusterization parameters (see "Creating Traffic Monitor cluster").
    c. Configure licensing server (see "Configuring Licensing Server (in case of Cluster)

Repeat i.3 to add one more Traffic Monitor Server duplicate copy to cluster.

Configuring Traffic Monitor Server as Sniffer

For Traffic Monitor Server to function as Sniffer, one needs to perform configuration file setup.

In **sniffer.conf** configuration file specify required parameters in sections for each interceptor (sections `http`, `icq` and `smtp`):

Parameter	Description
`Interface`	The network interface used to transfer data from the switch
`OpenInSec (subsection Timeouts)`	Time to keep the connection alive (in seconds) if no packages are transmitted. The recommended value – `600`.
`LiveInSec (subsection Timeouts)`	Timeout (in seconds) when the status of the connection must change to *ESTABLISHED*. If the status is not changed, the connection will be automatically terminated. Recommended value – `86400`.
`CloseInSec (subsection Timeouts)`	Time to keep the connection alive (in seconds) when the status is changed to *TIME_WAIT*. The recommended value – `300`
`TailInSec (subsection Timeouts)`	Wait time for sent packages (in seconds) after the connection has been terminated
`QueueMemorySizeInBytes`	The size of memory (in bytes), which is used to receive packages. When the channel utilization is high, you can increase this value. The range of values: from 1 to 500 Mb The recommended value – `16777216`

1. Stop server processes of Traffic Monitor:
   `iwtm stop`
2. Configure process autostart:
   - Variant 1. Traffic copy interception and analysis are performed on different computers. Configured Traffic Monitor Server example will be configured only as Sniffer (traffic interception):
     a. Enable **iw_sniffer** process autostart.
     b. Disable other processes autostart.

     > **Note:**
     >
     > For more information on enabling and disabling autostart see "Enabling and disabling autorun processes".

   - Variant 2. Traffic copy interception and analysis are performed on the same computer. Traffic Monitor Server will receive traffic copy from a switch (Sniffer function), analyze received data and upload it to the database (Traffic Monitor Server function):
     a. Enable **iw_sniffer**, **iw_x2db**, **iw_updater, iw_warpd** and **iw_adlibitum** processes autostart.
     b. Disable other processes autostart.

> **Note:**
>
> For more information on enabling and disabling autostart, see "Enabling and disabling autorun processes"

3. In **/opt/iw/tm5/etc/sniffer.conf** file, section `iscp`, configure traffic interception parameters:
   - `ListenHost`. IP-address for incoming connections.
   - `ListenPort`. Port for incoming connections.
4. Start Traffic Monitor processes:
   `iwtm start`

Configuring Traffic Monitor Server to Receive Copy of Traffic from Sniffer

Configuration is performed on the computer where Traffic Monitor Server is installed. Configuring these settings is required if Sniffer and Traffic Monitor Server are installed on the same computer.

Go to `/opt/iw/tm5/etc` directory and configure the following settings:

1. Enable autostart for required traffic interceptors (setup for SMTP, HTTP(S), ICQ traffic:
   i `wtm enable iw_proxy_http iw_proxy_smtp iw_proxy_icq`
   For NRPC traffic interceptor autostart configuration description, see "SPAN, или Port Mirroring".
2. Make sure **proxy.conf** configuration file has `false` meaning for `SkipNegotiate` parameter.
3. In case you need to intercept ICQ traffic, which is being transmitted via proxy-server (over HTTP), set `true` value for `IcqFilter` parameter in **proxy.conf** configuration file.
4. In **proxy.conf** configuration file, in `Iscp` part of sections `Smtp, Icq, Http` create values of `Host` and `Port` parameters.

> **Note:**
>
> To configure interaction with computer, which has 10.20.30.40 IP address and port **1234**, `Iscp` section for ICQ interceptor will look as follows:
>
> ```
> "iscp": {
> "ListenArea": "icq",
> "Host": 10.20.30.40,
> "Port": 1234
> }
> ```

Creating Traffic Monitor Cluster

If the traffic copy is intercepted by Sniffer, then you can create clusters of Traffic Monitor servers in order to increase the System performance.

> **Warning!**
>
> If a cluster is used, then the speed of a network connection between Sniffer and Traffic Monitor server should be twice as large as the speed at which traffic arrives at Sniffer.

To create a cluster of Traffic Monitor servers, in the **/opt/iw/tm5/etc/sniffer.conf** configuration file on each TM server instance, specify clusterization parameters:

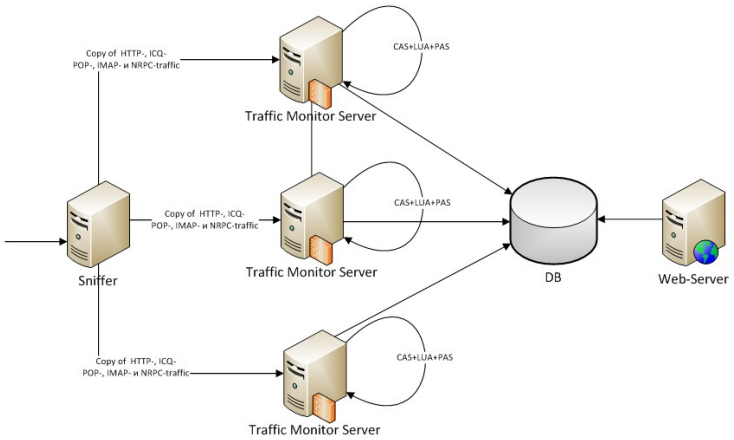
1. Make sure that `Usedareas` section looks like this:
   ```
   "UsedAreas": [
   "capstack",
   "http",
   "icq",
   "smtp"
   ]
   ```
   By default, this parameter is specified.
2. In the **proxy.conf** configuration file, in `Iscp` part of `Smtp`, `Icq`, and `Http` sections, specify values of `Host` and `Port` parameters.
   For example,
   To set up interaction with a computer which has an IP address of 10.20.30.40 and port **4301** (by default), the `Iscp` part for ICQ interceptor will look like this:
   ```
   "iscp": {
   "ListenArea": "icq",
   "Host": 10.20.30.40,
   "Port": 4301
   }
   ```
3. In the **sniffer.conf** configuration file, specify the value of the `Balancer` parameter for `Smtp`, `Icq`, and `Http` sections. Possible values:

- `Easy`. For each new TCP connection, an instance of Traffic Monitor Server with **iw_proxy** is chosen. Thus, all Traffic Monitor Server instances are used one in a turn.
- `IpPref`. The traffic is distributed between several instance of Traffic Monitor server with **iw_proxy** based on an IP address of the client. This means, that all data with the same IP address of the client is transmitted to the same instance of Traffic Monitor server.

By default, the `IpPref` parameter is used.

Example. Creating a cluster of several (up to three) Traffic Monitor server instances

The System intercepts a copy of SMTP, ICQ and HTTP traffic via Sniffer. To increase the performance, you can create a cluster of several (three in this case) Traffic Monitor Server instances. With the `Balancer` parameter, you can choose the optimal type of load on Traffic Monitor servers. This option allows you to avoid delays in processing data and losing data packages. The servers analyze traffic, then the data is saved to the database for further usage.



Configuring Licensing Server (in case of Cluster)

To receive correct data from interceptors in full, you need to configure the licensing server. It should run on the main Traffic Monitor server and be disabled on all other cluster nodes.

For this, take the following steps (on the node):

1. Stop **iw_licensed** service:
   `iwtm stop licensed`
2. Disable autostart of **iw_licensed** service:
   `iwtm disable iw_licensed`

And on the main Traffic Monitor server:

1. Enable autostart of **iw_licensed** service:
   `iwtm enable iw_licensed`
2. Run **iw_licensed** service:
   `iwtm start licensed`

To install, delete, request a license, or check its validity, please see the "License management" section in "/nfoWatch Traffic Monitor. User Guide".

4.4.2 Intercepting Traffic, Transmitted via ICAP Protocol

A proxy server, supporting ICAP, intercepts HTTP traffic and delivers it to the Traffic Monitor server for analysis and uploading to the database.

> **Note:**
>
> If you use Blue Coat as a proxy server, HTTPS traffic can also be intercepted. In this case, the Blue Coat proxy must be configured to process HTTPS traffic and send it to the Traffic Monitor server as HTTP traffic.

In this scheme, automatically installed modules are used on the Traffic Monitor server:

- **iw_icap_buf**, which receives large data in parts, combines these parts and send data to **iw_icap** for analysis;
- **iw_icap**, which processes intercepted data received through a proxy server or data processed by **iw_icap_buf** module.

The scheme supports user data processing with the following methods of authentication: NTLM, LDAP, Basic, Digest.

> **Warning!**
>
> Traffic Monitor Server and proxy with ICAP client must be located in the same subnetwork.
>
> The web-browser of each workstation must be configured to use one of the following proxy servers: SQUID, Blue Coat, Cisco IronPort, Fortinet FortiGate, UserGate for HTTP(S) traffic. For more information on configuring the settings, see the documentation for your web browser.

> **Important!**

The **iw_icap_buf** supports buffering of file uploads to file exchangers: filetrance.tander.ru, Yandex.Disk (disk.yandex.ru), Mail.ru Cloud (cloud.mail.ru), Google Drive (drive.google.com), BOX (box.com), DropBox (www.dropbox.com), OneDrive (onedrive.live.com). When uploading files to another file storage, buffering is not supported.

Depending on transmission type (**Copy** or **Block**), the following variants of HTTP traffic are possible:

- **Copy** mode – a copy of HTTP traffic is transmitted to TM Server for analysis; traffic is transmitted via proxy-server to the next chain link, depending on corporate infrastructure.
- **Block** mode – HTTP traffic is analyzed by the Traffic Monitor system. Depending on the fact if there is a violation or not, the following routes of traffic are possible:
  - In case there is no violation, a message which allows traffic transmission is returned to a proxy server. From the proxy-server, traffic is forwarded to the next link in a chain, depending on corporate infrastructure;
  - In case there is a violation, a message which prohibits traffic transmission is returned to a proxy-server. Traffic is blocked and the user, who sent the traffic, gets a warning message.

Note:

The text of the error message is contained in the **error.html** file which is located in the `/opt/iw/tm5/etc` directory.

In this chapter:

- Configuring ICAP;
- Configuring Blue Coat SG Series as an ICAP-client;
- Configuring SQUID as an ICAP-client;
- Configuring Cisco Iron Port as an ICAP-client;
- Configuring McAfee Web Gateway as an ICAP-client
- Recommendation on configuring Fortinet FortiGate
- Recommendations on configuring UserGate;
- Disabling ICAP.

Configuring ICAP

The IW ICAP module is automatically installed with Traffic Monitor server (**All-in-one** installation or **Interceptors** template options). Autostart of the **iw_icap** process on TM Server is enabled by default.

HTTP and HTTPS traffic is intercepted with the same System resources, but the configuration of external mechanisms configuration differs (see below).

To enable interception of HTTP(S) traffic transferred via ICAP, you need to configure parameters of intercepting HTTP and HTTPS requests on a proxy server.

Warning

On each workstation, configure the browser so that HTTP(S) traffic should pass through the proxy server being used (SQUID, Blue Coat). For more information on how to configure this, see the documentation for your browser.

The following ICAP configuration options are possible:

1. For the traffic to be transmitted in "Copy" mode:
    a. In the **luaengined.conf** configuration file, which is located in the `/opt/iw/tm5/etc` directory, in the `Icap` property of the `TransportModes` section, specify a valid FQDN name of the TM server (for example, `tm-server1.local`). The value of the mode should be: `Copy`. You can specify multiple pairs of values: `"Icap": [{"Server": "tm-server1.local", "Mode": "Copy"}, {"Server":"tm-server2.local", "Mode": "Copy"}]`
    b. Save changes in the **luaengined.conf** file.
2. For the traffic to be transmitted irrespective of the verdict:
    a. In the code specified above, set the mode value to `Transparent`.
    b. Save changes in the **luaengined.conf** file.
3. For the traffic to be transmitted in the "Block" mode:
    a. In the code specified above, set the move value to `Normal`.
    b. Save changes in the **luaengined.conf** file.
4. In the **icap.conf** configuration file, which is located in the `/opt/iw/tm5/etc` directory, set the value for `AsyncCheck` parameter of the `Icap` section as follows:
    - `true` – the "Copy" mode
    - `false` – the "Block" mode
5. Save the configuration file.
6. Restart the Traffic Monitor server:
   `iwtm restart`

Warning!

The transport mode configured in the **luaengined.conf** file will apply to SMTP- and HTTP(S) -interceptors. For more flexible configuration, see "Configuring Inline Mode for Several Interceptors".

Configure parameters for intercepting HTTP and HTTPS requests on a proxy server.

Note:

This setting depends on the modification of the proxy server. You can find actual information in the documentation for your proxy server.

If necessary, use recommendations on configuring Blue Coat SG Series (see "Configuring Blue Coat SG Series as an ICAP-client") and SQUID (see "Recommendations on SQUID Configuration").

Configuring Blue Coat SG Series as an ICAP-client

The proxy-server should have using ICAP in Request Mode allowed and parameters of interaction with Traffic Monitor configured. These settings are performed via Web-interface, under administrator user account.

Note:

The configuration procedure described below may vary depending on the proxy server's version and model.

To intercept the HTTPS traffic, it is necessary to implement ssl-inspection (ssl-bump) on the proxy server. For more information, see documentation for your proxy server.

1. Go to the **Configuration** tab.
2. Go to the **External Services ► ICAP** section. Create the **tm** service. Configure the settings of the service:

- **Service URL**: `icap://<TM_server_IP>/reqmod`
  Example: `icap://10.60.0.20/reqmod`.
- **Maximum number of connections:** `10`
- **Connection timeout:** `70`
- Check **This service supports plain ICAP connection**. In Plain ICAP port field, specify **1344**.

> **Warning!**
>
> The value of **Plain ICAP port** field must match the value of `ListenPort` setting in `/opt/iw/tm5/etc/icap.conf` file, Icap section. If another value was set for `ListenPort` setting, you need to adjust it.

- On **ICAP v1.0 Options** panel, configure the following settings:
- **Method supported:** select request modification
- **Send:** Check Authenticated User, Client address and Server address boxes.

1. Go to the **Health Checks ► General** section. Make sure that verification of server status is enabled — **Health Checks** tab displays the addresses:
   `icap.tm`
2. To check availability of all servers listed click **Perform health check** button.

Recommendations on SQUID Configuration

Documentation contains information on configuring SQUID proxy server for MS AD user authentication, SSL interception (ssl-bump) and traffic verification via ICAP.

In this chapter:

- SQUID Installation;
- Configuring ICAP;
- Configuring SSL Interception and Disclosure;
- Configuring User Authentication.

SQUID Installation

Before installing SQUID proxy server, download an RMP package or an archive (that should be then unpacked) from a repository or from CD/DVD.

To install an RMP package of SQUID proxy server, log into the System under `root` and enter the following command:

```
rpm -i squid-3.4.0.2-2.el6.x86_64.rpm
```

If the package is installed successfully, the following information will be displayed:

```
Preparing...        ##################  [100%]
1:squid             ##################  [100%]
```

To access the configuration file, enter:

```
cd /etc/squid/
mcedit squid.conf
```

Configuring ICAP

To configure ICAP, do the following:

1. To configure ICAP, in the **squid.conf** configuration file, add lines for processing ICAP:
   ```
   icap_enable on
   icap_service service_req reqmod_precache bypass=1 icap://10.60.7.7:1344/request
   adaptation_access service_req allow all
   icap_send_client_ip on
   icap_send_client_username on
   ```
2. To configure working on ICAP **UserGate Web Filter** server, in the **squid.conf** configuration file, add the following:
   ```
   icap_enable on
   icap_preview_enable on
   icap_preview_size 4096
   icap_send_client_ip on
   icap_service service_req reqmod_precache bypass=0 icap://10.0.3.10:1344/request
   adaptation_access service_req allow all
   icap_service service_resp respmod_precache bypass=0 icap://10.0.3.10:1344/response
   adaptation_access service_resp allow all http_port 8080 transparent
   ```

   where `10.0.3.10` - is the **UserGate Web Filter** server address.

   > **Warning!**
   >
   > **UserGate Web Filter** server does not support `icap_preview_enable off` mode `.`
   > Working with https traffic is not supported at the moment.

3. Restart **Squid**:
   ```
   sudo service squid3 restart
   ```

Configuring SSL Interception and Disclosure

SSL-Bump mode is being used for HTTPS sessions encrypted content interception. SQUID performs SSL-connection with server and receives its certificate as first intercepted HTTP request is transmitted. After that SQUID uses host name from real, received from server certificate and creates fictitious certificate whereby simulates requested server in interaction with client, wherein proceeding on using SSL connection. Except for HTTPS connections, specified scheme can be used to intercept major HTTP requests.

1. Create catalogue to store SQUID certificates and change its rights so that user **squid** is an owner of its content:
   ```
   cd /etc/squid
   ```

```
mkdir ssl_cert
chown -R squid:squid /etc/squid/ssl_cert/
```

2. Generate root certificate for browser of workstations traffic from which will be intercepted.
3. Move file with extention **.der** to Windows machine and install it as trusted certificate to computer storage:
```
openssl req -new -newkey rsa:1024 -days 720 -nodes -x509 -keyout /etc/squid/ssl_cert/IW.pem -out
/etc/squid/ssl_cert/IW.pem
openssl x509 -in /etc/squid/ssl_cert/IW.pem -outform DER -out /etc/squid/ssl_cert/IW.der
```
4. Create database for substitute certificates and create user **squid** its owner:
```
/usr/lib64/squid/ssl_crtd -c -s /var/lib/ssl_db/
chown -R squid:squid /etc/squid/ssl_cert/
squid -k reconfigure
```
5. In configuration file **squid.conf** Comment out the setting `http_port` and add the following lines:
```
#http_port 3128
http_port 3128 ssl-bump generate-host-certificates=on
dynamic_cert_mem_cache_size=4MB cert=/etc/squid/ssl_cert/IW.pem
sslproxy_flags DONT_VERIFY_PEER
sslproxy_cert_error allow all
sslproxy_cert_error allow all
ssl_bump client-first all
ssl_bump client-first all
ssl_bump none all
sslcrtd_program /usr/lib64/squid/ssl_crtd -s /var/lib/ssl_db -M 4MB
```
6. Check configuration and restart server **squid**:
```
squid -k reconfigure
service squid restart
```
7. Configure browser to use new proxy server.

Configuring User Authentication

SQUID authentication service is intended to decode HTTP `Authorization` header and transmit decoded information to a third-party module. User access is being provided in case information is correct. When information is incorrect or missing, SQUID returns 407 error to the client. Thus, all the work on user authentication is being performed by third-party modules. Location of these modules depends on SQUID distribution. For example, in Debian+SQUID3 they are located in catalogue: `/usr/lib/squid3` , in Red Hat they are likely to be located in `/usr/lib/squid` . To see what authentication methods, third-part modules placement and other parameters are supported by SQUID, use command `squid3 -v` :

```
squid -v
Squid Cache: Version 3.4.0.2
configure options: '--host=x86_64-redhat-linux-gnu' '--build=x86_64-redhat-linux-gnu' '--program-prefix='
'--prefix=/usr' '--exec-prefix=/usr' '--bindir=/usr/bin' '--sbindir=/usr/sbin'
'--sysconfdir=/etc' '--datadir=/usr/share'
'--includedir=/usr/include' '--libdir=/usr/lib64' '--libexecdir=/usr/libexec'
'--sharedstatedir=/var/lib'
'--mandir=/usr/share/man' '--infodir=/usr/share/info' '--exec_prefix=/usr' '--libexecdir=/usr/lib64/squid'
'--localstatedir=/var' '--datadir=/usr/share/squid' '--sysconfdir=/etc/squid'
'--with-logdir= of $ (localstatedir)/log/squid' '--with-pidfile= of $
```

```
(localstatedir)/run/squid.pid'
'--disable-dependency-tracking' '--enable-eui' '--enable-follow-x-forwarded-
for' '--enable-auth'
'--The enable-auth-basic=DB, the LDAP, MSNT, MSNT-multi-domain, NCSA, NIS, PAM,
the POP3, the RADIUS, SASL, SMB, getp
wnam '--enable-auth-ntlm=smb_lm,fake' enable-auth-digest=file, LDAP,
eDirectory
'--enable-auth-negotiate=kerberos,wrapper'
'--enable-external-acl-helpers=wbinfo_group,kerberos_ldap_group,AD_group' '--
enable-cache-digests'
'--enable-cachemgr-hostname=localhost' '--enable-delay-pools' '--enable-epoll'
'--enable-icap-client'
'--enable-ident-lookups' '--enable-linux-netfilter' '--enable-removal-
policies=heap,lru' '--enable-snmp'
'--enable-ssl' '--enable-ssl-crtd' '--enable-storeio=aufs,diskd,ufs,rock' '--
enable-wccpv2' '--enable-esi'
'--with-aio' '--with-default-user=squid' '--with-filedescriptors=16384' '--
with-dl' '--with-openssl' '--with-pthreads'
'--disable-arch-native' 'build_alias=x86_64-redhat-linux-gnu'
'host_alias=x86_64-redhat-linux-gnu'
'CFLAGS= is O2 -g' 'CXXFLAGS= is O2 -g -fPIC'
'PKG_CONFIG_PATH=/usr/lib64/pkgconfig:/usr/share/pkgconfig'
```

Third-party modules interaction and settings description is being performed with the help of `auth_param` param eter. Client will alternately attempt to use authentication schemes in the order they have been set in **squid.conf**. Newly configured authentication scheme enters into force after squid service restart. To change existing schemes without service restart, use `squid3 -k reconfigure` or `/etc/init.d/squid3 reload` commands.

To control internet access, create acl, which will use configured authentication module. To do this, acl in `selection_type` field must have `proxy_auth` , `proxy_auth_regex` or `external` value using `%LOGIN` variable. Set access permission in `http_access` parameter for specified acl. Below the format is listed, which specifies the type of used authentication (format of using `auth_param` parameter):

```
auth_param authentication_scheme schem_parameters [parameters_value]
```

Recommendations on Cisco IronPort Configuration

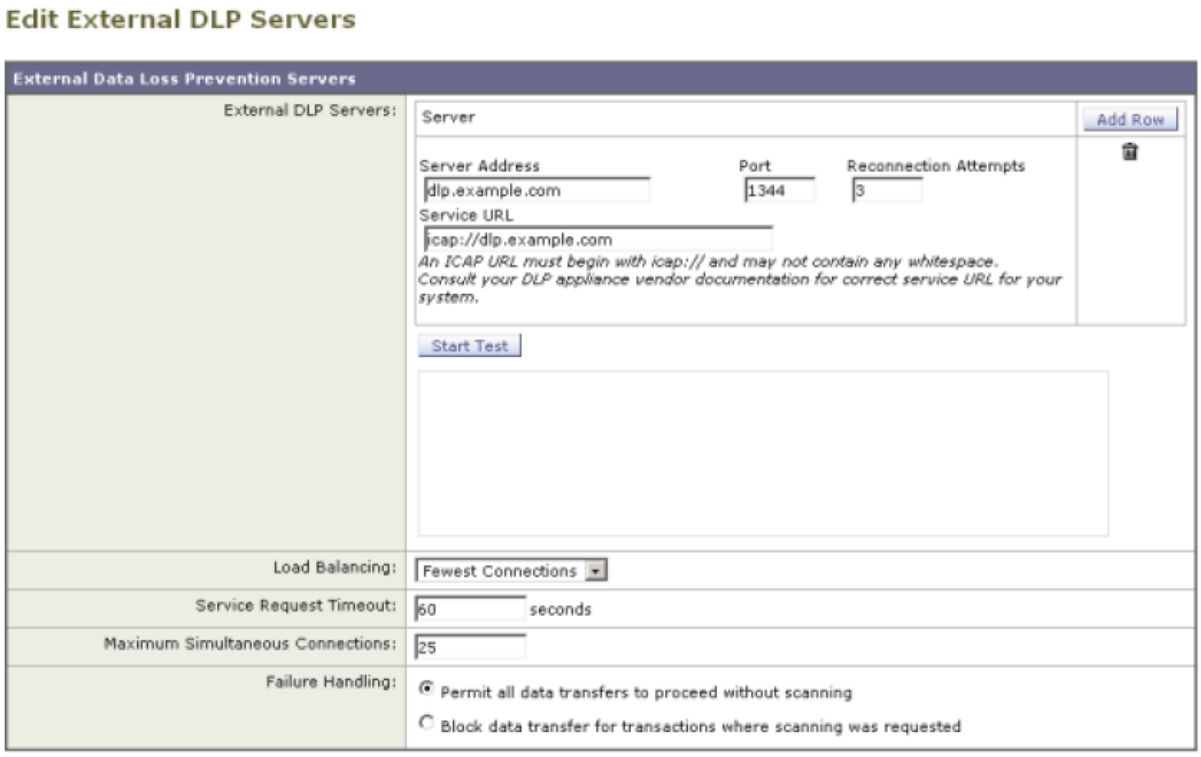
To configure Cisco IronPort as an ICAP-client:

- Add Traffic Monitor as an external DLP server
- Create and configure external DLP policy

To add external DLP server:

1. In browser open Cisco IronPort management console:
   `https://<Cisco IronPort hostname or IP-address>:8443`
2. Go to **Network > External DLP Servers** tab.

3. In the opened windows press **Edit Settings** button.



4. Fill in the fields in accordance with the table:

Parameter	**Value**
External DLP Servers	The following fields concerning external server of outgoing traffic filtering should be filled in: • **Server address and port**. Domain machine name and port used by Traffic Monitor ICAP-server • **Reconnection attempts**. Number of reconnection attempts with Traffic Monitor ICAP-server. Recommended value is `5`. • **DLP Service URL.** Traffic Monitor ICAP-server URL. URL should start with `icap://`. Example: `icap://FQDN:1344/reqmod`
Load Balancing	Load balancing. In case one Traffic Monitor ICAP-server is used for traffic filtering, `Fewest Connections` value should be specified `.`
Service Request Timeout	Timeout used for Cisco IronPort to wait for reply from Traffic Monitor ICAP-server. Default value is `60 seconds`.
Maximum Simultaneous Connections	Maximum number of simultaneous connections. Do not change default `25` value.
Failure Handling	Parameter, which allows to set Cisco IronPort behavior in case Traffic Monitor ICAP-server is unavailable.

Parameter	Value
	Recommended value is Permit all data transfers to proceed without scanning.

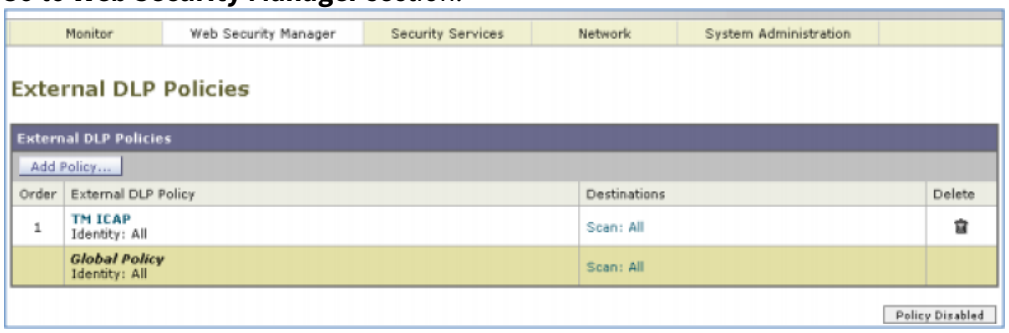
5. Press **Add Row** to create additional ICAP-server.
6. Press **Submit** to save changes.
7. Press **Start Test** to check connection with ICAP-server.

To create external DLP policy:

1. Go to **Web Security Manager** section.
2. Press **Add Policy** button.
3. Type in the name of the policy in **Policy Name** field (for example, TM ICAP)
4. In **Identities and Users** section choose users or user group, controlled by this policy.
5. Press **Advanced** and choose HTTP in **Protocols** field.
6. Save changes.

To configure external DLP policy:

1. Go to **Web Security Manager** section:



2. Choose policy in **Destinations** column.
3. In **Edit Destination Settings** drop-down list choose **Define Destinations Scanning Custom Settings** value.
4. In **Destinations to scan** choose **Scan All Uploads**.
5. Press **Submit** to save the changes.

> **Note:**
>
> Cisco IronPort can as well analyse HTTPS-traffic. In this case certificate replacement takes place. HTTPS-traffic is being decrypted and processed as HTTP. Interaction between Cisco IronPort and Traffic Monitor does not change. Find additional information on HTTPS decryption in Cisco IronPort documentation (see chapter «Decryption Policies»).

Recommendations on configuring McAfee Web Gateway

To configure the integration of McAfee Web Gateway with Infowatch Traffic Monitor for monitoring HTTP traffic using ICAP:

1. Make sure that **iw_icap** service is running on the Traffic Monitor server:
   `iwtm status`

2. In the status list, find the line:
   ```
   Service iw_icap.service is active (running); enabled state: loaded (enabled)
   ```
3. Log into the McAfee Web Gateway web console.
4. Go to the **Settings** tab of the **Policy** section.
5. Take the following steps to create an ICAP REQMOD client:
   a. Right-click **ICAP Client** and click **Add**.
   b. Enter the name, for example, *ICAP-REQMOD-Client.*
   c. On the **Settings for** panel, select **ICAP Client**.
   d. On the **ICAP Service** panel, click **Add**.
   e. Enter the name and click **OK & Edit**.
   f. Click **+Add ICAP Server**, then enter an IP address and a port of the McAfee DLP Prevent device.
   g. Click **OK** three times.
6. Add a set of rules:
   a. Go to the **Rule Sets** tab.
   b. Select **Add** -> **Rule Set from Library**.
   c. Select the **ICAP Client** set and click **OK**.
7. Configure REQMOD parameters:
   a. On the **Rule Sets** tab, expand the **ICAP Client** rule set and select **ReqMod**.
   b. Select **Call ReqMOd Server** and click **Edit**.
   c. Select the **Rule Criteria** stage.
   d. Select **If the following criteria is matched.**
   e. Select a criterion and click **Edit**.
   f. From the **Settings** drop-down list, select the ICAP REQMOD client you have created.
   g. Click **OK**, then click **Finish**.
8. Enable the rule:
   a. On the **Rule Sets** tab, select the **ICAP Client** rule.
   b. Select **Enable**.
9. Click **Save settings**.

Recommendation on configuring Fortinet FortiGate

FortiGate as ICAP client makes it possible to transfer HTTP/HTTPS to ICAP server toTraffic Monitor. To configure FortiGate operation with ICAP server you should do the following:

Step 1. Adding new ICAP server:

1. In the side bar go to section **Security Profiles > ICAP Servers**.
2. Click **Create New**.
3. In the **Name** field, enter a name for the ICAP server, for example, `tm`.
4. Select the IP Version you use. By default: `Ipv4`.
5. In the **IP Address** field, enter the IP address of Traffic Monitor ICAP server, for example `10.60.20.30`.
6. In the **Port** field, enter a new port number if required. The default value is `1344`.
7. Click **OK**.

> **Warning!**
>
> The **Port** field value should match the value of `ListenPort` parameter in `/opt/iw/tm5/etc/icap.conf` file, Icap section. In case `ListenPort` parameter has a different value, you should correct it.

The maximum number of concurrent connections to ICAP server can be configured in the command line interface. The default setting is 100 connections. For example:

```
config icap server
    edit "tm"
        set max-connections 200
end
```

Step 2. Creating an ICAP profile:

1. Go to **Security Profiles > ICAP**.
2. Click **Create New**.
3. In the **Name** field, enter a name for the ICAP profile, such as `prof-tm`.
4. Enable **Request Processing** and then set the following:
   a. **Server** - Select the ICAP server. In this example, select `tm`
   b. **Path** - The path to the processing component on the server to be selected: `icap://10.60.20.30:1344/reqmod` (or `icap://10.60.20.30:1344/request)`
   c. **On Failure** - Select
   i. **Error** to block the request. If the message cannot be processed, it will not be blocked.
   ii. **Bypass** to miss thy process.
5. **Response Processing** is not required to enable.
6. Enable **Streaming Media Bypass** to not offload streaming media to the ICAP server.
7. Click **OK**.

Step 3. Adding ICAP profile to a firewall policy:

1. Go to **Policy & Objects > IPv4 Policy**.
2. Click **Create New**.
3. Configure the policy as needed to apply to the required traffic.
4. Set **Inspection Mode** to **Proxy-based**.
5. Under **Security Profiles**, enable **ICAP** and select the ICAP server as `prof-tm`.
6. Click **OK**.

Recommendations on configuring UserGate

As an ICAP-client, UserGate allows you to transmit HTTP/HTTPS traffic, SMTP and POP3 mail traffic to Traffic Monitor ICAP server. To set up interaction between UserGate and ICAP server:

1. Create an ICAP-server:
   i. Go to **Security policies → ICAP servers**.
   ii. Click **Add** and create one or more ICAP servers by filling in the fields:

Field	Description
Name	ICAP server name
Description	ICAP server description (optional)
Address	IP address of the ICAP server
Port	ICAP server TCP port, the default value is 1344

Field	Description
Message maximum size	Defines maximum size of a message (in KB) to be transmitted to ICAP server. The size should be greater than 0. **Example:** `35840`
ICAP server accessibility checking period	Sets the time in seconds after which UserGate sends OPTIONS request to the ICAP server to check if the server is available. **Example:** `60`
Skip if error occurs	If the option is enabled, UserGate does not send data to the ICAP server when the server is unavailable (does not respond to OPTIONS request). Enabling this option is not needed
Reqmod path	You can enable Reqmod mode by selecting the **Enable** flag. Then specify **path on ICAP server to work in Reqmod mode** in the format: `icap://icap-server:port/path` - specifying the full URI for the `reqmod` mode **Example**: `icap://FQDN:1344/reqmod`
Respmod path	Enabling the Respmod mode is not required
Respond with username	Set the **Enable** flag to enable sending user names to the ICAP server. Then specify **Headline** value that will be used for sending user names to the ICAP server. The default value is `X-Authenticated-User` If necessary, select the **Encode in base64** option to encode user names in base64. This can be needed if usernames contain characters of national alphabets
Respond with IP address	If the **Enable** flag is on, then sending user's IP address to the ICAP server is enabled. Then specify **Heading** that will be used for sending user's IP address to the ICAP server. The default value is `X-Client-Ip` Enabling this option is not needed
Respond with MAC address	If the **Enable** flag is on, then sending user's MAC address to the ICAP-server is enabled. Then specify **Heading** that will be used for sending user's MAC address to the ICAP-server. The default headline is `X-Client-Mac` Enabling this option is not needed

2. Create a balancing rule for ICAP servers (optional):
    a. Go to **Network policy** → **Load balancing**.
    b. Select **Add** → **ICAP Balancer** and fill in the fields:

Field	Description
Enable/Disable	Enables or disables the rule
Name	Rule name
Description	Rule description
ICAP servers	List of ICAP servers created in the previous step between which the load will be distributed

3. Create an ICAP rule:
    a. Go to **Security policies -> ICAP Rules**.
    b. Click **Add** and fill in the fields:

Field	Description
Enable/Disable	Enables or disables the rule
Name	Rule name
Description	Rule description
Operation	Possible options: • **Skip** - not send data to the ICAP server. By creating this rule, administrator can explicitly exclude specific kind of traffic from transmission to the ICAP server; • **Transmit** - send data to the ICAP server and wait for response. This is a standard operating mode for ICAP servers; • **Transmit and ignore** - send data to the ICAP server and ignore its response. In this case, no matter what the ICAP server responce would be, data sent to user will not be modified, but the ICAP server will receive a full copy of user's traffic.
ICAP servers	The list of ICAP servers created at the previous step between which the load will be distributed
Source	Traffic source zone and/or list of traffic source IP addresses
Users	The list of users and groups, the rule applies to. The following user types can be used: **Any**, **Unknown**, **Known**. To apply the rules to specific users or to the **Known** type, set up user identification
Destination	Traffic destination zone and/or lists of traffic destination IP addresses

Field	Description
MIME-type content	MIME-type lists. There is a possibility to manage video and audio content, images, executables, and other types. The administrator can also create custom groups of MIME-types
Categories	Lists of UserGate URL filtering categories
URL	URL lists
HTTP-method	A method used in HTTP requests. As a rule, POST or GET method is used
Service	Possible options: • **HTTP** - web traffic • **SMTP** - mail traffic. Emails will be sent to the ICAP server as a corresponding MIME type • **POP3** - mail traffic. Emails will be sent to the ICAP server as a corresponding MIME type

Warning!

ICAP rules are applied from top to bottom in the order they are listed in the console. Only the first rule for which the conditions defined in the rule are matched, is applied. This means that specific rules should be placed above general ones. Use **Up**/**Down** arrow buttons to change the order of applying rules.

Disabling ICAP

In case HTTP/HTTPS requests interception over ICAP is no longer required, you can disable the **iw_icap** module
To disable iw_icap module:

1. Stop Traffic Monitor processes:
   `iwtm stop`
2. Disable autostart for **iw_icap** process:
   `iwtm disable iw_icap`
3. Start Traffic Monitor processes:
   `iwtm start`
4. Check the state of Traffic Monitor processes:
   `iwtm status`

After you have disabled the module, restore original settings of the proxy server.

4.5 Configuring Traffic Interception

The System can intercept data transferred via the following protocols:

Protocol	Description
SMTP (Simple Mail Transfer Protocol)	Mail protocol, which is used by mail clients for sending email messages to the server. It works in tandem with the POP3 protocol.
POP3 (Post Office Protocol, version 3)	Mail protocol, which is used by a mail client to receive incoming email messages from the server. For sending emails, the SMTP protocol is used.
HTTP (HyperText Transfer Protocol)	Data transfer protocol based on «client-server» technology, which is used to receive text information, stream video and sound from the website. You can realize interception of all transmitted data on the Internet (visited pages, portals, received and sent emails and messages).
HTTP(S)	HTTP protocol extension, which supports encryption. Data, transmitted over HTTP, are packed into cryptographic protocol, thereby providing data protection.
OSCAR	Instant and offline text messaging protocol, used by ICQ, AIM, Miranda, QIP programs. You can perform text messages interception, transmitted via these instant messaging programs. **Note:** ICQ traffic will be intercepted if a specific server that supports OSCAR protocol is used for ICQ.
NRPC	Mail Transfer Protocol in IBM Notes.
IMAP4 (Internet Mail Access Protocol)	Protocol of access to email. In accordance with POP3 protocol, it is used for work with emails but provides more broad work capabilities to work with a mailbox. For example, access to processing events, located on the server, as if they were located on local receiver computer, without the necessity of permanent file transfer with content from server and back. SMTP protocol is used to send messages. You can perform incoming emails interception, transmitted by email clients.

Depending on intercepted traffic type and the interception method, the System can be configured as follows:

- Configuring SMTP Traffic Interception
- Configuring POP3 Traffic Interception
- Configuring HTTP Traffic Interception
- Configuring HTTPS Traffic Interception
- Configuring NRPC Traffic Interception
- Configuring IMAP4 Traffic Interception
- Receiving Objects Intercepted by InfoWatch Device Monitor

Important!

It is assumed, that System is already installed before configuration starts.

For more information on installation for each deployment scheme, see the document "*InfoWatch Traffic Monitor. Installation Guide*".

Important!

After you configure traffic interception, you should configure object analysis parameters (see document "*InfoWatch Traffic Monitor. User Guide*").

Important!

On DM Agents installed on Astra Linux OS, the System only intercepts mail traffic sent via SMTP, POP3, and IMAP channels.

4.5.1 Configuring SMTP Traffic Interception

The section contains information on how to configure interception of SMTP traffic:

- SPAN, or Port Mirroring;
- Receiving Copies from Mail Server;
- Inline Mode;
- Configuring Mail Servers for SMTP Traffic Interception.

You can find a detailed description of SMTP traffic interception scheme in the "SMTP Traffic Interception Scheme" article.

SPAN, or Port Mirroring

1. Configure server (servers) for working with SPAN, or Port Mirroring (see "Configuring Server to Work with SPAN, or Port Mirroring Technology").
2. Enable the autorun option for `iw_proxy_smtp` process which is responsible for intercepting SMTP traffic:
   `iwtm enable iw_proxy_smtp`
3. Make sure, that autostart of all processes, which participate in mail interception and analysis, is enabled:
   iw_sniffer, **iw_proxy_smtp**, **iw_messed**, **iw_warpd**, **iw_cas**, **iw_x2db** (see "Enabling and disabling autorun processes").
4. To avoid duplication of intercepted data, disable **iw_smtpd** process (see "Enabling and disabling autorun processes").

Receiving Copies from Mail Server

A rule for sending a shadow copy (BCC) of each sent message should be configured on the corporate mail server. The copy is sent to a nonexistent mail address with a domain whose IP-address corresponds to Traffic Monitor Server. This functionality is supported by most mail servers.

Integration of Traffic Monitor Server with Postfix mail server is performed the following way. Postfix mail server, which is embedded in the Traffic Monitor system, receives copies of messages sent via SMTP. Copies are delivered to port **25** and transmitted to the **iw_smtpd** process on port **2025**. An event for each message is created in the System. Information about those events is then placed to the database.

To configure receiving copies from a mail server:

1. Make sure, that **iw_smtpd** process autostart is enabled (see "Process Autorun").
2. On the mail server, configure forwarding of blind copies of SMTP messages to Traffic Monitor Server. Find a setup example for Microsoft Exchange Server 2007 and 2010 in "Forwarding Blind Carbon Copies with Microsoft Exchange Server 2007 and 2010".
3. Configure the embedded Postfix server (see "Configuring Postfix Server embedded in Traffic Monitor system").
4. Make sure, that autostart of all processes that which participate in traffic interception and analysis is enabled:
   postfix, iw_smtpd, iw_messed, iw_warpd, iw_luaengined, iw_cas, iw_pas, iw_x2x, iw_x2db, iw_tech-tools (see "Process Autorun").
5. Make sure that the value of the `"TransportModes"/" Sm tp"` parameter in the **/opt/iw/tm5/etc/luaengined.conf** is `Copy` or empty.

All emails received according to the rule of shadow copy or journal rule will contain a permanent recipient, for example " `iwtm-mon@local` ". To remove it, configure the `SmtpTmBccList` parameter in the **luaengined.conf** file.

Warning!

The chosen mode will apply to SMTP and HTTP(S) interceptors. For more flexible configuration, see "Configuring Inline Mode for Several Interceptors".

Important!

If MS Exchange uses a journal rule, then, for correct processing of such emails, enable the corresponding option in Traffic Monitor. For this, in the `messed.conf` configuration file, specify:

```
"ExchangeJournalReports": true,
```

To enable the option, reload the configuration, or restart the service.

Inline Mode

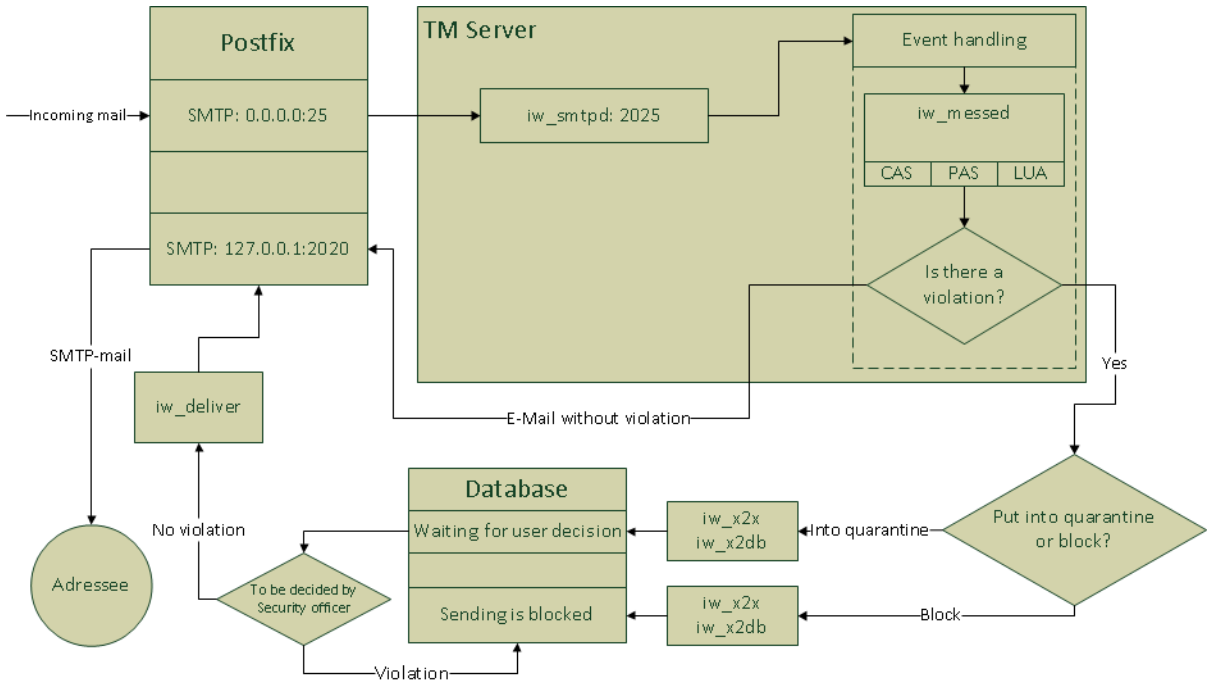
Traffic Monitor Server is used as an intermediate mail server. It includes Postfix mail server.

Integration of Traffic Monitor mail server with a mail server is implemented in the following way. Postfix mail server which is embedded in the Traffic Monitor system receives incoming SMTP messages via port **25**. SMTP messages are then transmitted to the **iw_smtpd** process via port **2025**. For each message, the System creates an event.

In the **Inline** mode, SMTP traffic is analysed by Traffic Monitor and:

- if there is no violation, SMTP traffic is sent to the recepient or to the next relay server in the company's mail system by means of the embedded Postfix server. Delivery works as follows: the **iw_messed** process sends emails to port **2020** of the Postfix mail server. The Postfix mail server either delivers emails to recipients directly or transmits them to the next mail relay server;

- if there is a violation and policies contain the *Quarantine* verdict, then the System sets the *Quarantine* verdict to the email. The email will be delivered only if the Security Officer sets the *No violation* user decision and allows the delivery in the Management Console (see the document "InfoWatch Traffic Monitor. User's Guide"). Delivery works as follows: the **iw_deliver** process transmits emails to port **2020** of the Postfix server that is embedded in the System. The Postfix mail server either delivers emails to recipients directly or transmits them to the next mail relay server;
- if there is a violation and policies contain the *Block* verdict, then the System sets the *Block* verdict to the email. In this case, the email will not be delivered and the event will be placed to the Database.



To configure the inline mode:

1. On the corporate mail server, configure Traffic Monitor as a relay server.

   > **Note:**
   >
   > If the company uses more than one mail server each server should be configured to send messages to the embedded Postfix server.
   >
   > The configuration process may differ depending on the mail server which is used in the company.

   As a result, all mail traffic sent from a corporate mail server is transmitted to Traffic Monitor Server.
2. Make sure that autostart for the **iw_smtpd** and **iw_deliver** processes is enabled (see "Process Autorun").
3. Configure Postfix server embedded in the System (see "Configuring Postfix Server in Traffic Monitor system").
4. Stop **iw_luaengined** process:
   `iwtm stop iw_luaengined`
5. Open the file **luaengined.conf**, located in `/opt/iw/tm5/etc` to edit;

6. In Smtp property of `TransportModes` section specify TM server name with interceptor (for example, `tm-server1`) and mode value `Normal` (Block mode):
`"Smtp": [{"Server": "tm-server1", "Mode": "Normal"}]`

> **Important!**
>
> In case of distributed installation, the mode is defined by the local **iw_luaengined** process or the one located on another node. That is why, on each node in `/opt/iw/tm5/etc/scripts/iwssid.lua` file in `Smtp` property of `TransportModes` section you need to specify several pairs of the valid addresses of TM servers and the required modes. For example:
>
> `"Smtp": [{"Server": "tm-server1", "Mode": "Copy"}, {"Server":"tm1.org.ru", "Mode": "Normal"}]`
>
> **Important!** The file **iwssid.lua** should be the same on all the nodes.

7. Save the file.
8. Restart the System:
`iwtm restart`

For the traffic to be transmitted in spite of a verdict given:

1. Set the `Transparent` value for the `TransportMode` parameter within the code above at step 6.
2. Save the file.
3. Restart the System:
`iwtm restart`

> **Warning!**
>
> The selected mode will be applied to the SMTP interceptor only. For more flexible configuration, see "Configuring Inline Mode for Server Interceptors".

Delivering SMTP emails with processing errors, sent in "inline mode"

SMTP emails processing of which caused errors, are to be put into the error queues: **queue/x2x-errors** и **queue/errors**. Delivering SMTP emails (including the ones with "Quarantine verdict" assigned) is performed by **iw_rammer** daemon from error queues. After that the queues are to be refined. Sender and addressee addresses (if sufficient) to be taken from .xml file. Otherwise, the email cannot be delivered. When sending e-mail to Security officer, adressee and recipient adresses are specified within the configuration file **opt/iw/tm5/etc/rammer.conf**. The enclosed mail contains object .xml and .dat files.E-mail sending to the addressee as well as notification for Security officer is performed via Postfix mail server (port **2020**). Notification is to be delivered to security officer via event email and the sender is specified from initial message. Connection data (address and port), as well as the addressee and sender addresses, are set within the **rammer.conf** configuration file (for details, see the document "*Configuration Files Guide*", the "rammer.conf" file).

SMTP email is to be delivered when meeting the following terms:

1. if it wasn't delivered in a regular mode (by daemon **iw_messed**);
2. If `"Block"` mode is installed when processing the e-mail and when the e-mail got into error queue;
3. if the email wasn't qualified as the "Blocked" one.

Mandatory delivery measure is **opt/iw/tm5/rammer-tool** utility. To view the list of available settings, enter in the command line:

```
/opt/iw/tm5/bin/rammer_tool --help
```

Configuring Mail Servers for SMTP Traffic Interception

Chapter contains information on configuring mail servers to intercept SMTP traffic with Traffic Monitor:

- Forwarding Blind Carbon Copies with Microsoft Exchange Server 2007 and 2010;
- Configuring Blind Carbon Copies with ZCS Zimbra;
- Forwarding BCC with MDaemon;
- Configuring Postfix server in Traffic Monitor System.

Forwarding Blind Carbon Copies with Microsoft Exchange Server 2007 and 2010

To enable sending shadow copies of SMTP messages, a connector for sending messages to Traffic Monitor Server should be created and configured in the Exchange Management Console. For this, perform the steps below.

Creating SMTP connector that will send message copies to Traffic Monitor Server

1. Choose **Organization Configuration –> Hub Transport** node and press **New Send Connector**.
2. In the window of Connector creation wizard, type in connector name and choose the **Custom** type from the drop-down list. Click **Next**.
3. At the **Address space** step, create a new address space to transmit traffic. To do this, press **Add**. In the dialog box that opens, specify address space parameters and press **OK**. Then click **Next**.
4. At the **Network Settings** step, choose **Route mail through the following smart hosts** and press **Add**. In the opened dialog box, specify the IP address of the Traffic Monitor server, to which mail will be transmitted and press **OK**. Then click **Next**.
5. At the **Configure smart host authentication settings** step, choose **None**: by default Postfix does not require authorization on the Traffic Monitor Server. Click **Next**.
6. At the **Source Server** step, choose a server, the connector will be located on. Click **Next**.
7. At the **New Connector** step make sure, that connector parameters have been specified correctly, and click **New**. Wait for the creation process to be completed and click **Finish**.

The window of the Connector creation wizard will be closed.

Creating contact to which message copies will be sent

1. Choose **Recipient Configuration –> Mail Contact** node and press **New Mail Contact**.
2. In the window of Contact creation wizard, choose **Mail Contact** and click **Next**.
3. At the **Configure smart host authentication settings** step, type in information about the contact.

   In the **External e-mail address** line, press **Edit**. In the opened **SMTP Address** dialog box, type in mail address, which will receive message copies.

   > **Warning!**
   >
   > The mail contact domain should match the connector domain.

4. At the **New Mail Contact** step, make sure that connector parameters are specified correctly, and click **New**. Wait for process completion and click **Finish**.

The window of Contact creation wizard will be closed.

Warning!

For the System to function properly, it is necessary to have a Linux user with the same domain name as a new contact.

For example, if *user@company.com* contact is created, it is necessary that *user* should be among Linux clients.

To add a user on OS Linux, issue the following command under root:

```
useradd <username>
```

where <username> is a required user name. In the example above, issue the following command:

```
useradd user
```

Creating a transport rule for copying messages

1. Choose **Organization Configuration -> Hub Transport** node and press  **New Transport Rule**.
2. In the Transport rule creation wizard, type in a name of the rule being created and set a flag in the **Enable Rule** field. Click **Next**.
3. At the **Conditions**, select the **from users inside or outside the organization** checkbox. As a condition parameter, choose **Inside**. Click **Next**.
4. At the **Actions** step, select the **Blind carbon copy (Bcc) the message to address** checkbox. In the dialog box that opens, click the link with the **address** parameter and in the **Select Recipient** window, choose created contact. Click **OK**. In the wizard window, click **Next**.
5. You can configure exceptions at the **Exceptions** step if necessary. For example, for the messages from particular users not to be copied, select the **except when the message is from people** checkbox and choose desired users in the exception parameters. Click **Next**.
6. At the **Create Rule** step, make sure, that parameters have been specified correctly, and press **New**. Wait for the creation process to be completed and click **Finish**.

Blocking mail delivery when Traffic Monitor Server is not available

1. Choose **Organization Configuration -> Hub Transport** node and press  **New remote Domain**.
2. Specify the same name as the domain name used in item 3 step 2 of this chapter (creating contact, to which message copies will be sent).
3. Right-click on the new domain and choose **Properties** from the context menu.
4. In the window that opens, go to the **Message Format** tab.
5. Deselect the **Allow non-delivery reports** checkbox.
6. Click **OK**.

Important!

If MS Exchange uses a journal rule, then, for the correct processing of such emails, enable the corresponding option in Traffic Monitor. For this, in the `messed.conf` configuration file, specify:

```
"ExchangeJournalReports": true,
```

To make the option active, reload the configuration, or restart the service.

Configuring Blind Carbon Copies with ZCS Zimbra

> **Warning!**
>
> All commands should be executed under **zimbra** user.

Configuring transport table

Use configuration block for Zimbra 5.0.9 or higher with the following string:

```
zmlocalconfig -e postfix_transport_maps="hash:/opt/zimbra/postfix/conf/
transportfile proxy:ldap:/opt/zimbra/conf/ldap-transport.cf"
```

> **Warning!**
>
> This command should be executed using **zmlocalconfig**. Editing **main.cf** will not be sufficient in the situation.

1. Check the existing transport table:
   `zmlocalconfig grep -i postfix_transport_maps`
   Get the command output of the following form:
   `postfix_transport_maps = proxy:ldap:/opt/zimbra/conf/ldap-transport.cf`
2. Create transport file:
   `mcedit /opt/zimbra/postfix/conf/infowatch`
3. Add the following line to file:
   `dlp.iw :[192.168.0.144]`
4. Check rights (**zimbra** should be owner of the group):
   `ll /opt/zimbra/postfix/conf/infowatch`
   `chown zimbra:zimbra /opt/zimbra/postfix/conf/infowatch`
5. Convert transport file to DB:
   `postmap /opt/zimbra/postfix/conf/infowatch`
6. Add transport file before the default file:
   `zmlocalconfig -e postfix_transport_maps="hash:/opt/zimbra/postfix/conf/infowatch proxy:ldap:/opt/zimbra/conf/ldap-transport.cf"`
7. Make sure, that relay_domains parameter of **main.cf** file contains all domains processed by server:
   `mcedit /opt/zimbra/postfix/conf/main.cf`
   Find or create line:
   `relay_domains = mydomain.com, mydomain.org, dlp.iw`

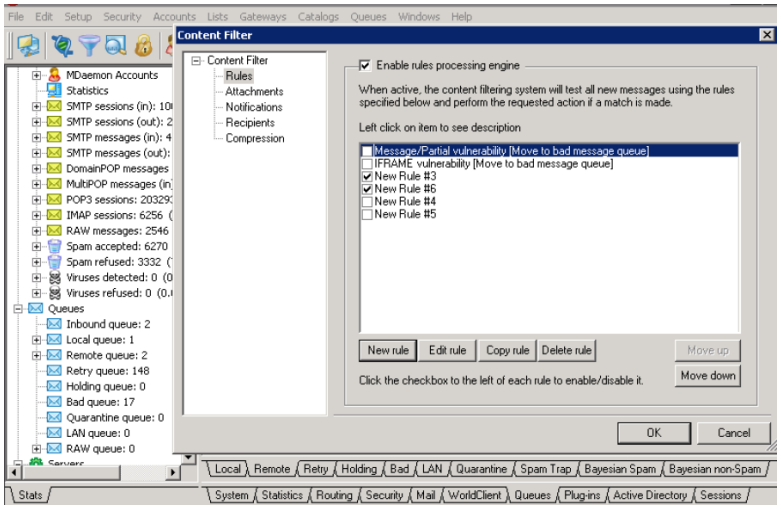
Configuring BCC

1. Add the following line to **/opt/zimbra/postfix/conf/main.cf** file:
   `/opt/zimbra/postfix/conf/main.cf`
2. Reboot Zimbra:
   `zmcontrol restart`

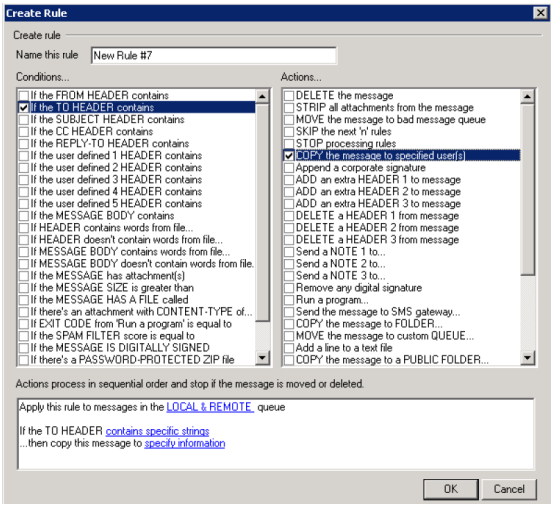
Forwarding BCC with MDaemon

In MDaemon mail client there is **Content Filter** option, which can be used to configure incoming/outgoing mail filtering.

1. Open MDaemon and go to **Security > Content Filter** tab.
2. Go to **Rules** tab. Press **New rule** button:



3. In the left column choose action condition. In the right column choose corresponding action:



4. Use blue sections to add values to rules.
5. Click **Add** and **OK**.

Configuring Postfix Server in Traffic Monitor

Depending on the System deployment scheme and on how the Traffic Monitor server is installed (on the same computer with the database or on different computers), you may need to configure the built-in Postfix server:

System deployment method		Configuring Postfix
SMTP traffic is delivered by the corporate mail server. Traffic Monitor receives only a copy of SMTP traffic. We recommend configuring Postfix for the traffic copy to be received properly	TM server is installed separately from the database	Mandatory
	All components are installed on the same server	Performed by default

System deployment method		Configuring Postfix
Traffic Monitor intercepts and delivers SMTP traffic by means of integration with Postfix	TM server is installed separately from the database	Mandatory
	All components are installed on the same server	Performed by default
The system receives a copy of SMTP traffic via Sniffer		It is not required
Interception of SMTP traffic is not required (for example, Traffic Monitor is used only as Sniffer)		It is not required

For proper interaction between InfoWatch Traffic Monitor and built-in Postfix mail server, make the following changes to **/etc/postfix/main.cf** and **/etc/postfix/master.cf** configuration files:

1. Enter the system under **root** user:
   `su - root`
2. In the **main.cf** file, set the value for the `inet_interfaces` parameter as recommended on the Postfix web page: http://www.postfix.org/postconf.5.html. In most cases, you should just specify the parameter value: `inet_interfaces = all`
3. In the **main.cf** file, set the value for the `message_size_limit` parameter as recommended on the Postfix web page: http://www.postfix.org/postconf.5.html. The default value of the parameter is as follows: `message_size_limit = 50000000`
4. If InfoWatch Traffic Monitor participates in delivering SMTP traffic (see "Inline"):

- in the **main.cf** file, configure `relayhost` parameter. As its value, enter the IP address of the corporate mail server to which SMTP emails will be sent after analysis in Traffic Monitor and a password to access the mail server. For example:
  `relayhost = [smtp.organization.ru]:port`
- edit the **master.cf** file by writing the following lines to the end of the file:

> **Warning!**
>
> Lines that specify the service option must begin with space. For example: " `-o <option specification>` "

```
127.0.0.1:2020   inet  n   -   n  -   21   smtpd
     -o content_filter=
     -o local_recipient_maps=
     -o relay_recipient_maps=
     -o smtpd_restriction_classes=
     -o smtpd_client_restrictions=
     -o smtpd_helo_restrictions=
     -o smtpd_sender_restrictions=
     -o mynetworks=127.0.0.0/8
     -o strict_rfc821_envelopes=yes
     -o smtpd_error_sleep_time=0
     -o smtpd_soft_error_limit=1001
```

```
    -o smtpd_hard_error_limit=1000
    -o myhostname=<fully_qualified_domain_name_of_the_server>
```

- In the **main.cf** file, check that the `mynetworks` parameter contains the correct name of the subnetwork where mail servers are located.
- In the **master.cf** file, add the following line to enable sending mail to TM for check:
  `smtp inet n - n - - smtpd -o content_filter=smtp:127.0.0.1:2025`

> **Note:**
>
> When the System is installed with installer, this setting is installed automatically.

- Check that the syntax in configuration files is correct:
  `postfix check`
- Restart Postfix:
  `systemctl restart postfix`
- Check availability of Postfix via port **25** with the following command in the command line:
  `telnet <TM_ip> 25`
  where `<TM_ip>` - IP address of Traffic Monitor server on which Postfix has been configured.
  In response to this command, the command line should display the following message:
  `Connected to mail.server.com`

> **Note:**
>
> If Telnet client is not installed, you can install it as MS Windows 2008-2012 component or use PuTTY application instead.

If you cannot establish the connection, then, depending on the System configuration, check settings of subnets and ports.

4.5.2 Configuring POP3 Traffic Interception

1. Configure server (servers) for working with SPAN, or Port Mirroring (see "Configuring Server to Work with SPAN, or Port Mirroring Technology").
2. Make sure, that `Hi Port` parameter of `capstack` section in **/opt/iw/tm5/etc/sniffer.conf** configuration file has value `110`:

```
"ListenAreas": {
"capstack": {
"Balancer": "IpPref",
"Interface": "eth1",
"MaxClient": 16,
"QueueMemorySizeInBytes": 67108864,
"Rules": [
{
"HiPort": 110,
"IP": "0.0.0.0",
"LoPort": 110,
"Mask": "0.0.0.0",
"Policy": "ACCEPT"
```

3. Specify value `true` for `pop3` parameter of **/opt/iw/tm5/etc/capstack.conf** configuration file.

4.5.3 Configuring HTTP Traffic Interception

For this traffic interception method, see "HTTP Traffic Interception Scheme".

SPAN, or Port Mirroring

1. Configure server (servers) to work with SPAN technology, or Port Mirroring (see "Configuring Server to Work with SPAN, or Port Mirroring Technology").
2. Enable autostart of HTTP traffic interceptor:
   `iwtm enable iw_proxy_http`
3. Make sure, that autostart of all processes, which participate in traffic interception and analysis, is enabled:
   iw_sniffer, iw_warpd, iw_cas, iw_x2db (see "Enabling and disabling autorun processes").

Inline Mode

	Note: In this item, «inline» mode of interception is described, which is being transmitted by ICAP protocol – do not confuse with «inline» mode for SMTP traffic.

To configure inline transfer mode, issue the following actions:

1. Learn this working schema (see "Intercepting traffic, transmitted via ICAP protocol").
2. Configure HTTP requests interception parameters on proxy server (see "Configuring ICAP").

4.5.4 Configuring HTTPS Traffic Interception

For this traffic interception method, see in "HTTPS Traffic".

Inline Mode

> **Note:**
>
> In this item, «inline» mode of interception is described, which is being transmitted by ICAP protocol – do not confuse with «inline» mode for SMTP traffic.

To configure inline transfer mode, issue the following actions:

1. Learn this working schema (see "Intercepting traffic, transmitted via ICAP protocol").
2. Configure HTTP requests interception parameters on proxy server (see "Configuring ICAP").
3. Enable HTTPS traffic parsing on proxy-server.

   > **Note:**

This setting depends on proxy-server modification. You can get actual information on configuring proxy-server from its manual.

4. Add certificate to the list of trusted root browser certificates of each Workstation, where outgoing HTTPS traffic is supposed to be controlled.

> **Note:**
>
> Get configuration information from browser documentation.

4.5.5 Configuring SMTP Traffic Interception

For this traffic interception method see "ICQ Traffic Interception Scheme".

SPAN, or Port Mirroring

1. Configure server (servers) to work with SPAN technology, or Port Mirroring (see "Configuring Server to Work with SPAN, or Port Mirroring Technology").
2. Enable autorun of ICQ traffic interceptor:
   `iwtm enable iw_proxy_icq`

4.5.6 Configuring NRPC Traffic Interception

This type of traffic interception is described in the article "NRPC Traffic Interception Scheme".

SPAN, or Port Mirroring

1. Configure server (servers) to work with SPAN technology, or Port Mirroring (see "Configuring Server to Work with SPAN, or Port Mirroring Technology").
2. Open **capstack.conf** configuration file, which is located in `/ort/iw/tm5/etc` directory.
3. Make sure, that `Usedprocessors` section has NRPC traffic interceptor enabled:
   ```
   "UsedProcessors": {
   "nrpc": true,
   ```
4. Make sure, that `Processors` section has NRPC traffic transmission enabled:
   ```
   "processors": {
   "nrpc": {
   "TrackExternal": true,
   "TrackInternal": true
    },
   ```
5. Save changes in the **capstack.conf** file.
6. Enable autostart for **iw_capstack** process:
   `iwtm enable iw_capstack`
7. Restart **iw_capstack** process:
   `iwtm restart capstack`

4.5.7 Configuring IMAP4 Traffic Interception

1. Configure server (servers) for working with SPAN, or Port Mirroring (see "SPAN, or Port Mirroring").
2. Make sure, that `Hi Port` parameter of `capstack` section in **/opt/iw/tm5/etc/sniffer.conf** configuration file has value `143`:

```
"ListenAreas": {
"capstack": {
"Balancer": "IpPref",
"Interface": "eth1",
"MaxClient": 16,
"QueueMemorySizeInBytes": 67108864,
"Rules": [
{
"HiPort": 143,
"IP": "0.0.0.0",
"LoPort": 110,
"Mask": "0.0.0.0",
"Policy": "ACCEPT"
```

3. Specify value `true` for `imap4` parameter of **/opt/iw/tm5/etc/capstack.conf** configuration file.

4.5.8 Receiving Objects Intercepted by InfoWatch Device Monitor

1. Install and configure Traffic Monitor Server part (see document "InfoWatch Traffic Monitor. Installation guide", article "Installing Traffic Monitor Server (TME Node Server)").
2. Setup event transmission from Device Monitor to Traffic Monitor server (see KB article "Integration with Traffic Monitor Versions").
3. Setup object analysis parameters (see document «InfoWatch Traffic Monitor. User guide», article "Technologies Section").

4.6 Process autorun

This section contains fratures of System's processes autostart:

- Checking process autorun;
- Enabling and disabling autorun processes.

General information on working with processes is available in chapter "Traffic Monitor Server Processes".

4.6.1 Check of Process Autostart

> **Warning!**
>
> Disable autostart of unlicensed processes responsible for traffic interception. This allows you to reduce the number of messages in the log.

When you divide servers into the main server, interception server and web console server, make sure, that autostart is configured according to notes in the table.

Autostart must be enabled only for processes, which this copy of Traffic Monitor server needs for proper operation:

Process	By default autostart is enabled
iw_adlibitum	Yes **Note:** The process should operate only on the major server
iw_agent	Yes
iw_analysis	Yes
iw_kicker	Yes **Note:** The process should operate only on a server with the web console
iw_blackboard	Yes
iw_bookworm	Yes **Note:** The process should operate only on the major server
iw_capstack	No
iw_cas	Yes
iw_configerator	Yes **Note:** The process should operate only on a server with the web console
iw_deliver	Yes **Note:** The process should operate only on the major server
iw_icap	Yes
iw_is	Yes **Note:** The process should operate only on the major server
iw_indexer	Yes **Note:** The process should operate only on the major server
iw_image_autoling	Yes **Note:** The process should operate only on a server with the web console
iw_text_autoling	Yes **Note:** The process should operate only on a server with the web console

Process	By default autostart is enabled
iw_licensed	Yes **Note:** The process should operate only on the major server
iw_luaengined	Yes
iw_messed	Yes
iw_proxy_http iw_proxy_icq iw_proxy_smtp	No
iw_qmover_client	No
iw_qmover_server	No
iw_sample_compiler	Yes
consul	Yes
iw_smtpd	Yes
iw_sniffer	No
iw_system_check	Yes
iw_tech_tools	Yes
iw_updater	Yes
iw_warpd	Yes
iw_x2x	Yes
iw_x2db	Yes
iw_xapi_xapi iw_xapi_puppy	Yes

Note:

To delete all **iw_kicker** processes from the server, delete **iwtm-web-meta** package:

```
rpm -e iwtm-web-meta
```

For more information on enabling autostart for processes, see "Enabling and disabling autostart of processes".

4.6.2 Enabling and Disabling Process Autorun

To enable/disable process autorun (the example below is for iw_proxy service):

The **iw_proxy** service includes the following three components: **iw_proxy_http**, **iw_proxy_icq**, **iw_proxy_smtp**. For this reason:

1. To enable autorun for a process (e.g., for **iw_proxy_http**) set the `enable` status for the process with the following command:
   `iwtm enable iw_proxy_http`
   To disable autorun, set the `disable` status for the process:
   `iwtm disable iw_proxy_http`
2. Restart **iw_proxy** service:
   `iwtm restart iw_proxy`

All Traffic Monitor processes with the `enable` status can run automatically, while processes with the `disable` status can only be started manually.

To configure the process autorun:

1. Unit files are stored in the /**usr/lib/systemd/system** directory. Edit the process unit file (for details, see "Traffic Monitor configuration files") and save the file.
2. Reboot the configuration:
   `systemctl daemon-reload`
3. Add the configured process to autorun:
   `iwtm enable <process_name>`
4. Start the process:
   `iwtm start <process_name>`
5. Check if the process is started with one of the following commands:
   `systemctl status <process_name>`
   `iwtm status`

To enable autorun of few processes, enter as follows**:**

`iwtm enable <daemon1_name> <daemon2_name> ... <daemonN_name>`

To disable autorun of few processes in the System, enter the following command**:**

`iwtm disable <daemon1_name> <daemon2_name> ... <daemonN_name>`

To enable autorun of all the processes in the System, enter the following command**:**

`iwtm enable all`

To disable autorun of all the processes in the System, enter the following command**:**

`iwtm disable all`

4.7 Remote database interaction module

In case the System deployment scheme is chosen in a way, that database, receiving intercepted objects is located on a remote server, you need to install a remote database interaction module.

The remote database is a database installed on a remote server with **TME DB Server** or **TME All-in-one** installation key (for details on installation keys, see "InfoWathc Traffic Monitor. Installation Guide", article "Installation from TME distribution").

The standard process of data transmission to a database is **iw_x2db** (see "Traffic Monitor Server modules list"). Using a remote database integration module with a remote database provides an additional opportunity to configure:

- the speed of files transmission to file queue;
- schedule of the width of the file transmission channel.

Configuration remote database integration module includes the following steps:

- Configuring the Client of the Remote Database Management Module
- Configuring the Server of the Remote Database Management Module

4.7.1 Configuring Data Collection in a Branch Network

If the System is deployed in an extensive branch network, then the following services are responsible for sending data on intercepted events and receiving this data on Traffic Monitor server:

- **iw_qmover_client** - sends data from branches;
- **iw_qmover_server** - receives data in the head office.

By default, both services are disabled and can be enabled manually by the Security Officer from Traffic Monitor Management Console:

- **iw_qmover_server** service - the first one;
- **iw_qmover_client** service - the second one.

These services can be configured in the directory `/opt/iw/tm5/etc:` **qmover_client.conf** and **qmover_server.conf** configuration files (for details, see the document "*Configuration Files Guide*", "qmover_client.conf" and "qmover_server.conf" articles).

4.7.2 Configuring the Client of the Remote Database Management Module

Configuring general settings

1. Configure the following client settings in **qmover_client.conf** configuration file, located in `/opt/iw/tm5/etc` directory:

Parameter	Description
`ListenerIP`	Server IP address (**qmover_server** service)
`Port`	Server port (central office)
`NookDir`	**qmover_server** service working catalogue
`ChannelWidth`	Channel bandwidth, speed of data downloading to Traffic Monitor (kbps). Can be implicitly limited with `WindowSize` parameter

2. Restart Traffic Monitor:
   `iwtm restart`

Configuring processes autorun

- Enable autorun for **iw_qmover_client** process.
- Disable autorun for **iw_x2db**, **iw_x2x**, **iw_deliverd** and **iw_adlibitum** processes.

For more information on disabling and enabling processes autorun see "Enabling and disabling autostart of processes".

Changing the bandwidth of the data transmission channel

By default, the bandwidth is 256 kbps. You can configure the bandwidth to be changed automatically at different time periods. To do this, use **iw_qmover_channel_width_setter** utility.
Bandwidth change is allowed. The bandwidth can be varied from 10 kbps through 2 Mbps.

To set bandwidth limitations,
Run the utility with the mandatory parameters:
`iw_qmover_channel_width_setter <unix_socket_name> <bandwidth>`
where

- `unix_socket_name` socket name (is being created automatically on service start; is being automatically deleted on service stop); default value - `/opt/iw/tm5/run/.channel_socket`;
- `bandwidth` the bandwidth (kbps) to be set.

Example
There is a channel whose bandwidth is 256 kbps. It is required that only 50% of the channel can be used from 9 AM to 6 PM. And from 6 PM to 9 AM – 100%.
Calculate the bandwidth for the required bandwidth usage. In this example, the bandwidth for different time intervals is following:

Interval	**Percent of the channel width**	
	Per cent of the channel width	Equivalent in kbps
9 AM to 6 PM	50%	128
6 PM to 9AM	100%	256

Add to **etc/crontab** these commands:

```
00 9 * * * iwtm /opt/iw/tm5/bin/iw_qmover_channel_width_setter /opt/iw/tm5/run/.channel socket 128
 00 18 * * * iwtm /opt/iw/tm5/bin/iw_qmover_channel_width_setter /opt/iw/tm5/run/.channel_socket 256
```

4.7.3 Configuring the Server of the Remote Database Management Module

Configuration setting

Configure the following client settings in the configuration file **/opt/iw/tm5/etc/qmover_server.conf**. The directory where the objects queue is stored is /opt/iw/tm5/queue/db. For this:

1. Specify the IP address of a client (branch office) in the `ip` parameter.
2. Specify the port, where the server listens for objects coming from clients in the `port` parameter.

> **Warning!**
>
> When branch offices parameters are changed (offices quantity or IP addresses), manually edit **qmover_server.conf** file.

Configuring autorun

Enable autorun for **iw_qmover_server** process. For more information on enabling and disabling processes autorun see "Enabling and disabling autostart of processes".

4.8 Configuring OCR Extractors

OCR for different interceptors is configured in the following configuration files:

- **warpd.conf** – to enable OCR for analysis of intercepted images, in the `Warp` section, set the value of the `EnableOCR` parameter to `true`;
- **sample_compiler.conf** – to enable OCR for analysis of images loaded as sample documents, set the value of the `EnableOCR` parameter to `true`.

In the file **/opt/iw/tm5/etc/config-perm/bookworm/ocr_custom.xml**, you can configure OCR for different interception channels:

- at the level of service.
- at the level of the event type for a particular service.
- at the level of a protocol for a particular event type.

For details, see "Configuring OCR".

> **Note:**
>
> For distributed installation when you install Traffic Monitor on several servers, you should specify individual OCR settings for each server.

> **Warning!**
>
> Settings specified at the protocol level have a higher priority than settings specified at the event type level. Settings specified at the event type level have a higher priority than settings specified at the service level.

> **Note:**
>
> If a new event type is registered by means of SDK, it will be processed with settings specified for the service the event type belongs to. If a new protocol is registered, it is processed with settings specified for the event type this protocol belongs to.

After you have changed the files, run the following command:

```
iwtm restart
```

The table below lists interception channels for which OCR can apply.

Service	Event type	Protocol
Email	Email	POP3 SMTP IMAP MAPI

Service	Event type	Protocol
		NRPC
	Webmail	HTTP HTTPS
Messenger	ICQ	OSCAR
	Skype	SKYPE
	XMPP	XMPP
	MS Lync	SIP
	Telegram	-
	Vkontakte	HTTPS
	Facebook	HTTPS
	WhatsApp	WhatsApp
Internet activity	Web message	HTTP HTTPS
File exchange	FTP	FTP
	External devices	-
	Cloud storages	HTTPS
Printer and MFD	Print	-
Storage	Data Discovery	-
Recording media	Photo	-

If the System is installed with the installer, both extractors are installed to the server end of the System. By default, ABBYY FineReader Engine 11 is used. Text extracted from images can be recognized with either ABBYY FineReader Engine 11 or Tesseract 4.1.1.

Functional limitations of extractors are listed in the table below:

Functionality	ABBYY FineReader Engine 11	Tesseract 4.1.1
Recognition of image rotation angles	0(+/-20) , 90(+/-20), 180(+/-20) and 270(+/-20) degrees	-
Recognition of colour images	+	-
Image correction	+	-
Recommended image resolution	300dpi for text with a font size from 10pt 400-600dpi for text with a font size of 9pt and less	300dpi for text with a font size from 10pt 400-600dpi for text with a font size of 9pt and less

Note:

To avoid deviation from recommended image resolution when using ABBYY FineReader Engine 11 the parameter `AutoOverwriteResolution` (`true` by default) is used, able to specify the image resolution automatically.

To start using ABBYY FineReader Engine 11:

1. Delete **/opt/iw/tm5/bin/iw_image2text** symlink.
2. Create a symlink:

```
ln -s /opt/iw/tm5/bin/iw_image2text_fre /opt/iw/tm5/bin/iw_image2text
```

To replace ABBYY FineReader Engine 11 with Tesseract 4.1.1:

1. Delete **/opt/iw/tm5/bin/iw_image2text** symlink.
2. Create a symlink:
   `ln -s /opt/iw/tm5/bin/iw_image2text_ts /opt/iw/tm5/bin/iw_image2text`

To change size limit for images that can be sent:

1. Go to **/opt/iw/tm5/etc/image2text_fre.conf** directory (for FineReader Engine 11) or /**opt/iw/tm5/etc/image2text_ts.conf** directory (for Tesseract).
2. Edit the `MaxSizeInKb` (maximum size) and `MinSizeInKb` (minimum size) parameters. By default, their values are 1536 KB and 200 KB respectively.

To enable OCR only for cloud storage events:

1. Open the `/opt/iw/tm5/etc/config/bookworm/services.xml` directory and find `mnemo` and `key` suitable for cloud storage.

For example,
`object_type mnemo="cloud_storage" key="AA9DFB259F0DFEE040BADC95815E13A200000000"`

2. Copy these key and `mnemo` and paste them to `/opt/iw/tm5/etc/config-perm/bookworm/ocr_custom.xml` directory.

If ABBYY FineReader Engine 11 is used as OCR extractor, you need to set up the ABBYY license. For this:

1. In the **/opt/iw/tm5/etc/image2text_fre.conf** configuration file, edit values of the fields as follows:
    - enter serial number in the **SerNum** field;
    - enter serial number in the **Pwd** field.
2. Copy the license file (.LocalLicense format) to the **/var/lib/ABBYY/SDK/11/Licenses** directory.
3. Make sure that **iwtm** user can access the downloaded file.
4. Restart the **iw_warpd** service.

ABBYY FineReader Engine 11 can operate in two modes:

1. balanced mode – provides the best quality of images processing (default mode). You can configure this mode user profile in the file **etc/FRProfile.ini**;
2. fast mode – provides the fastest images processing, 64 pages can be loaded at a time while document synthesis. If required, the mode is to be configured manually.

The following options are enabled while Fast mode is on:

- fast mode of page orientation detection (the quality lowers);
- standard analysis of page, no sample selection;
- ignoring the shadows;
- detecting tables during analysis;
- fast objects extraction (the quality lowers).

The following options are disabled while Fast mode is on:

- balanced mode;
- processing images as photos;
- compressing images;
- using image binarization;
- detecting font parameters;
- removing garbage from image;
- removing texture from temporary image;
- detecting porous text;
- detecting whole text on image, including text within image;
- extracting whole text from image;
- detecting headlines;
- detecting footnotes;
- detecting table of contents;
- detecting running titles;
- detecting pages of document.

To activate the fast mode of document processing, in `"ABBYYProfile"` parameter of the configuration file **image2text_fre.conf** located in **/opt/iw/tm5/etc** directory, indicate the path to the file with user profile configuration `"etc/FRProfile_fast.ini"`, then save the changes.

Warning!

Speed optimization of images processing cannot be applied for scanned copies of the schemes, location maps, monochrome images.

4.9 Configuring Notifications for Users and Employees

Users of the Management Console can configure sending notifications from the System to users or employees. To enable notifications:

- specify the email address from which notifications will be sent to users or employees;
- configure sending emails via Postfix mail server

Notifications are sent when policy rules are triggered (for details, see the document "*InfoWatch Traffic Monitor. User Guide*").

To check if emails are sent via the mail server:

Run the following command:

```
sendmail -v <employee@company.com> < <sample.log>
```

where:

- `<employee@company.com>` - email address of the notification recipient;
- `<sample.log>` - a text file that will be used as the email text (we recommend using a simple text file up to 1 MB).

If emails are not sent, configure the delivery via Postfix.

To configure the mail delivery via Postfix:

1. Open the **/etc/postfix/main.cf** file.
2. Specify the required mail server as the `relayhost` value:
   ```
   relayhost = <mail.company.ru>
   where <mail.company.ru> - the required mail server
   ```

   > **Note:**
   >
   > If the **/etc/postfix/main.cf** file does not have a line containing the `relayhost` attribute, add this line.

3. Reboot Postfix using the following command:
   ```
   service postfix restart
   ```
4. Check the mail delivery using the following command:
   ```
   sendmail -v <employee@company.com> < <sample.log>
   ```
   where:

- `<employee@company.com>` - email address of the notification recipient;
- `<sample.log>` - a text file that will be used as the text of the email (we recommend using a simple text file up to 1 MB).

4.10 Limiting the number of events that can be found

You can specify a limitation for the maximum number of events that will be displayed in the Management Console as a result of applying filter. For this, in the *SETTING* table of a database, specify a desired value for the *query_stop_count* attribute. The default value is 10.000.

4.11 Service-to-service cooperation setup (Consul service)

To register the services, monitor the accessibility and detect Traffic Monitor components the decentralized fault-tolerant discovery service Consul is used. The Consul agent:

- is installed on each host and is a significant part of cluster activity
- revealing the services, collecting the services state data, realizing DNS, API HTTP and RPC CLI interfaces
- can be started in one of two modes: client and server one.

Consul is installed in all types of installation. Information on System installation is available in Installation Guide, "System Installation" section.

When using All-in-one installation mode, the configuration parameters to connect to the Consul service are set automatically during the installation. The only exception is the distributed installation, when Traffic Monitor and the database are installed on different servers, when the System is installed on more than one node (has more than one network interface). See how to configure in "Configuring Consul and creating a cluster" article.

The service operation settings are to be done within the configuration file located by the following path: `/opt/iw/tm5/etc/consul/consul.json`. The full description of parameters is available at the page "Consul.json configuration file".

4.11.1 Starting and stopping the service

To start the Consul service, use one of the following commands:

```
service iwtm-consul start
systemctl start iwtm-consul.service
```

To stop the Consul service, you can use the following commands:

```
service iwtm-consul stop
systemctl stop iwtm-consul.service
```

If necessary, you can start the Consul agent **manually**:

```
consul agent -data-dir=<path> -bind=<bind_addr> -bootstrap -server -ui
```

where:

- `<path>` is a path to the directory with service data (e.g., `/opt/iw/tm5/var/consul`);
- `<bind>` is the network interface address.

If the System has more than one network interface, specify one of the following parameters:

- `-bind=<ip-address>`.
- `-config-file` or `-config-dir` - the path to the configuration file (e.g.: `/opt/iw/tm5/etc/consul`).

If several configuration files are loaded, their options are merged.

4.11.2 Registering services in Consul

You can register a service in Consul in 2 ways:

- using HTTP API or agent's configuration file, in the case, when service can communicate to Consul independently;
- registering service as an external component.

Services with obligatory registry in Consul	Services installed on nodes with Consul Server or Consul Client
iw_adlibitum	iw_adlibitum
iw_agent	iw_agent
Iw_analysis	Iw_analysis
iw_blackboard	iw_bookworm
iw_bookworm	iw_capstack
iw_capstack	iw_cas
iw_cas	iw_configerator
iw_icap	iw_icap
iw_deliver	iw_indexer
iw_indexer	iw_licensed
iw_licensed	iw_kicker
iw_luaengined	iw_luaengined
iw_messed	iw_messed
iw_pas	iw_pas
iw_proxy_http	iw_proxy_http
iw_proxy_icq	iw_proxy_icq
iw_proxy_smtp	iw_proxy_smtp
iw_qmover_server	iw_qmover_server
iw_sample_compiler	iw_sample_compiler
iw_system_check	iw_system_check
iw_smtpd	iw_smpd
iw_tech_tools	iw_tech_tools
iw_updater	iw_updater
iw_warpd	iw_warpd
iw_xapi_xapi	iw_xapi_xapi
iw_xapi_puppy	iw_xapi_puppy
iw_x2x	iw_x2x
iw_x2db	iw_x2db
	Web (backend)

Services with obligatory registry in Consul	Services installed on nodes with Consul Server or Consul Client

After the registration, Traffic Monitor services and Consul interact the following way:

- registration using Consul client;
- establishing TCP connection or returning HTTP code;
- deregistration.

4.11.3 Distributed installation

> **Important!**
>
> To use the Consul service, the full-mesh network topology ("each-to-each" connection) should be implemented for all the agents within the cluster and for servers, when combining them into WAN.

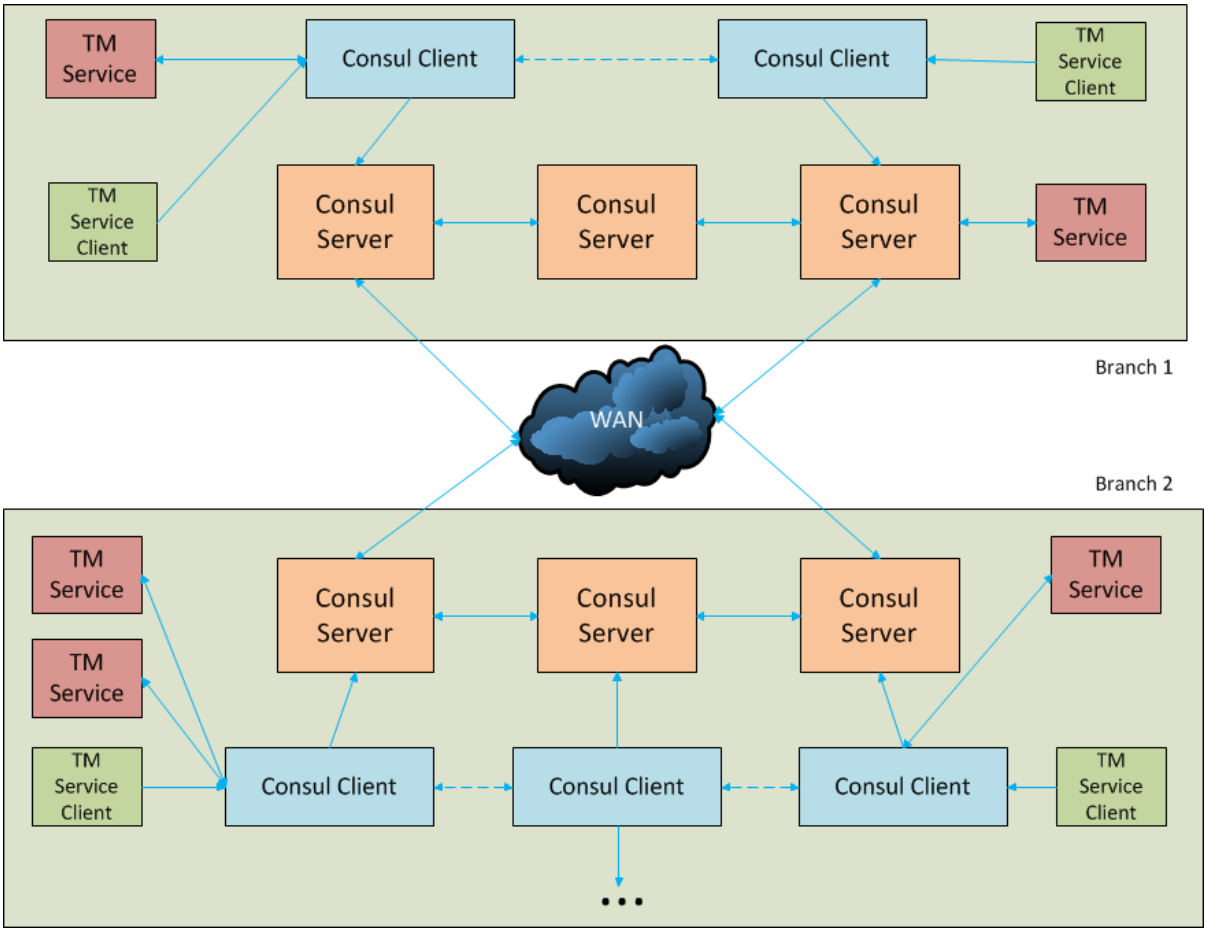
> **Important!**
>
> In case of distributed TM installation, using TCP and UDP between different network segments (including nodes) must be allowed in Windows firewall.

Clustering

The client collects the node- and service-related data and sends it to the server. System components searching for services send the request to the agent started on a local workstation, which resends the request to an available server. If the server is unable to respond to the request, it can send the request to a different data center (a branch) and retrieve the response.

Servers compose a cluster and define independently the leading server, responsible for elements coordination within the cluster. The first/the only one server is usually started in bootstrap mode (assigning the leader manually). When starting the agent, to connect to cluster it is enough specifying one server of this cluster. While configuring it in `retry_join` option, it is recommended specifying all the servers of the cluster. A quorum to hold the operations and to provide the consistency is required in each data center. If there are few data centers, a separate cluster to be created in each of them. Data centers are not isolated from each other due to service detection task. An agent within one data center can get information from a separate data center.

The Consul network can use one server, but to avoid data loss it is recommended using from three to seven servers within the data center.



Example:

A cluster consisting of three nodes (servers) continues operating when one server is out of operation.

Below are the examples of using the interface command line:

Command	Description
`consul members`	displays the list of cluster members
`consul catalog services -node <node_name>`	displays the list of cluster servers on a specific computer
`consul operator raft list-peers -stale=true`	displays the list of all the servers regardless of the cluster

Connecting to cluster

You may register extra nodes on the cluster using one of the following ways:

- Enter the command: `consul join <ip-адрес>`. Please make sure, all the servers and Consul clients have the same parameters `datacenter` and `encrypt` within the `consul.json` configuration file (see consul.json configuration file)
- Specify the list of servers, to be joined within the parameter `retry_join` of `consul.json` configuration file.

4.11.4 Network rules configuration to access Consul

To set up the network exchange the following ports between all Consul agents (servers and clients) should be accessible.

Port by default	Interface	Supported protocols	Description
8300	Server RPC	TCP	Used by servers to process incoming queries from other agents
8301	Serf LAN	TCP, UDP	Used by agents to process data flows within local network
8302	Serf WAN	TCP, UDP	Used by servers to exchange data with other servers via WAN
8400	CLI RPC	TCP	Used by all the agents to process RPC from CLI
8500	HTTP API	TCP	Used by clients to interact with HTTP API interface
8600	DNS	TCP, UDP	Used to allow DNS queries

4.11.5 consul.json configuration file and iwtm-consul.service unit-file

Content	Description
`{`	
`"bootstrap_expect": 1,`	Number of servers expected in cluster (for server mode only)
`"server": true,`	Start of agent on server mode (false – client)
`"datacenter": "iwtm",`	Title for datacenter

Content	Description
`"data_dir": "/opt/iw/tm5/var/consul",`	Directory to store the Consule service data
`"encrypt": "4RTZ5ttYY6RwIYX28XWNPw==",`	Secret key, shared between cluster agents
`"log_level": "WARN",`	Level of logging
`"enable_syslog": true,`	Let logging in syslog
`"disable_update_check": true,`	Prohibit to check the updates for Consul
`"leave_on_terminate": false,`	If it's true, then receiving SIGTERM, sends the farewell message and leaves the cluster in standard mode. Default values: for server - false, for client – true
`"skip_leave_on_interrupt": true,`	If it's false, then receiving the signal of interruptions (e.g, SIGINT) leaves the cluster in standard mode. Default values: for server - true, for client - false
`"rejoin_after_leave": true,`	If it's true, then joining to cluster once started
`"retry_join": "0.0.0.0",`	In case of distributed installation contains the list of servers, which should be connected to
`"ui": true,`	Access to web interface (prohibited by default)
`"client_addr": "0.0.0.0"`	Client IP with open web interface access
`}`	

Unit-файл **iwtm-consul.service**

Code	**Description**
`[Unit]`	Section defining demon metadata and its relationship settings with other demons
`Description=Consul Service discovery agent`	Demon name

Code	Description
`Requires=network-online.target`	Services cannot operate without network-online.target
`After=network-online.service`	Demons that will be run before the current demon is started
`[Service]`	Demon start setting section
`StandartOutput=syslog`	Redirecting standard output to syslog
`StandartError=syslog`	Redirecting standard error to syslog
`Type=simple`	Demon start type. `simple` - demon starts and switches to waiting mode on the console
`User=iwtm`	User name on behalf of which demon is started
`Group=iwtm`	User group name
`SyslogIdentifier=iwtm-consul`	Defines process name for log prefix rows, which are sent to logging system or to core log buffer.
`PermissionsStartOnly=true`	Starting commands from ExecStartPre on behalf of the **root** user
`ExecStartPre=/opt/iw/tm5/bin/consul validate /opt/iw/tm5/etc/consul`	Full path and command arguments which should be completed before starting the main process.
`ExecStart=/opt/iw/tm5/bin/consul agent $OPTIONS -config -dir= /opt/iw/tm5/etc/consul`	Full path and command arguments which should be completed to start demon. The command is to be run on behalf of the user defined in `User`.
`ExecReload=/bin/kill -s SIGHUP $MAINPID`	The command restarts demon configuration, if it is accessible. The command is to be run on behalf of the user defined in `User`.
`KillSignal=SIGINT`	The command stops demon's work forcefully
`TimeoutStopSec=5`	Period of time within which the system waits for demon to stop, before labeling it as inaccessible or stopped forcefully.

Code	Description
`[Install]`	Defining demon's behaviour, if it is enabled or disabled
`WantedBy=multi-user.target`	Start this demon, when the system is loading in a multi-user mode

4.12 Secure Deployment Recommendations

Traffic Monitor components use various network ports on the System servers.

> **Note:**
>
> For more information about component sets and templates on the System servers, see "Infowatch Traffic Monitor. Installation guide", "System Deployment Schemes and Installation Types".
>
> For information about Traffic Monitor servers processes, see "Traffic Monitor Server Processes".

To prevent unauthorized access to the components, it is recommended to configure a firewall. Only the connections that are necessary for the operation of the components should be allowed.

4.12.1 Components ports

Component	Ports	Description	Recommendations
consul	TCP/UDP 8301	Used to register, monitor and discover Traffic Monitor services	Configure a firewall for each Traffic Monitor server. External systems should not send traffic to the component port
nginx	TCP 443, 80	Used for: • Web console of Traffic Monitor. • Integrations with Platform products that receive data from Traffic Monitor. • Interaction with adapters that use: DataExport API, API for DB Unloadings, API for audit data.	Configure a firewall for the server with Web console template. Only the following should send traffic to the component ports: • Security officers and System administrators. • Platform products. • Adapters.

Component	Ports	Description	Recommendations
iw_smtpd	TCP 2025	The component receives traffic from a Postfix/Exim mail server	Configure a firewall for each server with Interceptors template. Only the mail server should send traffic to the component port
iw_xapi	TCP 9100, 9101	Used to: • Receive data from Device Monitor. • Receive data from Data Discovery. • Interact with adapters that send data to Traffic Monitor via pushAPI.	Configure a firewall for each server with Interceptors template. Only the following should send traffic to the component ports: • Device Monitor. • Data Discovery. • Adapters.
iw_sniffer	TCP 4301	The component receives a copy of traffic from a network switch via SPAN. **Note**: The component is not used by default, see "SPAN, or Port Mirroring"	Configure a firewall for each server with Interceptors template. Only the network switch should send traffic to the component port
iw_icap	TCP 1343	The component receives traffic via ICAP from a proxy server (ICAP client)	Configure a firewall for each server with Interceptors template. Only the proxy server should send traffic to the component port

5 Monitoring

Monitoring subsystem exercises the following functions:

- Monitoring operations of all servers (both physical and virtual) included in InfoWatch Traffic Monitor solution;
- Monitoring of all software components (OS, DBMS, DB, processes etc.) included in InfoWatch Traffic Monitor solution;
- Control of indicator values for each server and component. Here by control we mean regular retrieval of indicator value and comparing this indicator value to a threshold value;
- Enabling and disabling monitoring of specific indicators and servers;
- Sending email notifications when indicator values exceed the normal range.

The Monitoring subsystem is autoinstalled during InfoWatch Traffic Monitor server installation by the installer. For more details on the installation see*«InfoWatch Traffic Monitor. Installation and Configuration Guide»* document.

If InfoWatch Traffic Monitor system is deployed on few servers using the installer and installation templates, the monitoring subsystem will be automatically configured and detectors will be in accordancy with the templates used.

You can also use "Configuring indicators manually".

5.1 Monitoring Subsystem for Distributed Architecture

> **Warning!**
>
> If InfoWatch Traffic Monitor system is deployed on few servers using installer and installation templates, the monitoring subsystem will be automatically configured in accordance with installation templates used.

Monitoring configuration includes the following tasks:

- Configuring Connection to Device Monitor;
- Configuring Indicators Manually;
- Configuring Addresses of Time Synchronization Server for Monitoring Subsystem;
- Configuring Notifications.

5.1.1 Configuring Connection to Device Monitor

To configure connection to Device Monitor server:

1. Edit `/opt/iw/tm5/etc/nagios/iwmon/iwmon-hosts-dm.cfg` file:
   - Uncomment `host` and `hostgroup` sections.
   - In `address` parameter of `host` section define host name or IP-address of Device Monitor server.
- In `/opt/iw/tm5/etc/nagios/iwmon/iwmon-services-dm.cfg` file uncomment `service` section.
- In `/opt/iw/tm5/etc/nagios/iwmon/iwmon-commands.cfg` file uncomment `Check Dm server` section.
- Restart nagios process:
  `systemctl restart iwtm-nagios`

5.1.2 Configuring Indicators Manually

Enabling and disabling indicators is being performed in the following file of the `/opt/iw/tm5 /etc/nagios/iwmon` directory:

- iwmon-services-db-psql.cfg – Postgre SQL indicators configuration;
- iwmon-services-db.cfg – Oracle indicators configuration;
- iwmon-services-dm.cfg – Device Monitor indicators configuration;
- iwmon-services-loadavg.cfg – Server load parameters configuration (System load indicator);
- iwmon-services.cfg – main indicator configuration;
- iwmon-services-queue.cfg – queues indicators configuration.

The service_description parameter displays each indicator purpose.

To enable indicator, change `register` parameter value to `1`.

To enable indicator, change `register` parameter value to `0`.

To apply changes, restart nagios:

```
systemctl restart iwtm-nagios
```

5.1.3 Configuring Addresses of Time Synchronization Server for Monitoring Subsystem

To provide correct time synchronization, IP address of NTP server should be specified at every system server. You may use any exact time service utilizing NTP protocol and available from your network: both network equipment and Windows domain controllers.

To configure time synchronization at the server:

1. Open `/opt/iw/tm5/etc/nagios/iwmon/iwmon-services-ntp.cfg` file for editing.
2. In the check command parameter replace default IP-address with the actual IP-address of NTP server (time synchronization server).

5.1.4 Configuring Notifications

The monitoring subsystem enables sending email notifications where the current indicator value exceeds the threshold value.

For e-mail notifications to be sent only for selected indicators:

1. Go to the Nagios subsystem directory:
   `cd /opt/iw/tm5/etc/nagios/iwmon`
2. Open the **iwmon-services.cfg** configuration file:
   `mcedit /opt/iw/tm5/etc/nagios/iwmon/iwmon-services.cfg:`
3. To identify the needed indicator, view the `service_description` field.
4. In the indicator section, set the `notifications_enabled` parameter to:
   - 1 – to enable sending notifications;
   - 0 – to disable sending notifications.
     If there is no `notifications_enabled` parameter in the configuration file, add this parameter manually.

- Save changes.
- Set up a connection to one of the mail servers:
  - the built-in local Traffic Monitor mail server with anonymous access (Posfix or Exim) OR

- an external mail server without encryption.

6 Database Administration

This chapter contains information on administrating:

- Oracle
- PostgreSQL

DB statistics information is available in "DB statistics gathering" KB article.

6.1 Oracle

This chapter contains instructions on Oracle administration:

- Changing Preset Passwords
- Database Routinely Maintenance
- Tablespaces in InfoWatch Traffic Monitor database
- Managing Daily Tablespaces
- Database Backup
- Database Logging

6.1.1 Changing Preset Passwords

To change preset passwords of the DB users:

1. Stop Traffic Monitor processes:
   `iwtm stop`
2. Connect to Oracle database:
   sqlplus iwtm@iwtm
3. Enter the preset password.
4. Get the list of users:
   `select * from dba_users;`
5. Change user passwords:
   `ALTER USER user IDENTIFIED BY password;`
   where `user` is the selected DB user, `password` is a new password for this user.
6. Exit Oracle DB:
   `exit`
7. Start Traffic Monitor processes:
   `iwtm start`

On how to change the preset password in Traffic Monitor, see "Changing the Preset Password".

6.1.2 Tablespaces in InfoWatch Traffic Monitor database

There are two types of tablespaces (TS) in InfoWatch Traffic Monitor database:

The type of tablespace	Purpose
Main	Storing the settings that are needed for the analysis and processing of the objects (configuration, tags, colors, etc.). Managing the System using the Management Console (roles, user accounts, etc.)

The type of tablespace	Purpose
Daily	Storing objects, intercepted within one day. Storing information on the results of the analysis and processing of the objects (analyzed object categories, terms, etc.) Consists of three tablespaces: for storing objects with states *Violation*, *No Violations, Other (tablespace to save screenprints)*. Therefore the possibility of divided archiving, restoring, and deleting is acquired.

All data about the objects intercepted on a particular day are in the same daily TS. Daily tablespaces are created every day in such a way that the database always has TS for the next six days. The following name is automatically assigned for all daily TS:

- *IWTM_YYYY_MM_DD_N* – tablespace for the day, which contains objects without violations.
- *IWTM_YYYY_MM_DD_V* – tablespace for the day, which contains objects with violations.

Settings to manage data segments are defined when configuring database schema; however, they can be changed after the schema is created "Managing Daily Tablespaces").
Using installation type **TM Standard**, events are being saved in one tablespace. Automatic calculation of free space for future events with old events deletion takes place every week.

6.1.3 Managing Daily Tablespaces

This section covers:

- Configuring Location of Files within File System;
- Configuring Storage Modes for Tablespace Files;
- Archiving Daily Tablespaces;
- Restoring Daily Tablespaces;
- Deleting Daily Tablespaces.

Configuring Location of Files within File System

The daily tablespaces can be stored in the same directory or distributed to various directories on various disks.

The kickstart installation program (see "*InfoWatch Traffic Monitor. Installation Guide*") sets the usage of one daily tablespace located in `/u02/oradata/`.

> **Note:**
>
> For tablespace archives, the `/u02/arch` directory is used.

However at high loads, it is recommended to place daily TS on different I/O devices (LUN, physical drives) for sequential usage. For example, when 3 file systems are defined, data is located as follows:

First day – the daily tablespace is created in File system 1.

Second day – the daily tablespace is created in File system 2.

Third day – the daily tablespace is created in File system 3.

Fourth day – the daily tablespace is created in File system 1.

…

Distribution of daily TS files (number and locations) of daily TS files can be managed using scripts.

An example of the script to change the number of dedicated daily TS storage locations:

```
BEGIN
pkg_part.set_df_path_cnt('4');
COMMIT;
END;
/
```

> **Warning!**
>
> After changing the number of daily TS storage locations make sure to adjust (add/delete) their location paths.

An example of the script to change the location paths for daily TS:

```
BEGIN
pkg_part.set_df_path('/test1/', 1);
pkg_part.set_df_path('/test2/', 2);
pkg_part.set_df_path('/test3/', 3);
pkg_part.set_df_path('/test4/', 4);
COMMIT;
END;
/
```

> **Note:**
>
> It is advisable to add “/” symbol in the end whenever specifying the path.

An example of viewing daily TS content:

```
select a.tbs_name, a.service_code, power(10, trunc(log(10, a.text_size))) ||
'-' ||
power(10, trunc(log(10, a.text_size)) + 1) size_range,
count(1) cnt, sum(a.text_size) text_size
from
(
select t.tbs_name, o.service_code,
case
when length(o.text) > 0 then length(o.text)
else 1
end text_size
from object o
inner join object_source os on os.object_id = o.object_id
inner join tbs_list t on o.tbs_id = t.tbs_id
) a
group by a.tbs_name, a.service_code, power(10, trunc(log(10, a.text_size))) ||
'-' ||
```

```
power(10, trunc(log(10, a.text_size)) + 1)
order by 1, 2, 3
```

Service code definition is specified in **services.xml** file, which is located in `/opt/iw/tm5/etc/compendiums/` catalogue.

> **Note:**
>
> To receive intercepted objects volume analysis along with DB service information, use SQLDeveloper

Configuring Storage Modes for Tablespace Files

If during the installation, the System was configured to move data in the **Normal** mode, you can change the storage mode later.

You can use the **Fast/slow** mode (fast and slow drives). In this mode, data is saved to the fast partition and then, after a specified number of days is moved to slow partitions. To configure this mode:

1. Edit the `/etc/fstab` file to automatically mount a new partition to `/u03:`
   `/dev/sdd1 /u03/ ext4 defaults 1 2`
2. Create the "oradata" folder:
   `mkdir /u03/oradata` (where `/u03/oradata` is a path to the fast drive)
3. Change user:
   `chown -R oracle:oinstall /u03`
4. Log into the database:
   `su - oracle`
   `sqlplus iwtm@iwtm`
5. Specify the storage period on fast drives:
   `exec pkg_part.set_fast_days(7);`
6. Specify the path to the fast drive:
   `exec pkg_part.set_fast_path('/u03/oradata/',1);`
7. Specify the path to the slow drive:
   `exec pkg_part.set_df_path('/u02/oradata1/',1);`
8. If needed, you can use several slow drives. The data will be recorded to the next slow drive when the previous is full. To add the slow drives specify a new path:
   `exec pkg_part.set_df_path('/u02/oradata2/',2);`
9. Specify the total amount of slow drives:
   `exec pkg_part.set_df_path_cnt('2') ;`
10. Change the mode to fast-slow drives:
    `exec pkg_part.set_filesys_type('fast/slow');` The data will be transferred from fast drives to slow ones during night job.
11. Apply changes:
    `commit;`
12. To run the process of moving files manually:
    `exec iwtm.pkg_part.move_fast_tablespaces_to_slow();`

> **Note:**
>
> Few slow drives can be used in the System.

Warning!

Make sure the partitions paths you use are in accordance with the ones specified in the article.

Or you can use the **Rotate** storage mode (everyday rotation). In this mode, the System switches to the next partition daily or in case of the partition overflow. To configure this mode:

1. Mount the partition and make sure that it can be mounted automatically on reboot
2. Create the "oradata" folder:
   `mkdir /u03/oradata`
3. Change user:
   `chown -R oracle:oinstall /u03`
4. Log into the database:
   `su - oracle`
   `sqlplus iwtm@iwtm`
5. Add a path to the second partition:
   `exec pkg_part.set_df_path('/u03/oradata/',2);`
6. Specify a new number of paths:
   `exec pkg_part.set_df_path_cnt(2);`
7. Apply changes:
   `commit;`
8. Switch to the `rotate` mode:
   `exec pkg_part.set_filesys_type('rotate');`

```
SQL>select * from setting where setting like 'df_path%';
select * from setting where setting like 'df_filesys%';

setting | value | editable
------------+---------------+----------
df_path1 | /u02/oradata1/ | 1
df_path2 | /u03/oradata/ | 1
df_path_cnt | 2 | 1
df_filesys_type | rotate | 1
```

Note:

Specifics of data storage modes (**normal**, **fast/slow**, and **rotate**) are described in the KB article "Tablespaces data storage settings. Data storage partition").

Archiving Daily Tablespaces

To free some space on hard drive, you can periodically archive outdated data. It is recommended to place data archive on external devices. Data can be recovered when necessary.

Warning!

If the months or years are used as the time interval, it is recommended to use the maximum value of the interval in calculations. For a month - 31 days. For a year - 366 days. For example, to remove the daily TS older than 4 years specify the interval 366 * 4 = 1464 days in the IWTM_DELETE_TABLESPACES job

You can regularly archive obsolete data to free some space on a hard drive. We recommend you to save an archive with data to external data carrier. If necessary, you can restore the data.

The archiving can be performed:

- Automatically after the specified period is expired (see "Automatically Archiving of Daily Tablespaces");
- Manually – for archiving the selected daily tablespaces (see "Manual Archiving of Daily Tablespaces").

Automatic Archiving of Daily Tablespaces

Before strating automatic archiving, check, that archiving catalogue has been set properly:

```
select value from setting where setting = 'archive_path';
```

`Orcale` user should be an owner of the catalogue.

In case the catalogue has been set improperly, reset it with the following command:

```
begin
sp_setting_set('archive_path', '/u02/arch/');
commit;
end;
/
```

To perform TS archiving automatically (by default the function is disabled) you can use the following scripts (run under the account of the database schema owner):

- For daily TS storing objects with *Violation* status:

```
begin
sp_setting_set('violation_archive_enabled', 1);
sp_setting_set('violation_archive_period', D);
commit;
end;
/
```

- For daily TS storing objects with *NoViolation* status:

```
begin
sp_setting_set('noviolation_archive_enabled', 1);
sp_setting_set('noviolation_archive_period', D);
commit;
end;
/
```

- For daily TS storing *screenshots*:

```
begin
sp_setting_set('other_archive_enabled', 1);
sp_setting_set('other_archive_period', D);
commit;
end;
/
```

where:
1 – indicates that automatical deletion is enabled (to disable specify 0 instead);

D – is a number of days at the end of which the daily TS will be archived by the System. This number should be larger than the set number of days before archiving the daily tablespace ("Автоматическое архивирование ежедневных табличных пространств 1").

Manual Archiving of Daily Tablespaces

Manual archiving of daily tablespaces is performed in the following steps:

Selecting daily tablespaces and data files

To get a list of disconnected tablespaces, you must run the following query to the database under the account of the database schema owner. The queries are built according to the archiving policy of your company. For example, to select the daily TS storing the objects which were intercepted more than 100 days ago, run the following query:

```
SELECT t.tbs_id, t.tbs_name, t.part_date
FROM tbs_list t
WHERE t.part_date<trunc(SYSDATE) - 100 + 23 / 24 AND t.status IN (0, 3)
```

Warning!

It is strongly recommended to run the following sample query in this section in order to retrieve the list of files. This is due to the fact that the file list if generated by any other ways may be incomplete.

In this case, the following query is created to select data files:

```
SELECT f.file_name
FROM dba_data_files f
WHERE f.tablespace_name in
(
  SELECT t.tbs_name
  FROM tbs_list t
  WHERE t.part_date<trunc(SYSDATE) - 100 + 23 / 24 AND t.status IN (0, 3)
)
```

where `t.status IN (0, 3)` indicates that the tablespaces with the *ReadWrite* (status code `0`) and *ReadOnly* (status code `3`) statuses are selected for archiving.

Disconnecting Daily Tablespaces from the Database

Warning!

It is strongly recommended not to disable daily TS when the IWTM_ADD_PARTS, IWTM_DELETE_TABLESPACES and IWTM_ARCHIVE_TABLESPACES jobs are running as it may cause the data loss.

1. Call the procedure on behalf of the owner of the database schema, call the procedure:
   ```
   begin
   IWTM.pkg_part.archive_tablespace(N);
   ```

```
end;
/
```

where `N` is a value of tbs_id attribute of the target TS from the `tbs_list` table.
`After running this script status of daily TS will change to Offline.`

2. Repeat the procedure call for each daily TS you want to disable.

Moving Datafiles

Transfer the data files belonging to the disabled daily TS to the other data carrier.

To get a list of data files for all disconnected tablespaces, use the following script:

`select tbs_name from tbs_list` where `NOTE = 'Tablespace is offline'`

where `tbs_name` is a name of a tablespace.

`tbs_list` is a name of a table.

Data files are stored in the catalogue:

```
select value from setting where setting = 'archive_path'.
```

Restoring Daily Tablespaces

> **Warning!**
>
> A tablespace can only be restored in the database schema, from which it was disconnected (even if this schema was updated). The restoration of the tablespace after total database schema reinstallation is impossible.

Moving data files

To restore daily TS, you must move data files of this tablespace from a data carrier to the folder which path you can obtain using the following command:

```
select value from setting where setting = 'archive_path';
```

> **Warning!**
>
> Make sure that the *oracle* user has reading and writing privileges for the directory to move the data files to.

Connecting the daily tablespace

> **Warning!**
>
> Do not connect daily TS during IWADDPARTS, IWTM_DELETE_TABLESPACES jobs. This may cause the data loss.

1. On behalf of the owner of the database schema, call the procedure:

```
begin
pkg_part.restore_tablespace(N);
end;
/
```

where `N` is ID of the tablespace (specified in tbs_list).
After procedure ending the status of TS will change to *Restored*.

2. Repeat the procedure call for each daily TS you want to enable.

Deleting Daily Tablespaces

If you do not need to further store the data, you can use the procedure for deleting daily TS (**IWTM_DELETE_TABLESPACES**). The procedure automatically deletes all the data in a tablespace, segments, and also the tablespace and data files.

> **Warning!**
>
> 1. Deleting tablespaces cannot be undone. If you complete the operation, you will not be able to restore the deleted data.
> 2. IWTM_DELETE_TABLESPACES job cannot operate tablespaces which were disconnected/ connected manually.

As a result, this procedure will remove all the daily tablespaces (including information about the archived daily tablespaces), which satisfy the following condition:

The date of creating a tablespace is less or equal to the difference between the current date and the specified time interval for deleting the tablespace.

> **Note:**
>
> If the archived daily tablespace cannot be restored (because the information in it was removed from the database), then you can delete data files of this tablespace from the archive.

> **Warning!**
>
> While deleting tablespaces, access to the corresponding tables is closed. For this reason, log files of the **iw_deliver**, **iw_x2db**, **iw_updater** processes may contain database access errors. Once tablespaces are deleted, these processes automatically restore access to the database.

We recommend running a job to delete data daily. Otherwise, the amount of deleted data increases, which increases the time for running the procedure and consequently increases the idle time of the Traffic Monitor Server.

> **Warning!**
>
> If months or years are used as a time interval, then we recommend you to apply the maximal interval value in the counting: 31 days for a month and 366 days for a year. For example, to delete daily TS older than 4 years, specify 366*4=1464 days interval in the IWTM_DELETE_TABLESPACES job.

Setting the interval of daily TS deletion

To perform TS deletion automatically (by default the function is disabled) you can use the following scripts (run under the account of the database schema owner). Specify period to store information of archived tablespaces:

- For daily TS storing objects with *Violation* status:

```
begin
sp_setting_set('violation_delete_enabled', 1);
sp_setting_set('violation_delete_period', D);
commit;
end;
/
```

- For daily TS storing objects with *No Violation* status:

```
begin
    sp_setting_set('noviolation_delete_enabled', 1);
sp_setting_set('noviolation_delete_period', D);
commit;
end;
/
```

- For daily TS storing *screenshots*:

```
begin
sp_setting_set('other_delete_enabled', 1);
```

sp_setting_set('other_delete_period', D);

```
commit;
end;
/
```

where:

1 indicates that automatical deletion is enabled (to disable specify 0 instead);

D is a number of days at the end of which the daily TS will be deleted by the System. This number should be larger than the set number of days before archiving the daily tablespace (see "Automatic Archiving of Daily Tablespaces").

After removal of the tablespaces disconnected from the database (with *Offline* status), they become unavailable in the System.

Deleting archived tablespaces

When deleting archived daily tablespaces from the database, datafiles remain in the System (by default, they are stored in the `/u02/arch` directory. To free up disk space, you can:

- delete tablespaces manually;
- add new scheduled tasks. You can add tasks either in the `/etc/cron.d/iwtm_cleanup` file or in another file with tasks in the directory.

Example:

To delete all archived daily tablespaces older than 150 days:

1. Open for editing the `/etc/cron.d/iwtm_cleanup` file or another file with tasks in the directory.

2. Add lines:
   ```
   35 3 * * * root find /u02/arch/ -type f -mtime +150 -delete > /dev/null 2>&1 &
   40 3 * * * root find /u02/arch/ -type d -ctime +10 -empty -delete > /dev/null 2>&1 &
   ```
3. Save changes.
4. Apply new settings of the `cron` service:
   `systemctl reload crond`

Scheduled deletion of daily tablespaces

By default, the automatic deletion of daily TS is disabled. To enable the deletion of daily TS according to schedule (every day at 00 h 30 min 00 s), run the following script under the account of the database schema owner:

```
BEGIN
dbms_scheduler.enable('IWTM_DELETE_TABLESPACES ');
COMMIT;
END;
/
```

To disable procedure autorun, run the following script:

```
BEGIN
dbms_scheduler.disable('IWTM_DELETE_TABLESPACES');
COMMIT;
END;
/
```

Deleting daily tablespaces manually

If you need an immediate launch of procedure for deletion of daily TS (e.g., due to file system space shortage the interval of deletion was changed, but the next launch of the job will not happen soon), run the following script under the account of the database schema owner:

```
BEGIN
dbms_scheduler.run_job('IWTM_DELETE_TABLESPACES');
END;
/
```

Deleting daily tablespaces with a script

If you want to configure automatic deletion of daily tablespaces, use the **/opt/iw/tm5/bin/dbtools/dbconf-iwdrop-oracle.sh** script. You can use the following commands:

Purpose	Command
Set up deletion period	`/opt/iw/tm5/bin/dbconf-iwdrop-oracle.sh set violation|noviolation|other <days> [-v]`

Purpose	Command
Enable automatic deletion	`/opt/iw/tm5/bin/dbconf-iwdrop-oracle.sh enable violation|noviolation|other [-v]`
Disable automatic deletion	`/opt/iw/tm5/bin/dbconf-iwdrop-oracle.sh disable violation|noviolation|other [-v]`
View the state of settings	`/opt/iw/tm5/bin/dbconf-iwdrop-oracle.sh show [-v]`

Example:

To delete all objects with *"No violation"* status, which are older than 15 days, run the following commands:

```
/opt/iw/tm5/bin/dbconf-iwdrop-oracle.sh set noviolation 15 [-v]
/opt/iw/tm5/bin/dbconf-iwdrop-oracle.sh enable noviolation [-v]
```

6.1.4 Database Backup

To minimize the risk of data loss we strongly recommend to backup the database on a monthly basis. We recommend you to use dedicated storage system for backups storage.

Experienced Oracle database administrators can perform a backup at the running database (“hot backup”) using Oracle-recommended RMAN program (see Oracle documentation), previously taken the Oracle database to ARCHIVELOG mode.

For non-database administrators who do not have standard backuping methods we recommend creating a “cold backup” at the stopped database. This procedure may also be used to migrate the database from one server to another.

This section further covers:

- Creating Database Backup;
- Restoring the Database from the Backup.

Creating Database Backup

Creating database backup (cold backup procedure) is performed in the following order:

- Defining the Size of Backup;
- Checking the Backup Storage;
- Creating Backup Directories;
- Creating Recovery Aid Files;
- Collecting a List of Files to Backup;
- Stopping IWTM System;
- Stopping Oracle Database;
- Copying database Files to the Backup Storage.

Defining the Size of Backup

To define the backup size:

1. Log the computer that hosts database, as **oracle** user.
2. Open Oracle SQL*Plus and log as **sysdba**:
   `OS> sqlplus / as sysdba`
3. If the system was installed using the installer, you can use **wsqlplus** command.

   > **Note:**
   >
   > `wsqlplus` command is an alias of `sqlplus` command:
   > `alias wsqlplus='rlwrap -b "" -f ~/sql.dict sqlplus'`

   Wait until the connection is established - you will receive **Connected** message.
4. Copy (or enter) the following SQL query to the command prompt:
   `SQL> SELECT ROUND(SUM(bytes)/1024/1024/1024,4) GB FROM ( SELECT SUM(bytes) bytes FROM dba_data_files union SELECT SUM(bytes) bytes FROM dba_temp_files union SELECT SUM(bytes) bytes FROM v$log);`
5. Write down the received database size.
6. Exit Oracle SQL*Plus:
   `SQL> exit`

Checking the Backup Storage

Check your backup storage. It should confirm the following requirements:

- Located outside the computer where database is running.
- Available from the computer where backuping servers and database are located.
- Free space at the hard disk is bigger than backup size.

To define the hard disk free space

Run the command as **root**:

`OS> df -h`

Make sure this number is bigger than database size.

Creating Backup Directories

> **Warning!**
>
> Backup directories should be located at computer other than the database is located.

1. Log the system as **root** user.
2. Create the directory for backup files storage:
   `OS> mkdir /opt/IWTM_Backup_Files`
3. Create subdirectories:
   `OS> mkdir /opt/IWTM_Backup_Files/Oradata`
   `OS> mkdir /opt/IWTM_Backup_Files/IWTM`
   `OS> mkdir /opt/IWTM_Backup_Files/Recovery_Aid`

4. Grant permissions to these directories to the **oracle** user:
   `OS> chmod 777 /opt/IWTM_Backup_Files/ -R`

Creating Recovery Aid Files

To provide database restoring, besides data files, you need recovery aid files: a **trace** file of the control file and a copy of the **init.ora** file.

The **trace** file of the control file contains the names and locations of all of the data files and additional data files that have been added to the database. It also contains the redo logs and the commands that can be used to recreate the database structure.

The **init.ora** file contains Oracle initializing parameters, including the names and locations of the database control files.

To create trace file of the control file, spfile file and to backup them:

1. Log on to the computer that hosts the Oracle database as the **oracle** user.
2. Open Oracle SQL*Plus and log as **sysdba** user:
   `OS> sqlplus / as sysdba`
   If the system was installed using the installer, you can use **wsqlplus** command.

   > **Note:**
   >
   > `wsqlplus` command is an alias of `sqlplus`:
   > `alias wsqlplus='rlwrap -b "" -f ~/sql.dict sqlplus'`

   Wait for **Connected** message.
3. Copy (or enter) the following SQL queue to the command prompt:
   `SQL> alter database backup controlfile to trace;`
4. To find the directory in which the trace file was created, enter:
   `SQL> show parameter user_dump;`
   At that folder you can find **trc** file and **alert_iwtm.log** file (alert_INSTANCE_NAME). At log file you can find the name of the trace file which was created.
   Exit Oracle SQL*Plus:
   `SQL> exit`
5. If the system was installed using installer and default parameters were left, you can check last **alert_iwtm.log** records by the following command:
   `OS> tail -f /u01/app/oracle/diag/rdbms/iwtm/iwtm/trace/alert_iwtm.log`
   Press CTRL+C to exit view.
6. Create a copy of **spfile** (**pfile**):
   `OS> sqlplus / as sysdba`
   `SQL> CREATE PFILE from SPFILE;`
7. To find the directory in which the pfile file was created, enter:
   `SQL> show parameter PFILE`
   It returns a path to the directory where pfile was created (/u01/app/oracle/product/db_1/dbs/ by default).
   In this folder the **initiwtm.ora** file is located too. Please create a backup for **initiwtm.ora** file.
   Exit Oracle SQL*Plus:
   `SQL> exit`
8. Copy trace and spfile files to the backup storage, to previously created `/opt/IWTM_Backup_Files/Recovery_Aid` subdirectory.

9. Be sure to copy the file with the most recent date and timestamp. To check the date and the timestamps of the files in the directory, enter:
   `OS> ll`
10. Rename the file so that it can be easily identified, for example:
    `controlfilebackupMMDDYY.trc`

Collecting a List of Files to Backup

You can create a list of files that need to be backed up. These lists are used in a later step.

1. Log on to the computer that hosts the Oracle database as the **oracle** user.
2. Open Oracle SQL*Plus and log as **sysdba** user:
   OS> sqlplus / as sysdba
   Wait for **Connected** message.
3. Create the list of directories to backup using following SQL commands:
   ```
   SQL> SELECT file_name FROM dba_data_files UNION SELECT file_name FROM dba_temp_files UNION SELECT name FROM v$controlfile union select member name from v$logfile;
   ```
   The output is like:
   ```
   /u01/app/oracle/fast_recovery_area/iwtm/control02.ctl
   /u01/app/oracle/oradata/iwtm/control01.ctl
   /u01/app/oracle/oradata/iwtm/redo01.log
   /u01/app/oracle/oradata/iwtm/redo02.log
   /u01/app/oracle/oradata/iwtm/redo03.log
   /u01/app/oracle/oradata/iwtm/redo04.log
   /u01/app/oracle/oradata/iwtm/redo05.log
   /u01/app/oracle/oradata/iwtm/redo06.log
   /u01/app/oracle/oradata/iwtm/redo07.log
   /u01/app/oracle/oradata/iwtm/redo08.log
   /u01/app/oracle/oradata/iwtm/redo09.log
   /u01/app/oracle/oradata/iwtm/redo10.log
   /u01/app/oracle/oradata/iwtm/redo11.log
   /u01/app/oracle/oradata/iwtm/redo12.log
   /u01/app/oracle/oradata/iwtm/redo13.log
   /u01/app/oracle/oradata/iwtm/sysaux01.dbf
   /u01/app/oracle/oradata/iwtm/system01.dbf
   /u01/app/oracle/oradata/iwtm/temp01.dbf
   /u01/app/oracle/oradata/iwtm/undotbs01.dbf
   /u01/app/oracle/oradata/iwtm/users01.dbf
   /u02/oradata/IWTM_2012_06_25_1.dbf
   /u02/oradata/IWTM_2012_06_26_1.dbf
   /u02/oradata/IWTM_2012_06_27_1.dbf
   /u02/oradata/IWTM_2012_06_28_1.dbf
   /u02/oradata/IWTM_2012_06_29_1.dbf
   /u02/oradata/IWTM_2012_06_30_1.dbf
   /u02/oradata/IWTM_2012_07_01_1.dbf
   /u02/oradata/IWTM_2012_07_02_1.dbf
   /u02/oradata/IWTM_2012_07_03_1.dbf
   /u02/oradata/IWTM_2012_07_04_1.dbf
   /u02/oradata/iwtm_1.dbf
   ```
4. Exit Oracle SQL*Plus:
   ```
   SQL> exit
   ```

Stopping IWTM System

Stopping IWTM system is not required but recommend doing this if there is little free space on IWTM server.

To stop IWTM system:

1. On the computer that hosts IWTM services, log in as **root**.
2. Stop all running Traffic Monitor Server services:
   ```
   iwtm stop
   ```

3. You can start services later (when backup is finished) using the following command:
   `iwtm start`

Stopping Oracle Database

> **Waning!**
>
> Please stop ORACLE database before backuping database files.

To stop Oracle database:

1. On the computer that hosts the database, log on as the ***oracle*** user.
2. In the command prompt, enter:
   `OS> dbshut $ORACLE_HOME`
3. You can start services later (when backuping finished) using the following command:
   `OS> dbstart $ORACLE_HOME`

Copying Database Files to Backup Storage

1. Stop all Oracle services (see "Stopping Oracle Database"). To make sure that all services are stopped, run the following command:
   `ps aux | grep ora`
   If Oracle services are not stopped, backup files can be damaged and unsuitable for recovery.
2. On the computer that hosts the database, copy directories (and their content) using previously created directories list (see "Collecting a List of Files to Backup").
   If the system was installed using the installer and default parameters were left, the path should be as follows:
   a. copy contents of **/u01/app/oracle/oradata/iwtm/** directory to **/opt/IWTM_Backup_Files/IWTM** directory
   b. copy contents of **/u02/oradata/** directory to **/opt/IWTM_Backup_Files/Oradata** directory

   > **Note:**
   >
   > Only the following file storages can be used:
   >
   > - an external drive with Ext4 or XFS file system
   > - a remote block device connected via iSCSI or NFS protocol
   > - a locally connected block device with Ext4 or XFS file system

3. From the computer that hosts database, copy **/u01/app/oracle/product/db_1/dbs/orapwiwtm** file to **/opt/IWTM_Backup_Files/Recovery_Aid** directory of the computer where backup files are located.

Restoring the Database from the Backup

Depending on the reason for the database crash, choose the appropriate recovery method:

- If the database was damaged due to the system failure or user error, restore the old database. For example, if an important file has been occasionally deleted, you can restore the database to the state when this file still existed: for details, see "Restoring at the Same Database".

- If the old database cannot be used any more, create a new database and recover data to it: for details, see "Restoring at the New Database".

Important!

If you need to update Traffic Monitor to a new version, you should first restore the database. Updating Traffic Monitor either before or during the database recovery is not supported.

Restoring at the Same Database

This is the procedure of restoring to the database that has the same directory structure as the one the backup was created at.

To restore the database by creating a new one:

1. Make sure the database environment is healthy. Check the existing database, the database server that hosts the existing database, and the computer that hosts the database server.
2. Stop database:
   ```
   OS> dbshut $ORACLE_HOME
   ```
3. Install Oracle database according to «*InfoWatch Traffic Monitor. Installation Guide*» document.
4. Perform the following tasks:
   a. Delete all content of **/u02/oradata/, /u02/oradata1/** and **/u01/app/oracle/oradata/iwtm/** directories
   b. Copy the content of **/opt/IWTM_Backup_Files/Oradata/** directory to **/u02/** directory
   c. Copy the content of **/opt/IWTM_Backup_Files/IWTM/** directory to **/u01/app/oracle/oradata/iwtm/** directory
   d. Rename **control01.ctl** file located in **/opt/IWTM_Backup_Files/IWTM/** directory to **control02.ctl** and copy it to **/u01/app/oracle/oradata/iwtm/** directory
   e. Check permissions.
5. Change them if necessary:
   ```
   OS> chown -R oracle:oinstall /u02/
   OS> chown -R oracle:oinstall /u01/app/oracle/oradata/iwtm/
   ```
6. Start database:
   ```
   OS> dbstart $ORACLE_HOME
   ```

Restoring at the New Database

If the drive structure of the new database differs from the drive structure of the old database, perform the following actions:

1. Edit the **initiwtm.ora** file in the **/opt/IWTM_Backup_Files/Recovery_Aid** directory to reflect the drive structure of the new database.
2. Copy the edited **initiwtm.ora** file to the **$ORACLE_HOME/dbs** directory on the computer that hosts the new database.
3. Log on to the computer that hosts the Oracle database as the **oracle** user.
4. Open Oracle SQL*Plus and connect as the **sysdba** user:
   ```
   OS> sqlplus / as sysdba
   ```
5. Generate spfile
   ```
   SQL> create spfile from pfile;
   ```
6. If you need to rename some files, you can use the following script:
   ```
   OS> sqlplus / as sysdba
   SQL> startup mount
   ```

```
SQL> alter database rename file '/<path_to_proddb_files>/<filename1>' to '/
<path_to_clonedb_files>/<filename1>';
…
SQL> alter database rename file '/<path_to_proddb_files>/<filenameN>' to '/
<path_to_clonedb_files>/<filenameN>';
SQL> shutdown immediate
```

Here `path_to_proddb_files` is a path to the directory where new database files are located (to where backup is restoring), and `path_to_clonedb_files` is a path to the directory where backup files are located.

6.1.5 Database Routinely Maintenance

> **Warning!**
>
> Do not power DB server off with power button: in certain cases this may cause the DB corruption.

When doing routine database maintenance, you should follow the established order:

1. Close all instances of the Management Console. Make sure that all connections of other programs to DB Traffic Monitor schema are closed; if there're any active connections, disable them.
2. Stop all TM processes on Traffic Monitor server:
   ```
   iwtm stop
   service php-fpm stop
   service nginx stop
   ```
3. Retrieve list of scheduled jobs from database server. For thisб run the following query in sqlplus using schema owner account:
   ```
   select JOB_NAME, STATE
   from user_scheduler_jobs u
   where u.enabled = 'TRUE'
   ```
4. Disable jobs by running the following script:
   ```
   BEGIN
   dbms_scheduler.disable('JOB_1',true);
   …
   dbms_scheduler.disable('JOB_N',true);
   COMMIT;
   END;
   /
   ```
   where `JOB_1… JOB_N` are the names of tasks to disable.
5. To make sure that none of these jobs is running run the following query:
   ```
   SELECT job_name
   FROM user_scheduler_running_jobs
   A list of active jobs displays. If any of the jobs is running you may run
   the query to stop it:
   BEGIN
   dbms_scheduler.stop_job('job_name');
   COMMIT;
   END;
   /
   ```

6. To prevent hanging on, stop Device Monitor server:
   `net stop iwdms`
7. Make all the necessary operations with the database.
8. After all required operations are made check connection to database server from Traffic Monitor server:
   `sqlplus db_login/db_password@tns_name`
   Here `db_login` and `db_password` are the name and password of the database schema owner, and `tns_name` is the name of TNS service.
   If the test is successful, the following SQL *Plus prompt will be displayed in response to the command:
   SQL>
9. Run Device Monitor server:
   `net start iwdms`
10. Run the processes of the Traffic Monitor server:
    `iwtm stop`
    `service php-fpm stop`
    `service nginx stop`
11. Check if the system log contains errors. The path to the system log:
    `/var/log/messages`
12. If the system log contains any error messages, consult technical support service.
13. Enable running previously disabled jobs:
    ```
    BEGIN
    dbms_scheduler.enable('JOB_1',true);
    …
    dbms_scheduler.enable('JOB_N',true);
    COMMIT;
    END;
    /
    ```
    where `JOB_1… JOB_N` are the names of previously stopped jobs.

6.1.6 Database Logging

Oracle DBMS operation in Traffic Monitor is logged with a script. This script allows you to set the logging level and export log data to a CSV file. The script uses settings of the current configuration file: `/opt/iw/tm5/csw/database.conf`. You should run the script from the directory where it is stored: **/** `opt/iw/tm5/csw/oracle/scripts/sys_log/sys_log.sh`.

The script includes the following commands:

- To set the logging level: `debug, info, warning, error –` run the command:
  `level`
  If you do not specify the second parameter, the current logging level is displayed.
- To export the log body (V_SYS_LOG representation) to a CSV file, run the command:
  `export`
  If necessary, you can set the number of lines to be exported:
  `export <the number of lines>`

On how logs are stored on the disk, see "Rotation of database logs".

Rotation of database logs

Rotation of database logs is the process of archiving, storing, and deleting obsolete data in logs. This process is required to save space and free up disk space. In Traffic Monitor, rotation applies to:

1. Database logs:
    a. XML file that contains a log of errors and important messages. It is located in the `/u01/app/oracle/diag/rdbms/iwtm/iwtm/alert` folder. The file is stored for one year. Rotation applies to each 10 MB of the file. The file is deleted automatically.
    b. TRC and TRM files that contain detailed information about DB errors (trace files). They are located in the `/u01/app/oracle/diag/rdbms/iwtm/iwtm/trace` folder. Files are stored for 30 days and then they are automatically deleted.
    c. `alert_iwtm.log` - a database log file in a text format. It is stored in the `/u01/app/oracle/diag/rdbms/iwtm/iwtm/trace` folder. Rotation applies to each 100 MB of the file. The file is rotated by the **logrotate** service and is deleted when the number of files exceeds 1000.
2. Logs of **listener** network service:
    a. XML file that contains logs of the **listener** service. The file is located in the `/u01/app/oracle/diag/tnslsnr/hostname/listener/alert` folder. The file is stored for one year. The file is stored for one year. Rotation applies to each 10 MB of the file. The file is deleted automatically by the **crond** service.
    b. TRC and TRM files that contain detailed information about errors of the **listener** service. Files are stored for 30 days and then they are automatically deleted by the **crond** service.
    c. `listener.log` - a log file of the **listener** service in a text format. The file is located in the `/u01/app/oracle/diag/tnslsnr/hostname/listener/alert` folder. Rotation applies to each 100 MB of the file. The file is rotated by the **logrotate** service and is deleted when the number of files exceeds 100.

Settings of the **crond** service for deleting obsolete files are located in `/etc/cron.daily/delete_old_oracle_logs.cron.`

Settings of the **logrotate** service are located in `/etc/logrotate.d/iwtm-oracle-conf-server.`

6.2 PostgreSQL

To connect to DB server from Traffic Monitor server terminal, use the following commands:

```
su - iwtm
psql -p 5433 -h <DB server IP address> postgres iwtm
psql -p 5433 -h 127.0.0.1 postgres iwtm
```
- to connect local database

To connect to DB from workstations running Windows, use pgAdmin program.

Connection information is located in **/opt/iw/tm5/csw/postgres/database.conf** configuration file.

This chapter contains instructions on administrating PostgreSQL:

- Tablespaces in InfoWatch Traffic Monitor Database
- Managing Daily Tablespaces
- Database backup
- Database Server Routinely Maintenance
- Database logging

6.2.1 Changing Preset Passwords

To change preset passwords of the DB users:

1. Stop Traffic Monitor processes:
   `iwtm stop`
2. Connect to PostgreSQL database:
   `psql -p 5433 -h 127.0.0.1 postgres iwtm`
3. Get the list of users:
   `\du`
4. Change user passwords:
   `alter user 'iw_user' with password 'new_password';`
   where `'iw_user'` is the selected DB user and `'new_password'` is a new password for this user.
5. Exit PostgreSQL DB:
   `\q`
6. Start Traffic Monitor processes:
   `iwtm start`

On how to change the preset password in Traffic Monitor, see "Changing the Preset Password".

6.2.2 Tablespaces in InfoWatch Traffic Monitor database

There are two types of tablespaces (TS) in InfoWatch Traffic Monitor database:

The type of tablespace	**Purpose**
Main	Storing the settings that are needed for the analysis and processing of the objects (configuration, tags, colors, etc.). Managing the System using the Management Console (roles, user accounts, etc.)
Daily	Storing objects, intercepted within one day. Storing information on the results of the analysis and processing of the objects (analyzed object categories, terms, etc.) Consists of three tablespaces: for storing objects with states *Violation*, *No Violations, Other (tablespace to save screenprints)*. Therefore the possibility of divided archiving, restoring, and deleting is acquired.

All data about the objects intercepted on a particular day are in the same daily TS. Daily tablespaces are created every day in such a way that the database always has TS for the next six days. The following name is automatically assigned to all daily tablespaces: *IWTM_X*, where *X* table)

Settings to manage data segments are defined when configuring database schema; however, they can be changed after the schema is created (see "Managing Daily Tablespaces").

Using installation **TM Standard** type, events are being saved in one tablespace. Automatic calculation of free space for future events with old events deletion takes place every week.

6.2.3 Managing Daily Tablespaces

In this chapter:

- Archiving Daily Tablespaces;
- Configuring Storage Modes for Tablespace Files;
- Restoring Daily Tablespaces;
- Configuring Location of Files in File System;
- Deleting Daily Tablespaces.

Archiving Daily Tablespaces

To free some space on a hard drive, you can periodically archive outdated data. We recommend placing data archive on external devices. Data can be recovered when necessary.

> **Warning!**
>
> If the months or years are used as the time interval, it is recommended to use the maximum value of the interval in calculations. For a month - 31 days. For a year - 366 days. For example, to remove the daily TS older than 4 years specify the interval 366 * 4 = 1464 days in the iwtm_iwtm_archive_tablespaces job.

You can regularly archive obsolete data to free some space on a hard drive. We recommend you to save an archive with data to an external data carrier. If necessary, you can restore the data.

The archiving can be performed:

- Automatically after the specified period is expired (see "Automatic Archiving of Daily Tablespaces");
- Manually – for archiving the selected daily tablespaces (see "Manual Archiving of Daily Tablespaces ").

Automatic Archiving of Daily Tablespaces

Before you enable automatic archiving, check that the archive directory is specified correctly:

```
select value
from setting
where setting = 'archive_path';
```

A `postgre` user must be the owner of the directory.

If the directory is specified incorrectly, then set it properly with the following command:

```
begin;
select sp_setting_set('archive_path', '/test/archive/');
commit;
```

If enable automatic archiving of tablespaces (by default, the option is disabled), you can use the following scripts (you should run scripts on behalf of the owner of the database schema):

- For the daily tablespace that stores objects with *Violation* status:
  ```
  begin;
  select sp_setting_set('violation_archive_enabled', '1');
  ```

```
select sp_setting_set('violation_archive_period', 'D');
commit;
```

- For the daily tablespace that stores objects with *No Violation* status:

```
begin;
select sp_setting_set('noviolation_archive_enabled', '1');
select sp_setting_set('noviolation_archive_period', 'D');
commit;
```

- For the daily tablespace that stores *screenshots*:

```
begin;
select sp_setting_set('other_archive_enabled', '1');
select sp_setting_set('other_archive_period', 'D');
commit;
```

where:
1 indicates that automatical deletion is enabled (to disable it, specify 0 instead);
D is a number of days after which the daily tablespace is archived by the System. This number should be larger than the set number of days before archiving the daily tablespace (see "Автоматическое архивирование ежедневных табличных пространств").

Manual Archiving of Daily Tablespaces

You can archive daily tablespaces manually. The order is described below.

Selecting daily tablespaces and data files

You can get a list of tablespaces that can be disconnected by running queries to the database on behalf of the database schema owner. The queries are made according to the archiving policy of your company.

Example. To select daily tablespaces with basic attributes (name, identifier, path, types, creation date, size), you can use the following query:

```
SELECT t.tbs_name, t.tbs_id, t.tbs_type, t.part_date,
pg_tablespace_location(oid),
pg_size_pretty(pg_tablespace_size(spcname)), t.status, t.note
FROM  pg_tablespace, iwtm.tbs_list t
WHERE t.tbs_name = pg_tablespace.spcname AND t.status IN (0, 3);
```

```
tbs_name | tbs_id | tbs_type | part_date  | pg_tablespace_location |
pg_size_pretty | status |        note
---------+--------+----------+------------+-----------------------
+---------------+--------+-------------------
 iwtm_2   |      2 |        1 | 2017-03-30 | /u02/pgdata/iwtm_2     | 692
kB          |      0 | Partitions created
 iwtm_3   |      3 |        2 | 2017-03-30 | /u02/pgdata/iwtm_3     | 692
kB          |      0 | Partitions created
 iwtm_4   |      4 |        0 | 2017-03-31 | /u02/pgdata/iwtm_4     | 25
MB          |      0 | Partitions created
 iwtm_5   |      5 |        1 | 2017-03-31 | /u02/pgdata/iwtm_5     | 692
kB          |      0 | Partitions created
 iwtm_6   |      6 |        2 | 2017-03-31 | /u02/pgdata/iwtm_6     | 692
kB          |      0 | Partitions created
 iwtm_7   |      7 |        0 | 2017-04-01 | /u02/pgdata/iwtm_7     | 692
kB          |      0 | Partitions created
 iwtm_8   |      8 |        1 | 2017-04-01 | /u02/pgdata/iwtm_8     | 692
kB          |      0 | Partitions created
```

```
 iwtm_9    |      9 |        2 | 2017-04-01 | /u02/pgdata/iwtm_9     | 692
kB          |      0 | Partitions created
```

> **Warning!**
>
> To get the list of files, we highly recommend using the sample query described in the article. If you use a different query, the list of files may be incomplete.

Disconnecting Daily Tablespaces from the Database

> **Warning!**
>
> You should not disconnect daily tablespaces when the iwtm_iwtm_add_parts, iwtm_iwtm_delete_tablespaces, iwtm_iwtm_archive_tablespaces jobs are running as it may cause data corruption.

1. Call the procedure on behalf of the owner of the database schema:
   `select pkg_part_archive_tablespace(N);`
   where `N` is a value of `tbs_id` attribute of the required tablespace from the `tbs_list` table.
   After running this script, the daily tablespace status will change to *`Offline.`*
2. Repeat the procedure call for each daily tablespace you want to disconnect.

Moving Data Files

Move catalogs with archived tablespaces which belong disconnected daily tablespaces to a different storage.

To get the list of disconnected tablespaces, use the following command:
`select * from tbs_list where status = 10;`
Data files are located in the directory:
`select value from setting where setting = 'archive_path';`

Restoring Daily Tablespaces

> **Warning!**
>
> A tablespace can only be restored in the database schema, from which it was disconnected (even if this schema was updated). The restoration of the tablespace after total database schema reinstallation is impossible.

Moving data files

To restore daily TS, you must move data files of this tablespace from a data carrier to the folder which path you can obtain using the following command:

`select value from setting where setting = 'archive_path'`

Warning!

Make sure that the *postgres* user has read and write privileges for the directory to move the data files to.

Connecting the daily tablespace

Warning!

Do not connect daily TS during iwtm_iwtm_add_parts, iwtm_iwtm_delete_tablespaces and iwtm_iwtm_archive_tablespaces jobs. This may cause data loss.

1. On behalf of the owner of the database schema, call the procedure:
   `select pkg_part_restore_tablespace(N);`
   where `N` is ID of the tablespace (specified in tbs_list).
   After completing the procedure, the status of TS will change to *Restored*.
2. Repeat the procedure call for each daily TS you want to enable.

Configuring Location of Files in File System

Daily tablespaces can be stored either in the same directory or in various directories on various disks.

The installer (see "*InfoWatch Traffic Monitor. Installation Guide*" document) sets the usage of one daily tablespaces directory located in `/u02/pgdata1`.

Note:

For tablespace archives, the `/u02/arch` directory is used.

However, at high loads, we recommend storing daily tablespaces distributedly in different files systems (LUN, physical drives) for sequential usage. For example, if three file systems are defined, data is located as follows:

The first day – a daily tablespace is created in File system 1.

The second day – a daily tablespace is created in File system 2.

The third day – a daily tablespace is created in File system 3.

The fourth day – a daily tablespace is created in File system 1.

…

You can change the distribution of daily tablespace files (number and location) using scripts.

A sample script to change the number of separate storages for daily tablespaces:

```
begin;
select pkg_part_set_df_path_cnt('4');
commit;
```

Warning!

If you change the number of storages for daily tablespaces, you should also edit (add/delete) their paths.

A sample script to change paths for daily tablespaces:

```
begin;
select pkg_part_set_df_path('/test1/', 1);
select pkg_part_set_df_path('/test2/', 2);
select pkg_part_set_df_path('/test3/', 3);
select pkg_part_set_df_path('/test4/', 4);
commit;
```

Note:

We recommend adding "/" character at the end of the path.

A sample script to view contents of daily tablespaces:

```
select a.d, a.code, power(10, trunc(log(10, a.binary_size + a.text_size))) ||
 '-' ||
power(10, trunc(log(10, a.binary_size + a.text_size)) + 1) size_range,
count(1) cnt, sum(a.binary_size) binary_size, sum(a.text_size) text_size
from
(
select date_trunc('day', o.capture_date) d, s.display_name code, o.object_id,
coalesce(length(os.source),0)+coalesce(length(os.context),0)+
coalesce(length(o.gui_xml),0)+coalesce(length(o.preview_data),0) binary_size,
coalesce(length(o.text), 0) text_size
from object o
inner join service s on o.service_code = s.service_id and s.language = 'eng'
inner join object_source os on os.object_id = o.object_id
where o.capture_date between to_date('05.05.2014', 'dd.mm.yyyy') and
to_date('14.05.2014', 'dd.mm.yyyy')
) a
group by a.d, a.code, power(10, trunc(log(10, a.binary_size + a.text_size)))
|| '-' ||
  power(10, trunc(log(10, a.binary_size + a.text_size)) + 1)
order by 1, 2, 3;
```

Note:

If, along with the service information of the database, you need to retrieve the result of analyzing the size of intercepted objects in daily tablespaces, we recommend using pgAdmin.

Configuring Storage Modes for Tablespace Files

If during the installation, the System was configured to move data in the **Normal** mode, you can change the storage mode later.

You can use the **Fast/slow** mode (fast and slow drives). In this mode, data is saved to the fast partition and then, after a specified number of days is moved to slow partitions. To configure this mode:

1. Edit the `/etc/fstab` file to automatically mount a new partition to `/u03`
   `/dev/sdd1 /u03/ ext4 defaults 1 2`
2. Create the "pgdata" folder:
   `mkdir /u03/pgdata`
3. Change user:
   `chown -R postgres:postgres /u03`
4. Log into the database:
   `su - iwtm`
   `psql -p 5433 -h <DB_server_IP_address> postgres iwtm`
   `psql -p 5433 -h 127.0.0.1 postgres iwtm` - to connect local database
5. Specify the storage period on fast drives:
   select pkg_part_set_fast_days(7);
6. Specify the path to the fast drive:
   `select pkg_part_set_fast_path('/u03/pgdata/',1);`
7. Specify the path to the slow drive:
   `select pkg_part_set_df_path('/u02/pgdata1/',1);`
8. If needed, you can use several slow drives. The data will be recorded to the next slow drive when the previous is full. To add the slow drives specify a new path:
   `select pkg_part_set_df_path('/u02/pgdata2/',2);`
9. Specify the total amount of slow drives:
   `select pkg_part_set_df_path_cnt('2');`
10. Change the mode to fast-slow drives: `select pkg_part_set_filesys_type('fast/slow').`
    The data will be transferred from fast drives to slow ones during night job.
11. To run the process of moving files manually:
    `select iwtm.pkg_part_move_fast_tablespaces_to_slow();`

Or you can use the **Rotate** storage mode (everyday rotation). In this mode, the System switches to the next partition daily or in case of the partition overflow. To configure this mode:

1. Mount the partition and make sure that it can be mounted automatically on reboot
2. Create the "pgdata" folder:
   `mkdir /u03/pgdata`
3. Change user:
   `chown -R postgres:postgres /u03`
4. Log into the database:
   `su - iwtm`
   `psql -p 5433 -h <DB_server_IP_address> postgres iwtm`
   `psql -p 5433 -h 127.0.0.1 postgres iwtm` - to connect local database
5. Add a path to the second partition:
   `select pkg_part_set_df_path('/u03/pgdata/',2);`
6. Specify a new number of paths:
   `select pkg_part_set_df_path_cnt(2);`
7. Switch to the `rotate` mode:
   `select pkg_part_set_filesys_type('rotate');`

```
postgres=# select * from setting where setting like 'df_%';
setting | value | editable
------------+---------------+----------
df_path1 | /u02/pgdata1/ | 1
df_path2 | /u03/pgdata/ | 1
df_path_cnt | 2 | 1
df_filesys_type | rotate | 1
```

Note:

Specifics of data storage modes (**normal**, **fast/slow**, and **rotate**) are described in the KB article "Tablespaces data storage settings. Data storage partition".

Deleting Daily Tablespaces

If you do not need to further store the data, you can use the procedure for deleting daily tablespaces (iwtm_iwtm_delete_tablespaces). The procedure automatically deletes all the data in a tablespace, segments, and also the tablespace and data files.

Warning!

1. Deleting tablespaces cannot be undone. If you complete the operation, you will not be able to restore the deleted data.
2. iwtm_iwtm_delete_tablespaces job cannot operate tablespaces which were disconnected/connected manually.

As a result, this procedure will remove all the daily tablespaces (including information about the archived daily tablespaces), which satisfy the following condition:

The date of creating a tablespace is less or equal to the difference between the current date and the specified time interval for deleting the tablespace.

Note:

If the archived daily tablespace cannot be restored (because the information in it was removed from the database), then you can delete data files of this tablespace from the archive.

Warning!

While deleting tablespaces, access to the corresponding tables is closed. For this reason, log files of the **iw_deliver**, **iw_x2db**, **iw_updater** processes may contain database access errors. Once tablespaces are deleted, these processes automatically restore access to the database.

We recommend running a job to delete data daily. Otherwise, the amount of deleted data increases, which increases the time for running the procedure and consequently increases the idle time of the Traffic Monitor Server.

Warning!

If months or years are used as a time interval, then we recommend you to apply the maximal interval value in the counting: 31 days for a month and 366 days for a year. For example, to delete daily TS older than 4 years, specify 366*4=1464 days interval in iwtm _iwtm_delete_tablespaces job.

Setting the interval of daily TS deletion

To perform TS deletion automatically (by default the function is disabled) you can use the following scripts (run under the account of the database schema owner). Specify period to store information of archived tablespaces:

- For daily TS storing objects with *Violation* status:
```
begin;
select sp_setting_set('violation_delete_enabled', '1');
select sp_setting_set('violation_delete_period', 'D');
commit;
```
- For daily TS storing objects with *No Violation* status:
```
begin;
select sp_setting_set('noviolation_delete_enabled', '1');
select sp_setting_set('noviolation_delete_period', 'D');
commit;
```
- For daily TS storing *screenshots*:
```
begin;
select sp_setting_set('other_delete_enabled', '1');
select sp_setting_set('other_delete_period', 'D');
commit;
```

where:

1 indicates that automatical deletion is enabled (to disable it, specify 0 instead);

D is a number of days after which the daily TS will be deleted by the System. This number should be larger than the set number of days before archiving the daily tablespace (see "Automatic Archiving of Daily Tablespaces").

After removal of the tablespaces disconnected from the database (with *Offline* status), they become unavailable in the System.

Deleting archived tablespaces

When deleting archived daily tablespaces from the database, datafiles remain in the System (by default, they are stored in the / `u02/arch` directory). To free up disk space, you can:

- delete tablespaces manually;
- add new scheduled tasks. You can add tasks either in the `/etc/cron.d/iwtm_cleanup` file or in another file with tasks in the directory.

Example:

To delete all archived daily tablespaces older than 150 days:

1. Open for editing the `/etc/cron.d/iwtm_cleanup` file or another file with tasks in the directory.
2. Add lines:

```
35 3 * * * root find /u02/arch/ -type f -mtime +150 -delete > /
dev/null 2>&1 &
40 3 * * * root find /u02/arch/ -type d -ctime +10 -empty
-delete > /dev/null 2>&1 &
```

3. Save changes.
4. Apply new settings of the `cron` service:
   `systemctl reload crond`

Deleting daily tablespaces manually

If you need to delete daily tablespaces immediately (e.g., due to file system space shortage the interval of deletion was changed, but the next launch of the job will not happen soon), then run the following script on behalf of the database scheme owner:

```
select pkg_part_delete_tablespaces();
```

If you need to delete only one daily tablespace, then run the script with this tablespace number (`tbs_id`) specified:

```
select pkg_part_delete_tablespace(<tbs_id>);
```

Deleting daily tablespaces with a script

If you want to configure automatic deletion of daily tablespaces, use **/opt/iw/tm5/bin/dbtools/dbconf-iwdrop-postgres.sh** or **/opt/iw/tm5/bin/dbtools/dbconf-jobs-postgres.sh** script. You can use the following commands:

Purpose	Command
Set up deletion period	`/opt/iw/tm5/bin/dbtools/dbconf-iwdrop-postgres.sh set violation|noviolation|other <days> [-v]`
Enable automatic deletion	`/opt/iw/tm5/bin/dbtools/dbconf-iwdrop-postgres.sh enable violation|noviolation|other [-v]`
Disable automatic deletion	`/opt/iw/tm5/bin/dbtools/dbconf-iwdrop-postgres.sh disable violation|noviolation|other [-v]`
View the state of settings	`/opt/iw/tm5/bin/dbtools/dbconf-iwdrop-postgres.sh show [-v]`
Delete all daily TS	`/opt/iw/tm5/bin/dbtools/dbconf-jobs-postgres.sh start iwtm_delete_tablespace`

Example:

To delete all objects with *"No violation"* status, which are older than 15 days, run the following commands:

```
/opt/iw/tm5/bin/dbtools/dbconf-iwdrop-postgres.sh set noviolation 15 [-v]
/opt/iw/tm5/bin/dbtools/dbconf-iwdrop-postgres.sh enable noviolation [-v]
```

6.2.4 Database Backup

To minimize the risk of data loss we strongly recommend to backup the database on a monthly basis. We recommend you to use dedicated storage system for backups storage.

For non-database administrators who do not have standard backuping methods we recommend creating a “cold backup” at the stopped database. This procedure may also be used to migrate the database from one server to another.

This section further covers:

- Creating Database Backup;
- Резервное копирование базы данных.

Creating Database Backup

Creating database backup (cold backup procedure) is performed in the following order:

- Defining the Size of Backup;
- Checking Backup Storage;
- Creating Backup Directories;
- Stopping IWTM System;
- Copying Database Files to Backup Storage;
- Stopping PostgreSQL.

Defining the Size of Backup

To define size of the future archive, it is necessary to find out summary size of catalogue of PostgreSQL DB, main tablespace size and daily tablespaces catalogues:

1. Enter the system using **root**;
2. Get summary catalogue size:
   `du -sx -BM /u01/postgres/ /u02/pgdata` /u02/pgdata1 `/u02/arch`

If you another storage mode, the data can be stored in different directories (for more details, please see "Configuring Storage Modes for Tablespace Files").

Checking Backup Storage

To check if the selected backup storage is suitable, take the following steps:

1. Mount the external storage to the DB server. Make sure that the following requirements are met:
   - The external storage and the database are located on different computers.
   - Computer with servers and databases to be backed up can access the external storage.
   - The external storage has more free space on the hard disk than the backup size.
2. Check the amount of free space on the hard disk:

a. Run the following command as **root**:
   `OS>df -h`
b. Make sure that the mounted section has more free space than the backup size.

Creating Backup Directories

> **Warning!**
>
> Backup directories should be located at computer other than the database is located.

1. Log the system as **root** user.
2. Create the directory for backup files storage:
   `mkdir /mnt/IWTM_Backup_Files`
3. Create subdirectories:
   ```
   mkdir /mnt/IWTM_Backup_Files/Pgdata
   mkdir /mnt/IWTM_Backup_Files/IWTM_main
   mkdir /mnt/IWTM_Backup_Files/IWTM_data
   ```

Stopping IWTM System

Stopping IWTM system is not required but we recommend doing it if there is little free space on IWTM server.

To stop IWTM system:

1. On the computer that hosts IWTM services, log in as **root**.
2. Stop all running Traffic Monitor Server services:
   `iwtm stop`
   You can start services later (when backup is finished) using the following command:
   `iwtm start`

Stopping PostgreSQL

> **Important!**
>
> Before processing the database files backup, you should obligatory stop the PostgreSQL database.

To stop PostgreSQL database:

1. On the computer that hosts the database, log on as the **root** user.
2. In the command prompt, enter:
   ```
   service pgagent-13 stop
   service postgresql-13 stop
   ```
   You can start services later (when backuping finished), using the following command:
   ```
   service pgagent-13 start
   service postgresql-13 start
   ```

Copying Database Files to Backup Storage

1. Stop all PostgreSQL services ("Остановка PostgreSQL"). To make sure that all services are stopped, run the following command:

```
ps aux | grep postgre
```
If PostgreSQL services are not stopped, backup files can be damaged and unsuitable for recovery.

2. On the computer that hosts the database, copy directories (and all their contents) using a previously created list of directories.
   If the system has been installed with installer and default settings are not modified, then:
   - copy contents of **/u01/postgres/** directory to **/opt/IWTM_Backup_Files/postgres** directory
   - copy contents of **/u02/pgdata/** directory to **/opt/IWTM_Backup_Files/pgdata** directory
   - copy contents of **/u02/pgdata1/** directory to **/opt/IWTM_Backup_Files/pgdata1** directory
   - copy contents of **/u02/arch/** directory to **/opt/IWTM_Backup_Files/arch** directory

   > **Note:**
   >
   > Only the following file storages can be used:
   >
   > - an external drive with Ext4 or XFS file system
   > - a remote block device connected via iSCSI or NFS protocol
   > - a locally connected block device with Ext4 or XFS file system

Restoring Database from Backup

Depending on the reason for the database crash, choose the appropriate recovery method:

- If the database was damaged due to the system failure or user error, restore the old database. For example, if an important file has been occasionally deleted, you can restore the database to the state when this file still existed: for details, see "Restoring at the Same Database".
- If the old database cannot be used any more, create a new database and recover data to it: see "Restoring to a New Database".

> **Important!**
>
> If you need to update Traffic Monitor to a new version, you should first restore the database. Updating Traffic Monitor either before or during the database recovery is not supported.

Restoring to the Same Database

Below you can find instructions on how to restore data to a database that has the same directory structure as the one that was backed up.

To restore the database by creating a new one:

1. Make sure the database environment is healthy. Check the existing database, the database server that hosts the existing database, and the computer that hosts the database server.

2. Stop PostgreSQL services:
   ```
   service pgagent-13 stop
   service postrgesql-13 stop
   ```

3. Install PostgreSQL database according to the «InfoWatch Traffic Monitor. Installation Guide» document.

4. Take the following steps:
    a. Delete all the content of **/u01/postgres/**, **/u02/pgdata/**, **/u02/pgdata1/**, **/u02/arch/** directories;
    b. Copy the content of **/opt/IWTM_Backup_Files/postgres** directory to **/u01/postgres/** directory;
    c. Copy the content of **/opt/IWTM_Backup_Files/pgdata/** directory to **/u02/pgdata/** directory;
    d. Copy the content of **/opt/IWTM_Backup_Files/pgdata1/** directory to **/u02/pgdata1/** directory;
    e. Copy the content of **/opt/IWTM_Backup_Files/arch/** directory to **/u02/arch/** directory.

5. Check the permissions. If necessary, change them:
```
chown postgres /u01/postgres/  -R
chown postgres /u01/pgdata/ -R
chown postgres /u01/pgdata1/ -R
chown postgres /u01/arch/ -R
```

6. Start the database:
```
service postrgesql-13 start
service pgagent-13 start
```

Restoring to a New Database

When restoring to PostgreSQL, you should copy DB files to the same directories, to which they were saved.

To restore the database, copy the directories, check permissions and start the database services (see "Restoring to the Same Database").

6.2.5 Database Server Routinely Maintenance

> **Warning!**
>
> We highly recommend not shutting down the DB server with the power button: in certain cases, this may cause the DB corruption.

If you need to carry out routine maintenance on the database server, take the following steps:

1. Close all instances of the Management Console. Make sure that all connections of other programs to DB Traffic Monitor schema are closed; if there are any active connections, disable them.
2. Stop all TM processes on Traffic Monitor server:
```
iwtm stop
service iwtm-php-fpm stop
service nginx stop
```
3. On the database server, retrieve the list of scheduled jobs. For this, in psql, under the account of the database schema owner, run the following query:
```
select jobname,  case when jobagentid is null then 'scheduled' else
'running' end state
from pgagent.pga_job
where jobenabled= true;
```

4. Disable jobs by running the following script:
   `select iwtm.pkg_utility_disable_job('JOB_1);`
   ...
   `select iwtm.pkg.utility_disable_job('JOB_N');`
   `commit;`
   where `JOB_1… JOB_N` are the names of jobs to be disabled.
5. To make sure that there are no running jobs, run the following query:
   `select pga_job.jobname`
   `from pgagent.pga_job`
   `where pga_job.jobagentid is not null;`
   A current task cannot be stopped in PostgreSQL, this should be done by stopping the agent from Linux using thy following command:
   `service pgagent-13 stop` (stopping all tasks with one command)
6. Make all the necessary operations with the database.
7. After all operations are complete, check the connection to the database server from Traffic Monitor server:
   `psql -p 5433 -h server_name postgres postgres`
   where `server_name` - database name or IP address
   If the test is successful, the following psql invitation will appear:
   `postgre=#`
8. Run the Traffic Monitor server processes:
   `iwtm start`
   `service iwtm-php-fpm start`
   `service nginx start`
9. Check if the system log contains errors. The path to the system log:
   `/var/log/messages`
10. If the system log contains any error messages, consult the technical support service.
11. Enable running previously disabled jobs:
    `BEGIN`
    `select iwtm.pkg_utility_enable_job('JOB_1');`
    `…`
    `select iwtm.pkg_utility_enable_job('JOB_N');`
    `commit;`
    `end;`
    `/`
    where `JOB_1… JOB_N` are the names of the previously stopped jobs.

6.2.6 Database logging

PostgreSQL DBMS operation in Traffic Monitor is logged with a script. This script allows you to set the logging level and export log data to a CSV file. The script uses settings of the current configuration file: `/opt/iw/tm5/csw/database.conf` . You should run the script from the directory where it is stored: **/** `opt/iw/tm5/csw/postgres/scripts/sys_log/sys_log.sh` .

The script supports the following commands:

- To set the logging level: `debug, info, warning, error –` run the command:
  `level`
  If you do not specify the second parameter, the current logging level is displayed.
- To export the log body (V_SYS_LOG representation) to a CSV file, run the command:
  `export`

If necessary, you can set the number of lines to be exported:
`export <кол-во строк>`

On how logs are stored on the disk, see "Rotation of database logs".

Rotation of database logs

Rotation of database logs is the process of archiving, storing, and deleting obsolete data in logs. This process is required to save space and free up disk space. In Traffic Monitor, rotation applies to the DB log in a text format: `/u01/postrges/pg_log/*.log.` This log file is rotated by the **logrotate** service. Rotation applies to each 100 MB of the file. When the number of files exceeds 1000, the log file is deleted.

Settings of the **logrotate** service are stored in `/etc/logrotate.d/iwtm-pg-conf.`

7 Administrating the Server End of InfoWatch Traffic Monitor

This chapter contains description of Traffic Monitor server part components and methods of their use:

- Traffic Monitor Server Modules and Processes;
- Setting Traffic Monitor Server End Configuration Files;
- Configuring Settings for HTTP-Requests Transferred through ICAP Protocol (icap.conf file);
- Configuring Settings of Enclosures Archives Processing (extractors.conf file);
- Archiving a Mail Queue Directory;
- Logging of System Work;
- Loading an Object Queue;
- Recovering the System after Failures;
- Configuring forwarding data to SIEM;
- Deleting temporary files.

7.1 Traffic Monitor Server Processes

This section covers:

- List of Traffic Monitor Server End Processes;
- Using Traffic Monitor Server End Processes.

7.1.1 List of Traffic Monitor Server End Processes

The System works by means of running processes: the same process can run simultaneously in several instances.

Purpose	Process name	Process description	Configuration file
Data collection	iw_icap	Processes HTTP traffic. Receives HTTP requests from the ICAP client. Extracts data from HTTP requests. Then, the extracted data is added to the XML context. The XML context is sent to the analysis subsystem for the check. After analysis, the response is sent to the ICAP-client to allow/deny the delivery of the HTTP request. It also transfers HTTP request to **iw_x2db** process that saves it to the database	/opt/iw/tm5/etc/icap.conf
	iw_sniffer	Process that intercepts traffic transferred by SMTP, HTTP, ICQ, POP3, IMAP, and NRPC protocols	/opt/iw/tm5/etc/sniffer.conf
	iw_proxy	Receives a copy of the traffic, divides it to HTTP, ICQ, and SMTP-traffic and sends it to iw_messed module. Includes the following processes: • iw_proxy_http – receives a copy of HTTP traffic Receives an HTTP request,	/opt/iw/tm5/etc/proxy.conf

Purpose	Process name	Process description	Configuration file
		generates XML context from the received object. Then XML context is transferred to the analysis and decision making subsystem **iw_analysis**. • iw_proxy_icq - receives a copy of ICQ traffic Receives an ICQ message, generates XML context from the received object. Then XML context is transferred to the analysis and decision making subsystem **iw_analysis**. • iw_proxy_smtp - receives a copy of SMTP traffic Receives an SMTP message, generates XML context from the received object. Then XML context is transferred to the analysis and decision-making subsystem. After the analysis, the object copy is sent to the **iw_x2db** process that saves is to the database.	
	iw_smtpd	Receives SMTP messages. When integrated with the Postfix mail server, it receives incoming messages from Postfix. If there is no integration with Postfix, it receives incoming messages from the corporate mail server or mail client (depending on the settings of your mail system). Receives incoming messages in SMTP format, converts SMTP envelope data to the XML context. Then it transfers SMTP-message and XML context to the **iw_messed** process.	/opt/iw/tm5/etc/smtpd.conf
	iw_capstack	Processes traffic transferred by POP3, IMAP, and NRPC protocols	/opt/iw/tm5/etc/capstack.conf
	iw_messed	Processes SMTP messages. Extracts data from SMTP, POP3, and IMAP objects. The extracted data is then added to the received XML context. The ready XML context (containing the data extracted from the envelope and the e-mail) is transferred to the analysis subsystem. After the analysis, **iw_messed** transfers the allowed SMTP messages to the mail system component that delivers mail	/opt/iw/tm5/etc/messed.conf

Purpose	Process name	Process description	Configuration file
		(only in the normal and transparent transport modes). If integration with the Postfix mail server is configured, then this component is Postfix. If there is no integration with Postfix, then the component depends on the settings configured in your mail system: it can be a corporate mail server or a mail client. Besides, a copy of the checked SMTP message is sent to the **iw_x2db** process that saves is to the database.	
	iw_xapi	Includes 2 services: **iw_xapi_xapi** and **iw_xapi_puppy**. Receives objects from Device Monitor and external systems via thrift-interface and places them in a file queue. Then it sends objects to **iw_analysis** process. When receiving EML objects, transmits them to **iw_messed** process.	/opt/iw/tm5/etc/xapi.conf
	iw_analysis	Takes objects from the file queue, previously placed there by **iw_xapi_xapi/ iw_xapi_puppy, iw_proxy_icq, iw_proxy_http**. By means of file queue it transmits objects to **iw_warpd**, **iw_cas**, **iw_pas**, **iw_luaengined** for processing. Then the objects are placed into the file queue to be sent to the database by **iw_x2db** process.	/opt/iw/tm5/etc/analysis.conf
Data processing	iw_warpd	Manages processes of extracting data from containers enclosed in intercepted objects	/opt/iw/tm5/etc/warpd.conf
	iw_image2text_fre	Manages text recognizing in images with the help of OCR ABBYY FineReader.	/opt/iw/tm5/etc/image2text_fre.conf
	iw_image2text_ts	Manages text recognizing in images with the help of OCR Tesseract.	/opt/iw/tm5/etc/image2text_ts.conf
	iw_cas	Takes the role of the content analysis server. Interception subsystems sends text queries in plain text format to the **iw_cas** process for content analysis. When the analysis is complete, the query result is sent to the analysis and decision-making subsystem.	/opt/iw/tm5/etc/cas.conf

Purpose	Process name	Process description	Configuration file
	iw_image_autoling	Takes the role of the graphic objects automatic classifier	/opt/iw/tm5/etc/iw_image_autoling.conf
	iw_text_autoling	Takes the role of the text objects automatic classifier	/opt/iw/tm5/etc/iw_image_autoling.conf
	iw_pas	Receives analysis results from **iw_cas**. Defines the presence of protected objects and adds corresponding attributes to the object.	/opt/iw/tm5/etc/pas.conf
	iw_luaengined	Enables running of an LUA-script according to the actual policy.	/opt/iw/tm5/etc/luaengined.conf
	iw_x2x	The process gets data with xml+dat-files via file queue. The files provided are to be modified and sent to **iw_x2db** process.	/opt/iw/tm5/etc/x2x.conf
	iw_tech_tools	Verifies regular expressions and conditions for DB unloadings, makes it possible to normalize text according to regular expressions.	/opt/iw/tm5/etc/tech_tools.conf
Loading to DB	iw_qmover_client	Works on the Traffic Monitor Server installed at a branch office. Sends intercepted objects to the headquarters' database.	/opt/iw/tm5/etc/qmover_client.conf
	iw_qmover_server	Works on the Traffic Monitor Server, installed in the central office. Receives objects from the agent installed in a branch office. Through **iw_x2x**, it sends objects to the **iw_x2db** process that saves them to the database.	/opt/iw/tm5/etc/qmover_server.conf
	iw_x2db	Load objects verified by analysis and decision making systems from output file queue of **iw_x2x** process to the database.	/opt/iw/tm5/etc/x2db.conf
Infrastructure	iw_adlibitum	Manages processes of receiving actual data from Active Directory, Domino Directory, Samba DC, Astra Linux Directory, Astra Linux Directory Pro and FreeIPA servers	/opt/iw/tm5/etc/adlibitum.conf

Purpose	Process name	Process description	Configuration file
	iw_agent	Is required for managing the System configuration	/opt/iw/tm5/etc/agent.conf
	iw_blackboard	Enables interaction of active policies and the database	/opt/iw/tm5/etc/blackboard.conf
	iw_bookworm	Acts a reference book in the System	/opt/iw/tm5/etc/bookworm.conf
	iw_cas_config_compiler	Converts the configuration file of Content analysis server to a normal binary file for using the configuration in the content analysis	/opt/iw/tm5/etc/cas_config_compiler.conf
	iw_configerator	Generates configuration that is sent to Device Monitor	/opt/iw/tm5/etc/configerator.conf
	iw_deliver	Delivers emails. Sends SMTP messages to recipients if the delivery is allowed in the Management Console (only in Normal and Transparent transport modes). Besides, it delivers SMTP messages if, for some reason, they have not been delivered by **iw_messed** process (for example, if there is no connection with the mail relay server or a mail client).	/opt/iw/tm5/etc/deliver.conf
	iw_metainfo_fetcher	Selects metainformation about all contacts, including the ones from the events, for indexing from the DB. Transfers data for indexing to **iw_is** process	-
	iw_audit_fetcher	Selects data of extended audit for indexing from the DB. Transfers data for indexing to **iw_is** process	-
	iw_is	Manages the indexing process and the work of full text search service of search servers. Prepares the files with data description, which get to the indexer through the file queues, and starts the indexer	/opt/iw/tm5/etc/is.conf
	iw_indexer	Indexes the text of database objects. Gets access to the database for indexing it and adds indexes to file storage. When a	/opt/iw/tm5/etc/indexer.conf

Purpose	Process name	Process description	Configuration file
		sphinx search query is running, receives object IDs from the file storage.	
	iw_ kicker	Enables operation of WebGUI and starts the following services: agent, blackboard, export, import, report, notifier, selection, systemcheck, xapisamplecompiler, samplecompiler, querytracker, reporttracker	/opt/iw/tm5/etc/kicker.conf
	iw_licensed	Licensing subsystem. Monitors and processes licenses installed in the System	/opt/iw/tm5/etc/licensed.conf
	iw_rammer	Dispatches the processing errors e-mails when operating inline	/opt/iw/tm5/etc/rammer.conf
	iw_sample_compiler	A process for creating fingerprints from uploaded sample files	/opt/iw/tm5/etc/sample_compiler.conf
	consul	Detects, registers and monitors availability of servers which interact with the user interface	/opt/iw/tm5/etc/consul/consul.json
	iw_system_check	Collects data from Nagios service and provides received data to be displayed in Management Console	/opt/iw/tm5/etc/system_check.conf
	iw_updater	Loads the configuration from the database to Traffic Monitor Server	/opt/iw/tm5/etc/updater.conf

7.1.2 Setting Traffic Monitor Server End Configuration Files

You can find the list of System configuration files and their settings that can be changed to configure the System for operation in your organization in the "*Configuration Files Guide*" document. We recommend not editing files that are not described in this document.

Configuration files are located in `/opt/iw/tm5/etc`.

The System configuration files are in JSON format. Configuration file names match the names of corresponding System components to be configured. For example, for configuring **iw_x2x** component, **x2x.conf** configuration file is used**.**

There are common configurable settings (see the document "*Configuration Files Guide*", articles: "*General section Bookworm*", *"Common section Discovery", "General section Logging", "General section Statistics", "General section Statistic", "General section ThriftServers"*) and parameters specific for each configuration file (see a description of separate files in the "*Configuration Files Guide*" document).

7.1.3 Using Traffic Monitor Server End Processes

You can find the list of Traffic Monitor processes in "List of Traffic Monitor Server End Processes"

All Traffic Monitor Server processes are launched under **iwtm** user, which is created automatically during Traffic Monitor Server installation (for more information on user accounts, see "InfoWatch Traffic Monitor. Installation Guide").

> **Note:**
>
> The user name is registered in unit files of processes in `User` parameter. For correct operation of the System, we recommend leaving the value of this parameter unchanged.

During Traffic Monitor Server operation, the state of processes is checked by **pguard** script which is created in `/opt/iw/tm5/bin` directory during the installation. If for some reason, one or more Traffic Monitor Server processes are stopped, **pguard** script restarts them.
Traffic Monitor Server processes are managed with bash script **/opt/iw/tm5/bin/iwtm** which is an autorun script for run levels 2, 3, 4, 5.

> **Note:**
>
> 1. To intercept a copy of traffic using Sniffer (ICQ- HTTP-, SMTP-traffic), separate **iw_proxy** processes are launched.
> 2. The **iw_qmover_server, iw_qmover_client** processes are available, however, autorun is disabled for them by default. Each process is launched on its end (**iw_qmover_client** in branches and **iw_qmover_server** in the central office.
> 3. The **iw_rammer** process is not installed by default. After manual installation, the process is available in the process list.

Start keys for **iwtm** script:

Start key	Purpose
`start`	starting processes
`stop`	safe stop of processes
`status`	displaying process state (running/not started/available/ unavailable)
`restart`	restarting processes (sequential execution of start+stop commands)
`reload`	reloading process configuration
`kill`	transmitting a signal to immediately end the process (SIGKILL)

Start key	Purpose
`test`	displaying all available iwtm daemons
`enable`	setting the "available" status to a daemon - the daemon autostart is allowed
`disable`	setting the "unavailable" status to a daemon - the daemon autostart is forbidden
`services_state`	displaying all available iwtm daemons with bit masks

Sample commands

Command	Action
`iwtm status`	Check the state of Traffic Monitor Server processes

One of the following commands:
`service iw_cas start` (if you need to view logs)
`iwtm start cas`
`iwtm start iw_cas`
`iwtm start iw_cas.service`
`systemctl start iw_cas` (viewing logs is unavailable)
`systemctl start iw_cas.service`
	Start the content analysis server (CAS)

Warning!

PID files are stored in `/opt/iw/tm5/run` directory. In case of an emergency shutdown, you should delete all PID files before starting processes.

Changing process autorun parameters

You can find information on enabling/disabling autorun for processes in "Check of process autostart".

For each process managed by **iwtm** bash script, autorun parameters can be specified in a command line. Enabling/disabling autorun for processes (with iw_sniffer service as an example) is described in "Enabling and disabling autorun processes". For details about systemd commands see article "Commands to work with systemd".

7.2 Configuring OCR

The OCR technology allows you to convert hand-written, typed or printed text to text data. By default, the technology is disabled for all services, event types, and related protocols. OCR is used for:

- analyzing intercepted images,
- analyzing images loaded as sample documents.

For the first case, **iw_warpd** is extracting data from containers, included into intercepted objects. As per analyzing images, **iw_sample_compiler** is creating digital traces from downloaded sample documents. OCR enabling and configuring is performed within its configuration files. For details, see "Configuring OCR Extractors".

If necessary, you can configure OCR to analyze intercepted images. The following methods of configuring OCR are available:

Configuring interception at the level of:	Settings apply to the content of events	Priority of the setting
Service	Received by protocols of event types which belong to this service (if OCR settings are not specified for these event types or protocols)	Low
Event type for a particular service	Received by protocol of this event type (if OCR settings are not specified for these protocols)	Medium
Protocol for a particular event type	Received by the selected protocol for the specified event type	High

OCR settings are specified in the directory of **iw_bookworm** daemon, in `/opt/iw/tm5/etc/config-perm/bookworm` catalogue:

- `ocr.xml` - preset settings;
- `ocr_custom.xml` - custom settings for a specific type of implementation.

You can enable using OCR technology when you implement the System. For this, modify the `ocr_custom.xml` file (for details see "Configuration File ocr_custom.xml") the following way:

1. Select required objects: services, protocols, and event types.

   > **Note:**
   >
   > New event types registered via plugins are added to `/opt/iw/tm5/etc/config/bookworm/services.xml`. They can be processed or moved to the `ocr_custom.xml` file.

2. Set identifiers for service directory objects and event types (files with a description are located in the `/opt/iw/tm5/etc/config/bookworm/` catalogue).
3. Enable OCR (`ocr_enabled="true"`).

If you need to enable OCR on several server instances (for a distributed installation), you should set rules for each instance. For this:

1. In catalogue `/opt/iw/tm5/etc/config-perm/bookworm`, create a new XML file that will describe the node.
2. Specify created xml-file in `CustomNodeXMLPath` section of configuration file `/opt/iw/tm5/etc/bookworm.conf`

3. Specify instance name from file `/opt/iw/tm5/node_name` in `<ocr_option node>` parameter.
4. Define overridable rules for the instance as described above.

> **Note:**
>
> In this case, settings have the following priority (in descending order): a directory with settings for the server instance -> a directory with custom settings -> a directory with preset settings.

> **Important!**
>
> When you update the System to current version, OCR parameters are reset to preset ones. In case you add or change OCR functional capacity, the new settings to be available within the `ocr.xml` file. User settings remain within the `ocr_custom.xml` file.

7.2.1 Configuration File ocr_custom.xml

Below you may find disabled OCR rules, where:

- `object_type - object type`;
- `service -` services;
- `protocol -` protocols;
- `key` - keys;
- `mnemo -` catalogues objects IDs of object types, services and protocols.

When enabling the rules, it is recommended specifying only the required ones:

```
<ocr_options node="*" ocr_enabled="false">
  <service key="CE6D8E0E27DA11E2962FC1DB6088709B00000000" mnemo="email" ocr_enabled="false">
    <object_type key="D2B5132E27DA11E28444C2DB6088709B00000000" mnemo="email" ocr_enabled="false">
      <protocol key="501A9868F3460E2E5AAF0C6AB21F8D6F63C09109" mnemo="pop3" ocr_enabled="false"/>
      <protocol key="2ECB2A264E31677895BC5D8845D33BC26F637CDF" mnemo="imap" ocr_enabled="false"/>
      <protocol key="A324CCB227DA11E2A8D99FDB6088709B00000000" mnemo="smtp" ocr_enabled="false"/>
      <protocol key="5F7E60DB3E86EFF90FDA87E72209EA1B0E017F16" mnemo="mapi" ocr_enabled="false"/>
      <protocol key="93B79EB44EE1A45522C08319EC47B499294776D7" mnemo="nrpc" ocr_enabled="false"/>
    </object_type>
    <object_type key="D8333C9027DA11E29E34CADB6088709B00000000" mnemo="email_web" ocr_enabled="false">
      <protocol key="A779DB3627DA11E2ADDCA0DB6088709B00000000" mnemo="http" ocr_enabled="false"/>
      <protocol key="7ED97C84BDBDD99C1C21AC0A6D6191F6A891C440" mnemo="https" ocr_enabled="false"/>
    </object_type>
  </service>
  <service key="DD6ECB5227DA11E2B507CBDB6088709B00000000" mnemo="im" ocr_enabled="false">
    <object_type key="E266719627DA11E2A83ECCDB6088709B00000000" mnemo="im_icq" ocr_enabled="false">
      <protocol key="ABA5D02027DA11E2B78FA1DB6088709B00000000" mnemo="oscar" ocr_enabled="false"/>
    </object_type>
    <object_type key="EEC2D87627DA11E29EA6D2DB6088709B00000000" mnemo="im_mail_ru" ocr_enabled="false">
      <protocol key="B8C7FC6A27DA11E2A080B7DB6088709B00000000" mnemo="mmp" ocr_enabled="false"/>
    </object_type>
    <object_type key="F249A80827DA11E29BA2D3DB6088709B00000000" mnemo="im_skype" ocr_enabled="false">
      <protocol key="DD3D593857521DE2E9618C26FD3E1B914F8A16F9" mnemo="skype" ocr_enabled="false"/>
    </object_type>
    <object_type key="E7C3A26C27DA11E296D3CDDB6088709B00000000" mnemo="im_xmpp" ocr_enabled="false">
```

```
      <protocol key="AF69EA3427DA11E2BE09A2DB6088709B00000000" mnemo="xmpp" ocr_enabled="false"/>
    </object_type>
  </service>
  <service key="62E7C68AD1354D118282FAFF07DA59ED00000000" mnemo="multimedia" ocr_enabled="false">
    <object_type key="55E10E81F5C94B3FB742CB61CA9476F800000000" mnemo="multimedia_photo" ocr_enabled="false
"/>
  </service>
  <service key="0794BBB227DB11E2BD81E9DB6088709B00000000" mnemo="web" ocr_enabled="false">
    <object_type key="0CAFCC9027DB11E2AD27EDDB6088709B00000000" mnemo="web_common" ocr_enabled="false">
      <protocol key="A779DB3627DA11E2ADDCA0DB6088709B00000000" mnemo="http" ocr_enabled="false"/>
      <protocol key="7ED97C84BDBDD99C1C21AC0A6D6191F6A891C440" mnemo="https" ocr_enabled="false"/>
    </object_type>
  </service>
  <service key="111CBA0427DB11E2AB82EEDB6088709B00000000" mnemo="file" ocr_enabled="false">
    <object_type key="1515A7B027DB11E2BBB2EFDB6088709B00000000" mnemo="file_exchange" ocr_enabled="false">
      <protocol key="BEFB1A7C27DA11E2AB10B8DB6088709B00000000" mnemo="ftp" ocr_enabled="false"/>
    </object_type>
    <object_type key="190D004827DB11E287B1F0DB6088709B00000000" mnemo="file_copy_out" ocr_enabled="false"/>
  </service>
  <service key="1DA8A90427DB11E289E8F5DB6088709B00000000" mnemo="print" ocr_enabled="false">
    <object_type key="225BD8F427DB11E2926DF9DB6088709B00000000" mnemo="print_common" ocr_enabled="false"/>
  </service>
  <service key="7843FC5BEA024E9B274E26DB43B7E680D8BC9356" mnemo="placement" ocr_enabled="false">
    <object_type key="602A224D9335579214E3188D1D2745DB9F85D500" mnemo="crawler" ocr_enabled="false"/>
  </service>
</ocr_options>

<ocr_options node="*" ocr_enabled="false">
</ocr_options>
```

Note:

To enable OCR on all the levels at one time (service level, event type and protocol level) it is required replacing `<ocr_options node="*" ocr_enabled="false">` with `<ocr_options node="*" ocr_enabled="true">` in the lower row of `ocr_custom.xml` file.

7.3 Configuring Settings for HTTP-Requests Transferred through ICAP Protocol

The **/opt/iw/tm5/etc/icap.conf** file defines settings of interaction with ICAP server.

Note:

The **icap.conf** file is created only after installation of ICAP integration module.

7.4 Configuring Settings of Enclosures Archives Processing

Attachment processing is configured in the following configuration files:

- `/opt/iw/tm5/etc/config-perm/bookworm/extractors.xml` file (see "The extractors.xml Configuration File")
- `/opt/iw/tm5/etc/extractors.conf` (see the document "*Configuration Files Guide*", "extractors.conf" article)

Important!

If MS Exchange uses a journal rule, then, for the correct processing of such emails, enable the corresponding option in Traffic Monitor. For this, in the `messed.conf` configuration file, specify:

```
"ExchangeJournalReports": true,
```

To make the option active, reload the configuration, or restart the service.

7.4.1 The extractors.xml Configuration File

The **/opt/iw/tm5/etc/config-perm/bookworm/extractors.xml** file contains directory settings and signatures base which define file types when unpacking archives and enclosures.

Parameter	Description
`FilenameCharsets`	If file name encoding differs from the standard one (ANSI, UTF) then the filename processes as corresponding to encodings listed in this setting. Several values are listed comma separated; the System sequentially tries process the filename in listed encodings while it finds a matched one. The default value is `UTF-8,cp1251,cp866`
`MinFileSizeInBytes`	Minimum file size (in bytes) subjected to unpacking. This limit lets increase the System performance due to refusing of small files unpacking. The default value is `10` **Note:** Processing files which size is less than 10 bytes is not supported. This limitation also applies to Clipboard events.
`MaxTextPlainSizeInKb`	Maximum size of file, which signature is not defined. Exceeding the threshold value file is automatically considered to be binary and is not sent to **iw_cas**. The default value is `25600`
`SpeedInKBs`	Proposed extractor's operation speed per 1 GHz of the processor (in Kb/s). Can take integer values from 1 and greater. The default value is `100`
`TimeoutInSec`	Awaiting time till file processing ends (in seconds). The default value is `1800`
`UseLog`	Logging extractor. The default value is `false`

If the general values of `TimeoutInSec` and `MinFileSizeInBytes` settings are not appropriated for some file types then enable these parameters in sections of needed file types with other values.

Example:

The extractor operating time can be calculated by the formula:

The extractor operating time = File size in KB / 1024 / (`SpeedInKBs` * CPU clock speed in MHz / 1000)

Other sections define signatures used for detection of file types from archives and enclosures. Each section contains the same set of parameters:

Parameter	Description
`Extension`	Extension of archive files. Optional parameter which is needed for correct operation of some archiving utilities requiring correct extensions of incoming files **Example**: `Ext = arj`

`Name`	Format name. Used for exact detection of format name when file unpacking.
	To define detection/detailing of format the setting can include a list of names:
	" `defaultname, name1(code1), name2(code2)` "
	In this case the format can be defined basing on the code (`codeN`) assigned to the file when unpacking. For example if the unpacking is ended with code1 code that the file is considered as having name1 format. The list of names can include default name (`defaultname`) which will be assigned when the code is not assigned:
	Example 1 (one format name)
	`text/xml`
	Example 2 (list of format names)
	`"application/arj, UNKNOWN(9), text/encrypted(4)"`
	the file format is defined as application/arj. Two others for specific cases are: unknown format (UNKNOWN), encrypted format (`text/encrypted`)

`Signature`	Format signature which is «standard» sequence of values (bytes) with initial displacement and masks. This sequence is needed for unambiguous definition of files format by the content of those files. The signature can include up to 16 triades of the following view: `[OFFSET]:BYTE_VALUE/[MASK]` There can be string signature like "BZh" for BZIP2. This signature means specified bytes sequence from 0 displacement. The search of string signatures is performed except for upper/lowercase distinction.

Parameter	Description
	The OFFSET setting is optional. By default it equals 0 for the first byte and increases by 1 for each later one. The displacement can be specified using «?» symbol – searching of the pattern in first N bytes of a file. For example to search pattern in first 500 bytes you should specify '500?' displacement. The MASK setting is optional and equals to 0xFF by default. **Example** (signature of a heading of WAV format): `Sign = "'RIFF', 0x8: 'WAVEfmt'"` Starting from 0 displacement there is a sequence 'R', 'I', 'F', 'F', then from 8 displacement there should be 'W', 'A', 'V', 'E', 'f', 'm', 't'
`Comment`	The explanation commentary, for example, indicating the version of archiving utility: `Comment = "bzip2 v. 1.0.x"`
`Command`	Command string for file extracting, for example, `Extract = "/usr/bin/bzip2 -f -dc ${SRC} > ${OUTDIR}/${SRC}"` where `${OUTDIR}` is a catalogue where to the archive will be extracted and `${SRC}` is a name of file to unpack
`ExcludeFromContext`	If the parameter is enabled (`On`) then the file is unpacked but information on archiving utility is not added to object's XML-context. This lets to let out the fictional containers like MS-TNEF from object's context. By default the parameter is disabled (`Off`)
`CaseInsensitive`	Indicates whether the symbol register will be taken into account in file processing or not. Default value is `false`
`CreateTags`	Indicates if there is an extracting of the metadata from the file when proceeding by TM extractors.
`Archive`	Regulates the kind of retrieved information. When `true` - files. When `false` - data.
PIRegexp	Contains a description of PIRE signature for file format detection. Can be specified several times withing the same Extractor. Includes the following attributes: • assurance - the accuracy of detecting file format with this signature • offset - offset where to start searching for the signature • max_length - the length of the section to be checked • case_sensitive - enables case sensitivity in the signature description

Parameter	Description
`DetectableByRegexp`	Allows you to disable format detection by means of PIRE (instead, signatures from Signature will be used).
`OpenFifoRetryTimeout`	Timeout during few attempts to open fifo queue
`OpenFifoRetryCount`	Number of attempts to open fifo queue
`ResultCharset`	Specifies the code of extracted text
`NeedProcess`	If the files with mime type specified should be sent for analysis

7.5 Archiving a Mail Queue Directory

If errors occur in the incoming SMTP mail queue:

1. Archive the SMTP mail queue folder **queue/smtp** and save it for further analysis.
2. Remove the catalogue.

7.6 Logging System Work

For the convenience of monitoring processes, the logging subsystem has 6 levels:

Level	Description
`fatal`	Writes errors that are critical for the process operation
`error`	Writes messages about errors that are not critical for the process operation
`warning`	Writes information about potentially dangerous cases
`Information`	General information about the process that can be useful (process start/stop, applying configurations, etc.)
`debug`	Writes information which is mostly used to diagnose the service operation (IT, system administrators and so on)
`trace`	Mostly used by programmers to track the code

Configuring logging levels

Warning!

Please, note that choosing a more detailed logging level may significantly reduce the System performance.

Configuration files are located in the `/opt/iw/tm5/etc` directory. By default, the `warning` level is used for all processes.

To change the logging level for Traffic Monitor Server processes:

1. In the configuration file of the required process, find the `Logging` section and set the needed value for `GlobalLevel` parameter.
2. Save changes.
3. After you have changed the system log, restart the process:
   `iwtm restart <service_name>`

By default, all process logs are stored in the `/var/log/infowatch` directory.

For extractors which do not have a separate configuration file, the logging level can be set in the **/opt/iw/tm5/etc/config-perm/bookworm/extractors.xml** configuration file:

1. Open the configuration file.
2. For `text-extractor` parameter, add the value `-l <level>,` where `<level>` is the logging level. For example:
   `< Command> bin/text-extractor -l error -t ooxml -i ${OUTDIR}" < Command>`
3. After you have made changes, restart processes:
   `iwtm restart bookworm`
   `iwtm restart warpd`

Note:

This type of configuring the logging level is only available for extractors of the following formats: docx, html, msoffice_xml, msole, odp, odt, pptx, xlsx, xml.

7.7 File queues

To enable loading the existing object queues:

1. Stop the following services: iw_icap, iw_deliver, iw_luaengined, iw_is, iw_smtpd, iw_sniffer, iw_xapi_xapi, iw_xapi_puppy, iw_analysis, iw_messed, iw_proxy_http, iw_proxy_icq, iw_proxy_smtp, iw_capstack.
2. Place objects from the error queue to the required queue.
3. Wait until all objects in the file queue are processed.
4. Run the following services: iw_icap, iw_deliver, iw_luaengined, iw_is, iw_smtpd, iw_sniffer, iw_xapi_xapi, iw_xapi_puppy, iw_analysis, iw_messed, iw_proxy_http, iw_proxy_icq, iw_proxy_smtp, iw_capstack.

To start all the services, run the command: **iwtm start**. To check if the processes are started, use the following command: `iwtm status.`

Commands for starting/stopping separate services:

Starting	Stopping
`iwtm start icap`	`iwtm stop icap`
`iwtm start deliver`	`iwtm stop deliver`
`iwtm start luaengined`	`iwtm stop luaengined`
`iwtm start is`	`iwtm stop is`
`iwtm start smtpd`	`iwtm stop smtpd`
`iwtm start sniffer`	`iwtm stop sniffer`
`iwtm start xapi_xapi`	`iwtm stop xapi_xapi`
`iwtm start xapi_puppy`	`iwtm stop xapi_puppy`
`iwtm start analysis`	`iwtm stop analysis`
`iwtm start messed`	`iwtm stop messed`
`iwtm start proxy_http`	`iwtm stop proxy_http`
`iwtm start proxy_icq`	`iwtm stop proxy_icq`
`iwtm start proxy_smtp`	`iwtm stop proxy_smtp`
`iwtm start capstack`	`iwtm stop capstack`

Objects in the System are moved by means of file queues:

Path to the directory of the queue	**Format of files in the queue**
queue/analysis	.xml & .dat
`queue/smtp`	`.xml & .dat`
`queue/db`	`.xml & .dat`
`queue/blackboard`	`.dat`
`queue/blackboard_errors`	`.dat`
`queue/is`	`.xml & .dat`
queue/x2x	.xml & .dat

Path to the directory of the queue	Format of files in the queue
`queue/errors`	`.xml & .dat`
`queue/x2x-errors`	`.xml & .dat`
queue/x2db-errors	.xml & .dat
queue/final-errors	.xml & .dat

Each queue contains additional technical queues which allow you to monitor for processing objects: `.db, .in, .out.`

Note:

For the `queue/smtp` process, the processing can be divided into the following steps:

1. `queue/smtp/.in` – as the **iw_smtpd** service receives objects from Postfix, a file is generated in this queue. If for some reason, the object processing in this queue is delayed, please, check **iw_smtpd** or **iw_proxy_smtp** service.
2. `queue/smtp/.db` – when the processing is complete, the file is moved from the `.in` queue to the `.db` queue. EML mail objects from **iw_xapi** are placed in this queue.
3. `queue/smtp/.out` – the object is placed in this queue by the following service - **iw_messed**.

Note that:

Queues of the **iw_is** service are additionally divided into:

- `queue/is/cmd/` – a file queue of **iw_is** commands;
- `queue/is/fetching/` – a queue of commands for loading;
- `queue/is/indexing/` – a queue of commands for indexing;
- `queue/is/errors/` – an error queue.

Queue name	Services that place an event in the queue	Services that remove an event from the queue
queue/analysis	iw_xapi_xapi, iw_xapi_puppy	iw_analysis
queue/smtp	iw_xapi_xapi, iw_xapi_puppy, iw_smtpd, iw_proxy_smtp, iw_capstack	iw_messed
queue/db	iw_messed, iw_analysis, iw_icap, iw_proxy_icq, iw_proxy_http	iw_x2x
queue/blackboard	iw_x2db, iw_deliver	iw_blackboard

Queue name	Services that place an event in the queue	Services that remove an event from the queue
queue/blackboard_errors	an error when processing iw_blackboard	-
queue/x2x	iw_x2x	iw_x2db
queue/is	iw_metainfo_fetcher	iw_is
queue/errors	all services in case of processing errors	iw_rammer
queue/x2x-errors	errors when processing iw_x2x	
queue/x2db-errors	errors when processing iw_x2db	
queue/final-errors	iw_rammer	-

You can enable collecting statistics on file queues in the service configuration file which is located in the `/opt/iw/tm5/etc` directory. For this, in the *Statistic* section, set the **Enabled** parameter value to `true` .

7.8 Recovering the System after Failures

You can recover the System when server failures occur or during a network outage by completing the steps described below:

1. Stop Traffic Monitor Server processes by running the command:
   `iwtm stop`
2. Move objects from error queues to general ones. For this, use `iw_qtool` utility (see KB article "Moving of Objects between Queues (iw_qtool Utility)").
3. If Traffic Monitor Server works with installed Postgre DBMS, then, to check the connection, run the following command:
   `su - iwtm`
   `psql -p 5433 -h <DB_server_IP_address> postgres iwtm`
   `psql -p 5433 -h 127.0.0.1 postgres iwtm` - to connect local database
   If the check is successful, then, in response to the execution of the command, PSQL invitation will be displayed:
   `postgres=#`
   If Traffic Monitor Server works with installed Oracle DBMS, then, to check the connection, run the following command:
   `sqlplus db_login/db_password@tns_name`
   where `db_login` and `db_password` are the name and the password of the DB schema owner respectively and `tns_name` is the name of TNS service.
   If the check is successful, then, in response to the execution of the command, SQL *Plus invitation will be displayed:

`SQL>`

4. Run the Traffic Monitor Server processes by executing the command:
   `iwtm start`

After the Traffic Monitor Server is started, check the system log for errors. The path to the system log: `/var/log/messages`

If the system log contains any error messages, consult our technical support service.

7.9 Managing Languages Including Morphological Support

Managing languages including morphological support in Traffic Monitor is being performed through configuration file change and installation of package with language dictionary.

Depending on settings specified during installation, two and more languages can be installed in the System (find information on installation in the document "InfoWatch Traffic Monitor. Installation guide"). Russian and English morphology dictionaries are preinstalled (even if it was not specified during installation).

Upon installation, user also can:

- Add new language including morphological support ;
- Update installed language including morphological support;
- Delete language including morphological support.

7.9.1 Adding New Language for Events Search. Morphology and Adding Terms.

To add a new language to the System for event search:

1. Stop thy **iw_indexer** and **iw_is** processes:
   `iwtm stop indexer`
   `iwtm stop is`
2. Go to the local repository that keeps packages downloaded during the installation:
   `cd /opt/iw/distr`
3. Go to directory that matches current Traffic Monitor version.
4. Select the required package and install it using the command:
   `rpm -i <package name>`
   For example, to install French dictionary package, enter the command:
   `rpm -i iwtm-sphinx-dict-fra-7.0.0-792.x86-64.rpm`
5. Run the processes:
   `iwtm start indexer`
   `iwtm start is`

   > **Note:**
   >
   > Installing a new dictionary causes full database re-indexing, which may take some time.

   To enable morphology for events search:

1. Stop the **iw_indexer** and **iw_is** processes:
   `iwtm stop indexer`
   `iwtm stop is`
2. Open the **sphinx_options.ini** file using the command:
   `mcedit /opt/iw/tm5/etc/sphinx_options.ini` and add the required language key to `sphinx_language` parameter.

For example, to activate the morphology for Russian and Turkish languages, specify the following parameter values:

```
sphinx_languages = 'rus tur'
```

> **Note:**
>
> To set the language priority, put the language parameter to be the last in the list of `sphinx_languages` parameters of **sphinx_options.ini** file.

3. When using PostgreSQL DBMS, open the **database.conf** file to add terms:
   `mcedit opt/iw/tm5/csw/postgres/database.conf` When using Oracle DBMS, open the **database.conf** file to add terms:
   `mcedit /opt/iw/tm5/csw/oracle/database.conf`
4. Add the language key with morphology support from `cfdb_language` parameter, for example,

```
\set cfdb_language 'rus'
```

> **Note:**
>
> The full list of language keys with morphology support can be found in "List of languages including morphological support".

5. Run the **iw_indexer** and **iw_is** processes:
   `iwtm start indexer`
   `iwtm start is`

7.9.2 Updating Installed Language Including Morphological Support

To update existing dictionary:

1. Go to directory with dictionary packages:
   `cd /opt/iw/disrt/7.0.0/`
2. Run package installation:
   `rpm -i <package name>`
   For example:
   `rpm -i iwtm-sphinx_dict-deu-7.0.0.792.x86_64.rpm`

> **Note:**
>
> Updating dictionary, database reindexing will not take place. Language support will be performed only for new events.

7.9.3 Deleting Search Language and Terms

To delete a dictionary from the System:

1. Stop the **iw_indexer** and **iw_is** processes:
   `iwtm stop indexer`
   `iwtm stop is`
2. Open **database.conf** file if you use PostgreSQL DBMS:
   `mcedit /opt/iw/tm5/csw/postgresql/database.conf` If you use Oracle DBMS, open file **database.conf** to add terms:
   `mcedit /opt/iw/tm5/csw/oracle/database.conf`
3. Delete code of language with morphology support from `define cfdb_language` parameter.
4. Delete indexing files from `/var/lib/sphinx/` directory.
5. Start processes:
   `iwtm start indexer`
   `iwtm stop is`

After you delete a dictionary, the database is completely reindexed.

> **Note:**
>
> If you want to save the language in Categories and Terms, then add the code of the language with morphology support to the `cfdb_language` parameter of the **database.conf** configuration file just before updating the System. This will also restore the language with morphology support. If you want to delete the language with morphology support after the System update, repeat the steps described above.

7.10 Configuring Forwarding Data to SIEM

Traffic Monitor can be integrated with SIEM systems (ArcSight, Tivoli). Integration means forwarding consolidated information from all installed TM components to SIEM.

Configuring this functionality is possible using the script **/opt/iw/tm5/bin/config/iwtm-siem.conf.py**, which is available on Traffic Monitor server.

Information from TM is available for SIEM system:

1. By means of a table view:

- Events, registered in TM;
- TM console user session audit;

- By means of rsyslog:
  - Logging in and out TM Linux server;
  - Events, registered in TM Linux server system log, including information on logging in and out Oracle or PostgreSQL DB users;
  - State of services on TM Linux server or group of servers.

In this chapter:

- Configuring SIEM side
- Configuring TM side
- Type of logs, transmitted to SIEM

7.10.1 Configuring SIEM Side

To prepare SIEM to recieving data from TM:

1. In SIEM tables to extract information from:

- `IWTM.ARC_VIEW_OBJECTS`
  TM events
- `IWTM.ARC_VIEW_AUDIT_LOG`
  TM user audit

- Create SIEM account to access DB tables.
- Configure processing data, which has been extracted from TM DB.
  To analyse table views of TM events and user audit see articles "TM events table view" and "User audit table view".

> **Warning!**
>
> While configuring integration, additional modules from SIEM system vendor, which allow SIEM system to work with table views, can be required. For example, HP Flex Conector module is required for integration with HP ArcSight.

Table Representation of TM Events

Connect to TM database using the created **siem** user (see "Creating Siem User").
The `IWTM.ARC_VIEW_OBJECTS2` table contains the desired data.

> **Note:**
>
> If for importing data to SIEM, you need to filter the data, you can use `capture_date` or `insert_date` fields for filtering. We recommend filtering data by the `insert_date` field. Filtering data by the `object_id` field is not supported.

Attribute name	Data type	Description	Possible values	Example
`object_id`	number(20)	*Event ID* attribute of the event	Event ID in TM database. Is always present.	110
`monitorcode`	varchar2(4000)	*Event type* attribute of the event	The event type determines how the data is transferred. Possible values: • External device • Printing • ICQ • Skype	Email

Attribute name	Data type	Description	Possible values	Example
			• XMPP • Mail.Ru Agent • Telegram • Vkontakte • Facebook • WhatsApp • MS Lync • FTP • Email • Webmail • Web message • Clipboard • Cloud storage • Keybord input • Terminal session • Network resources • File reading • File writing	
`protocol`		*Protocol* attribute of the event	Possible values: • OSCAR • Skype • XMPP • MMP • SIP • FTP • POP3 • IMAP • MAPI • SMTP • HTTP • HTTPS • NRPC • WhatsApp • None	
`verdict`	varchar2(12)	*Verdict* attribute of the event	Possible values: • Quarantined • Forbidden • Allowed	Forbidden
`date_of_capture`	varchar2(50)	*Date of capture* attribute in ISO 8601 with specifying the timezone of the data capture		2014-06-19T18:56:26+04:00

Attribute name	Data type	Description	Possible values	Example
`capture_data`	timestamp	Event interception date (in UTC, without specifying the timezone) in `timestamp` format. Is used for fast data filtering.		timestamp
`insert_date`	timestamp	Event insertion date (in UTC, without specifying the timezone) in `timestamp` format		timestamp
`device`	varchar2(256)	*Device name* attribute of the event	Name of the device, to which or from which data has been copied. Or a name of the printer, to which a document from the intercepted event has been sent. Can be blank.	Kingston USB Drive 5.0
`Web-source`	varchar2(256)	*Resource* attribute of the event	Address of the visited web resource or address of cloud storage. Can be blank.	Yahoo.com
`recipients contacts`	clob	*Recipients* attribute of the event	List of recipients separated by commas in `<contact type>:<contact value>` format. Can be blank.	email:ivanov@infowatch.ru, email:petr.petrov@infowatch.ru
`recipients fullname`	clob	*Recipients* attribute of the event	List of recipients' full names separated by commas. The order is the same as for `recipients`. Names are specified only if recipients have been identified. Can be blank	Ivanov Ivan Ivanovich, Petrov Petr Petrovich

Attribute name	Data type	Description	Possible values	Example
`recipientsdomainaccountname`	clob	*Recipients* attribute of the event	List of identification keys of the `auth` type for all recipients. Keys in the list are separated by commas. The order is the same as for `recipients`. Can be blank.	Ivanov@iw, Petrov@iw
`senderdomainaccountname`	clob	*Senders* attribute of the event	Identification key of `auth` type for the sender. Can be blank.	Petrov@iw
`senderfullname`	clob	*Senders* attribute of the event	Sender's full name. Can be blank.	Petrov Petr Petrovich
`sendercontacts`	clob	*Senders* attribute of the event	Sender's contact in `<contact type>:<contact value>` format. Can be blank.	email:petr.petrov@infowatch.ru
`sendermachinedomainname`	clob	*Workstation* attribute of the event	Domain name `dnshostname` of the sender's workstation. Can be blank.	XP-PETROV
`sendermachineip`	clob	*Workstation* attribute of the event	IP address of the sender's workstation. Can be blank.	10.60.20.184
`perimetersin`	clob	Name of the perimeter the event has entered	List of names of the perimeters which the event has entered. Names in the list are separated by commas. Can be blank.	Company perimeter
`perimetersout`	clob	Name of the perimeter which the event has left	List of names of the perimeters which the event has left. Names in the list are separated by commas.	Company perimeter

Attribute name	Data type	Description	Possible values	Example
			Can be blank.	
`tags`	clob	*Tag* attribute of the event	List of tags, separated by commas. Can be blank.	New
`categories`	clob	*Category* attribute of the event	List of categories, separated by commas. Can be blank.	Confidentially
`text_objects`	clob	*Text object* attribute of the event	List of text objects detected in the intercepted event. Text objects in the list are separated by commas. Can be blank	special control
`fingerprints`	clob	*Form*, S*ample document*, *Stamp*, *DB unloading* attributes of the event	List of forms, sample documents, stamps, and DB unloadings detected in the intercepted object. Elements in the list are separated by commas. Can be blank.	Application form.doc
`protecteddocuments`	clob	*Protected object* attribute of the event	List of protected objects detected in the intercepted object. Elements in the list are separated by commas. Can be blank.	`Lease contract`
`policies`	clob	*Policy* attribute of the event	List of policies triggered by the intercepted object. Policy names are separated by commas. Can be blank.	New employees monitoring policy
`violationtype`	varchar2(40)	*Rules group* attribute of the event	Possible values: • *Copy* (*Copying violation*) • *Placement* (*Placing violation*)	Copy

Attribute name	Data type	Description	Possible values	Example
			• *Transfer* (*Transferring violation*) Can be blank.	
`violation_level`	List	*Violation level* attribute of the event	Possible values: • *High* • *Medium* • *Low* • *No violation* Can be blank.	Medium
`userdecision`	varchar2(27)	User decision attribute of the event	Decision of the Console user. Possible values: • *Violation* • *NoViolation* • *NotProcessed* • *AdditionalProcessingNeeded* Can be blank	Violation
`filepath`	clob	*File path* attribute of the event	List of paths to files. Paths in the list are separated by commas. Can be blank.	\\xp-petrov\C$ \666.txt
`attachments`	clob	*Attachment name* attribute of the event	Names of attachments separated by commas	666.txt, Petrov.doc, 3.jpg
`url`	varchar2(4000)	*URL* attribute of the event	Full address from which data has been sent Can be blank.	10.60.21.34/3.jpg
`capture_server_ip`	varchar2(256)	*IP of interception server* attribute of the event	IP address of the server, on which data has been intercepted. Can be blank.	10.60.21.34
`capture_server_hostname`	varchar2(256)	*Name of interception server* attribute of the event	Name of the server, on which data has been intercepted. Can be blank.	iwtm.infowatch.ru

Attribute name	Data type	Description	Possible values	Example

Warning!

The number of elements to display within one cell of one record is limited to 1000 (For example: 1000 recipients or extracted files in the event).

User Audit Table View

Connect to TM DB using created **siem** user (see "Creating siem user"). `IWTM.ARC_VIEW_AUDIT_LOG` contains desired data.

Attribute	Data type	Desctiption	Example
`audit_log_id`	Number(20)	TM user session audit entry ID.	12345
`change_date`	Varchar2(50)	Date and time of registered user action	05.08.2015 09:35:10.641446000
`user_login`	varchar2(256)	Login of user, who performed an action	Admin
`user_fullname`	varchar2(256)	Full name of user, who performed an action	Petrov Petr Petrovich
`user_email`	varchar2(256)	Email of user, who performed an action	petr.petrov@infowatch.ru
`operation`	varchar2(40)	Type of action, performed by user Possible values: • restart (restart) • delete_hash (hash deletion) • sync (synchronization) • add_tag (adding tag) • remove_tag (removing tag) • run (performing query) • start (starting) • stop (stopping) • view (viewing) • create (creation) • update (editing)	Edit

Attribute	Data type	Desctiption	Example
		• delete (deletion) • login_failure (unsuccessful login attempt) • login (successful login) • logout (logout) • change_password (password change) • decision_update (changing user decision) • remove_tag (changing event tag) • delete_ref (deleting reference) • copy (copying) • move (move) • commit (applying changes in system configuration) • rollback (cancellation of changes in system configuration) • draft (saving changes in system configuration) • add (adding) • import (import) • export (export)	
`entity_type`	varchar2(40)	Type of object on which the action was carried out. Possible values: • AgentJob (diagnostic data) • Adlibitum (Adlibitum) • Agent (service) • Classifier (classifier) • NetworkSettings (network parameters) • NotificationSettings (system status) • ObjectReport (events unloading) • Query (launching objects search) • QueryReportRun (report creation) • Setting (settings)	Dashboard

Attribute	Data type	Desctiption	Example
		• UpdateSystem (system update) • Category (category) • Dashboard (dashboard) • DashboardWidget (widget) • EtForm (sample form) • EtStamp (sample stamp) • EtTable (sample table) • Fingerprint (sample documents) • LdapContact (LDAP contact) • LdapGroup (LDAP group) • LdapPerson (LDAP person) • LdapStatus (LDAP person status) • LdapWorkstation (LDAP workstation) • Perimeter (perimeter) • Policy (policy) • ProtectedDocuments (protected object) • Report (report) • Role (role) • Selection (selection) • ServiceLog (service log) • SystemList (list of resource topics) • SystemListItem (list of resources with definite topic) • Tag (tag) • Term (term) • TextObject (text pbject) • User (user) • VisibilityArea (visibility scope) • Config (configuration) • License (license) • Object (object) • ProtectedCatalog (protected object catalog)	
`entity_display_name`	varchar2(4000)	Name of object, on which the action was carried out.	Statistics1

Attribute	Data type	Desctiption	Example
property_changes	clob	Description of actions in json format. Filled only in case of managing users, roles, areas and logging in and out of the management console. Three different formats are possible.	
	-	**Format №1.** Relevant for events of role and visibility scope management.	

		{
		“old”: {
		“<OBJECT TYPE>”:{
		{
		“<FIELD>”: “<VALUE>”,
		“<FIELD>”: “<VALUE>”
		}
		}
		}
		{
		“new”: {
		“<OBJECT TYPE>”:{
		{
		“<FIELD>”: “<VALUE>”,
		“<FIELD>”: “<VALUE>”
		}
		}
		}
		}
			{
			"old":{
			"visibilityareas":{
			}
			},
			"new":{
			"visibilityareas":[
			{
			"VISIBILITY_AREA_ID":"F00207A1E7E743EE0433D003C0A5DD400000000",
			"DISPLAY_NAME":"<idclip>",
			"NOTE":"<idclip>",
			"VISIBILITY_AREA_CONDITION":"{"data":{"link_operator":"and","children":[]}}",
			"IS_SYSTEM":1
			}
			}
			}

	-	**Format №2.** Relevant for user management events.	

Attribute	Data type	Desctiption	Example

		{
		“old”:{
		“<FIELD>”: “<VALUE>”,
		“<FIELD>”: “<VALUE>”
		}
		“new”:{
		“<FIELD>”: “<VALUE>”,
		“<FIELD>”: “<VALUE>”
		}
		}
			{
			"old":{
			"EMAIL":"asdasd@asdasd.ru",
			"CHANGE_DATE":"01-07-2014 09:46:29.000000"
			},
			"new":{
			"EMAIL":"asdasd11@asdasd.ru",
			"CHANGE_DATE":"01-07-2014 09:46:44.000000"
			}
			}

	-	**Format №3.** Relevant for log in and log out events. -	

		{
		"request":{
		"hostname": “<HOST NAME>”,
		"ip":"<IP-ADDRESS>",
		"login":"<USER LOGIN>"
		}
		}
			{
			"request":{
			"hostname":*null*,
			"ip":"127.0.0.1",
			"login":"officer"
			}
			}

7.10.2 Configuring TM Side

To configure the transfer of consolidated information from Traffic Monitor:

1. Create a database account for SIEM (see "Creating Siem User").
2. Configure data transfer from Traffic Monitor to SIEM (see "Forwarding Logs to SIEM").

3. If necessary, modify logging settings for Traffic Monitor database user session audit (see "Log Management for TM DB User Sessions").

Managing Siem User

This chapter describes creating, deleting and changing password for **siem** user, which is used by SIEM to interact with Traffic Monitor:

- Creating Siem User;
- Changing Siem User Password;
- Deleting Siem User.

Creating Siem User

To create siem user:

1. To start script, run the command:
   `/opt/iw/tm5/bin/config/iwtm-siem.conf.py`
2. Choose **DB siem user** option.
3. In the window that opens, select **Create DB siem user** option.
4. Set parameters:

Parameter	Description
`Enter login for DB administrative account`	Login of Oracle/PostgreSQL administrators account **Note:** the following logins are used: • `sys` - if you run Oracle • `postgres` - if you run PostgreSQL
`Enter password for DB administrative account`	Password for Oracle/PostgreSQL administrators account
`Enter password DB siem user`	Password for new siem user

5. Press **Create**.

Changing Siem User Password

To change siem user password:

1. To start script, run the command:
   `/opt/iw/tm5/bin/config/iwtm-siem.conf.py`
2. Choose the option **DB siem user**.
3. Choose the option **Change password for DB siem user**.
4. Set parameters:

Parameter	Description
`Enter login for DB administrative account`	Login of Oracle/PostgreSQL administrators account

Parameter	Description
	Note: the following logins are used: • if you run Oracle - `sys` • if you run PostgreSQL - `postgres`
`Enter password for DB administrative account`	Password of Oracle/PostgreSQL administrators account
`Enter new password user siem`	New password for siem user

5. Press **Change password**.

Deleting Siem User

To delete siem user:

1. To start script, run the command: `/opt/iw/tm5/bin/config/iwtm-siem.conf.py`
2. Choose the option **DB siem user**.
3. Choose the option **Delete DB siem user**.
4. Set parameters:

Parameter	Description
`Enter login for DB administrative account`	Login of Oracle/PostgreSQL administrators account
`Enter password for DB administrative account`	Password of Oracle/PostgreSQL administrators account

5. Press **Delete**.

Forwarding Logs to SIEM

To configure forwarding entries from TM Linux-server log files to SIEM:

1. Ru the following script: `/opt/iw/tm5/bin/config/iwtm-siem.conf.py`
2. Choose the option **Log messages forwarding configuration**.
3. Set parameters for logs transfer:

Parameter	Description
`Enable forwarding`	Enabling/disabling forwarding logs to siem. (Possible value: `Yes/No`)
`Forwarding server`	SIEM server IP address or dns name

Parameter	Description
`Forwarding server port`	Port of SIEM server, where **syslog** is running
`Forwarding protocol`	Protocol of forwarding data to SIEM. (Possible value: `TCP /UDP`)
`Log messages severity`	Minimal level of log messages, sent to SIEM server. (Possible value: `Emergency, Alert, Critical, Error, Warning, Notice, Info, Debug`)
`Size (MB)`	Acceptable size of messages queue, which are to be sent to SIEM. (Default value: `500`)

4. Press **Ok**.

> **Warning!**
>
> Disconnecting users with administrative permissions is not being logged in DB, thereafter, this information will not be forwarded to SIEM.

Log Management for TM DB User Sessions

You can enable or disable logging for TM DB user sessions in the OS system log via **rsyslog** utility.

To enable logging for TM DB user sessions:

1. Run the script:
   `/opt/iw/tm5/bin/config/iwtm-siem.conf.py`
2. Select the option **DB audit logging management**.
3. Enter your login and password for Oracle/Postgre administrator:
   - **Enter login for DB administrative account** - a login for the administrator account;
   - **Enter password for DB administrative account** - a password for the administrator account.
4. Click **Check logging status**.
5. If:
   - **DB audit logging to OS journal: OFF** - click **Change logging status** to enable logging;
   - **DB audit logging to OS journal: ON** - click **Change logging status** to disable logging.

> **Note:**
>
> For Oracle database, IWTM services are restarted when you change the logging status. Restarting services may take some time.

7.10.3 Type of Logs, Transmitted to SIEM

Rsyslog forms common system journal. It is a protocol, which is used to transmit logs to SIEM.

There are five major log types, transmitted to SIEM:

1. **iw_*** processes logs. For example:
   `Mar 11 14:32:30 iw-VMware-4224da3ab iw_expressd: 5 (18485:0x00007f53001b97e0) [INFO ] : <Root> Runtime environment initialized. Starting...`
2. **pguard** script logs. Script monitors state of services and restarts them when necessary:
   `Mar 11 14:32:26 iw-VMware-4224da3ab pguard: 148 (18256:0) [INFO] : expressd Terminating pid 18257 (signal 15)`
3. Logs of login to **Oracle DB** and logout from it:
   `Mar 11 14:28:20 iw-VMware-4224da3ab Oracle Audit[17786]: LENGTH : '153' ACTION :[7] 'STARTUP' DATABASE USER:[1] '/' PRIVILEGE :[4] 'NONE' CLIENT USER:[4] 'root' CLIENT TERMINAL:[13] 'Not Available' STATUS:[1] '0' DBID: [0]`
4. **Linux users** login and logout:
   `Mar 11 14:32:02 iw-VMware-4224da3ab runuser: pam_unix(runuser:session): session opened for user iwtm by root(uid=0)`
5. **Nagios** logs:
   `Feb 10 20:05:39 iw-VMware-4224289a4 nagios: SERVICE ALERT: IWTM;TM_DAEMONS_STATE;CRITICAL;SOFT;1;CRITICAL - updater(3)`

7.11 Deleting Temporary Files

Ability to delete temporary files has been implemented in the product as **clean_temporary_files.sh** script.

Script deletes the following information:

1. Files from operation system's temporary directory (`/opt/iw/tm5/tmp/` directory).
2. Data from Traffic Monitor file queue directory (`/opt/iw/tm5/queue/` directory).

> **Note:**
>
> New events will not be processed by the system during temporary files deletion. Information about all unprocessed data will be deleted at the moment of script execution.

To delete temporary files:

1. Run **clean_temporary_files.sh** script:
   `/opt/iw/tm5/bin/clean_temporary_files.sh`
2. Accept temporary files deletion:
   `yes`

8 Configuring Single Sign-On in InfoWatch products

Single Sign-On feature enables you to move between various InfoWatch products without re-entering login and password over and over again. This version of InfoWatch Traffic Monitor supports Single Sign-On connection with InfoWatch Vision 2.5 and it works only when the transition between products is explicit and only for users created on the basis of one Active Directory account.

To implement Single Sign-On:

1. Type the following command in the command line on Vision server:
   `kubectl get secret guardkeys-central -n infowatch -o 'go-template={{index .data "ec256-public.pem"}}' | base64 -d`
2. Copy a generated public key in pem format. Key example:
   ```
   -----BEGIN PUBLIC KEY-----
   MFkwEwYHKoZIzj0CAQYIKoZIzj0DAQcDQgAExqBY7YcuTlucSX6s8LBTrBmWRuxT
   WkEmnwCBkurgc9Ntm+o+QOOmCZube3M8yimt2Xqy3sgq/WJe+PoGjvhVCg==
   -----END PUBLIC KEY-----
   ```
3. Connect to Traffic Monitor database:
   a. For PostrgreSQL database use:
      `psql postgres iwtm`
   b. For Oracle database use:
      `sqlplus iwtm@iwtm`
4. In Traffic Monitor specify a list of trusted systems and accordant public keys which can authorize in the System by their user accounts. Give a name to each trusted system and paste a public key. For example, run a command:
   ```
   insert into trusted_system(system_name, public_key)
   values('my system','-----BEGIN PUBLIC KEY-----
   MFkwEwYHKoZIzj0CAQYIKoZIzj0DAQcDQgAExqBY7YcuTlucSX6s8LBTrBmWRuxT
   WkEmnwCBkurgc9Ntm+o+QOOmCZube3M8yimt2Xqy3sgq/WJe+PoGjvhVCg==
   -----END PUBLIC KEY-----');
   commit;
   ```
5. Exit database:
   a. For PostrgreSQL database use:
      `\q`
   b. For Oracle database use:
      `exit`
6. Open a new tab and go to Traffic Monitor Console.
7. Configure and run synchronization with Active Directory to import a user, one who is going to work with both Systems. Wait for synchronization to fully complete.
8. In the section **Users and roles** add a new user from LDAP, assign a role to them for viewing events and a visibility scopes.
9. Log out from this user account.
10. Open Vision Console in separate browser tab.
11. Configure and run synchronization with Active Directory to import the user mentioned earlier.
12. In the **Users** tab add a new user and assign a role to them.
13. Log out and then log in from the new user LDAP account.
14. Go to **Events** section and click to select the required event from the list or a few ans press **Viewing event**.

Console will open on **Events** section of Traffic Monitor console as well as audit log will hold an event of the user logging in from an external system.

9 Interaction with external systems

Traffic Monitor and external systems exchange data via API. To make working with API more convenient, **iwtm-apidocs-publicapi** is implemented. This package is a part of Traffic Monitor distribution kit and needs to be installed. To install the package, run the following command on the Traffic Monitor server: `yum install iwtm-apidocs-publicapi`

This command install the following packages:

- **iwtm-apidocs-publicapi** that contains OpenAPI schemes for the public API;
- **iwtm-apidocs-common** that contains UI with a full description of methods including models, response codes, request parameters. To access this UI, use the following address: <server_name_TM>/doc/

Futher you can find descriptions of data exchange protocols that are used between Traffic Monitor and external systems:

- Uploading events (pushAPI SDK)
- Uploading sample documents and DB unloadings (REST API SDK)
- Access to InfoWatch Traffic Monitor events for external systems (DataExport API SDK)

9.1 Uploading events (pushAPI SDK)

This programming interface is designed to integrate third-party components with Traffic Monitor, which intercept data from various types of channels to process data analysis.
Third-party components form the data interception events and pass them to Traffic Monitor. Traffic Monitor classifies the received events, analyses them and assigns a verdict based on configured data protection policies. The events and verdicts can be viewed in Traffic Monitor console.

9.1.1 Principles of using pushAPI SDK programming interface

To configure sending events to Traffic Monitor, the following principles should be taken into consideration:

- Interception events are passed to Traffic Monitor in the form of "event" object
- Each "event" has a set of required attributes specified by the user of the programming interface
- Each "event" may have a set of optional attributes specified by the user of the programming interface
- Each "event" has a "sender" and a "recipient"
- Each sender or recipient may have a list of associated "contacts" which are used to uniquely identify this sender/recipient
- Each "sender" or "recipient" may have a list of attributes associated with this sender/recipient
- Each "event" has associated "data", that is a set of bytes and/or text characters which represent the contents of the intercepted event
- Each element of the "data" should have a set of data associated with this element

All possible "events" that can be received by Traffic Monitor and analyzed are divided into groups (event "classes") united by common characteristics. The event class defines the business logic of the event processing and how the event will be displayed in Traffic Monitor console.
For now, the following event classes are supported:

- **Email** – any events of sending emails including emails with attachments. The event is characterized by a list of senders and recipients (persons), a sending date, a subject, a message body, and attachments. Includes corporate email (IMAP, POP3, SMTP, MAPI, NRPC) and webmail (HTTP, HTTPS). Service name in TM: **E-mail**;

- **Chat** – any events of exchanging only text messages or files within a single application. The application can be either a thin client on workstations and mobile devices or a web application. The event is characterized by a list of remarks. For each remark, the sender (person), the time of sending, and the message text must be specified. The following services are preinstalled in this class: Mobile communication, WhatsApp, Yahoo!, MS Linc, ICQ, Mail.ru, Jabber, Skype (SMS and text messages tranferring). Service name in TM: **Messenger**;
- **Printers and MFPs** – events of data conversion on "specialized" devices for input/output of images and documents (e.g., printers, scanners). The event is characterized by a sender (person), a recipient (device), a number of copies, and a file with the original document/document image/ print task. The class has a preinstalled service – Printer. Service name in TM: **Printer and MFD**;
- **Internet activity** – events of sending requests from web browsers and similar programs via HTTP/ HTTPS protocols. Data for which no other class is selected also refers to this class. Sending a web message can be an example of an internet activity. The event is characterized by a sender (person) and a recipient (resource) for POST requests or a recipient (person) and a sender (resource) for GET requests. It is also characterized by the body of a "raw" request. The class has a preinstalled service – Internet application. Service name in TM: **Web activity**;
- **Photo** – events of photographing using device camera. The event is characterized by a sender (person) and a recipient (device). It is also characterized by an intercepted image. The class has a preinstalled service – Photo camera. Service name in TM: **Recording media**;
- **File exchange** – any event of transferring files between any senders and recipients. The event is characterized by a sender (person), a recipient (person/device/resource), and the intercepted file. Includes copying data to removable USB devices, cloud storage, sharing files via FTTP protocol. The following services are preinstalled in this class: FTP, External device, Mobile communication, WhatsApp, Yahoo!, MS Linc, ICQ, Mail.ru, Jabber, Skype. Service name in TM: **Messengers** (if recipient and sender are persons) or **File exchange** (if at least one recipient or sender are not persons).
- **Call** – any event of voice or video call via messenger or phone. The event is characterized by a person-sender (call initiator) and persons-recipients. It is also characterized by a file and a record time. Example: sending/receiving SMS or MMS or intercepting calls in social media. The class has the following preinstalled services: Mobile communication, MS Lync, Mail.ru, Jabber. Service name in TM: **Messenger**;
- **Recording media** – event of recording audio or video using a device. The event is characterized by a person-sender, a device-recipient, and an intercepted image. Example: microphone or dictaphone recordings, videocamera recordings and any events of photographing potentially confidential documents using device camera. Service name in TM: **Recording media**.

The SDK user should define a "class" of object intercepted by SDK and a "service" of intercepted object. "Service" determines what exactly was intercepted from the point of view of the user service, which the "sender" used for transferring data.

The SDK user can select a service from the list of services embedded in Traffic Monitor or define and register a custom service. The licensing policy in Traffic Monitor is implemented based on the object "protocol" and the interceptor vendor identifier. The object "service" is a sequence of characters defined by the SDK user.

> **Example:**
>
> If SDK user has developed an interceptor for a Viber client, the user can define and register the service as "Viber". For each service of a single vendor, a separate license is issued.

The "service" of the intercepted object can take part in creating a "policy" in Traffic Monitor, as well as in various analytical queries.

For each "event", "sender(s)" and "recipient(s)" must be defined.
The following types of "senders" and "recipients" are supported:

- A "person" is a "user" who is defined as a creator, a sender or a recipient of the intercepted object. For the person identification, a set of person's contacts can be defined. The contact type can be selected from the list which is supported by SDK. An example of the contact type can be email, phone number or a Windows account;
- A "workstation" is a computer, a mobile device or a terminal server, where the intercepted object was "created". For this type of a "sender", a list of "contacts" can be defined;
- A "resource" is an address on the Internet to which data is passed;
- A "device" is a device that receives data when files are copied to removable devices.

The list of contacts associated with a "person" makes it possible to identify the person by the contact. So, any intercepted actions of a "person" where at least one contact of the person is defined, allows Traffic Monitor to identify a particular user.
The SDK interface allows you to create logical connections between different objects, for example, a sender *Person* with a sender *Workstation*. This allows you to accurately determine the context of an intercepted operation, that is to determine who has initiated the data transferring and where.
For adding custom "services", a special file in a specific format will be used. This file will be loaded into the system through Traffic Monitor console and update internal data structures. Then, new services will be able to participate in creating rules and analytical queries.
The SDK interface enables sending data to a network in parts. It allows external developers to define, how to limit the load on the network.
A general algorithm of passing event the SDK interface looks like the following:

- Create an "event" object and set its attributes;
- Create senders/recipients of the event and specify their contacts and attributes;
- Create the event data and set its attributes;
- Establish connection with Traffic Monitor;
- Check access to Traffic Monitor and a plugin license of an external developer;
- Pass the event metadata;
- Pass contents of the event data in parts;
- Close the connection;
- Delete the event object.

For more details on the process of passing events, see SDK Samples.

9.1.2 General description of pushAPI SDK programming interface

The programming interface is implemented as a Thrift service. For more information on Thrift services, see https://thrift.apache.org. SDK samples include a Thrift scheme which describes a service implemented in Traffic Monitor. Below you can find a description of the scheme.



Data Types in pushAPI SDK

Code	**Description**
Identity stucture	
`typedef i32 ItemId`	Item identifier in the event

Code	**Description**
`enum IdentityItemType { kPerson, kWorkstation, kDevice, kResource, }`	Identification item type
`struct Attribute { 1: required string name, 2: required string value }`	A separate attribute of any event entity (the event itself, identification, dataflow): 1. Contact 2. Contact metadata
`struct ContactWithMeta { 1: required Attribute contact, 2: optional string meta }`	Identification contacts with metadata: 1. Contact 2. Contact metadata
`struct Identity { 1: required ItemId identity_id, 2: required IdentityItemType identity_type, 3: required list<Attribute> identity_contacts, 4: optional list<Attribute> identity_attributes, 5: optional list<ContactWithMeta> identity_contacts_with_meta }`	Identification of the object receiver or sender: 1. A unique identification number inside the object, used for links to identification 2. Identification item type 3. Identification list of contacts 4. An optional set of identification attributes 5. The list of identification contacts with metadata
`struct EventData { 1: required ItemId data_id, 2: optional list<Attribute> data_attributes }`	Description of the event dataflow: 1. A unique identifier of dataflow inside the event, used for links to dataflow 2. An optional set of the dataflow attributes
`struct ChatMessage { 1: required ItemId sender_id, 2: required string sent_time, 3: required string utf8_text, 4: optional ItemId mes_data_id }`	Description of a single message of the *Chat* class: 1. The link to the identification that is the message sender 2. Local time when the message was sent in YYY-MM-DDTHH:MM:SS+HH:MM formatted (ISO 8601 format yyyy-MM-ddTHH:mm:sszzz) 3. The message text in UTF-8 encoding 4. An identifier of the object data that will be used to transfer the message content if `utf8_text` is empty

Code	**Description**

`typedef string LinkNameType`
`struct ItemLink {`
`1: required ItemId id,`
`2: required ItemId link_to_id,`
`3: required LinkNameType link_name`
`}`
	Description of connection between different entities of the event:
	1. An identifier of the event entity, from which the connection goes
	2. An identifier of the event entity, to which the connection goes
	3. The name (type) of the connection

`const LinkNameType link_name_ws = "workstation_link"`	The list of names of supported connections between entities: • a name to establish connection between identifications of the *Person* and *Workstation* types

`struct Event {`
`1: required EventClass evt_class,`
`2: required TmServiceType evt_service,`
`3: optional list<Attribute> evt_attributes,`
`4: required list<Identity> evt_senders,`
`5: required list<Identity> evt_receivers,`
`6: required list<EventData> evt_data,`
`7: optional list<ChatMessage> evt_messages,`
`8: optional list<ItemLink> evt_links,`
`9: optional Identity evt_source,`
`10: optional Identity evt_destination`
`}`
	Description of the event that must be transferred to Traffic Monitor:
	1. The event class
	2. The event service
	3. The event attributes
	4. The event senders
	5. The event recipients
	6. The event data
	7. Event messages for the *Chat* class
	8. Connections between the event entities
	9. The event source
	10. The event receiver

`struct Credentials {`
`1: required string company_name,`
`2: required string token`
`}`
	The structure that describes parameters to access Traffic Monitor:
	1. The client name (or the company name in our case). The parameter connects an external developper's plugin with the license.
	2. An authorization token. This string is a "secret" known by the plugin and Traffic Monitor. This is how the authorization of data source is implemented

`typedef i64 EventId`	An identifier of the event being loaded

Code	**Description**
`typedef i64 StreamId`	An identifier of the event dataflow being loaded
`typedef i32 InterfaceVersion` `const InterfaceVersion pushapi_version = 1`	PushAPI interface version

`enum EventClass {`
`kChat,`
`kEmail,`
`kMfp,`
`kWeb,`
`kFileExchange,`
`kPhoto,`
`kMultimedia,`
`kVoiceTalk`
`}`
	Supported event "classes" in PushAPI:
	• Chat
	• Mail
	• Printing, copying and scanning
	• Internet activity
	• File exchange
	• Photo
	• Multimedia recording
	• Call

Note:

If you need to be able to block data transfer based on analysis results, then you can use one of the following classes: `kChat, kEmail , kWeb,` when sending events to Traffic Monitor by means of PushAPI. These classes correspond to the following event types: **Messenger**, **Mail**, **Internet activity**. For these classes, Traffic Monitor allows you to set the *Block* verdict to events in the Data Protection Policy.

Exceptions of pushAPI SDK

Code	**Description**

`exception EventNotFound {`
`1: string message,`
`}`
	`EventId` specified in the list of parameters is not found in the current session of passing the event

`exception DataNotFound {`
`1: string message,`
`}`
	`DataId` for the specified `EventId` is incorrect, that is specified `DataId` is not found in the current session of passing the event

`exception StreamNotFound {`
`1: string message,`
`}`
	`StreamId` for the specified `EventId` is incorrect, that is specified `StreamId` is not found in the current session of passing the event

`exception InvalidEventFormat {`
`1: string message,`
`}`
	The event format is incorrect, that is validation for the contents of the event attributes failed. Each class has a set of required attributes

Code	**Description**
`exception InvalidCredentials { 1: string message }`	Incorrect parameters of access to the interface. A correct token must be specified
`exception LicenseError { 1: string message }`	Traffic Monitor server does not have a correct license for passing events
Note: message specifies the reason of exclusion	

Traffic Monitor pushAPI SDK services

Services embedded in Traffic Monitor which can be used for events:

```
const TmServiceType service_email = "email" //!< Mail on Client
const TmServiceType service_email_web = "email_web" //!< Mail in browser
const TmServiceType service_im_icq = "im_icq" //!< ICQ
const TmServiceType service_im_skype = "im_skype" //!< Skype
const TmServiceType service_im_xmpp = "im_xmpp" //!< XMPP
const TmServiceType service_im_mmp = "im_mail_ru" //!< MMP
const TmServiceType service_im_lync = "im_lync" //!< MS Lync
const TmServiceType service_web = "web_common" //!< Web-messages
const TmServiceType service_file_removable_storage = "file_copy_removable" //!< File exchange with an external device (removable device)
const TmServiceType service_file_ftp = "ftp" //!< File exchange through FTP
const TmServiceType service_print = "print" //!< Printing
const TmServiceType service_cloud_storage = "cloud_storage" //!< File exchange with a cloud storage
const TmServiceType service_terminal_session = "terminal_session" //!< File exchange through terminal session
const TmServiceType service_network_resource = "network_resource" //!< File exchange with network resources
```

Service name	Classes	Description
email	"Email"	A corporate email interception service. The service does not depend on the used protocol or the mail server type. If you extend the "Email" class, we recommend you adding the "email_" prefix to the service name, e.g., "email_google"
email_web	"Email"	A service for intercepting email in browser
im_icq	"Chat", "Voice chat", "File exchange"	A service for intercepting "ICQ" messaging program ("OSCAR" protocol)

Service name	Classes	Description
im_skype	"Chat", "Voice chat", "File exchange"	A service for intercepting "Skype" messaging program
im_xmpp	"Chat", "Voice chat", "File exchange"	A service for intercepting any messaging program that works on XMPP protocol (Jaber)
im_mail_ru	"Chat", "Voice chat", "File exchange"	A service for intercepting any messaging program that works on MMP protocol (Mail.ru Agent)
im_lync	"Chat", "Voice chat", "File exchange"	A service for intercepting "MS Lync" messaging program
web_common	"Internet activity"	A service for intercepting unparsed POST request
file_copy_removable	"File exchange"	A service for creating copies of files which are copied to removable storage devices
ftp	"File exchange"	A service for creating copies of files which are copied to removable storage devices
print	«Printers and MFPs»	A service for creating "images" of documents printed on a printer
cloud_storage	"File exchange"	A service for creating copies of files which are copied to cloud storages
terminal_session	"File exchange"	A service for creating copies of files which are copied via terminal session
network_resource	"File exchange"	A service for creating copies of files which are copied to network resources
Note: When you add a new service which is a messaging program, we recommend you adding "im_" prefix to the service name. For example, "im_viber"		

Note:

Services having other types of events can be registered using plugins

Contact types in Traffic Monitor pushAPI SDK

Contact types, which Traffic Monitor business logic supports:

Code	**Description**
`const TmContactType contact_type_email = "email"`	Email address. Is used for identifications with "Person" type
`const TmContactType contact_type_auth = "auth"`	Login in OS in login@domain format. Is used for identifications with "Person" type
`const TmContactType contact_type_dnshostname = "dnshostname"`	DNS name. Is used for senders with "Workstation" type
`const TmContactType contact_type_icq = "icq"`	ICQ number. Is used for identifications with "Person" type
`const TmContactType contact_type_skype = "skype"`	Skype login. Is used for identifications with "Person" type
`const TmContactType contact_type_phone = "phone"`	Phone number. Is used for identifications with "Person" type
`const TmContactType contact_type_ip = "ip"`	IPv4 address. Is used for senders with "Workstation" type
`const TmContactType contact_type_sid = "sid"`	Security Identifier in Windows OS, in a text format. Is used for identifications with "Person" type
`const TmContactType contact_type_webaccount = "webaccount"`	Account name on a network resource
`const TmContactType contact_type_lotus = "lotus"`	Mailing address in Lotus. Is used for identifications with "Person" type
`const TmContactType contact_type_domain = "domain"`	Domain

Traffic Monitor pushAPI SDK supported attributes

List of attribute names, supported in Traffic Monitor:

Code	Attribute description
`typedef string EventAttributeType`	**Event attributes:**
`const EventAttributeType event_attr_capture_date = "capture_ts"`	Event interception local time in yyyy-MM-ddTHH:mm:sszzz format (ISO 8601) (*)

Code	Attribute description
`const EventAttributeType event_attr_capture_server_ip = "capture_server_ip"`	IP-address of interception server (able to differ different copies of the same plugin) (*)
`const EventAttributeType event_attr_capture_server_fqdn = "capture_server_fqdn"`	DNS-name of interception server (able to differ different copies of the same plugin) (*)
`const EventAttributeType event_attr_inteceptor_id = "interceptor_id"`	Object identificator within the interceptor
`const EventAttributeType event_attr_inteceptor_protocol = "protocol_mnemo"`	Protocol set for object transfer
`const EventAttributeType event_attr_print_copies = "print_copies"`	Number of copies (integer within a string)
`const EventAttributeType event_attr_destination_type = "destination_type"`	Receiver type
`typedef string DataAttributesType`	**Common attributes of data stream:**
`const DataAttributesType data_attr_mimetype = "mimetype"`	MIME-type of content (to be defined only for the nodes, that have been already reviewed by client)
`const DataAttributesType data_attr_size = "data_size"`	Amount of data, in case it is known prior
`const DataAttributesType data_attr_sent_date = "sent_date"`	Object sending date in YYYY-MM-DDTHH:MM:SS+HH:MM format. Able to set up independently the time of event formation and the time of real data transfer.
`const DataAttributesType data_attr_comment = "data_comment"`	Comment
	"Email" class attributes of data stream:

Code	Attribute description
`const DataAttributesType data_attr_email_subject = "subject"`	Email subject
`const DataAttributesType data_attr_email_is_encrypted = "encrypted"`	Sign of encryption ("true" or "false" lines)
`const DataAttributesType data_attr_email_is_signed = "is_signed"`	Digital signature sign ("true" or "false" lines)
	"Files exchange" class attributes of data stream:
`const DataAttributesType data_attr_file_filename = "filename"`	Short name of file (*)
`const DataAttributesType data_attr_file_source_file_path = "source_path"`	Full path to event source file
`const DataAttributesType data_attr_file_destination_file_path = "destination_path"`	Full path to transferred or scanned file or full address of web resource
	"Mobile networks" class attributes of data stream:
`const DataAttributesType data_attr_voice_duration_sec = "call_duration"`	Duration in seconds (integer within a string)
	"Pinter and MFP" class attributes of data stream:
`const DataAttributesType data_attr_print_job_name = "print_job_name"`	Name of printing task

Code	Attribute description
`const DataAttributesType data_attr_print_copies = "event_attr_print_copies"`	Number of copies (integer within a string)
`typedef string IdentityAttrType`	**Common identification attributes:**
`const IdentityAttrType identity_attr_comment = "identity_comment"`	Comment
`typedef string TWorkstation`	**"Computers" type identification attributes:**
`const IdentityAttrType identity_attr_ws_type = "workstation_type"`	Type of workstation::
`const TWorkstation ws_type_computer = "ws_type_computer"`	Workstation
`const TWorkstation ws_type_mobile = "ws_type_mobile"`	Mobile device
`const TWorkstation ws_type_terminal = "ws_type_terminal"`	Terminal server
	"Device" type identification attributes:
`const IdentityAttrType identity_attr_device_name = "device_name"`	Device name (*)
`const IdentityAttrType identity_attr_device_type = "device_type"`	Device type
	"Device", "Resource", "Workstation" type identification attributes for resource and receiver:
`const IdentityAttrType identity_attr_endpoint_name = "name"`	Device or resource name (*)
`const IdentityAttrType identity_attr_endpoint_path = "path"`	Path on specified resource or device (*)

Code	Attribute description
`const IdentityAttrType identity_attr_endpoint_type = "type"`	Resource or device type. To be filled with mnemonics from the guide
`const IdentityAttrType identity_attr_endpoint_device_id`	Removable device ID
`const string identity_attr_print_location = "print_location"`	Printer location
`const string identity_attr_print_port_name = "print_port_name"`	Port name of printer
`const string identity_attr_print_server = "print_server"`	Server name of printer
	Attributes of "Resource" type identifications:
`const IdentityAttrType identity_attr_resource_url = "res_destination_url"`	Resource URL (*)
`const IdentityAttrType identity_attr_resource_address = "res_destination_host"`	DNS or resource IP address (*)
Note: (*) - required attribute	

> **Note:**
>
> If an external system sends and event to Traffic Monitor, and its attribute `destination_path` has several values, then the event will be saved in Traffic Monitor with the first of the values, all others casted away.

EventProcessor service in pushAPI SDK

Code	Description
`InterfaceVersion GetVersion()`	Function of getting the current interface version

Code	Description
`void VerifyCredentials(1: Credentials cred) throws(1: InvalidCredentials ex);`	Auditing function of pushAPI SDK interface access parameters. Allows you to verify the data transfer before its transfer:
`ventId BeginEvent (1: Event event, 2: Credentials cred) throws(1: InvalidEventFormat ex1, 2: InvalidCredentials ex2, 3: LicenseError ex3, 4: EventNotFound ex4, 5: DataNotFound ex5);`	Function initiating the transfer process of event interception to Traffic Monitor by means of pushAPI SDK, where: • event – filled in structure, containing all "metadata" describing the interception event. Attributes: sender, recipient, list of data streams, related to event; • cred – structure, which allows to authorize the event transfer process; • return – data transfer session event identification (few events can be transferred within one TCP-session).
`StreamId BeginStream (1: EventId event_id, 2: ItemId event_data_id) throws(1: EventNotFound ex1, 2: DataNotFound ex2);`	Function of data stream transfer initiation, related to interception event, where: • event_id – event identificator, related to this data stream. To be returned by `BeginEvent` function; • event_data_id – data transfer identificator. This identificator is a part of event "metadata", in evt_data field; • return – identification of loading stream.
`void SendStreamData(1: EventId obiect id, 2: StreamId stream_id, 3: binary chunk) throws(1: EventNotFound ex1, 2: StreamNotFound ex2, 3: InvalidEventFormat ex3);`	Function transferring the clipboard as a part of data stream related to interception event, where: • event_id – event identificator, related to this data stream. To be returned by `BeginEvent` function; • stream_id – data stream identificator, where clipboard is a part of transferred data. To be returned by `BeginStream` function; • chunk – clipboard. SDK user should specify the buffer size to provide enough speed of events loading with no overload of network infrastructure.
`void EndStream(1: EventId event_id, 2: StreamId stream_id) throws(1: EventNotFound ex1, 2: StreamNotFound ex2, 3: InvalidEventFormat ex3);`	Function, recording the data stream finishing, related to event interception, where: • event_id – event identificator, related to this data stream. To be returned by `BeginEvent` function;

Code	Description
	• stream_id – data stream identificator, where clipboard is a part of transferred data. To be returned by `BeginStream` function.
`string GetEventDatabaseId(1: EventId object_id) throws(1: EventNotFound ex1);`	Function of getting unique interception event identification within Traffic Monitor System, where: • event_id – event identificator, got by calling `BeginEvent`. This value can be used to refer to loaded event. The function can be called after successful completion of `BeginEvent` function.
`void EndEvent(1: EventId event_id, 2: bool abort) throws(1: EventNotFound ex1, 2: InvalidEventFormat ex2, 3: LicenseError ex3);`	Function, recording the data stream finishing, related to event interception, where: • event_id – event identificator, which transfer is finishing; • abort – flag of event processing finish within Traffic Monitor. If the flag is true, the event processing is over and Traffic Monitor is about "to forget" about it.

9.1.3 Registering external component with pushAPI SDK

To integrate an external data interception module with Traffic Monitor system, perform the following steps:

1. Register with InfoWatch company the identifier string of vendor company producing a component. This will link the vendor company with a license that will be installed in Traffic Monitor system;
2. Get a developer license linked with the company identifier. This will enable loading interception events from this vendor to Traffic Monitor. The developer license allows you to load any event types (services);
3. Create a file for external component registry. The file format is described below. By this moment, the data source names for sample unloading should be already defined, which is to be generated by the external component. The license obtained as per step 2 is added to the registry file;
4. Load the external component registry file to Traffic Monitor system via Traffic Monitor console interface. For details, see the "Administration" - "Plugins" section in "Traffic Monitor. User Guide";
5. In the properties of the loaded external component, get an access token.

Now the System is ready to receive events from the specified vendor company with the specified interception service.

PushAPI SDK third-party component registry file format

The plugin is an archive in a ZIP format. The archive includes:

- **licenses** folder that contains license files;
- **icon** folder that contains files with pictograms for registered events;
- **manifest.json** file with information on a plugin.

Note:

Folders **licenses** and **icon** are optional. License files and files with pictograms can be located in the root folder.

For external source systems, **manifest.json** file should contain the following information:

Content	Type of data	Optional	Description
`{`			
`"PLUGIN_ID": "",`	String	Yes	Unique plugin identifier (UUID) created by developer. It may include up to 40 characters. The identificator is used for plugin update. **Example:** `"PLUGIN_ID": "189C38D390396EB6E0530100007F1CA200000001",`
`"DISPLAY_NAME": "",`	String	Yes	Plugin name displayed. **Example:** `"DISPLAY_NAME": "Plugin name",`
`"DESCRIPTION": "",`	String	No	Plugin description displayed. **Example:** `"DESCRIPTION": "Test plugin to demonstrate",`
`"VERSION": "",`	String	Yes	Plugin version. **Example** `"VERSION": "1.0.0",`
`"VENDOR": "",`	String	Yes	Software company ID in accordance with the company name specified in the license. **Example** `"VENDOR": "infowatch",`
`"LICENSE": [ { "PATH":"" } ],`	Array String	Yes	License files. The paths to license files should be specified in accordance with archive root folder. **Example:** `"LICENSE": [ { "PATH":"licenses/license file 1.license" }, { "PATH":"licenses/license file 2.license" }, ],`
`"PATTERN_SEARCH_LICENSE": "",`	String	No	Template to search previously downloaded licenses to be binded to plugin. It has the following format: `{operator:or|`

Content	Type of data	Optional	Description
			`and,child[{name:value}]}"`. **Example:** `"PATTERN_SEARCH_LICENSE": "{\"operator\":\"or\", \"conditions\":[{\"origin\": \"dm\"},{\"origin\": \"dmmobile\"}]}",`
`"ADDS_EVENTS": { "OBJECT_TYPE": [ { "MNEMO": "", "SERVICE_MNEMO": "", "ICON": "", "LOCALE": { "": "" } } ], "PROTOCOL": [ { "MNEMO": "", "LOCALE": { "": "" } } ] },`	Object Array String String String Object Array String Object	Yes	Registered types of events and protocols. Array of registered events types containing services types they are related to. Event type. Service. Files containing registered contacts icons. Localization of contacts types names available at least in one language. **Example:** `"ADDS_EVENTS": { "OBJECT_TYPE": [{ "MNEMO": "cloud_storage", "SERVICE_MNEMO": "file", "LOCALE": { "rus": "Облачное хранилище", "eng": "Cloud storage" } }, { "MNEMO": "im_telegram", "SERVICE_MNEMO": "im", "ICON": "icon/event_icon_telegram.png", "LOCALE": { "rus": "Telegram", "eng": "Telegram" } }], "PROTOCOL": [{ "MNEMO": "telegram", "LOCALE": { "rus": "Telegram", "eng": "Telegram" } }] },`

Content	Type of data	Optional	Description
`"USES_EVENTS": { "OBJECT_TYPE": [ { "MNEMO": "", "PROTOCOL": [ { "MNEMO": "" } ], "ORIGIN": [ "" ] } ] },`	Object Array String Array String Array String	Yes	Types of existing events. Array of registered events types specifying the types of services they are related to. Type of event. Array of protocols, related to this type of event. Protocols. Array of interceptors types codes for InfoWatch plugins. Codes **Example:** `"USES_EVENTS": { "OBJECT_TYPE": [{ "MNEMO": "email", "PROTOCOL": [{ "MNEMO": "pop3" }, { "MNEMO": "imap" }, { "MNEMO": "mapi" }, { "MNEMO": "smtp" }], "ORIGIN": ["dm", "dmmobile"] }, { "MNEMO": "email_web", "PROTOCOL": [{ "MNEMO": "http" }, { "MNEMO": "https" }], "ORIGIN": ["dm", "dmmobile"] }, { "MNEMO": "im_whatsapp", "PROTOCOL": [{ "MNEMO": "whatsapp" }], "ORIGIN": ["dm", "dmmobile"] }] },`
`"ADDS_SERVICES": { "SERVICE_TYPE": [ { "SERVICE_MNEMO": "", "DATA_CLASS": [""], "ICON": "",`	Object Array String Array of strings String Object	Да	Types of events registered via SDK services. Types of intercepted services registered. Name of intercepted service. List of data categories, intercepted by this service interceptor. Files containing registered contacts icons. Localization of contacts types names available

Content	Type of data	Optional	Description
`"LOCALE": { "": "", "": "" } } ] },`			at least in one language. **Example:** `"ADDS_SERVICES": { "SERVICE_TYPE": [{ "SERVICE_MNEMO": "newservice", "DATA_CLASS": ["kChat", "kFileExchange"], "ICON": "icon/TM_icon.png", "LOCALE": { "rus": "сервис#5", "eng": "service#5" } }, { "SERVICE_MNEMO": "newservice2", "DATA_CLASS": ["kPhoto"], "ICON": "icon/TM_icon.png", "LOCALE": { "rus": "сервис#5+2", "eng": "service#5+2" } }] }`

`"OBJECT_HEADER": [ { "NAME": "",`
 	
`"NOTE": { "": "", "": "" },`
`"TYPE": "",`
`"FORMAT": "",`
 	
`"DATA_CLASS": [""],`
`"USE_IN_POLICY": "",`
`"USE_IN_NOTIFICATION": "",`
`"USE_IN_QUERY": "",`
`"USE_IN_LIST": "",`
`"USE_IN_SHOW":`
	Array
	String
	
	Object
	String
	Listing
	Listing
	
	Strings array
	Listing
	Listing
	
	Listing
	Listing
	Listing
	Listing
	
	Listing
			User events attributes.
			
			Unique attribute's code to be used in the events headers and to be identified in xAPI/ PushAPI.
			
			If developer's ID is not "IW", the code should start with " `<Software company's ID>_` " prefix.
			
			For example: CISCO_CALL_DURATION
			
			Attribute's name, displayed on Traffic Monitor management console.
			
			Type of value.
			
			Recording format. Possible values: number (integer, fractional), string, date and time UTC + specifying the time zone shifting, duration, hyperlink, listing, logic type.
			
			Services, which events will be qquipped with new user user attribute.
			
			Using attribute in policies. `"1"` - yes, `"0"` - no.

Content	Type of data	Optional	Description

`"",`
`"USE_IN_DETAIL": "",`
`"IS_MULTIPLE_VALUE": "",`
`}`
`]`
			Using attribute in tabular form of events list preview. `"1"` - yes, `"0"` - no.
			Using attribute in short form of events list preview. `"1"` - yes, `"0"` - no.
			Using attribute in detailed form of events list preview. `"1"` - yes, `"0"` - no.
			Multiple value. `"1"` - yes, `"0"` - no.
			`"OBJECT_HEADER": [`
			`{`
			`"NAME": "header_multi_string",`
			`"NOTE": {`
			`"rus": "Заголовок строк1",`
			`"eng": "Header strings1"`
			`},`
			`"DATA_CLASS": ["kEmail"],`
			`"USE_IN_POLICY": "1",`
			`"USE_IN_QUERY": "1",`
			`"USE_IN_NOTIFICATION": "1",`
			`"USE_IN_LIST": "1",`
			`"USE_IN_SHOW": "1",`
			`"USE_IN_DETAIL": "1",`
			`"TYPE": "string",`
			`"FORMAT": "string",`
			`"IS_MULTIPLE_VALUE": "1"`
			`},`
			`{`
			`"NAME": "header_date",`
			`"NOTE": {`
			`"rus": "Заголовок дата1",`
			`"eng": "Header date1"`
			`},`
			`"DATA_CLASS": ["kEmail"],`
			`"USE_IN_POLICY": "1",`
			`"USE_IN_QUERY": "1",`
			`"USE_IN_NOTIFICATION": "1",`
			`"USE_IN_LIST": "0",`
			`"USE_IN_SHOW": "1",`

Content	Type of data	Optional	Description
			"USE_IN_DETAIL": "1", "TYPE": "string", "FORMAT": "date", "IS_MULTIPLE_VALUE": "0" }]
}			

A full JSON scheme is a part of SDK samples (see "Description of PushAPI SDK samples"). A sample file of the module registration is included in the SDK.

Important!

The file contains an expired license. To use the sample file for registration of a plugin, you need to obtain a new license.

9.1.4 Description of PushAPI SDK samples

Samples are the source codes of console utilities, which implement loading events into Traffic Monitor using Thrift interface of pushAPI SDK.
The first utility is `pushapi-cpp.` It is implemented in C++ and prepared for assembly in Windows and Linux operating systems. This utility demonstrates scripts of loading all event types that are already registered with Traffic Monitor.

The second utility is `pushapi-csharp` . It is implemented in C# and prepared for assembly in Windows operating system. This utility demonstrates scripts of loading all event types that are already registered with Traffic Monitor.

The third utility is pushapi-demo.py. Is implemented in Python. Is prepared for assembly in Windows and Linux operating systems. This utility demonstrates scripts of loading all event types that are already registered with Traffic Monitor.

The fourth utility is `pushapi-util` . It is implemented in C++ and prepared for assembly in Windows and Linux operating systems. This utility has an advanced command-line interface which enables uploading any events to Traffic Monitor system, including events registered with an external system. Here is the command line description:

```
./pushevent-util
--host <pushapi address > [--port <pushapi port>]
--token <plugin token>
--id <company>
--class <event class>
--service <event service>
--evtattr <attr_name:attr_value,…, attr_name:attr_value>
--sender
<contact_type:contact_value,attr_name:attr_value,…,attr_name:attr_value>
--receiver
<contact_type:contact_value,attr_name:attr_value,…,attr_name:attr_value>
```

```
--data file:<data_falie_name>, attr_name:attr_value,…, attr_name:attr_value
--mes <contact_type:contact_value,"message text"
[-addctx]
```

Where:

- <pushapi address > – pushAPI server address;
- <pushapi port> – pushAPI server port; if the port is not specified, a default value is used;
- <plugin token> – the plugin authorization token. It is retrieved from the console, from the section of the given plugin;
- <company> – an identifier of the plugin vendor. A string, which must be the same as the string used for generating a license for the plugin;
- <event class> – the class of the passed event;
- <event service> – the service of the passed event. The plugin can register intercepted services by their names and pass the names;
- --evtattr – attributes of the passed event. Can be viewed in the list of commands with a sample. Some attribute names have fixed values and business sense;
- --sender – the event sender. The first pair of parameters defines the sender's contact. Then the sender's attributes are specified. There are three "special" contact types: dev (the sender/recipient is a device), res (the sender/recipient is a resource), ws (the sender/recipient is a "Workstation"). If no sender is specified, then two senders will be generated: one sender with "Person" type and "auth" contact type and the other sender with "Workstation" type and `dnshostname` contact. Only one sender can be specified;

  Example:

  For the event where the sender has a VK account and meta-information is indicated:

  ```
  --sender "vkontakte:349051292:'{\"display_name\":\"some name\",\"url\":
  \"some_url\",\"login\":\"some_login\"}'"
  ```

- --receiver – the event recipient. Has the same parameters as the sender;
- --data – the event data. The first pair of parameters defines the path to a file with the event body. Other parameters describe attributes of these data. Some of the attributes are required for some event types;
- --mes – passing events of "Chat" class. A contact of the message sender and the message contents are specified. There can be several messages;
- --addctx – an optional parameter. Automatically adds two senders to the event: one sender with "Person" type and "auth" contact type and the other sender with "Workstation" type and dnshostname contact type.

Examples of calling this utility can be found in the source codes of samples.
Besides, SDK samples include:

- pluging.json file – JSON scheme of mainifest.json file, which is included in the registration file for a new plugin;
- plugin.zip file – a sample of file used for registration of an external plugin.

Important!

The file contains an expired license. To use the sample file for registration of the plugin, you need to obtain a new license.

Building samples under Linux in pushAPI SDK

To build samples under Linux, you need the installed **cmake** package and the compiler supporting C++11 standard. All other dependencies are defined by **cmake** script. To build the samples, you may need to install Thrift Runtime libraries, Boost library, and OpenSSL library, namely the following ones:

- boost 1.62
- openssl 1.0.1
- thrift 0.11.0

Building samples under Windows in pushAPI SDK

To build samples under Windows, you need the installed Visual Studio 2013 program. The samples include Toolchain that contains boost, OpenSSL, and source codes of Thrift Runtime libraries which are built as a part of the sample. Toolchain includes a `thrift` utility that compiles the `thrift` scheme to a corresponding source code. It is possible to use custom implementation of boost, OpenSSL, and Thrift – for these the user should define the environment variables:
`$(BOOST_ROOT)`
`$(OPENSSL_ROOT_DIR)`
`$(THRIFT_INSTALL_DIR)`

9.2 Uploading sample documents and DB unloadings (REST API SDK)

This programming interface is designed to integrate third-party components with Traffic Monitor. Third-party components can generate documents which represent "Database sample unloadings" and "Sample documents" and then pass them to Traffic Monitor using the provided interface. After that, the passed unloadings will be detected in data streams that are analyzed by Traffic Monitor. Rules for detection of unloadings are set in Traffic Monitor console. A third-party component can only upload and update contents of the uploading. The third-party component must be registered in the system according to the procedure that is described in "Registering REST API external component".

This document will let you realize sample documents and DB unloadings automatic download via API. The document is intended for company's developers, technology partners or contarctors.



9.2.1 Configuring REST API programming interface

The following parameters participate in configuring the programming interface:

- Address for connection to the SDK service (network address, port);
- "Authorization" token. A string of characters, which allows you to authorize components that use the SDK. This string can be obtained in the control panel by external automated systems in Traffic Monitor management console;
- Identifier of transmitted data. A string received by a vendor of the external component from InfoWatch. This string describes the type of transmitted data and is used in the licensing policy;
- Identifier of a vendor of the external component. A string received by a vendor of the external component from InfoWatch. This string describes the vendor and is used in the licensing policy.

9.2.2 General description of REST API programming interface

The programming interface is a REST API, that is a sequence of requests to a web server. The programming interface provides the following features:

- Creating sample unloading;
- Updating REST API sample unloading;
- Adding contents to REST API sample unloading;
- Getting state of REST API sample unloading;
- Initiating deployment of uploaded sample documents' new content to analysis modules;
- Getting interface version supported by Traffic Monitor;
- Creating sample documents catalogue;
- Deleting sample documents catalog;
- Creating sample document;
- Deleting sample document;
- Adding sample document content;
- Getting state of sample document.

Creating sample unloading

```
FingerPrintDsc Create(string name, string[] columns)
```

The function creates a sample unloading with a specified name and a list of column names of the sample unloading. Returns a description of the created sample object (FingerPrint).

Updating REST API sample unloading

```
FingerPrintDsc UpdateContent(string FingerPrintId,string[]content)
```

The function allows you to upload contents to an existing sample object (unloading). The sample object is determined by its identifier (FingerPrintDsc field of the structure). Returns a description of the sample object (FingerPrint). Once the contents are uploaded, the process of converting and saving the contents is initiated. This function completely replaces the contents of a sample object.

Adding contents to REST API sample unloading

```
FingerPrintDsc AddContent(string FingerPrintId, string[] content)
```

The function allows you to add extra contents to an existing sample object (unloading). The sample object is determined by its identifier (FingerPrintDsc field of the structure). Returns a description of the sample object (FingerPrint). Once the contents are uploaded, the process of converting and saving the contents is initiated. This function completely replaces the contents of a sample object.

Getting state of REST API sample unloading

```
FingerPrintDsc GetInfo(string FingerPrintId)
```

The function allows you to receive information about existing sample unloading. Sample object description (FingerPrint) is returning. The important result of calling this function is a field containing status of sample unloading.

Initiating deployment of uploaded sample documents' new content to analysis modules

```
Void Ditribute()
```

The function initiates the procedure of deploying new contents of sample unloadings to analisys modules. The function is synchronous. Once the function is executed, Traffic Monitor is ready to detect new contents in data streams it analyzes.

Getting interface version supported by Traffic Monitor

```
VersionInfo GetInterfaceVersion()
```

The function allows you to receive information about the interface supported by Traffic Monitor.

Each part of the unloading, which is uploaded to Traffic Monitor, passes stages of conversion to an internal format and saving to a database. After that, an external component initiates passing the new unloading to Traffic Monitor systems of analysis. Thus, a sufficiently large unloading can be uploaded in parts. That is, it takes several requests to upload the unloading and then a single command is used to deploy it to systems of analysis.

Each step of processing the uploaded sample unloading takes some time. At each step, an error may occur.

The programming interface allows you to track the steps of processing a sample unloading and respond to errors that may occur during processing.

Creating sample documents catalogue

```
CatalogId CreateEtDocCatalog(CatalogId parentCatalog, string name);
```

The function is intended to create a sample documents catalogue, returning the created catalogue's identifier, where:

- `parentCatalog` - parent directory, where the catalogue is created. (0 - to create in the root directory).
- `name` - name of sample documents catalogue. This name will be displayed in TM management console.

```
CatalogId GetEtDocCtalogIdByName(string name);
```

The function is intended to receive the catalogue's ID by name, returning the created catalogue's identifier.

```
CatalogList GetEtDocCtalogs();
```

The function is intended to receive the catalogues, created by plugin, returning the list of catalogues.

Deleting sample documents catalog

```
void DeleteEtDocCatalog(CatalogId id)
```

The fuinction is intended to delete sample documents catalog if it is a part of protected object.

The function returns the deleted catalog's id.

Creating sample document

```
DocumentId CreateEtDoc(CatalogId parentCatalog, string name, Type type);
```

The function is intended to create a sample document, returning sample document ID, where:

- `parentCatalog` - the catalog ID, where sample document is created. Cannot be set to "0" since documents cannot be created in the root directory.
- `name` - name of sample document. Sample document cane be created in accordance with intercepted text or its binary representation.

Deleting sample document

```
void DeleteEtDoc(DocumentId doc);
```

The function is intended to delete a sample document if it is a part of protected object.

Adding sample document content

```
void AddEtDocContent(DocumentId doc, Buffer buf);
```

The function is intended to add sample document content, thus letting to download the content by parts, where:

- `doc` - sample document identifier, which will be completed by content;
- `buf` - data buffer, aded to document.

```
void UpdateEtDocContent(DocumentId doc, Buffer buf);
```

The function is intended to update or replace sample document content, where:

- `doc` - sample document identifier, where the content is changed;
- `buf` - data buffer, being a new content of sample document.

Getting state of sample document

`DocState GetEtDocState(DocumentId doc)`;

The function is intended to get the state of sample document, where:

- `doc` - sample document identifier.

9.2.3 Registering REST API external component

To integrate an external data interception module with Traffic Monitor system, perform the following steps:

1. Register with InfoWatch company the identifier string of vendor company producing a component. This will link the vendor company with a license that will be installed in the Traffic Monitor system.
2. Get a developer license linked with the company identifier. This will enable loading sample unloadings from this vendor to Traffic Monitor. The developer license allows you to load any sample unloadings.
3. Create an external component registry file as per below. By this moment, the data source names for sample unloading should be already defined, which is to be generated by the external component. The license obtained as per step 2 is added to the registry file.
4. Load the external component registry file to Traffic Monitor system via Traffic Monitor console interface. For details, see the *Administration -> Plugins* section in "*InfoWathc Traffic Monitor. User Guide*";
5. Get the access token within the properties of the external component loaded.

Now the System is ready to receive generated sample unloadings from the specified vendor company with the specified source of the sample unloading.

REST API third-party component registry file format

The plugin is an archive in a ZIP format. The archive includes:

- **licenses** folder that contains license files;
- **icon** folder that contains files with pictograms for registered events;
- **manifest.json** file with information on a plugin.

> **Note:**
>
> Folders **licenses** and **icon** are optional. License files and files with pictograms can be located in the root folder.

For events source external systems, **manifest.json** file should contain the following information:

Content	Type of data	Optional	Description
`{`			
`"PLUGIN_ID": "",`	String	Yes	Unique plugin identifier (UUID). Up to 40 characters. **Example:** `"PLUGIN ID": "189C38D390396EB6E0530100007F1CA200000001",`
`"DISPLAY_NAME": "",`	String	Yes	Plugin name displayed. **Example:** `"DISPLAY_NAME": "Plugin name",`
`"DESCRIPTION": "",`	String	No	Plugin name displayed. **Example:** `"DESCRIPTION": "Test plugin to demonstrate",`
`"VERSION": "",`	String	Yes	Plugin version. **Example** `"VERSION": "1.0.0",`
`"VENDOR": "",`	String	Yes	Software company ID in accordance with the company name specified in the license. **Example** `"VENDOR": "infowatch",`

`"LICENSE": [`
`{`
`"PATH":""`
`}`
`],`
	Array
	
	String
		Yes	License files. The paths to license files hould be specified in accordance with archive root folder.
			Example:
			`"LICENSE": [`
			`{`
			`"PATH":"licenses/license`

Content	Type of data	Optional	Description
			`file 1.license" }, { "PATH":"licenses/license file 2.license" }, ],`
`"PATTERN_SEARCH_LICENSE": "",`	String	No	Template to search previously downloaded licenses to be binded to plugin. It has the following format: `{operator:or|and,child[{name:value}]}"`. **Example:** `"PATTERN_SEARCH_LICENSE": "{\"operator\":\"or\", \"conditions\": [{\"origin\":\"dm\"}, {\"origin\": \"dmmobile\"}]}",`
`"DATATYPE": [ { "VALUE": "" } ]`	Array String	Yes	List of data types specifying the source systems. **Example:** `"DATATYPE": [ { "VALUE": "type1_s1", "VALUE": "type2_s2" } ],`
`}`			

Important!

The file contains an expired license. To use the sample file for registration of a plugin, you need to obtain a new license.

9.2.4 Format of sample unloading and REST API sample document

A sample unloading is a sequence of rows in UTF-8 encoding. The rows should be separated by CRLF or LF characters. Cell values in the row should be separated by TAB or ‘,’ (comma) characters. These limitations follow TSV (Tab separated values) CSV (Comma separated values) format. The number of cells in all rows must be the same. When you create an unloading, the number of cells must be specified. It is equal to the number of column names, which are passed to the *Create* function. It is only possible to upload contents to an existing sample unloading if the number of cells is equal to the number specified during the unloading creation. If a different number of cells is specified it will make the unloading invalid.

A sample document is a file of any format. If the file is not an encrypted archive, the System extracts the files from the archive, process them with separately from each other and creates a separate sample document basing on each

extracted file (a sample document cannot be created based on the whole archive). All created sample documents are placed into the catalog, selected while creating a sample document. If the file is an encrypted archive, sample document cannot be created by System. If the file is an envelope, System will create one sample document basing on the file.

9.2.5 Functional description of REST API programming interface

The programming interface is a REST API, that is a sequence of GET/POST requests to a specific resource of a web server and responses to them. The request and response formats are described below. Data protection during the transfer is carried out through the SSL/TLS protocol without the client's authorization. Transferring unencrypted data is not supported. For data transfer, a UTF-8 encoding is used.

Common headings for GET/POST requests

Each request to the server must contain the following obligatory headings:

- X-API-Auth-Token – the authorization token is specified;
- X-API-DataType – an identifier of the transferred data type is specified;
- X-API-CompanyId – an identifier of the vendor is specified;
- X-API-Version – a version of the programming interface is specified. For now, we use number 1.

Working with configuration

After the content of the sample unloading has been sent to the SDK and successfully compiled, you can initiate distribution of the modified configuration to the analysis systems.

Distribution of REST API configuration

Description: the method is required to distribute configuration to analysis subsystems.

Method features: POST, synchronous.

Resource: xapi/configuration.

JSON Scheme request body:

```
{
    "STATUS": "distribute"
}
```

In case of success – the return code is "200" and the response body is as follows:

```
{
    "STATUS": "distributed"
}
```

In case of an error – the return code is "500". Possible values of the `code` field:

- error – cannot apply the configuration.

Working with sample unloadings

The chapter contains the following information:

- Creating the unloading;

- Updating data of the unloading;
- Adding data for the unloading;
- Getting state of the unloading;
- Getting current version.

Creating the unloading

Description: the method is required to add a new unloading without filling it with data. The data will be added with a separate method.

Method features: POST, synchronous.

Resource: xapi/etalonTable.

JSON Scheme request body:

```
{
    "properties": {
        "DISPLAY_NAME": {
            "description": "Name of unloading",
            "type": "string",
            "errors": ["required", "not_match", "not_unique_field"]
        },
        "CONDITION_COLUMNS": {
            "description": "a string, an encoded JSON array with column names,
e.g. [\"first_column\", \"second_column\"]",
            "type": "string",
            "errors": ["required", "not_valid_json"]
        },
        "NOTE": {
            "description": "Arbitrary description of the unloading",
            "type": "string"
        }
    },
    "required": [
        "DISPLAY_NAME",
        "CONDITION_COLUMNS"
    ]
}
```

In case of success – the return code is "200" and the response body is as follows:

```
{
    "FINGERPRINT_ID":    "string",
    "TYPE":              "string",
    "SOURCE":            "string",
```

```
    "DISPLAY_NAME":      "string",
    "NOTE":              "string",
    "CONDITION_COLUMNS": "string",
    "CREATE_DATE":       "string",
    "CHANGE_DATE":       "string",
    "STATUS":            "string"
}
```

Important!

The number of columns that was specified when creating the unloading cannot be changed. When loading the contents, the number of columns in the rows being loaded should match the value that was specified when creating the sample unloading.

Updating data of the unloading

Description: the method is required to update the unloading contents. All entries of the sample unloading will be deleted, and then, a new entry will be added. This method can be used for the initial filling of the unloading.

Important!

The filling should have an integer number of rows.
The minimum number of row for filling is 2.
The minimum number of columns is 2.
The minimum byte size of loadable content is 128 byte.
The minimum byte size of loadable content is 2GB.

Methods features: POST, asynchronous.

Resource: xapi/etalonTable/{id}/content/replace.

Parameters:

- id – fingerprint_id of the object being edited.

Example: enatalonTable/0123456789ABCDEF/content/replce

Content-type of the request body should be not `application/json`, but `multipart/form-data` (for more details, see: https://tools.ietf.org/html/rfc2388).

Content-Disposition that will include the file should have the `name` field with CONTENT value and `filename` attr ibute with the file name and TSV or CSV extension depending on the file format, separated with Tab or commas respectively.

Possible values of errors for the CONTENT field:

- not_valid – the file has an invalid signature;
- not_allowed_file_extension – an unauthorized file extension, for now. only 2 formats are supported: TSV and CSV;
- too_long_size – the file size is too large;
- duplicate – this file already exists in the system.

In case of success – the return code is "200" and the response body is as follows:

```
{
    "FINGERPRINT_ID":    "string",
    "TYPE":              "string",
    "SOURCE":            "string",
    "DISPLAY_NAME":      "string",
    "NOTE":              "string",
    "CONDITION_COLUMNS": "string",
    "CREATE_DATE":       "string",
    "CHANGE_DATE":       "string",
    "STATUS":            "string"
}
```

After getting the "200" return code, you should take the FINGERPRINT_ID field and use it for the checking the unloading state, until the state changes to "ready".

Important!

The number of cells in loadable rows should match the number of columns that was specified when creating the unloading.
When you delete the unloading through Traffic Monitor console, it is considered existing until you distribute the configuration, i.e. you can update this unloading and add contents to it.
When loading "erroneous" content, i.e. the content which duplicates an already loaded unloading (or its part) or the content whose rows contain an incorrect number of cells, the whole sample object gets an invalid status. The external subsystem should stop loading this content and go to the next one. Loading the correct content changes the sample object status to the correct one. Incorrect content never reaches the analysis modules.

Adding data for the unloading

Description: the method is used for adding content to the unloading. All content entries will be saved, and a new entry will be added.

Method features: POST.

Resource: xapi/etalonTable/{id}/content.

For details, see "Updating data of the unloading".

Getting state of the unloading

Description: the method is required to get information about the state of a single unloading.

Method features: GET.

Ресурс: xapi/etalonTable/{id}.

Parameters:

- id – fingerprint_id of the object being edited.

Example: etalonTable/0123456789ABCDEF

Response body:

```
{
    "FINGERPRINT_ID":    "string",
    "TYPE":              "string",
    "SOURCE":            "string",
    "DISPLAY_NAME":      "string",
    "NOTE":              "string",
    "CONDITION_COLUMNS": "string",
    "CREATE_DATE":       "string",
    "CHANGE_DATE":       "string",
    "STATUS":            "string"
    "content":           [
        {
            "CONTENT_ID":   "string",
            "CHECKSUM":     "string",
            "CONTENT_SIZE": "integer",
            "CONTENT_MIME": "string"
        }
    ]
}
```

The `status` field can have the following values:

- sending – sending data to the compiler;
- sent – data has been sent to the compiler, and compilation has been started;
- compiling – the document is being compiled;
- compiled – the document is ready;
- saving – the document is being saved;
- ready – the document has been saved, it is ready for further changes and does not block applying the configuration;
- fatal_error – an error occurred when saving the document, the operation cannot be repeated or continued;
- duplicate – the content data is duplicated (loading the content can be continued);
- not_match_delimiter – rows in the unloading do not contain delimiters (COMMA or TAB);
- wrong_column_count – the number of columns in the row does not match the number of columns that was specified when creating the unloading;
- error – a temporary error, you can try the operation again in some time (better in an hour);
- max_words - the maximum number of words is exceeded;
- max_columns - the maximum number of columns is exceeded.

Getting current version

Description: the method is required for getting supported versions.

If the return code is "200", you can continue working with the system.

You can use this method to check a license, a version or the authorization. In case of success, the return code is "200". In case of an error, the error code is returned.

Method features: GET.

Resource: xapi/version.

Response body:

```
{
    "data":       [
        {
            "NAME":    "string",
            "STATUS": "supported|deprecated|removed"
        }
    ]
}
```

An example of response if incorrect version is specified:

HTTP/1.1 400 Bad Request

Content-Type: application/json

```
{
    "error": {
        "code": "unsupported_version",
        "meta": {
            "versions": [
                {
                    "NAME":   "1.0.0",
                    "STATUS": "removed"
                },
                {
                    "NAME":   "2.0.0",
                    "STATUS": "deprecated"
                },
                {
                    "NAME":   "3.0.0",
                    "STATUS": "supported"
                }
            ]
        }
    }
}
```

Common errors

Description of possible errors:

- not_unique_field – not a unique value;
- unique – a unique value;
- too_short – too short value;
- too_long – too long value;
- wrong_length – the value has incorrect length;
- repeat_exactly – the value does not match the value in a different field;
- required – the field value is required;
- not_exist_in_list – the value is not in the list;
- invalid – invalid value;
- contains_child – the node has child elements;
- contains_items – the category node contains entities;
- parent_own_child – the parent contains child elements;
- parent_self_set_current – the object tries to set itself its parent;
- not_valid_json – invalid JSON;
- invalid_cron_format – incorrect cron format;
- read_only – the object is readonly;
- empty – the value cannot be empty.

Successful response

The return code is "200".

Response format:

```
{
    "data": "mixed",
    "meta": "mixed"
}
```

Data/version validation error

The return code is "400".

Error format in case of incorrect version of API (JSON Scheme)

```
{
    "properties": {
        "error": {
            "description": "Error container",
            "properties":  {
                "code":       {
                    "description": "General description of error",
                    "type":        "string",
                    "value":       "unsupported_version"
                },
```

```
                "meta": {
                    "description": "Additional information on error",
                    "type":        "object",
                    "properties":  {
                        "supported_versions": {
                            "description": "Array of supported versions",
                            "type":        "array",
                            "items": {
                                "description": "Supported version",
                                "type": "string"
                            }
                        }
                    }
                }
            }
        }
    }
}
```

Response format in case of request validation error (JSON Scheme)

```
{
    "properties": {
        "error": {
            "description": "Error container",
            "properties":  {
                "code":       {
                    "description": "General description of error",
                    "type":        "string",
                    "value":       "validation"
                },
                "meta": {
                    "description": "Additional information on error",
                    "type":        "object",
                    "properties":  {
                        "validation": {
                            "description": "Names of model fields",
                            "type":        "object",
                            "properties":  {
```

```
                                "field":     {
                                    "description": "Model field",
                                    "type":        "array",
                                    "items":       {
                                        "description": "Error",
                                        "type":        "string",
                                        "values": [
                                            "not_unique_field",
                                            "too_short",
                                            "too_long",
                                            "wrong_length",
                                            "repeat_exactly",
                                            "required",
                                            "not_exist_in_list",
                                            "invalid",
                                            "contains_child",
                                            "contains_items",
                                            "parent_own_child",
                                            "unique",
                                            "not_valid_json",
                                            "invalid_cron_format",
                                            "read_only",
                                            "parent_self_set_current",
                                            "empty"
                                        ]
                                    }
                                },
                                "sub_model": {
                                    "description": "Name of nested model",
                                    "type":        "object",
                                    "$ref":       "#/properties/error/
properties/meta/properties/validation"
                                }
                            }
                        }
                    }
                }
```

```
            }
        }
    }
}
```

Example of error when incorrect version is specified

```
{
    "error": {
        "code": "unsupported_version",
        "meta": {
            "supported_versions": ["2", "3"]
        }
    }
}
```

Example of error when checking uniqueness of a sample unloading name

```
{
    "error": {
        "code": "validation",
        "meta": {
            "validation":    {
                "DISPLAY_NAME": ["unique"]
            },
            "unique_models": [
                {
                    "FINGERPRINT_ID": "0123456789ABCDEF",
                    "DISPLAY_NAME":   "test"
                }
            ]
        }
    }
}
```

Authorization is required

The return code is "401".

Description: is returned in all requests which require authorization.

Response body: no.

Insufficient permissions

The return code is "403".

Description: is returned for all requests if the current user does not have sufficient permissions to perform a given operation.

Response body: no.

Entity is not found

The return code is "404".

Description: is returned if a particular model is not found in the system. For example, a sample unloading is not found.

Response body: no.

Request body is too large

The return code is "413".

Description: is returned if a too large request is transferred.

Response body: no.

Number of server requests is exceeded

The return code is "429".

Description: is returned if too many requests have been sent to the server over a certain period. May include Retry-After heading which specifies in how much time you can repeat the request.

Response body (JSON Scheme):

```
{
    "properties": {
        "error": {
            "description": "Error container",
            "properties":  {
                "code": {
                    "description": "General description of error",
                    "type":        "string",
                    "value":       "too_many_requests "
                },
                "meta": {
                    "description": "Additional information on error",
                    "type":        "object",
                    "properties":  {
                        "time": {
                            "description": "HTTP date or an integer in seconds, are which you can repeat the request",
                            "type":        "string"
                        }
```

```
                    }
                }
            }
        }
    }
}
```

System error

The return code is "500".

Description: is returned if a logical error has occurred in the system, and the request execution cannot be continued.

Response body (JSON Scheme):

```
{
    "properties": {
        "error": {
            "description": "Error container",
            "properties":  {
                "code": {
                    "description": "General description of error",
                    "type":        "string"
                },
                "meta": {
                    "description": "Additional information on error",
                    "type":        "object"
                }
            }
        }
    }
}
```

Server is temporarily unavailable

The return code is "503".

Description: informs that currently is not possible to execute requests and the server is down for maintenance. The Retry-After heading contains estimated time of completion of maintenance (the heading value can be either HTTP-date or an integer in seconds).

Response body (JSON Scheme):

```
{
    "properties": {
        "error": {
```

```
            "description": "Error container ",
            "properties":  {
                "code": {
                    "description": "General description of error ",
                    "type":        "string",
                    "value":       "maintains"
                },
                "meta": {
                    "description": "Additional information on error ",
                     "type":        "object",
                    "properties":  {
                        "time": {
                            "description": "HTTP-date or integer in seconds
after which you can repeat the request",
                            "type":        "string"
                        }
                    }
                }
            }
        }
    }
}
```

Working with REST API sample documents

This chapter contains the information as follows:

- Creating REST API sample documents catalogue;
- REST API sample documents catalogues review;
- Editing REST API sample documents catalogue;
- Deleting REST API sample documents catalogue;
- Creating REST API sample document;
- REST API sample documents review;
- Updating and replacing content of REST API sample document;
- REST API sample document deletion.

Creating REST API sample documents catalogue

Method: `POST`

Resource: `etalonDocumentCategory`

Request body:

```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
```

```
    "definitions": {},
    "id": "http://infowatch.com/tm/etalonDocumentCategory/edit",
    "type": "object",
    "properties": {
        "PARENT_CATEGORY_ID": {
            "examples": [
                "AC3DF073B60107890A4C704A10577FE700000000"
            ],
            "title": "Parent GUID categories, if null, the folder of automatic sample
documents is set",
            "type": "string"
        },
        "DISPLAY_NAME": {
            "title": "Title",
            "type": "string"
        },
        "DIR_PATH (title can be changed)": {
            "title": "Directory full name",
            "type": "string"
        },
        "FP_BIN_VALUE_THRESHOLD": {
            "title": "Binary data quote index",
            "type": "integer"
        },
        "FP_TEXT_VALUE_THRESHOLD": {
            "title": "Text data quote index",
            "type": "integer"
        },
        "NOTE": {
            "title": "Description",
            "type": [
                "null",
                "string"
            ]
        }
    }
}
```

Response body:

```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
    "definitions": {},
    "id": "http://infowatch.com/tm/etalonDocumentCategory",
    "type": "object",
    "properties": {
        "CATEGORY_ID": {
            "examples": [
                "AC3DF073B60107890A4C704A10577FE700000000"
            ],
            "title": "GUID categories",
            "type": "string"
        },
```

```
        "PARENT_CATEGORY_ID": {
            "examples": [
                "AC3DF073B60107890A4C704A10577FE700000000"
            ],
            "title": "Parent GUID categories",
            "type": "string"
        },
        "DISPLAY_NAME": {
            "title": "Title",
            "type": "string"
        },
        "DIR_PATH (title can be changed)": {
            "title": "Directory full name",
            "type": "string"
        },
        "FP_BIN_VALUE_THRESHOLD": {
            "title": "Binary data quote index",
            "type": "integer"
        },
        "FP_TEXT_VALUE_THRESHOLD": {
            "title": "Text data quote index",
            "type": "integer"
        },
        "NOTE": {
            "title": "Description",
            "type": [
                "null",
                "string"
            ]
        },
        "OWNER": {
            "title": "Token ID",
            "type": "integer"
        },
        "CREATE_DATE": {
            "examples": [
                "2017-07-04 10:45:45.000000"
            ],
            "title": "Date of creation",
            "type": "string"
        },
        "CHANGE_DATE": {
            "examples": [
                "2017-07-04 10:45:45.000000"
            ],
            "title": "Date of change",
            "type": "string"
        }
    }
}
```

REST API sample documents catalogues review

Method: `GET`

Resource: `etalonDocumentCategory[ /{category_id}]`

Parameters:

- `filter` — filtering list:
  - `create_date[from]` — start of range for filtering by date of creation in UNIX-timestamp format (including the date, can be used saparately from `create_date[to]`)
  - `create_date[to]` — end of range for filtering by date of creation in UNIX-timestamp format (including the date, can be used saparately from `create_date[from]`)
  - `change_date[from]` — start of range for filtering by date of change in UNIX-timestamp format ((including the date, can be used saparately from `change_date[to]`)
  - `change_date[to]` — end of range for filtering by date of change in UNIX-timestamp format ((including the date, can be used saparately from `change_date[from]`)
  - `display_name[]` — catalogue name, * can be used in the end to enable search by `LIKE`, e.g.: `?filter[display_name][]=foo*`
  - `dir_path[]` — full path to catalogue, * can be used in the end to enable search by `LIKE`, e.g.: `?filter[dir_path][]=foo*`
  - `fingerprint_id []` — sample document GUID, e.g.: `?filter[ fingerprint_id ][]= 82EAE496A1686E407B1162E3C3159999F404F559&filter[fingerprint_id][]=AF8EAC3C3C8532C3C780481B7D8C5B8E68D0148F`
- `with[]` — list of addititional entities to be added to the object:
  - `etalonDocumentsCount` — number oa sample documets in the catalogue
- `sort[]` — field used to sort the result. Possible keys are:
  - `create_date` — `desc/asc`, e.g.: `?sort[create_date]=desc`
  - `change_date` — `desc/asc`, e.g. : `?sort[change_date]=asc`

Response:

Massive of objects, sent when created/edited

Examples:

```
GET /xapi/etalonDocumentCategory?filter[create_date][to]=1&filter[display_name]
[]=foo*&filter[display_name][]=bar&with[]=etalonDocumentsCount&sort[create_date]=desc
GET /xapi/etalonDocumentCategory/FAB85F61531BB9E428088EFC81F266FA3C2959E6
```

Editing REST API sample documents catalogue

Method: PUT

Resource: `etalonDocumentCategory/{category_id}`

Request body :

```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
    "definitions": {},
    "id": "http://infowatch.com/tm/etalonDocumentCategory/edit",
    "type": "object",
    "properties": {
        "PARENT_CATEGORY_ID": {
            "examples": [
```

```
                "AC3DF073B60107890A4C704A10577FE700000000"
            ],
            "title": "Parent GUID categories, if null, the folder of automatic sample
documents is set",
            "type": "string"
        },
        "DISPLAY_NAME": {
            "title": "Title",
            "type": "string"
        },
        "DIR_PATH (title can be changed)": {
            "title": "Directory full name",
            "type": "string"
        },
        "FP_BIN_VALUE_THRESHOLD": {
            "title": "Binary data quote index",
            "type": "integer"
        },
        "FP_TEXT_VALUE_THRESHOLD": {
            "title": "Text data quote index",
            "type": "integer"
        },
        "NOTE": {
            "title": "Description",
            "type": [
                "null",
                "string"
            ]
        }
    }
}
```

Response body:

```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
    "definitions": {},
    "id": "http://infowatch.com/tm/etalonDocumentCategory",
    "type": "object",
    "properties": {
        "CATEGORY_ID": {
            "examples": [
                "AC3DF073B60107890A4C704A10577FE700000000"
            ],
            "title": "GUID category,
            "type": "string"
        },
        "PARENT_CATEGORY_ID": {
            "examples": [
                "AC3DF073B60107890A4C704A10577FE700000000"
            ],
            "title": "Parent GUID category",
            "type": "string"
```

```
        },
        "DISPLAY_NAME": {
            "title": "Title",
            "type": "string"
        },
        "DIR_PATH (title can be changed)": {
            "title": "Directory full name",
            "type": "string"
        },
        "FP_BIN_VALUE_THRESHOLD": {
            "title": "Binary data quote index",
            "type": "integer"
        },
        "FP_TEXT_VALUE_THRESHOLD": {
            "title": "Text data quote index",
            "type": "integer"
        },
        "NOTE": {
            "title": "Description,
            "type": [
                "null",
                "string"
            ]
        },
        "OWNER": {
            "title": "Token ID",
            "type": "integer"
        },
        "CREATE_DATE": {
            "examples": [
                "2017-07-04 10:45:45.000000"
            ],
            "title": "Date of creation",
            "type": "string"
        },
        "CHANGE_DATE": {
            "examples": [
                "2017-07-04 10:45:45.000000"
            ],
            "title": "Date of change",
            "type": "string"
        }
    }
}
```

Example of editing CURL catalog:

```
curl 'https://example.com/xapi/etalonDocumentCategory/0123456789ABCDEF123400000000' \
  -X PUT \
  -H 'X-API-Auth-Token: 1792jmclf7fer1ikuhby' \
  -H 'X-API-Version: 1' \
  -H 'X-API-CompanyId: IW' \
```

```
  -H 'X-API-DataType: sap' \
  -H 'Content-Type: application/json' \
  --data-
binary
'{"PARENT_CATEGORY_ID":"0123456789ABCDEF123400000000","DISPLAY_NAME":"world.txt","DIR_
PATH":"c:\\hello\
\world.txt","FP_BIN_VALUE_THRESHOLD":10,"FP_TEXT_VALUE_THRESHOLD":10,"NOTE":null}'
```

Deleting REST API sample documents catalogue

Method: `DELETE`
Resource: `etalonDocumentCategory /{category_id}`

Creating REST API sample document

It is considered that initially the sample document is created by means of `POST /xapi/ etalonDocument` with status "new". Then sample document's compilation is done, its status should be checked when getting this document (`GET /xapi/ etalonDocument/{id}`) and monitoring it. The sample document's duplicates (STATUS=duplicate) will be deleted, if received.

Method: `POST`
Resource: `etalonDocument`
Request body:

Fields:

Field name	Description
DISPLAY_NAME	Sample document name (if not specified, to be taken from FILE field)
FILE_PATH*	Path to sample document in source, e.g.: smb://example.com/top_secret/etalon.docx, \\example\test\text.rtf, ftp://example.com/foo/bar.txt, oracle://example.com:1521/database/table/row, https://examlpe.com/same/html/document In fact, this is a tip for automatic loader to be used for search.
NOTE	Sample document description.
BIN_VALUE_THRESHOLD	Binary data quote index (by default, to be taken from the first catalog specified).
TEXT_VALUE_THRESHOLD	Text data quote index (by default, to be taken from the first catalog specified).
CATEGORY_ID*	List of GUID categories, separated by comma, e.g.: "E77D893219A24EEAB3D049804FD86751,C743F88121B8449DAF37291474830679,A7AF8EFCF4D54E9393A9B3D750E5ABBB"
FILE*	File itself (The file is sent, not the path to a file. Server cannot connect to your PC and take the file. Thus, the file is sent via request).
COMPILE_TYPE*	Type of digital fingerprint:

Field name	Description
	• TEXT — to extract text only • ALL — to extract and compile all types of data

* — field is obligatory

Response: JSON-Schema:

```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
    "definitions": {},
    "id": "http://infowatch.com/tm/etalonDocument",
    "type": "object",
    "properties": {
        "FINGERPRINT_ID": {
            "examples": [
                "139C7026ED48BE13459669024786F7517E5687AE"
            ],
            "title": "sample document identifier",
            "type": "string"
        },
        "DISPLAY_NAME": {
            "title": "Title",
            "type": "string"
        },
        "FILE_PATH": {
            "title": "File full name",
            "type": "string"
        },
        "FILE_SIZE": {
            "title": "File size in bytes",
            "type": "integer"
        },
        "MIME": {
            "title": "File mime-type",
            "type": "string"
        },
        "BIN_VALUE_THRESHOLD": {
            "title": "Binary data quote index",
            "type": "integer"
        },
        "TEXT_VALUE_THRESHOLD": {
            "title": "Text data quote index",
            "type": "integer"
        },
        "NOTE": {
            "title": "Description",
            "type": [
                "null",
                "string"
            ]
        },
```

```
"OWNER": {
    "title": "Token ID",
    "type": "integer"
},
"STATUS": {
    "examples": [
        "new",
        "compiled",
        "compiling",
        "sending",
        "sent",
        "saving",
        "ready",
        "fatal_error",
        "duplicate",
        "error"
    ],
    "title": "Status of processing",
    "type": "string"
},
"CREATE_DATE": {
    "examples": [
        "2017-07-04 10:45:45.000000"
    ],
    "title": "Date of creation",
    "type": "string"
},
"CHANGE_DATE": {
    "examples": [
        "2017-07-04 10:45:45.000000"
    ],
    "title": "Date of change",
    "type": "string"
},
"categories": {
    "type": "array",
    "title": "Массив категорий",
    "items": {
        "type": "object",
        "properties": {
            "CATEGORY_ID": {
                "examples": [
                    "AC3DF073B60107890A4C704A10577FE700000000"
                ],
                "title": "GUID categories",
                "type": "string"
            },
            "DISPLAY_NAME": {
                "title": "Title",
                "type": "string"
            },
            "DIR_PATH (title can be changed)": {
                "title": "Directory full name",
```

```
                        "type": "string"
                    },
                    "FP_BIN_VALUE_THRESHOLD": {
                        "title": "Binary data quote index",
                        "type": "integer"
                    },
                    "FP_TEXT_VALUE_THRESHOLD": {
                        "title": "Text data quote index",
                        "type": "integer"
                    },
                    "NOTE": {
                        "title": "Description",
                        "type": [
                            "null",
                            "string"
                        ]
                    },
                    "OWNER": {
                        "title": "Token ID",
                        "type": "integer"
                    },
                    "CREATE_DATE": {
                        "examples": [
                            "2017-07-04 10:45:45.000000"
                        ],
                        "title": "Date of creation",
                        "type": "string"
                    },
                    "CHANGE_DATE": {
                        "examples": [
                            "2017-07-04 10:45:45.000000"
                        ],
                        "title": "Date of change",
                        "type": "string"
                    }
                }
            }
        }
    }
}
```

Example:

```
POST /xapi/etalonDocument HTTP/1.1
Host: tm.example.com
X-API-Auth-Token: brse99dugp1cdbr69axz
X-API-Version: 1
X-API-DataType: cap
X-API-CompanyId: liw
Content-Type: multipart/form-data; boundary=Asrf456BGe4h
Content-Length: (total amount, including subheaders)
(empty line)
(absent preamble)
```

```
--Asrf456BGe4h
Content-Disposition: form-data; name="CATEGORY_ID"
(empty line)
2ABECC84F2360B94E0533D003C0A80AE00000000
--Asrf456BGe4h
Content-Disposition: form-data; name="COMPILE_TYPE"
(empty line)
ALL
--Asrf456BGe4h
Content-Disposition: form-data; name="FILE"; filename="foo.doc"
Content-Type: application/msword
(empty line)
(binary content of document )
```

Example of creating the file by means of CURL

```
curl -i -X POST \
   -H "Content-Type:multipart/form-data" \
   -H "X-API-Auth-Token:brse99dugp1cdbr69axz" \
   -H "X-API-Version:1" \
   -H "X-API-DataType:cap" \
   -H "X-API-CompanyId:liw" \
   -F "CATEGORY_ID=2ABECC84F2360B94E0533D003C0A80AE00000000" \
   -F "FILE=@\"./foo.doc\";filename=\"foo.doc\"" \
   -F "COMPILE_TYPE=ALL" \
 'https://tm.example.com/xapi/etalonDocument'
```

REST API sample documents review

Method: `GET`
Resource: `etalonDocument[/{fingerprint_id}]`
Parameters:

- `filter` — filtering list:
  - `create_date[from]` — start of range for filtering by date of creation in UNIX-timestamp format (including the date, can be used saparately from `create_date[to]`)
  - `create_date[to]` — end of range for filtering by date of creation in UNIX-timestamp format (including the date, can be used saparately from `create_date[from]`)
  - `change_date[from]` — start of range for filtering by date of change in UNIX-timestamp format ((including the date, can be used saparately from `change_date[to]`)
  - `change_date[to]` — end of range for filtering by date of change in UNIX-timestamp format ((including the date, can be used saparately from `change_date[from]`)
  - `display_name[]` — catalog name, * can be used in the end to enable search by `LIKE`, e.g: `?filter[display_name][]=foo*`
  - `file_path[]` — full path to a file, * can be used in the end to enable search by `LIKE`, e.g: `?filter[file_path][]=foo*`
  - `category_id[]` — GUID categories, e.g: `?filter[category_id][]=82EAE496A1686E407B1162E3C3159999F404F559&filter[category_id][]=AF8EAC3C3C8532C3C780481B7D8C5B8E68D0148F`
  - `category_path[]` — full path to category path, * can be used in the end to enable search by `LIKE`, e.g: `?filter[category_path][]=bar*`
- `with[]` — list of addititional entities to be added to the object:

    - `categories` — list of categories, where sample document is included
- `sort[]` — field used to sort the result. Possible keys are:
    - `create_date` — `desc/asc`, например: `?sort[create_date]=desc`
    - `change_date` — `desc/asc , например: ?sort[change_date]=asc`

Response:

Massive of objects, sent when created/edited

Examples:

```
GET /xapi/etalonDocument?filter[create_date][to]=1&filter[display_name]
[]=foo*&filter[display_name][]=bar&with[]=categories&sort[create_date]=desc
GET /xapi/etalonDocument/FAB85F61531BB9E428088EFC81F266FA3C2959E6
```

Updating and replacing content of REST API sample document

Method: POST

Resource: `etalonDocument/{fingerprint_id}/update`

Request body:

Fields:

Field name	Description
DISPLAY_NAME	Sample document name (if not specified, to be taken from FILE field)
FILE_PATH	Path to sample document in source, e.g.: smb://example.com/top_secret/etalon.docx, \\example\test\text.rtf, ftp://example.com/foo/bar.txt, oracle://example.com:1521/database/table/row, https://examlpe.com/same/html/document
NOTE	Sample document description.
BIN_VALUE_THRESHOLD	Binary data quote index (by default, to be taken from the first catalogue specified).
TEXT_VALUE_THRESHOLD	Text data quote index (by default, to be taken from the first catalogue specified).
CATEGORY_ID	List of GUID categories, separated by comma, e.g: "E77D893219A24EEAB3D049804FD86751,C743F88121B8449DAF37291474830679,A7AF8EFCF4D54E9393A9B3D750E5ABBB"
FILE	File itself (The file is sent, not the path to a file. Server cannot connect to your PC and takes the file. Thus, the file is sent via request).
COMPILE_TYPE	Type of digital fingerprint: • TEXT — to extract text only • ALL — to extract and compile all types of data

The fields required to be changed should be sent. The rest fields should be put down.

Response:


```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
    "definitions": {},
    "id": "http://infowatch.com/tm/etalonDocument",
    "type": "object",
    "properties": {
        "FINGERPRINT_ID": {
            "examples": [
                "139C7026ED48BE13459669024786F7517E5687AE"
            ],
            "title": "Sample document identifier",
            "type": "string"
        },
        "DISPLAY_NAME": {
            "title": "Title",
            "type": "string"
        },
        "FILE_PATH": {
            "title": "File full name",
            "type": "string"
        },
        "FILE_SIZE": {
            "title": "Size in bytes",
            "type": "integer"
        },
        "MIME": {
            "title": "File mime-type",
            "type": "string"
        },
        "BIN_VALUE_THRESHOLD": {
            "title": "Binary data quote index",
            "type": "integer"
        },
        "TEXT_VALUE_THRESHOLD": {
            "title": "Text data quote index",
            "type": "integer"
        },
        "NOTE": {
            "title": "Description",
            "type": [
                "null",
                "string"
            ]
        },
        "OWNER": {
            "title": "Token ID",
            "type": "integer"
        },
        "STATUS": {
```

```
        "examples": [
            "new",
            "compiled",
            "compiling",
            "sending",
            "sent",
            "saving",
            "ready",
            "fatal_error",
            "duplicate",
            "error"
        ],
        "title": "Status of processing",
        "type": "string"
    },
    "CREATE_DATE": {
        "examples": [
            "2017-07-04 10:45:45.000000"
        ],
        "title": "Date of creation",
        "type": "string"
    },
    "CHANGE_DATE": {
        "examples": [
            "2017-07-04 10:45:45.000000"
        ],
        "title": "Date of change",
        "type": "string"
    },
    "categories": {
        "type": "array",
        "title": "Categories array",
        "items": {
            "type": "object",
            "properties": {
                "CATEGORY_ID": {
                    "examples": [
                        "AC3DF073B60107890A4C704A10577FE700000000"
                    ],
                    "title": "GUID categories",
                    "type": "string"
                },
                "DISPLAY_NAME": {
                    "title": "Title",
                    "type": "string"
                },
                "DIR_PATH (title can be changed)": {
                    "title": "Directory full name",
                    "type": "string"
                },
                "FP_BIN_VALUE_THRESHOLD": {
                    "title": "Binary data quote index",
                    "type": "integer"
```

```
                    },
                    "FP_TEXT_VALUE_THRESHOLD": {
                        "title": "Text data quote index",
                        "type": "integer"
                    },
                    "NOTE": {
                        "title": "Description",
                        "type": [
                            "null",
                            "string"
                        ]
                    },
                    "OWNER": {
                        "title": "Token ID",
                        "type": "integer"
                    },
                    "CREATE_DATE": {
                        "examples": [
                            "2017-07-04 10:45:45.000000"
                        ],
                        "title": "Date of creation",
                        "type": "string"
                    },
                    "CHANGE_DATE": {
                        "examples": [
                            "2017-07-04 10:45:45.000000"
                        ],
                        "title": "Date of change",
                        "type": "string"
                    }
                }
            }
        }
    }
}
```

REST API sample document deletion

Method: DELETE
Resource: `etalonDocument/{fingerprint_id}`

9.3 Access to InfoWatch Traffic Monitor events for external systems (DataExport API SDK)

This application programming interface is intended to integrate Traffic Monitor with external data receiving systems. As a part of DataExport API implementation, external systems get the content and metadata of events, organizational structure data, lists of the Management Console users, and audit data of their actions from Traffic Monitor. DataExport API supports two-way data exchange between Traffic Monitor and external systems.

9.3.1 DataExport API functionality

The functionality of DataExport API includes the following:

- Ability to specify the number of attributes to be included within the result:
    - Event ID;
    - Senders: list of contacts and authentication result, taking into account the potential conflicts;
    - Recipients: list of contacts, and authentication result, taking into account the potential conflicts;
    - Sender's computer, taking into account the potential conflict;
    - Type of event;
    - Date and time of interception;
    - Protocol;
    - Level of violation;
    - Verdict;
    - Path to file or receiver address;
    - Path to file or sender address;
    - User's decision;
    - Path to file;
    - Web resource address;
    - Security objects and catalogues;
    - Event's size;
    - Tags;
    - Set of user attributes logged via plugin;
    - Set of system titles for events;
    - Date and time of event pasting into DB;
    - Name of perimeter where the event has entered;
    - Name of perimeter left by event;
    - List of policies names (including policy ID), triggered by the intercepted object;
    - Group of rules;
    - Interception server;
    - IP interception server;
    - Receiver device name;
    - Sender device name;
    - E-mail subject;
    - Attachment;
    - Mandate level;
    - Mandate category.
- Ability to specify the number of attributes to filtrate:
    - Date and time of interception;
    - Type of event;
    - Protocol;
    - Security objects and catalogues;
    - User's decision;
    - Event's size;
    - Tags;
    - Date and time of event pasting into DB;
    - Group of rules;
    - Level of violation;
    - Verdict;
    - Data and time of the logged user action;
    - Type of the object the action applied to.
- Ability to change the attributes of event in Traffic Monitor:

    - User verdict about an event;
    - User verdict about many events.
- Getting separate event metadata being able to specify the number of attributes to be included into the result. In this regard, if the event contains few enclosed objects, all the extracted text to be assembled into one file;
- Getting all the extracted text of an event;
- Getting a full list of system titles and user attributes of event registered using plugin;
- Getting binary data of a separate event;
- Getting the list of the Management Console users;
- Starting query execution and getting queries' results in Traffic Monitor:
    - list of queries;
    - status of queries;
    - results of queries;
- Retrieving user audit data:
    - Record ID in auditing Console user sessions;
    - Data and time of the logged user action in UTC;
    - ID of the user who performed the action;
    - Full name of the user who performed the action;
    - Type of the action the user has taken;
    - Type of the object the action applied to;
    - ID of the object the action applied to;
    - Name of the object the action applied to;
    - Description of changes with old and new values.

9.3.2 Authorization to access DataExport API

Authorization to access DataExport API is provided via tokens mechanism, similar to other Traffic Monitor API's. To get token and review DataExport API licensing status it is required adding new type of plugin into the System - Plugin for DataExport API. All the activities related to plugins are performed within the Traffic Monitor console.

Work with plugins

Adding plugin

To add plugin:

1. Go to **Administration - Plugins**;
2. Within the area **Plugins** click .
3. Click **Add**.
4. Review the plugin description and click **Install**.

> **Note:**
>
> To update a plugin, the updated version of this plugin should be added.

Plugin removal

To remove plugin:

1. Go to **Administration - Plugins**;
2. Within the area **Plugins** click 
3. Click **Yes** to confirm the deletion.

Work with tokens

Token is generated automatically after the plugin has been added. All the activities related to tokens are performed within the InfoWatch Traffic Monitor console.

Adding token

To add token:

1. Go to **Administration - Plugins**;
2. Choose the plugin within the **Plugins** area;
3. Go to **Tokens** bookmark;
4. Click .

> **Note:**
>
> Token's value is generated automatically when setting up a token and it cannot be set by user.

Token's data editing

To change token's data:

1. Go to **Administration - Plugins**;
2. Choose the plugin within the **Plugins** area;
3. Go to **Tokens** bookmark;
4. By double left button click, enter the required info within the fields *Name* and *Description*.

Token's value update

If the token was compromised or if there is a potential token leak to the third party, it is required generating a new token's value.

To update token's value:

1. Go to **Administration - Plugins**;
2. Choose the plugin within the **Plugins** area;
3. Go to **Tokens** bookmark;
4. Click .

Copying token

To copy token's value into the clipboard:

1. Go to **Administration - Plugins**;
2. Choose the plugin within the **Plugins** area;
3. Go to **Tokens** bookmark;
4. Click  .

Deleting token

To delete token:

1. Go to **Administration - Plugins**;
2. Choose the plugin within the **Plugins** area;
3. Go to **Tokens** bookmark;
4. Click  .

9.3.3 DataExport API third-party component registration

To integrate third-party receiving system with InfoWatch Traffic Monitor the following actions are to be taken:

1. Register the authentication type string of company - the component user in Infowatch JSC. Thus letting to connect a user company to the license, to be installed within Traffic Monitor System;
2. Obtain the developer's license related to company's ID. This would let unloading the events data from Traffic Monitor;
3. Create third-party component registry file in accordance with the format below. The license, obtained as per the point 2 is to be added to the file;
4. Download the third-party component registry file to InfoWatch Traffic Monitor System using the Traffic Monitor console interface. Section "Administration" - "Plugins". (see "Traffic Monitor. User Guide");
5. Obtain an access token within the downloaded third-party component's properties;

The System is ready to send the company's events data.

DataExport API third-party component registry file format

Plugin is a .zip format archive. The archive includes:

- **licenses** folder, containing license files;
- **icon** folder, containing the files with pictograms used for registered events;
- **manifest.json** file, containing information on a plugin.

> **Note:**
>
> Folders **licenses** and **icon** are optional. License files and files with pictograms can be located in the root folder.

For external systems, receiving data from Traffic Monitor **manifest.json** file should contain the following information:

Content	Type of data	Optional	Description
`{`			
`"PLUGIN_ID": "",`	String	Yes	Unique plugin identifier (UUID) created by developer. It may include up to 40 characters. The identificator is used for plugin update. **Example:** `"PLUGIN_ID": "189C38D390396EB6E0530100007F1CA200000001",`
`"DISPLAY_NAME": "",`	String	Yes	Plugin name displayed. **Example:** `"DISPLAY_NAME": "Plugin name",`
`"DESCRIPTION": "",`	String	No	Plugin description displayed. **Example:** `"DESCRIPTION": "Test plugin to demonstrate",`
`"VERSION": "",`	String	Yes	Plugin version. **Example** `"VERSION": "1.0.0",`
`"VENDOR": "",`	String	Yes	Software company ID in accordance with the company name specified in the license. **Example** `"VENDOR": "infowatch",`
`"LICENSE": [ { "PATH":"" } ],`	Array String	Yes	License files. The paths to license files should be specified in accordance with archive root folder. **Example:** `"LICENSE": [ { "PATH":"licenses/license file 1.license" }, { "PATH":"licenses/license file 2.license" }, ],`
`"PATTERN_SEARCH_LICENSE": "",`	String	No	Template to search previously downloaded licenses to be binded to plugin. It has the following format: `{operator:or|and,child[{name:value}]}"`. **Example:** `"PATTERN_SEARCH_LICENSE": "{\"operator\":\"or\", \"conditions\":[{\"origin\":`

Content	Type of data	Optional	Description
			`\"dm\"},{\"origin\": \"dmmobile\"}]}",`
`"DATA_RECEIVER": [ "" ]`	Array String	Yes	List of identificators for systems receiving data from Traffic Monitor. **Example:** `"DATA_RECEIVER": [ "Events reciever1", "Events reciever2" ]`

`"OBJECT_HEADER": [ { "NAME": "",`
 	
`"NOTE": { "": "", "": "" },`
`"TYPE": "",`
`"FORMAT": "",`
 	
`"DATA_CLASS": [""],`
`"USE_IN_POLICY": "",`
`"USE_IN_NOTIFICATION": "",`
`"USE_IN_QUERY": "",`
`"USE_IN_LIST": "",`
`"USE_IN_SHOW": "",`
`"USE_IN_DETAIL": "",`
`"IS_MULTIPLE_VALUE": "",`
`}`
`]`
	Object
	
	Array
	
	Object
	String
	
	Enum
	Enum
	
	Array
	Enum
	Enum
	
	Enum
	Enum
	Enum
	Enum
	Enum
		No	User events attributes.
			
			Unique attribute's code to be used in the events headers and to be identified in xAPI/PushAPI.
			
			If developer's ID is not "IW", the code should start with "`<Software company's ID>_`" prefix.
			
			For example: CISCO_CALL_DURATION
			
			Attribute's name, displayed on Traffic Monitor management console.
			
			Type of value.
			Recording format. Possible values: number (integer, fractional), string, date and time UTC + specifying the time zone shifting, duration, hyperlink, listing, logic type.
			Services, which events will be equipped with new user attribute.
			Using attribute in policies. `"1"` - yes, `"0"` - no.
			Using attribute in notifications. `"1"` - yes, `"0"` - no.
			Using attribute in queries. `"1"` - yes, `"0"` - no.
			Displaying attribute in tabular event viewing mode. `"1"` - yes, `"0"` - no.
			Displaying attribute in brief event viewing form. `"1"` - yes, `"0"` - no.
			Displaying attribute in detailed event viewing form. `"1"` - yes, `"0"` - no.
			Multiple value. `"1"` - yes, `"0"` - no.
			
			`"OBJECT_HEADER": [ { "NAME": "header_multi_string", "NOTE": { "rus": "Заголовок строк1",`

Content	Type of data	Optional	Description

			<pre>"eng": "Header strings1"
			},
			"DATA_CLASS": ["kEmail"],
			"USE_IN_POLICY": "1",
			"USE_IN_QUERY": "1",
			"USE_IN_NOTIFICATION": "1",
			"USE_IN_LIST": "1",
			"USE_IN_SHOW": "1",
			"USE_IN_DETAIL": "1",
			"TYPE": "string",
			"FORMAT": "string",
			"IS_MULTIPLE_VALUE": "1"
			},
			{
			"NAME": "header_date",
			"NOTE": {
			"rus": "Заголовок дата1",
			"eng": "Header date1"
			},
			"DATA_CLASS": ["kEmail"],
			"USE_IN_POLICY": "1",
			"USE_IN_QUERY": "1",
			"USE_IN_NOTIFICATION": "1",
			"USE_IN_LIST": "0",
			"USE_IN_SHOW": "1",
			"USE_IN_DETAIL": "1",
			"TYPE": "string",
			"FORMAT": "date",
			"IS_MULTIPLE_VALUE": "0"
			}
			]</pre>

`}`			

9.3.4 Functional description of DataExport API application programming interface

Common Headers of GET/POST Queries for DataExport API

Authorization

Token received for Public API should be specified within **X-API-Auth-Token** header in each API query. The token can be canceled, blocked/deleted via IWTM interface. In this case, the token is considered to be invalid. When the token is invalid, **401** error message will be returned.

Error message example when token is invalid

```
{
    "error": {
        "code": "unauthorized"
    }
}
```

If the token is valid, but API user has no sufficient access rights, **403** error message will be returned.

Error message when user has no sufficient access rights

```
{
    "error": {
        "code": "forbidden"
    }
}
```

Versions

API version is sent via **X-API-Version** header and can be in one of the following states:

- supported — the version is supported and actively developing
- deprecated — the version is available but no longer supported. We recommend upgrading to a newer version as this version can be removed in future releases
- removed — the version is completely removed from the product

In case the server does not support the version, **400** error message is returned.

Response if the version is incorrect

```
{
    "error": {
        "code": "unsupported_version",
        "meta": {
            "versions": [
                {
                    "NAME":   "1",
                    "STATUS": "removed"
                },
                {
```

```
                    "NAME":   "1.1",
                    "STATUS": "deprecated"
                },
                {
                    "NAME":   "1.2",
                    "STATUS": "deprecated"
                },
                {
                    "NAME":   "1.3",
                    "STATUS": "deprecated"
                },
                {
                    "NAME":   "1.4",
                    "STATUS": "deprecated"
                },
                {
                    "NAME":   "1.5",
                    "STATUS": "deprecated"
                },
                {
                    "NAME":   "1.6",
                    "STATUS": "deprecated"
                },
                {
                    "NAME":   "1.7",
                    "STATUS": "supported"
                }
            ]
        }
    }
}
```


Licenses

To operate properly, the module requires a license as follows:


```
{
    "common_name": "iw",
    "importer_name": "dome"
}
```


Where `common_name` — is a name of a licensed company and `importer_name` — is a product, receiving data from TM. **X-API-CompanyId** and **X-API-ProductName** headers should be sent in each query. In case the license is rejected **403** error message will be returned.

Respond when the license is invalid.


```
{
    "error": {
        "code": "licence_not_valid"
    }
}
```


Thus, each server query should contain the following obligatory headings:

- X-API-Version – a version of the programming interface is specified. Current version: **1.6**;
- X-API-CompanyId – an identifier of the vendor is specified, e.g. **iw**;
- X-API-ImporterName – data receiving product is specified, e.g. **dome**;
- X-API-Auth-Token – the authorization token is specified.

Example of query

```
X-API-Version: 1.6
X-API-CompanyId: iw
X-API-ProductName: dome
X-API-Auth-Token: gla20dos1pcdbr69caxz
```

Getting list of features for the current version of Traffic Monitor

Description: List of features for the current version of Traffic Monitor

Method: `GET`

Resource: version/features

Parameters:

Example of request:

```
curl -k -i -X GET    -H "X-Api-Auth-Token:1lap4tvpakbgsbj8tyeu"    -H "X-Api-Version:1.3"    -H "X-Enable-Openapi:1"    -H "X-API-CompanyId:iw"    -H "X-API-ProductName:dome"  'https://qa-797e.infowatch.ru/xapi/version/features'
```

Example of request:


```
{
  "data": [
    {
      "VERSION_TM": "7.3.0.285",
      "VERSION_API": "1.6",
      "FEATURES": "sso - single sign-on from vision to tm"
    }
  ]
}
```


Retrieving audit data

> **Note:**
>
> New actions can become available in API for retrieving audit data, while the version of API may remain unchanged.

Description: List of audit data sorted by date and time of logged user actions.

Method: `GET`

Resource: `audit`

Parameters:

- `filter` - filter list:
  - `change_date[>]` – start date and time of the logged user action. Are specified in UNIX timestamp format with microtime dot, for example, `filter[change_date][>]=1591368000.123456`
  - `change_date[<]` – end date and time of the logged user action. Are specified in UNIX timestamp format with microtime dot, for example, `filter[change_date][<]=1591368000.123456`
  - `change_date[>=]` – start date and time of the logged user action. Are specified in UNIX timestamp format with microtime dot, for example, `filter[change_date][>=]=1591368000.123456`
  - `change_date[<=]` – end date and time of the logged user action. Are specified in UNIX timestamp format with microtime dot, for example, `filter[change_date][<=]=1591368000.123456`
  - `entity_type[]` – the type of the entity to which the action applied (several values are possible)
- `without[] –` get data without additional attributes
  - `property_changes` – data of extended audit
- `sort[]` – parameter used for sorting
  - `change_date –` sort by date of `asc` change
- `start` – a position from which audit data should be delivered (the default value is 0)
- `limit` – how many audit data sets should be delivered (the default value is 100, the value cannot be larger than 1000)

OpenAPI scheme for delivering audit data

```
schemas:
    auditCommon:
      type: object
      required: [AUDIT_LOG_ID, CHANGE_DATE, OPERATION, ENTITY_TYPE]
      properties: &common
        AUDIT_LOG_ID:
          type: integer
          description: Audit log id
        USER_ID:
          type: integer
          nullable: true
          description: |
            User id who performed the action (See /xapi/user).
            USER_ID may be null on login or if changes make by plugin.
        CHANGER_NAME:
          type: string
          nullable: true
          description: |
            User name or Plugin name who performed the action.
            May be null on login.
        CHANGE_DATE:
          type: string
          description: Date and time of the registered user action with format "Y-m-d H:i:s.u" in UTC
```

```
          example: "2020-05-14 13:53:52.926560"
        OPERATION:
          type: string
          description: Operation type over which the action was performed. There may be values not from the
enum.
          enum:
            - run
            - canceled
            - start
            - stop
            - restart
            - view
            - create
            - update
            - change
            - delete
            - delete_ref
            - delete_hash
            - copy
            - move
            - login_failure
            - bruteforce
            - login
            - logout
            - change_password
            - commit
            - rollback
            - draft
            - add
            - import
            - export
            - export_object
            - create_widget
            - update_widget
            - delete_widget
            - download
            - sync
            - decision_update
            - add_tag
            - remove_tag
            - add_role
            - remove_role
            - add_visibility_area
            - remove_visibility_area
            - logging
            - apply_inbound
            - xapi_decision_update
            - start_scan_job
            - apply_result_scan_job
            - update_job_schedule
            - create_log
            - plugin_register
            - plugin_update
            - privileges_update
            - privileges_create
            - notification
            - notification_template
            - notification_test
```

```
            - upload_image
            - delete_image
            - create_contact
            - update_contact
            - delete_contact
            - compile_create
            - compile_update
            - create_template
            - update_template
            - delete_template
            - create_rule
            - update_rule
            - delete_rule
            - notification_test
        ENTITY_TYPE:
          type: string
          description: Entity type over which the action was performed. There may be values not from the
enum.
          enum: *entryTypes
        ENTITY_ID:
          type: string
          nullable: true
          description: |
            ID of the entity which the action was performed. May be GUID or integer as string
            May by null for:
            | OPERATION | ENTITY_TYPE |
            | :--- | :--- |
            | commit | Config |
            | run | QueryReportRun |
            | sync | Adlibitum |
            | login | User |
            | rollback | Config |
          example: "DBAF4F834F7647CBB297BC9DD17B77B100000000"
        ENTITY_DISPLAY_NAME:
          type: string
          nullable: true
          description: The name of the entity over which the action was carried out
          example: "Some name"
        PROPERTY_CHANGES:
          type: object
          nullable: true
          description: Null in default Audit log events
    userLoginLogout:
      type: object
      description: For ENTITY_TYPE User and OPERATION login or logout
      properties:
        <<: *common
        OPERATION:
          type: string
          enum: [login, logout]
        ENTITY_TYPE:
          type: string
          enum: [User]
        PROPERTY_CHANGES:
          type: object
          nullable: true
          required: [request]
          properties:
```

```
          request:
            required:
              - hostname
              - ip
              - result
              - login
            properties:
              hostname:
                type: string
                title: Hostname
                description: Hostname from which authorization passed
              ip:
                type: string
                title: Ip address
                description: Ip address from which authorization passed
              result:
                type: string
                title: Result
                description: Result
                enum:
                  - login_failure
                  - login
                  - logout
              login:
                type: string
                title: User login
                description: Entered user login in input
  userBruteForce:
    type: object
    description: For ENTITY_TYPE User and OPERATION login with bruteforce
    properties:
      <<: *common
      OPERATION:
        type: string
        enum: [ bruteforce ]
      ENTITY_TYPE:
        type: string
        enum: [ User ]
      PROPERTY_CHANGES:
        type: object
        nullable: true
        required: [ login ]
        properties:
          request:
            required:
              - login
              - display_name
            properties:
              login:
                type: string
                title: User login
                description: Entered user login in input
              display_name:
                type: string
                title: User full name
                description: User full name
  tagPropertyChanges:
    type: object
```

```
    properties:
      <<: *common
      ENTITY_TYPE:
        type: string
        enum: [ Object ]
      OPERATION:
        type: string
        enum: [ add_tag, remove_tag ]
      PROPERTY_CHANGES:
        type: object
        properties:
          new:
            $ref: '#/components/schemas/TagDiffProperties'
          old:
            $ref: '#/components/schemas/TagDiffProperties'
  TagDiffProperties:
    type: object
    properties:
      DISPLAY_NAME:
        type: string
      NOTE:
        type: string
  userDesicionPropertyChanges:
    type: object
    properties:
      <<: *common
      ENTITY_TYPE:
        type: string
        enum: [ Object ]
      OPERATION:
        type: string
        enum: [ decision_update, xapi_decision_update ]
      PROPERTY_CHANGES:
        type: object
        properties:
          new:
            type: object
            properties:
              USER_DECISION:
                $ref: '#/components/schemas/UserDecisionState'
          old:
            type: object
            properties:
              USER_DECISION:
                $ref: '#/components/schemas/UserDecisionState'
  UserDecisionState:
    type: string
    enum: [ NotProcessed, NoViolation, Violation, AdditionalProcessingNeeded ]
  objectExportPropertyChanges:
    type: object
    properties:
      <<: *common
      ENTITY_TYPE:
        type: string
        enum: [ Object ]
      OPERATION:
        type: string
        enum: [ export_object ]
```

```
PROPERTY_CHANGES:
  type: object
  properties:
    new:
      type: object
      properties:
        PARAMS:
          type: object
          properties:
            QUERY_ID:
              type: integer
              nullable: true
            DISPLAY_NAME:
              type: string
            COMMENT:
              type: string
            FILTER:
              anyOf:
                - type: object
                - type: array
            SORT:
              type: object
            IS_ONE_REPORT:
              $ref: '#/components/schemas/BooleanAsInteger'
            ONE_LOAD_REPORT:
              $ref: '#/components/schemas/BooleanAsInteger'
            FORMAT:
              type: string
              enum: [ simple, full ]
            TYPE:
              type: object
              properties:
                one_report:
                  type: string
                  enum: [ docx, xls, xlsx, pdf ]
                several_report:
                  type: string
                  enum: [ docx, pdf ]
            IS_SEVERAL_REPORT:
              $ref: '#/components/schemas/BooleanAsInteger'
            SEVERAL_LOAD_REPORT:
              $ref: '#/components/schemas/BooleanAsInteger'
            LOAD_ATTACHMENT:
              $ref: '#/components/schemas/BooleanAsInteger'
            KEEP_HIERARCHY:
              $ref: '#/components/schemas/BooleanAsInteger'
            LOAD_SNIPPET:
              $ref: '#/components/schemas/BooleanAsInteger'
            LOAD_EML:
              $ref: '#/components/schemas/BooleanAsInteger'
            LOAD_DEBUG_OBJECT:
              $ref: '#/components/schemas/BooleanAsInteger'
            SCOPE:
              oneOf:
                - type: string
                  enum: [ all ]
                - type: array
                  items:
```

```
                        type: integer
                GROUPING:
                  type: array
                  items:
                    type: string
                    enum: [CaptureDate, Computer, Object, ObjectType, Person]
                IS_REPORT_ARCHIVE:
                  $ref: '#/components/schemas/BooleanAsInteger'
  BooleanAsStringOrInteger:
    $ref: 'common.yaml#/components/schemas/BooleanAsStringOrInteger'
  BooleanAsInteger:
    $ref: 'common.yaml#/components/schemas/BooleanAsInteger'
  BooleanAsString:
    $ref: 'common.yaml#/components/schemas/BooleanAsString'
```

Example:

Query

```
curl -X GET "https://qa-2944.infowatch.ru/xapi/audit?sort[CHANGE_DATE]=asc&filter[ENTITY_TYPE]
[]=Adlibitum&filter[ENTITY_TYPE][]=Audit&filter[ENTITY_TYPE][]=Config&filter[ENTITY_TYPE]
[]=Perimeter&filter[ENTITY_TYPE][]=Policy&start=0&limit=5" -H "accept: application/json" -H "X-Enable-
OpenAPI: 1"
```

Response


```
{
  "data": [
    {
      "AUDIT_LOG_ID": 0,
      "USER_ID": 0,
      "CHANGER_NAME": "string",
      "CHANGE_DATE": "2020-05-14 13:53:52.926560",
      "OPERATION": "run",
      "ENTITY_TYPE": "Adlibitum",
      "ENTITY_ID": "DBAF4F834F7647CBB297BC9DD17B77B100000000",
      "ENTITY_DISPLAY_NAME": "Some name",
      "PROPERTY_CHANGES": {}
    },
    {
      "AUDIT_LOG_ID": 0,
      "USER_ID": 0,
      "CHANGER_NAME": "string",
      "CHANGE_DATE": "2020-05-14 13:53:52.926560",
      "OPERATION": "login",
      "ENTITY_TYPE": "User",
      "ENTITY_ID": "DBAF4F834F7647CBB297BC9DD17B77B100000000",
      "ENTITY_DISPLAY_NAME": "Some name",
      "PROPERTY_CHANGES": {
        "request": {
          "hostname": "string",
          "ip": "string",
          "result": "login_failure",
          "login": "string"
        }
```

```
    }
  },
  {
    "AUDIT_LOG_ID": 0,
    "USER_ID": 0,
    "CHANGER_NAME": "string",
    "CHANGE_DATE": "2020-05-14 13:53:52.926560",
    "OPERATION": "run",
    "ENTITY_TYPE": "Policy",
    "ENTITY_ID": "DBAF4F834F7647CBB297BC9DD17B77B100000000",
    "ENTITY_DISPLAY_NAME": "Some name",
    "PROPERTY_CHANGES": {
      "old": {
        "DISPLAY_NAME": "string",
        "NOTE": "string",
        "STATUS": 0,
        "START_DATE": "string",
        "END_DATE": "string",
        "DATA": {
          "ITEMS": [
            {
              "TYPE": "catalog",
              "ID": "string",
              "NAME": "string"
            },
            {
              "TYPE": "fileformat",
              "ID": "string",
              "NAME": "string",
              "MIME_TYPE": "string",
              "ENCRYPTED": 0,
              "MERGED": 0,
              "MAX": 0,
              "MIN": 0,
              "MAX_TYPE": 0,
              "MIN_TYPE": 0
            }
          ]
        }
      },
      "new": {
        "DISPLAY_NAME": "string",
        "NOTE": "string",
        "STATUS": 0,
        "START_DATE": "string",
        "END_DATE": "string",
        "DATA": {
          "ITEMS": [
            {
              "TYPE": "catalog",
              "ID": "string",
              "NAME": "string"
            },
            {
              "TYPE": "fileformat",
              "ID": "string",
              "NAME": "string",
              "MIME_TYPE": "string",
```

```
                "ENCRYPTED": 0,
                "MERGED": 0,
                "MAX": 0,
                "MIN": 0,
                "MAX_TYPE": 0,
                "MIN_TYPE": 0
              }
            ]
          }
        },
        "rule": {
          "ENTITY_TYPE": "PolicyRule",
          "ENTITY_ID": "string",
          "ENTITY_DISPLAY_NAME": "string"
        }
      }
    }
  ],
  "meta": {
    "totalCount": 0,
    "start": 0,
    "limit": 0
  }
}
```


Getting organizational structure

Getting information on groups

Getting the list of groups

Description: the list of groups

Method: `GET`

Resource: `group`

Parameters:

- `filter` — the filter list:
  - `change_date[from]` — since the date of the last change in UNIX-timestamp format (can be used separately from `change_date[to]`)
  - `change_date[to]` — up to the date of the last change in UNIX-timestamp format (can be used separately from `change_date[from]`)
  - `create_date[from]` — since the date of the last change in UNIX-timestamp format (can be used separately from `create_date[to]`)
  - `create_date[to]` — up to the date of the last change in UNIX-timestamp format (can be used separately from `create_date[from]`
  - `is_deleted` — flag 1 or 0. If the parameter is specified, then entities with the specified value will be returned
  - `disabled` — flag 1 or 0, indicates activity. If the flag is set, then the entity is inactive (the flag is obtained from LDAP)
  - `contact_type[]` — filtering by the contact type (several values can be passed, e.g., `/xapi/group?filter[contact_type][]=webaccount&filter[contact_type][]=icq`)

    - `contact_value[]` — filtering by the contact value (several values can be passed, e.g., `/xapi/group?filter[contact_value][]=user@ad&filter[contact_value][]=login@example.com`)
    - `parent_group_id[]` — filtering by groups (several values can be passed, e.g., `/xapi/group?filter[parent_group_id][]=FCE1409680E5D6469E1F7998266CE9E9&filter[parent_group_id][]=918462B6DC2C954BAAF8706F7DC53F14)`
- `with[]` — the list of additional entities to be added to the object:
    - `contacts` — group contacts
    - `children` — child groups
- `sort` — parameter for sorting
    - `change_date` — sort by the modification date `asc` or `desc` (e.g., `/xapi/group?sort[change_date]=asc`) ⚠️ may slow down returning the result
- `start` — a start position for returning items, the default value is 0
- `limit` — how many items to return (the default value is 100, cannot be more than 1000

Response: The list of persons described with the following JSON Schema:

JSON returning schema

```
{
   "$schema": "http://json-schema.org/draft-04/schema#"
                  ,
   "type": "object",
   "required": [
       "data",
       "meta"
   ],
   "properties": {
       "data": {
           "description": "Array of groups",
           "type": "array",
           "items": {
               "description": "Group",
               "type": "object",
               "required": [
                   "GROUP_ID",
                   "CREATE_DATE",
                   "CHANGE_DATE",
                   "DISPLAY_NAME",
                   "DISTINGUISHEDNAME",
                   "GROUP_TYPE",
                   "IS_VISIBLE",
                   "IS_DELETED",
                   "childrenCount"
               ],
               "properties": {
                   "GROUP_ID": {
                       "description": "A unique identifier of the group",
                       "type": "string"
                   },
                   "CREATE_DATE": {
```

```
                        "description": "Entry creation date",
                        "type": "string"
                    },
                    "CHANGE_DATE": {
                        "description": "Entry modification date",
                        "type": "string"
                    },
                    "DISPLAY_NAME": {
                        "description": "Group name",
                        "type": "string"
                    },
                    "DISTINGUISHEDNAME": {
                        "description": "Full name",
                        "type": "string"
                    },
                    "GROUP_TYPE": {
                        "description": "Group type (tmRoot, tmGroup, adRoot, adGroup,
adContainer, adDomain, adOU from LDAP objectclass)",
                        "type": "string"
                    },
                    "IS_VISIBLE": {
                        "description": "Group visibility",
                        "type": "integer"
                    },
                    "IS_DELETED": {
                        "description": "Whether the group is deleted from TM",
                        "type": "integer"
                    },
                    "childrenCount": {
                        "description": "The number of child elements in the group",
                        "type": "integer"
                    },
                    "contacts": {
                        "description": "Array of contacts",
                        "type": "array",
                        "items": {
                            "description": "Contact",
                            "type": "object",
                            "required": [
                                "CONTACT_ID",
                                "CREATE_DATE",
                                "CHANGE_DATE",
                                "CONTACT_TYPE",
                                "VALUE",
                                "IS_PERSONAL",
                                "IS_PRIMARY",
                                "SOURCE"
                            ],
                            "properties": {
                                "CONTACT_ID": {
                                    "description": "Object unique identifier",
                                    "type": "string"
                                },
```

```
                                "CREATE_DATE": {
                                    "description": "Creation date",
                                    "type": "string"
                                },
                                "CHANGE_DATE": {
                                    "description": "Modification date",
                                    "type": "string"
                                },
                                "CONTACT_TYPE": {
                                    "description": "Type",
                                    "type": "string"
                                },
                                "VALUE": {
                                    "description": "Value",
                                    "type": "string"
                                },
                                "IS_PERSONAL": {
                                    "description": "Belongs to (Work, Personal)",
                                    "type": "integer"
                                },
                                "IS_PRIMARY": {
                                    "description": "Is primary",
                                    "type": "integer"
                                },
                                "SOURCE": {
                                    "description": "Type",
                                    "type": "string"
                                }
                            }
                        }
                    },
                    "children": {
                        "description": "An array of groups which belong to the
current group",
                        "type": "array",
                        "items": {
                            "description": "Group",
                            "type": "object",
                            "properties": {
                                "GROUP_ID": {
                                    "description": "A unique identifier of the group",
                                    "type": "string"
                                },
                                "PARENT_GROUP_ID": {
                                    "description": "A unique identifier of the parent
group",
                                    "type": "string"
                                },
                                "RELATION_TYPE": {
                                    "description": "Connection type: 0 - tm, 1 -
member, 2 - distinguishedname",
                                    "type": "integer"
                                }
```

```
                            }
                        }
                    }
                }
            },
            "meta": {
                "description": "Additional data",
                "type": "object",
                "required": [
                    "totalCount",
                    "start",
                    "limit"
                ],
                "properties": {
                    "totalCount": {
                        "type": "integer",
                        "description": "Total number"
                    },
                    "start": {
                        "type": "integer",
                        "description": "A position from which returning started"
                    },
                    "limit": {
                        "type": "integer",
                        "description": "Total number of returned items"
                    }
                }
            }
        }
    }
```

Example:

Query

```
/xapi/group?filter[change_date][from]=1&filter[change_date][to]=2&with[]=contacts&
with[]=children&limit=10&sort[change_date]=asc
```

Getting the list with group contact types

Description: The list of all possible types of the group contacts

Method: `GET`

Resource: group `/contact_type`

- `start` — a start position for returning items, the default value is 0
- `limit` — how many items to return (the default value is 100, cannot be more than 1000

Example:

Query

```
GET /xapi/group/contact_type?start=0&limit=10
```

Getting statistics on groups

Description: Statistics on groups

Method: `GET`

Resource: group `/stat`

Parameters:

- `filter` — the filter list:
  - `change_date[from]` — since the date of the last change in UNIX-timestamp format (can be used separately from `change_date[to]`)
  - `change_date[to]` — up to the date of the last change in UNIX-timestamp format (can be used separately from `change_date[from]`)

Response:

JSON returning schema

```
{
    "$schema": "http://json-schema.org/draft-04/schema#"
                    ,
    "description": "Statistics",
    "type": "object",
    "properties": {
        "data": {
            "description": "Not used",
            "type": "array",
            "items": {}
        },
        "meta": {
            "description": "Statistics",
            "type": "object",
            "properties": {
                "CHANGE_DATE": {
                    "description": "Modification date",
                    "type": "object",
                    "properties": {
                        "from": {
                            "description": "The first modification date",
                            "type": "string"
                        },
                        "to": {
                            "description": "The last modification date",
                            "type": "string"
                        }
                    }
                },
                "totalCount": {
                    "description": "Total number of items",
                    "type": "integer"
                }
            }
        }
```

```
    }
}
```

Example:

```
GET /xapi/group/stat?filter[CAPTURE_DATE][to]=1494951762&filter[CAPTURE_DATE][from]=1494951000
```

Response

```
{
  "data": [],
  "meta": {
    "CHANGE_DATE": {
      "from": "2017-03-24 10:40:03",
      "to": "2017-05-24 12:10:22"
    },
    "totalCount": 539693
  }
}
```

Getting information on a person

Getting images of multiple persons

Method: POST

Resource: `person/images`

Parameters (are passed in the form of JSON):

- `response_type` — the response type:
  - `chunked` — `Transfer-Encoding: chunked` is used, where each image is passed in its own block and in the order which is specified in the request body; if there is no image, then null character "\0" is passed instead
  - `multipart/mixed` — `multipart/mixed` rfc tech-ms, format is used. This format is not part of the HTTP standard, however, it is used in emails, so it can be easily implemented. Besides, it is very similar to `multipart/form-data`. Each image is passed in its block and is separately marked with X-Person-ID title indicating the event the image belongs to. If there is no image, then it is either not passed or the image body is missing
- `person_id` — an array of person IDs

Examples:

`chunked`:

Query

```
POST /xapi/person/images
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
(пустая строка)
```

```
{"response_type": "chunked", "person_id": ["DEF1CC1FA015CA428D5DE3CD5B804B69",
"E277B624BC988C4C96590A8435F634ED"]}
```

Response

```
HTTP/1.1 200 OK
Content-Type: image/png
Transfer-Encoding: chunked
(empty line)
1
\0 (no-image character for person DEF1CC1FA015CA428D5DE3CD5B804B69)
48AC
(image content for person E277B624BC988C4C96590A8435F634ED)
0
```

`multipart/mixed` :

Query

```
POST /xapi/person/images
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
(empty line)
{"response_type": "multipart/mixed", "person_id": [
"DEF1CC1FA015CA428D5DE3CD5B804B69", "E277B624BC988C4C96590A8435F634ED"]}
```

Response

```
HTTP/1.1 200 OK
Content-Type: multipart/mixed; boundary=Asrf456BGe4h
Content-Length: (total volume including titles, can be missing!)
(empty line)
(missing preamble)
--Asrf456BGe4h
Content-Type: application/x-empty
Content-Disposition: attachment; filename="DEF1CC1FA015CA428D5DE3CD5B804B69"
X-Person-ID: DEF1CC1FA015CA428D5DE3CD5B804B69
(empty line and zero content after)
--Asrf456BGe4h
Content-Disposition: attachment; filename="E277B624BC988C4C96590A8435F634ED.jpg"
Content-Type: image/jpeg
X-Person-ID: E277B624BC988C4C96590A8435F634ED
(empty line)
(binary contents of the second person E277B624BC988C4C96590A8435F634ED)
--Asrf456BGe4h--
(missing epilogue - empty line)
```

Getting person image

Method: `GET`

Resource: `person/image/{person_id}`

Response: The person image

Getting the list of persons

Description: The list of persons

Method: `GET`

Resource: `person`

Parameters:

- `filter` — the filter list:
  - `change_date[from]` — since the date of the last change in UNIX-timestamp format (can be used separately from `change_date[to]`)
  - `change_date[to]` — up to the date of the last change in UNIX-timestamp format (can be used separately from `change_date[from]`)
  - `create_date[from]` — since the date of the last change in UNIX-timestamp format (can be used separately from `create_date[to]`)
  - `create_date[to]` — up to the date of the last change in UNIX-timestamp format (can be used separately from `create_date[from]`
  - is_deleted — flag 1 or 0. If the parameter is specified, then entities with the specified value will be returned
  - `disabled` — flag 1 or 0, indicates activity. If the flag is set, then the entity is inactive (the flag is obtained from LDAP)
  - `contact_type[]` — filtering by the contact type (several values can be passed, e.g., `/xapi/person?filter[contact_type][]=webaccount&filter[contact_type][]=icq`)
  - `contact_value[]` — filtering by the contact value (several values can be passed, e.g., `/xapi/person?filter[contact_value ][]=user@ad&filter[contact_value ][]=login@example.com`)
  - `group_id[]` — filtering by groups (several values can be passed, e.g.,: `/xapi/person?filter[group_id][]=webaccount&filter[group_id][]=icq)`
- `with[]` — the list of additional entities to be added to the object:
  - `contacts` — person contact
  - `p2g` — connection of the person with groups
  - `status` — person statuses
- `sort` — parameter for sorting
  - `change_date` — sort by the modification date `asc` or `desc` (e.g. `/xapi/person?sort[change_date]=asc`) ⚠️ may slow down returning the result
- `start` — a start position for returning items, the default value is 0
- `limit` — how many items to return (the default value is 100, cannot be more than 1000

Response: The list of persons described with the following JSON Schema:

JSON schema of returning the list of persons

```
{
    "$schema": "http://json-schema.org/draft-04/schema#"
                    ,
    "type": "object",
    "required": [
```

```
        "data",
        "meta"
    ],
    "properties": {
        "data": {
            "description": "Array of perons",
            "type": "array",
            "items": {
                "description": "Person",
                "type": "object",
                "required": [
                    "PERSON_ID",
                    "CREATE_DATE",
                    "CHANGE_DATE",
                    "DISTINGUISHEDNAME",
                    "DISPLAY_NAME",
                    "GIVENNAME",
                    "SN",
                    "DISABLED",
                    "IS_EMPLOYEE",
                    "IS_DELETED"
                ],
                "properties": {
                    "PERSON_ID": {
                        "description": "Object unique identifier",
                        "type": "string"
                    },
                    "CREATE_DATE": {
                        "description": "Creation date",
                        "type": "string"
                    },
                    "CHANGE_DATE": {
                        "description": "Last modification date",
                        "type": "string"
                    },
                    "DISTINGUISHEDNAME": {
                        "description": "Full name",
                        "type": "string"
                    },
                    "DISPLAY_NAME": {
                        "description": "First and last names",
                        "type": "string"
                    },
                    "GIVENNAME": {
                        "description": "First name",
                        "type": "string"
                    },
                    "SN": {
                        "description": "Last name",
                        "type": "string"
                    },
                    "DISABLED": {
                        "description": "Person state",
```

```
            "type": "integer"
        },
        "IS_EMPLOYEE": {
            "description": "If the person is the company employee",
            "type": "integer"
        },
        "IS_DELETED": {
            "description": "If the person is deleted from TM",
            "type": "integer"
        },
        "contacts": {
            "description": "Array of contacts",
            "type": "array",
            "items": {
                "description": "Contact",
                "type": "object",
                "required": [
                    "CONTACT_ID",
                    "CREATE_DATE",
                    "CHANGE_DATE",
                    "CONTACT_TYPE",
                    "VALUE",
                    "IS_PERSONAL",
                    "IS_PRIMARY",
                    "SOURCE"
                ],
                "properties": {
                    "CONTACT_ID": {
                        "description": "Object unique identifier",
                        "type": "string"
                    },
                    "CREATE_DATE": {
                        "description": "Creation date",
                        "type": "string"
                    },
                    "CHANGE_DATE": {
                        "description": "Modification date",
                        "type": "string"
                    },
                    "CONTACT_TYPE": {
                        "description": "Type",
                        "type": "string"
                    },
                    "VALUE": {
                        "description": "Value",
                        "type": "string"
                    },
                    "IS_PERSONAL": {
                        "description": "Belong to (Work, Personal)",
                        "type": "integer"
                    },
                    "IS_PRIMARY": {
                        "description": "Is primary",
```

```
                                    "type": "integer"
                                },
                                "SOURCE": {
                                    "description": "Type",
                                    "type": "string"
                                }
                            }
                        }
                    },
                    "p2g": {
                        "description": "Array of connection with groups",
                        "type": "array",
                        "items": {
                            "description": "Connection with group",
                            "type": "object",
                            "required": [
                                "PERSON_ID",
                                "PARENT_GROUP_ID",
                                "RELATION_TYPE"
                            ],
                            "properties": {
                                "PERSON_ID": {
                                    "description": "Person unique identifier",
                                    "type": "string"
                                },
                                "PARENT_GROUP_ID": {
                                    "description": "Group unique identifier",
                                    "type": "string"
                                },
                                "RELATION_TYPE": {
                                    "description": "Connection type: 0 - tm, 1 -
member, 2 - distinguishedname, 3 - primarygroupsid",
                                    "type": "integer"
                                }
                            }
                        }
                    },
                    "status": {
                        "description": "Array of statuses",
                        "type": "array",
                        "items": {
                            "description": "Person status",
                            "type": "object",
                            "required": [
                                "IDENTITY_STATUS_ID",
                                "CREATE_DATE",
                                "CHANGE_DATE",
                                "ASSIGNMENT_DATE",
                                "DISPLAY_NAME",
                                "COLOR",
                                "EDITABLE"
                            ],
                            "properties": {
```

```
                                "IDENTITY_STATUS_ID": {
                                    "description": "Status unique identifier",
                                    "type": "string"
                                },
                                "CREATE_DATE": {
                                    "description": "Status creation date",
                                    "type": "string"
                                },
                                "CHANGE_DATE": {
                                    "description": "Status modification date",
                                    "type": "string"
                                },
                                "ASSIGNMENT_DATE": {
                                    "description": "The date when the status was
assigned to the person",
                                    "type": "string"
                                },
                                "DISPLAY_NAME": {
                                    "description": "Status name",
                                    "type": "string"
                                },
                                "COLOR": {
                                    "description": "Status color (e.g. #ff0000)",
                                    "type": "string"
                                },
                                "EDITABLE": {
                                    "description": "Indicator that the status is not
system",
                                    "type": "integer"
                                }
                            }
                        }
                    }
                }
            },
            "meta": {
                "description": "Additional data",
                "type": "object",
                "required": [
                    "totalCount",
                    "start",
                    "limit"
                ],
                "properties": {
                    "totalCount": {
                        "type": "integer",
                        "description": "Total number"
                    },
                    "start": {
                        "type": "integer",
                        "description": "A position from which returning started"
                    },
```

```
                "limit": {
                    "type": "integer",
                    "description": "Total number of returned items"
                }
            }
        }
    }
}
```

Example:

Query

```
GET /xapi/person?start=0&limit=10&filter[change_date][from]=0&filter[change_date][to]=1&with[]=contacts
```

Response


```
{
    "data": [{
        "PERSON_ID": "532ECB81F75DDC46BE023478C2E86BD9",
        "WHENCHANGED": "20151229230303.0Z",
        "WHENCREATED": "20151229230303.0Z",
        "DISABLED": 0,
        "IS_EMPLOYEE": 1,
        "DISTINGUISHEDNAME": "CN=Annett Rist,OU=Testou,DC=trafmon,DC=iw",
        "DISPLAY_NAME": "Annett Rist",
        "GIVENNAME": "Annett",
        "SN": "Rist",
        "OBJECTSID": "S-1-5-21-4236050433-3472386798-155597913-156702",
        "SAMACCOUNTNAME": "AC428097",
        "NETBIOSNAME": "TRAFMON",
        "DNSROOT": "trafmon.iw",
        "USERPRINCIPALNAME": "AC428097@acme.com",
        "MAIL": "Annett.Rist@acme.com",
        "TELEPHONENUMBER": "+49-30-626763",
        "SERVER_ID": "65E2D37A643561E5E43C7E757BE121096253B4D6",
        "CREATE_DATE": "2017-03-07 08:54:56.401138",
        "CHANGE_DATE": "2017-03-10 08:40:35.741001",
        "SOURCE": "ad",
        "HAS_TM_THUMBNAILPHOTO": false,
        "HAS_THUMBNAILPHOTO": false,
        "TM_PHOTO": "da39a3ee5e6b4b0d3255bfef95601890afd80709",
        "contacts": [{
            "CONTACT_ID": "4A211BA3896A7620E0530100007F388100000000",
            "IDENTITY_ID": "532ECB81F75DDC46BE023478C2E86BD9",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "auth",
            "VALUE": "ac428097@acme.com",
            "IS_PRIMARY": 0,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.402060",
```

```
        "CHANGE_DATE": "2017-03-07 08:54:56.402060",
        "SOURCE": "ad"
    }, {
        "CONTACT_ID": "4A211BA389687620E0530100007F388100000000",
        "IDENTITY_ID": "532ECB81F75DDC46BE023478C2E86BD9",
        "IDENTITY_TYPE": "person",
        "IDENTITY_SOURCE": "ad",
        "CONTACT_TYPE": "auth",
        "VALUE": "ac428097@trafmon",
        "IS_PRIMARY": 1,
        "IS_PERSONAL": 0,
        "CREATE_DATE": "2017-03-07 08:54:56.401926",
        "CHANGE_DATE": "2017-03-07 08:54:56.401926",
        "SOURCE": "ad"
    }, {
        "CONTACT_ID": "4A211BA389697620E0530100007F388100000000",
        "IDENTITY_ID": "532ECB81F75DDC46BE023478C2E86BD9",
        "IDENTITY_TYPE": "person",
        "IDENTITY_SOURCE": "ad",
        "CONTACT_TYPE": "auth",
        "VALUE": "ac428097@trafmon.iw",
        "IS_PRIMARY": 0,
        "IS_PERSONAL": 0,
        "CREATE_DATE": "2017-03-07 08:54:56.401998",
        "CHANGE_DATE": "2017-03-07 08:54:56.401998",
        "SOURCE": "ad"
    }, {
        "CONTACT_ID": "4A211BA389667620E0530100007F388100000000",
        "IDENTITY_ID": "532ECB81F75DDC46BE023478C2E86BD9",
        "IDENTITY_TYPE": "person",
        "IDENTITY_SOURCE": "ad",
        "CONTACT_TYPE": "email",
        "VALUE": "annett.rist@acme.com",
        "IS_PRIMARY": 1,
        "IS_PERSONAL": 0,
        "CREATE_DATE": "2017-03-07 08:54:56.401457",
        "CHANGE_DATE": "2017-03-07 08:54:56.401457",
        "SOURCE": "ad"
    }, {
        "CONTACT_ID": "4A211BA389677620E0530100007F388100000000",
        "IDENTITY_ID": "532ECB81F75DDC46BE023478C2E86BD9",
        "IDENTITY_TYPE": "person",
        "IDENTITY_SOURCE": "ad",
        "CONTACT_TYPE": "phone",
        "VALUE": "+49-30-626763",
        "IS_PRIMARY": 1,
        "IS_PERSONAL": 0,
        "CREATE_DATE": "2017-03-07 08:54:56.401670",
        "CHANGE_DATE": "2017-03-07 08:54:56.401670",
        "SOURCE": "ad"
    }, {
        "CONTACT_ID": "4A211BA3896B7620E0530100007F388100000000",
        "IDENTITY_ID": "532ECB81F75DDC46BE023478C2E86BD9",
```

```
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "sid",
            "VALUE": "s-1-5-21-4236050433-3472386798-155597913-156702",
            "IS_PRIMARY": 1,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.402130",
            "CHANGE_DATE": "2017-03-07 08:54:56.402130",
            "SOURCE": "ad"
        }],
        "status": []
    }, {
        "PERSON_ID": "92FB7D1EC79A9947938BE582D355B109",
        "WHENCHANGED": "20151229230304.0Z",
        "WHENCREATED": "20151229230303.0Z",
        "DISABLED": 0,
        "IS_EMPLOYEE": 1,
        "DISTINGUISHEDNAME": "CN=Lieselene SchÃ¶nemann,OU=Testou,DC=trafmon,DC=iw",
        "DISPLAY_NAME": "Lieselene SchÃ¶nemann",
        "GIVENNAME": "Lieselene",
        "SN": "SchÃ¶nemann",
        "OBJECTSID": "S-1-5-21-4236050433-3472386798-155597913-156706",
        "SAMACCOUNTNAME": "AC727058",
        "NETBIOSNAME": "TRAFMON",
        "DNSROOT": "trafmon.iw",
        "USERPRINCIPALNAME": "AC727058@acme.com",
        "MAIL": "Lieselene.SchÃ¶nemann@acme.com",
        "TELEPHONENUMBER": "+49-2183-398305",
        "SERVER_ID": "65E2D37A643561E5E43C7E757BE121096253B4D6",
        "CREATE_DATE": "2017-03-07 08:54:56.402195",
        "CHANGE_DATE": "2017-03-10 08:40:35.741198",
        "SOURCE": "ad",
        "HAS_TM_THUMBNAILPHOTO": false,
        "HAS_THUMBNAILPHOTO": false,
        "TM_PHOTO": "da39a3ee5e6b4b0d3255bfef95601890afd80709",
        "contacts": [{
            "CONTACT_ID": "4A211BA389707620E0530100007F388100000000",
            "IDENTITY_ID": "92FB7D1EC79A9947938BE582D355B109",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "auth",
            "VALUE": "ac727058@acme.com",
            "IS_PRIMARY": 0,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.403048",
            "CHANGE_DATE": "2017-03-07 08:54:56.403048",
            "SOURCE": "ad"
        }, {
            "CONTACT_ID": "4A211BA3896E7620E0530100007F388100000000",
            "IDENTITY_ID": "92FB7D1EC79A9947938BE582D355B109",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "auth",
```

```
        "VALUE" : "ac727058@trafmon",
        "IS_PRIMARY" : 1,
        "IS_PERSONAL" : 0,
        "CREATE_DATE" : "2017-03-07 08:54:56.402920",
        "CHANGE_DATE" : "2017-03-07 08:54:56.402920",
        "SOURCE" : "ad"
    }, {
        "CONTACT_ID" : "4A211BA3896F7620E0530100007F388100000000",
        "IDENTITY_ID" : "92FB7D1EC79A9947938BE582D355B109",
        "IDENTITY_TYPE" : "person",
        "IDENTITY_SOURCE" : "ad",
        "CONTACT_TYPE" : "auth",
        "VALUE" : "ac727058@trafmon.iw",
        "IS_PRIMARY" : 0,
        "IS_PERSONAL" : 0,
        "CREATE_DATE" : "2017-03-07 08:54:56.402984",
        "CHANGE_DATE" : "2017-03-07 08:54:56.402984",
        "SOURCE" : "ad"
    }, {
        "CONTACT_ID" : "4A211BA3896C7620E0530100007F388100000000",
        "IDENTITY_ID" : "92FB7D1EC79A9947938BE582D355B109",
        "IDENTITY_TYPE" : "person",
        "IDENTITY_SOURCE" : "ad",
        "CONTACT_TYPE" : "email",
        "VALUE" : "lieselene.schÃ¶nemann@acme.com",
        "IS_PRIMARY" : 1,
        "IS_PERSONAL" : 0,
        "CREATE_DATE" : "2017-03-07 08:54:56.402517",
        "CHANGE_DATE" : "2017-03-07 08:54:56.402517",
        "SOURCE" : "ad"
    }, {
        "CONTACT_ID" : "4A211BA3896D7620E0530100007F388100000000",
        "IDENTITY_ID" : "92FB7D1EC79A9947938BE582D355B109",
        "IDENTITY_TYPE" : "person",
        "IDENTITY_SOURCE" : "ad",
        "CONTACT_TYPE" : "phone",
        "VALUE" : "+49-2183-398305",
        "IS_PRIMARY" : 1,
        "IS_PERSONAL" : 0,
        "CREATE_DATE" : "2017-03-07 08:54:56.402731",
        "CHANGE_DATE" : "2017-03-07 08:54:56.402731",
        "SOURCE" : "ad"
    }, {
        "CONTACT_ID" : "4A211BA389717620E0530100007F388100000000",
        "IDENTITY_ID" : "92FB7D1EC79A9947938BE582D355B109",
        "IDENTITY_TYPE" : "person",
        "IDENTITY_SOURCE" : "ad",
        "CONTACT_TYPE" : "sid",
        "VALUE" : "s-1-5-21-4236050433-3472386798-155597913-156706",
        "IS_PRIMARY" : 1,
        "IS_PERSONAL" : 0,
        "CREATE_DATE" : "2017-03-07 08:54:56.403117",
        "CHANGE_DATE" : "2017-03-07 08:54:56.403117",
```

```
            "SOURCE": "ad"
        }],
        "status": []
    }, {
        "PERSON_ID": "F0A3298727D7E0498106AE678CC1F5F8",
        "WHENCHANGED": "20151229230304.0Z",
        "WHENCREATED": "20151229230304.0Z",
        "DISABLED": 0,
        "IS_EMPLOYEE": 1,
        "DISTINGUISHEDNAME": "CN=Kasimir Eggers,OU=Testou,DC=trafmon,DC=iw",
        "DISPLAY_NAME": "Kasimir Eggers",
        "GIVENNAME": "Kasimir",
        "SN": "Eggers",
        "OBJECTSID": "S-1-5-21-4236050433-3472386798-155597913-156710",
        "SAMACCOUNTNAME": "AC217045",
        "NETBIOSNAME": "TRAFMON",
        "DNSROOT": "trafmon.iw",
        "USERPRINCIPALNAME": "AC217045@acme.com",
        "MAIL": "Kasimir.Eggers@acme.com",
        "TELEPHONENUMBER": "+49-7191-389863",
        "SERVER_ID": "65E2D37A643561E5E43C7E757BE121096253B4D6",
        "CREATE_DATE": "2017-03-07 08:54:56.403185",
        "CHANGE_DATE": "2017-03-10 08:40:35.741388",
        "SOURCE": "ad",
        "HAS_TM_THUMBNAILPHOTO": false,
        "HAS_THUMBNAILPHOTO": false,
        "TM_PHOTO": "da39a3ee5e6b4b0d3255bfef95601890afd80709",
        "contacts": [{
            "CONTACT_ID": "4A211BA389767620E0530100007F388100000000",
            "IDENTITY_ID": "F0A3298727D7E0498106AE678CC1F5F8",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "auth",
            "VALUE": "ac217045@acme.com",
            "IS_PRIMARY": 0,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.404114",
            "CHANGE_DATE": "2017-03-07 08:54:56.404114",
            "SOURCE": "ad"
        }, {
            "CONTACT_ID": "4A211BA389747620E0530100007F388100000000",
            "IDENTITY_ID": "F0A3298727D7E0498106AE678CC1F5F8",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "auth",
            "VALUE": "ac217045@trafmon",
            "IS_PRIMARY": 1,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.403984",
            "CHANGE_DATE": "2017-03-07 08:54:56.403984",
            "SOURCE": "ad"
        }, {
            "CONTACT_ID": "4A211BA389757620E0530100007F388100000000",
```

```
            "IDENTITY_ID" :  "F0A3298727D7E0498106AE678CC1F5F8" ,
            "IDENTITY_TYPE" :  "person" ,
            "IDENTITY_SOURCE" :  "ad" ,
            "CONTACT_TYPE" :  "auth" ,
            "VALUE" :  "ac217045@trafmon.iw" ,
            "IS_PRIMARY" : 0,
            "IS_PERSONAL" : 0,
            "CREATE_DATE" :  "2017-03-07 08:54:56.404055" ,
            "CHANGE_DATE" :  "2017-03-07 08:54:56.404055" ,
            "SOURCE" :  "ad"
        }, {
            "CONTACT_ID" :  "4A211BA389727620E0530100007F388100000000" ,
            "IDENTITY_ID" :  "F0A3298727D7E0498106AE678CC1F5F8" ,
            "IDENTITY_TYPE" :  "person" ,
            "IDENTITY_SOURCE" :  "ad" ,
            "CONTACT_TYPE" :  "email" ,
            "VALUE" :  "kasimir.eggers@acme.com" ,
            "IS_PRIMARY" : 1,
            "IS_PERSONAL" : 0,
            "CREATE_DATE" :  "2017-03-07 08:54:56.403507" ,
            "CHANGE_DATE" :  "2017-03-07 08:54:56.403507" ,
            "SOURCE" :  "ad"
        }, {
            "CONTACT_ID" :  "4A211BA389737620E0530100007F388100000000" ,
            "IDENTITY_ID" :  "F0A3298727D7E0498106AE678CC1F5F8" ,
            "IDENTITY_TYPE" :  "person" ,
            "IDENTITY_SOURCE" :  "ad" ,
            "CONTACT_TYPE" :  "phone" ,
            "VALUE" :  "+49-7191-389863" ,
            "IS_PRIMARY" : 1,
            "IS_PERSONAL" : 0,
            "CREATE_DATE" :  "2017-03-07 08:54:56.403722" ,
            "CHANGE_DATE" :  "2017-03-07 08:54:56.403722" ,
            "SOURCE" :  "ad"
        }, {
            "CONTACT_ID" :  "4A211BA389777620E0530100007F388100000000" ,
            "IDENTITY_ID" :  "F0A3298727D7E0498106AE678CC1F5F8" ,
            "IDENTITY_TYPE" :  "person" ,
            "IDENTITY_SOURCE" :  "ad" ,
            "CONTACT_TYPE" :  "sid" ,
            "VALUE" :  "s-1-5-21-4236050433-3472386798-155597913-156710" ,
            "IS_PRIMARY" : 1,
            "IS_PERSONAL" : 0,
            "CREATE_DATE" :  "2017-03-07 08:54:56.404184" ,
            "CHANGE_DATE" :  "2017-03-07 08:54:56.404184" ,
            "SOURCE" :  "ad"
        }],
        "status" : []
    }, {
        "PERSON_ID" :  "52BDB45E49090F4D986899E29FEB35CB" ,
        "WHENCHANGED" :  "20151229230304.0Z" ,
        "WHENCREATED" :  "20151229230304.0Z" ,
        "DISABLED" : 0,
```

```
"IS_EMPLOYEE": 1,
"DISTINGUISHEDNAME": "CN=Leoni Huck,OU=Testou,DC=trafmon,DC=iw",
"DISPLAY_NAME": "Leoni Huck",
"GIVENNAME": "Leoni",
"SN": "Huck",
"OBJECTSID": "S-1-5-21-4236050433-3472386798-155597913-156709",
"SAMACCOUNTNAME": "AC716847",
"NETBIOSNAME": "TRAFMON",
"DNSROOT": "trafmon.iw",
"USERPRINCIPALNAME": "AC716847@acme.com",
"MAIL": "Leoni.Huck@acme.com",
"TELEPHONENUMBER": "+49-9184-802313",
"SERVER_ID": "65E2D37A643561E5E43C7E757BE121096253B4D6",
"CREATE_DATE": "2017-03-07 08:54:56.404249",
"CHANGE_DATE": "2017-03-10 08:40:35.741577",
"SOURCE": "ad",
"HAS_TM_THUMBNAILPHOTO": false,
"HAS_THUMBNAILPHOTO": false,
"TM_PHOTO": "da39a3ee5e6b4b0d3255bfef95601890afd80709",
"contacts": [{
    "CONTACT_ID": "4A211BA3897C7620E0530100007F388100000000",
    "IDENTITY_ID": "52BDB45E49090F4D986899E29FEB35CB",
    "IDENTITY_TYPE": "person",
    "IDENTITY_SOURCE": "ad",
    "CONTACT_TYPE": "auth",
    "VALUE": "ac716847@acme.com",
    "IS_PRIMARY": 0,
    "IS_PERSONAL": 0,
    "CREATE_DATE": "2017-03-07 08:54:56.405104",
    "CHANGE_DATE": "2017-03-07 08:54:56.405104",
    "SOURCE": "ad"
}, {
    "CONTACT_ID": "4A211BA3897A7620E0530100007F388100000000",
    "IDENTITY_ID": "52BDB45E49090F4D986899E29FEB35CB",
    "IDENTITY_TYPE": "person",
    "IDENTITY_SOURCE": "ad",
    "CONTACT_TYPE": "auth",
    "VALUE": "ac716847@trafmon",
    "IS_PRIMARY": 1,
    "IS_PERSONAL": 0,
    "CREATE_DATE": "2017-03-07 08:54:56.404978",
    "CHANGE_DATE": "2017-03-07 08:54:56.404978",
    "SOURCE": "ad"
}, {
    "CONTACT_ID": "4A211BA3897B7620E0530100007F388100000000",
    "IDENTITY_ID": "52BDB45E49090F4D986899E29FEB35CB",
    "IDENTITY_TYPE": "person",
    "IDENTITY_SOURCE": "ad",
    "CONTACT_TYPE": "auth",
    "VALUE": "ac716847@trafmon.iw",
    "IS_PRIMARY": 0,
    "IS_PERSONAL": 0,
    "CREATE_DATE": "2017-03-07 08:54:56.405040",
```

```
            "CHANGE_DATE": "2017-03-07 08:54:56.405040",
            "SOURCE": "ad"
        }, {
            "CONTACT_ID": "4A211BA389787620E0530100007F388100000000",
            "IDENTITY_ID": "52BDB45E49090F4D986899E29FEB35CB",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "email",
            "VALUE": "leoni.huck@acme.com",
            "IS_PRIMARY": 1,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.404575",
            "CHANGE_DATE": "2017-03-07 08:54:56.404575",
            "SOURCE": "ad"
        }, {
            "CONTACT_ID": "4A211BA389797620E0530100007F388100000000",
            "IDENTITY_ID": "52BDB45E49090F4D986899E29FEB35CB",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "phone",
            "VALUE": "+49-9184-802313",
            "IS_PRIMARY": 1,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.404789",
            "CHANGE_DATE": "2017-03-07 08:54:56.404789",
            "SOURCE": "ad"
        }, {
            "CONTACT_ID": "4A211BA3897D7620E0530100007F388100000000",
            "IDENTITY_ID": "52BDB45E49090F4D986899E29FEB35CB",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "sid",
            "VALUE": "s-1-5-21-4236050433-3472386798-155597913-156709",
            "IS_PRIMARY": 1,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.405174",
            "CHANGE_DATE": "2017-03-07 08:54:56.405174",
            "SOURCE": "ad"
        }],
        "status": []
    }, {
        "PERSON_ID": "BE20920FFD837142AAC09C87A874CCD4",
        "WHENCHANGED": "20151229230304.0Z",
        "WHENCREATED": "20151229230304.0Z",
        "DISABLED": 0,
        "IS_EMPLOYEE": 1,
        "DISTINGUISHEDNAME": "CN=Adelgund Krebs,OU=Testou,DC=trafmon,DC=iw",
        "DISPLAY_NAME": "Adelgund Krebs",
        "GIVENNAME": "Adelgund",
        "SN": "Krebs",
        "OBJECTSID": "S-1-5-21-4236050433-3472386798-155597913-156708",
        "SAMACCOUNTNAME": "AC944381",
        "NETBIOSNAME": "TRAFMON",
```

```
"DNSROOT": "trafmon.iw",
"USERPRINCIPALNAME": "AC944381@acme.com",
"MAIL": "Adelgund.Krebs@acme.com",
"TELEPHONENUMBER": "+49-6392-145757",
"SERVER_ID": "65E2D37A643561E5E43C7E757BE121096253B4D6",
"CREATE_DATE": "2017-03-07 08:54:56.405238",
"CHANGE_DATE": "2017-03-10 08:40:35.741765",
"SOURCE": "ad",
"HAS_TM_THUMBNAILPHOTO": false,
"HAS_THUMBNAILPHOTO": false,
"TM_PHOTO": "da39a3ee5e6b4b0d3255bfef95601890afd80709",
"contacts": [{
    "CONTACT_ID": "4A211BA389827620E0530100007F388100000000",
    "IDENTITY_ID": "BE20920FFD837142AAC09C87A874CCD4",
    "IDENTITY_TYPE": "person",
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        "MAIL" : "Kilian.Adolph@acme.com",
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        "WHENCREATED": "20151229230305.0Z",
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        "USERPRINCIPALNAME": "AC673590@acme.com",
        "MAIL": "Lene.Escher@acme.com",
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        "CONTACT_TYPE": "auth",
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        "IDENTITY_SOURCE": "ad",
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        "WHENCREATED": "20151229230305.0Z",
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        "MAIL": "Annett.Schwanke@acme.com",
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        "IS_EMPLOYEE" : 1,
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        "GIVENNAME" : "Edgar",
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        "USERPRINCIPALNAME" : "AC938446@acme.com",
        "MAIL" : "Edgar.Genz@acme.com",
        "TELEPHONENUMBER" : "+49-7191-731883",
        "SERVER_ID" : "65E2D37A643561E5E43C7E757BE121096253B4D6",
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        "CONTACT_TYPE": "email",
        "VALUE": "edgar.genz@acme.com",
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        "DISABLED" : 0,
        "IS_EMPLOYEE" : 1,
        "DISTINGUISHEDNAME" :  "CN=Velten SchÃ¶ning,OU=Testou,DC=trafmon,DC=iw" ,
        "DISPLAY_NAME" :  "Velten SchÃ¶ning" ,
        "GIVENNAME" :  "Velten" ,
        "SN" :  "SchÃ¶ning" ,
        "OBJECTSID" :  "S-1-5-21-4236050433-3472386798-155597913-156713" ,
        "SAMACCOUNTNAME" :  "AC617874" ,
        "NETBIOSNAME" :  "TRAFMON" ,
        "DNSROOT" :  "trafmon.iw" ,
        "USERPRINCIPALNAME" :  "AC617874@acme.com" ,
        "MAIL" :  "Velten.SchÃ¶ning@acme.com" ,
        "TELEPHONENUMBER" :  "+49-9184-565860" ,
        "SERVER_ID" :  "65E2D37A643561E5E43C7E757BE121096253B4D6" ,
        "CREATE_DATE" :  "2017-03-07 08:54:56.410219" ,
        "CHANGE_DATE" :  "2017-03-10 08:40:35.742522" ,
        "SOURCE" :  "ad" ,
        "HAS_TM_THUMBNAILPHOTO" :  false ,
        "HAS_THUMBNAILPHOTO" :  false ,
        "TM_PHOTO" :  "da39a3ee5e6b4b0d3255bfef95601890afd80709" ,
        "contacts" : [{
            "CONTACT_ID" :  "4A211BA389A07620E0530100007F388100000000" ,
            "IDENTITY_ID" :  "DEF1CC1FA015CA428D5DE3CD5B804B69" ,
            "IDENTITY_TYPE" :  "person" ,
            "IDENTITY_SOURCE" :  "ad" ,
            "CONTACT_TYPE" :  "auth" ,
            "VALUE" :  "ac617874@acme.com" ,
            "IS_PRIMARY" : 0,
            "IS_PERSONAL" : 0,
            "CREATE_DATE" :  "2017-03-07 08:54:56.411056" ,
            "CHANGE_DATE" :  "2017-03-07 08:54:56.411056" ,
            "SOURCE" :  "ad"
        }, {
            "CONTACT_ID" :  "4A211BA3899E7620E0530100007F388100000000" ,
            "IDENTITY_ID" :  "DEF1CC1FA015CA428D5DE3CD5B804B69" ,
            "IDENTITY_TYPE" :  "person" ,
            "IDENTITY_SOURCE" :  "ad" ,
            "CONTACT_TYPE" :  "auth" ,
            "VALUE" :  "ac617874@trafmon" ,
            "IS_PRIMARY" : 1,
            "IS_PERSONAL" : 0,
            "CREATE_DATE" :  "2017-03-07 08:54:56.410937" ,
            "CHANGE_DATE" :  "2017-03-07 08:54:56.410937" ,
            "SOURCE" :  "ad"
        }, {
            "CONTACT_ID" :  "4A211BA3899F7620E0530100007F388100000000" ,
            "IDENTITY_ID" :  "DEF1CC1FA015CA428D5DE3CD5B804B69" ,
            "IDENTITY_TYPE" :  "person" ,
            "IDENTITY_SOURCE" :  "ad" ,
```

```
            "CONTACT_TYPE": "auth",
            "VALUE": "ac617874@trafmon.iw",
            "IS_PRIMARY": 0,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.411000",
            "CHANGE_DATE": "2017-03-07 08:54:56.411000",
            "SOURCE": "ad"
        }, {
            "CONTACT_ID": "4A211BA3899C7620E0530100007F388100000000",
            "IDENTITY_ID": "DEF1CC1FA015CA428D5DE3CD5B804B69",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "email",
            "VALUE": "velten.schÃ¶ning@acme.com",
            "IS_PRIMARY": 1,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.410541",
            "CHANGE_DATE": "2017-03-07 08:54:56.410541",
            "SOURCE": "ad"
        }, {
            "CONTACT_ID": "4A211BA3899D7620E0530100007F388100000000",
            "IDENTITY_ID": "DEF1CC1FA015CA428D5DE3CD5B804B69",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "phone",
            "VALUE": "+49-9184-565860",
            "IS_PRIMARY": 1,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.410750",
            "CHANGE_DATE": "2017-03-07 08:54:56.410750",
            "SOURCE": "ad"
        }, {
            "CONTACT_ID": "4A211BA389A17620E0530100007F388100000000",
            "IDENTITY_ID": "DEF1CC1FA015CA428D5DE3CD5B804B69",
            "IDENTITY_TYPE": "person",
            "IDENTITY_SOURCE": "ad",
            "CONTACT_TYPE": "sid",
            "VALUE": "s-1-5-21-4236050433-3472386798-155597913-156713",
            "IS_PRIMARY": 1,
            "IS_PERSONAL": 0,
            "CREATE_DATE": "2017-03-07 08:54:56.411129",
            "CHANGE_DATE": "2017-03-07 08:54:56.411129",
            "SOURCE": "ad"
        }],
        "status": []
    }],
    "meta": {
        "totalCount": 232525,
        "start": 0,
        "limit": 10
    }
}
```

Getting the list of person statuses

Description: The list of all possible person statuses

Method: `GET`

Resource: `person/status`

Parameters:

- `start` — a start position for returning items, the default value is 0
- `limit` — how many items to return (the default value is 100, cannot be more than 1000

Response: The list of statuses described with the following JSON Schema:

JSON schema for returning the list of statuses

```
{
    "$schema": "http://json-schema.org/draft-04/schema#"
                    ,
    "type": "object",
    "properties": {
        "data": {
            "description": "Array of statuses",
            "type": "array",
            "items": {
                "description": "Person status",
                "type": "object",
                "required": [
                    "IDENTITY_STATUS_ID",
                    "CREATE_DATE",
                    "CHANGE_DATE",
                    "ASSIGNMENT_DATE",
                    "DISPLAY_NAME",
                    "COLOR",
                    "EDITABLE"
                ],
                "properties": {
                    "IDENTITY_STATUS_ID": {
                        "description": "Status unique identifier",
                        "type": "string"
                    },
                    "CREATE_DATE": {
                        "description": "Status creation date",
                        "type": "string"
                    },
                    "CHANGE_DATE": {
                        "description": "Status modification date",
                        "type": "string"
                    },
                    "ASSIGNMENT_DATE": {
                        "description": "The date when the status was assigned to the
person",
                        "type": "string"
                    },
```

```
                    "DISPLAY_NAME": {
                        "description": "Status name",
                        "type": "string"
                    },
                    "COLOR": {
                        "description": "Status color (e.g. #ff0000)",
                        "type": "string"
                    },
                    "EDITABLE": {
                        "description": "Indicator that the status is not system",
                        "type": "integer"
                    }
                }
            }
        },
        "meta": {
            "description": "Additional data",
            "type": "object",
            "required": [
                "totalCount",
                "start",
                "limit"
            ],
            "properties": {
                "totalCount": {
                    "description": "Total number",
                    "type": "integer"
                },
                "start": {
                    "description": "A position from which returning started",
                    "type": "integer"
                },
                "limit": {
                    "description": "Total number of returned items",
                    "type": "integer"
                }
            }
        }
    }
}
```


Example:

Query

```
GET /xapi/person/status?start=0&limit=10
```

Getting the list of person contact types

Description: The list of all possible contact types

Method: `GET`

Resource: `person/contact_type`

Parameters:

- `start` — a start position for returning items, the default value is 0
- `limit` — how many items to return (the default value is 100, cannot be more than 1000

Response: The list of types described with the following JSON Schema:

JSON schema of returning the list of contacts

```
{
    "$schema": "http://json-schema.org/draft-04/schema#"
                    ,
    "type": "object",
    "properties": {
        "data": {
            "description": "Array of contact types",
            "type": "array",
            "items": {
                "description": "Contact type",
                "type": "object",
                "properties": {
                    "CONTACT_TYPE_ID": {
                        "description": "A unique identifier of the contact type",
                        "type": "string"
                    },
                    "DISPLAY_NAME": {
                        "description": "Contact type name",
                        "type": "string"
                    },
                    "LANGUAGE": {
                        "description": "Translation language",
                        "type": "string"
                    },
                    "MNEMO": {
                        "description": "Mnemonic identifier (is used in contact
entity)",
                        "type": "string"
                    }
                }
            }
        },
        "meta": {
            "description": "Additional data",
            "type": "object",
            "required": [
                "totalCount",
                "start",
                "limit"
            ],
            "properties": {
                "totalCount": {
                    "description": "Total number",
                    "type": "integer"
                },
```

```
                "start": {
                    "description": "A position where to start returning items",
                    "type": "integer"
                },
                "limit": {
                    "description": "Total number of returned items",
                    "type": "integer"
                }
            }
        }
    }
}
```

Example:

Query

```
GET /xapi/person/contact_type?start=0&limit=10
```

Getting statistics on persons

Description: Statistics on persons

Method: `GET`

Resource: `person/stat`

Parameters:

- `filter` — the filter list:
  - `change_date[from]` — since the date of the last change in UNIX-timestamp format (can be used separately from `change_date[to]`)
  - `change_date[to]` — up to the date of the last change in UNIX-timestamp format (can be used separately from `change_date[from]`)

Response:

JSON returning schema

```
{
    "$schema": "http://json-schema.org/draft-04/schema#"
                    ,
    "description": "Statistics",
    "type": "object",
    "properties": {
        "data": {
            "description": "Not used",
            "type": "array",
            "items": {}
        },
        "meta": {
            "description": "Statistics",
            "type": "object",
            "properties": {
                "CHANGE_DATE": {
                    "description": "Modification date",
```

```
                    "type": "object",
                    "properties": {
                        "from": {
                            "description": "The first modification date",
                            "type": "string"
                        },
                        "to": {
                            "description": "The last modification date",
                            "type": "string"
                        }
                    }
                },
                "totalCount": {
                    "description": "Total number of items",
                    "type": "integer"
                }
            }
        }
    }
}
```

Example:

```
GET /xapi/person/stat?filter[change_date][to]=1494951762&filter[change_date][from]=1494951000
```

Response

```
{
  "data": [],
  "meta": {
    "CHANGE_DATE": {
      "from": "2017-03-24 10:40:03",
      "to": "2017-05-24 12:10:22"
    },
    "totalCount": 539693
  }
}
```

Getting information on workstations

Getting the list of workstations

Description: The list of workstations

Method: `GET`

Resource: `workstation`

Параметры:

- `filter` — the filter list:
  - `change_date[from]` — since the date of the last change in UNIX-timestamp format (can be used separately from `change_date[to]`)

- `change_date[to]` — up to the date of the last change in UNIX-timestamp format (can be used separately from `change_date[from]`)
- `create_date[from]` — since the date of the last change in UNIX-timestamp format (can be used separately from `create_date[to]`)
- `create_date[to]` — up to the date of the last change in UNIX-timestamp format (can be used separately from `create_date[from]`
- is_deleted — flag 1 or 0. If the parameter is specified, then entities with the specified value will be returned
- `disabled` — flag 1 or 0, indicates activity. If the flag is set, then the entity is inactive (the flag is obtained from LDAP)

- `contact_type[]` — filtering by the contact type (several values can be passed, e.g., `/xapi/workstation?filter[contact_type][]=webaccount&filter[contact_type][]=icq`)
- `contact_value[]` — filtering by the contact value (several values can be passed, e.g., `/xapi/workstation?filter[contact_value][]=user@ad&filter[contact_value][]=login@example.com`)
- `group_id[]` — filtering by groups (several values can be passed, e.g., `/xapi/workstation?filter[group_id][]=FCE1409680E5D6469E1F7998266CE9E9&filter[group_id][]=918462B6DC2C954BAAF8706F7DC53F14)`

- `with[]` — the list of additional entities to be added to the object:
  - `contacts` — workstation contacts
  - `w2g` — workstation connections with groups
  - `status` — workstation statuses
- `sort` — parameter for sorting
  - `change_date` — sort by the modification date `asc` or `desc` (e.g., `/xapi/workstation?sort[change_date]=asc`) может замедлить выдачу
- `start` — a start position for returning items, the default value is 0
- `limit` — how many items to return (the default value is 100, cannot be more than 1000

Response: The list of workstations described with the following JSON Schema :

JSON returning schema

```
{
    "$schema": "http://json-schema.org/draft-04/schema#"
                    ,
    "type": "object",
    "required": [
        "data",
        "meta"
    ],
    "properties": {
        "data": {
            "description": "Array of workstations",
            "type": "array",
            "items": {
                "description": "Workstation",
                "type": "object",
                "required": [
                    "WORKSTATION_ID",
```

```
                    "CREATE_DATE",
                    "CHANGE_DATE",
                    "DISPLAY_NAME",
                    "DISTINGUISHEDNAME",
                    "DNSHOSTNAME",
                    "DISABLED",
                    "TYPE",
                    "IS_DELETED"
                ],
                "properties": {
                    "WORKSTATION_ID": {
                        "description": "Workstation unique identifier",
                        "type": "string"
                    },
                    "CREATE_DATE": {
                        "description": "Entry creation date",
                        "type": "string"
                    },
                    "CHANGE_DATE": {
                        "description": "Entry modification date",
                        "type": "string"
                    },
                    "DISPLAY_NAME": {
                        "description": "Workstation name",
                        "type": "string"
                    },
                    "DISTINGUISHEDNAME": {
                        "description": "Distinguished name",
                        "type": "string"
                    },
                    "DNSHOSTNAME": {
                        "description": "Full name",
                        "type": "string"
                    },
                    "DISABLED": {
                        "description": "Workstation state",
                        "type": "integer"
                    },
                    "TYPE": {
                        "description": "Type: computer – Workstation, mobile – Mobile
device, terminal – Terminal server",
                        "type": "string"
                    },
                    "IS_DELETED": {
                        "description": "If the workstation is deleted from TM",
                        "type": "integer"
                    },
                    "contacts": {
                        "description": "Array of contacts",
                        "type": "array",
                        "items": {
                            "description": "Contact",
                            "type": "object",
```

```
                "required": [
                    "CONTACT_ID",
                    "CREATE_DATE",
                    "CHANGE_DATE",
                    "CONTACT_TYPE",
                    "VALUE",
                    "IS_PERSONAL",
                    "IS_PRIMARY",
                    "SOURCE"
                ],
                "properties": {
                    "CONTACT_ID": {
                        "description": "Object unique identifier",
                        "type": "string"
                    },
                    "CREATE_DATE": {
                        "description": "Creation date",
                        "type": "string"
                    },
                    "CHANGE_DATE": {
                        "description": "Modification date",
                        "type": "string"
                    },
                    "CONTACT_TYPE": {
                        "description": "Type",
                        "type": "string"
                    },
                    "VALUE": {
                        "description": "Value",
                        "type": "string"
                    },
                    "IS_PERSONAL": {
                        "description": "Belongs to (Work, Personal)",
                        "type": "integer"
                    },
                    "IS_PRIMARY": {
                        "description": "Is primary",
                        "type": "integer"
                    },
                    "SOURCE": {
                        "description": "Type",
                        "type": "string"
                    }
                }
            }
        },
        "w2g": {
            "description": "Array of connections with groups",
            "type": "array",
            "items": {
                "description": "Connection with group",
                "type": "object",
                "required": [
```

```
                                "WORKSTATION_ID",
                                "PARENT_GROUP_ID",
                                "RELATION_TYPE"
                            ],
                            "properties": {
                                "WORKSTATION_ID": {
                                    "description": "Workstation unique identifier",
                                    "type": "string"
                                },
                                "PARENT_GROUP_ID": {
                                    "description": "Group unique identifier",
                                    "type": "string"
                                },
                                "RELATION_TYPE": {
                                    "description": "Connection type: 0 - tm, 1 -
member, 2 - distinguishedname, 3 - primarygroupsid",
                                    "type": "integer"
                                }
                            }
                        }
                    },
                    "status": {
                        "description": "Array of statuses",
                        "type": "array",
                        "items": {
                            "description": "Person status",
                            "type": "object",
                            "required": [
                                "IDENTITY_STATUS_ID",
                                "CREATE_DATE",
                                "CHANGE_DATE",
                                "ASSIGNMENT_DATE",
                                "DISPLAY_NAME",
                                "COLOR",
                                "EDITABLE"
                            ],
                            "properties": {
                                "IDENTITY_STATUS_ID": {
                                    "description": "Status unique identifier",
                                    "type": "string"
                                },
                                "CREATE_DATE": {
                                    "description": "Status creation date",
                                    "type": "string"
                                },
                                "CHANGE_DATE": {
                                    "description": "Status modification date",
                                    "type": "string"
                                },
                                "ASSIGNMENT_DATE": {
                                    "description": "The date when the status was
assigned to the person",
                                    "type": "string"
```

```
                                },
                                "DISPLAY_NAME": {
                                    "description": "Status name",
                                    "type": "string"
                                },
                                "COLOR": {
                                    "description": "Status color (e.g. #ff0000)",
                                    "type": "string"
                                },
                                "EDITABLE": {
                                    "description": "Indicator that the status is not
system",
                                    "type": "integer"
                                }
                            }
                        }
                    }
                }
            }
        },
        "meta": {
            "description": "Additional data",
            "type": "object",
            "required": [
                "totalCount",
                "start",
                "limit"
            ],
            "properties": {
                "totalCount": {
                    "type": "integer",
                    "description": "Total number"
                },
                "start": {
                    "type": "integer",
                    "description": "A position from which returning started"
                },
                "limit": {
                    "type": "integer",
                    "description": "Total number of returned items"
                }
            }
        }
    }
}
```

Example:

Query

```
/xapi/workstation?filter[change_date][from]=1&filter[change_date][to]=2&with
[]=contacts&with[]=w2g&limit=10&sort[change_date]=asc
```

Getting the list of workstation statuses

Description: The list of all possible workstation statuses

Method: `GET`

Resource: `workstation/status`

- `start` — a start position for returning items, the default value is 0
- `limit` — how many items to return (the default value is 100, cannot be more than 1000

Example:

Query

```
GET /xapi/workstation/status?start=0&limit=10
```

Getting the list of workstation contact types

Description: The list of all possible types of workstation contacts

Method: `GET`

Resource: `workstation/contact_type`

- `start` — a start position for returning items, the default value is 0
- `limit` — how many items to return (the default value is 100, cannot be more than 1000

Example:

Query

```
GET /xapi/workstation/contact_type?start=0&limit=10
```

Getting statistics on workstations

Description: Statistics on workstations

Method: `GET`

Resource: workstation `/stat`

Parameters:

- `filter` — the filter list:
  - `change_date[from]` — since the date of the last change in UNIX-timestamp format (can be used separately from `change_date[to]`)
  - `change_date[to]` — up to the date of the last change in UNIX-timestamp format (can be used separately from `change_date[from]`)

Response:

JSON returning schema

```
{
    "$schema": "http://json-schema.org/draft-04/schema#"
                    ,
    "description": "Statistics",
    "type": "object",
    "properties": {
```

```
        "data": {
            "description": "Not used",
            "type": "array",
            "items": {}
        },
        "meta": {
            "description": "Statistics",
            "type": "object",
            "properties": {
                "CHANGE_DATE": {
                    "description": "Modification date",
                    "type": "object",
                    "properties": {
                        "from": {
                            "description": "The first modification date",
                            "type": "string"
                        },
                        "to": {
                            "description": "The last modification date",
                            "type": "string"
                        }
                    }
                },
                "totalCount": {
                    "description": "Total number of items",
                    "type": "integer"
                }
            }
        }
    }
}
```

Example:

```
GET /xapi/workstation/stat?filter[CAPTURE_DATE][to]=1494951762&filter[CAPTURE_DATE]
[from]=1494951000
```

Response

```
{
  "data": [],
  "meta": {
    "CHANGE_DATE": {
      "from": "2017-03-24 10:40:03",
      "to": "2017-05-24 12:10:22"
    },
    "totalCount": 539693
  }
}
```

Getting events

Getting text extracted from multiple events

Method: `POST`

Resource: `event/texts`

Parameters (passed in the form of JSON):

- `response_type` — the response type:
  - `chunked` — `Transfer-Encoding: chunked` is used, where each text is passed in its own block and in the order which is specified in the request body; if there is no text, then null character "\0" is passed instead.
  - `multipart/mixed` — `multipart/mixed` rfc tech-ms format is used. This format is not part of the HTTP standard, however, it is used in emails, so it can be easily implemented. Besides, it is very similar to `multipart/form-data`. Each text is passed in its block and is separately marked with X-Event-ID title indicating the event the text belongs to. If there is no text, then it is either not passed or the text body is missing.
- `event` — an array of objects with the following fields:
  - `id` — event ID
  - `tbsId` — tablespace with the event

Examples:

`chunked`:

Query

```
POST /xapi/event/texts
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
(empty line)
{"response_type": "chunked", "events": [{"id": 2, "tbsId": 4}, {"id": 4, "tbsId": 4}]}
```

Response

```
HTTP/1.1 200 OK
Content-Type: text/plain
Transfer-Encoding: chunked
(empty line)
1
\0 (no-text character for event 2)
48AC
(text content for event 4)
0
```

`multipart/mixed`:

Query

```
POST /xapi/event/texts
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
(empty line)
{"response_type": "multipart/mixed", "events": [{"id": 2, "tbsId": 4}, {"id": 4, "tbsId": 4}]}
```

Response

```
HTTP/1.1 200 OK
Content-Type: multipart/mixed; boundary=Asrf456BGe4h
Content-Length: (total volume including titles, can be missing!)
(empty line)
(missing preamble)
--Asrf456BGe4h
Content-Type: application/x-empty
Content-Disposition: attachment; filename="text-2.txt"
X-Event-ID: 2
(empty line and zero content then)
--Asrf456BGe4h
Content-Disposition: attachment; filename="text-4.txt"
Content-Type: text/plain
X-Event-ID: 4
(empty line)
(event content for event 4)
--Asrf456BGe4h--
(missing epilogue - empty line)
```

Getting extracted text of event

Method: `POST`

Resource: `event/texts`

Parameters (transferred as JSON):

- `response_type` — type of response:
- `chunked` — using `Transfer-Encoding: chunked`, where each text is left within its block and order, transferred within the query body. In case there is no text, null, symbol "\0" is trasferred instead of the text
- `multipart/mixed` — `multipart/mixed` rfc tech-ms format is used, it is not a HTTP format, but it is used in e-mails. That's why this can be realised. It is also similar to `multipart/form-data`. Each text is left within its block and is specified by X-Event-ID title in accordance with event it belongs to. In case there is no text, it cannot be transferred or the text body is absent
- `events` — objects massive with fields:
- `id` — event ID
- `tbsId` — event tablespace

Examples:

`chunked`:

Query

```
 POST /xapi/event/texts
X-API-Version: 1.1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
(empty string)
{"response_type": "chunked", "events": [{"id": 2, "tbsId": 4}, {"id": 4, "tbsId": 4}]}
```

Response

```
HTTP/1.1 200 OK
Content-Type: text/plain
Transfer-Encoding: chunked
(empty string)
1
\0 (text absence symbol for event 2)
48AC
(text content for event 4)
0
```

`multipart/mixed` :

Query

```
POST /xapi/event/texts
X-API-Version: 1.1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
(empty string)
{"response_type": "multipart/mixed", "events": [{"id": 2, "tbsId": 4}, {"id": 4, "tbsId": 4}]}
```

Response

```
HTTP/1.1 200 OK
Content-Type: multipart/mixed; boundary=Asrf456BGe4h
Content-Length: (summary amount, including child titles can be absent!)
(empty string)
(absent preamble)
--Asrf456BGe4h
Content-Type: application/x-empty
Content-Disposition: attachment; filename="text-2.txt"
X-Event-ID: 2
(empty string and null content after)
--Asrf456BGe4h
Content-Disposition: attachment; filename="text-4.txt"
Content-Type: text/plain
X-Event-ID: 4
(empty string)
(text content for event 4)
--Asrf456BGe4h--
(absent epilogue - empty string)
```

Getting event metadata

Method: `GET`

Resource: `event/{id}`

`Parameters:`

- `{id}` - `OBJECT_ID` of event
- `with[]` - list of additional entities, to be added to the object (for example, senders, recipients, etc.).

Response: Event

Example:

Get event OBJECT_ID "1" with senders and recipients:

```
GET /xapi/event/1?with[]=senders&with[]=recipients
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: aplab
X-API-Auth-Token: gla20dos1pcdbr69caxz
```

Getting multiple event contents

Method: `POST`

Resource: `event/raws`

Parameters (passed in the form of JSON):

- `response_type` — the response type:
  - `chunked` — `Transfer-Encoding: chunked` is used, where each content is passed in its own block and in the order which is specified in the request body; if there is no content, then null character "\0" is passed instead
  - `multipart/mixed` — `multipart/mixed` rfc tech-ms format is used. This format is not part of the HTTP standard, however, it is used in emails, so it can be easily implemented. Besides, it is very similar to `multipart/form-data`. Each content is passed in its block and is separately marked with X-Event-ID and X-Content-ID titles which indicate the event and the content the block belongs to.f there is no content, then it is either not passed or the text body is missing.
- `event` — an array of objects with the following fields:
  - `id` — event ID;
  - `tbsId` — tablespace with the event;
  - `contentId` — content ID. If not specified, the main node is passed.

Examples:

`chunked` :

Query

```
POST /xapi/event/raws
X-API-Version: 1
X-API-CompanyId: iw
```

```
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
(empty line)
{"response_type": "chunked", "events": [{"id": 2, "tbsId": 4}, {"id": 3, "tbsId": 4}, {"id": 4, "tbsId": 4,
"contentId": 8}]}
```

Response

```
HTTP/1.1 200 OK
Content-Type: text/plain
Transfer-Encoding: chunked
(empty line)
1
\0 (no-content character for event 2)
3E4
(root content data for event 3)
48AC
(data of content 8 for event 4)
0
```

`multipart/mixed` :

Query

```
POST /xapi/event/raws
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
(empty line)
{"response_type": "multipart/mixed", "events": [{"id": 2, "tbsId": 4}, {"id": 3, "tbsId": 4}, {"id": 4,
"tbsId": 4, "contentId": 8}]}
```

Response

```
HTTP/1.1 200 OK
Content-Type: multipart/mixed; boundary=Asrf456BGe4h
Content-Length: (total volume including titles, can be missing!)
(empty line)
(missing preamble)
--Asrf456BGe4h
Content-Type: application/x-empty
Content-Disposition: attachment; filename="content-2"
X-Event-ID: 2
(empty line and then zero content)
--Asrf456BGe4h
Content-Disposition: attachment; filename="content-3-5.eml"
Content-Type: email
X-Event-ID: 3
X-Content-ID: 5
(empty line)
(root content data for event 3)
--Asrf456BGe4h
Content-Disposition: attachment; filename="my-project.jpg"
Content-Type: image/jpeg
```

```
X-Event-ID: 4
X-Content-ID: 8
(empty line)
(data of content 8 for event 4)
--Asrf456BGe4h--

(missing epilogue - empty line)
```

Getting info on events contents

Method: `POST`

Resource: `event/contents`

Parameters (to be sent via JSON):

- `response_type` — types of response are as follows:
  - `chunked` — `Transfer-Encoding: chunked` is used, where each content is given in its block and in the order according to query body, in case content is absent, null - "\0" character is given instead of content
  - `multipart/mixed` — `multipart/mixed` rfc tech-ms format is used, its not a part of HTTP standard but it is used in e-mails. Thus this can be easily realized. It also looks like `multipart/form-data` . Each content is givent in its block and marked with X-Event-ID and X-Content-ID headers, to show which event and content it belongs to. In case content is absent, this will not be given or there is no text body
- `events` — events massive with fields as follows:
  - `id` — one or few events ID, used to get contents;
  - `tbsId` — tablespaces ID for each event;
- `filter[mime]` — content types where few values (exact match or mask) or all of them can be set
- `start` - starting from which position the contents are to be given, by default is 0
- `limit` - the number of contents to be given. By default is 100, cannot exceed 1000 in one query.

Example:

Query

```
curl -X POST "https://qa-2e55.infowatch.ru/xapi/event/contents?filter[mime][]=image%2Fjpeg&filter[mime]
[]=text%2F%2A&start=1&limit=10" -H "accept: application/json" -H "Content-Type: application/json" -H "X-
Enable-OpenAPI: 1" -d "{\"events\":[{\"id\":2,\"tbsId\":4}]}"
```

By request there will be given content IDs which are in accordance with query conditions and containing the following attributes:

Response

```
{
  "data": [
    {
      "OBJECT_CONTENT_ID": 15,
      "MIME": "string",
      "OBJECT_ID": 2,
      "TBS_ID": 4,
      "CONTENT_SIZE": 1500,
      "is_filename": 0           // indicates the content is a part or not a part of filename
```

```
    }
  ],
  "meta": {
    "totalCount": 1,
    "start": 1,
    "limit": 10
  }
}
```

Getting intercepted file of event

Method: `GET`

Resource: `event/{id}/raw?download=0`

Parameters:

- `{id}` - OBJECT_ID of event, mandatory
- `download` - adding HTTP-heading to download a file (`Content-Disposition` , `Content-Transfer-Encoding` and others), mandatory, the value is 1 or 0 (default value is 0)

Supporting HTTP-heading `Range`

Response: File of intercepted event.For example, eml (for emails) or the file itself for copying file event.

Getting the list of protected objects

Description: The list of protected objects sorted by name.

Method: `GET`

Resource: `event/protectedDocument`

Parameters:

- `start` - a position from which to start returning protected objects, the default value is 0
- `limit` - the number of protected objects to be returned; the default value is 100; cannot be more than 1000
- `with[]` — the list of additional entities to be added to the protected object:
    - `pd2pc` — a link of the protected object with the catalog of protected objects

Response: The list of protected objects described with the following JSON Schema:

JSON schema of returning the list of protected objects:

```
{
    "$schema": "http://json-schema.org/draft-04/schema#"
                    ,
    "type": "object",
    "properties": {
        "data": {
            "type": "array",
            "description": "Array of protected objects",
            "items": {
                "type": "object",
                "description": "Protected object",
                "properties": {
                    "DOCUMENT_ID": {
                        "type": "string",
```

```
                        "description": "Identifier"
                    },
                    "DISPLAY_NAME": {
                        "type": "string",
                        "description": "Name"
                    },
                    "CREATE_DATE": {
                        "type": "string",
                        "description": "Creation date"
                    },
                    "IS_DELETED": {
                        "type": "integer",
                        "description": "Whether it is removed from the active
configuration",
                        "enum": [
                            0,
                            1
                        ]
                    },
                    "pd2pc": {
                        "description": "Array of links to catalogs of protected
objects",
                        "type": "array",
                        "items": {
                            "description": "Link to the catalog of protected objects",
                            "type": "object",
                            "required": [
                                "CATALOG_ID",
                                "DOCUMENT_ID"
                            ],
                            "properties": {
                                "CATALOG_ID": {
                                    "description": "A unique identifier of the
catalog of protected objects",
                                    "type": "string"
                                },
                                "DOCUMENT_ID": {
                                    "description": "A unique identifier of the
protected object",
                                    "type": "string"
                                }
                            }
                        }
                    }
                },
                "required": [
                    "DOCUMENT_ID",
                    "DISPLAY_NAME",
                    "CREATE_DATE",
                    "IS_DELETED"
                ]
            }
        },
```

```
        "meta": {
            "description": "Additional data",
            "type": "object",
            "properties": {
                "totalCount": {
                    "type": "integer",
                    "description": "The total number of protected objects"
                },
                "start": {
                    "type": "integer",
                    "description": "The position from which returning has started"
                },
                "limit": {
                    "type": "integer",
                    "description": "The number of returned objects"
                }
            },
            "required": [
                "totalCount",
                "start",
                "limit"
            ]
        }
    },
    "required": [
        "data",
        "meta"
    ]
}
```

Example:

Query

```
GET /xapi/event/protectedDocument?start=0&limit=10
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
```

Response

```
{
    "data": [{
        "DOCUMENT_ID": "C78E821A67C7F34A1B1D63A4151CEF6300000000",
        "DISPLAY_NAME": "Security labels",
        "CREATE_DATE": "2016-05-12 10:24:41.342554",
        "IS_DELETED": 0
    }],
    "meta": {
        "totalCount": 1,
        "start": 0,
        "limit": 10
```

```
    }
}
```

Getting the list of titles

Description: Getting the list of additional fields of the event.

Method: `GET`

Resource: `event/header`

Parameters:

- `start` - the start position for returning titles; the default value is 0
- `limit` - the number of titles to be returned; the default value is 100; cannot be more than 1000

Response: The list of additional fields described with the following **JSON return schema:**

```
{
    "$id": "http://infowatch.com/iwtm/xapi/event/header.json",
    "type": "object",
    "$schema": "http://json-schema.org/draft-07/schema#",
    "properties": {
        "data": {
            "type": "array",
            "items": {
                "type": "object",
                "properties": {
                    "NAME": {
                        "type": "string",
                        "title": "Attribute code that will be used in the
event titles and for identification in xAPI/PushAPI",
                        "examples": [
                            "mac_level"
                        ]
                    },
                    "NOTE": {
                        "type": "string",
                        "title": "Attribute name which is displayed in TM
Console",
                        "examples": [
                            "Mandatory access level"
                        ]
                    },
                    "TYPE": {
```

```
                        "type": "string",
                        "title": "One of the following values: number
(integer, fractional, string), date and time in UTC format + specifying time
zone offset, duration, hyperlink",
                        "enum": [
                            "integer",
                            "float",
                            "string",
                            "date",
                            "UTC",
                            "duration",
                            "link"
                        ]
                    },
                    "IS_DELETED": {
                        "type": "integer",
                        "title": "Whether the title is removed from the
System (for obsolete objects, it remains)",
                        "default": 0,
                        "enum": [
                            0,
                            1
                        ]
                    },
                    "FORMAT": {
                        "type": "string",
                        "title": "Value type (only for version 1.2)",
                        "enum": [
                            "string",
                            "date",
                            "number"
                        ]
                    },
                    "IS_SYSTEM": {
                        "type": "integer",
                        "title": "Whether the title is system (only for
version 1.1)",
                        "default": 1,
```

```
                        "enum": [
                            0,
                            1
                        ]
                    },
                    "IS_MULTIPLE_VALUE": {
                        "type": "integer",
                        "title": "Can the title contain several values (for
verrion 1.1)",
                        "default": 0,
                        "enum": [
                            0,
                            1
                        ]
                    },
                    "locale": {
                        "type": "array",
                        "title": "Titles localization (for version 1.2)",
                        "items": {
                            "type": "object",
                            "title": "Title localization",
                            "properties": {
                                "NAME": {
                                    "type": "string",
                                    "title": "Attribute code that will be
used in the event titles and for identification in xAPI/PushAPI"
                                },
                                "LANGUAGE": {
                                    "type": "string",
                                    "title": "Language name",
                                    "enum": [
                                        "rus",
                                        "eng"
                                    ]
                                },
                                "DISPLAY_NAME": {
                                    "type": "string",
```

```
                                    "title": "Attribute name which is
displayed in TM Console"
                                }
                            }
                        }
                    }
                }
            }
        },
        "meta": {
            "description": "Additional data",
            "type": "object",
            "properties": {
                "totalCount": {
                    "type": "integer",
                    "description": "Total number of protected objects"
                },
                "start": {
                    "type": "integer",
                    "description": "From which position has it started to
return"
                },
                "limit": {
                    "type": "integer",
                    "description": "Total number of returned"
                }
            },
            "required": [
                "totalCount",
                "start",
                "limit"
            ]
        }
    },
    "required": [
        "data",
        "meta"
```

```
    ]
}
```

Example:

Query

```
GET /xapi/event/header
X-API-Version: 1.1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
```

Response


```
{
    "data": [
        {
            "NAME": "device_type",
            "NOTE": "Device type",
            "TYPE": "enum",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "destination_type",
            "NOTE": "Type of the scanning source",
            "TYPE": "enum",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "destination_url",
            "NOTE": "URL",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
```

```
        {
            "NAME": "print_server",
            "NOTE": "Print server name",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "location",
            "NOTE": "Printer location",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "comment",
            "NOTE": "Comment to the printer",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "port_name",
            "NOTE": "Name of the printer port",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "copies",
            "NOTE": "The number of copies",
            "TYPE": "number",
            "IS_DELETED": 0,
```

```
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "task_name",
            "NOTE": "Task name",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "print_task_name",
            "NOTE": "Print task name",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "task_run_date",
            "NOTE": "Task start date",
            "TYPE": "date",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "create_date",
            "NOTE": "File creation date",
            "TYPE": "date",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "modify_date",
```

```
            "NOTE": "File modification date",
            "TYPE": "date",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "source_ip",
            "NOTE": "IP address of the source",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "workstation_type",
            "NOTE": "Workstation type",
            "TYPE": "enum",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "application_path_from",
            "NOTE": "Path to the application from which the event has been
copied",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "application_path_to",
            "NOTE": "Path to the application, to which the event has been
copied",
            "TYPE": "string",
            "IS_DELETED": 0,
```

```
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "terminal_session",
            "NOTE": "Terminal session indicator",
            "TYPE": "number",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "emitter",
            "NOTE": "Event source",
            "TYPE": "enum",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        },
        {
            "NAME": "charset",
            "NOTE": "Encoding of the attachment text",
            "TYPE": "string",
            "IS_DELETED": 0,
            "IS_SYSTEM": 1,
            "IS_MULTIPLE_VALUE": 0
        }
    ],
    "meta": {
        "totalCount": 20,
        "start": 0,
        "limit": 100
    }
}
```


Getting list of security objects catalogues

Description: List of security objects catalogues, sorted out by name.

Method: `GET`

Resource: `event/protectedCatalog`

Parameters:

- `start` - from what position the catalogue should be started to be given (default value is 0)
- `limit` - how many catalogues are to be given (default value is 100, but it can't be more than 1000)

Response: List of security objects catalogues, described in the JSON-Schema below:

JSON scheme of catalogues list output

```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
    "type": "object",
    "properties": {
        "data": {
            "type": "array",
            "description": "Массив каталогов ОЗ",
            "items": {
                "type": "object",
                "description": "Каталог ОЗ",
                "properties": {
                    "CATALOG_ID": {
                        "type": "string",
                        "description": "Идентификатор"
                    },
                    "DISPLAY_NAME": {
                        "type": "string",
                        "description": "Имя"
                    },
                    "CREATE_DATE": {
                        "type": "string",
                        "description": "Дата создания"
                    },
                    "IS_DELETED": {
                        "type": "integer",
                        "description": "Удален ли из активной конфигурации",
                        "enum": [
                            0,
                            1
                        ]
                    }
                },
                "required": [
                    "CATALOG_ID",
                    "DISPLAY_NAME",
                    "CREATE_DATE",
                    "IS_DELETED"
                ]
            }
        },
        "meta": {
            "description": "Дополнительные данные",
            "type": "object",
            "properties": {
                "totalCount": {
```

```
                    "type": "integer",
                    "description": "Общее количество ОЗ"
                },
                "start": {
                    "type": "integer",
                    "description": "С какой позиции началось отдаваться"
                },
                "limit": {
                    "type": "integer",
                    "description": "Сколько всего отдалось"
                }
            },
            "required": [
                "totalCount",
                "start",
                "limit"
            ]
        }
    },
    "required": [
        "data",
        "meta"
    ]
}
```

Example:

Request

```
GET /xapi/event/protectedCatalog?start=0&limit=10
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: aplab
X-API-Auth-Token: gla20dos1pcdbr69caxz
```

Response

```
{
    "data": [{
        "CATALOG_ID": "3D0F8CDAF9E74F82AC85EB32D12727A700000000",
        "DISPLAY_NAME": "Грифованная информация",
        "CREATE_DATE": "2016-05-12 10:24:41.342554",
        "IS_DELETED": 0
    }],
    "meta": {
        "totalCount": 1,
        "start": 0,
        "limit": 10
    }
}
```

Getting the list of policies

escription: The list of policies sorted by name.

Method: `GET`

Resource: `event/policy`

Parameters:

- `start` — a position from which to start returning policies, the default value is 0
- `limit` — the number of policies to be returned; the default value is 100; cannot be more than 1000

Response: The list of policies described with the following JSON Schema:

JSON schema of returing the list of policies:

```
{
    "$schema": "http://json-schema.org/draft-04/schema#"
                    ,
    "type": "object",
    "properties": {
        "data": {
            "type": "array",
            "description": "Array of policies",
            "items": {
                "type": "object",
                "description": "Policy",
                "properties": {
                    "POLICY_ID": {
                        "type": "string",
                        "description": "Identifier"
                    },
                    "DISPLAY_NAME": {
                        "type": "string",
                        "description": "Name"
                    },
                    "CREATE_DATE": {
                        "type": "string",
                        "description": "Creation date"
                    },
                    "IS_DELETED": {
                        "type": "integer",
                        "description": "Whether it is removed from the active
configuration",
                        "enum": [
                            0,
                            1
                        ]
                    }
                },
                "required": [
                    "POLICY_ID",
                    "DISPLAY_NAME",
                    "CREATE_DATE",
                    "IS_DELETED"
                ]
            }
```

```
        },
        "meta": {
            "description": "Additional data",
            "type": "object",
            "properties": {
                "totalCount": {
                    "type": "integer",
                    "description": "Total number of policies"
                },
                "start": {
                    "type": "integer",
                    "description": "A position where to start returning policies"
                },
                "limit": {
                    "type": "integer",
                    "description": "Total number of returned policies"
                }
            },
            "required": [
                "totalCount",
                "start",
                "limit"
            ]
        }
    },
    "required": [
        "data",
        "meta"
    ]
}
```

Example:

Query

```
GET /xapi/event/policy?start=0&limit=10
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
```

Response

```
{
    "data": [{
        "POLICY_ID": "3D0F8CDAF9E74F82AC85EB32D12727A700000000",
        "DISPLAY_NAME": "Security labels",
        "CREATE_DATE": "2016-05-12 10:24:41.342554",
        "IS_DELETED": 0
    }],
    "meta": {
        "totalCount": 1,
        "start": 0,
```

```
        "limit": 10
    }
}
```

Getting the List of Events

Description: The list of events sorted out by the time of interception (from new to old ones).

Method: `GET`

Resource: `event`

Parameters:

- `filter` - the filter list:
  - `date[from]` — start date in UNIX-timestamp format (can be used separately from `date[to]`)
  - `date[to]` — end date in UNIX-timestamp format (can be used separately from `date[from]`)
  - `insert_date[>]` — start insert date in UNIX-timestamp format separated by microtime dot, for example, `filter[insert_date][>]=1234.123312`
  - `insert_date[<] –` end insert date in UNIX-timestamp separated by microtime dot, for example, `filter[insert_date][<]=1234.123312`
  - `insert_date[>=]` — start insert date in UNIX-timestamp format separated by microtime dot, for example `filter[insert_date][>=]=1234.123312` (incl.) (API 1.1 and later versions)
  - `insert_date[<=]` — end insert date in UNIX-timestamp separated by microtime dot, for example `filter[insert_date][<=]=1234.123312` (incl.) (API 1.1 and later versions)
  - `rule_group_type[]` — rule group (API 1.1 and later versions)
  - `violation_level[]` — violation level (API 1.1 and later versions)
  - `verdict[]` — verdict (API 1.1 and later versions)
  - `object_type_code[]` — type of event (can be several values)
  - `protocol[]` — protocol (can be several values)
  - `user_decision[]` — user decision (can be several values)
  - `object_size[from]` — the minimum number of bytes for event search (can be used separately from `object_size [to]`)
  - `object_size[to]` — the maximum number of bytes for event search (can be used separately from `object_size [from]`)
  - `protected_catalog_id[]` — an ID of the catalog with protected objects (can be several values)
  - `tag_id[]` — tag ID (can be several values)
- `with[]` - the list of additional entities to be added to the object (for example, senders, recipients, etc.):
  - `protected_catalogs`
  - `protected_documents`
  - `policies`
  - `senders_keys`
  - `senders`
  - `recipients_keys`
  - `recipients`
  - `workstations_keys`
  - `workstations`
  - `tags`

        - `perimeters` (API 1.1 and later versions)
        - `attachments` (API 1.1 and later versions)
        - `files` (API 1.1 and later versions) — an undocumented parameter which returns all contents with unempty FILE_NAME field
        - `contents_renderer` (API 1.8 and later versions) - attach renderer contents with different type contents
    - `without[]` — additional flags
        - `count` — omit calculating `totalCount` (calculating `totalCount` may take more than halftime of the query, so we recommend using `event/stat` method instead)
    - `headers[]` — the list of additional fields (titles) of the event (for all fields, you * character). You can get the list with `event/header` method (API 1.1 and later versions)
    - `sort[]` — an undocumented field for sorting the result (significantly slows down getting events; for getting the first/last event, we recommend using `event/stat` method. Possible keys:
        - `capture_date` — `asc` (API 1.1 and later vesions) `/desc`, for example, `?sort[capture_date]=desc`
        - `insert_date` — `asc/desc`, for example, `?sort[insert_date]=asc` (API 1.1 and later versions)
- `start` - a start position for returning events (the default value is 0)
- `limit` - how many events to return (the default value is 100, cannot be more than 1000)

Steps to take when receiving events for the first time:

1. Define the date starting from which it is required to receive events. For example, to receive an interval INSERT_DATE from the events statistics (GET /xapi/event/stat).
2. Divide the interval by the smalest value: number of streams (not higher than 32) **or** number of cores on server.
3. In each stream, create and run the first request to receive a list of event which will look as follows:
   GET /xapi/event?without[]=count&filter[insert_date][>=]={interval_minimum}
   &filter[insert_date][<=]={interval_maximum}&sort[insert_date]=asc&limit=1000
4. Remember all OBJECT_ID in the received list.
5. In the received list, find the last INSERT_DATE and use it as `interval_minimum` in the request described at step 3.
6. Exclude the events which were remembered in the last iteration, from the new list.
7. If no `interval_maximum`, start again from step 4.
8. Save to persistent storage:
    a. INSERT_DATE maximum value, received at step 1.
    b. OBJECT_ID list from the interval, which includes INSERT_DATE maximum value.

Examples:

Get the first 100 events of January 2015

```
GET /xapi/event?filter[date][from]=1420059600&filter[date][to]=1422737999&start=0&limit=100
X-API-Version: 1
```

```
X-API-CompanyId: iw
X-API-ImporterName: aplab
X-API-Auth-Token: gla20dos1pcdbr69caxz
```

Get 1000 events with emails that contain content

```
GET /xapi/event?with=contents_renderer&limit=1000
X-API-Version: 1.8
X-API-CompanyId: IW
X-API-productName: Vision
X-API-Auth-Token: 1eja07v23vs9k1s5ij5k
```

The response contains the list of events sorted out by the time of interception (from new to old ones). For different event types, the response structure will be different.

Sample response

```
[
 OBJECT_ID: 1
 VIOLATION_LEVEL: 'High'
 CAPTURE_DATE: '12-03-2022 15:02:25'
 contents_renderer:
 [
    SUBJECT: [
       CONTENT_ID: 1
       OBJECT_ID: 1
       CONTENT_SIZE: 26
   ]
   BODY: [
      CONTENT_ID: 2
      OBJECT_ID: 1
      CONTENT_SIZE:5125
   ]
 ]
]
```

Getting tags list

Description: Tags list, sorted out by name.

Method: `GET`

Resource: `event/tag`

Parameters:

- `start` - from what position the catalogue should be started to be given (default value is 0)
- `limit` - how many catalogues are to be given (default value is 100, but it can't be more than 1000)

Response: List of tags, described in the JSON-Schema below:

JSON scheme of tags list output

```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
```

```
"type": "object",
"properties": {
    "data": {
        "type": "array",
        "description": "Массив тегов",
        "items": {
            "type": "object",
            "description": "Тег",
            "properties": {
                "TAG_ID": {
                    "type": "string",
                    "description": "Идентификатор"
                },
                "DISPLAY_NAME": {
                    "type": "string",
                    "description": "Имя"
                },
                "COLOR": {
                    "type": "string",
                    "description": "Цвет тега в HEX RGP, например #ffffff"
                },
                "CREATE_DATE": {
                    "type": "string",
                    "description": "Дата создания"
                },
                "IS_DELETED": {
                    "type": "integer",
                    "description": "Удален ли из активной конфигурации"
                },
                "IS_SYSTEM": {
                    "type": "integer",
                    "description": "Является ли тег системным"
                }
            },
            "required": [
                "TAG_ID",
                "DISPLAY_NAME",
                "COLOR",
                "CREATE_DATE",
                "IS_DELETED",
                "IS_SYSTEM"
            ]
        }
    },
    "meta": {
        "description": "Дополнительные данные",
        "type": "object",
        "properties": {
            "totalCount": {
                "type": "integer",
                "description": "Общее количество ОЗ"
            },
            "start": {
                "type": "integer",
                "description": "С какой позиции началось отдаваться"
            },
            "limit": {
                "type": "integer",
```

```
                    "description": "Сколько всего отдалось"
                }
            },
            "required": [
                "totalCount",
                "start",
                "limit"
            ]
        }
    },
    "required": [
        "data",
        "meta"
    ]
}
```

Example:

Request

```
GET /xapi/event/tag?start=0&limit=10
X-API-Version: 1
X-API-CompanyId: iw
X-API-ImporterName: aplab
X-API-Auth-Token: gla20dos1pcdbr69caxz
```

Response

```
{
    "data": [{
        "TAG_ID": "0AF69DD5742E6977E0530100007F2BB700000000",
        "DISPLAY_NAME": "VIP",
        "COLOR": "#4e954e",
        "CREATE_DATE": "2016-05-12 10:24:40.002673",
        "IS_DELETED": 0,
        "IS_SYSTEM": 1
    }],
    "meta": {
        "totalCount": 1,
        "start": 0,
        "limit": 10
    }
}
```

Getting statistics on events

Description: An undocumented method of getting statistics on events, for now, it only provides statistics by the interception date.

Method: `GET`

Resource: `event/stat`

Parameters:

- fields — a list of fields to be selected: CAPTURE_DATE , INSERT_DATE , totalCount (API 1.2 version)

- `filter` — a filtering list:
  - `date[from]` — start date in the UNIX-timestamp format (can be used separately from `date[to]`)
  - `date[to]` — end date in the UNIX-timestamp format (can be used separately from `date[from]`)
  - `insert_date[>]` — date of start pasting in the UNIX-timestamp format and via microtime point, for example `filter[insert_date][>]=1234.123312` (starting from API 1.1 version)
  - `insert_date[<]` — date of end pasting in the UNIX-timestamp format and via microtime point, for example `filter[insert_date][>]=1234.123312` (starting from API 1.1 version)
  - `insert_date[>=]` — date of start pasting in the UNIX-timestamp format and via microtime point, for example `filter[insert_date][>]=1234.123312` (including) (starting from API 1.1 version)
  - `insert_date[<=]` — date of end pasting in the UNIX-timestamp format and via microtime point, for example `filter[insert_date][>]=1234.123312` (including) (starting from API 1.1 version)
  - `object_type_code[]` — type of event (could be few values) (starting from API 1.1 version)
  - `violation_level[]` — level of violation (starting from API 1.1 version)

Ответ: Statistics on events described with the following JSON Schema:

JSON return schema:

```
{
    "$schema": "http://json-schema.org/draft-04/schema#",
    "type": "object",
    "properties": {
        "data": {
            "description": "Empty section",
            "items": {},
            "type": "array"
        },
        "meta": {
            "description": "Additional data",
            "type": "object",
            "properties": {
                "CAPTURE_DATE": {
                    "description": "Statistics by field CAPTURE_DATE",
                    "type": "object",
                    "properties": {
                        "from": {
                            "type": "string",
                            "description": "The date of capture of the first event in
selection"
                        },
                        "to": {
                            "type": "string",
                            "description": "The date of capture of the last event in
selection"
                        }
                    }
```

```
                },
                "INSERT_DATE": {
                    "description": "Statistics by field INSERT_DATE (API 1.1
version)",
                    "type": "object",
                    "properties": {
                        "from": {
                            "type": "string",
                            "description": "The date of insertion of the first event
in selection"
                        },
                        "to": {
                            "type": "string",
                            "description": "The date of insertion of the last event in
selection"
                        }
                    }
                },
                "totalCount": {
                    "type": "integer",
                    "description": "Total number of events"
                }
            }
        }
    }
}
```

Example:

Query

```
GET /xapi/event/stat?filter[data][from]=0
X-API-Version: 1.3
X-API-CompanyId: iw
X-API-ImporterName: dome
X-API-Auth-Token: brse99dugp1cdbr69axz
```

Response

```
{
    "data": [],
    "meta": {
        "CAPTURE_DATE": {
            "from": "2017-04-16 00:00:04",
            "to": "2017-05-16 16:20:36"
        },
        "INSERT_DATE": {
            "from": "2017-04-16 00:01:07",
            "to": "2017-05-16 16:20:40"
        },
```

```
        "totalCount": 225075
    }
}
```

Changing events attributes

Assigning user verdict
API version: ≥ 1.2

Method: PATCH

Resource: event/{id}/userDecision?tbsId={tbsId}

Description:

The method is used to assign the user decision. The fields as follows:

- `{id}` — event ID (`OBJECT_ID`)
- `{tbsId}` — Event tablespace(`TBS_ID`)
- `USER_DECISION` — User decision. Possible values:
    - `NotProcessed - No decision made`
    - `Violation - There was a violation`
    - `NoViolation - There was no violation`
    - `AdditionalProcessingNeeded - Additional processing is required`
- `NOTE –` a comment to be saved within Audit section. It may contain for example, a username of account from third company system, who has changed the attribute's value. The filed's length should not exceed 1000 characters.

Calling of this API is recorded into Audit section. When assigning a user decision the following fields could be automatically changed within the event:

- `TBS_ID`
- `VERDICT`
- `FORWARD_STATE_CODE`

That's why in API respond there are the values that could be updated within your copy of event.

Query body: JSON scheme for user verdict assignment

```
{
  "$schema": "http://json-schema.org/draft-07/schema#",
  "type": "object",
  "title": "Set user decision schema",
  "required": [
    "USER_DECISION"
  ],
  "properties": {
    "USER_DECISION": {
      "$id": "#/properties/USER_DECISION",
      "type": "string",
      "title": "User decision",
      "enum": [
        "NotProcessed",
        "Violation",
        "NoViolation",
```

```
        "AdditionalProcessingNeeded"
      ]
    },
    "NOTE": {
      "$id": "#/properties/NOTE",
      "type": "string",
      "title": "Note",
      "maxLength": 1000
    }
  }
}
```

Response body: JSON scheme for user verdict assignment

```
{
  "$schema": "http://json-schema.org/draft-07/schema#",
  "type": "object",
  "title": "Result setting user decision schema",
  "required": [
    "OBJECT_ID",
    "TBS_ID",
    "VERDICT",
    "USER_DECISION",
    "FORWARD_STATE_CODE"
  ],
  "properties": {
    "OBJECT_ID": {
      "$id": "#/properties/OBJECT_ID",
      "type": "integer",
      "title": "Event ID"
    },
    "TBS_ID": {
      "$id": "#/properties/TBS_ID",
      "type": "integer",
      "title": "Tablespace ID"
    },
    "VERDICT": {
      "$id": "#/properties/VERDICT",
      "type": "string",
      "title": "Вердикт",
      "enum": [
        "Allowed",
        "Quarantined",
        "Forbidden"
      ]
    },
    "USER_DECISION": {
      "$id": "#/properties/USER_DECISION",
      "type": "string",
      "title": "Assigned user decision",
      "enum": [
        "NotProcessed",
        "NoViolation",
        "Violation",
        "AdditionalProcessingNeeded"
```

```
      ]
    },
    "FORWARD_STATE_CODE": {
      "$id": "#/properties/FORWARD_STATE_CODE",
      "type": "string",
      "title": "Sending status",
      "examples": [
        "Sent",
        "NotSent",
        "Pending"
      ]
    }
  }
}
```

Example: Assigning "Violation" verdict containing comment to event ID 194 in TBS 1 by mens of Url:

```
curl 'https://example.com/xapi/event/195/userDecision?tbsId=1' \
  -X PATCH \
  -H 'X-API-Auth-Token: 1792jmclf7fer1ikuhby' \
  -H 'X-API-Version: 1' \
  -H 'X-API-CompanyId: IW' \
  -H 'X-API-ImporterName: dome' \
  -H 'Content-Type: application/json' \
  --data-binary '{"USER_DECISION":"Violation","NOTE":"Assignign verdict via Dome.
Employee john Smith."}'
```

Assigning user verdict to multiple events
API Version: ≥ 1.2

Method: PATCH

Resource: event/userDecision

Description:

The method is used to assign user decision to multiple events (no more than **1000** user decisions, otherwise **413** error message will be returned). Event ID and tablespace ID are sent within the request body containing user decision and comment.

Request body: JSON scheme for multiple assignment of verdicts

```
{
  "$schema": "http://json-schema.org/draft-07/schema#",
  "type": "array",
  "title": "Set batch user decision schema",
  "items": {
    "$id": "#/items",
    "type": "object",
    "required": [
      "OBJECT_ID",
      "TBS_ID",
      "USER_DECISION"
    ],
    "properties": {
      "OBJECT_ID": {
```

```
        "$id": "#/items/properties/OBJECT_ID",
        "type": "integer",
        "title": "Event ID"
      },
      "TBS_ID": {
        "$id": "#/items/properties/TBS_ID",
        "type": "integer",
        "title": "Tablespace ID"
      },
      "USER_DECISION": {
        "$id": "#/items/properties/USER_DECISION",
        "type": "string",
        "title": "User decision",
        "enum": [
          "NotProcessed",
          "Violation",
          "NoViolation",
          "AdditionalProcessingNeeded"
        ]
      },
      "NOTE": {
        "$id": "#/items/properties/NOTE",
        "type": "string",
        "title": "Note",
        "maxLength": 1000
      }
    }
  }
}
```

Response body: JSON scheme for multiple assignment of verdicts

```
{
  "$schema": "http://json-schema.org/draft-07/schema#",
  "type": "array",
  "title": "Array result",
  "items": {
    "$id": "#/items",
    "type": "object",
    "title": "Result setting user decision schema",
    "required": [
      "OBJECT_ID",
      "TBS_ID",
      "VERDICT",
      "USER_DECISION",
      "FORWARD_STATE_CODE"
    ],
    "properties": {
      "OBJECT_ID": {
        "$id": "#/items/properties/OBJECT_ID",
        "type": "integer",
        "title": "Event ID"
      },
      "TBS_ID": {
        "$id": "#/items/properties/TBS_ID",
```

```
        "type": "integer",
        "title": "Tablespace ID"
      },
      "VERDICT": {
        "$id": "#/items/properties/VERDICT",
        "type": "string",
        "title": "Verdict",
        "enum": [
          "Allowed",
          "Quarantined",
          "Forbidden"
        ]
      },
      "USER_DECISION": {
        "$id": "#/items/properties/USER_DECISION",
        "type": "string",
        "title": "User decision assigned",
        "enum": [
          "NotProcessed",
          "NoViolation",
          "Violation",
          "AdditionalProcessingNeeded"
        ]
      },
      "FORWARD_STATE_CODE": {
        "$id": "#/items/properties/FORWARD_STATE_CODE",
        "type": "string",
        "title": "Sending status",
        "examples": [
          "Sent",
          "NotSent",
          "Pending"
        ]
      }
    }
  }
}
```

Example:

```
curl 'https://example.com/xapi/event/userDecision' \
  -X PATCH \
  -H 'X-API-Auth-Token: 1792jmclf7fer1ikuhby' \
  -H 'X-API-Version: 1' \
  -H 'X-API-CompanyId: IW' \
  -H 'X-API-ImporterName: dome' \
  -H 'Content-Type: application/json' \
  --data-binary '[{"OBJECT_ID": 1, "TBS_ID": 1,
"USER_DECISION":"Violation","NOTE":"Verdict assigning via Dome. Employee John
Smith."},{"OBJECT_ID": 24, "TBS_ID": 2,
"USER_DECISION":"AdditionalProcessingNeeded"}]'
```

Retrieving the list of Console users

Description: The list of Traffic Monitor Console users (including former employees)

Method: `GET`

Resource: `user`

Parameters (are passed in JSON format):

- `start` - a position from which user data should be delivered (the default value is 0)
- `limit` - how many user data sets should be delivered (the default value is 100, the value cannot be larger than 1000)

JSON scheme for delivering user data

```
schemas:
    user:
      type: object
      additionalProperties: false
      properties:
        USER_ID:
          type: integer
          description: User ID
        USERNAME:
          type: string
          description: Login
        DISPLAY_NAME:
          type: string
          description: Full name
        STATUS:
          type: integer
          description: Status (0 - active, 1 - disabled, 2 - deleted)
          enum: [0, 1, 2]
        CREATE_DATE:
          type: string
          description: Create Date with format "Y-m-d H:i:s.u" in UTC
        EMAIL:
          type: string
          description: E-mail
        NOTE:
          type: string
          description: Note
```

Example:

Query

```
curl -X GET "https://qa-b2a1.infowatch.ru/xapi/user?start=1&limit=100" -H "accept: application/json" -H "X-Enable-OpenAPI: 1"
```

Response

```
{
  "data": [
```

```
    {
      "USER_ID": 0,
      "USERNAME": "string",
      "DISPLAY_NAME": "string",
      "STATUS": 0,
      "CREATE_DATE": "string",
      "EMAIL": "string",
      "NOTE": "string"
    }
  ],
  "meta": {
    "totalCount": 0,
    "start": 0,
    "limit": 0
  }
}
```

Getting Results of Completed Traffic Monitor Query

Receiving List of Queries

Description: List of Traffic Monitor queries

Method: `GET`

Resource: `query`

Parameters (transferred as a JSON file):

- `userId` - id of the user, whose list of queries you need to receive
- `start` - from which position to start sending queries (default value 0)
- `limit` - how many queries to send (default value 100, can not exceed 1000)

To your query you will get a list of existing TM queries with their ID and text name.
JSON scheme of the queries list:

```
  "data": [
    {
      "QUERY_ID": 0,
      "DISPLAY_NAME": "string"
    }
  ],
  "meta": {
    "totalCount": 0,
    "start": 0,
    "limit": 0
  }
```

Example of query:

```
curl -X GET "https://server.company.ru/xapi/query?userId=5&start=0&limit=10" -H "accept: application/json"
 -H "X-Enable-OpenAPI: 1"
```

Starting Query Execution

Description: Starting query execution in Traffic Monitor

Method: `POST`

Resource: `query/{queryId}/exec`

Parameters:

- `queryId` - id of a query you need to start

JSON-scheme of response to query:

```
{
  "data": {
    "QUERY_ID": 0,
    "QUERY_TYPE": "query",
    "DISPLAY_NAME": "string",
    "CREATE_DATE": "string",
    "CHANGE_DATE": "string"
  }
}
```

Example of query:

```
curl -X POST "https://server.conpany.ru/xapi/query/0/exec" -H "accept: application/json" -H "X-Enable-OpenAPI: 1"
```

Getting Status of Query

Description: Getting status of query

Method: `GET`

Resource: `query/{queryId}/status`

Parameters:

- `queryId` - id of the query, the status of which you need to receive

JSON scheme of response:

```
{
  "data": {
    "QUERY_ID": 0,
    "USER_ID": 0,
    "STATUS": 0,
    "RUN_DATE": "string",
    "COMPLETE_DATE": "string",
    "PERCENT_COMPLETE": 0,
    "OBJECT_COUNT": 0
  }
}
```

Example of query:

```
curl -X GET "https://server.company.ru/xapi/query/0/status" -H "accept: application/json" -H "X-Enable-OpenAPI: 1"
```

Getting Query Results

Description: Traffic Monitor queries list of results

Method: `GET`

Resource: `query/{queryId}/result`

Parameters (transferred as a JSON file):

- `queryId` - id of query;
- `start` - from which position to start queries (default value 0)
- `limit` - how many queries to send (default value 100, can not exceed 1000)
- `fields:`
  - `OBJECT_ID –` event identifier in TM (positive integer);
  - `TBS_ID –` table space identifier (positive integer).

As a response to a query initiated earlier (see. "Starting Query Execution") you will get a list of events with their ID.

JSON scheme of query:

```
{
  "data": [
    {
      "OBJECT_ID": 0,
      "TBS_ID": 0
    }
  ],
  "meta": {
    "totalCount": 0,
    "start": 0,
    "limit": 0
  }
}
```

Example of query:

```
curl -X GET "https://server.company.ru/xapi/query/5/result?start=0&limit=10" -H "accept: application/json"
 -H "X-Enable-OpenAPI: 1"
```

10 Appendix A. Username and Password Creation Recommendations

Rules for logins

- The username should be 1-20 characters long.
- The username may include English letters, digits and underscore "_". It should start with a letter.

Rules for passwords

- The user password should be 8-128 characters long.
- The user password may include English letters, digits, and also the following characters:

«#», «$», «!» or «%».

- The password is case-sensitive.

Recommendations for strong passwords

- Recommended password length is 10-30 characters.
- The password must contain the combination of letters, digits and characters.
- It is not advised to:
    - include whole words or phrases into a password.
    - use a series of the same character.
    - start and end the password with the same character.
    - create a new password by adding characters to your current password

General recommendations

Do not start usernames or passwords with these combinations: SYS_ and ORA_.

Do not use Oracle reserved words in usernames or passwords:

ACCESS	DELETE	INTERSECT	OPTION	SUCCESSFUL
ADD	DESC	INTO	OR	SYNONYM
ALL	DISTINCT	IS	ORDER	SYSDATE
ALTER	DROP	LEVEL	PCTFREE	TABLE
AND	ELSE	LIKE	PRIOR	THEN
ANY	EXCLUSIVE	LOCK	PRIVILEGES	TO
AS	EXISTS	LONG	PUBLIC	TRIGGER
ASC	FILE	MAXEXTENTS	RAW	UID
AUDITBETWEEN	FLOAT	MINUS	RENAME	UNION
BY	FOR	MLSLABEL	RESOURCE	UNIQUE

CHAR	FROM	MODE	REVOKE	UPDATE
CHECK	GRANT	MODIFY	ROW	USER
CLUSTER	GROUP	NOAUDIT	ROWID	VALIDATE
COLUMN	HAVING	NOCOMPRESS	ROWNUM	VALUES
COMMENT	IDENTIFIED	NOT	ROWS	VARCHAR
COMPRESS	IMMEDIATE	NOWAIT	SELECT	VARCHAR2
CONNECT	IN	NULL	SESSION	VIEW
CREATE	INCREMENT	NUMBER	SET	WHENEVER
CURRENT	INDEX	OF	SHARE	WHERE
DATE	INITIAL	OFFLINE	SIZE	WITH
DECIMAL	INSERT	ON	SMALLINT	
DEFAULT	INTEGER	ONLINE	START	

11 Appendix B. Monitoring Indicators

The table below is listing all indicators, used by monitoring subsystem to check the state of System components, installed and operating on servers in All-in-one mode. The check includes obtaining indicator values at regular intervals and comparing them with threshold values. Critical values of all indicators may mean that the server is physically inaccessible. In this case, please check if the server works properly.

Warning!

If configuration files have been changed, then the threshold values and check period may differ from the specified values.

Warning!

If recommendations from the table below do not help you to solve the problem, please contact InfoWatch technical support at support@infowatch.com.

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
General System load	Load of IW-Linux-servers, TMcap servers, DB servers over the last 15, 5, and 1 minute	30 minutes	🔴 – at least one figure exceeds the value of 20.0, 16.0 and 12.0 for 15, 5 and 1 minute respectively 🟡 – at least one figure exceeds the value of 10.0, 8.0 and 6.0 for 15, 5, and 1 minute respectively 🟢 – none of the figures exceed the value of 10.0, 8.0 and 6.0 for 15, 5 and 1 minute respectively	Check the load of interception and analysis servers, and DB servers: 1. Run `top` 2. Sort the results, using the commands: a. Shift+m to sort by RAM load; b. Shift+p to sort by CPU load.
System components statuses	System services statuses	30 minutes	🔴 – at least one service is not started 🟢 – all services are started	In All-in-one installation mode, the list and number of System services are known and permanent. To display services status details, type `iwtm status`
Syslog service status	Whether the syslog service is started or not	30 minutes	🔴 – service not started 🟢 – service started	Check if rsyslog service is running:

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
				`systemctl status rsyslog`
Number of active users	Number of users (security ofiicers), registered in the System (Linux servers)	30 minutes	🔴 – > 50 users 🟡 – from 20 to 50 🟢 – < 20 users	It is necessary to decrease number of security officers to 50 persons
DB Alert Log Errors	Whether Alert Log contains errors (DB servers)	5 minutes	🔴 – errors found 🟢 – no errors	It is necessary to decrease the number of errors having SEVERITY=HIGH label. **Search in Alert Log should be based on the following words:** • ORA- • Failed to archive • ORACLE Instance .* - Archival Error • ARC[0-9]: I/O error • ARC[0-9]: RFS network connection lost at host • ARC[0-9]: Error 3113 creating • Media Recovery failed with error • Corrupt block • Fractured block • Bad header • Data in bad block • Reread of rdba • log corruption • RESETLOGS **Search in pg_log should be based on the following words:** • FATAL • PANIC • ERROR

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
Server availability	Response time for sent packages and number of lost packages (Linux servers)	5 minutes	🔴 – > 500 ms 🟡 – from 100 to 500 ms 🟢 – < 100 ms	Ping results with the following parameters `100.0,20%!500.0,60%` show that: response to sent packages exceeds 100 milliseconds and more than 20% of packages are lost; response to sent packages exceeds 500 milliseconds and 60% of packages are lost.
Availability of incorporated mail transfer agent	Postfix server availability	30 minutes	🔴 – not available 🟢 – available	1. Check Postfix server status, using the command `systemctl status postfix` 2. Start checking correctness of configuration file */etc/postfix/main.cf* , using the command `postfix check`
Server availability via SSH	Response time	10 minutes	🔴 – >= 10 seconds 🟢 – < 10 seconds	Check sshd daemon status, using the command `systemctl status sshd`
Device Monitor server availability	Response for request	30 minutes	🔴 – no connection 🟢 – connection established	If the System has an active Device Monitor license, it should be displayed. Check the license in **Administration ->Licenses** in Traffic Monitor console.

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
Using swap file	Free space in swap (virtual memory). (Linux servers)	5 minutes	🔴 – < 10% free 🟡 – from 10 % to 50% free 🟢 – > 50% free	For details, see "Recommendations to Partition Server Disk Space during Installation in Different Modes"
Free space in root partition	Free space in the root file system (Linux servers)	30 minutes	🔴 – < 10 000 MB 🟡 – from 10 000 MB to 20 000 MB 🟢 – > 20 000 MB	
Free space in /var partition	Free space in the `/var.` file system `(` Linux servers)	30 minutes	🔴 – < 10 000 MB 🟡 – from 10 000 MB to 20 000 MB 🟢 – > 20 000 MB	
Status of time synchronization service	ntpd. service status (NTPD)	30 minutes	🔴 – NTP server is unavailable 🟢 – NTP server is available	Check ntpd daemon status, using the command `systemctl status ntpd`
System time offset	Time lag on System servers and NTP server. (Linux servers)	360 minutes	🔴 – > 40 seconds 🟡 – from 20 to 40 seconds 🟢 – < 20 seconds	The error occurs, if the System cannot connect NTP servers, or System configuration has no NTP servers. In this case, the error message "*Can't create socket connection*" will appear. Make sure that *ntp.conf* and *iwmon-services-ntp.cfg* configuration files have the same correct NTP server specified.
Core dump	Number of files in /opt/iw/tm5 catalogue, starting with core_.... (Linux servers)	30 minutes	🔴 – core dump 🟢 – no core dumps	Contact InfoWatch technical support at support@infowatch.com

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations

Queue of events processing errors	Number of objects in **queue/final-errors** queue (iw_rammer)	1 minute	🔴 – > 1 objects
			🟢 – 0
				Option 1: Clear queues using the commands:
				`su - iwtm`
				`/opt/iw/tm5/bin/iw_qtool erase /opt/iw/tm5/queue/final-errors`
				`exit`
				Option 2:
				1. Open the `/etc/cron.d/iwtm_cleanup` file in the edit mode `.`
				2. Reduce the period of cleaning files in file queue folders. You can do it in a regular cron job (the default value is 30 days).
				3. Save changes and close the file.

Database status	Database status (depending on the DBMS in use)	10 minutes	🔴 – <> ok 🟢 – ok	Check availability of the database: 1. Log in the database `sqlplus iwtm@iwtm` 2. Enter password xxXX1234 3. Watch `SQL>`
Database access service status	Oracle TNS listener's status	10 minutes	🔴 – TNS listener is not started 🟢 – TNS listener is started	Indicator is enabled and displayed in the list, only in case when Oracle SMDB is used in the System
The number of Oracle data files	If the number of files has reached 90% of	60 minutes		If the number of files reaches the maximum value, you should

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
	the specified maximum value		🔴 – if the current number of data files reaches the maximum value 🟡 – if the number of files is 90% of the maximum value 🟢 – if the number of files is fewer than 90% of the maximum value	increase the value of the **db_files** Oracle paramerer
Free space on the database main partition	Free space on the partition that stores main information (By default: `/u01`)	30 minutes	🔴 – < 10 000 MB 🟡 – from 10000 to 20 000 MB 🟢 – > 20 000 MB	Dedicate more disk space for `/u01` (for details, see "Recommendations to Partition Server Disk Space during Installation in Different Modes")
Free space in database events catalogue	Free space on the partitions that store events (By default: `/u02`)	30 minutes	🔴 – < 7% 🟡 – from 7 to 15% (if daily table spaces are stored in several sections, then when the value is < 7% in one section, at least. 🟢 – > 15%	If daily table spaces are stored in several sections, then the free space is calculated as a total sum of all sections, which during the installation were dedicated for storing daily table spaces. For details, see "Recommendations to Partition Server Disk Space during Installation in Different Modes"
Free space on daily events partition on fast disk	Free space on fast disk on partition that stores daily table spaces.	30 minutes	🔴 – < 7% 🟡 – from 7 to 15% 🟢 – > 15%	The indicator is added, if during the installation *Fast and slow disks* storing mode was chosen. For details, see "Recommendations to Partition Server Disk Space during Installation in Different Modes"

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
Database patch availability	Whether Oracle patches, required for correct operation of the System, are installed.	Once a day	🔴 – not installed 🟢 – installed	Indicator is on and displayed in the list, only if Oracle DBMS is used in the System. Download and install the required patch.
Size of database alert log	Size of PostgreSQL DBMS alert log: System LogSize of Oracle DBMS alert log: Alert Log	5 minutes	🔴 – > 3 GB 🟡 – from 1 GB to 3 GB 🟢 – < 1 GB	Contact InfoWatch technical support at support@infowatch.com
DB syslog errors	Database log contains errors	30 minutes	🔴 – > 1 errors found 🟡 – 1 error found 🟢 – no errors found	It is necessary to decrease the number of errors with SEVERITY=Error
Mail traffic processing queue	Number of objects in queue **queue/smtp** (iw_messed)	30 minutes	🔴 – > 10000 objects 🟡 – from 1000 to 10000 objects 🟢 – < 1000 objects	1. Check status of service `systemctl status iw_messed` 2. View service logs in `opt/iw/tm5/log/messed_app.log` 3. Check RAM and swap load: a. for a short response, run command `free -m` b. for a detailed response, run command `cat /proc/meminfo`
Queue for specific analysis for xAPI/ pushAPI objects	Number of objects in queue **queue/analysis** (iw_analysis)	30 minutes	🔴 – > 10000 objects 🟡 – from 1000 to 10000 objects 🟢 – < 1000 objects	1. Check status of service `systemctl status iw_analysis` 2. View service logs in `opt/iw/`

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
				`tm5/log/analysis.log` 3. Check RAM and swap load: a. for a short response, run command `free -m` b. for a detailed response, run command `cat /proc/meminfo`
Queue of objects loading from interceptors to **iw_x2x** service	Number of objects from interceptors for **iw_x2x** queueing in **queue/db** (iw_x2x)	30 minutes	🔴 – > 10000 objects 🟡 – from 1000 to 10000 objects 🟢 – < 1000 objects	1. Check status of service `systemctl status iw_x2x` 2. View service logs in `opt/iw/tm5/log/x2x.log` 3. Check RAM and swap load: a. for a short response, run command `free -m` b. for a detailed response, run command `cat /proc/meminfo`
Loading to storage queue	Number of objects queueing in **queue/x2x, which** are to be loaded to storage by service **iw_x2db** (TMcap servers)	30 minutes	🔴 – > 10000 objects 🟡 – from 1000 to 10000 objects 🟢 – < 1000 objects	1. Check status of service `systemctl status iw_x2db` 2. View service logs in `opt/iw/tm5/log/x2db.log` 3. Check RAM and swap load:

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
				a. for a short response, run command `free -m` b. for a detailed response, run command `cat /proc/meminfo`
Queue of applied policies actions processing	Number of objects queueing in **queue/blackboard** (Linux servers)	30 minutes	🔴 – > 1000 objects 🟡 – from 200 to 1000 objects 🟢 – < 200 objects	1. Check status of service `systemctl status iw_analysis` 2. View service logs in `opt/iw/tm5/log/analysis.log` 3. Check RAM and swap load: a. for a short response, run command `free -m` b. for a detailed response, run command `cat /proc/meminfo`
Queue of objects to be indexed in Sphinx for full-text search	Number of objects queueing to be indexed in Sphinx, for full-text search	30 minutes	🔴 – > 10000 objects 🟡 – from 1000 to 10000 objects 🟢 – < 1000 objects	1. Check status of service: `searchd --status -c /etc/infowatch/sphinx.conf` 2. View service logs in `opt/iw/tm5/log/sphinx/` 3. Check RAM and swap load:

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
				a. for a short response, run command `free -m` b. for a detailed response, run command `cat /proc/meminfo` 4. Calculate the number of running `searchd` instances: a. if `iw_is` is running on a node, then: 1 (`iw_is itself)+ 4 (grep max_children /opt/iw/tm5/etc/is.conf)=5` b. if `iw_indexer` is running on a node, then: 1 `(iw_ndexer itself)+ 8 (grep max_children /opt/iw/tm5/etc/sphinx.conf)=9` c. Total: a+b=14 `searchd` instances. The more processes, the less are the odds of slow user request processing.
Queue of objects to be indexed in	Number of objects queueing to be indexed in Sphinx,	30 minutes	🔴 – > 10000 objects	1. Check status of service:

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
Sphinx for meta-information search	for meta-information search		🟡 – from 1000 to 10000 objects 🟢 – < 1000 objects	`searchd --status -c /etc/infowatch/sphinx.conf` 2. View service logs in `opt/iw/tm5/log/sphinx/` 3. Check RAM and swap load: a. for a short response, run command `free -m` b. for a detailed response, run command `cat /proc/meminfo`
Events indexation by **iw_indexer** service number of errors	Indexation errors number (iw_indexer)	30 minutes	🔴 – > 100 errors 🟡 – from 10 to 100 errors 🟢 – 10 errors	1. Check status of service `systemctl status iw_indexer` 2. View service logs in `opt/iw/tm5/log/indexer.log` 3. Check RAM and swap load: a. for a short response, run command `free -m` b. for a detailed response, run command `cat /proc/meminfo`
Number of meta-information indexation by	Number of errors occurred during indexation of meta-	30 minutes	🔴 – > 100 errors 🟡 – from 10 to 100 errors	1. Check status of `systemctl`

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
iw_is service errors	information by **iw_is** service		🟢 – 10 errors	`status iw_is` service 2. View service logs in `opt/iw/tm5/log/is.log` 3. Check RAM and swap load: a. for a short response, run command `free -m` b. for a detailed response, run command `cat /proc/meminfo`
iw_is commands queue	Number of commands in **iw_is** service queue	30 minutes	🔴 – > 100 commands 🟡 – from 50 to 100 commands 🟢 – < 50 commands	
Data selection queues	Number of objects in **iw_is** service queue	30 minutes	🔴 – > 100 objects 🟡 – from 50 to 100 objects 🟢 – < 50 objects	
iw_is indexation queue	Number of commands in **iw_is** service queue	30 minutes	🔴 – > 100 objects 🟡 – from 50 to 100 objects 🟢 – < 50 objects	
iw_is errors queue	**iw_is** service has errors	5 minutes	🔴 – > 500 errors found 🟡 – from 50 to 500 errors found 🟢 – < 50 errors found	
Queue of commands for text tablespace	Number of commands in text tablespace queue	30 minutes	🔴 – > 50 commands 🟡 – from 20 to 50 commands 🟢 – < 20 commands	1. Enable logging of **iw_indexer** service work on `debug` (see "Logging System Work") 2. Check if log file **iw_indexer** in `opt/iw/tm5/log/indexer.log` has errors `.` 3. Contact InfoWatch technical support.
Queue of commands for meta-information tablespace	Number of commands in meta-information tablespace queue	30 minutes	🔴 – > 50 commands 🟡 – from 20 to 50 commands 🟢 – < 20 commands	

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations

Events processing errors queue	Number of objects in errors queue **queue/errors** (Extractors Framework, TMcap servers: iw_luaengined, iw_warpd, iw_cas)	30 minutes	🔴 – > 500 objects
			🟡 – from 50 to 500 objects
			🟢 – < 50 objects
				Option 1: Clear queues by using the commands:
				`su - iwtm`
				`/opt/iw/tm5/bin/iw_qtool erase /opt/iw/tm5/queue/errors`
				`exit`
				Option 2:
				1. Open the `/etc/cron.d/iwtm_cleanup` file in the edit mode.
				2. Reduce the period of cleaning files in file queue folders. You can do it in a regular `cron` job (the default value is 30 days).
				3. Save changes and close the file.

Errors queue of processing events by **iw_x2x**	Number of objects in queue **queue/x2x-errors** (iw_x2x)	30 minutes	🔴 – > 500 objects
			🟡 – from 50 to 500 objects
			🟢 – 50 objects
				Option 1: Clear queues by using the commands:
				`su - iwtm`
				`/opt/iw/tm5/bin/iw_qtool erase /opt/iw/tm5/queue/x2x-errors`
				`exit`
				Option 2:
				1. Open the `/etc/cron.d/iwtm_cleanup` file in the edit mode.
				2. Reduce the period of cleaning files in file queue

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
				folders. You can do it in a regular `cron` job (the default value is 30 days). 3. Save changes and close the file.

Errors queue of processing events by **iw_x2db** service	Number of objects in queue **queue/x2db-errors** (iw_x2db)	30 minutes	🔴 – > 500 objects
			🟡 – from 50 to 500 objects
			🟢 – 50 objects
				Option 1: Clear queues by using the commands:
				`su - iwtm`
				`/opt/iw/tm5/bin/iw_qtool erase /opt/iw/tm5/queue/x2db-errors`
				`exit`
				Option 2:
				1. Open the `/etc/cron.d/iwtm_cleanup` file in the edit mode.
				2. Reduce the period of cleaning files in file queue folders. You can do it in a regular `cron` job (the default value is 30 days).
				3. Save changes and close the file.

Errors queue of applied policies actions processing	Number of objects in queue **queue/blackboard_errors** (Linux servers)	30 minutes	🔴 – > 500 objects
			🟡 – from 50 to 500 objects
			🟢 – 50 objects
				Option 1: Clear queues by using the commands:
				`su - iwtm`
				`/opt/iw/tm5/bin/iw_qtool erase /opt/iw/tm5/queue/blackboard-errors`
				`exit`

Indicator name	What is checked, where it is checked	Poll interval	Values	Details and recommendations
				Option 2: 1. Open the `/etc/cron.d/iwtm_cleanup` file in the edit mode. 2. Reduce the period of cleaning files in file queue folders. You can do it in a regular `cron` job (the default value is 30 days). 3. Save changes and close the file.