Opensource ICT Solutions

ZABBIX Benelux conference 2025

Zabbix and Netconf!

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Whoami

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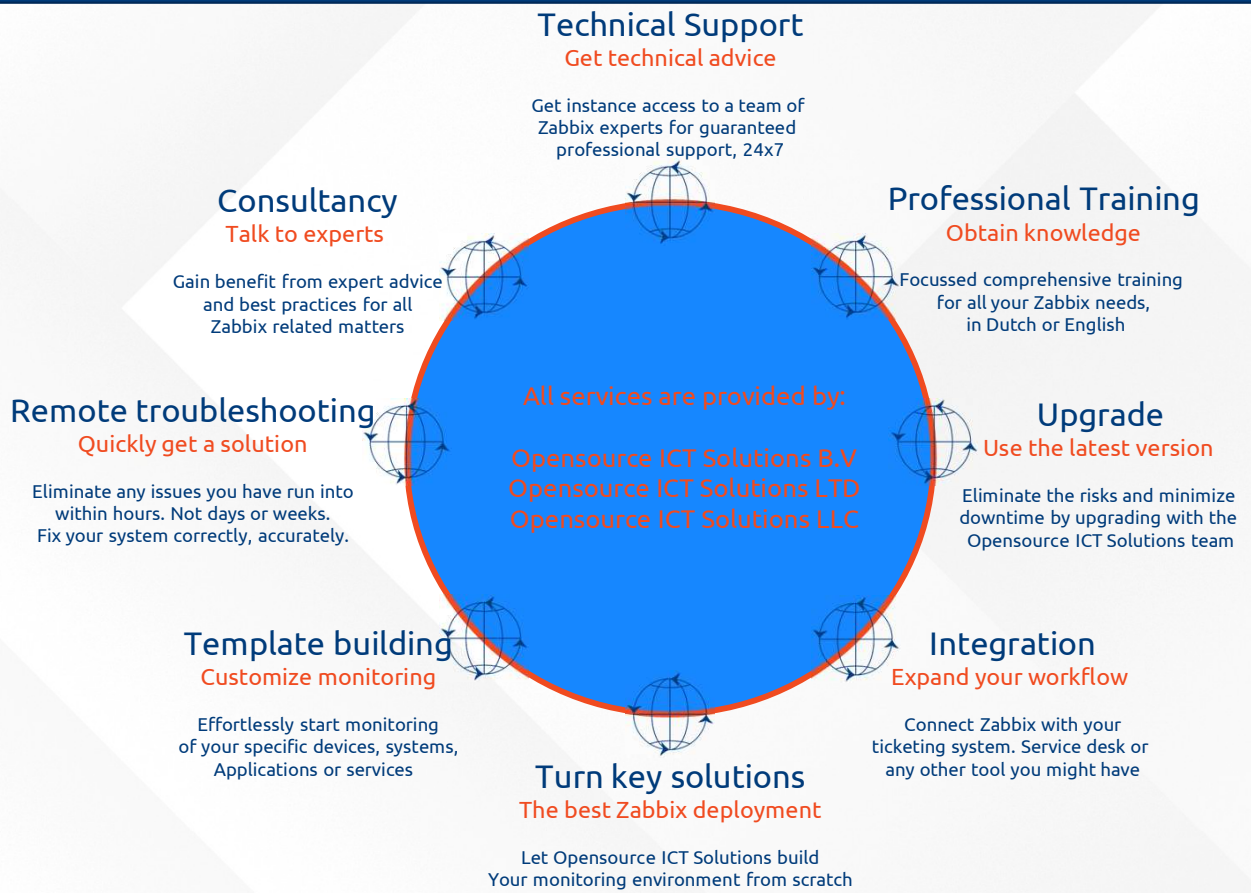
Opensource ICT Solutions

Your Zabbix partner in:

- The Netherlands
- United Kingdom
- United States
- Belgium!

Services overview



https://oicts.com

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How to monitor a network device

- 3 options:
  - SNMP
    - Very well known protocol (old: v1 1989)
    - Various versions / options
    - The S is a big lie
    - RFCs are too open -> complex implementations from vendors
  - Netconf
    - Introduced late 2006 (RFC 4741), revised in 2011(RFC 6241)
    - Using RPC
    - XML format (and later JSON)
    - Built on top of SSH
  - Streaming telemetry

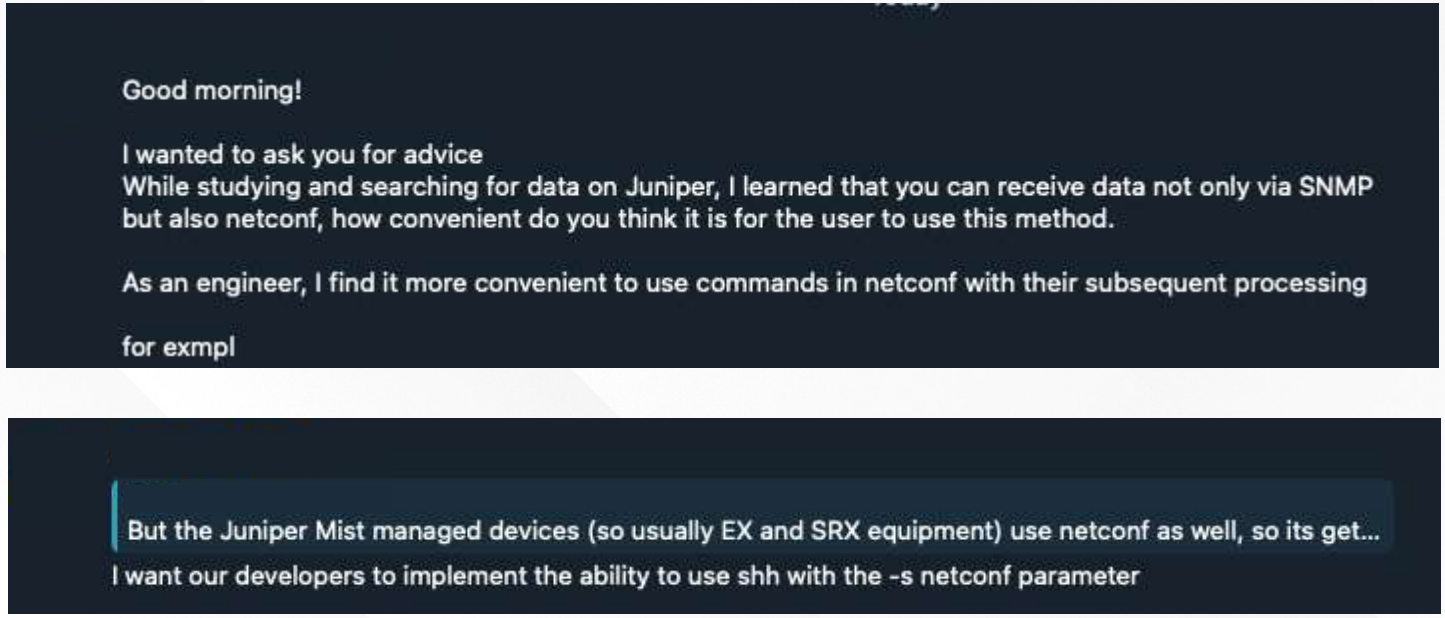
Zabbix?

- SNMP
  - Was available for years already
  - Improvements in 6.4 (walk/get options)
  - Even better improvements in 7.0 (async polling)

  - Still limitations mainly due to how SNMP is built by the vendor

Since 7.2: Netconf support!

- Template: Juniper MX by SNMP



ZBXNEXT-9588

- Which led to https://support.zabbix.com/browse/ZBXNEXT-9588

Title: SSH item subsystem support

Summary

Currently there is no SSH subsystem support (SSH flag "-s") for SSH items.

We need to introduce SSH subsystem support to allow to use netconf over ssh –

possibility to monitor devices which support only netconf.

Use case

As a user I want SSH subsystem support for SSH items (identical to SSH flag "-s")

•to connect to devices which supports netconf or similar

•limit access to one command only (configured in SSH subsystem)

•streamline SSH command execution across various monitoring targets
(e.g. backup would resolve to /opt/backup.sh on one system or c:\scripts\backup.cmd on another)

What is Netconf?

- Basically: open a connection via SSH and use one of the ‘base operations’ to do something
- Device replies with requested information

- Not in Zabbix (yet?): Event notifications

Netconf base operations

- ***<get>***
  - Retrieves all or part of the information about the running configuration and device state.
- ***<get-config>***
  - Retrieves all or part of the configuration information available from a specified configuration datastore.
- ***<edit-config>***
  - Submits all or part of a configuration to a target configuration datastore.

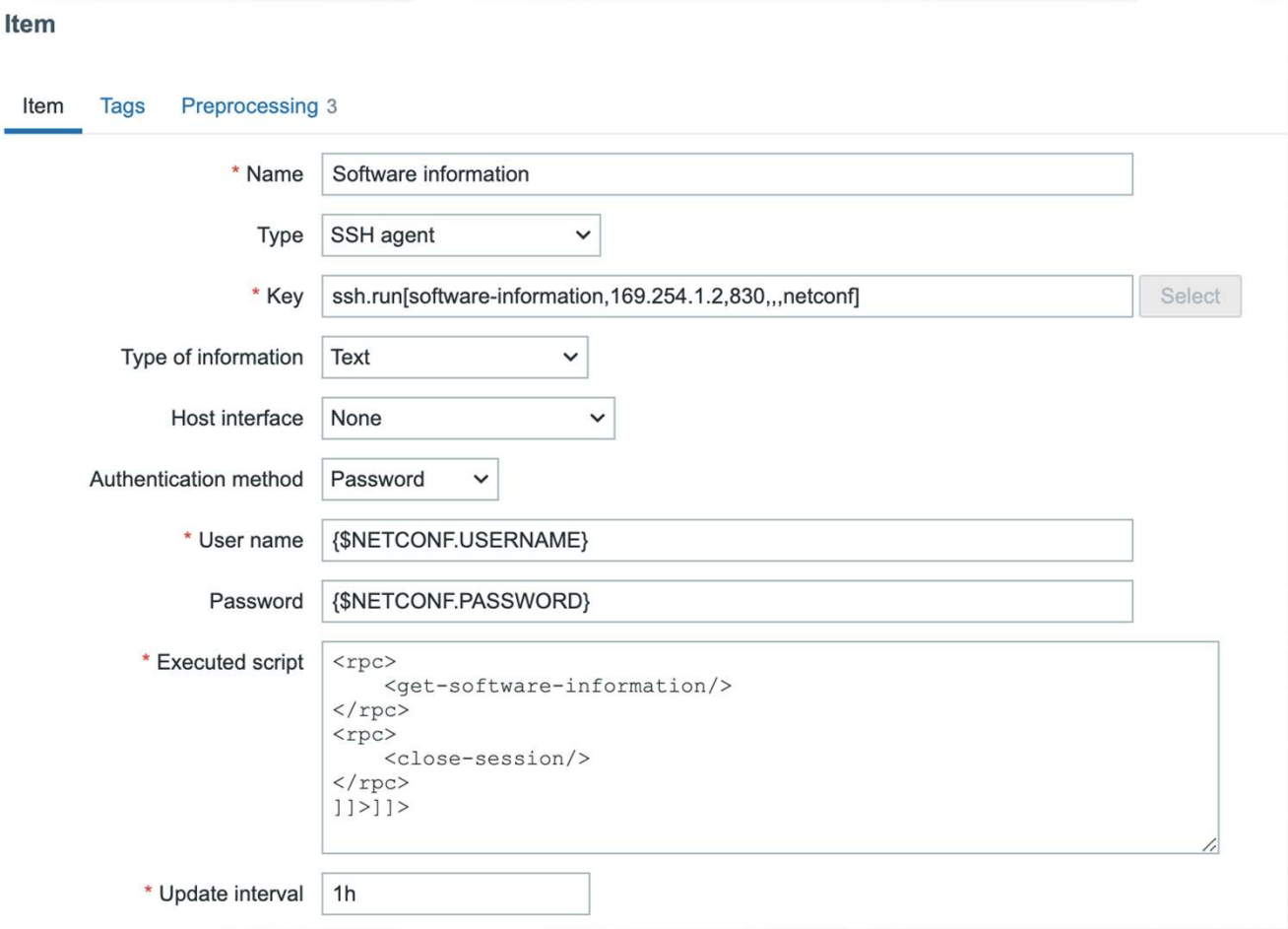
Netconf base operations 2

- ***<copy-config>***
  - Creates or replaces a target configuration datastore with the information from another configuration datastore.
- ***<delete-config>***
  - Deletes a target configuration datastore, but only if it's not running.
- ***<lock>***
  - Locks a target configuration datastore, unless a lock already exists on any part of that datastore.
- ***<unlock>***
  - Releases a lock on a configuration datastore that was previously locked through a <lock> operation.

Netconf base operations 3

- ***<close-session>***
  - Requests the NETCONF server to gracefully terminate an open session.
- ***<kill-session>***
  - Forces a session's termination, causing current operations to be aborted.

How to build this in Zabbix



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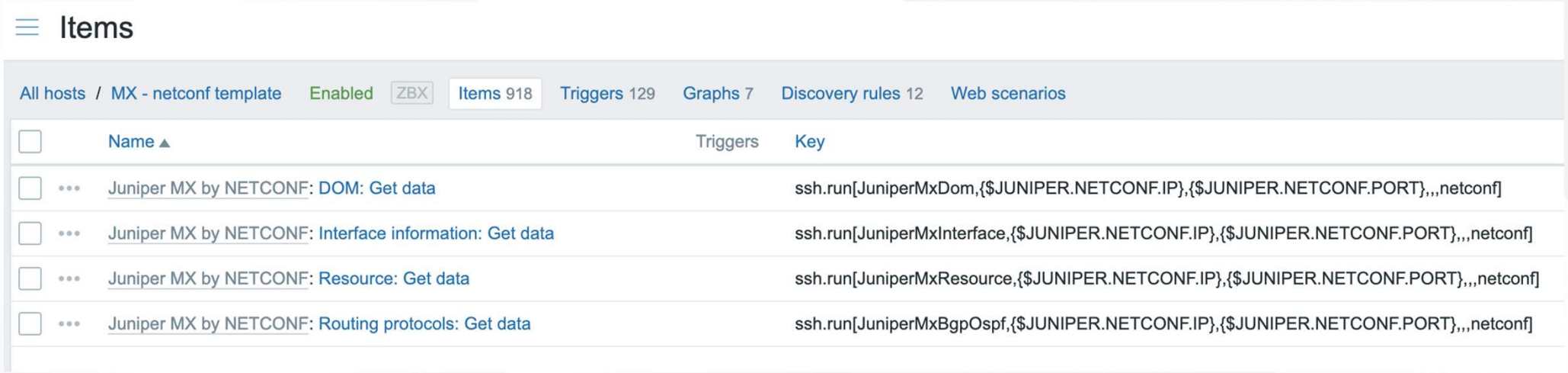
Result


```
<!-- No zombies were killed during the creation of this user interface -->
<!-- user root, class super-user -->
<hello xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
 <capabilities>
 </capabilities>
 <session-id>22979</session-id>
</hello>
]]>]]>
<rpc-reply xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" xmlns:junos="http://xml.juniper.net/junos/24.2R1-S1.10/junos">
<software-information>
<host-name></host-name>
<product-model>mx204</product-model>
<product-name>JNP204 [MX204]</product-name>
<junos-version>24.2R1-S1.10</junos-version>
<package-information>
<name>os-kernel</name>
<package-name>os-kernel-prd-x86-64-20240711.b8a9aee_builder_bsd15_242</package-name>
<comment>JUNOS OS Kernel 64-bit  [20240711.b8a9aee_builder_bsd15_242]</comment>
</package-information>
```

New MX template by Netconf

- 4 SSH items
- That's it.



1: Master item

Name ▲	Triggers	Key	Interval	History	Trends	Type	Status
Juniper MX by NETCONF: Resource: Get data		ssh.run[JuniperMxResource,{$JUNIPER.NETCONF.IP},{$JUNIPER.NETCONF.PORT},,,netconf]	0	0		SSH agent	Enable


```
{
  "results":[
    {
      "hello":{
        "capabilities":{
          "capability":[
            "urn:ietf:params:netconf:base:1.0",
            ......
          ]
        },
        "session-id":"11089"
      }
    },
    {
      "rpc-reply":{
        "fpc-information":{
          "@style":"brief",
          "fpc":{
            "slot":"0",
            "state":"Online",
            "temperature":{
              "@celsius":"0",
              "#text":"N/A"
            },
```

2: Dependent item

Name ▲	Triggers	Key	Interval	History	Trends	Type	Status	Tag
Juniper MX by NETCONF: Resource: Get data: Alarm: Get data		juniper.mx.alarm.data		31d		Dependent item	Enabled	co


```
{
  "results":[
    ....
    {
      "rpc-reply":{
        "alarm-information":{
          "alarm-summary":{
            "active-alarm-count":"1"
          },
          "alarm-detail":{
            "alarm-time":{
              "@seconds":"1738561515",
              "#text":"2025-02-03 05:45:15 UTC"
            },
            "alarm-class":"Major",
            "alarm-description":"PEM 0 Not Powered",
            "alarm-short-description":"PEM 0 No Power",
            "alarm-type":"Chassis"
          }
        }
      }
    },
```

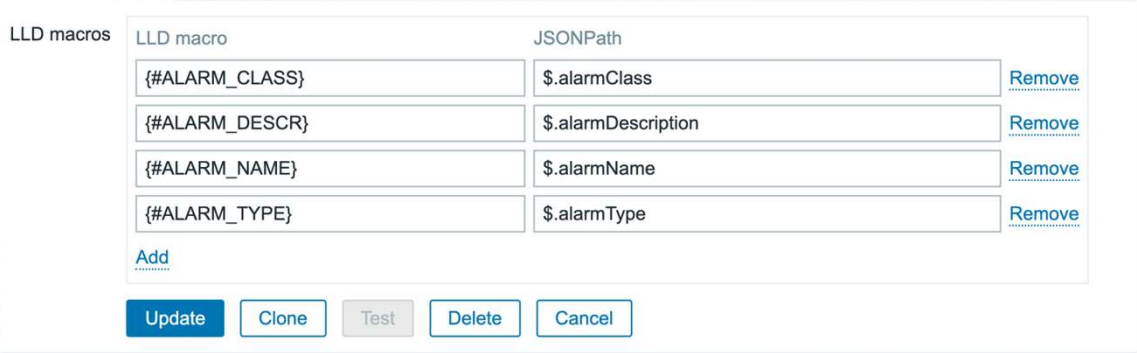


```
[
  {
    "alarm-detail":{
      "alarm-description":"PEM 0 Not Powered",
      "alarm-time":{
        "@seconds":"1738561515",
        "#text":"2025-02-03 05:45:15 UTC"
      },
      "alarm-type":"Chassis",
      "alarm-short-description":"PEM 0 No Power",
      "alarm-class":"Major"
    },
    "alarm-summary":{
      "active-alarm-count":"1"
    }
  }
]
```

3: LLD rule

Host	Name ▲	Items	Triggers	Graphs	Hosts	Key	Interval	Type
MX - netconf template	Juniper MX by NETCONF: Alarm: Get data: Alarms discovery	Item prototypes 2	Trigger prototypes 2	Graph prototypes	Host prototypes	juniper.mx.alarm.discovery		Depe


```
[
  {
    "alarmDescription":"PEM 0 Not Powered",
    "alarmClass":"Major",
    "alarmType":"Chassis",
    "alarmName":"PEM 0 No Power"
  }
]
```

4: Items as per prototypes

Name ▲	Key	Interval	History	Trends	Type	Create enabled	Discover	Tags
Juniper MX by NETCONF: Alarm: Get data: Alarm [{#ALARM_NAME}]: Get data	juniper.mx.alarm.get.data["{#ALARM_NAME}"]		0		Dependent item	Yes	Yes	component: ra
Juniper MX by NETCONF: Alarm [{#ALARM_NAME}]: Get data: Alarm [{#ALARM_NAME}]: Severity	juniper.mx.alarm.severity["{#ALARM_NAME}"]		31d	365d	Dependent item	Yes	Yes	class: {#ALAR

Name ▲	Triggers	Key
Alarms discovery: Alarm: Get data: Alarm [PEM 0 No Power]: Get data		juniper.mx.alarm.get.data["PEM 0 No Power"]
Alarms discovery: Alarm [PEM 0 No Power]: Get data: Alarm [PEM 0 No Power]: Severity	Triggers 2	juniper.mx.alarm.severity["PEM 0 No Power"]

Why use Netconf over SNMP?

- SSH so secure by default
- Way, waaaay more efficient than SNMP ever will be
- More info is exposed
- Easier to correlate different entities
- Structured data; easier to parse

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