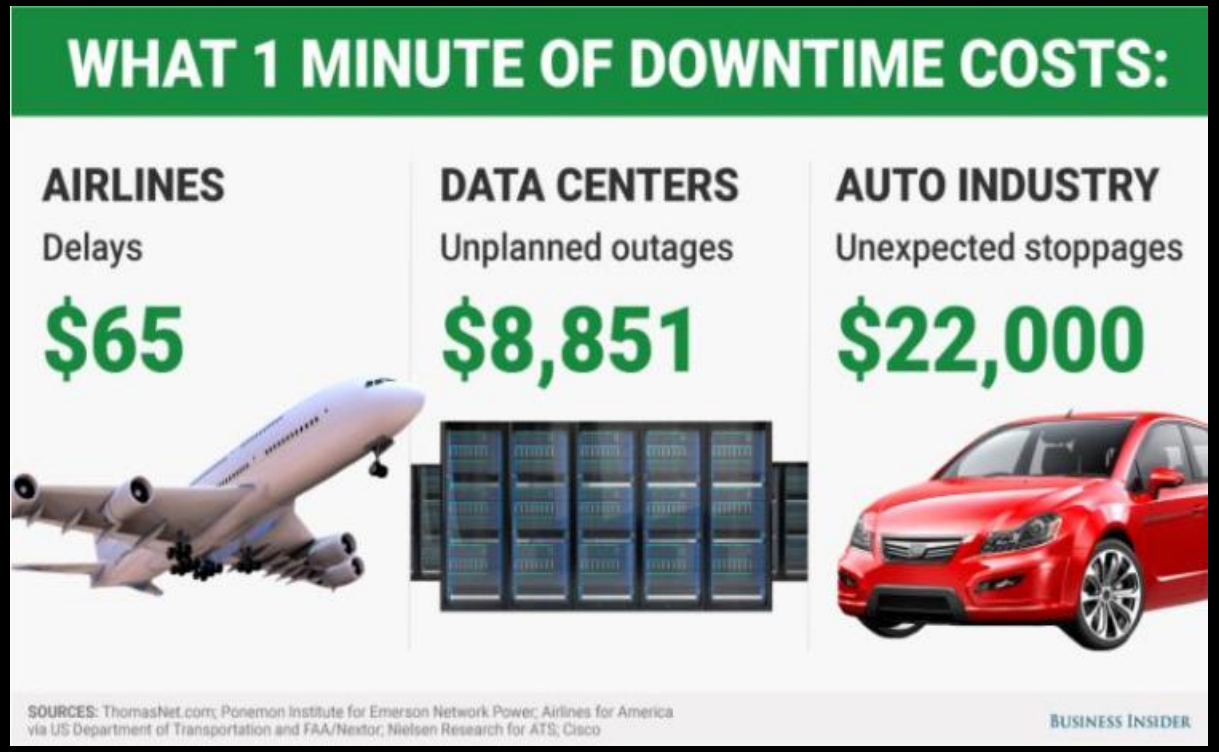
“ZABBIX: OPEN-SOURCE MONITORING AT SCALE”

Scalable Open-Source Monitoring for IT, Cloud & Beyond
Empowering Enterprises with Reliability, Flexibility, and Community

- Saquib Akhtar, Solution Designer

Nokia

WHY TO MONITOR?



- Prevent downtime.
- Make big IT environments transparent & easy to manage.
- Collect and visualize real-time data, analyze and make trend-
- predictions.
- Enable better planning & purchasing.

ZABBIX JOURNEY

24 years of experience ZABBIX is an enterprise-level monitoring system designed to monitor millions of metrics in real time, collected from tens of thousands of servers, virtual machines, network devices and applications.

- **Zabbix Journey (2001 – 2025)**
- **2001** – First release of Zabbix by Alexei Vladishev
- **2004** – Zabbix SIA founded (commercial support + development)
- **2012** – Zabbix 2.0 introduced distributed monitoring & better scalability
- **2015** – Zabbix 3.0 launched with encryption & visualization upgrades
- **2017** – Zabbix 4.0 (LTS) released – high performance, dashboards improved
- **2020** – Zabbix 5.0 (LTS) with modern UI, new integrations, security focus
- **2022** – Zabbix 6.0 (LTS) – HA support, business services, advanced integrations
- **2024** – Zabbix 7.0 (LTS) – scalability boosts, new plugins, cloud-native improvements
- **2025** – Zabbix celebrated **24 years** in the open-source monitoring space

Monitoring tools used in the past

HP ITO + NNM

- Run on HP-UX
- Motif based user interface
- Strong support for HP-UX and other pure UNIX platform
- Integrated Agents/Scripts deploy

HP / Microfocus OM9

- Run on Linux
- Java based Console + WebUI for adm
- Integrated Templates Versioning
- Support for the major OS
- NNM still present
- Integrated Agents/Scripts deploy

1996 — 2000 — 2009 — 2013 — 2024

HP OVO + NNM

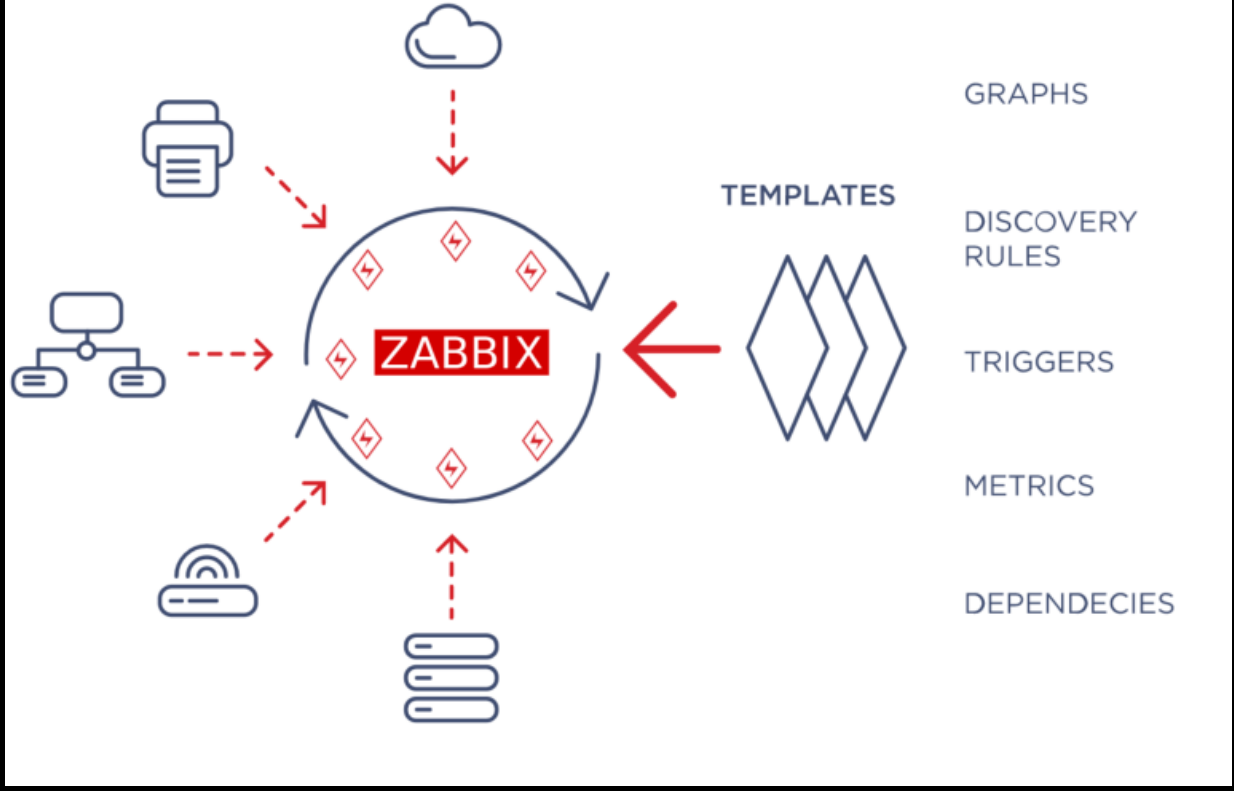
- Run on HP-UX
- Motif based user interface
- Windows and Linux support
- NNM still remain the tool for topology and network monitoring
- Integrated Agents/Scripts deploy

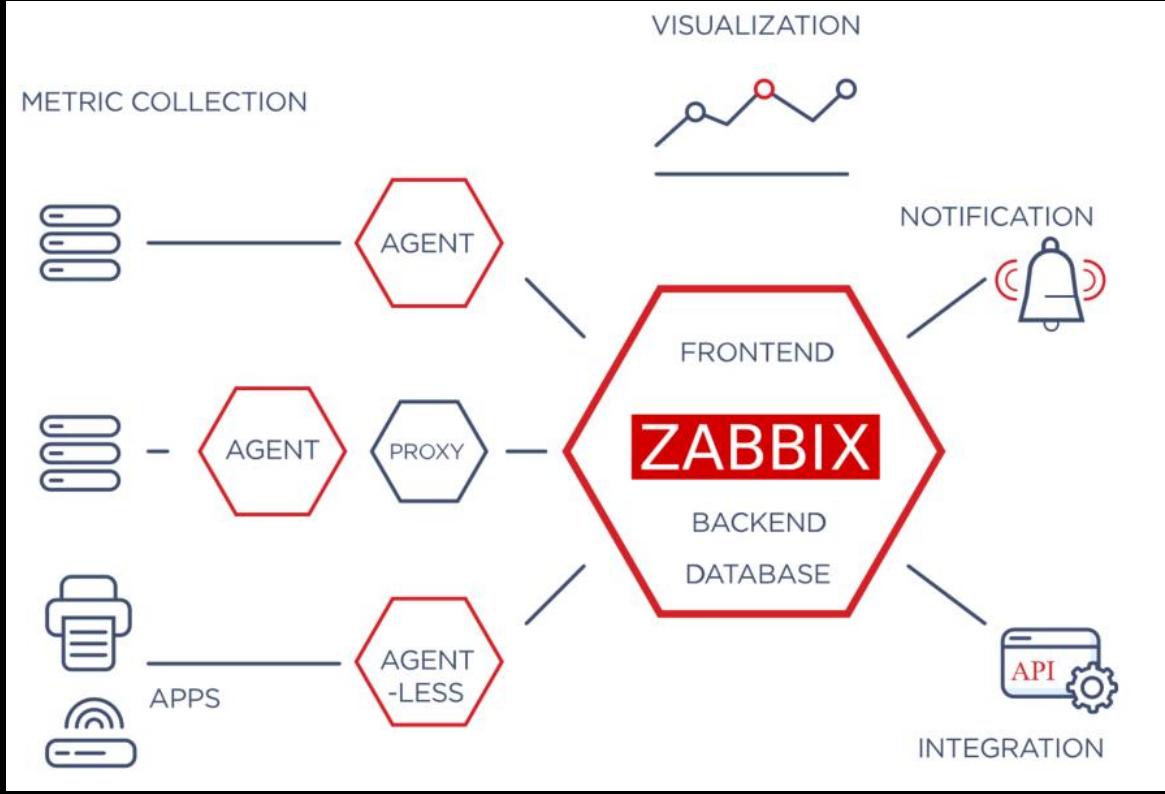
ZABBIX

- Built on more fresh technology
- Possibility to Monitor WebApplication
- Full Web based user interface

Slide from Zabbix Summit 2025

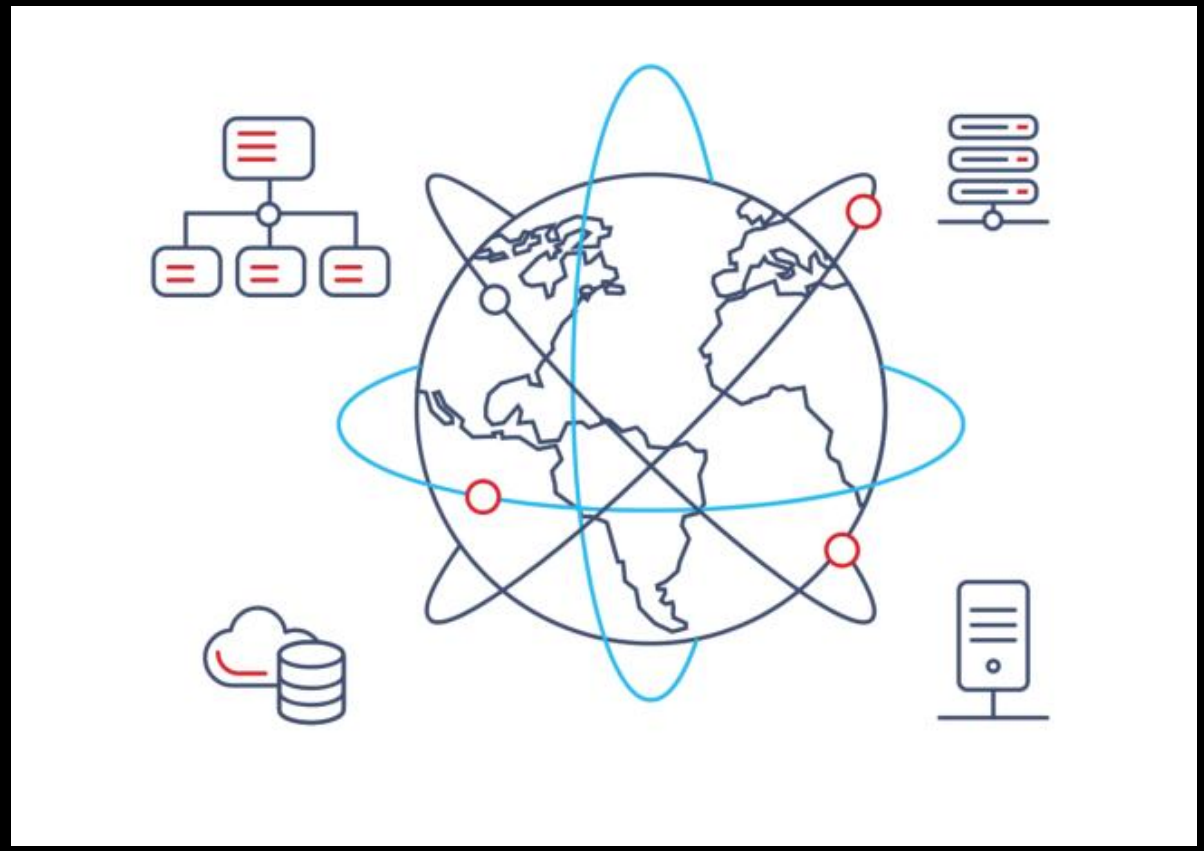
ZABBIX COMPONENTS





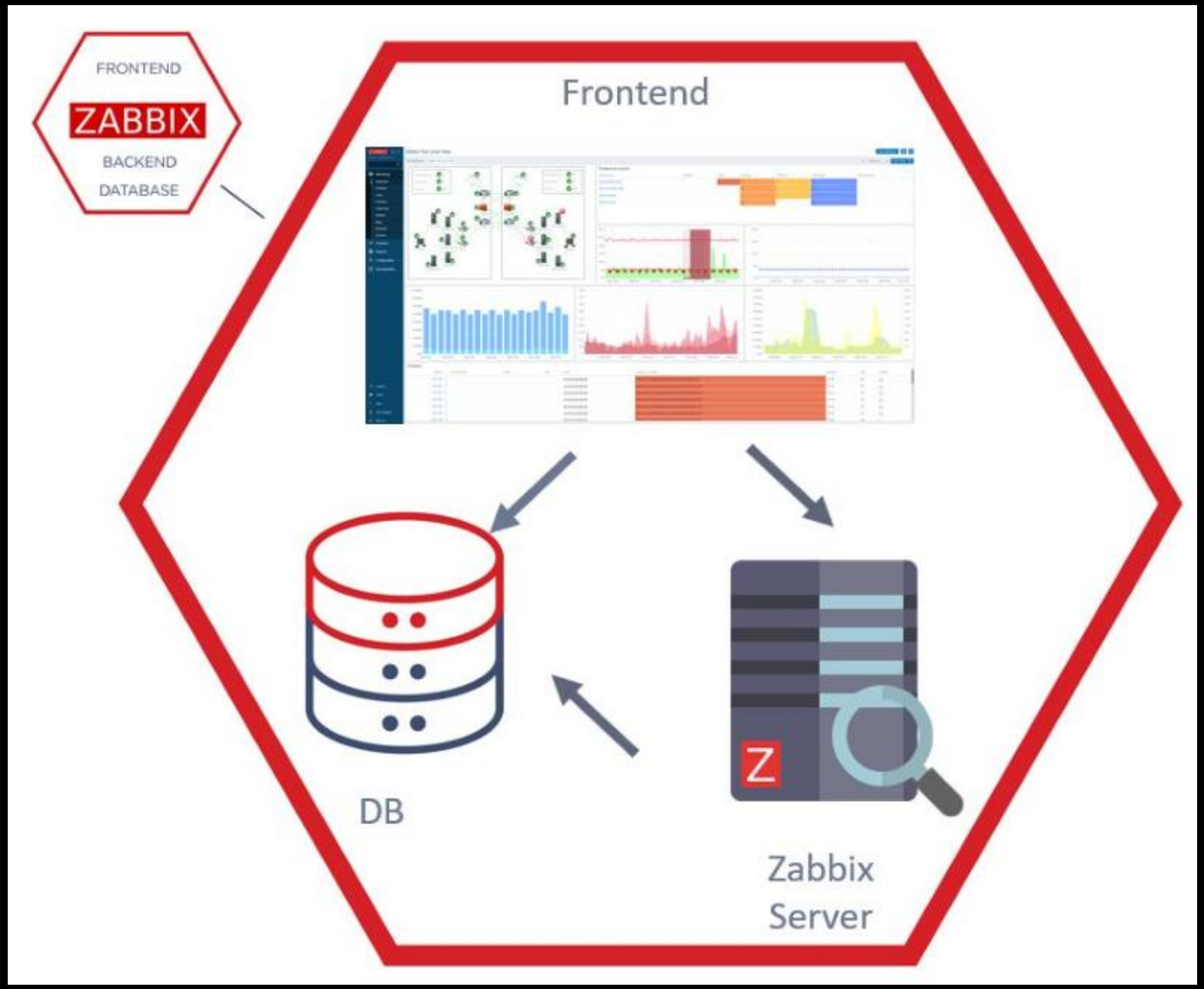
BASIC ARCHITECTURE

- Host
- Anything you wish to monitor:
  - Server
  - Switch
  - UPS
  - Application
  - Database
  - Website
- Agent
- Monitoring of devices, resources and applications.
- Proxy
- Monitoring of distributed locations

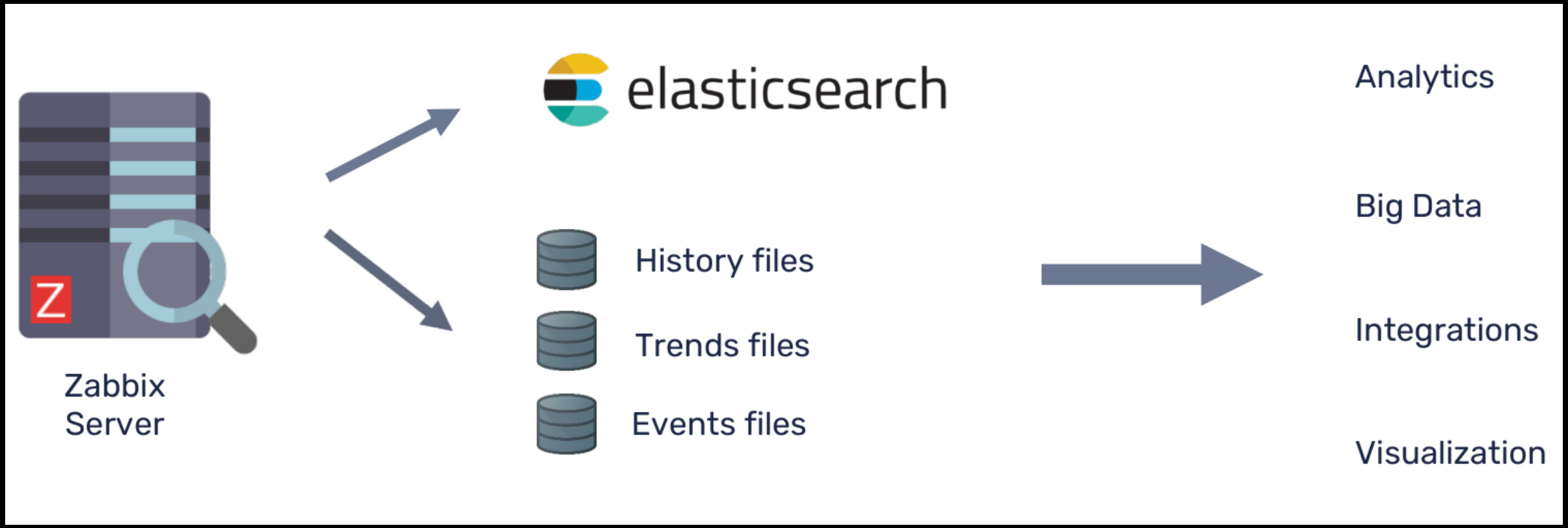


BASIC ARCHITECTURE

- Server
  - Data collection
  - Calculating Triggers
  - Creating Events
  - Notification
- Frontend
  - Visualization
  - Configuration management
- Database
  - Data storage

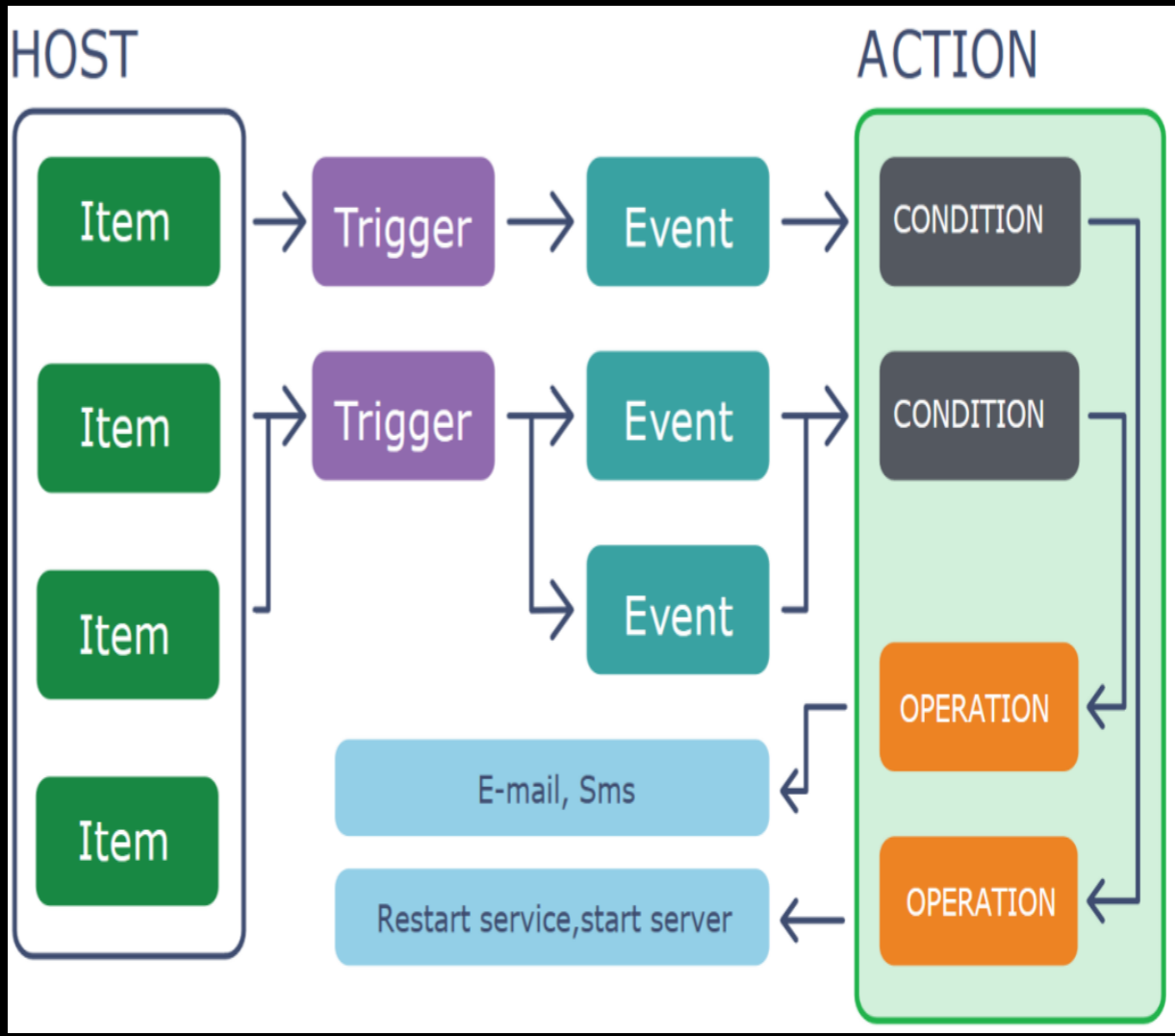


BASIC ARCHITECTURE



ZABBIX COMPONENTS

- Host - the device you wish to monitor.
- Item - defines a metric which you would like
- to monitor:
  - DB status
  - CPU utilization
  - Temperature in a server room
  - Number of users online for an application,
  - etc.
- Trigger – a problem definition.
- Event - a single occurrence of something
- that deserves attention.
- Problem - a trigger that is in “Problem”
- state.
- Action - a predefined means of reacting to
- an event.



SYSTEM OVERVIEW

Access control: monitor changes in room temperature, use of access cards, etc.

KPI monitoring: understand the state of health of your business and make rational decisions by checking collected data against planned numbers: profit, number of web visitors, number of purchases, amount of devices manufactured per hour, etc.

Capacity monitoring: plan your IT budget by measuring performance of IT infrastructure and reporting how much resources remain unused/are missing.

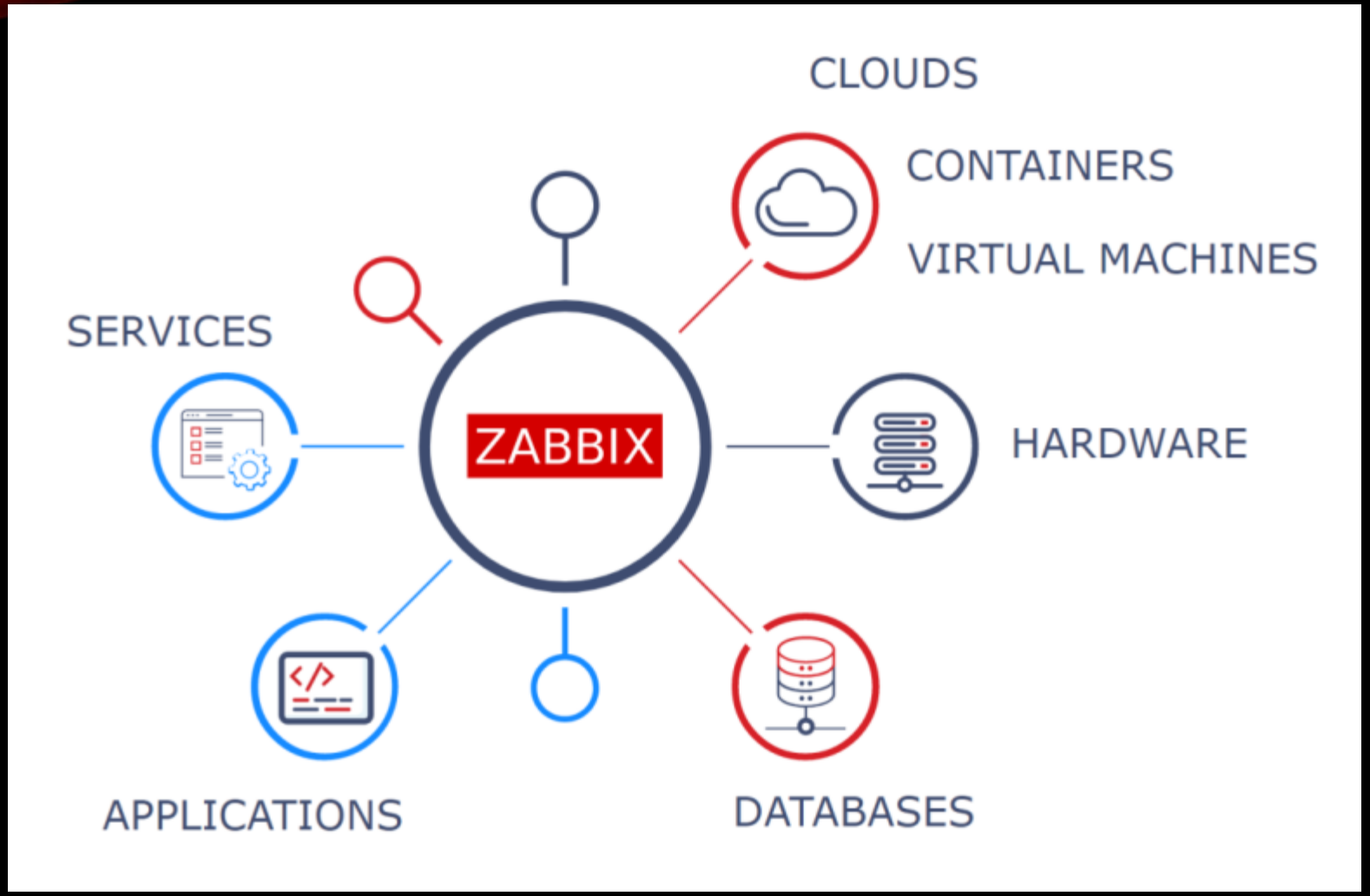
Configuration monitoring: make sure systems work according to rules by checking software versions, installed applications against the allowed ones run on your hardware.

Inventory monitoring: know the actual state of your IT equipment by monitoring licenses, RAM modules, disks, network devices and desktops, printers and other peripherals in actual use and comparing with the official (purchased) inventory.

Security monitoring: exclude security breaches to minimize losses by monitoring network port, malicious software, password files, root password, server case, etc.

DATA COLLECTION

- Services: availability and the responsiveness of e-mail or web servers.
- Network devices: network utilization, CPU, memory and port status.
- Virtual machines: VMware vCenter and vSphere installations for various VMware hypervisor and virtual machine properties and statistics.
- Databases: monitor in great detail any database, including MySQL, PostgreSQL, Oracle and Microsoft SQL Server.
- Java Application Server: monitor JBoss, Tomcat, Oracle Application Server or any other application with the efficient Zabbix Java gateway.
- Web services: easily monitor availability, response time and download speed of your external website, e-commerce portal or internal wiki and service desk system.
- Hardware: gather statistics such as temperature, fan speed voltage, and disk state.
- Customized monitoring: integrate ZABBIX in any environment and gather data from financial systems, environment control systems or even sophisticated research devices.


CLOUDS
CONTAINERS
VIRTUAL MACHINES
SERVICES
ZABBIX
HARDWARE
APPLICATIONS
DATABASES

DATA COLLECTION

- Zabbix Agent can work on different platforms and collect metrics from any device or application on performance and availability.
- Zabbix Agent supports active/passive checks, is highly efficient and extendable via custom parameters, modules or scripts.

What if agent is not an option?

- SNMP, HTTP, IPMI and SSH agents
- Agentless monitoring
- Databases and Java applications
- monitoring
- Custom metrics/scripts
- Aggregation and calculated checks
- VMware monitoring
- Web monitoring

OS LEVEL MONITORING

WINDOWS & LINUX

- Average CPU load for the machine 1min, 5min and 15min with line graph
- Disk utilization for all the partitions or mount point and NFS/SAMBA shares with pie graph
- Number of process running and other background tasks information
- Traffic of Network Interfaces attached to the VM
- All windows services listed under services.msc automatically added to the list of monitored items
- Custom service running on a user-defined or service specific port number defined by OEM
- Able to run custom scripts to get real time values/data as a part of active checks
- Log file analysis and monitoring
- OS version and other static information

Trigger Information:

- 80% utilization of RAM, CPU and all disks is treated as Average(Warning) level
- Above 90% utilization of RAM, CPU and all disks is treated as Critical level
- Trigger can be created for high network traffic

DATA COLLECTION: PRE-PROCESSING

12 C	Right trim	Temperature: 12
{“users“:10022}	JSON	User count: 10022
“GET /index.html HTTP/1.0“ 200 28083	Regexp	Response code 200 Size 28083
Unstructured text	Regexp	Version Apache 2.4.37 DNS lookup threads 10

VISUALIZATION

- Widget-based dashboards
- Graphs
- Network maps
- Geographical maps
- Slideshows
- Drill-down reports

Latest Data:

All values in the database are stored as raw and averaged data.

The refresh interval and the storage time is set for each data item separately (or automated through a template).

Automatic database cleaning from old data.

VISUALIZATION: GRAPHS

1. A **standard graph** for a numeric item is available without any configuration at all - these graphs are generated on runtime.

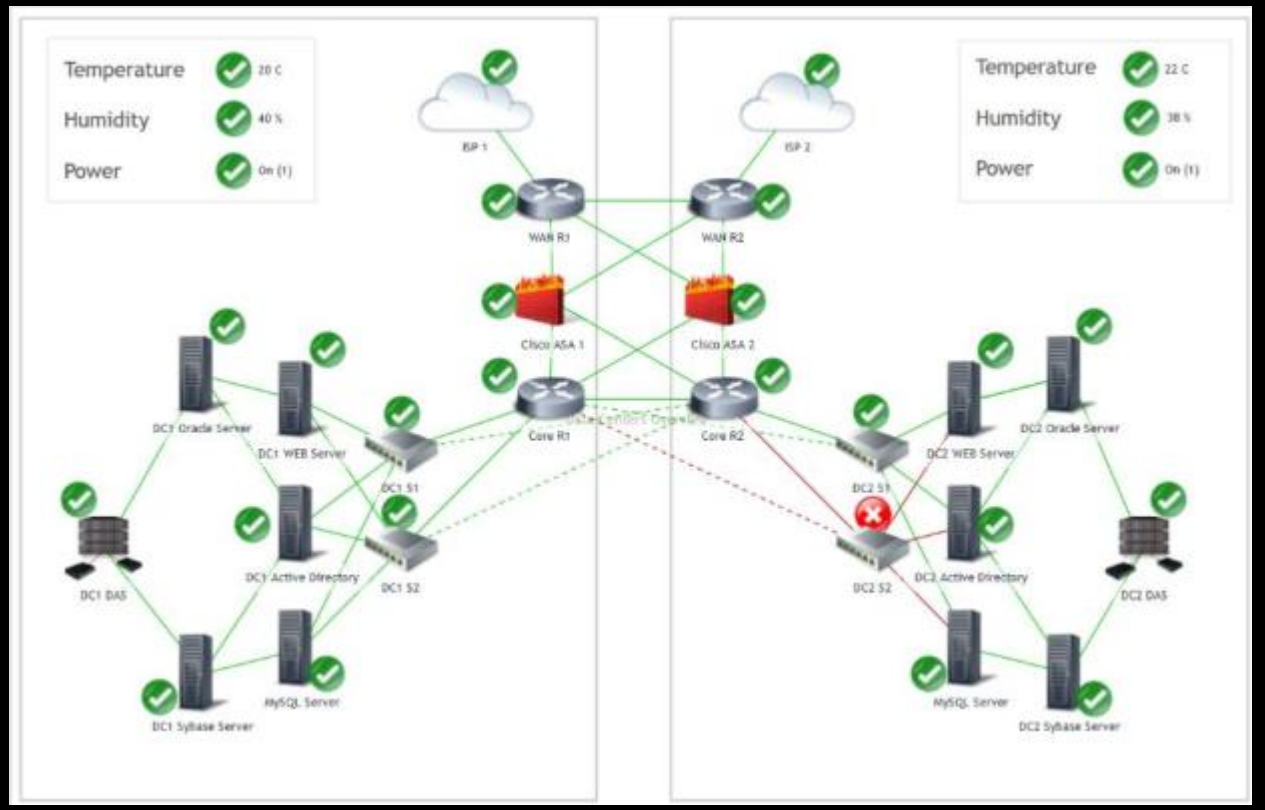
2. In a **custom graph** data of several items can be compared and you can specify the graph style, or the way lines are displayed.

3. **Ad-hoc graphs** - create a comparison graph for multiple items with little effort and no maintenance.

4. **Graph** - dashboard widget allows to add data sets and define their visual representation.

VISUALIZATION: MAPS

Zabbix network maps offer a possibility of laying out the monitored environment over an optional background image for a user-friendly overview. Each element on the map may represent a host, host group, single trigger, an image or another map.



VISUALIZATION: DASHBOARDS

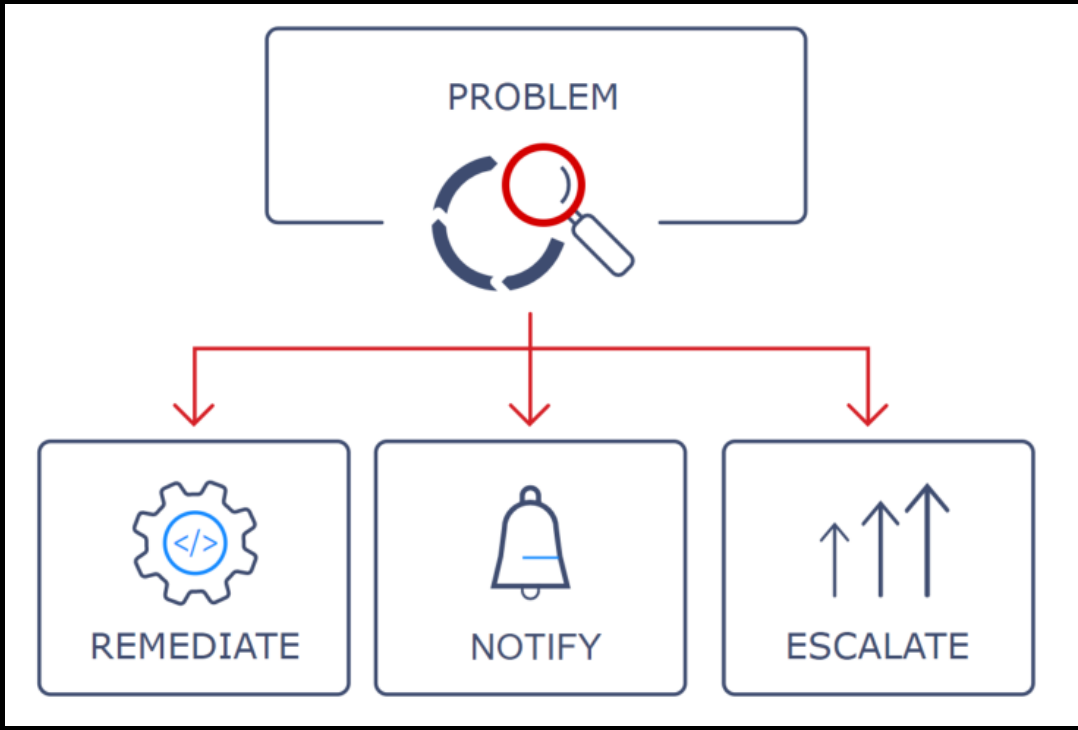
Zabbix Dashboard is a central place in the web frontend that provides personalized details about the monitored environment:

- Drill-down reports
- Maps
- Graphs
- Screens
- Problems
- System status
- Host status
- Status of Zabbix server
- Discovery status
- Web

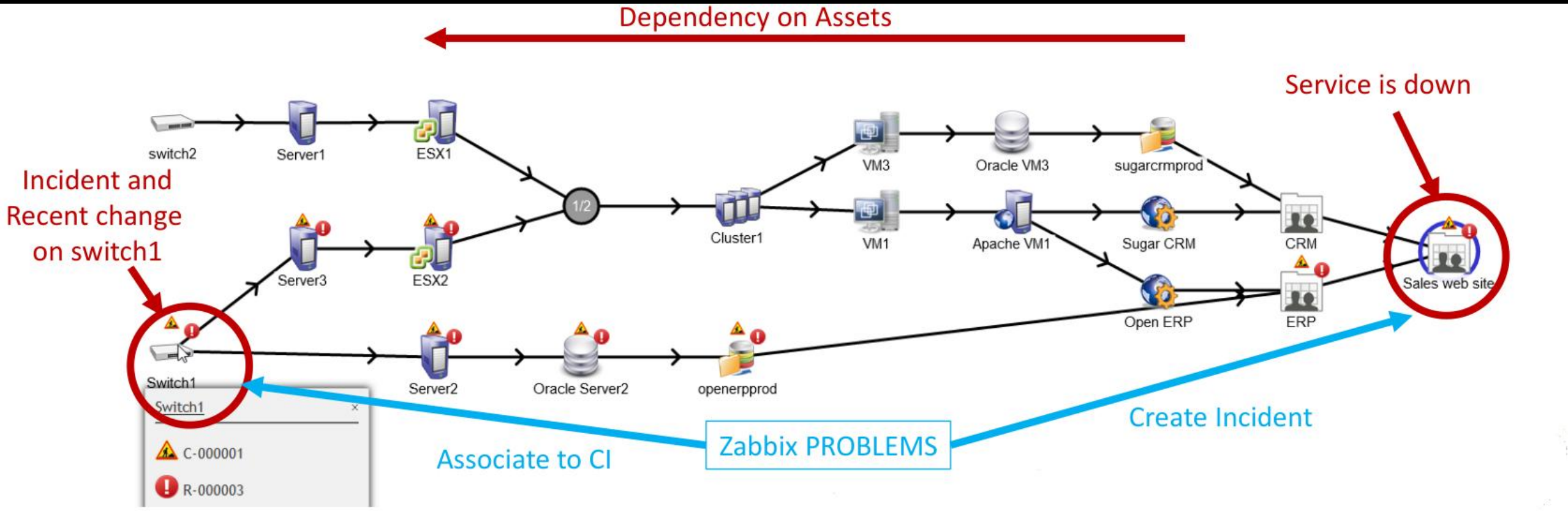
ALERTING & NOTIFICATIONS

Be notified in case of any issues using different channels:

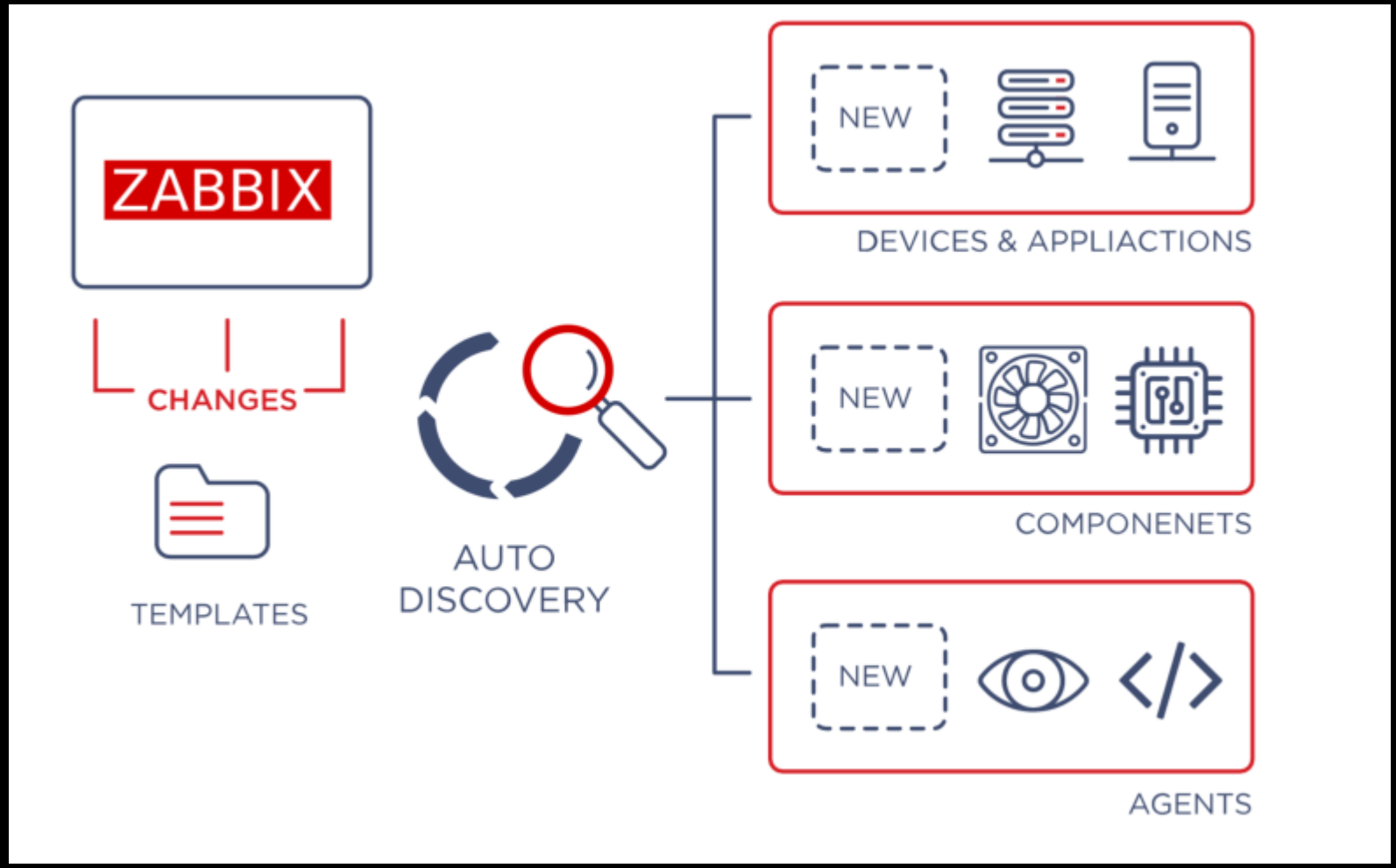
- Send messages
- Let Zabbix fix issues automatically
- Escalate problems according to flexible user-defined Service Levels
- Customize messages based on recipient's role
- Customize messages with runtime and inventory information



FLOW OF INCIDENT CREATION

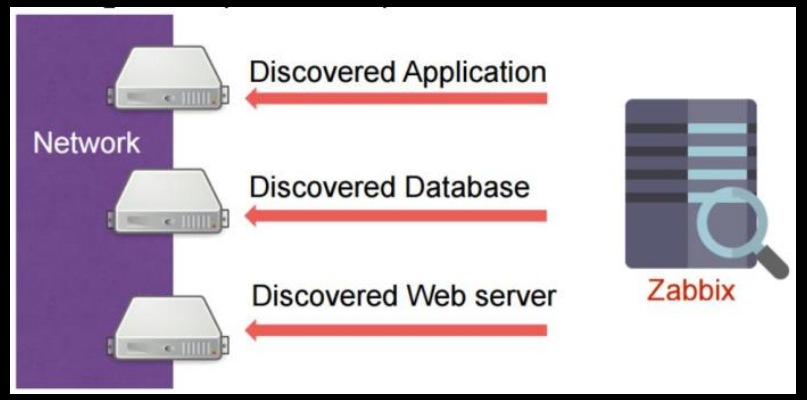


AUTO-DISCOVERY

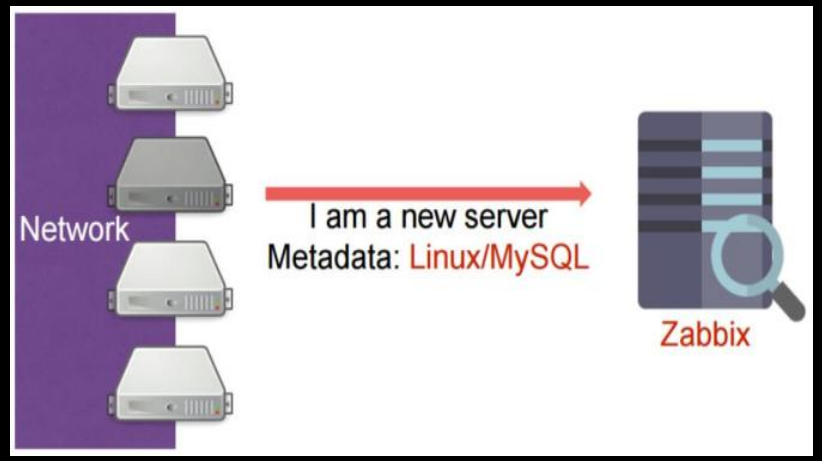


AUTO-DISCOVERY

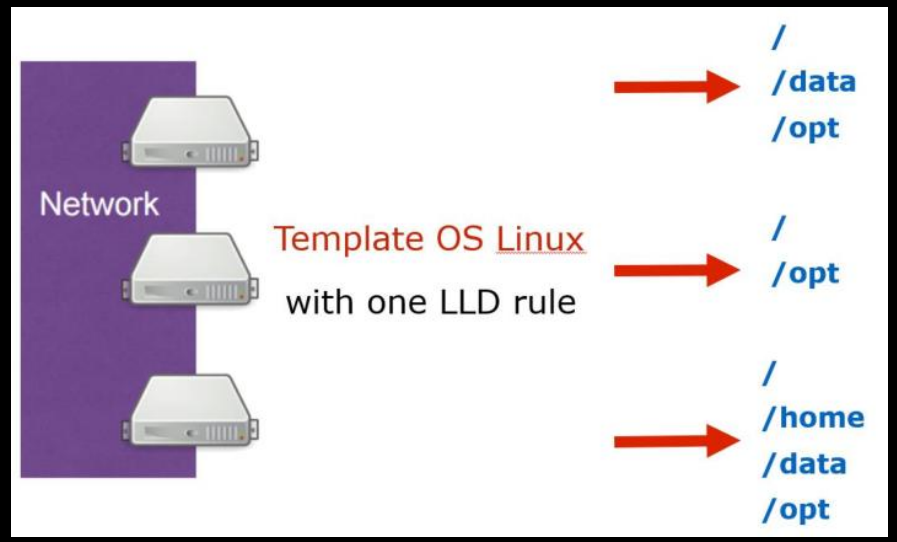
Network discovery: periodically scans the network to detect changes and performs specified actions.



Agent auto-registration: configure automatized monitoring of new equipment with Zabbix agents installed.

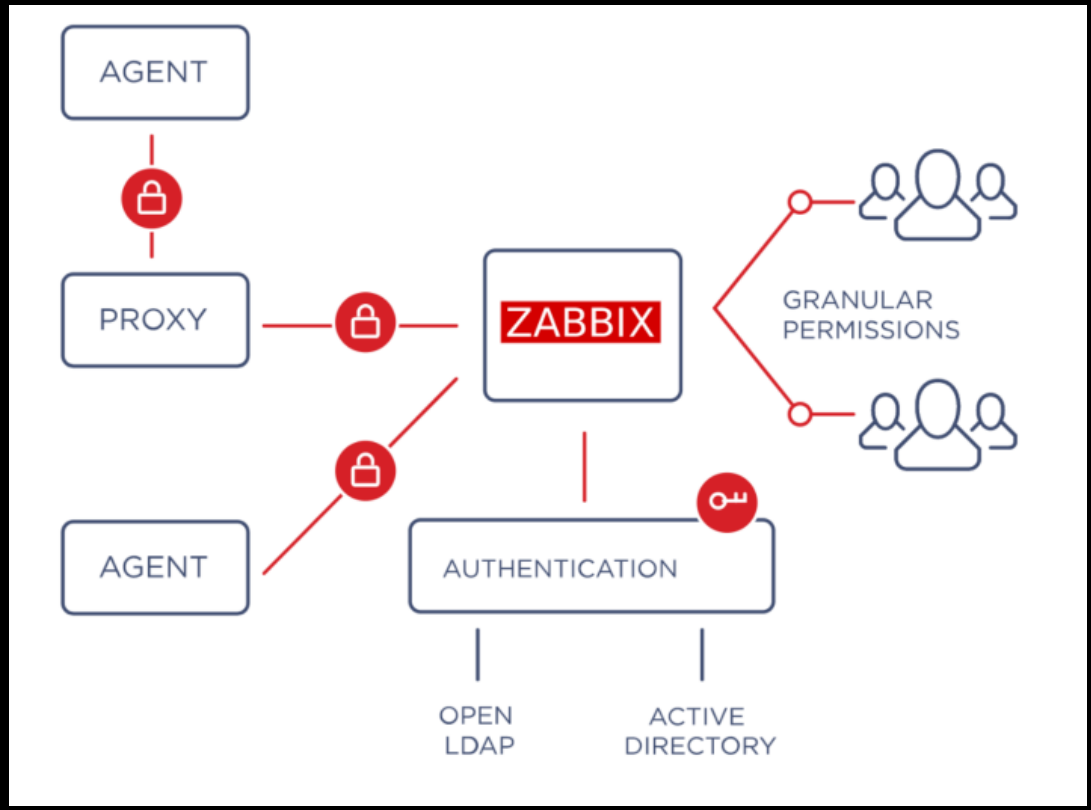


Low-level detection: automatically creates data items, triggers and graphics on the host.



SECURITY

- Strong encryption between all Zabbix components
- Multiple authentication methods: Open LDAP,
- Active Directory, SAML
- Flexible user permission schema
- Zabbix code is open for security audits

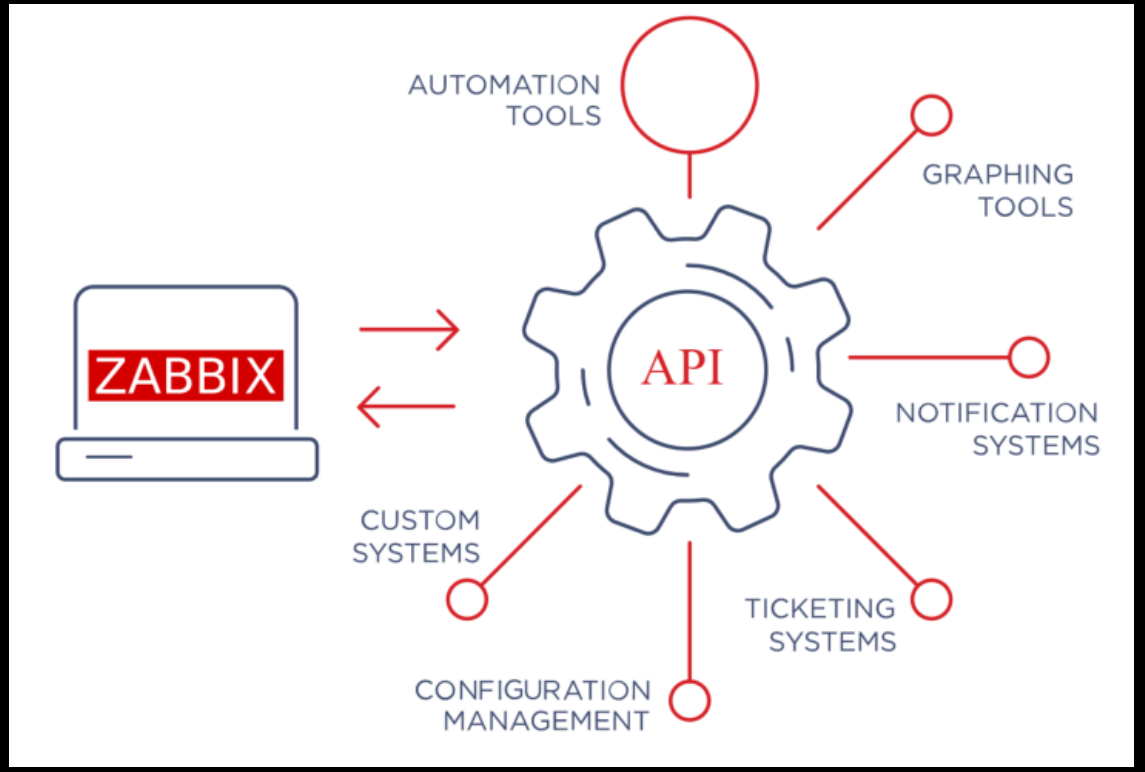


ZABBIX API

Integrate Zabbix with any part of your IT environment.

Get access to all Zabbix functionality from external applications through Zabbix API:

- Automate Zabbix management via API
- Create new applications to work with Zabbix
- Integrate Zabbix with third party software: Configuration management, ticketing systems
- Retrieve and manage configuration and historical data



Thank you for listening !!
Time for Q&A session.