



Enhancing Zabbix Monitoring with AI





Zabbix Summit 2024

About initMAX





ZABBIX

wazuh.

 PostgreSQL

Widgets & Modules



Certified trainings

Technical Support



All in one solutions

Consulting



Integration



ZABBIX

wazuh.

 PostgreSQL

Honesty,

Honesty, diligence

Honesty, diligence and MAXimum
knowledge of our products

Honesty, diligence and MAXimum
knowledge of our products
is our standard.

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knowledge of our products
is our standard.

Heimönek





Monitoring all around the globe



Zabbix Summit 2024

Getting started with AI



Getting started with AI

Our first implementation of AI in Zabbix dates back to our experimental project, which was presented at the summit a year ago. We showcased a Proof of Concept (POC) for a chat interface with the ability to connect to the ChatGPT model or other AI models.

Getting started with AI

Even back then, we had bigger ambitions, as we gained the experience that integrating artificial intelligence into a monitoring system like Zabbix is not only possible but also highly beneficial.

Getting started with AI

What we play with

Getting started with AI

What we play with



Apple iMac Studio



NVIDIA RTX A6000



ChatGPT

Getting started with AI

Some details about our decision

- ▶ Apple M2 Ultra with 24-core CPU, 76-core GPU, 128GB RAM, 32-core Neural Engine
- ▶ NVIDIA RTX A6000 – supports NVLink for scaling (40XX series does not)
- ▶ ChatGPT utilizes around 30,000 GPUs – 5,000 for training
- ▶ ChatGPT is now using NVIDIA H100 94GB, and the price is enormous

Getting started with AI

Weakness of AI training

- ▶ Performance – Large power consumption, specific powerful hardware
- ▶ Specific hardware for scaling – for large models, you need to use a lot of VRAM
- ▶ If data changes often, you need to rerun training – this is called data drift
- ▶ It is better to pay for a service to rent hardware than to buy your own.

Getting started with AI

AI Models

Getting started with AI

AI Models



LSTM
(Long Short-Term Memory)



LLM
(ChatGPT)



SVM
(Support Vector Machines)

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ChatGPT Widget



Getting started with AI

Some details - ChatGPT widget

- ▶ It can be connected to ChatGPT or other LLM APIs such as GPT4ALL.
- ▶ It respects user permissions
- ▶ Completely created as a Zabbix Widget
- ▶ You need to have an API token



Briefly, what is Zabbix?



Zabbix is an open-source monitoring software tool designed for tracking and managing the performance and availability of IT infrastructure, applications, and services. It collects data from diverse network devices, servers, and virtual machines to ensure smooth operations. Zabbix offers features such as real-time monitoring, alerting, data visualization through graphs and dashboards, and extensive metric collection capabilities. It is highly flexible and scalable, making it suitable for various environments, ranging from small businesses to large enterprises.

How can I setup monitoring with ZabbixAgent2?



Setting up monitoring with ZabbixAgent2 involves several steps, from installation to configuration. ZabbixAgent2, the newer version of the traditional Zabbix agent, provides advanced monitoring capabilities and better performance. Here's a basic guide to get you started:

1. INSTALL ZABBIX AGENT 2

On Debian/Ubuntu:

```
wget https://repo.zabbix.com/zabbix/6.0/ubuntu/pool/main/z/zabbix/zabbix-agent2_6.0.0-1%2Bubuntu20.04_amd64.deb
sudo dpkg -i zabbix-agent2_6.0.0-1+ubuntu20.04_amd64.deb
sudo apt-get update
sudo apt-get install -f
```

On RHEL/CentOS:

```
rpm -Uvh https://repo.zabbix.com/zabbix/6.0/rhel/7/x86_64/zabbix-agent2-6.0.0-1.el7.x86_64.rpm
sudo yum install zabbix-agent2
```

 Send a message





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sudo apt-get update
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```

 Send a message



1 He is doing consultancy

2 He can read or change your configuration

3 Helping with importing or exporting



ChatGPT Widget

Creating hosts based on cities

initMAX

Dashboards

Monitoring

Services

Inventory

Reports

Data collection

Alerts

Users

Administration

initMAX

GitLab

Social media

Help

User settings

Sign out

DEMO/widget / ChatGPT

Edit dashboard

Welcome to the initMAX Zabbix demo

Active since: 2024-10-02 08:00

Active till: 2024-10-04 07:59


All dashboards / DEMO/widget / ChatGPT


[Main page](#)

ChatGPT

The ChatGPT widget integrates AI capabilities into your Zabbix dashboard, allowing interaction with OpenAI models directly from the widget.

Product page





Send a message

Examples

FREE version: ChatGPT

- widget without Zabbix integration or file upload.

PRO version

- File Management: Allows working with your own files for export and import.
- Configuration Querying: Enables querying the current configuration settings.
- Problem Management: Allows listing and working with existing problems in the system.
- Access to Latest Values: Provides access to the latest measured values in the system.
- Configuration Changes: Enables modifying all configuration settings.
- Access Control: Access can be restricted using a manual token, rather than standard user permissions.
- API Limitations: Functionality is limited only by the capabilities of the Zabbix API.
- Technology Integration: Uses a combination of ChatGPT and PHP; actions are controlled via direct calls from the widget, not directly through ChatGPT.



ChatGPT Widget

Smart hosts import from CSV file

initMAX

Search

- Dashboards
- Monitoring
- Services
- Inventory
- Reports
- Data collection
- Alerts
- Users
- Administration
- initMAX
- GitLab
- Social media
- Help
- User settings
- Sign out

DEMO/widget / ChatGPT Edit dashboard


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initMAX

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AI Assistant



AI Assistant

Some details - AI Assistant

- ▶ It can connect to Zabbix's "Problems" section to explain issues and suggest solutions
- ▶ Each problem has a dedicated button for quick chat-based communication
- ▶ Collecting problem details in the background and using them for the request
- ▶ Fully integrated as a Zabbix Module for easy use

Problem

Zabbix agent is not available (for 3m) ?

AI Assistant



INTERPRETATION OF THE PROBLEM

The event indicates that the Zabbix agent on the host zabbix.intevia.cloud is not available for the last 3 minutes.

POTENTIAL IMPACT IF NOT ADDRESSED

Critical monitoring data from the host may be unavailable, affecting overall system monitoring and alerts.

SUGGESTED SOLUTIONS OR TROUBLESHOOTING STEPS

Check Agent Status on Host: Ensure that the Zabbix agent service is running on the host. You can do this by executing `systemctl status zabbix-agent` on the host.

Network Connectivity: Verify that the host zabbix.intevia.cloud is reachable from the Zabbix server. Use ping or traceroute to check connectivity.

Firewall and Security Groups: Ensure that TCP port 10050 (default port) is open for inbound traffic to the Zabbix agent.

Agent Configuration: Confirm that the `zabbix_agentd.conf` configuration file on the host has the correct `Server` parameter pointing to your Zabbix server.

ADDITIONAL QUESTIONS


Have there been any recent changes to the network or firewall settings?


Is the issue persistent, or does the agent become available intermittently?

By following these steps, you should be able to diagnose and potentially fix the issue of the Zabbix agent being unavailable.



Problem

Zabbix agent is not available (for 3m)  **AI Assistant**

 **initMAX**

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1 Clear explanation

2 Suggesting next steps to solve your issue

3 You can ask for more information



AI Assistant

Smart problem resolving

initMAX

Search

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All dashboards / DEMO/. Main page

WELCOME TO initMAX DEMO

Explore our demo pages with Zabbix showcases, news and so on.
Feel free to contact us for more information.



- Zabbix 7.0
- AI
- Home monitor
- Geomaps
- Aquarium
- VMware
- Network map
- References

Widgets & modules

- AI Preprocessing Assistant**
is a puzzle game where players uncover tiles to find hidden mines using numerical clues
- matrixMAX**
provides a quick overview of hosts with their problems using color-based indicators
- AI Problem Diagnostics Assistant**
is a puzzle game where players uncover tiles to find hidden mines using numerical clues

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AI Event Correlation



AI Event Correlation

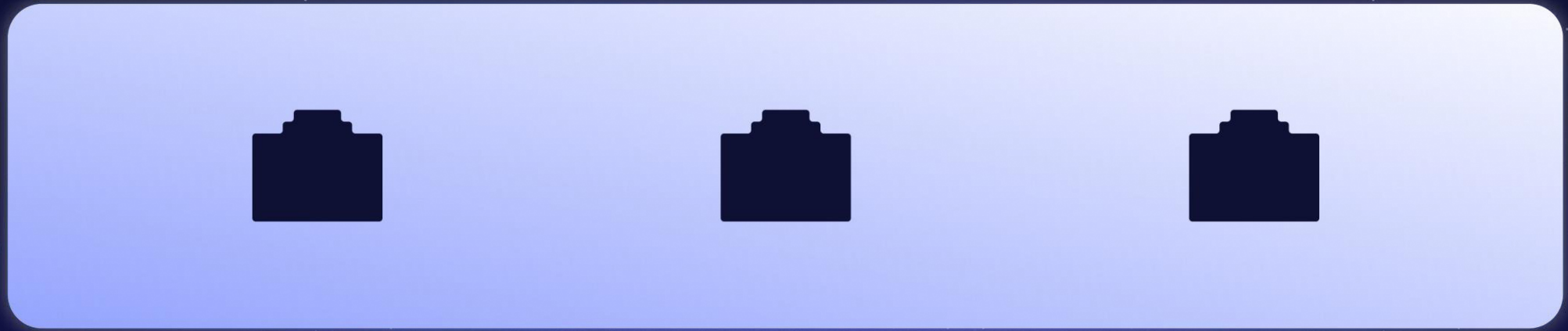
Some details - AI Event Correlation

- ▶ It is not only about your events, but also about your topology
- ▶ There is a small delay
- ▶ A better solution than global event correlation
- ▶ Correlation is done via API calls



AI Assistant

Topology information



MAC1

MAC2

MAC5

MAC3

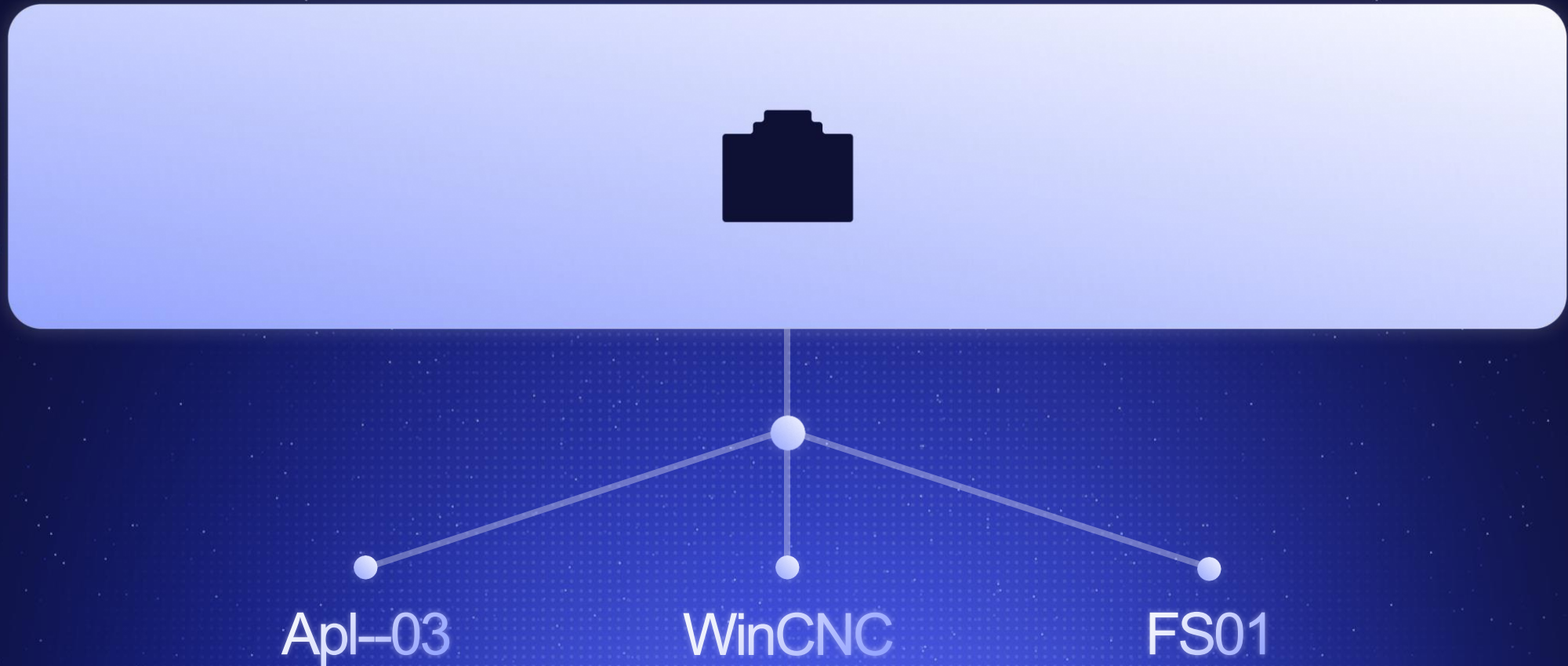
MAC6

MAC4

MAC7

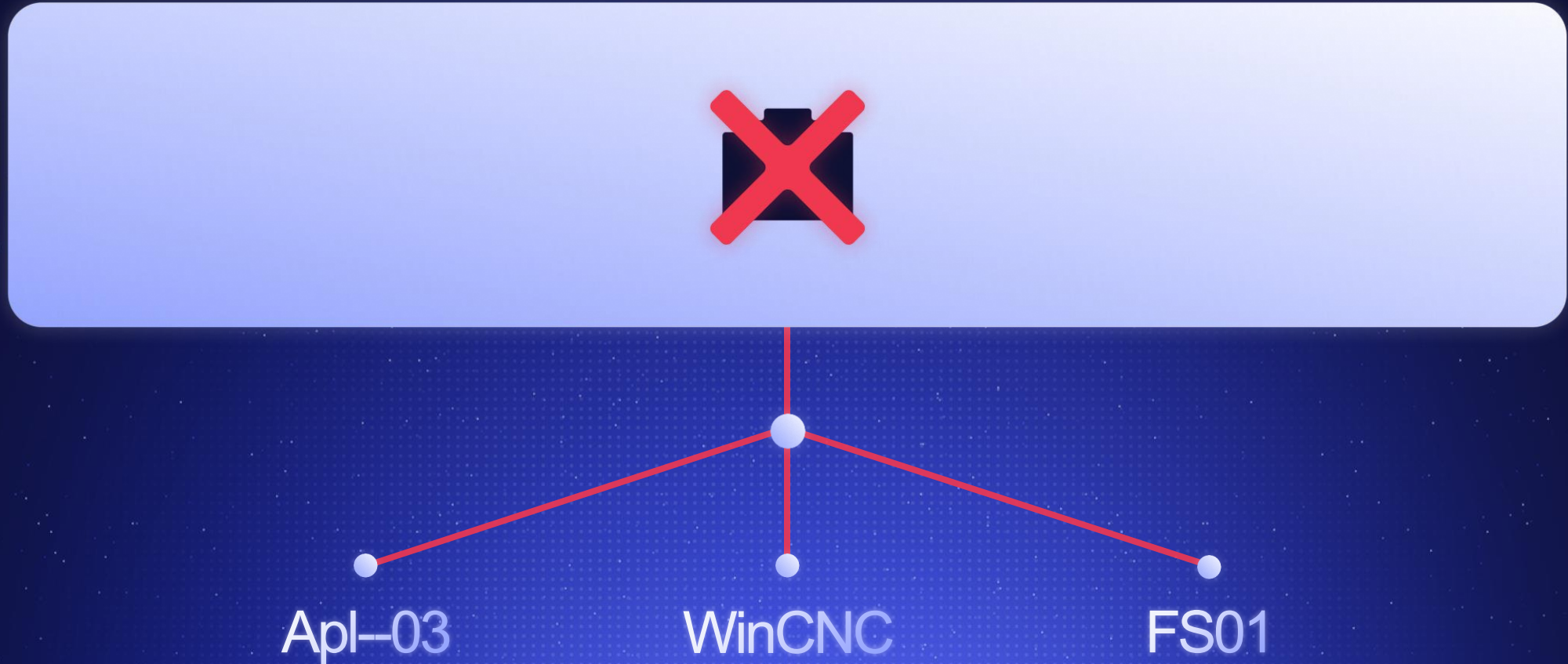
Connected devices

Switch_Core-01



Pairing MAC addresses and devices is done through inventory

Switch_Core-01



When a port on the switch is down, your machines cannot be reached.

AI Event Correlation

How does it work?



Network topology



AI Reading events
and additional information



Zabbix API

- 1 Reading events and additional information, such as host groups, assigned templates, and tags...
- 2 The AI analyzes the problem and evaluates topology information from the tag
- 3 If the AI determines a correlation, either based on topology or similar/related issues, it triggers an action in the API – `event.acknowledge (256 - change event rank to "symptom")`

AI Event Correlation

Problem correlation

<input type="checkbox"/>	Time	Severity	Recovery time	Status	Info	Host	Problem	Duration	Update	Actions	Tags
<input type="checkbox"/>	05:44:47 PM	Disaster		PROBLEM		Switch_Core-01	Interface gi6(Test_port): Link down	6h 1m 5s	Update	AI Assistant	Env: Prod Port: gi6
<input type="checkbox"/>	05:35:37 PM	Average		PROBLEM		apl-03	Zabbix agent is not available (for 3m) ?	6h 10m 15s	Update	AI Assistant	Application: Status Env: Prod Parent: Switch_Core-01 ...
<input type="checkbox"/>	05:34:30 PM	Average		PROBLEM		Win_CNC	Zabbix agent is not available (for 3m) ?	6h 11m 22s	Update	AI Assistant	Application: Status Env: Prod Parent: Switch_Core-01 Parent Port: gi6
<input type="checkbox"/>	05:30:55 PM	High		PROBLEM		FS01	Unavailable by ICMP ping ?	6h 14m 57s	Update	AI Assistant	component: health component: network Env: Prod ...

Displaying 4 of 4 found

This is the standard Zabbix problem screen without correlation. Some devices have a 'Parent' tag with the parent device's hostname, and another tag showing the port.

	Time	Severity	Recovery time	Status	Info	Host	Problem	AI Assistant	Duration	Update	Actions	Tags
<input type="checkbox"/>	05:44:47 PM	Disaster		PROBLEM		Switch_Core-01	Interface gi6(Test_port): Link down	AI Assistant	6h 4m 38s	Update		Env: Prod Port: gi6
<input type="checkbox"/>	05:35:37 PM	Average		PROBLEM		apl--03	Zabbix agent is not available (for 3m)	AI Assistant	6h 13m 48s	Update	1	Application: Status Env: Prod Parent: Switch_Core-01
<input type="checkbox"/>	05:34:30 PM	Average		PROBLEM		Win_CNC	Zabbix agent is not available (for 3m)	AI Assistant	6h 14m 55s	Update		Application: Status Env: Prod Parent: Switch_Core-01 Parent Port: gi6
<input type="checkbox"/>	05:30:55 PM	High		PROBLEM		FS01	Unavailable by ICMP ping	AI Assistant	6h 18m 30s	Update	3	component: health component: network Env: Prod

Displaying 1 of 1 found

AI used the Port and Parent tags to find a matching issue on the parent device. Since the port was down, it marked the related problem as a symptom of the main issue.

AI Event Correlation

Suppress notification

New action ✕

[Action](#) [Operations 2](#)

* Default operation step duration

	Steps	Details	Start in	Duration	Action
Operations	2	Send message to user groups: Zabbix_Super_Admins via MS Teams	00:01:00	Default	Edit Remove
Add					

	Details	Action
Recovery operations	Notify all involved	Edit Remove
Add		

	Details	Action
Update operations		Add

Pause operations for symptom problems

Pause operations for suppressed problems

Notify about canceled escalations

* At least one operation must exist.

We need to delay all operations to give the AI time to do its job

Pause operations for symptom problems

Pause operations for suppressed problems

Notify about canceled escalations

We are using the functionality introduced in Zabbix version 6.4 to suppress actions if an event is marked as a symptom

AI Event Correlation

What does ChatGPT say?

<input type="checkbox"/>	Time ▼	Severity	Recovery time	Status	Info	Host	Problem		Duration	Update	Actions	Tags
<input type="checkbox"/>	1 ^ 03:53:25 PM	Disaster		PROBLEM		Load balancer 1	Load balancer is DOWN!	AI Assistant	10m 39s	Update		Env: Prod
<input type="checkbox"/>	↳ 03:53:04 PM	Information		PROBLEM		Load balancer 2	Load balancer is MASTER now!	AI Assistant	11m	Update	1 ↔	Env: Prod

Displaying 1 of 1 found

It correctly marks the load balancer being down as the root cause and identifies the second load balancer becoming master as a symptom


```
03:53:25 PM    Disaster    PROBLEM    Load balancer 1 Load
balancer is DOWN! AI Assistant 1m 33s Update    Env: Prod
03:53:04 PM    Information  PROBLEM    Load
balancer 2 Load balancer is MASTER now! AI Assistant 1m 54s
Update    Env: Prod
```



This correlation between the two events shows a typical failover situation in a high-availability environment:

- **03:53:25 PM - Load balancer 1 is DOWN (Disaster level):** This is the root cause of the problem.
- **03:53:04 PM - Load balancer 2 becomes MASTER (Information level):** This is a consequence of Load balancer 1 going down, so it's a symptom.

In terms of correlation, the AI Assistant should interpret the **failure of Load balancer 1** as the primary issue (root cause), while the **promotion of Load balancer 2 to MASTER** is merely a response or a symptom of that failure.

The system has responded as expected to maintain availability by promoting Load balancer 2, so there's no further action required on that part. The focus should be on resolving the failure of Load balancer 1. If you're using Zabbix's **Root Cause and Symptoms** feature, it should automatically correlate these events and help you reduce the noise by treating the "Load balancer 2 becoming MASTER" event as informational rather than a separate problem.

'becomes Master' is marked as a symptom

AI Item Preprocessing

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AI Item Preprocessing

Some details - AI Preprocessing

- ▶ You can find it on the item level
- ▶ You can use manual input or a “Get value” button to provide raw data from the item
- ▶ It suggests what is best for your use case, and you can approve the setting
- ▶ After approval, it automatically fills the preprocessing form

Item

Item Tags Preprocessing

Preprocessing steps ? Add

AI Preprocessing Assistant

AI Assistant

Get value from host

Host address

Port

Test with **Server** Proxy

Value

Time


Not supported Error


Previous value

Prev. time


End of line sequence **LF** CRLF

Get value


 initMAX

 Enter the data you wish to modify, or retrieve it using the 'Get value' option.

I have an item with the following configuration: Item Details: `{"itemid":"230406","name":"item-1","key_":"item-1","value_type":"0","preprocessing":[]}`
Actual Item Value: 1 I need assistance in determining the optimal preprocessing steps for this item. Could you help me define the necessary preprocessing methods? First at all, ask the question: "What is the desired outcome or format for the preprocessed value? For example, should the data be normalized or transformed into a specific unit or range?"

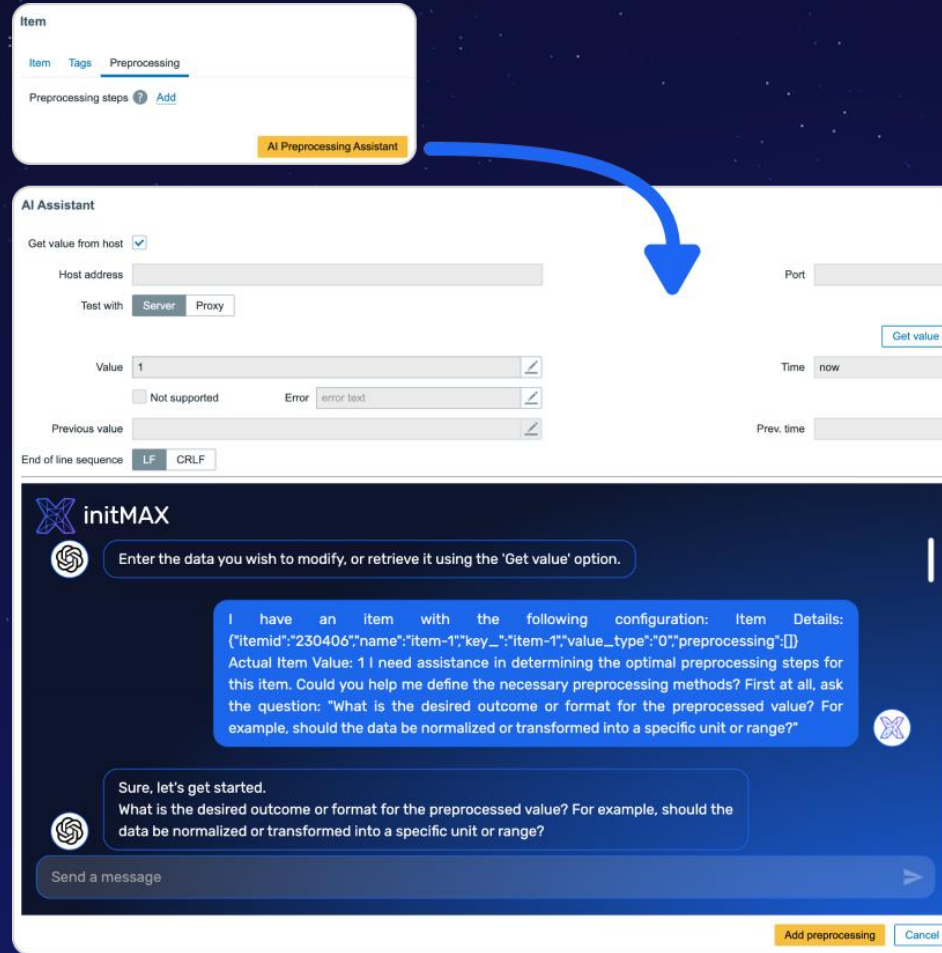


Sure, let's get started.
What is the desired outcome or format for the preprocessed value? For example, should the data be normalized or transformed into a specific unit or range?



Send a message

Add preprocessing Cancel



The image shows a Zabbix 'Item' configuration window with a blue arrow pointing from the 'AI Preprocessing Assistant' button to the 'AI Assistant' dialog box. The 'AI Assistant' dialog contains a form for configuring a 'Get value' step, including fields for 'Host address', 'Port', 'Value', 'Error', 'Previous value', and 'End of line sequence'. Below the form is a chat interface with the 'initMAX' logo and a GPT icon. The chat messages are: 'Enter the data you wish to modify, or retrieve it using the 'Get value' option.', 'I have an item with the following configuration: Item Details: {"itemid":"230406","name":"item-1","key_":"item-1","value_type":"0","preprocessing":[]}. Actual Item Value: 1 I need assistance in determining the optimal preprocessing steps for this item. Could you help me define the necessary preprocessing methods? First at all, ask the question: "What is the desired outcome or format for the preprocessed value? For example, should the data be normalized or transformed into a specific unit or range?"', and 'Sure, let's get started. What is the desired outcome or format for the preprocessed value? For example, should the data be normalized or transformed into a specific unit or range?'. At the bottom of the dialog are 'Add preprocessing' and 'Cancel' buttons.

1 No Coding Required

2 Step-by-Step Guidance

3 One-click setup for all preprocessing steps



AI Item Preprocessing

Using only short host name

initMAX

- Dashboards
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- Reports
- Data collection
 - Template groups
 - Host groups
 - Templates
 - Hosts
 - Maintenance
 - Event correlation
 - Discovery
- Alerts
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Items

Create item



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All hosts / Preprocessing AI Example Enabled ZBX Items 2 Triggers Graphs Discovery rules Web scenarios

Filter

Host groups Type

Hosts Type of information

Name

Key

Value mapping

History

Trends

Update interval

Tags

State

Status

Triggers

Inherited

Discovered

Subfilter affects only filtered data

TYPE OF INFORMATION

Character 1 Text 1

<input type="checkbox"/>	Name ▲	Triggers	Key	Interval	History	Trends	Type	Status	Tags	Info
<input type="checkbox"/>	*** JSON file for LLD		vfs.file.contents[/tmp/json_for_discovery]	1m	31d		Zabbix agent	Enabled	AI: Example	
<input type="checkbox"/>	*** System hostname		agent.hostmetadata	1m	31d		Zabbix agent	Enabled	AI: Example	

Displaying 2 of 2 found

0 selected



AI Item Preprocessing

Transform JSON to LLD

initMAX

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Host groups Type

Hosts Type of information

Name History

Key Trends

Value mapping Update interval

Tags

State

Status

Triggers

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Subfilter affects only filtered data

TYPE OF INFORMATION
Character 1 Numeric (unsigned) 1

STATE
Normal 1 Not supported 1

<input type="checkbox"/>	Name	Triggers	Key	Interval	History	Trends	Type	Status	Tags	Info
<input type="checkbox"/>	*** JSON file for LLD		vfs.file.contents[/tmp/json_for_discovery]	1m	31d	0	Zabbix agent	Not supported	AI: Example	i
<input type="checkbox"/>	*** System hostname		agent.hostmetadata	1m	31d		Zabbix agent	Enabled	AI: Example	

Displaying 2 of 2 found

0 selected



Zabbix Summit 2024



Last but not least



Last but not least

What do we bring to you?

- ▶ We have a new e-shop with widgets, modules, and templates
- ▶ We updated our Git repository and added some news
- ▶ We prepared a new Zabbix demo
- ▶ We have some gifts here at our booth

Last but not least

Important links

Last but not least

Important links



www.initmax.com/eshop



git.initmax.com



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Thank you

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