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ZABBIX PREMIUM PARTNER

ZABBIX CERTIFIED TRAINER

Webinar

Zabbix Scripting JavaScript and Automation

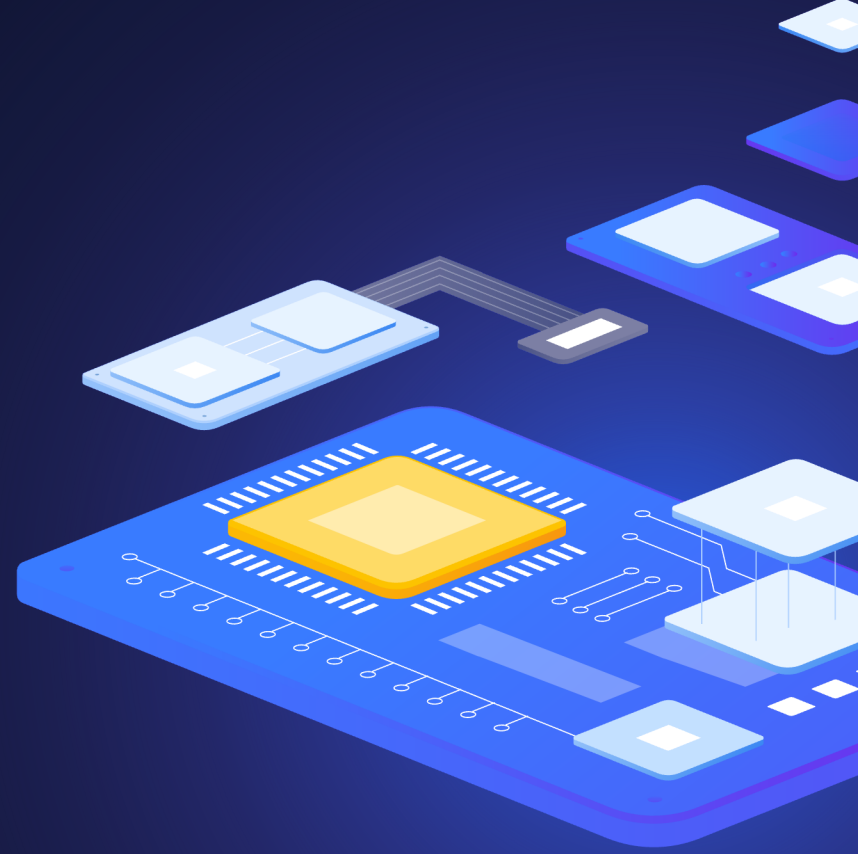
All microphones are muted.

Please ask your questions in Q&A, not in the chat.

Use the chat for discussion, networking, or applause.

1

Automation in Zabbix



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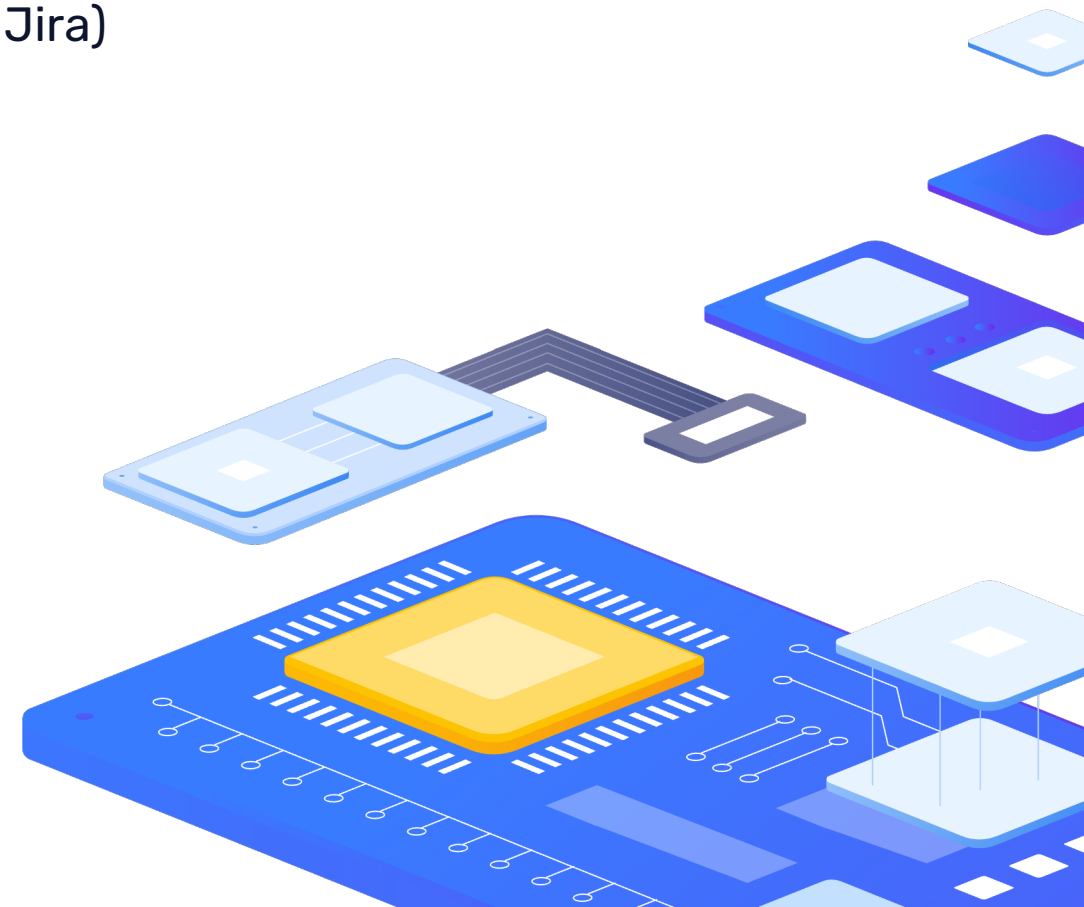
Why Automation in Monitoring

- Manual remediation slows incident resolution
- Tickets often created manually in ITSM tools (ServiceNow, Jira)
- Repetitive operational tasks consume admin time
- Human errors increase operational risk
- Slow response leads to increased Recovery Time



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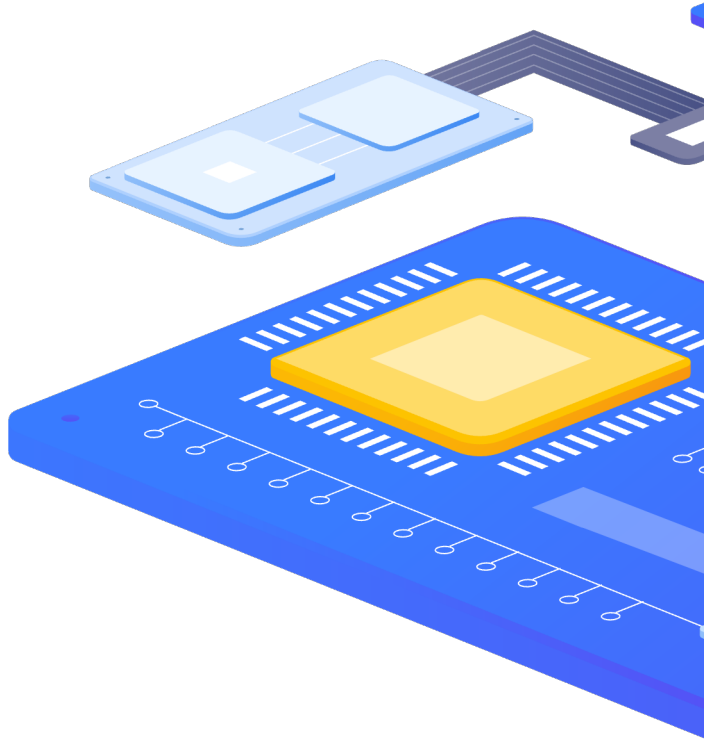
How Zabbix enables Automation

- Zabbix continuously monitors infrastructure metrics
- Triggers detect problems based on defined conditions
- A detected problem generates a Problem Event
- Actions evaluate conditions and execute operations
- Operations can execute scripts, webhooks, or commands
- This allows Zabbix to automatically respond to incidents
- Zabbix is not only a monitoring tool — it is also an automation platform



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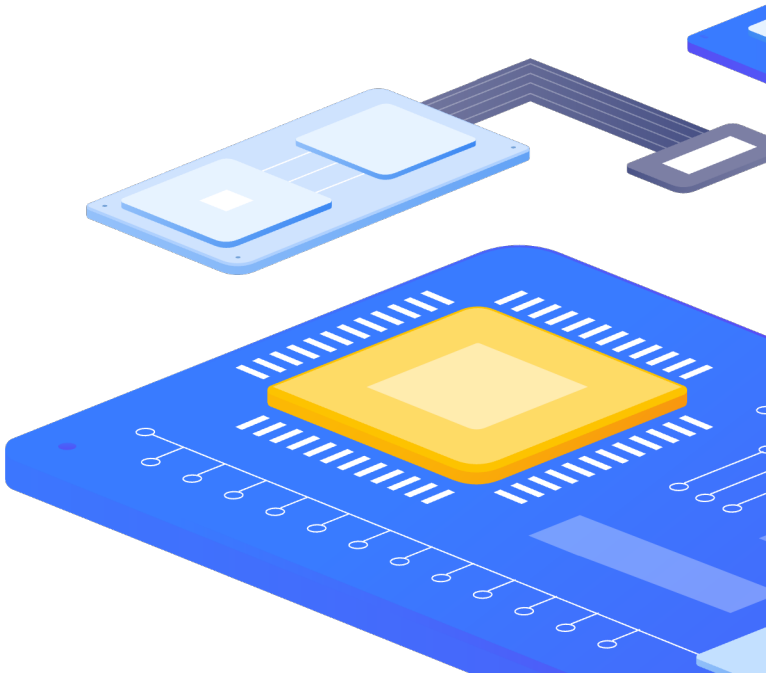
Available Automation and Scripting in Zabbix

- Manual Operations
  - Frontend Scripts
    - Manual Host actions
    - Manual Event actions
- Automatic Remediation
  - Actions (Execute Scripts Automatically)
  - External Integrations (Service Now, Jira, Slack, Custom API)
- Data Preprocessing
- External Scripts



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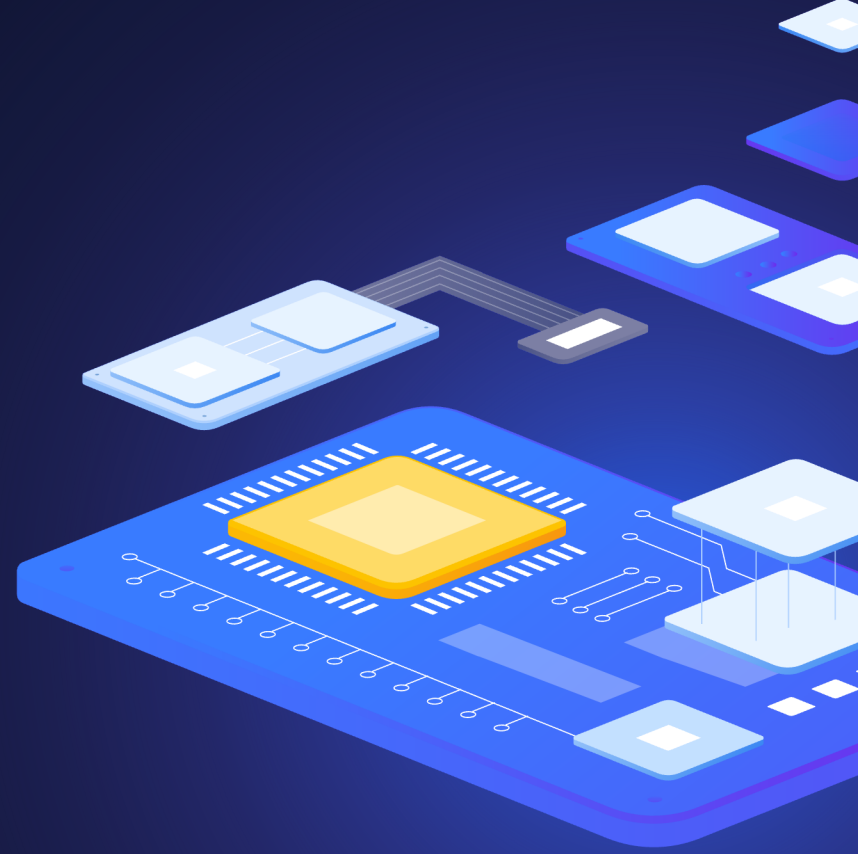
Frontend Scripting



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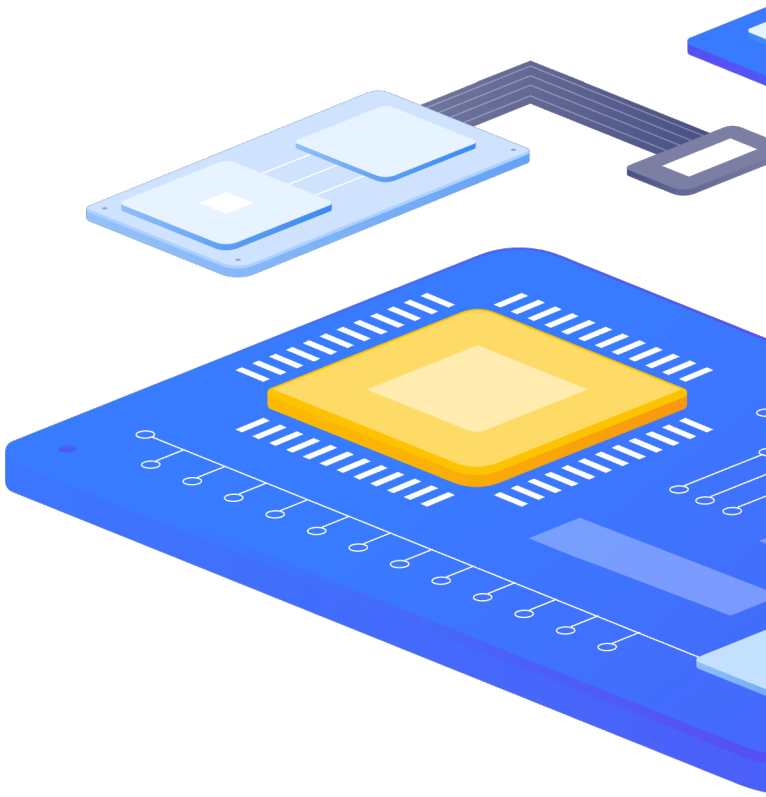
What is a Frontend script?

- Frontend scripts are executed directly from the Zabbix frontend
- They allow administrators to perform operational tasks directly from:
  - Host View
  - Problem View
- Typical Use Cases include
  - Manual remediation of a problem
  - Running troubleshooting commands
  - Performing operational tasks (restart services, diagnostics, etc.)



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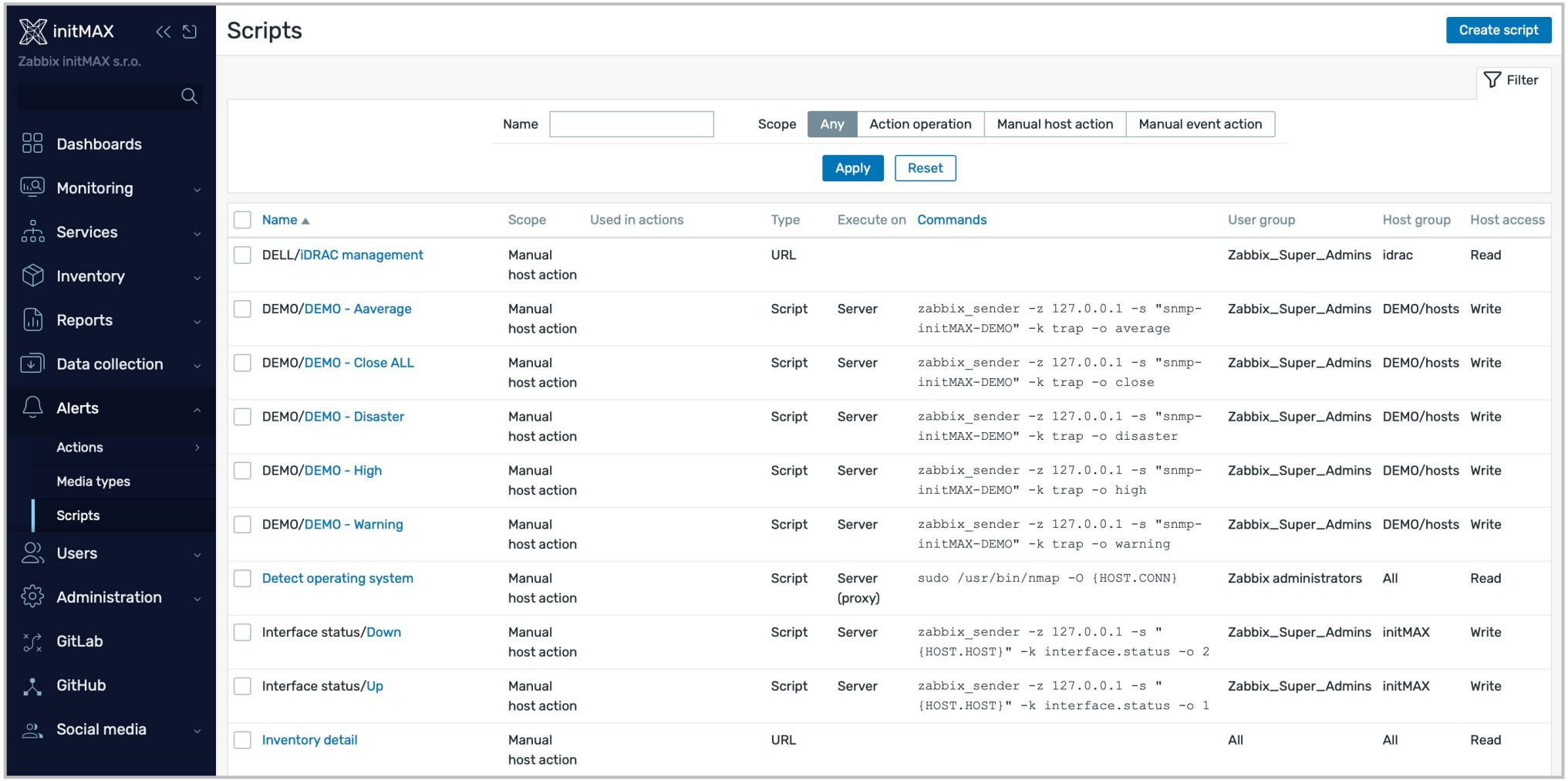
Frontend Scripts



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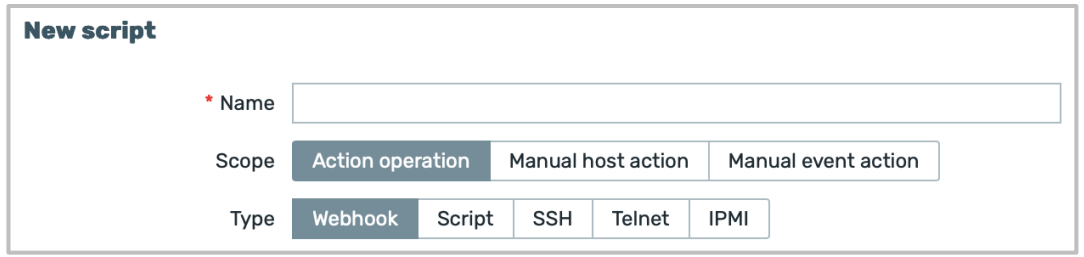
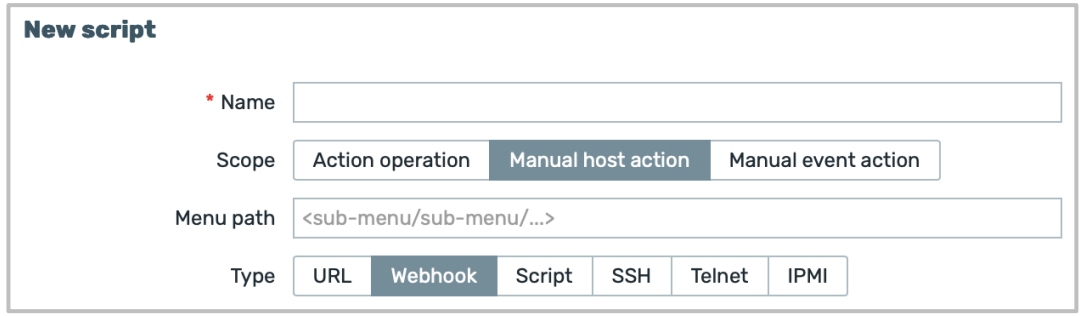
Script execution scope

- Frontend scripts can be executed in different contexts
- Action Operation
  - Script executed automatically as part of an Action
- Manual Host action
  - Script executed manually on a Host
- Manual Event action
  - Script executed manually for a specific event





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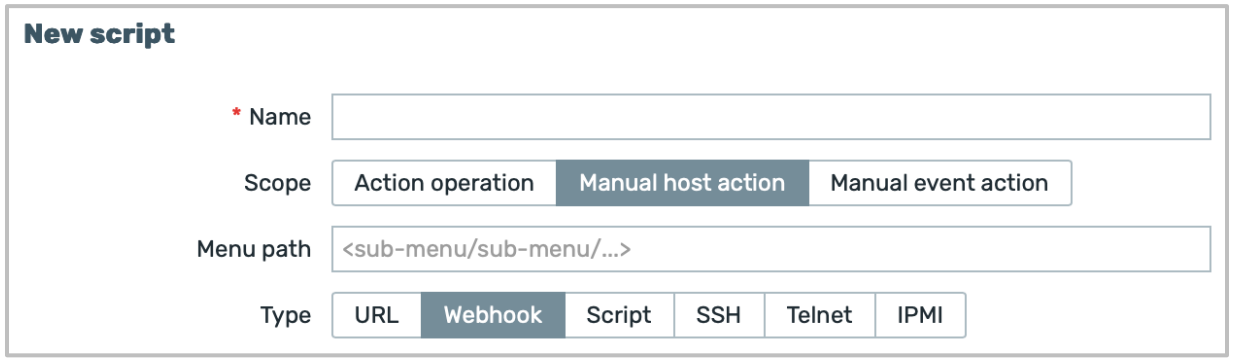
Manual Host action

- Scripts executed manually on a specific host
- Typical Use Cases
  - Restart a host or a service
  - Collect diagnostic information (logs, system status)
  - Run operational scripts (cleanup, configuration checks)
  - Identify responsible team or system owner



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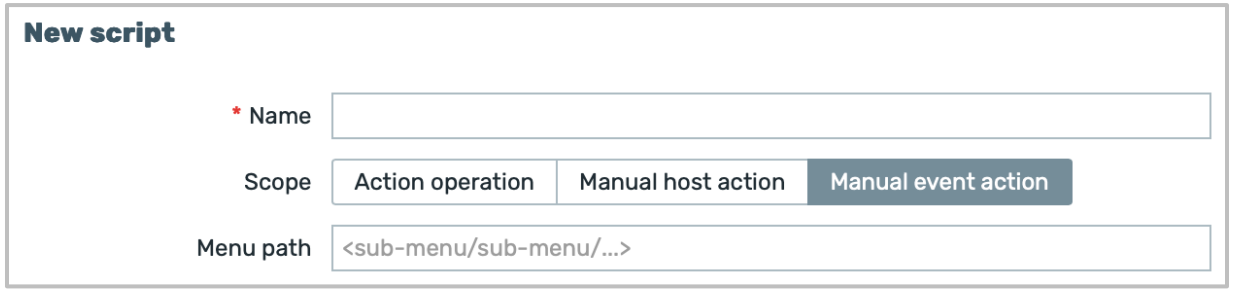
Manual Event action

- Scripts executed manually from the Problem/Event view
- Used when a problem is detected and an operator needs to take action.
- Typical Use Cases
  - Restart a failed service
  - Create a ticket in ITSM System
  - Run troubleshooting and diagnostic scripts
  - Trigger remediation workflows



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Frontend Script Macro usage

- Supported Macros
- https://www.zabbix.com/documentation/current/en/manual/appendix/macros/supported_by_location
- Available macros **differ** between Zabbix versions

Scripts		
Commands, confirmation text (Type: script, manual **host action**)	Host macros: {HOST.CONN}, {HOST.DNS}, {HOST.HOST}, {HOST.ID}[1], {HOST.IP}, {HOST.NAME}, {HOST.PORT} Host inventory macros[2] {MANUALINPUT} Username macros User-definable macros	[1] Confirmation text only [2] Supported for Zabbix server and Zabbix proxy
Commands (Type: script, manual **event action**)	Date/time macros Event macros, Cause/symptom event macros, Recovery event macros (if recovery took place)	

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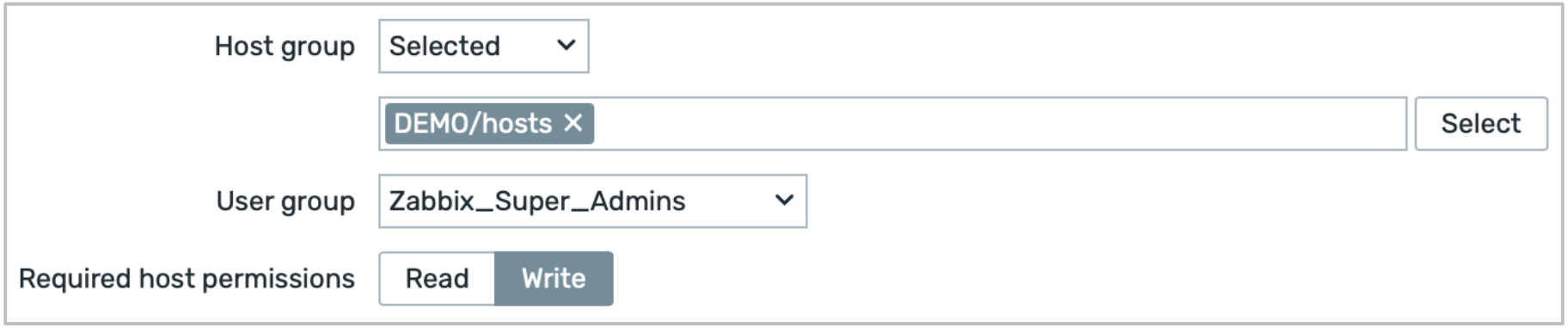
Manual Action restriction

- Frontend scripts can be restricted to control who can execute them and where.
- Restrictions can be configured based on:
  - Selected Host group (Limit scripts on specific infrastructure group)
  - Selected User group (Allow only authorized users to execute scripts)
  - Required Host Permissions (Require specific access levels)



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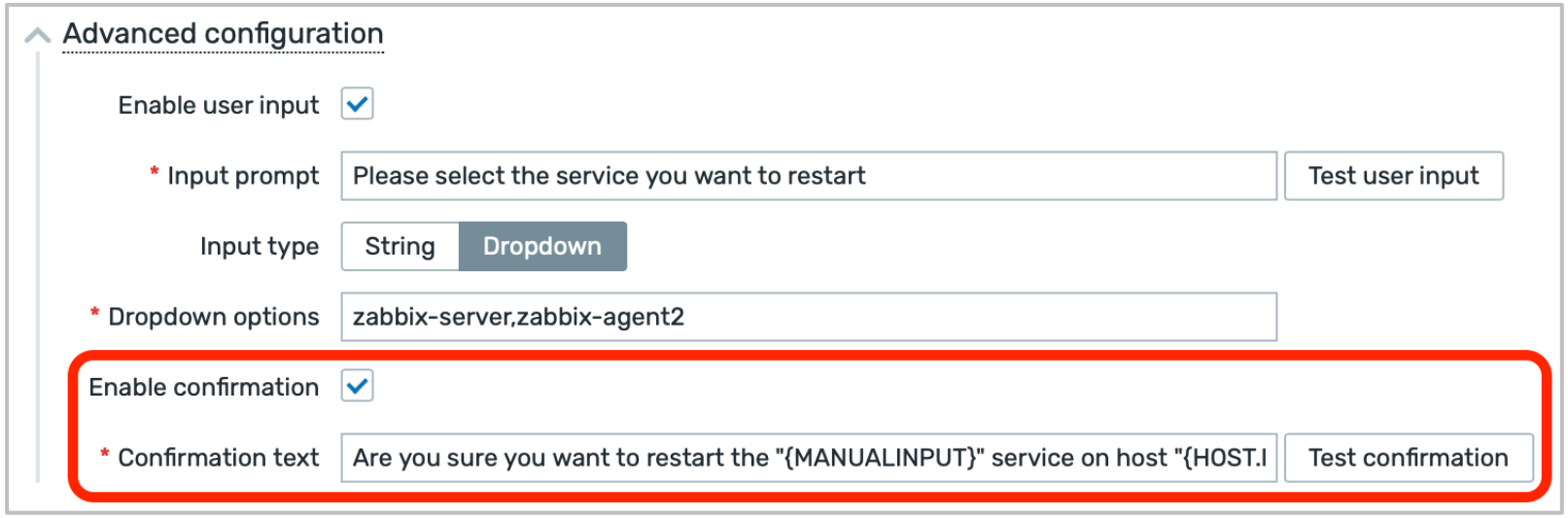
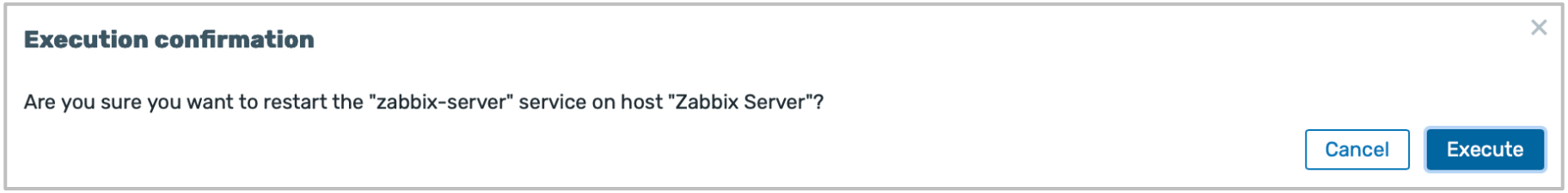
Confirmation on script execution

- To prevent accidental execution of critical scripts, Zabbix allows a confirmation dialog before running a script.
- This helps protect against unintended actions.





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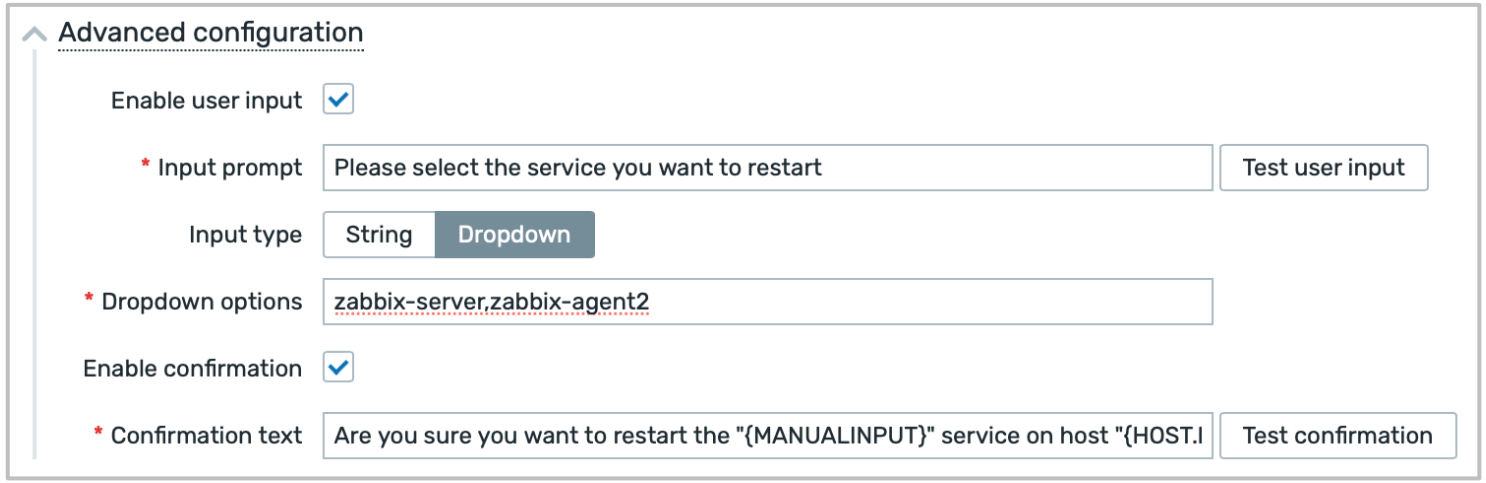
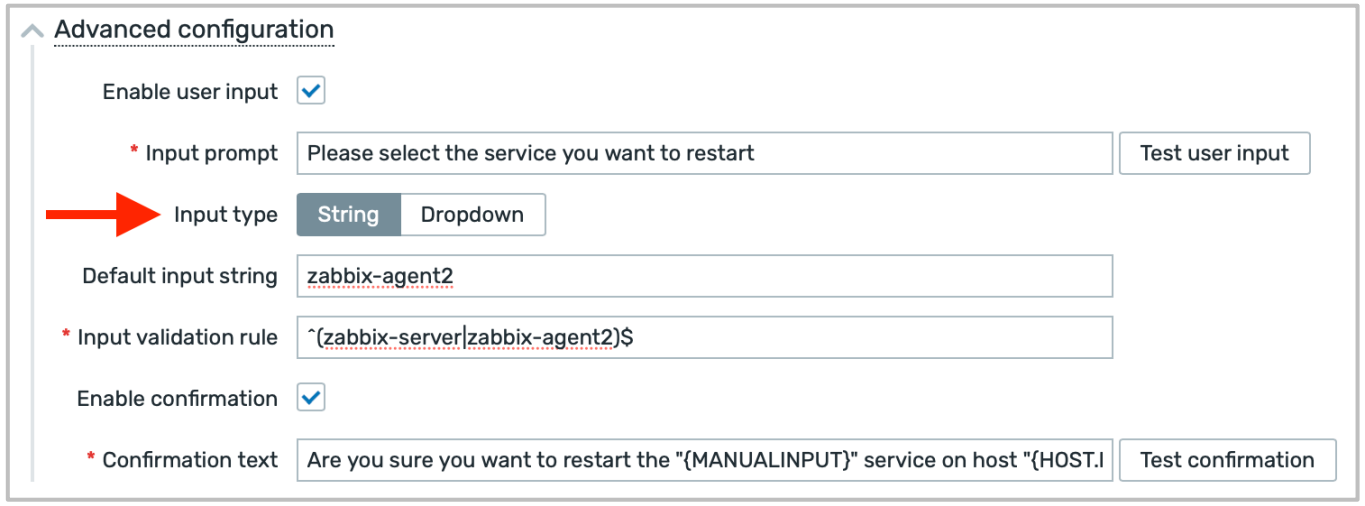
Zabbix – Advanced Configuration

- User input
  - String
  - Dropdown
- Input validation rule
- Safety confirmation dialog





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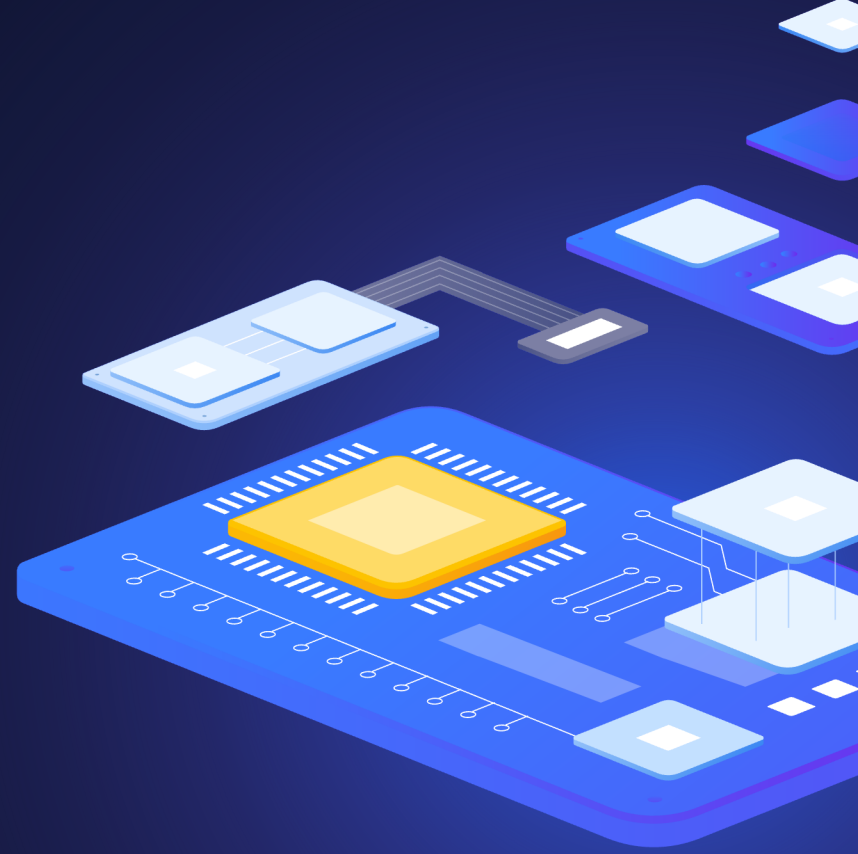
Script Execution Targets



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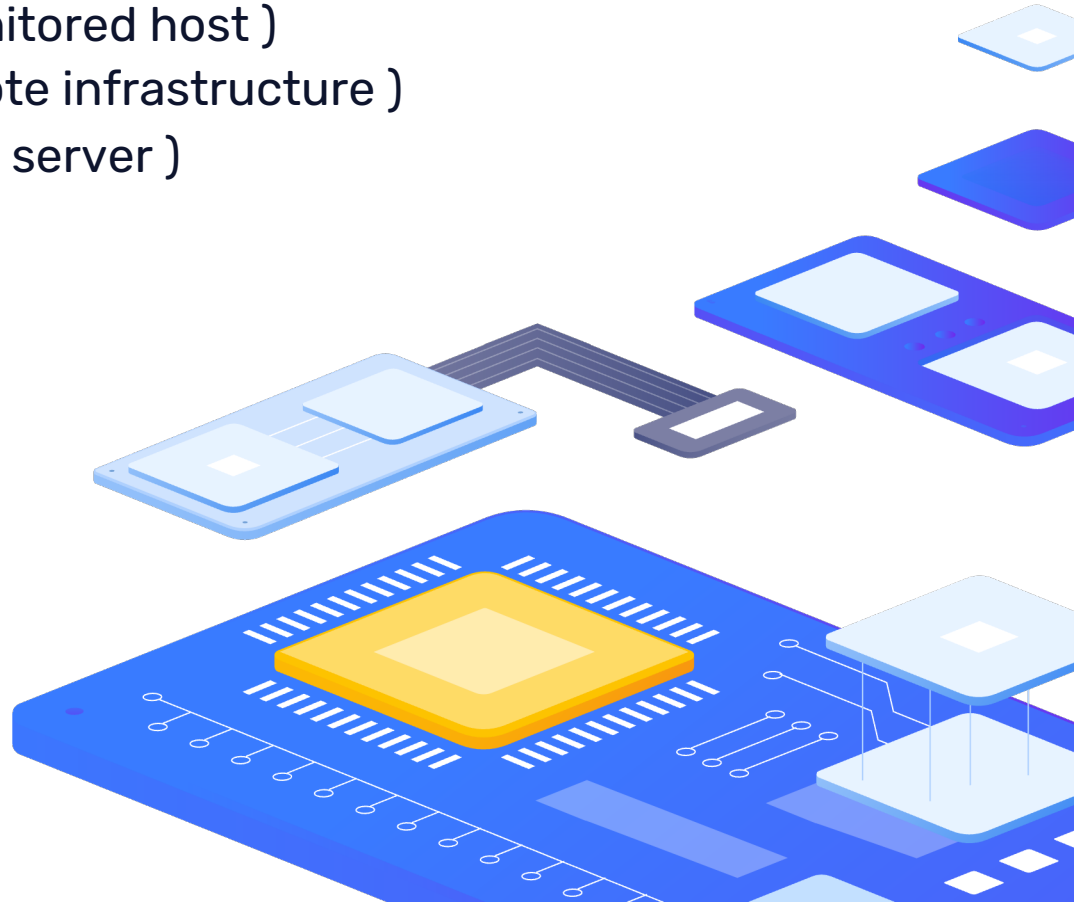
Script Execution Target

- Frontend scripts can be executed on different components of the Zabbix infrastructure.
- Execute on:
  - Zabbix agent (Execute commands directly on the monitored host)
  - Zabbix server or proxy (Execute scripts closer to remote infrastructure)
  - Zabbix server (Execute scripts centrally on the Zabbix server)



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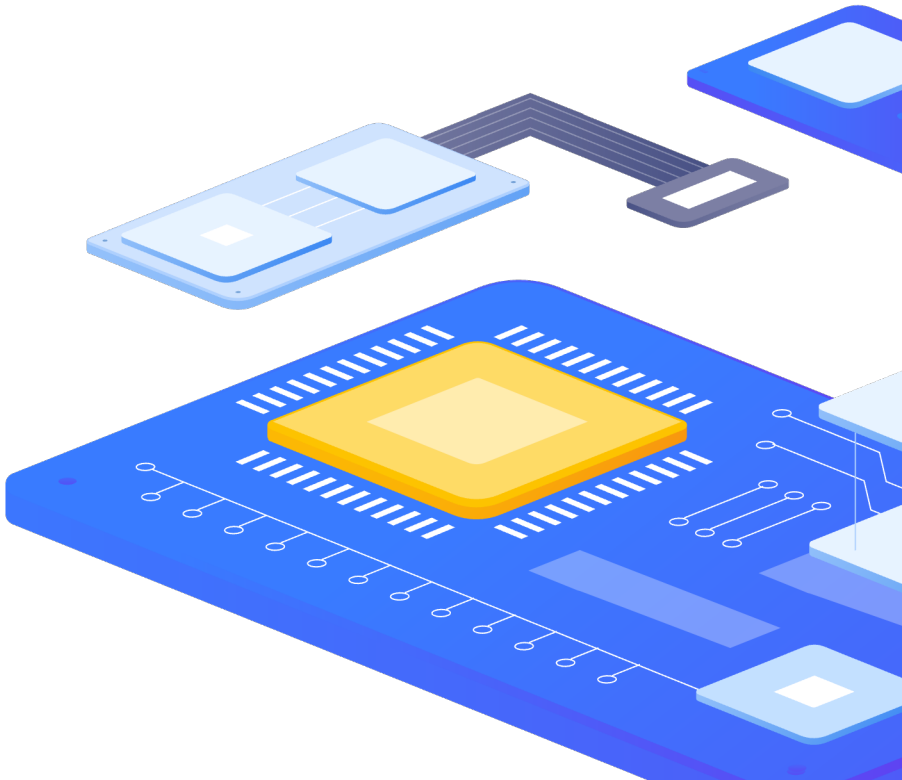
Webhook

- Webhooks allow Zabbix to communicate with external systems using HTTP APIs.
- Webhooks are typically used for
  - Communication with external systems:
    - Ticketing systems (Jira, request Tracker, OTRS, …)
    - Automation (AWX, Ansible)
    - Inventory systems (CMDB)
    - Callbacks to the Zabbix server
- Webhooks are written in JavaScript
- Webhooks use the built-in HttpRequest() object to call APIs



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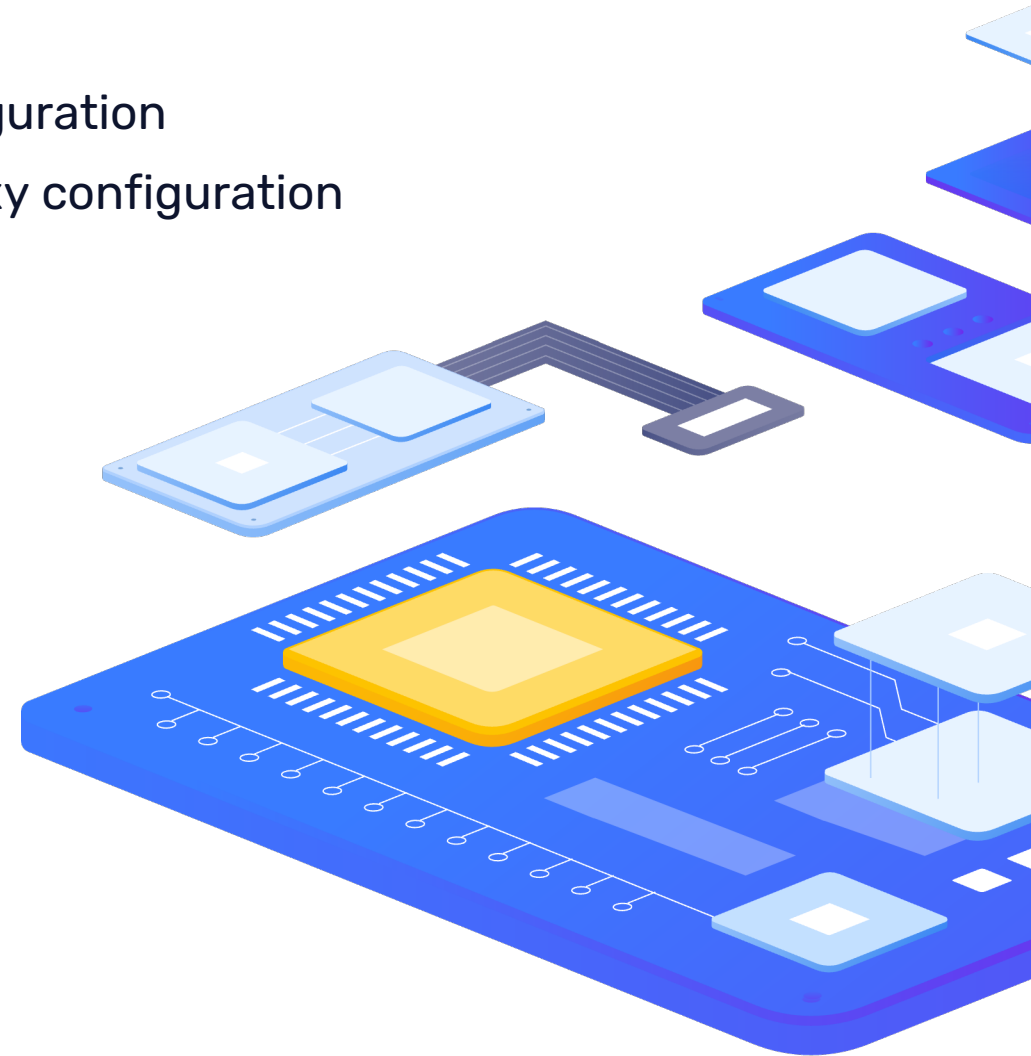
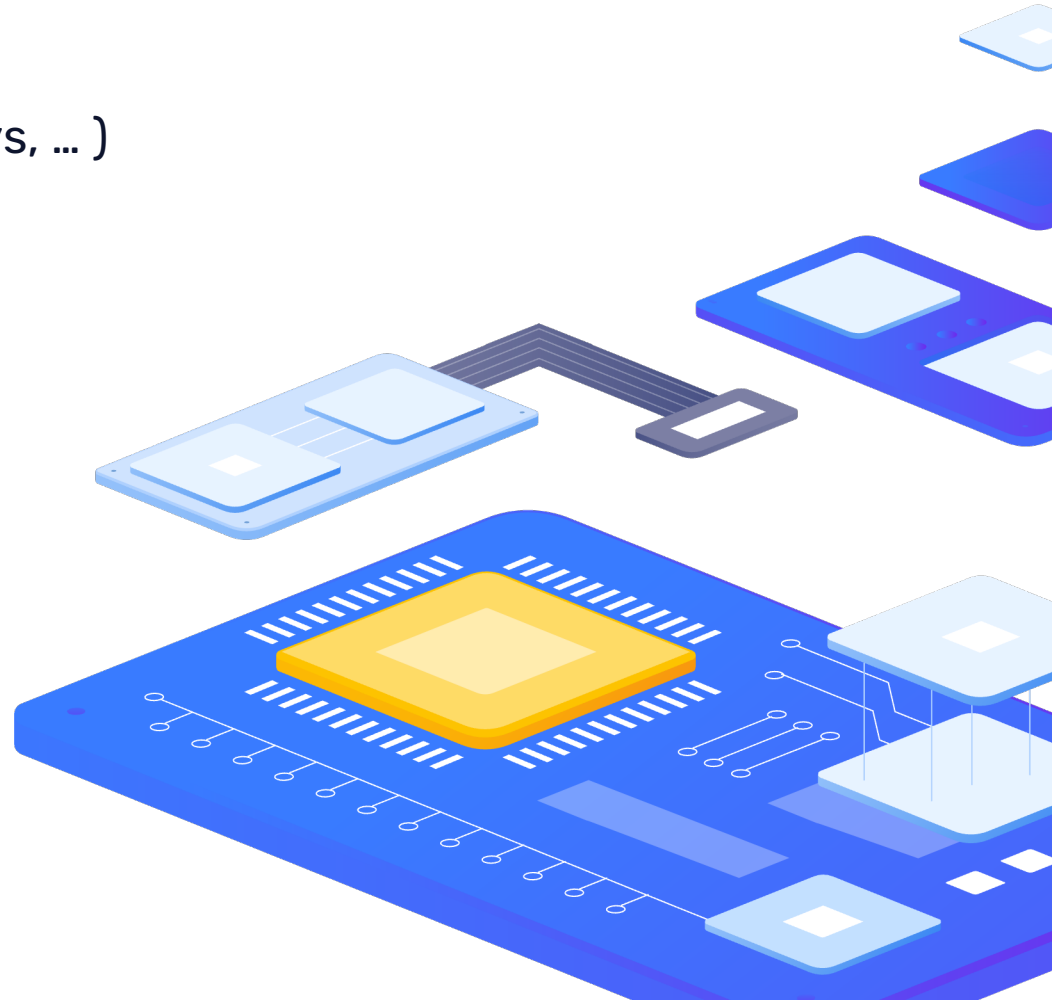
Frontend Script

- Scripts can run on the server, proxy, or agent
- adding an AllowKey=system.run[*] parameter in agent configuration
- setting the EnableRemoteCommands parameter to '1' in proxy configuration
- Target systems:
  - Linux - bash script or command
  - Windows – cmd command or script
- wait / nowait status



SSH / Telnet

- Remote command execution using the ssh protocol
- Password or key based authentication
- Calls to devices without zabbix agents (switches, disk arrays, …)



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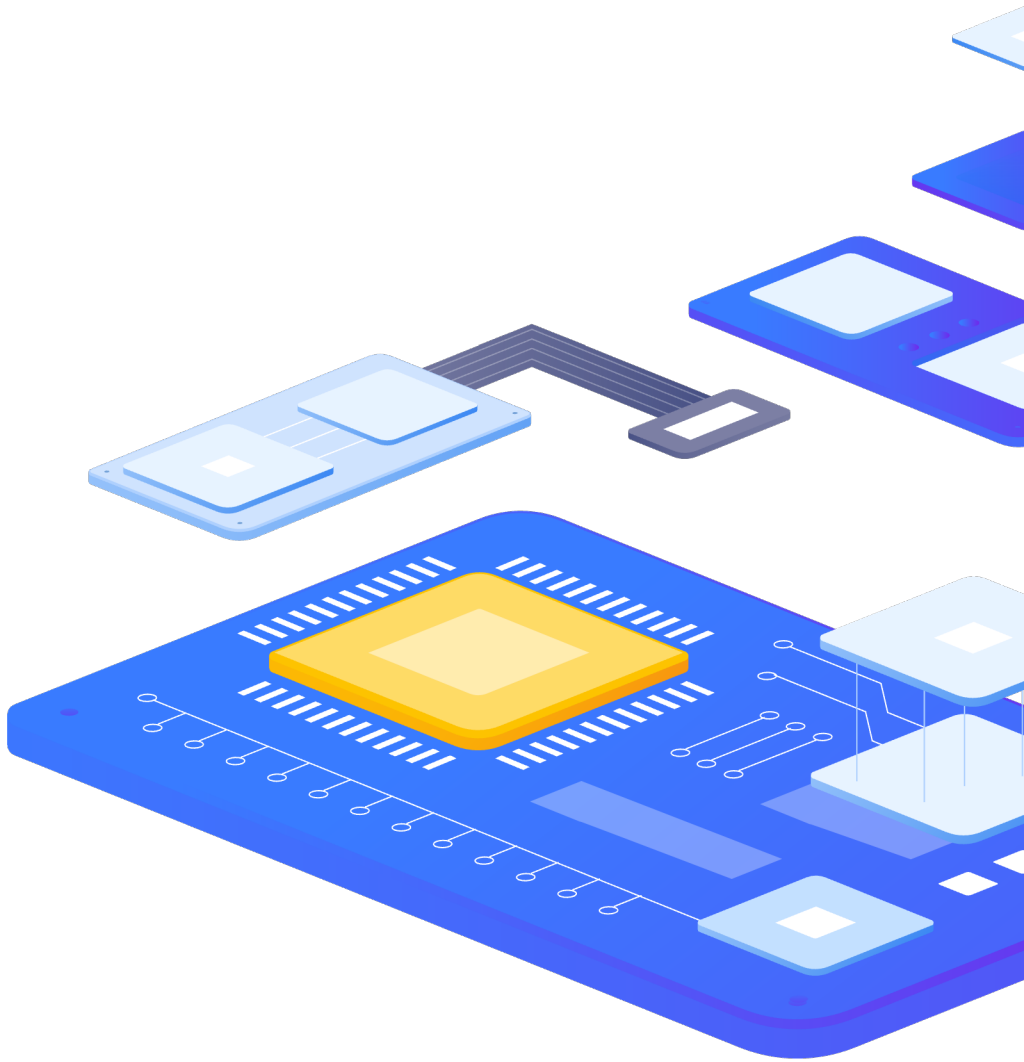
IPMI

- Remote command execution using the IPMI protocol
- Calls to hardware devices (iDrac, iLo, ..)



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Zabbix agent configuration

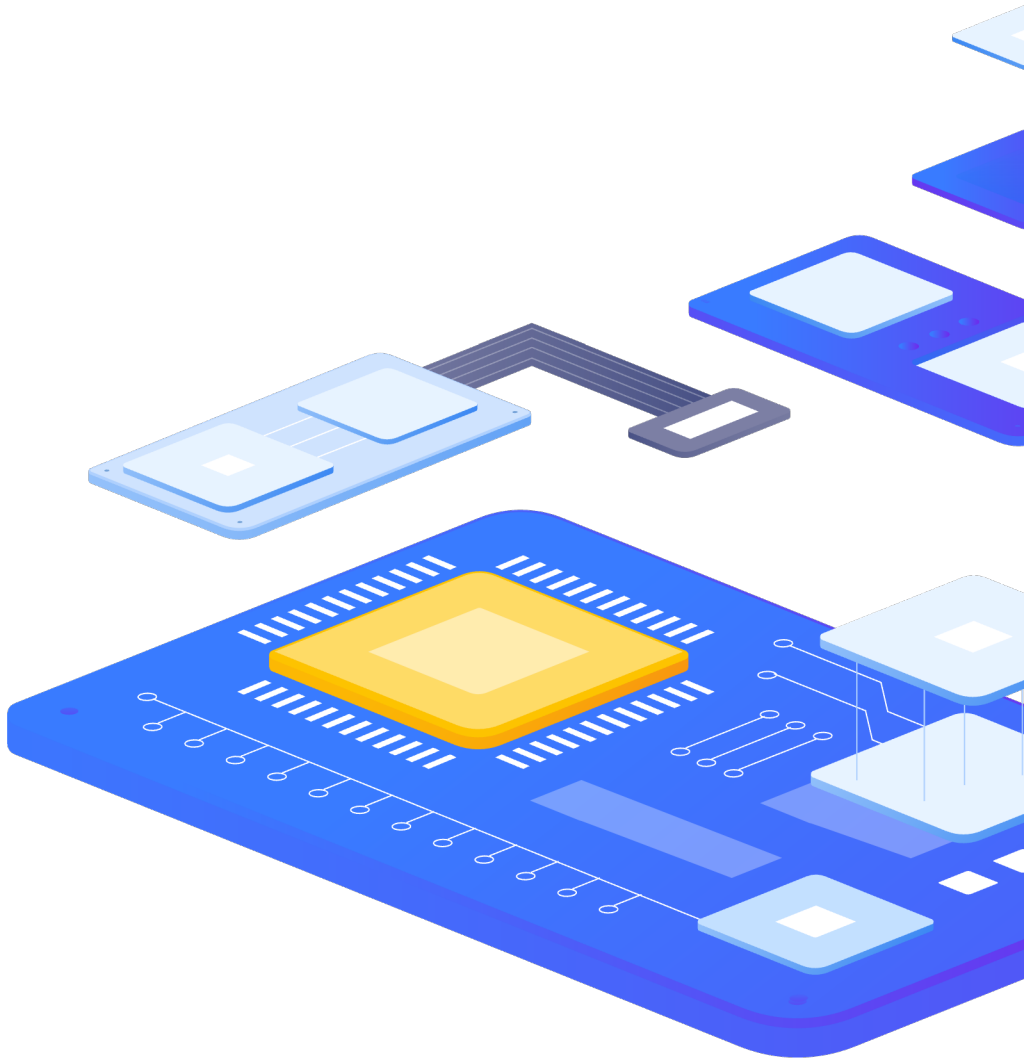
- AllowKey=system.run[shutdown –r –t 0]
- AllowKey =system.run[shutdown –r –t 0,*]
- DenyKey =system.run[*]

- wait / nowait type
  - wait: manual Actions, Item checks
  - nowait: Action operation
- Examples:
  - AllowKey = system.run[shutdown –r –t 0]
  - AllowKey = system.run[shutdown –r –t 0,wait]
  - AllowKey = system.run[shutdown –r –t 0,nowait]
  - AllowKey = system.run[shutdown –r –t 0,*]

- Agent user rights on system?

Zabbix version < 5.0

- EnableRemoteCommands



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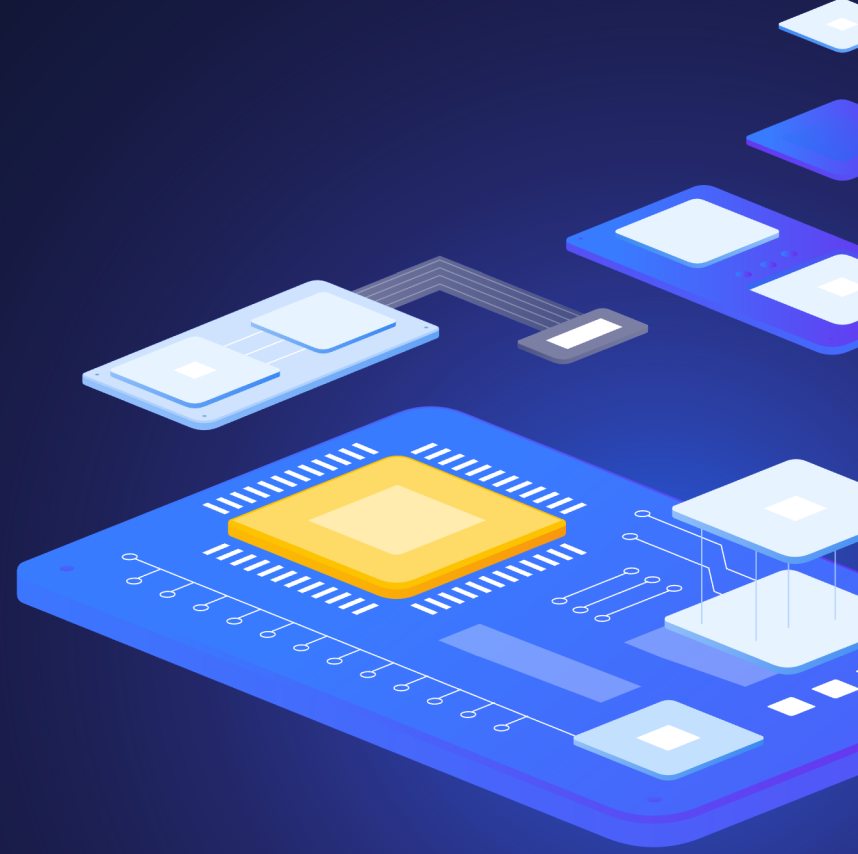
JavaScript usage in Zabbix



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JavaScript capabilities

- Built-In Objects
  - Zabbix

Alias	Alias to
console.log(object)	Zabbix.log(4, JSON.stringify(object))
console.warn(object)	Zabbix.log(3, JSON.stringify(object))
console.error(object)	Zabbix.log(2, JSON.stringify(object))

  - HttpRequest
  - This object encapsulates a cURL handle and allows simple HTTP requests to be made
  - Errors are thrown as exceptions
  - Full List of Objects:
  - https://www.zabbix.com/documentation/current/en/manual/config/items/preprocessing/javascript/javascript_objects

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JavaScript usage locations

- **Webhooks**
  - Primary Use – Integration with External Systems (ITSM / CHAT / etc)
  - Key object – the built-in HttpRequest() used to send and receive data
  - Context – Typically triggered by Action Operations
- **Preprocessing**
  - Primary Use – Transform raw data into a structured format
  - Capabilities – Advanced JSON/XML Manipulation, Complex math, Transformation
  - Context - Applied to Items or Low-Level Discovery rules to clean up "messy" API responses.
- **Script Items**
  - Primary Use – Custom data collection where standard Zabbix Agent fall short
  - Advantage – Allows for multi-step logic (getting auth.token, then querying data)

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Zabbix JavaScript Engine

- Sandboxed execution environment
  - Designed for security, the engine does not have direct access to the underlying OS file system or network outside the provided built-in objects
- Built-In specialized objects
  - HttpRequest – Encapsulated cURL handles to perform HTTP requests
  - Zabbix.log – Native logging for debugging
- Error Handling
  - The engine uses standard JavaScript exception handling: errors are thrown as exceptions
- Debugging Capabilities
  - Supports common aliases like console.log()

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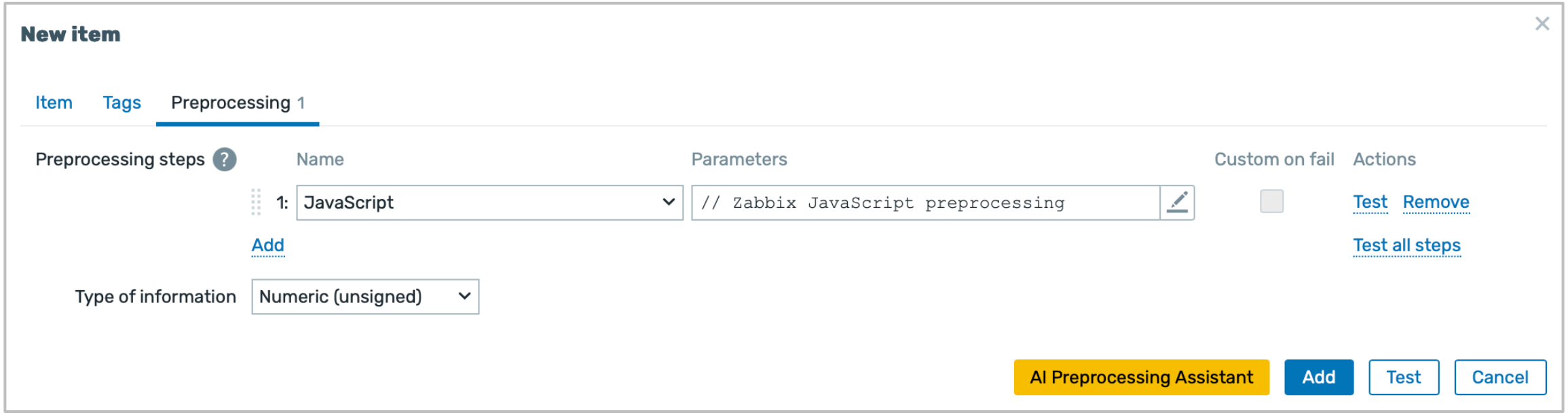
Preprocessing

Custom Script

- JavaScript



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Preprocessing JavaScript

- Parsing API Data
  - Convert raw, complex responses from external systems into readable metrics
  - Ideal for scenarios where a single API call returns data for multiple items at once\
- JSON & Structure Manipulation
  - Data Cleanup: Flattening nested JSON objects or filtering out unnecessary arrays before storage.
  - Format Conversion: Transforming XML or unstructured text into clean JSON for easier processing in later steps.
- Value transformations
  - Handles complex math, conditional logic ("if/else"), and string manipulations that standard Zabbix preprocessing steps cannot.
  - Combining multiple received values into a single summary string or calculated metric.

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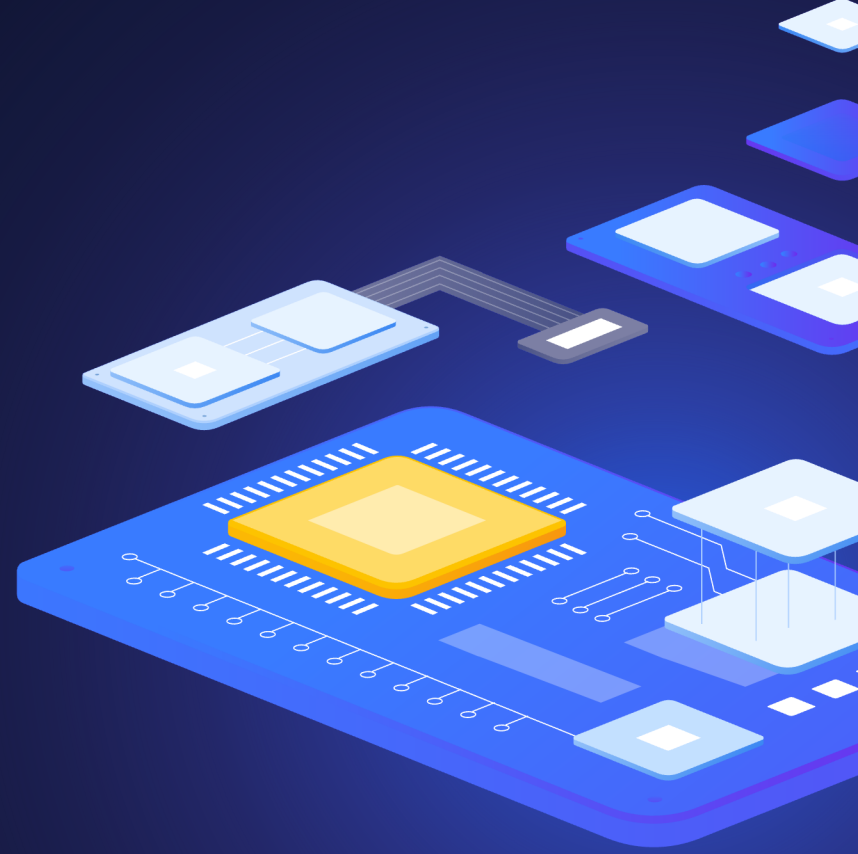
Automation Examples



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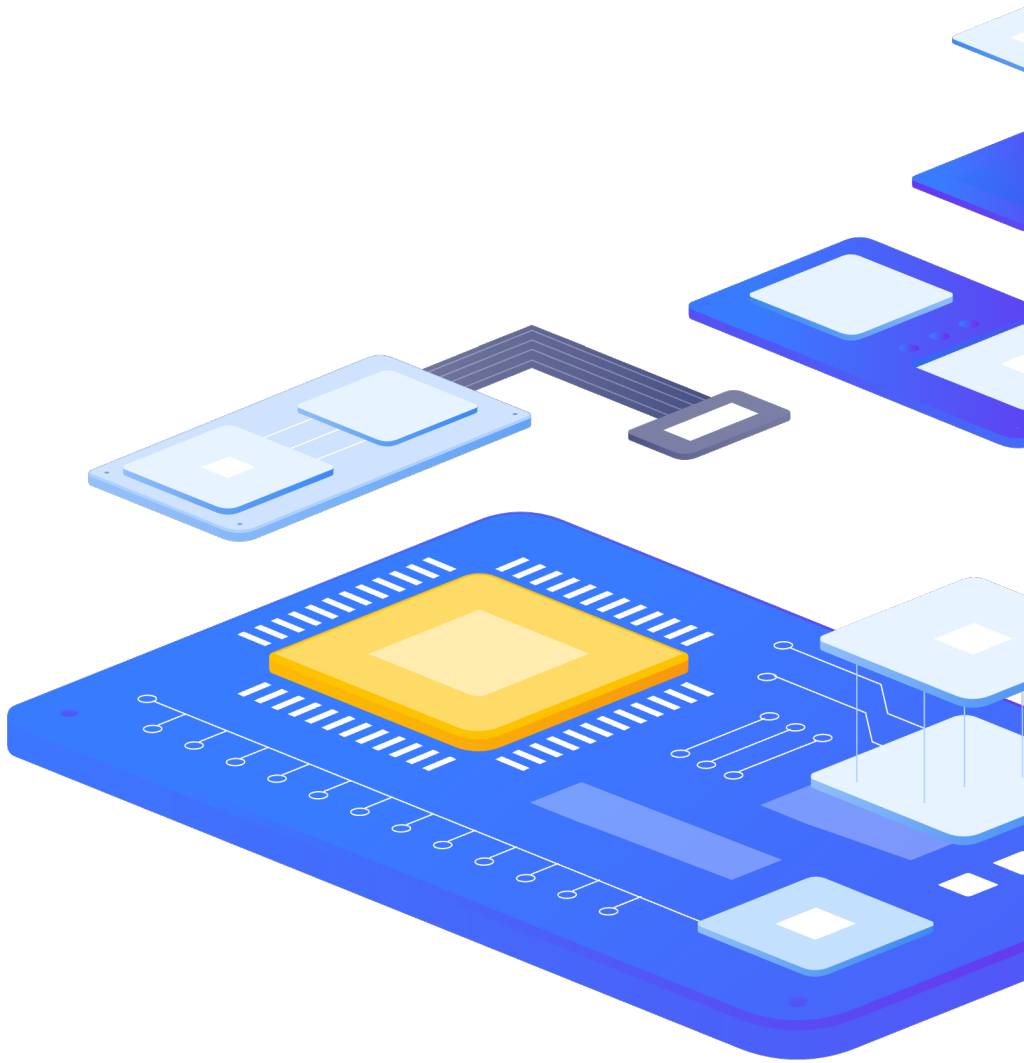
Example 1 - Manual Host action

- Problem:
  - Manually start and stop httpd service
- Solution:
  - Create Host script – stop httpd service
  - Create Host script – start httpd service



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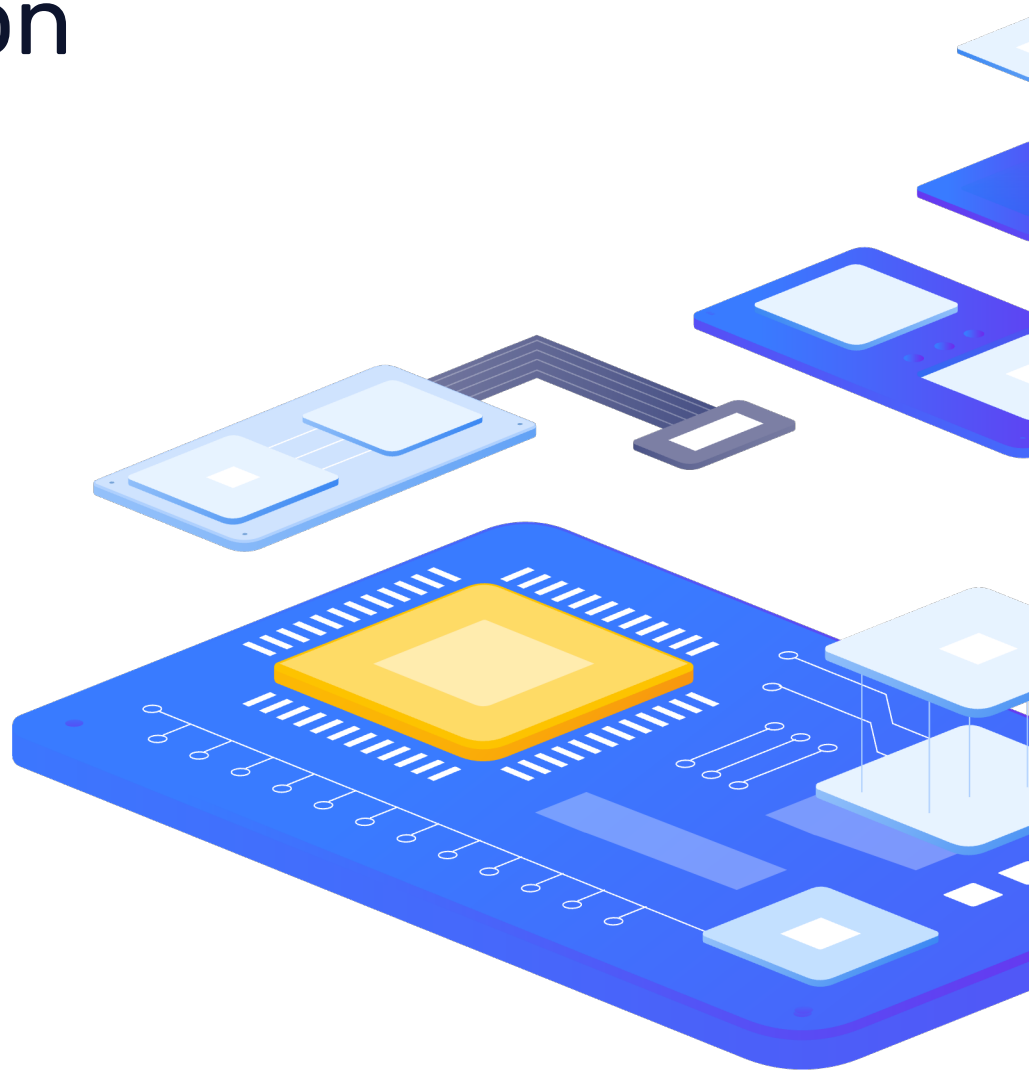
Example 2 – Manual Event action

- Problem:
  - Manually create Ticket for problem
- Solution:
  - Create Event script – Webhook

- Problem:
  - Manually start powered-off workstation
- Solution:
  - Create Event script – Wake on LAN



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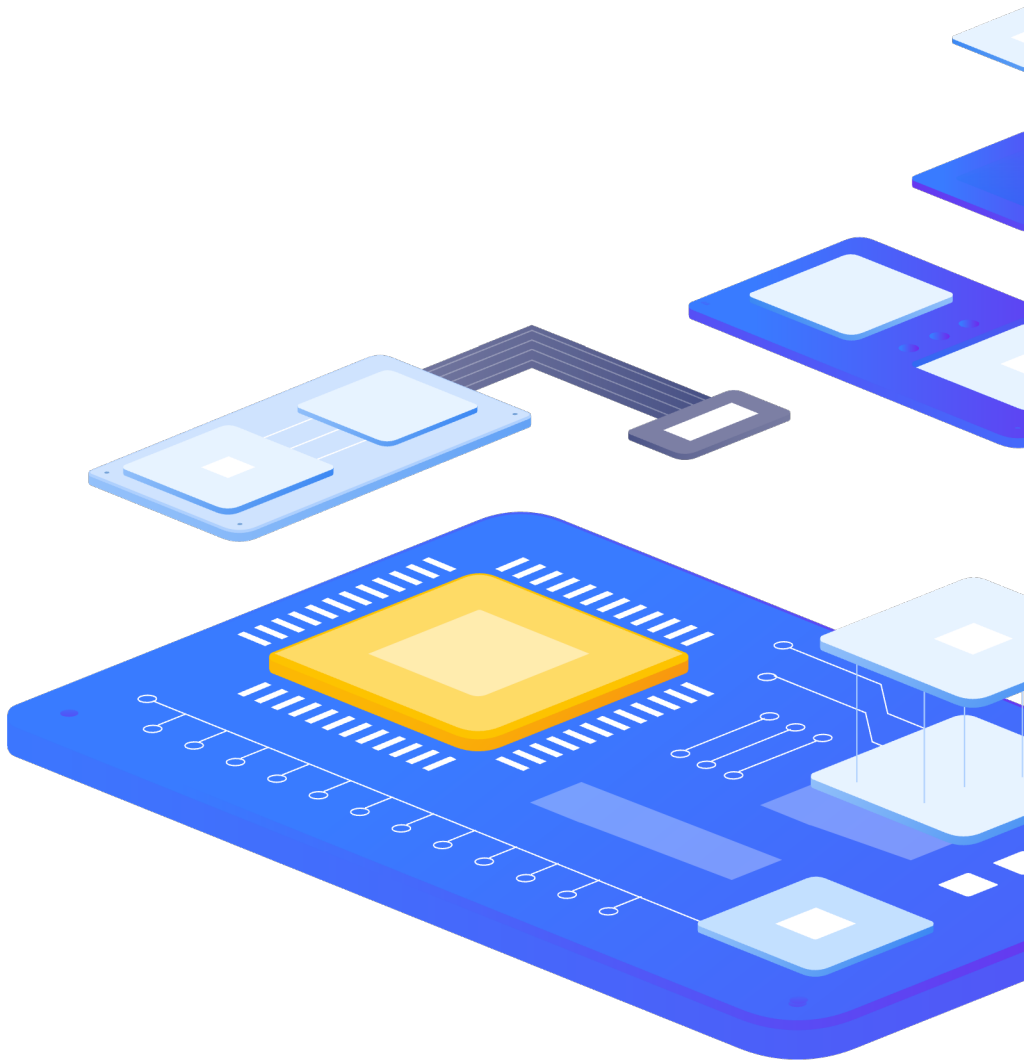
Example 3 – Action operation

- Problem:
  - Automatically start stopped service
- Solution:
  - Create Trigger - Httpd service not running
  - Create Action – Execute script
  - Create Script - Start service



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Example 4 – DNS HOST Name settings

- Problem:
  - Agent autoregistration updates workstation interface settings
  - Dynamic IP addresses
- Solution:
  - Change host interface setting based on hostname

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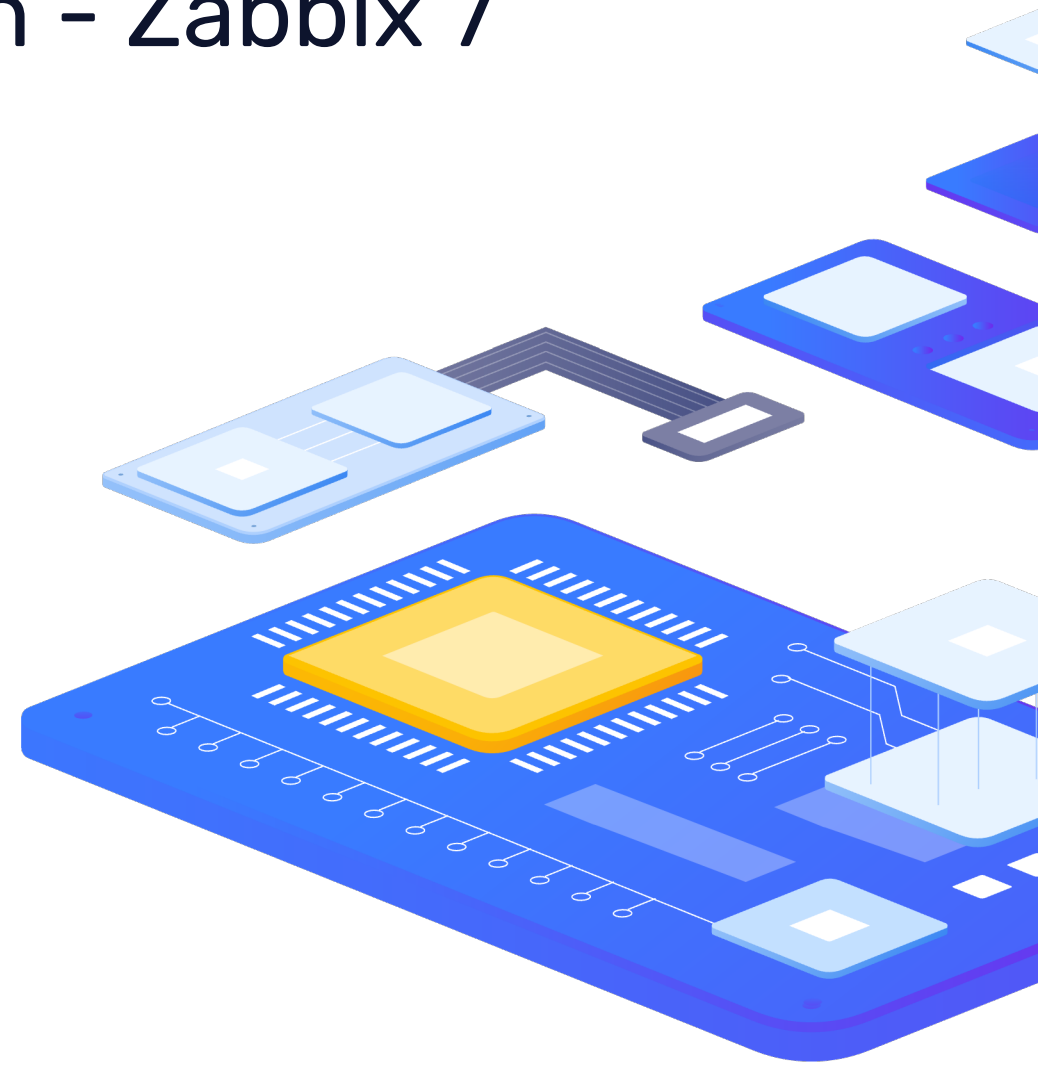
Example 5 – Manual Host action - Zabbix 7

- Problem:
  - Allow to restart list of services
- Solution:
  - Agent script with dropdown menu



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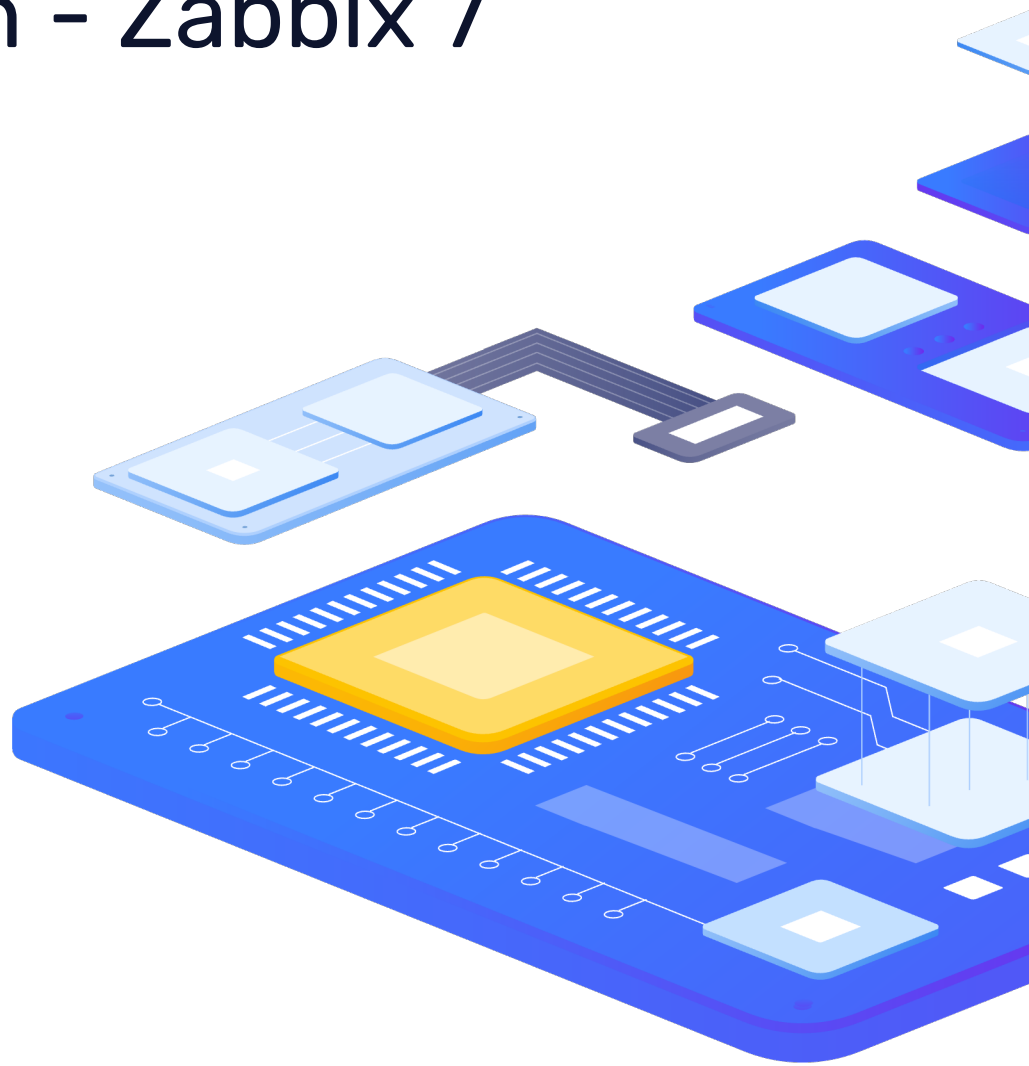
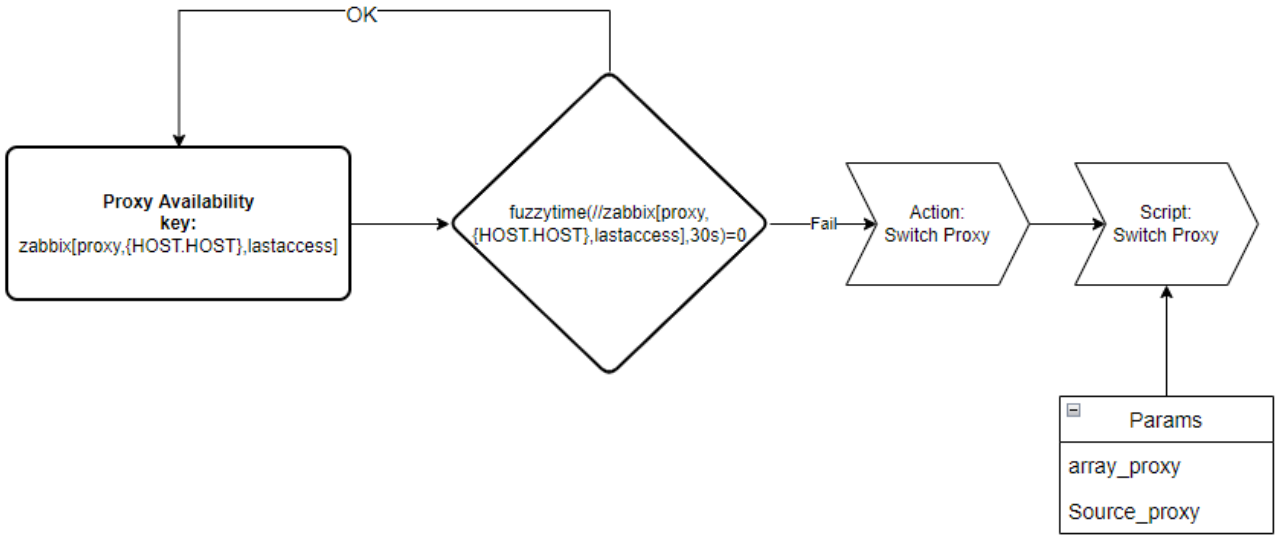
Example 6 – Manual Host action - Zabbix 7

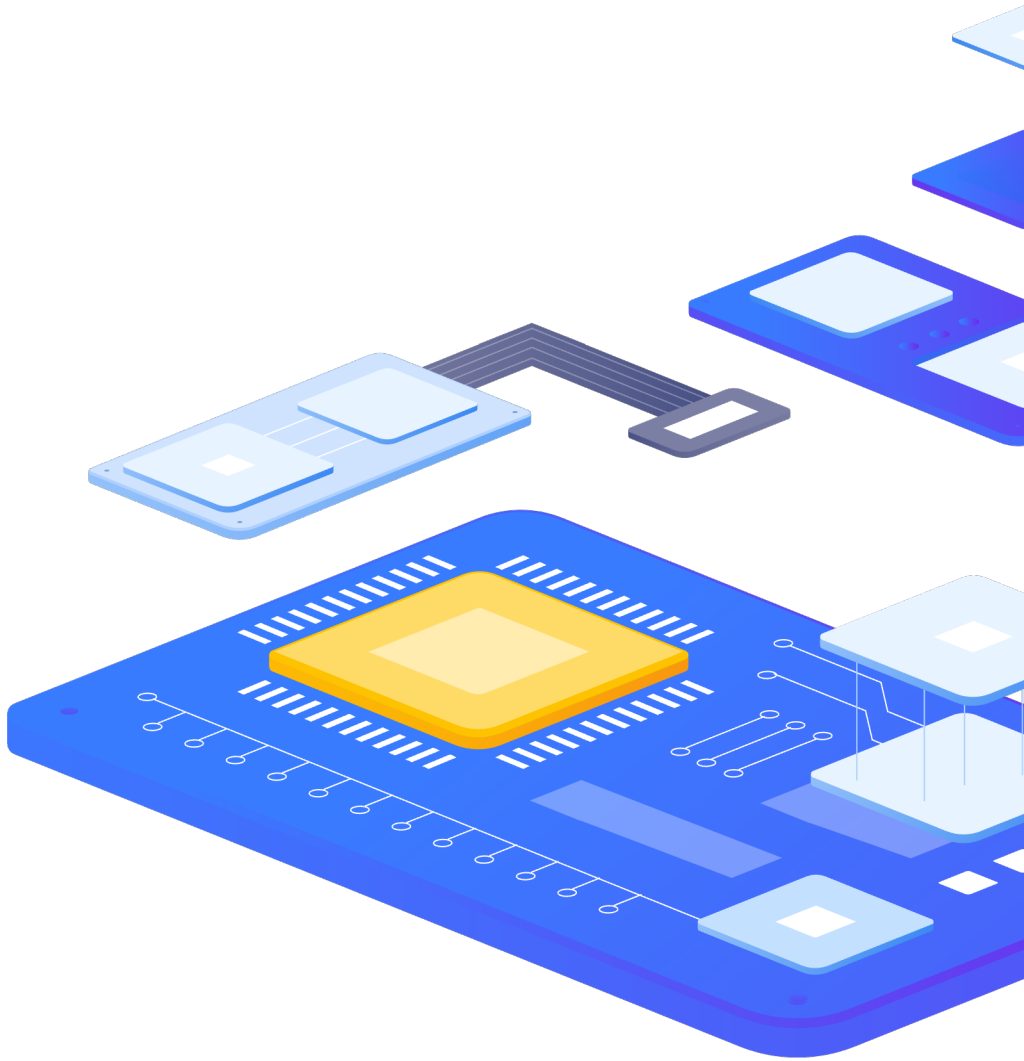
- Problem:
  - Manual data input
- Solution:
  - Webhook script with API call history.push



Example 7 – Proxy failover

- Problem:
  - HA for Zabbix proxy needed by customer for SNMP devices
- Solution:
  - Use two Zabbix proxies as a “cluster”
  - Script for Failover based on availability of proxy





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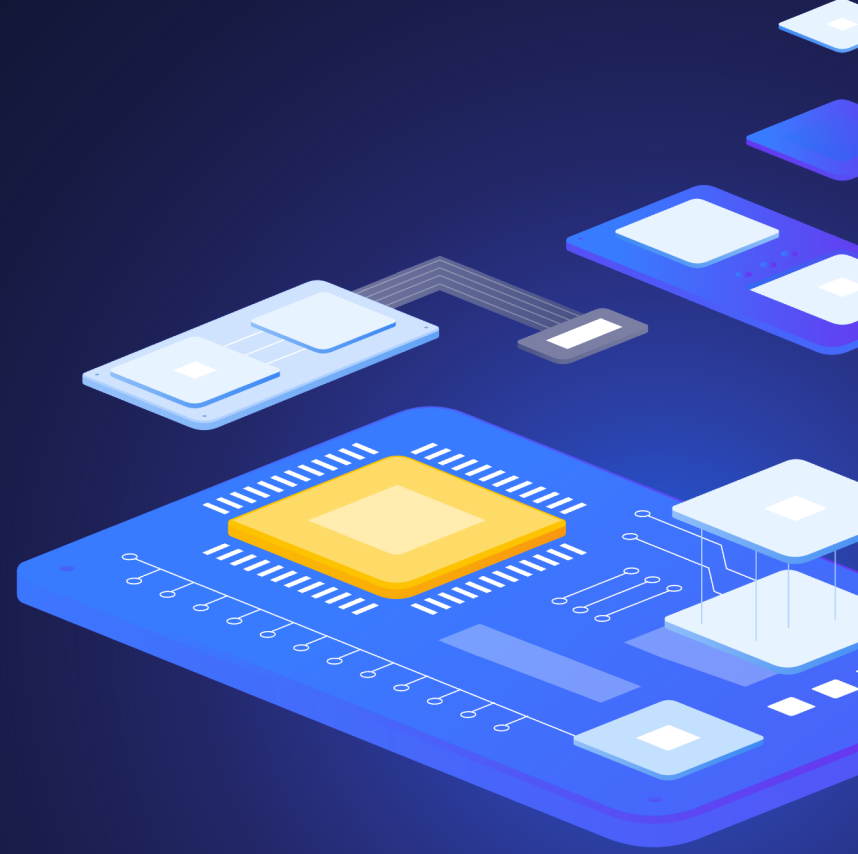
Best Practices in Script usage



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Security Best Practices

- Restrict system.run on Zabbix agents
  - Use AllowKey and DenyKey parameters in the agent configuration to whitelist specific commands and block everything else.
  - Avoid using broad wildcards like system.run[*] which can lead to unauthorized remote command execution
  - Ensure proper agent user rights on the system to limit the impact if a command is compromised
- Limit scripts by User groups
- Confirmation dialogs
  - Enable confirmation dialogs for critical tasks like service reboots to prevent "accidental clicks"

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Performance Best Practices

- Avoid heavy scripts
  - JavaScript execution is sandboxed and limited to a specific memory and timeout window to prevent scripts from hanging the main process.
  - Avoid deep nested loops or processing massive datasets (e.g., multi-megabyte JSON files) within a single preprocessing step.
  - If a script requires significant computation, consider moving that logic to an external script triggered via the agent or server rather than using internal JavaScript
- Use Zabbix proxies
  - Execute scripts closer to the remote infrastructure to reduce latency and offload the CPU burden from the central Zabbix Server.
- Logging
  - excessive use of console.log() or Zabbix.log() can bloat server logs and impact I/O performance.
  - Ensure all debugging code is removed or commented out before moving scripts into production environments

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Script Maintainability

- Naming Conventions
  - Organize scripts by type and function (e.g., Linux/Service/Restart, API/Jira/CreateTicket) to keep the "Scripts" menu clean.
- Version Control
  - Do not treat the Zabbix Frontend as your only source of truth; maintain your JavaScript and shell scripts in a version control system like GitLab or GitHub.
- Script Documentation
  - Document complex regex expressions and custom JavaScript objects (like HttpRequest) directly within the script body

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Tips and tricks

Check our wiki and social networks regularly for tips and updates

Tips and tricks on our webpage:

- https://www.initmax.com/wiki/frontend-scripts-and-sudo-in-zabbix/
- https://www.initmax.com/wiki/zabbix-java-gateway-installation-with-tomcat-monitoring/
- https://www.initmax.com/wiki/zabbix-7-0-instructions-for-installation-in-5-minutes/
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- https://www.initmax.com/wiki/reporting-in-zabbix-7-0/

Frontend Scripting

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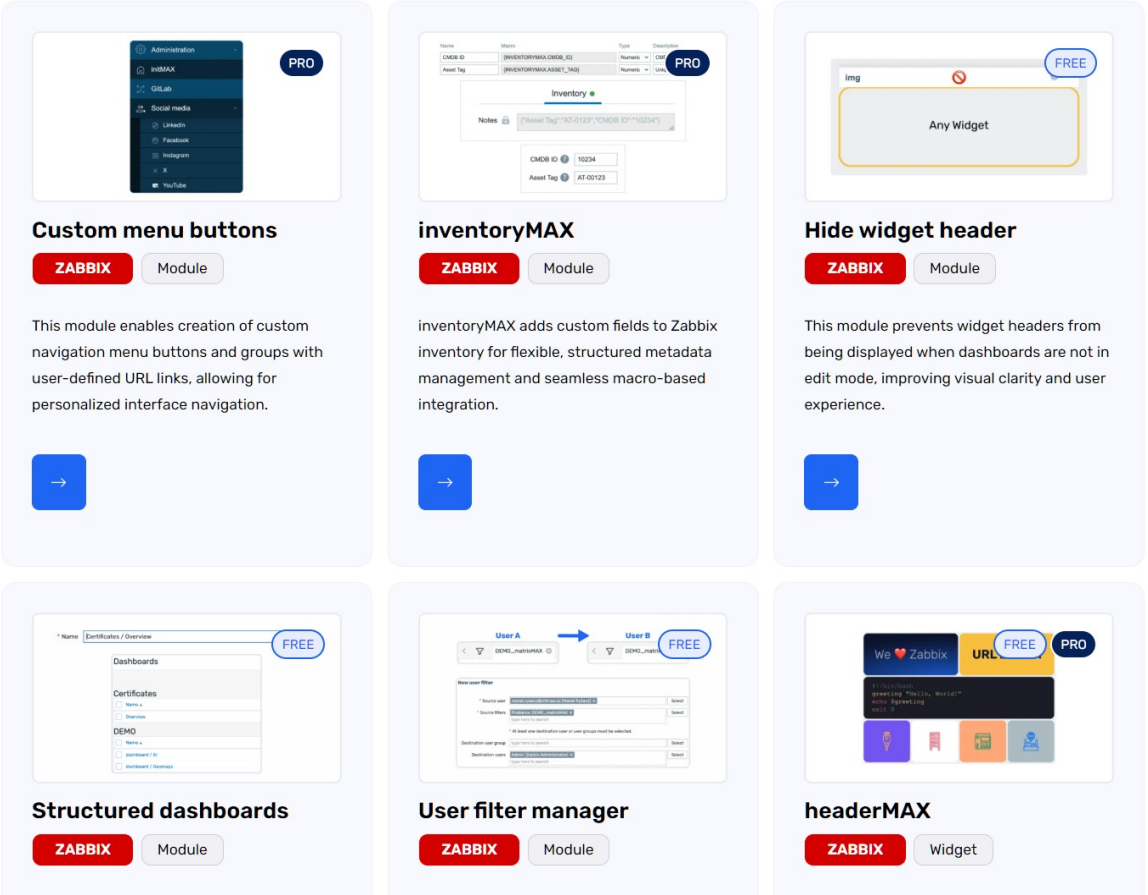
- Custom visualization widgets
- UX Improvement Modules
- AI Integration with Zabbix
- Both **FREE** and PRO Versions

- initMAX eshop link
  https://www.initmax.com/eshop/



- Video explanation of widgets and modules
  https://www.youtube.com/watch?v=fpW6TR7DQdU&list=PLF7Hh_ikyQDpHiHhXwLtw57OCDF9jn7zL

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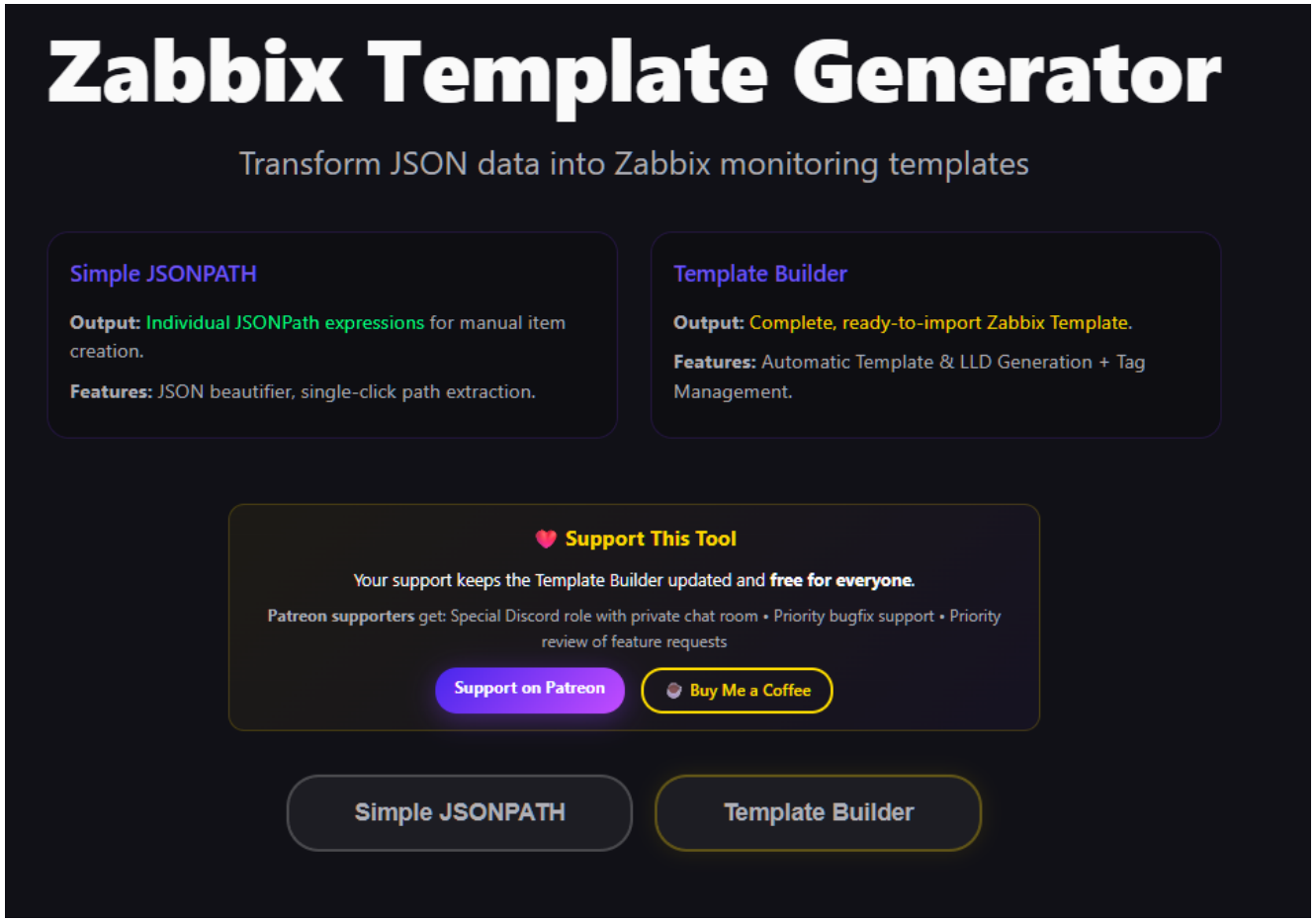
Frontend Scripting

dmitrylambert.com

- FREE Template builder out of JSON
- Tag support
- Low Level Discovery support
- Zabbix 7.0 / 7.2 / 7.4 version support
- Extract Simple JSONPATH
- Download ready to apply Template

- www.dmitrylambert.com



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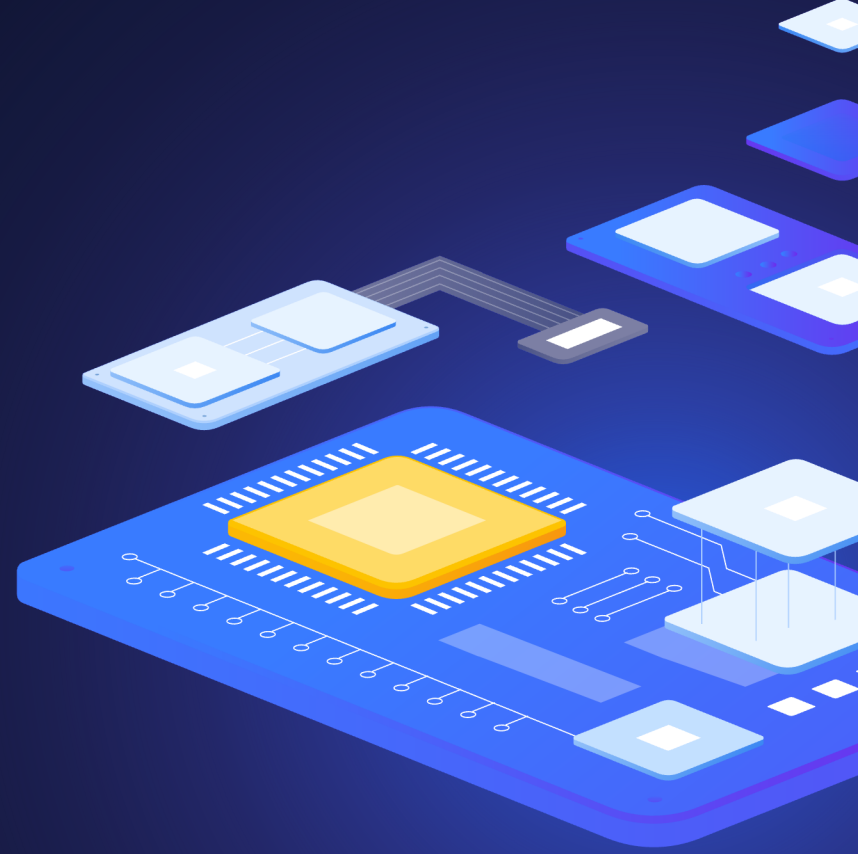
Questions?



Frontend Scripting

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