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AI ON THE EDGE

IN ZABBIX

Tomáš Heřmánek / CEO initMAX

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WHO WE ARE & WHY **THIS TOPIC**

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UNLOCKING THE VALUE OF DATA

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2

Zabbix Certified

TRAINERS

4

Zabbix Certified

EXPERTS

6

Zabbix Certified

PROFESSIONALS

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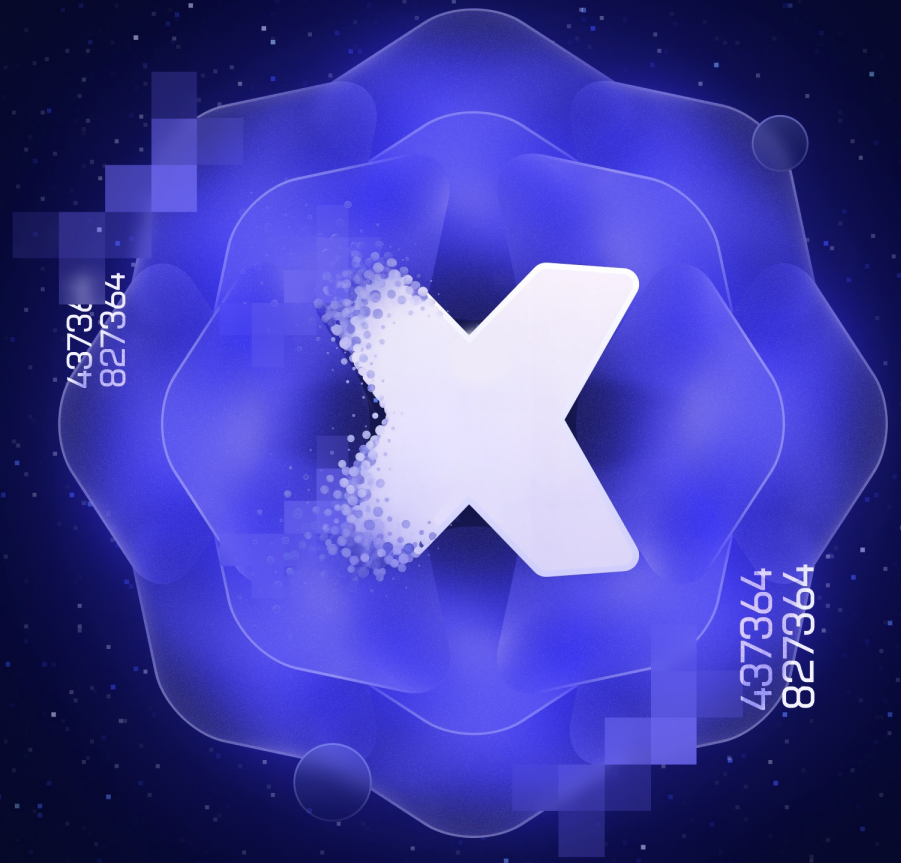
WIDGETS & MODULES

CERTIFIED TRAININGS



TECHNICAL SUPPORT

ALL IN ONE SOLUTIONS

CONSULTING

INTEGRATION

ZABBIX wazuh. PostgreSQL

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GLOBAL PARTNER

MONITORING ALL OVER THE WORLD

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GLOBAL PARTNER

MONITORING ALL OVER THE WORLD

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HONESTY, DILIGENCE AND MAXIMUM KNOWLEDGE OF OUR PRODUCTS IS OUR STANDARD.

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FROM GEEKS TO GEEKS. SOMETHING THAT EVERYONE CAN TRY. THE TRUE POWER OF OPEN SOURCE, WITH A TOUCH OF AI MAGIC.

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THE IDEA
IN ONE PICTURE

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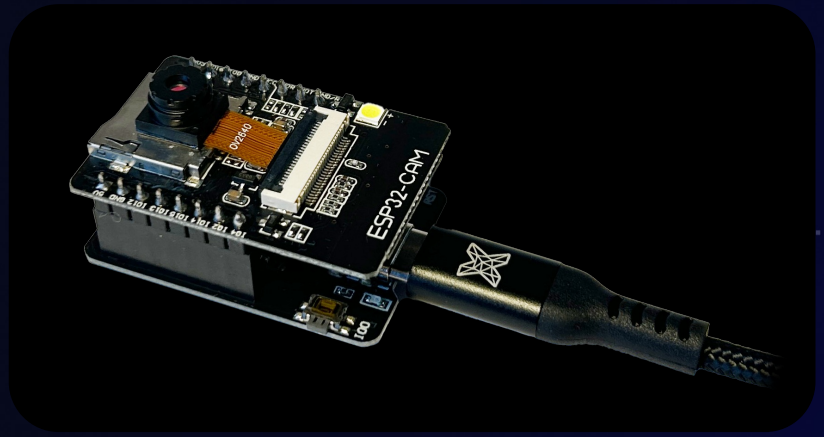
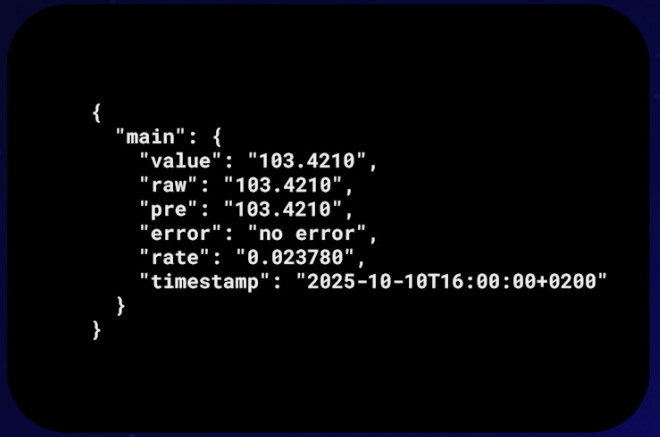
THE IDEA IN ONE PICTURE

Camera → ROI processing → Inference → JSON/MQTT/HTTP → Zabbix

WATER METER



ESP32-CAM



```
{
  "main": {
    "value": "103.4210",
    "raw": "103.4210",
    "pre": "103.4210",
    "error": "no error",
    "rate": "0.023780",
    "timestamp": "2025-10-10T16:00:00+0200"
  }
}
```

API NUMBER PREVIEW

(Images stay in LAN; we send results, not streams)

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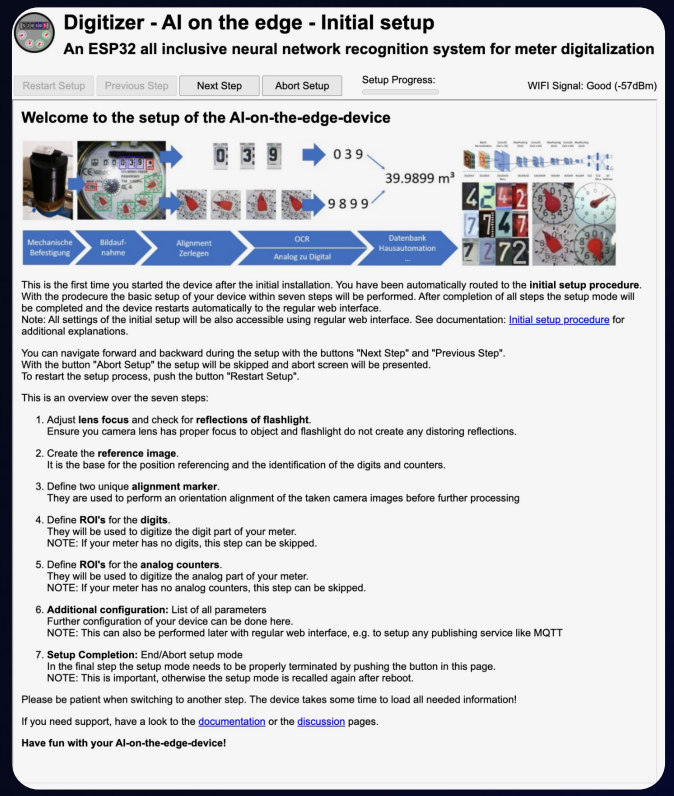
THE IDEA IN ONE PICTURE

Camera → ROI processing → Inference → JSON/MQTT/HTTP → Zabbix

01



Digitizer - AI on the edge - Initial setup

An ESP32 all inclusive neural network recognition system for meter digitalization

Restart Setup | Previous Step | Next Step | Abort Setup | Setup Progress: | WIFI Signal: Good (-57dBm)

Welcome to the setup of the AI-on-the-edge-device

This is the first time you started the device after the initial installation. You have been automatically routed to the **initial setup procedure**. With the prodecure the basic setup of your device within seven steps will be performed. After completion of all steps the setup mode will be completed and the device restarts automatically to the regular web interface.
Note: All settings of the initial setup will be also accessible using regular web interface. See documentation: Initial setup procedure for additional explanations.

You can navigate forward and backward during the setup with the buttons "Next Step" and "Previous Step".
With the button "Abort Setup" the setup will be skipped and abort screen will be presented.
To restart the setup process, push the button "Restart Setup".

This is an overview over the seven steps:

1. Adjust **lens focus** and check for **reflections of flashlight**.
   Ensure you camera lens has proper focus to object and flashlight do not create any distoring reflections.
2. Create the **reference image**.
   It is the base for the position referencing and the identification of the digits and counters.
3. Define two unique **alignment marker**.
   They are used to perform an orientation alignment of the taken camera images before further processing
4. Define **ROI's** for the **digits**.
   They will be used to digitize the digit part of your meter.
   NOTE: If your meter has no digits, this step can be skipped.
5. Define **ROI's** for the **analog counters**.
   They will be used to digitize the analog part of your meter.
   NOTE: If your meter has no analog counters, this step can be skipped.
6. **Additional configuration:** List of all parameters
   Further configuration of your device can be done here.
   NOTE: This can also be performed later with regular web interface, e.g. to setup any publishing service like MQTT
7. **Setup Completion:** End/Abort setup mode
   In the final step the setup mode needs to be properly terminated by pushing the button in this page.
   NOTE: This is important, otherwise the setup mode is recalled again after reboot.

Please be patient when switching to another step. The device takes some time to load all needed information!

If you need support, have a look to the documentation or the discussion pages.

Have fun with your AI-on-the-edge-device!

- A simple Setup Wizard is ready at http://<IP-of-your-device>/setup.html you can relaunch it anytime by visiting that URL directly.
- For a quick start, use the DEMO data from the **jomjol** repository.

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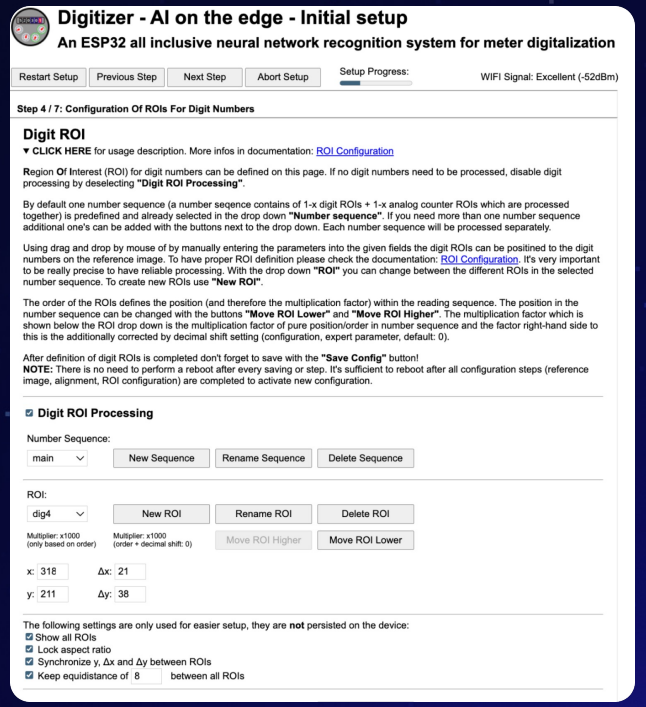
THE IDEA IN ONE PICTURE

Camera → ROI processing → Inference → JSON/MQTT/HTTP → Zabbix

02



Digitizer - AI on the edge - Initial setup

An ESP32 all inclusive neural network recognition system for meter digitalization

Restart Setup | Previous Step | Next Step | Abort Setup | Setup Progress: | WIFI Signal: Excellent (-52dBm)

Step 4 / 7: Configuration Of ROIs For Digit Numbers

Digit ROI

▼ **CLICK HERE** for usage description. More infos in documentation: ROI Configuration

Region **O**f **I**nterest (ROI) for digit numbers can be defined on this page. If no digit numbers need to be processed, disable digit processing by deselecting **"Digit ROI Processing"**.

By default one number sequence (a number seqence contains of 1-x digit ROIs + 1-x analog counter ROIs which are processed together) is predefined and already selected in the drop down **"Number sequence"**. If you need more than one number sequence additional one's can be added with the buttons next to the drop down. Each number sequence will be processed separately.

Using drag and drop by mouse of by manually entering the parameters into the given fields the digit ROIs can be positined to the digit numbers on the reference image. To have proper ROI definition please check the documentation: ROI Configuration. It's very important to be really precise to have reliable processing. With the drop down **"ROI"** you can change between the different ROIs in the selected number sequence. To create new ROIs use **"New ROI"**.

The order of the ROIs defines the position (and therefore the multiplication factor) within the reading sequence. The position in the number sequence can be changed with the buttons **"Move ROI Lower"** and **"Move ROI Higher"**. The multiplication factor which is shown below the ROI drop down is the multiplication factor of pure position/order in number sequence and the factor right-hand side to this is the additionally corrected by decimal shift setting (configuration, expert parameter, default: 0).

After definition of digit ROIs is completed don't forget to save with the **"Save Config"** button!
NOTE: There is no need to perform a reboot after every saving or step. It's sufficient to reboot after all configuration steps (reference image, alignment, ROI configuration) are completed to activate new configuration.

☑ **Digit ROI Processing**

Number Sequence:

main | New Sequence | Rename Sequence | Delete Sequence

ROI:

dig4 | New ROI | Rename ROI | Delete ROI

Multiplier: x1000 (only based on order) | Multiplier: x1000 (order + decimal shift: 0) | Move ROI Higher | Move ROI Lower

x: 318 Δx: 21

y: 211 Δy: 38

The following settings are only used for easier setup, they are **not** persisted on the device:

☑ Show all ROIs
☑ Lock aspect ratio
☑ Synchronize y, Δx and Δy between ROIs
☑ Keep equidistance of 8 between all ROIs

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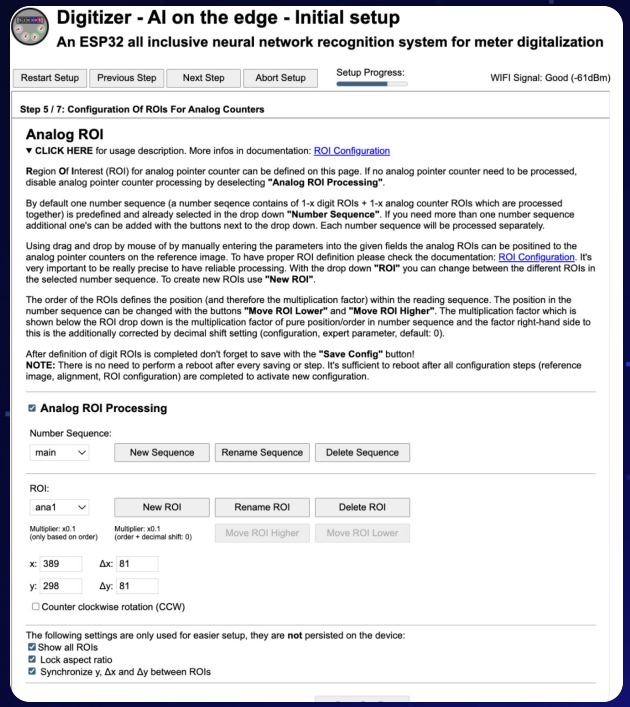
THE IDEA IN ONE PICTURE

Camera → ROI processing → Inference → JSON/MQTT/HTTP → Zabbix

03



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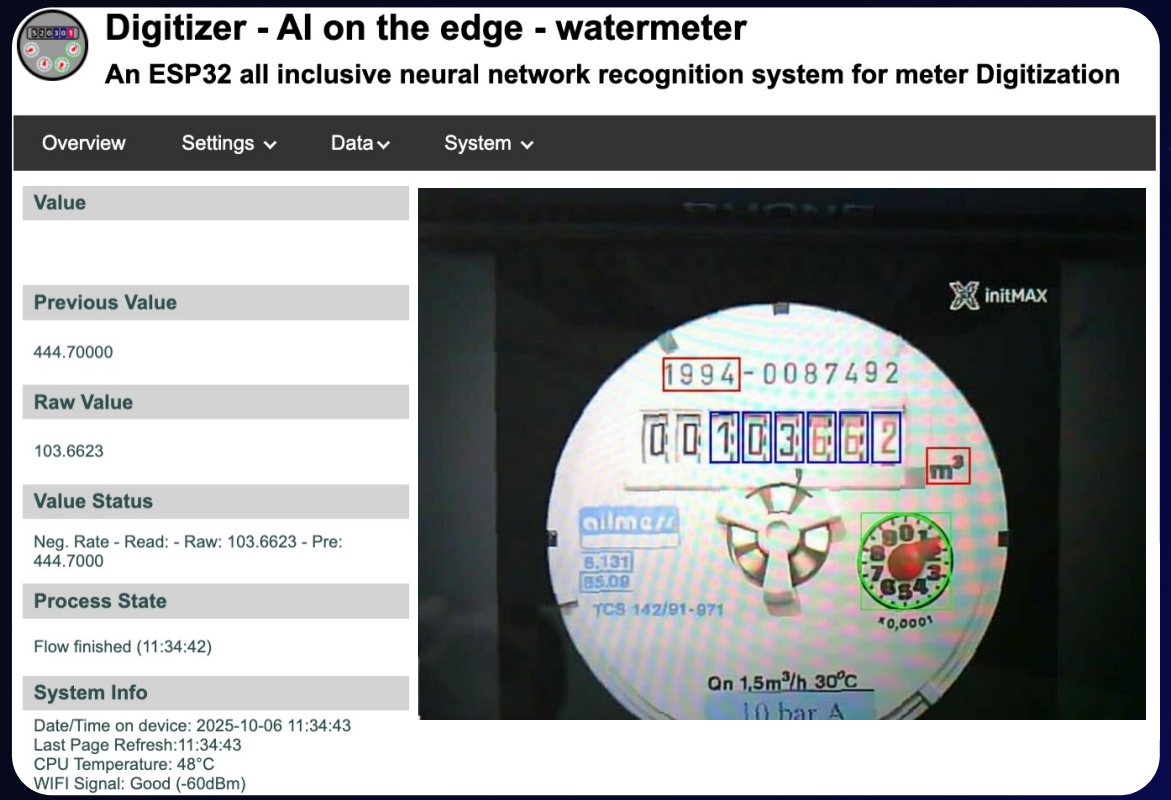
THE IDEA IN ONE PICTURE

Camera → ROI processing → Inference → JSON/MQTT/HTTP → Zabbix

04



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THE IDEA IN ONE PICTURE

- Many enterprise signals are still analog (meters, dials, LEDs, displays).
- Edge AI converts images → numbers locally (privacy, no cloud lock-in).
- Works with tiny budget and off-the-shelf parts ($10 - $20 USD).
- A simple “AI game” anyone can try, learn, and extend.

WHO BUILT IT?

Open-source (non-commercial limits; credit: Josef / jomjol)
https://github.com/jomjol/AI-on-the-edge-device

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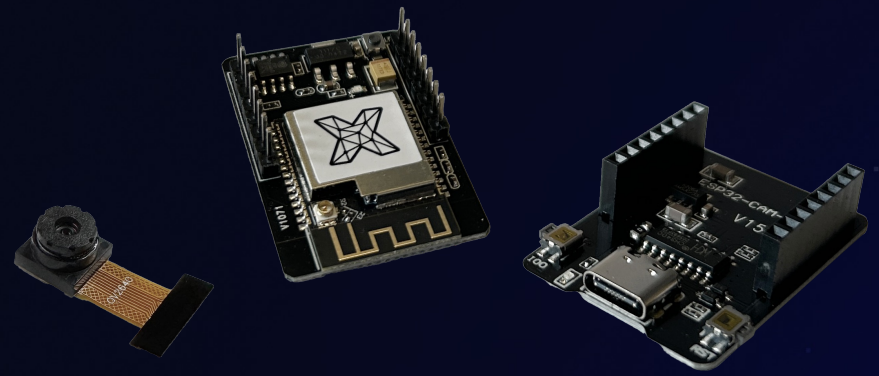
THE IDEA IN ONE PICTURE

Camera → ROI processing → Inference → JSON/MQTT/HTTP → Zabbix



01

- OV2640 camera (2 MP).
- ESP32-CAM (ESP32, **8 MB PSRAM**), 2.4 GHz Wi-Fi; power 5 V / ≥ 500 mA.
- microSD ≥ 2 GB with FAT32.
- Use ESP32-CAM-MB (USB-UART) for programming and power; connect with a USB-C cable (a USB-mini board variant is also available).
- Data cable for firmware upload, power delivery and debug console access.

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THE IDEA IN ONE PICTURE

Camera → ROI processing → Inference → JSON/MQTT/HTTP → Zabbix

02

- Workshop AI Monitoring Kit — everything you need to get started.
- Recommended: CAM Adjuster for precise lens fine-tuning.
- The kit includes a demo holder; for specific setups, you can 3D-print your own design/mount.

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HOW TO MONITOR THIS
WITH ZABBIX

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WHY ZABBIX

- Mature open-source platform – built-in alerting, SLA and escalations
- Broad inputs – HTTP Agent, MQTT (Agent2), Trapper (push/pull)
- Large data storage (including images) – store long-term time-series and image snapshots for audits, comparisons and model tuning
- Item Browser – double-check image and numeric values side-by-side
- Clean widgets – build clear, readable dashboards
- Calculated/Aggregate items – daily/monthly statistics and rollups
- Easy-to-configure notifications and escalations
- Because Zabbix is COOL!!!

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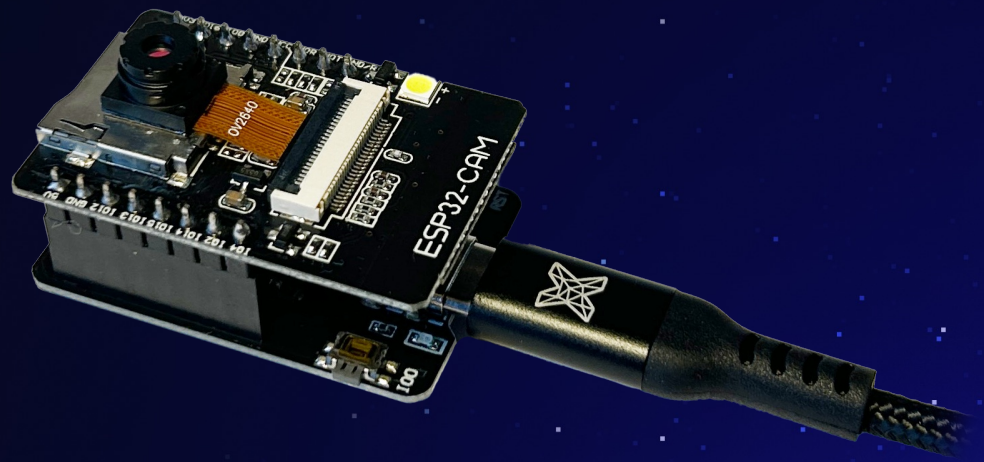
WHY ZABBIX

Monitoring from Zabbix server or proxy via HTTP Agent
Easy to check and get your data



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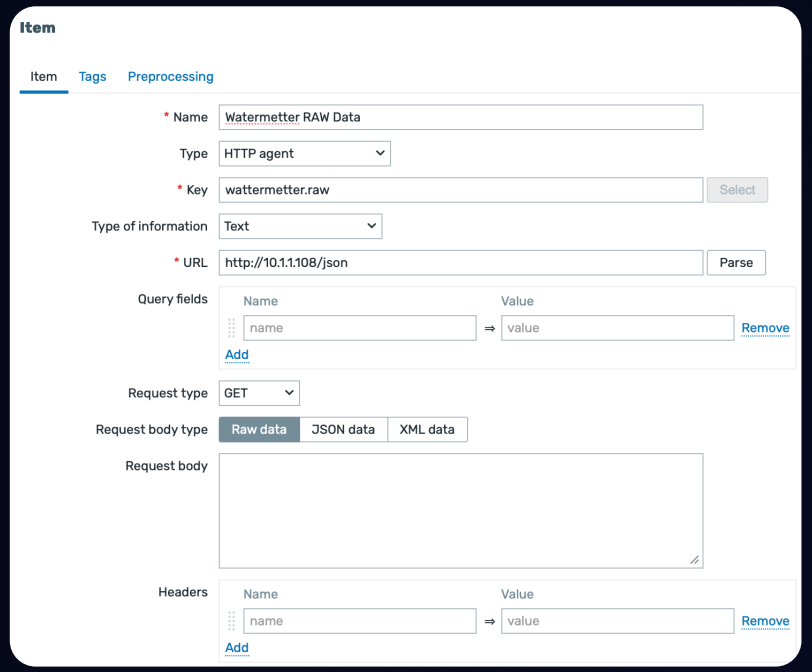
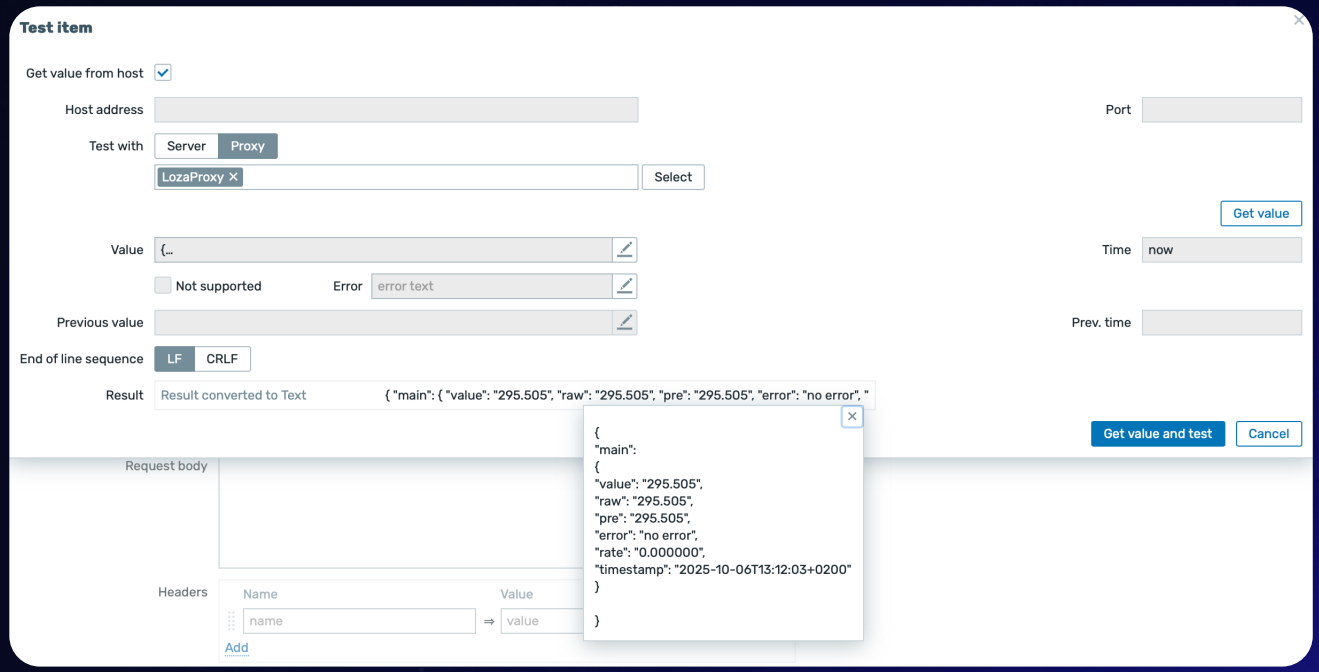
WHY ZABBIX

Monitoring from Zabbix server or proxy via HTTP agent





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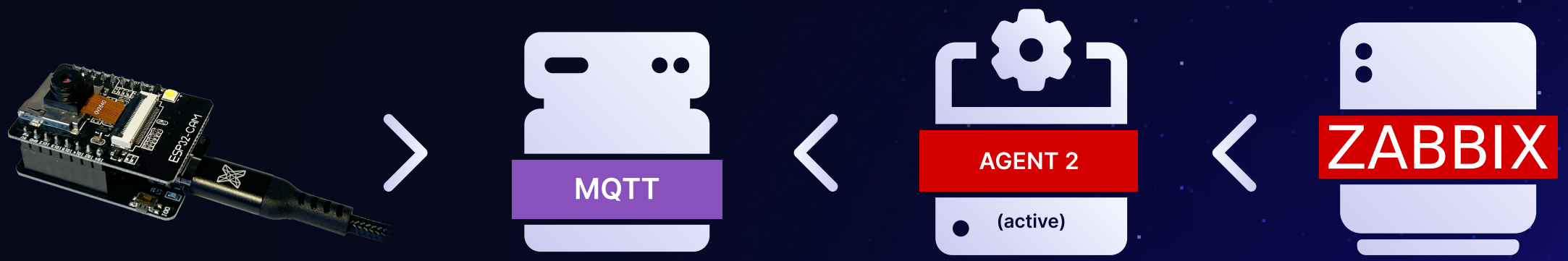
WHY ZABBIX

Sending data via MQTT (recommended)



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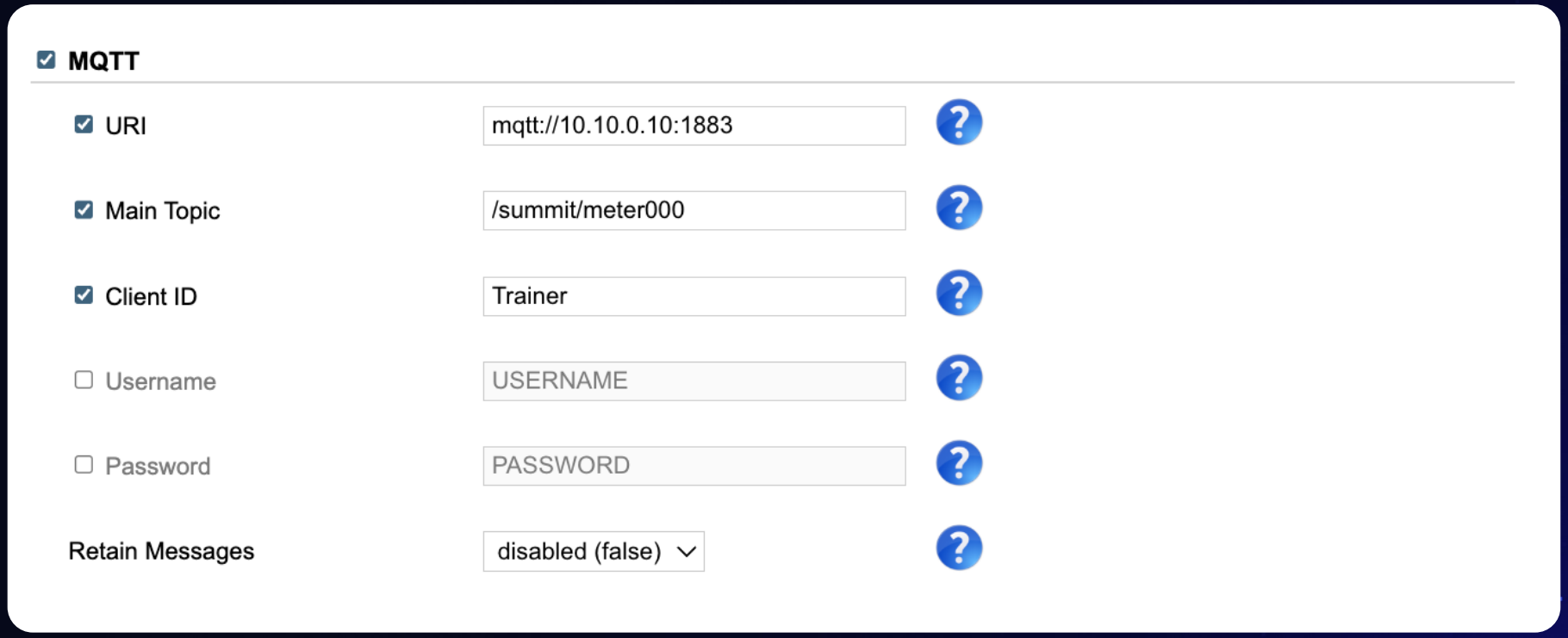

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WHY ZABBIX

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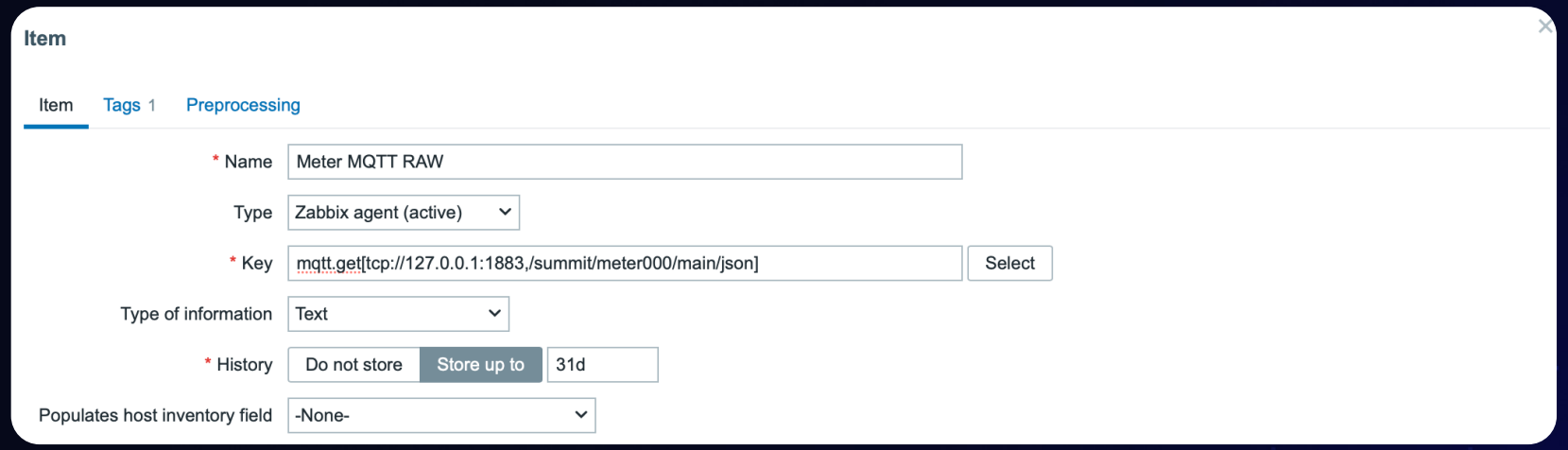

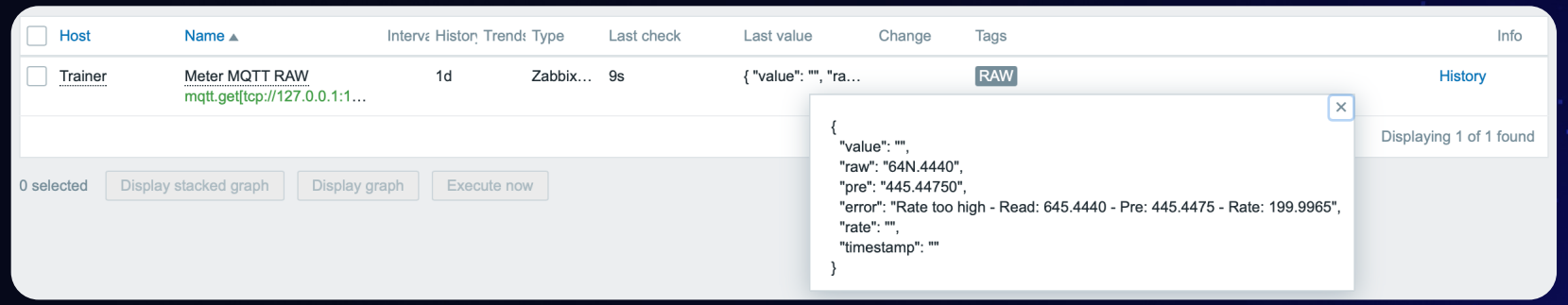

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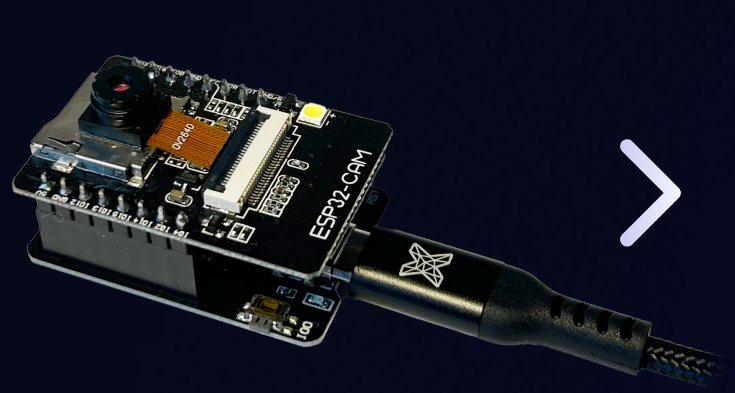
WHY ZABBIX

Sending data via Webhook



WEBHOOK SERVER

Zabbix sender

history.push

ZABBIX

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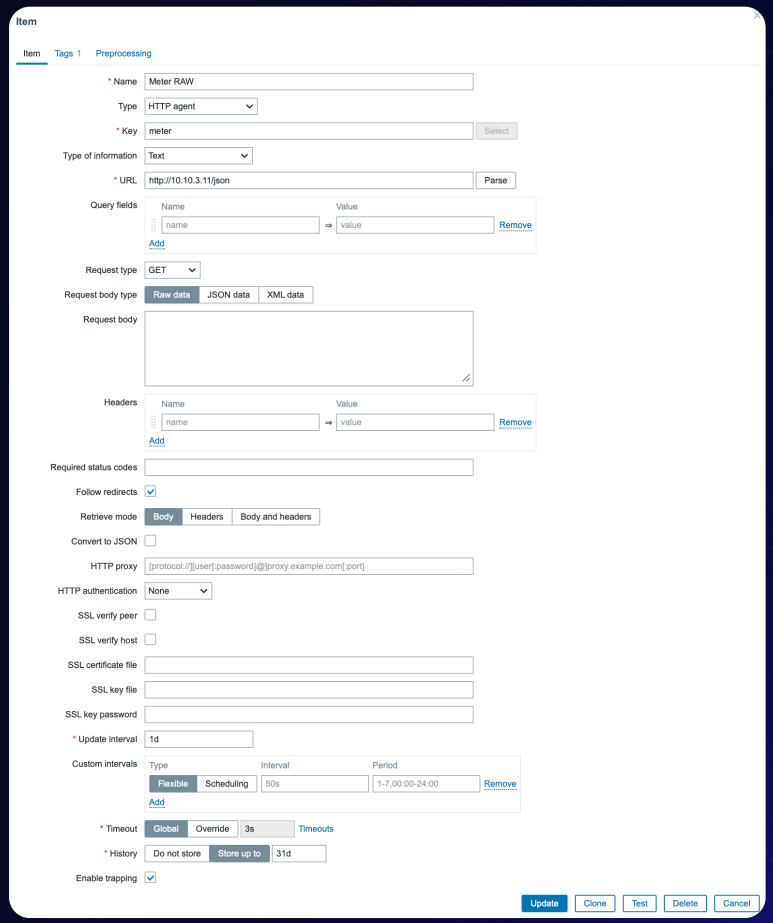
WHY ZABBIX

Webhook

Zabbix sender

history.push



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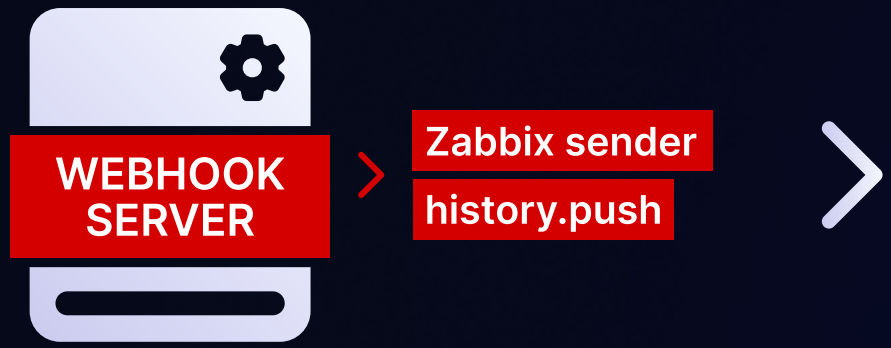
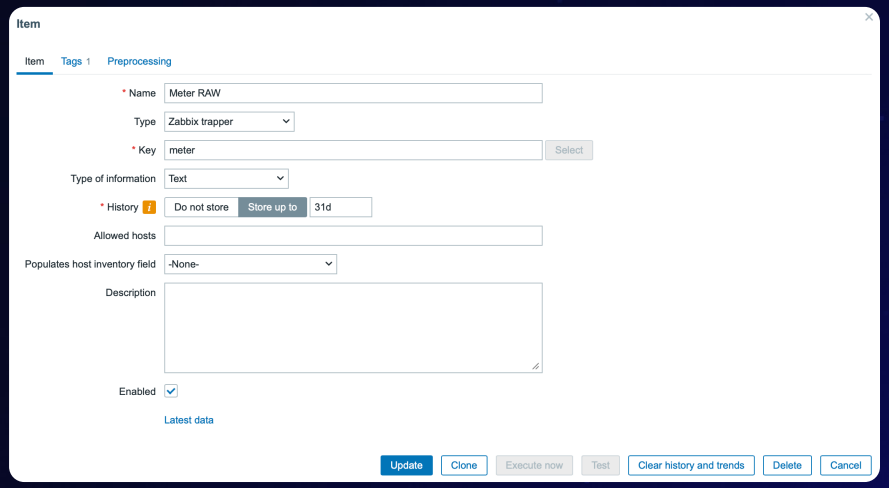
WHY ZABBIX

Webhook





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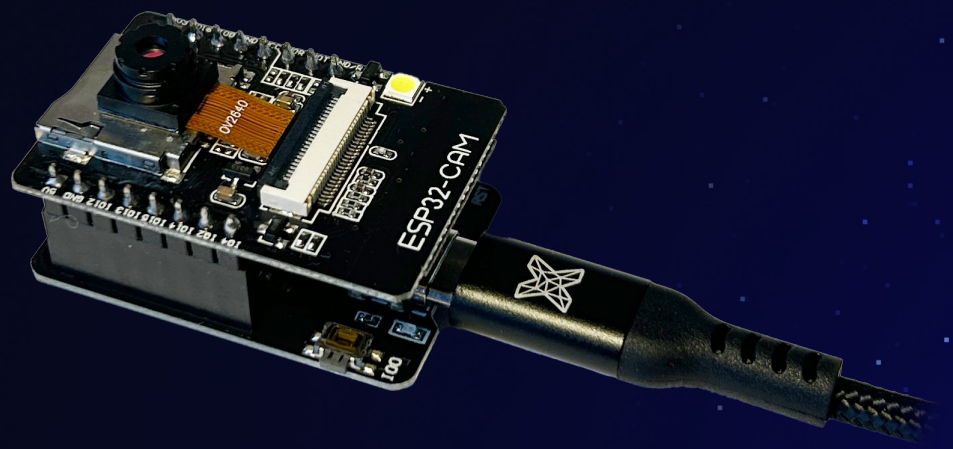
WHY ZABBIX

Extra check by item Browser



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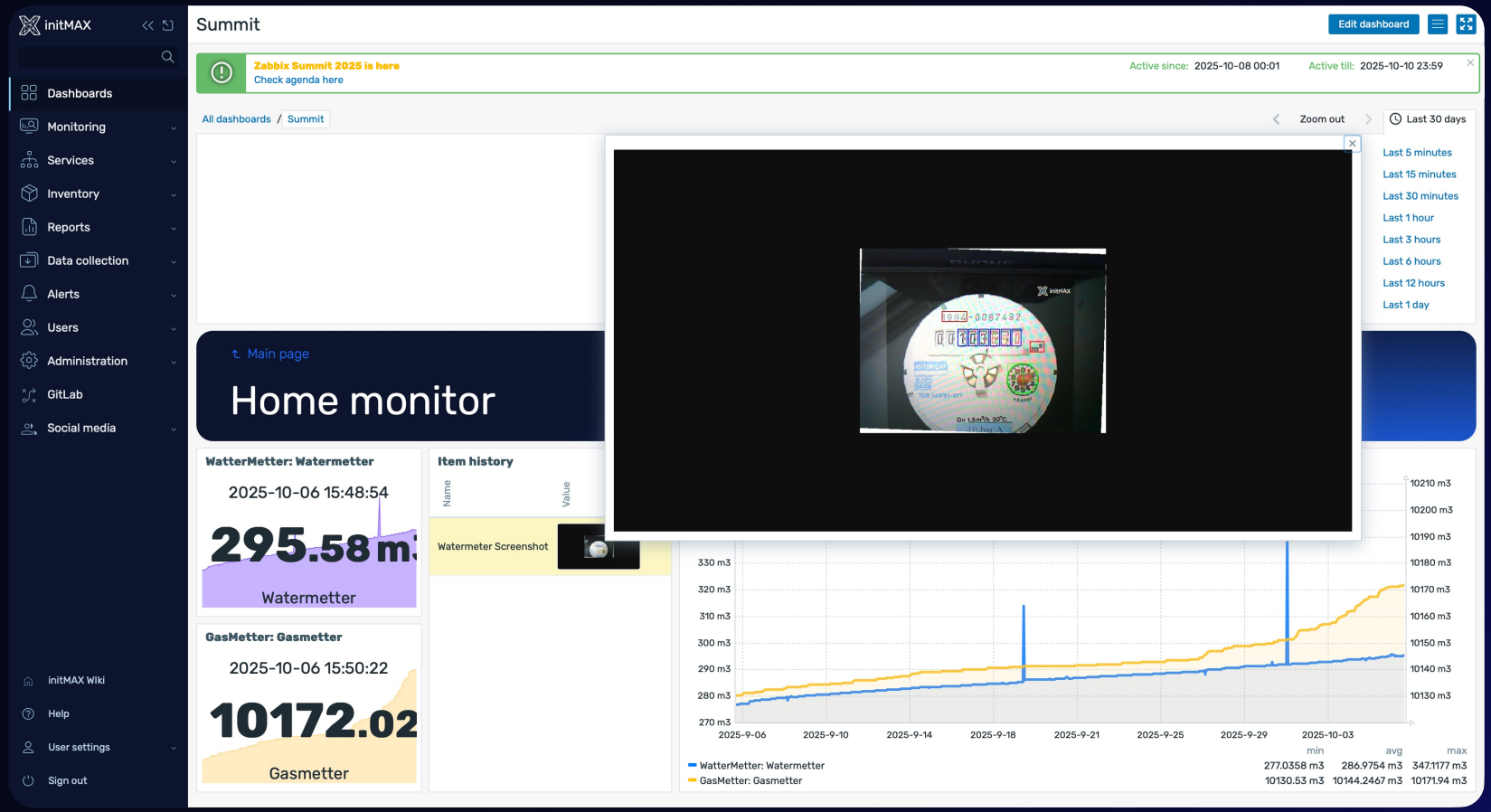
WHY ZABBIX

Item Browser http://<IP-of-your-device>/img_tmp/alg_roi.jpg



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RECOMMENDATIONS AND ADDITIONAL TIPS

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TIPS

- Stable power (5 V / ≥ 500 mA; solar is viable thanks to low draw).
- Reliable Wi-Fi; no Internet required (runs locally).
- Take time to calibrate - focus, ROI, thresholds.
- Telemetry cadence: ≥ 1 minute (sub-minute not supported). Make sure the whole pipeline finishes within 60 s.
- Prefer MQTT or webhook push so data are sent only when ready - less polling, lower device load, better performance/power.
- Dashboard idea: scene snapshot + item value + 1-min trend chart.
- Range option: ESP32-CAM supports an external antenna for stronger Wi-Fi signal, but it requires a solder modification.

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INDUSTRIAL USAGE

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WATER LEAK

GARAGE DOOR

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LIGHT DETECT

OBJECT DETECT

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ACID TANK

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MEET US

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ZABBIX CERTIFIED TRAINER

TOMÁŠ
CEO

TOMÁŠ
Developer

ALOIS
Technical consultant

MAREK
Technical consultant

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GIFTS

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WORKSHOP + PRESENT

E-SHOP DISCOUNT

NEW GAME TETRISMAX

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WORKSHOP

10. OCTOBER
11 AM

Few seats left!

REGISTER FOR WORKSHOP

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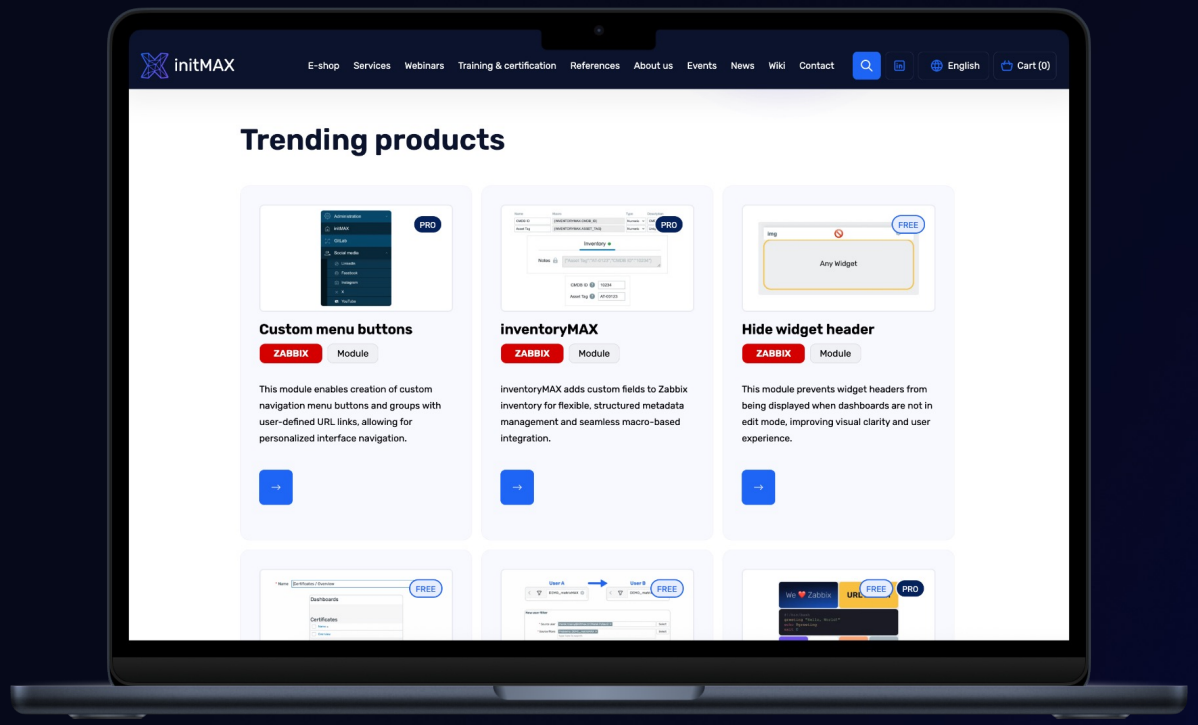

E-SHOP

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ZABBIX-SUMMIT-2025

VISIT E-SHOP
INITMAX.COM/ESHOP

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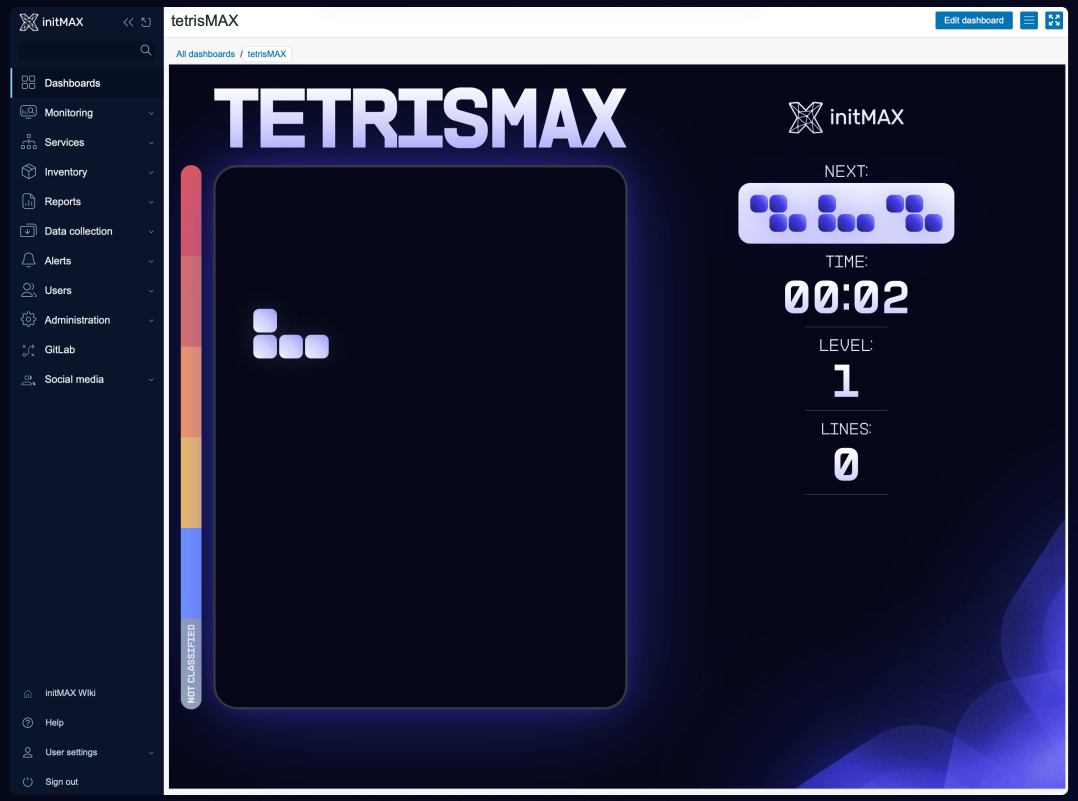

TETRISMAX

ORIGINAL GAME IN ZABBIX

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JOIN OUR MINI-GAME & WIN GREAT PRIZES!

JOIN US AND WIN OUR PRICES

1) Open the Zabbix demo: https://www.initmax.com/zabbix/
2) Play our game tetrisMAX and win
3) The game starts now—results update in real time. We'll finalize and announce the winners at the end of the Summit on our LinkedIn page. Follow us so you don't miss it!

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1

1-year Zabbix Academy subscription

2

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3

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