Zabbix Proxy Deep Dive: The Key to Scalable Distributed Monitoring

Facundo Vilarnovo, Technical Support Engineer, Zabbix Latam

ZABBIX SUMMIT

OCTOBER 8 · 10, 2025
RIGA · LATVIA


Canadá
Bahía de Hudson
Mar de Labrador
Estados Unidos
México
Cuba
Puerto Rico
Guatemala
Nicaragua
Mar Caribe
Venezuela
Guyana
Surinam
Colombia
Ecuador
Perú
Brasil
Bolivia
Paraguay
Chile
Uruguay
Argentina
Atlántico Norte
Atlántico Sur
Océano Índico
Noruega
Finlandia
Rusia
Dinamarca
Irlanda
Polonia
Bielorrusia
Alemania
Ucrania
Austria
Francia
Rumanía
Italia
España
Portugal
Grecia
Turquía
Mar Mediterráneo
Kazajistán
Mongolia
Uzbekistán
Kirguistán
Turkmenistán
China
Siria
Irak
Irán
Afganistán
Pakistán
Nepal
India
Myanmar (Birmania)
Tailandia
Vietnam
Filipinas
Malasia
Indonesia
Marruecos
Túnez
Argelia
Libia
Egipto
Sahara Occidental
Mauritania
Malí
Níger
Chad
Sudán
Arabia Saudita
Omán
Yemen
Golfo de Adén
Mar Arábigo
Golfo de Bengala
Golfo de Tailandia
Mar de Laquedivas
Burkina Faso
Guinea
Ghana
Nigeria
Golfo de Guinea
Sudán del Sur
Etiopía
Somalia
Kenia
Gabón
República Democrática del Congo
Tanzania
Angola
Zambia
Mozambique
Namibia
Zimbabue
Botsuana
Madagascar
Sudáfrica


Canadá
Bahía de Hudson
Mar de Labrador
Finlandia
Rusia
Estados Unidos
Atlántico Norte
México
Cuba
Puerto Rico
Guatemala
Mar Caribe
Nicaragua
Venezuela
Guyana
Surinam
Colombia
Ecuador
Brasil
Perú
Bolivia
Paraguay
Chile
Uruguay
Argentina
cífico Sur


Finlandia
Rusia
Canadá
Bahía de Hudson
Mar de Labrador
Estados Unidos
Atlántico Norte
México
Cuba
Puerto Rico
Guatemala
Mar Caribe
Nicaragua
Venezuela
Guyana
Surinam
Colombia
Ecuador
Perú
Brasil
Bolivia
Paraguay
Chile
Uruguay
Argentina
cífico Sur


Finlandia
Rusia
Canadá
Bahía de Hudson
Mar de Labrador
Estados Unidos
Atlántico Norte
México
Cuba
Puerto Rico
Guatemala
Mar Caribe
Nicaragua
Venezuela
Guyana
Surinam
Colombia
Ecuador
Brasil
Perú
Bolivia
Paraguay
Chile
Uruguay
Argentina
cífico Sur
10
AFA
FRANCE
18 DECEMBER 2022
LUSAIL STADIUM


Canadá
Bahía de Hudson
Mar de Labrador
Finlandia
Rusia
Estados Unidos
Atlántico Norte
México
Cuba
Puerto Rico
Guatemala
Mar Caribe
Nicaragua
Venezuela
Guyana
Surinam
Colombia
Ecuador
Brasil
Perú
Bolivia
Paraguay
Chile
Uruguay
Argentina
not stonks

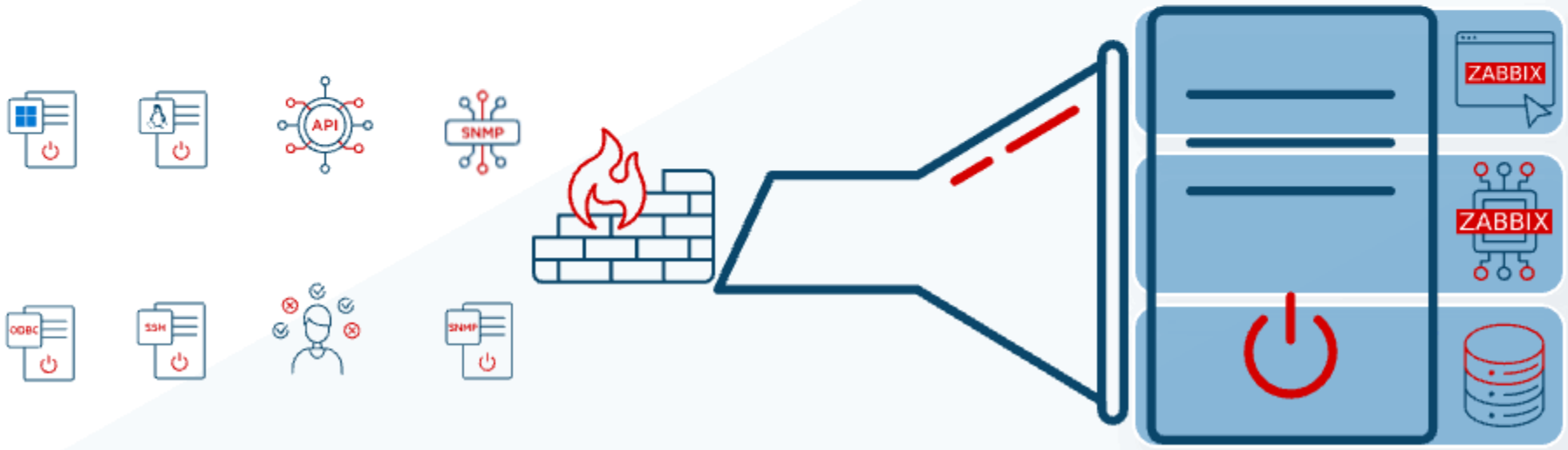
Topology

ZABBIX SUMMIT
OCTOBER 8 · 10, 2025
RIGA · LATVIA

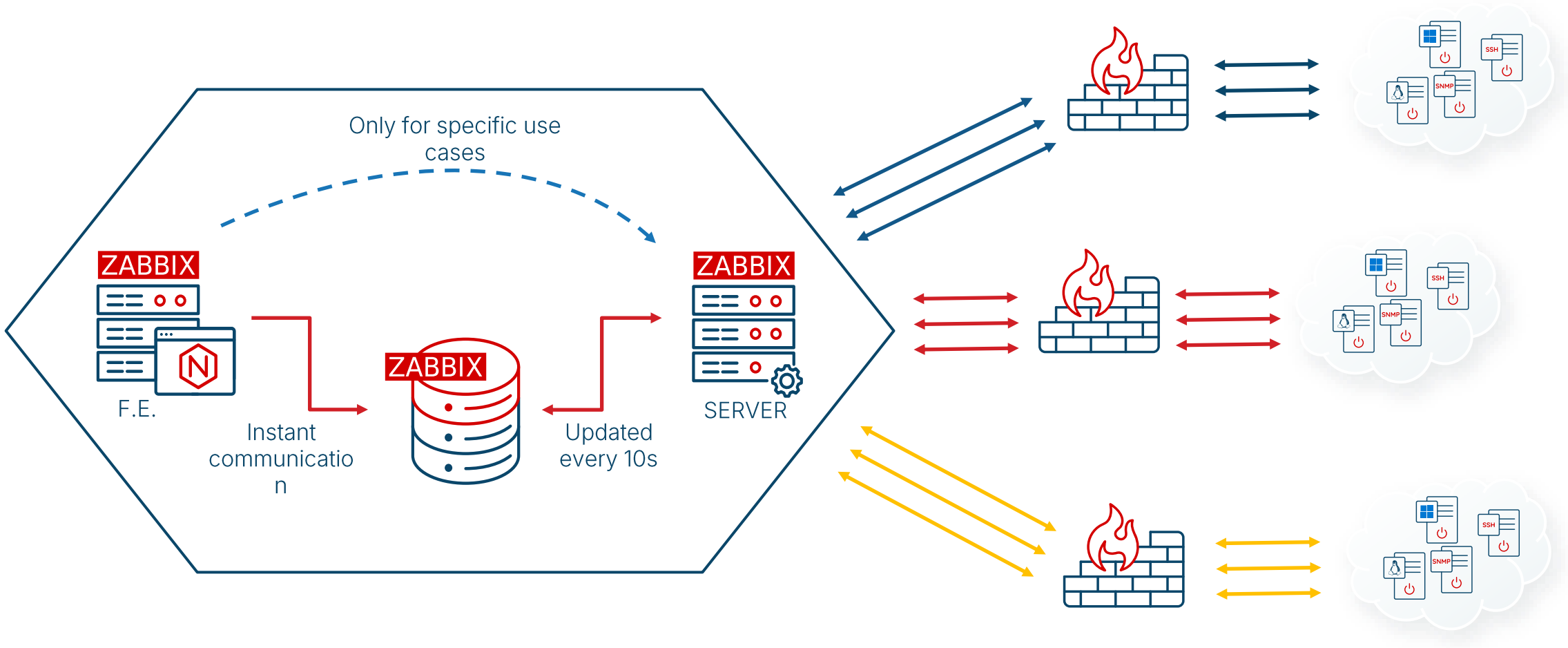
The Challenge of Centralized Monitoring:

Monolithic architectures might not scale as needed:

- Performance is tied to resources with constraints:
  - High load on Zabbix server (CPU, DB, I/O)
  - Network latency when monitoring remote locations
  - Complexity in firewall administrations (many rules to manage)
  - Data loss if network connection to a remote site fails



Architecture: Before proxy



The Solution: What is a Zabbix Proxy?

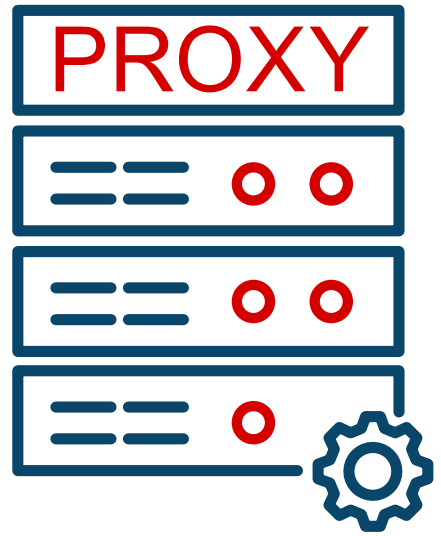
A process that can collect data on behalf of the server:

- Offloads the data collection task from the server.
- Performs preprocessing of data if needed.
- Temporarily stores (buffers) data locally.
- Sends data to the Zabbix server in a single connection.
- Can be used to test items

The Proxy is a data collector, it will not:

- Calculate triggers or send alerts

ZABBIX SUMMIT
OCTOBER 8 · 10, 2025
RIGA · LATVIA



Proxy database support

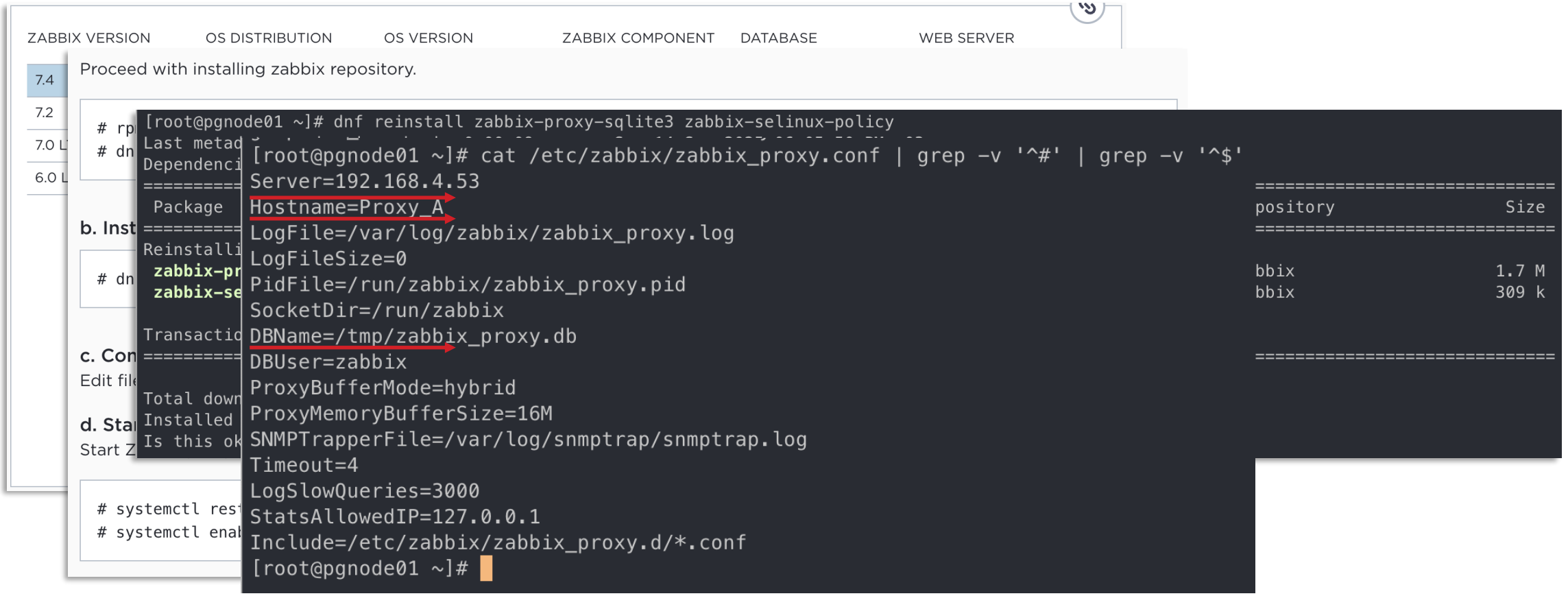
Proxies are compatible with MySQL, PostgreSQL and SQLite3:

- For MySQL and PostgreSQL, database must be manually created, and schema should be imported (like Zabbix server).
- For SQLite3 database is automatically created by specifying the path to file
- Proxy database is used as temporal storage of data

Proxy installation

Installation is straight forward:

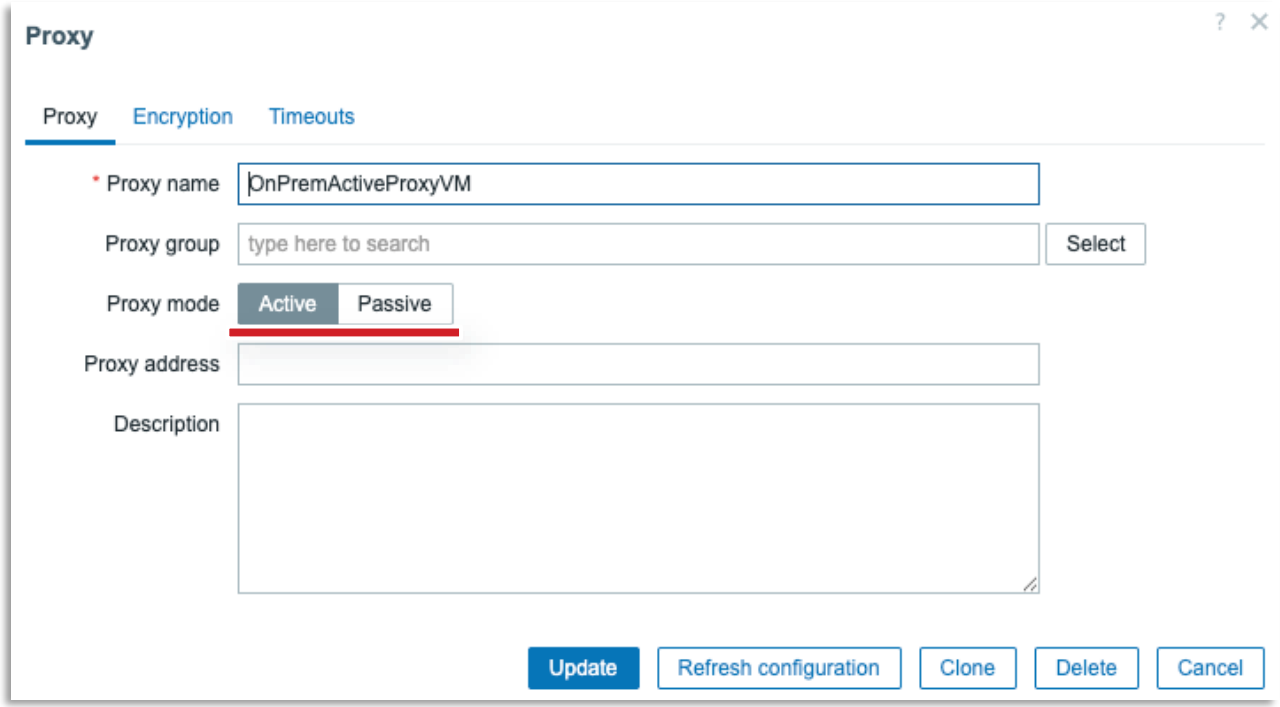
- From Zabbix download page, select OS, version, component, backed:



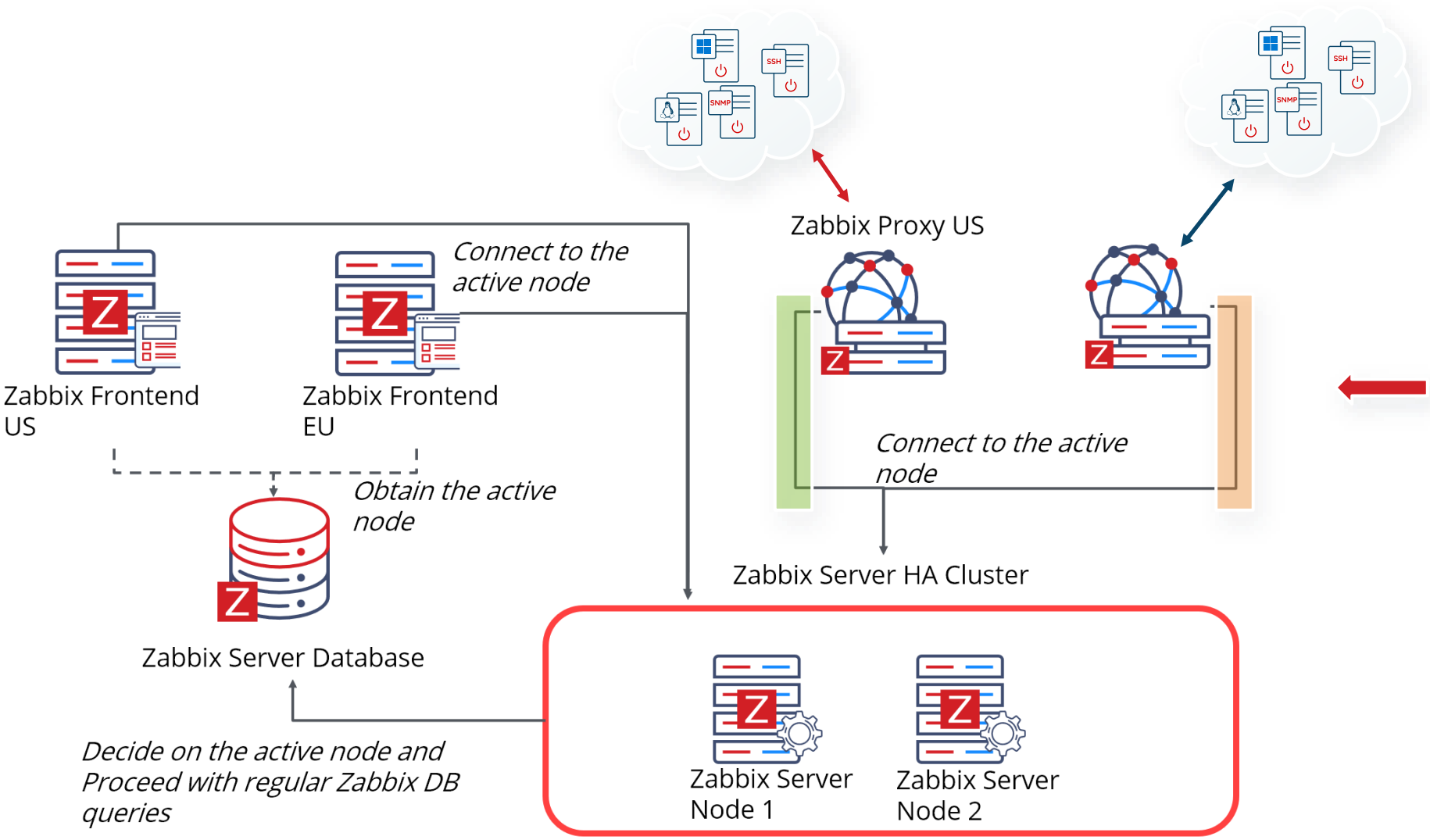
How to add a proxy?

Proxies are added via frontend, under administration section:

- Enter proxy name
- Specify if belongs to a group (Proxy HA)
- Define the mode of operation



Architecture: After proxy



Simplified network administration

Ref: https://blog.zabbix.com/whats-new-in-zabbix-6-0-lts-by-arturs-lontons-zabbix-summit-online-2021/17761/

ZABBIX SUMMIT

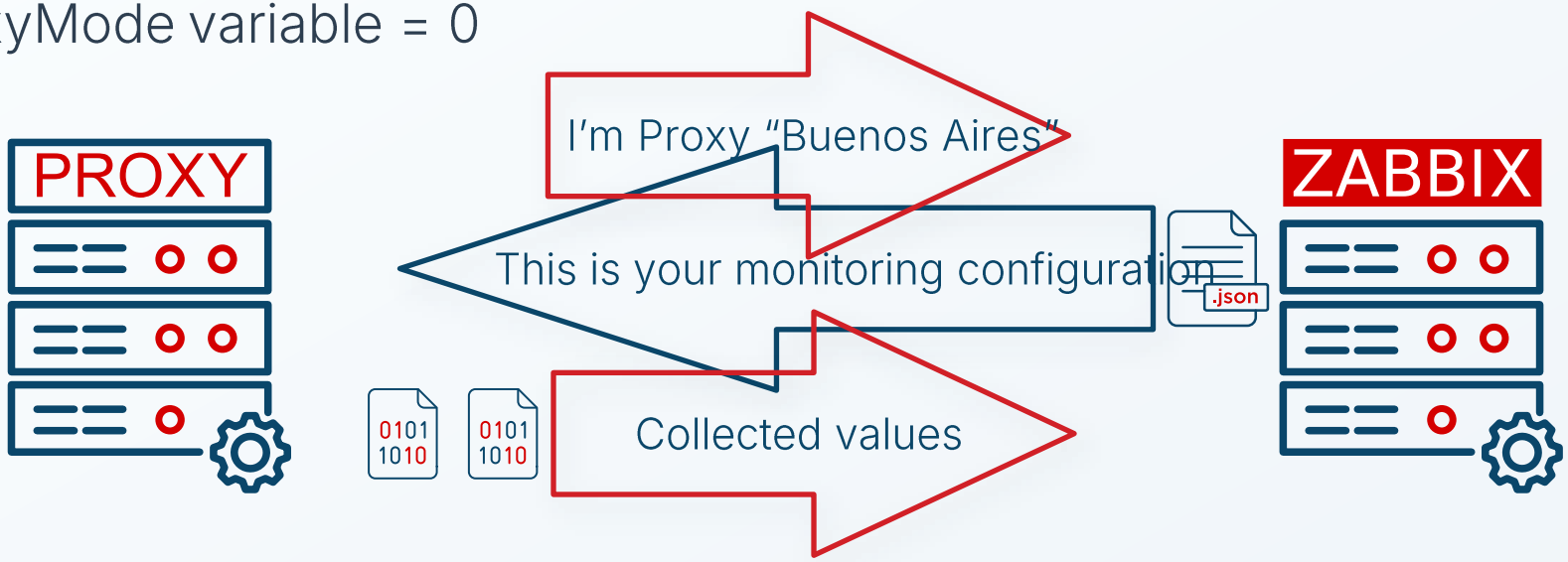
OCTOBER 8 · 10, 2025
RIGA · LATVIA

Communication

Operating Modes: Active vs. Passive

Active Proxy (Recommended):

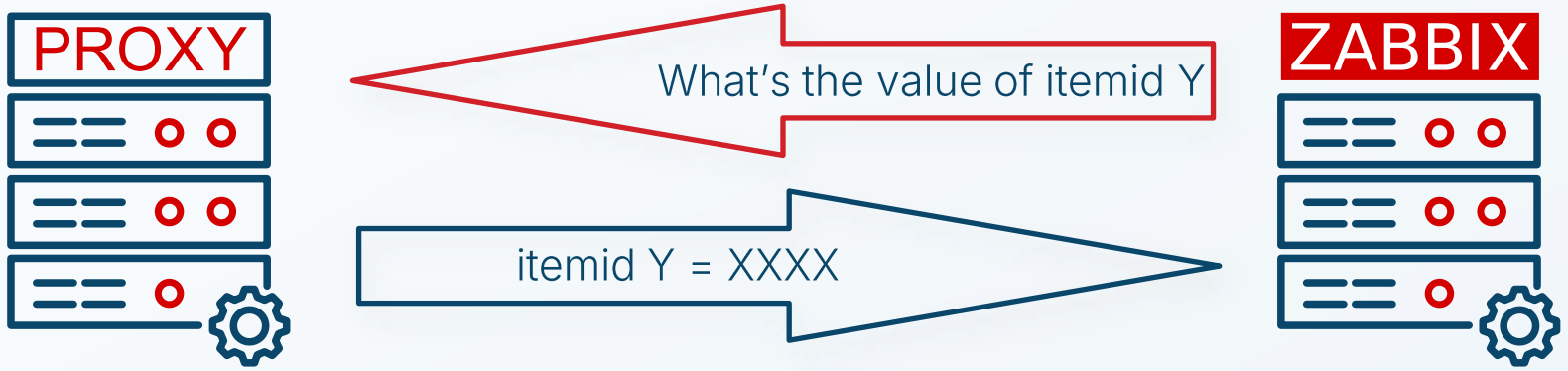
- "The proxy initiates the connection." Ideal for networks behind NAT/Firewall.
- Requests monitoring configuration and proceeds to actively send collected values.
- If server is in cluster mode, semicolon must be used. (address:port;address2:port)
- ProxyMode variable = 0



Operating Modes: Active vs. Passive

Passive Proxy:

- "The server initiates the connection." Requires the server to be able to reach the proxy.
- Server queries the proxy for each metric.
- Requires that server has “ProxyPoller = 1” variable enabled in server configuration file.
- The value of Server= in proxy acts as list of accepted IPs to receive queries.



Proxy encryption (Active)

TLSConnect defines type of encryption for connecting to server:

- Used for active proxy, ignored for passive proxy
  - unencrypted - connect without encryption (default)
  - psk - connect using TLS and a pre-shared key (PSK)
  - cert - connect using TLS and a certificate
- Mandatory if TLS certificate or PSK parameters are defined

```
### Option: TLSConnect
#       How the proxy should connect to Zabbix server. Used for an active proxy, ignored on a passive proxy.
#       Only one value can be specified:
#               unencrypted - connect without encryption
#               psk         - connect using TLS and a pre-shared key
#               cert        - connect using TLS and a certificate
#
# Mandatory: yes, if TLS certificate or PSK parameters are defined (even for 'unencrypted' connection)
# Default:
TLSConnect=psk
```

Proxy encryption (Passive)

TLSAccept defines type of encryption it accepts from server:

- Used for a passive proxy, ignored on an active proxy. Multiple values are possible:
  - unencrypted - connect without encryption (default)
  - psk - connect using TLS and a pre-shared key (PSK)
  - cert - connect using TLS and a certificate
- Mandatory if Cert or PSK are used.

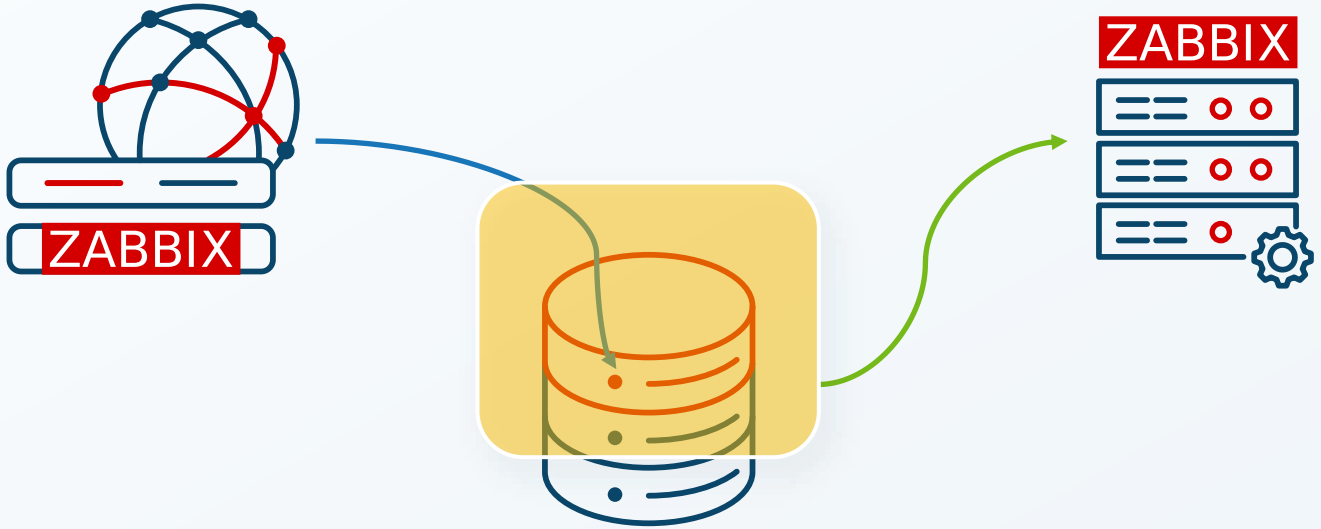
```
### Option: TLSAccept
#       What incoming connections to accept from Zabbix server. Used for a passive proxy, ignored on an active proxy.
#       Multiple values can be specified, separated by comma:
#               unencrypted - accept connections without encryption
#               psk         - accept connections secured with TLS and a pre-shared key
#               cert        - accept connections secured with TLS and a certificate
#
# Mandatory: yes, if TLS certificate or PSK parameters are defined (even for 'unencrypted' connection)
# Default:
TLSAccept=cert,psk
```

BufferMode

Buffer Mode: Disk (legacy)

Specifies history, network discovery and auto-registration data storage mechanism :

- All information must be stored in the database.
- Possible bottleneck due to database or I/O



Proxy configuration (retention)

Proxies need definitions for data retention:

- Can keep information stored besides if already was sent to server:
  - ProxyLocalBuffer

```
### Option: ProxyLocalBuffer
#       Proxy will keep data locally for N hours, even if the data have already been synced with the server.
#       This parameter may be used if local data will be used by third party applications.
#
# Mandatory: no
# Range: 0-720
# Default:
ProxyLocalBuffer=1
```

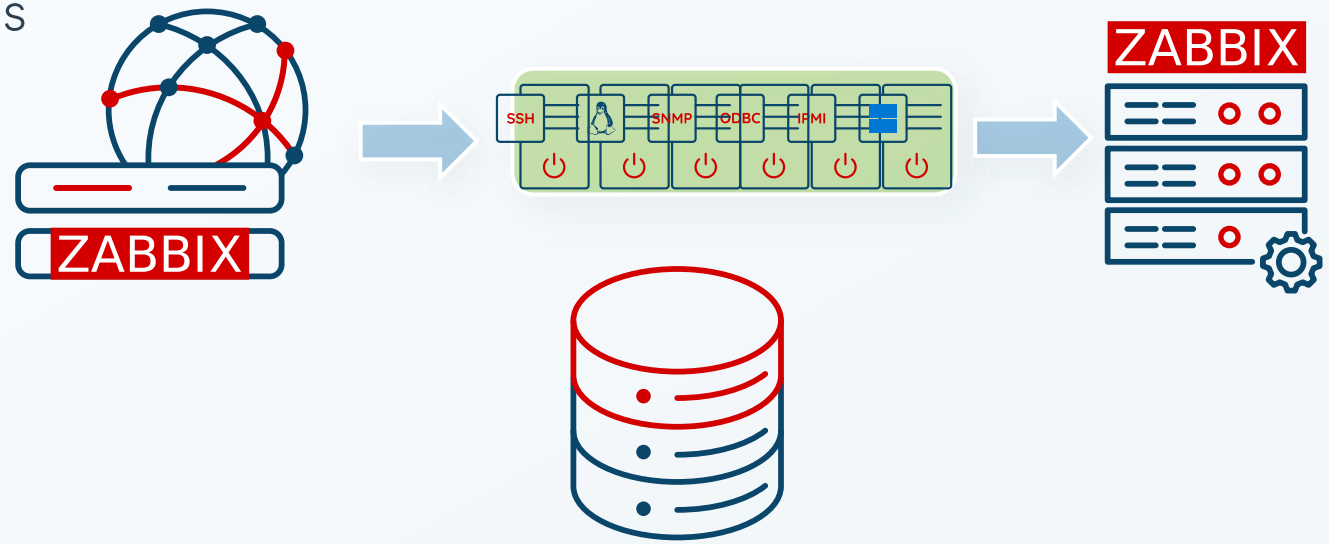
- Will store the information in case of no connection to server by the amount of time defined:
  - ProxyOfflineBuffe

```
### Option: ProxyOfflineBuffer
#       Proxy will keep data for N hours in case if no connectivity with Zabbix Server.
#       Older data will be lost.
#
# Mandatory: no
# Range: 1-720
# Default:
ProxyOfflineBuffer=1
```

Buffer Mode: Memory

Specifies history, network discovery and auto-registration data storage mechanism:

- Uploads to Zabbix server without accessing the database:
  - Requires to define the buffer size. (ProxyMemoryBufferSize up to 2 GB)
  - Between 10 and 100 times better proxy performance, depending on the allocated hardware
  - Values are stored considering age. If values are old and not sent they could be overwritten by new ones



Proxy configuration (memory)

When working in memory mode we can define sizing by:

- Size of shared memory:
  - ProxyMemoryBufferSize

```
### Option: ProxyMemoryBufferSize
#       Size of shared memory cache for collected history, discovery and auto registration data, in bytes.
#       If enabled (not zero) proxy will keep history discovery and auto registration data in memory unless
#       cache is full or stored records are older than defined ProxyMemoryBufferAge.
#       This parameter cannot be used together with ProxyLocalBuffer parameter.
#
# Mandatory: no
# Range: 0,128K-2G
# Default:
# ProxyMemoryBufferSize=0

ProxyMemoryBufferSize=16M
```

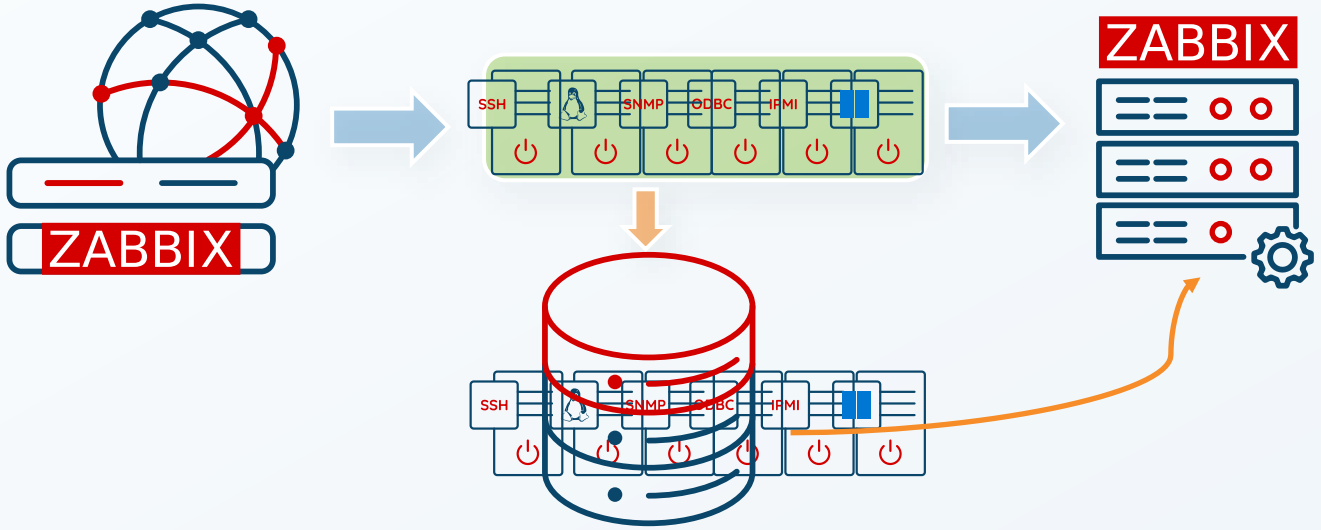
- Will store the information in case of no connection to server by the amount of time defined:
  - ProxyMemoryBufferAge

```
### Option: ProxyMemoryBufferAge
#       Maximum age of data in proxy memory buffer, in seconds.
#       When enabled (not zero) and records in proxy memory buffer are older, then it forces proxy buffer
#       to switch to database mode until all records are uploaded to server.
#       This parameter must be less or equal to ProxyOfflineBuffer parameter (note different units).
#
# Mandatory: no
# Range: 0,600-864000
# Default:
ProxyMemoryBufferAge=0
```

Buffer Mode: Hybrid

Normally works in memory mode until it runs out of memory or the oldest record exceeds the configured age, if so:

- The buffer is flushed to database, and it works like in disk mode until all data have been uploaded.
- Once data is uploaded switches back to memory mode
- During shutdown memory buffer is flushed to database



Keeping an eye on the proxy

ZABBIX SUMMIT
OCTOBER 8 · 10, 2025
RIGA · LATVIA

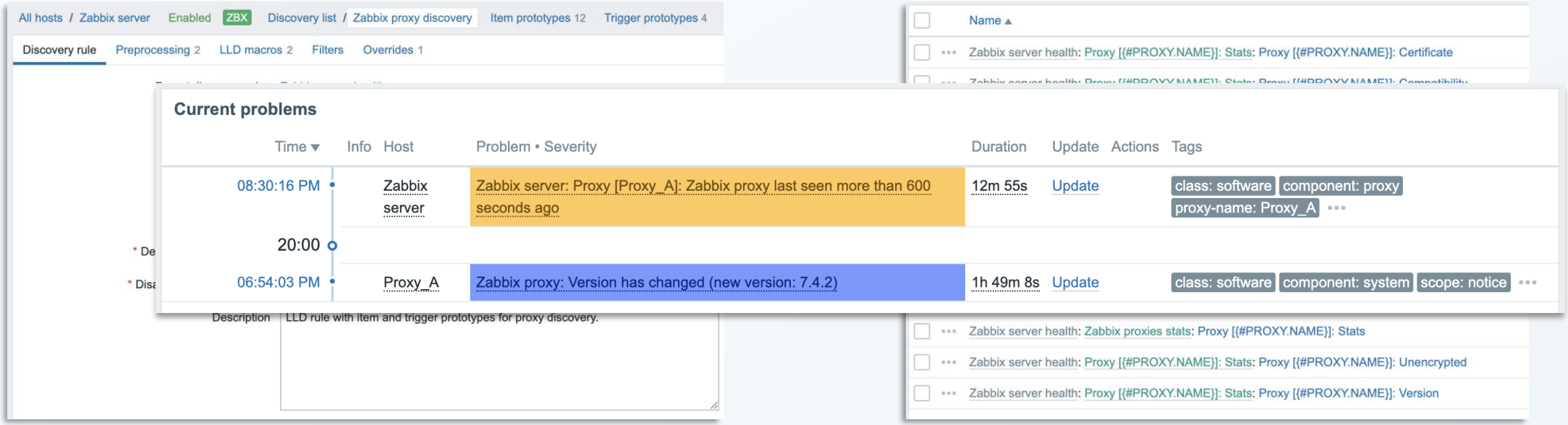
Proxy monitoring (via server)

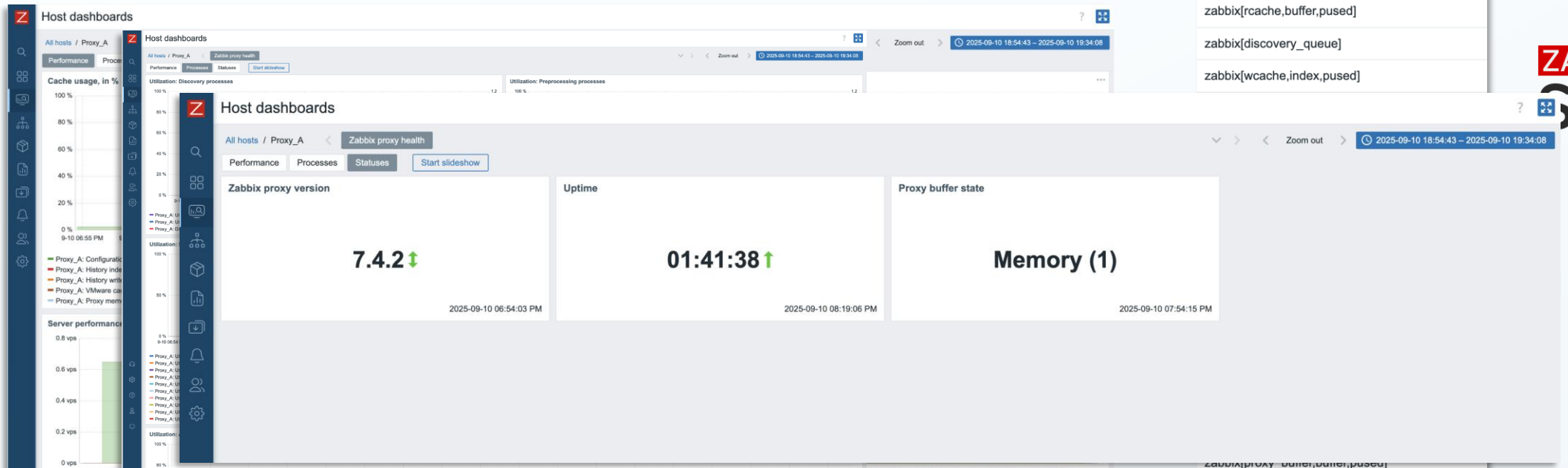
Monitoring proxies is necessary to understand their current performance:

- It's possible to check basic metrics via Administration -> Proxies:

Name ▲	Mode	Encryption	State	Version	Last seen (age)	Item count	Required vps
Proxy_A	Active	None	Online	7.4.2	5s	0	0

- Zabbix server health template will discover general metrics from proxies:





Key
zabbix[rcache,buffer,pused]
zabbix[discovery_queue]
zabbix[wcache,index,pused]
zabbix[queue]
zabbix[queue,10m]
zabbix[requiredperformance]
zabbix[uptime]
zabbix[process,agent poller,avg,busy]
zabbix[process,availability manager,avg,busy]
zabbix[process,browser poller,avg,busy]
zabbix[process,configuration syncer,avg,busy]
zabbix[process,data sender,avg,busy]
zabbix[process,discovery manager,avg,busy]
zabbix[process,discovery worker,avg,busy]
zabbix[process,history syncer,avg,busy]
zabbix[process,housekeeper,avg,busy]
zabbix[process,http agent poller,avg,busy]
zabbix[process,http poller,avg,busy]
zabbix[process,icmp pinger,avg,busy]
zabbix[process,internal poller,avg,busy]

ZABBIX SUMMIT

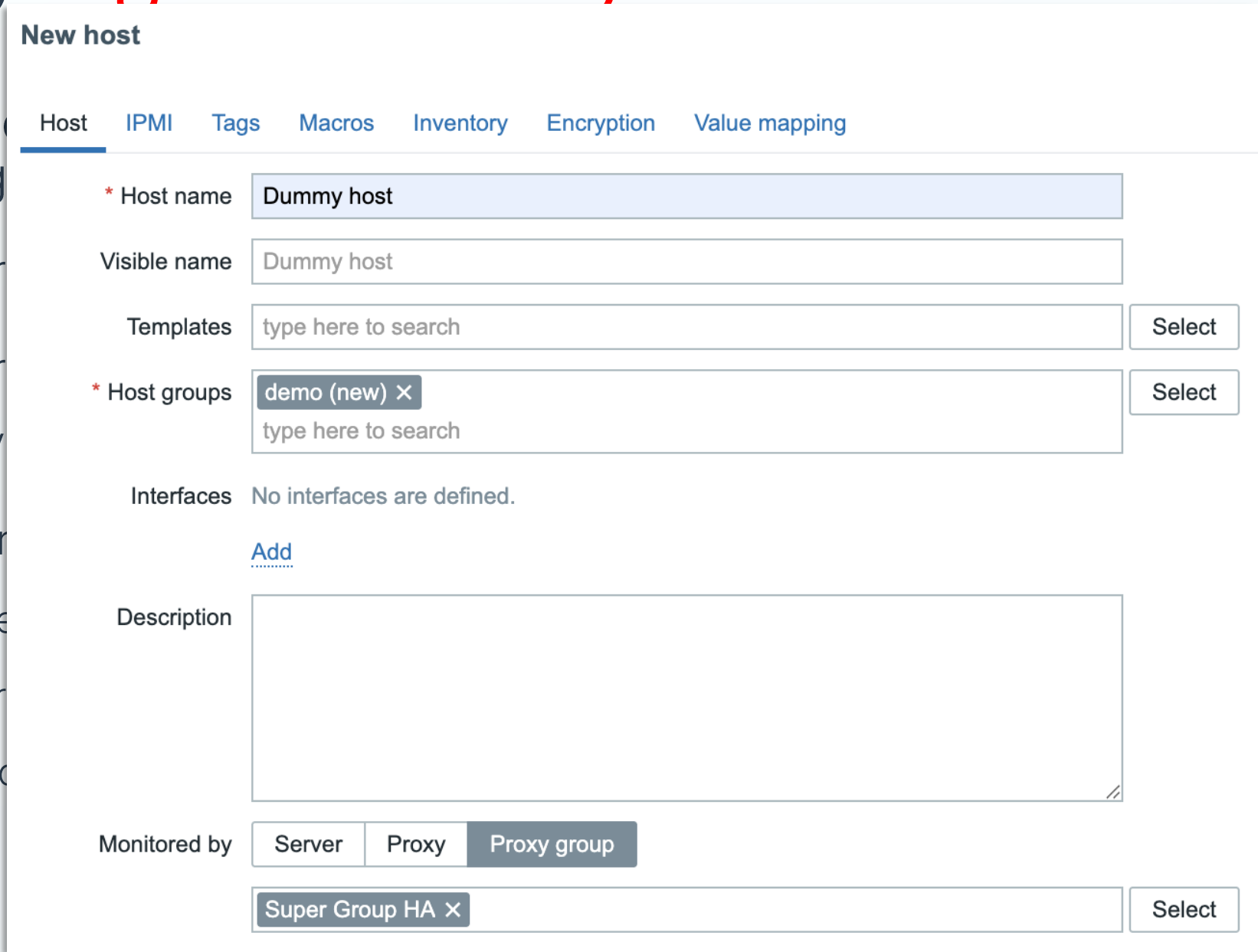
OCTOBER 8 · 10, 2025
RIGA · LATVIA

Proxy load balancing
High availability

Proxy high availability

Zabbix pr xy load balancing

- If a pr
- If a pr ed to other proxy
- Host r
  - Ve
  - Pr
  - Ho



Proxy host redistribution

Distribution is handled by the server, via process called Proxy Group Manager:

- The group manager redistributes hosts using the following logic:
  - Calculate the average number of hosts per proxy
  - For proxies with hosts excess, move excess to under assigned pool of proxies
  - For proxies with host deficit, calculate how many hosts are needed to reach balance
  - Remove the required number of hosts form proxies with most hosts
  - Move unassigned hosts to proxies with the fewer hosts

Key Benefits

- **Scalability**: Monitor thousands of new devices
- **Performance**: Reduce load on the server
- **Simplified Administration**: Centralized configuration. Hosts are assigned to a proxy o group of proxies via Zabbix frontend
- **Robust remote monitoring**: Ideal for DMZs, remote offices, cloud environment. Zero data loss from network failures
- **Enhanced security**: Fewer firewall rules and smaller attack surface

Considerations, limitations and best practices

- Proxy Sizing: The proxy hardware depends on the number of 'New Values Per Second' (NVPS) it will manage.
- Proxy Database: SQLite is ideal for starters and small proxies. Use MySQL or PostgreSQL for heavier loads.
- High Availability (HA): The proxy is a single point of failure for its location. Consider load-balancing agents between multiple proxies.
- Monitor the Proxy: Zabbix includes the "Zabbix proxy health" template to watch the performance and status of your proxies.
- **Proxies don’t:**
  - Calculate triggers.
  - Do event correlation.
  - Alert and notifications.

Thank you

ZABBIX SUMMIT

OCTOBER 8 · 10, 2025
RIGA · LATVIA