

# Что нового в Zabbix 4.2

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# Где мы сейчас?



3.0 LTS   3.2   3.4   4.0 LTS   4.2



# Начнѐм с малых изменений

1

# Поддержка НОВЫХ платформ



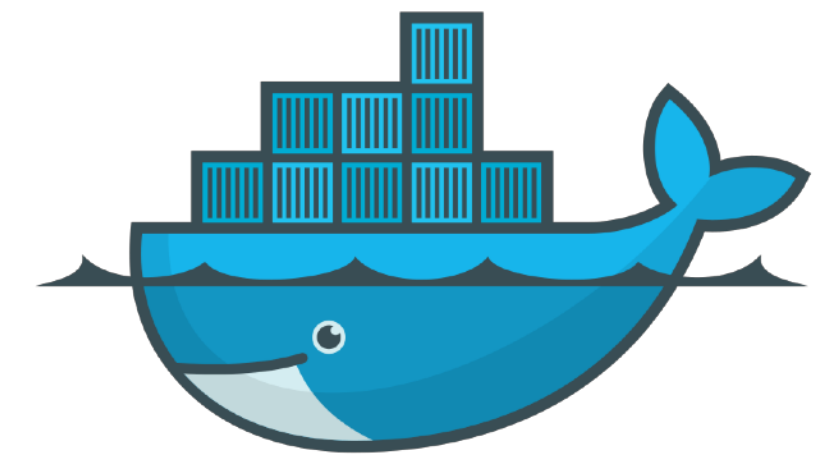
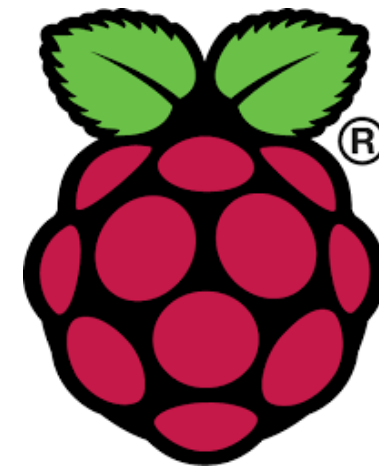
RaspberryPi

Mac OS/X

SUSE Enterprise Linux Server 12

MSI for Windows agent

Docker





2

Проверить,  
работает ли медиа

<https://support.zabbix.com/browse/ZBXNEXT-1238>



<input type="checkbox"/>	Name ▲	Type	Status	Used in actions	Details	Action
<input type="checkbox"/>	Email	Email	Enabled		SMTP server: "mail.example.com", SMTP helo: "example.com", SMTP email: "zabbix@example.com"	<a href="#">Test</a>
<input type="checkbox"/>	Ez texting	Ez Texting	Enabled		Username: "test"	<a href="#">Test</a>
<input type="checkbox"/>	Jabber	Jabber	Disabled		Jabber identifier: "jabber@example.com"	<a href="#">Test</a>
<input type="checkbox"/>	Slack	Script	Enabled		Script name: "slack.sh"	<a href="#">Test</a>
<input type="checkbox"/>	SMS	SMS	Enabled		GSM modem: "/dev/ttyS0"	<a href="#">Test</a>
Displaying 5 of 5 found						

Test media type

\* Send to

Subject

Test subject

\* Message

This is the test message from Zabbix

Test

Cancel



Test media type

✓

Media type test successful.

\* Send to

testaccount@zabbix.com

Subject

Test subject

\* Message

This is the test message from Zabbix

Test

Cancel



3

# Красивые сообщения в HTML формате

<https://support.zabbix.com/browse/ZBXNEXT-4853>



# Administration->Media types

**Media types**

Media type Options

\* Name

Type

\* SMTP server

SMTP server port

\* SMTP helo

\* SMTP email

Connection security

Authentication

Message format

Enabled ☒



Более наглядная информация  
Кнопки  
Графики

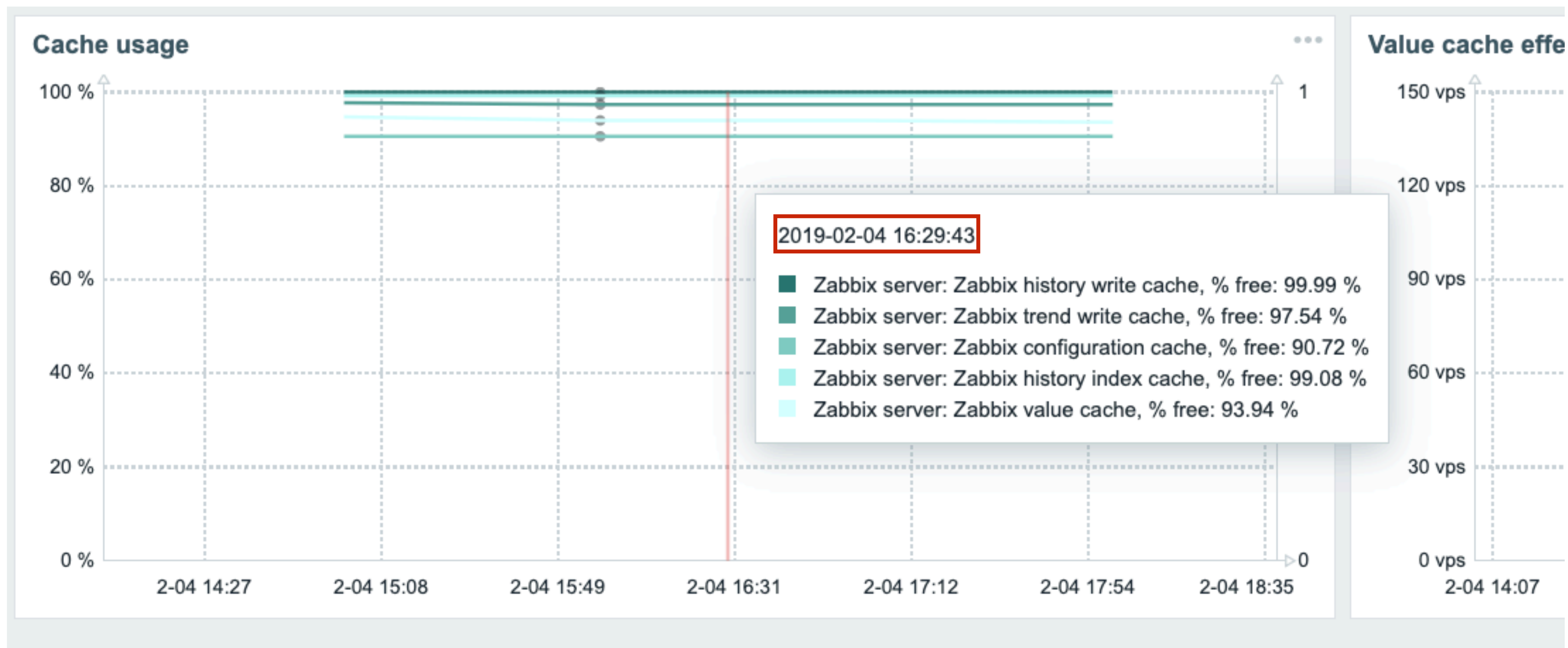
## 4

# Показываем время в графиках

<https://support.zabbix.com/browse/ZBXNEXT-4819>



# Время в конкретной точке



5

# Удобный фильтр в Configuration->Triggers

<https://support.zabbix.com/browse/ZBXNEXT-221>

# Используем любые атрибуты!

Triggers

Create trigger

All hosts / AWS N30 Enabled ZBX SNMP JMX IPMI Applications 16 Items 84 Triggers 51 Graphs 14 Discovery rules 2 Web scenarios

Filter

Host groups

type here to search

Select

Hosts

AWS N30

type here to search

Select

Name

Severity

☐ Not classified

☐ Information

☐ Warning

☐ Average

☐ High

☐ Disaster

State

all

Normal

Unknown

Status

all

Enabled

Disabled

Value

all

Ok

Problem

Tags

And/Or

Or

tag

Contains

Equals

value

Remove

Add

Inherited

all

Yes

No

Discovered

all

Yes

No

With dependencies

all

Yes

No

Apply

Reset



## 6

# Массовое изменение прототипов метрик

<https://support.zabbix.com/browse/ZBXNEXT-1190>

Item prototypes

Create item prototype

All hosts / AWS N30 Enabled ZBX SNMP JMX IPMI Discovery list / Mounted filesystem discovery Item prototypes 5 Trigger prototypes 2 Graph prototypes 1 Host prototypes

<input checked="" type="checkbox"/>	Wizard	Name ▲	Key	Interval	History	Trends	Type	Applications	Create enabled
<input checked="" type="checkbox"/>	...	Template OS Linux: Free disk space on {#FSNAME}	vfs.fs.size[{#FSNAME},free]	1m	1w	365d	Zabbix agent	Filesystems	Yes
<input checked="" type="checkbox"/>	...	Template OS Linux: Free disk space on {#FSNAME} (percentage)	vfs.fs.size[{#FSNAME},pfree]	1m	1w	365d	Zabbix agent	Filesystems	Yes
<input checked="" type="checkbox"/>	...	Template OS Linux: Free inodes on {#FSNAME} (percentage)	vfs.fs.inode[{#FSNAME},pfree]	1m	1w	365d	Zabbix agent	Filesystems	Yes
<input checked="" type="checkbox"/>	...	Template OS Linux: Total disk space on {#FSNAME}	vfs.fs.size[{#FSNAME},total]	1h	1w	365d	Zabbix agent	Filesystems	Yes
<input checked="" type="checkbox"/>	...	Template OS Linux: Used disk space on {#FSNAME}	vfs.fs.size[{#FSNAME},used]	1m	1w	365d	Zabbix agent	Filesystems	Yes

Displaying 5 of 5 found

5 selected Create enabled Create disabled Mass update Delete

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# Более гибкая авто- регистрация устройств

<https://support.zabbix.com/browse/ZBXNEXT-1282>





MYSQL01



MYSQL02



DB01



DB02



DB03



### Actions

Action Operations

\* Name Register MySQL hosts

Conditions	Label	Name	Action
New condition	Host name	matches	^MYSQL.*\$

Add

Enabled ☒

\* At least one operation must exist.

Update Clone Delete Cancel



Обнаружены



MYSQL01



MYSQL02

## 8

# Имена устройств при авторегистрации

<https://support.zabbix.com/browse/ZBXNEXT-158>

# Имя хоста из полученного значения

\* Checks

Zabbix agent "system.uname"

Edit
Remove

New

Device uniqueness criteria

☒ IP address

☐ Zabbix agent "system.uname"

Host name

☐ DNS name

☐ IP address

☒ Zabbix agent "system.uname"

Visible name

☐ Host name

☐ DNS name

☐ IP address

☒ Zabbix agent "system.uname"

Enabled

☒

Update

Clone

Delete

Cancel



## 9

# Теги шаблонов и ХОСТОВ

<https://support.zabbix.com/browse/ZBXNEXT-4731>

# Теги шаблонов

Templates

All templates / Template OS Linux

Applications 10Items 34Triggers 15Graphs 5Screens 1Discovery rules 2Web scenarios

TemplateLinked templatesTagsMacros

Name	Value	Action
OS	Linux	<a href="#">Remove</a>
<a href="#">Add</a>		

Update

Clone

Full clone

Delete

Delete and clear

Cancel

# Теги хостов

## Hosts

All hosts / AWS N30

EnabledZBXSNMPJMXIPMI

Applications 16Items 84Triggers 51Graphs 14Discovery rules 2Web scenarios

Host

Templates

IPMI

Tags

Macros

Inventory

Encryption

Name	Value	Action
Service	Oracle Cluster	<a href="#">Remove</a>
Region	us-east-1	<a href="#">Remove</a>

Add

Update

Clone

Full clone

Delete

Cancel



# Список устройств

ZABBIX

MonitoringInventoryReportsConfigurationAdministration

Host groupsTemplatesHostsMaintenanceActionsEvent correlationDiscoveryServices

Central NOC

Hosts

GroupallCreate hostImport

Filter

<input type="checkbox"/>	Name ▲	Applications	Items	Triggers	Graphs	Discovery	Web	Interface	Templates	Status	Availability	Agent encryption	Info	Tags
<input type="checkbox"/>	AWS N30	Applications 16	Items 84	Triggers 51	Graphs 14	Discovery 2	Web	127.0.0.1: 10050	Template App Zabbix Server, Template OS Linux (Template App Zabbix Agent), Template Services	Enabled	ZBXSNMPJMXIPMI	NONE		Region: us-east-1 Service: Oracle Cluster
<input type="checkbox"/>	AWS N34	Applications 16	Items 85	Triggers 52	Graphs 14	Discovery 2	Web	127.0.0.1: 10050	Template App Zabbix Server, Template OS Linux (Template App Zabbix Agent), Template OS Linux Security, Template Services	Enabled	ZBXSNMPJMXIPMI	NONE		
<input type="checkbox"/>	AWS N90	Applications 16	Items 85	Triggers 52	Graphs 14	Discovery 2	Web	127.0.0.1: 10050	Template App Zabbix Server, Template OS Linux (Template App Zabbix Agent), Template OS Linux Security, Template Services	Enabled	ZBXSNMPJMXIPMI	NONE		
<input type="checkbox"/>	AZ M08	Applications 16	Items 85	Triggers 52	Graphs 14	Discovery 2	Web	127.0.0.1: 10050	Template App Zabbix Server, Template OS Linux (Template App Zabbix Agent), Template OS Linux Security, Template Services	Enabled	ZBXSNMPJMXIPMI	NONE		
<input type="checkbox"/>	AZ M10	Applications 16	Items 85	Triggers 52	Graphs 14	Discovery 2	Web	127.0.0.1: 10050	Template App Zabbix Server, Template OS Linux (Template App Zabbix Agent), Template OS Linux Security, Template Services	Enabled	ZBXSNMPJMXIPMI	NONE		
<input type="checkbox"/>	AZ M18	Applications 16	Items 85	Triggers 52	Graphs 14	Discovery 2	Web	127.0.0.1: 10050	Template App Zabbix Server, Template OS Linux (Template App Zabbix Agent), Template OS Linux Security, Template Services	Enabled	ZBXSNMPJMXIPMI	NONE		

# Список проблем

ZABBIX

MonitoringInventoryReportsConfigurationAdministration

SupportShare?UserPower

DashboardProblemsOverviewWebLatest dataGraphsScreensMapsDiscoveryServices

Central NOC

Problems

Export to CSV

Filter

Time	<input type="checkbox"/>	Severity ▾	Recovery time	Status	Info	Host	Problem	Duration	Ack	Actions	Tags
2018-09-30 13:45:45	<input type="checkbox"/>	Average		PROBLEM		AWS N30	Too many queries per second	5m 6d 1h	Yes	12	Region: NY1 Env: Production Service: HTTP balancer

Displaying 1 of 1 found

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# Скорость и простота: TimescaleDB

<https://support.zabbix.com/browse/ZBXNEXT-4868>

# Хранилища данных



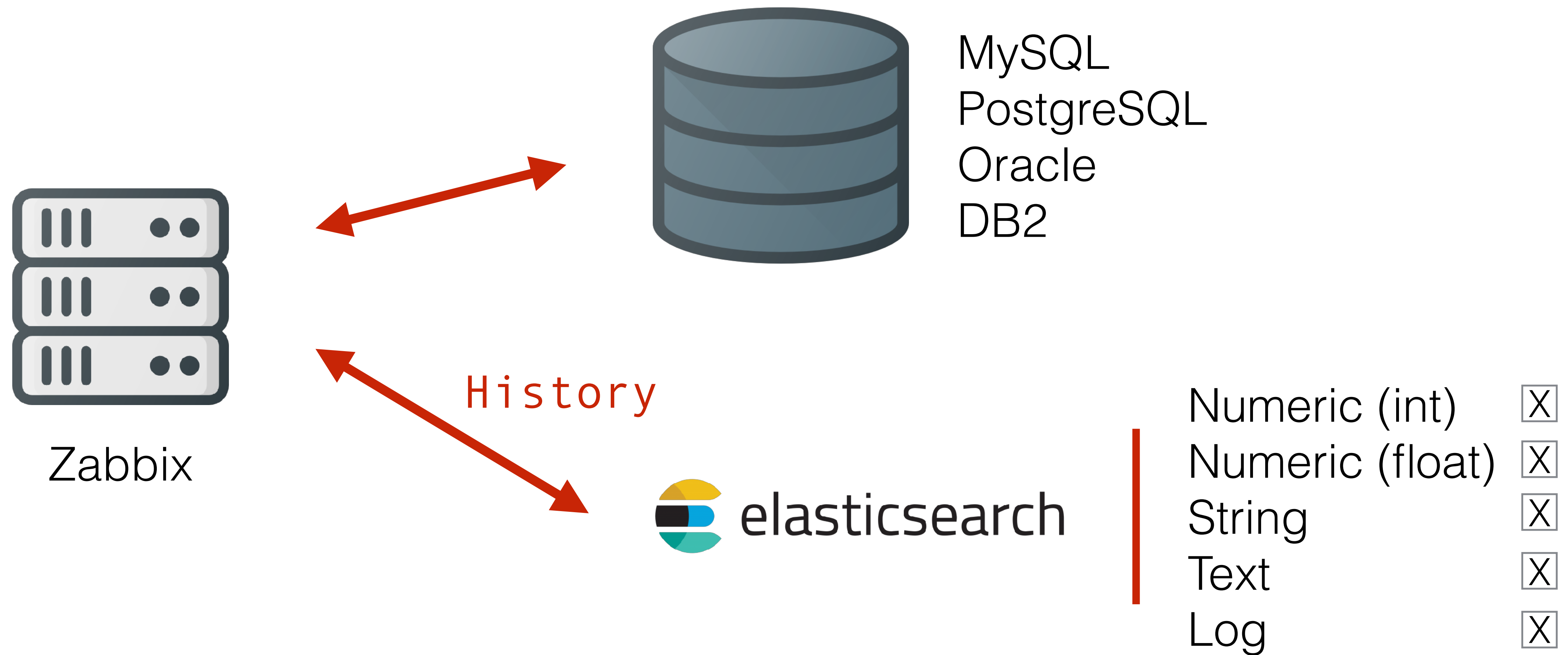
Zabbix



MySQL  
PostgreSQL  
Oracle  
DB2



# ElasticSearch



TimescaleDB = PostgreSQL + Extension



# TimescaleDB



Zabbix



**TIMESCALE**

# TimescaleDB



## Преимущества

- Автоматическое партиционирование
- Zabbix управляет удалением данных
- Хранилище, ориентированное на скорость



**TIMESCALE**



# Как установить?



Устанавливаем TimescaleDB

<https://docs.timescale.com/v1.2/getting-started>

```
shell> echo "CREATE EXTENSION IF NOT EXISTS timescaledb CASCADE;" | sudo -u postgres psql zabbix
shell> cat timescaledb.sql | sudo -u zabbix psql zabbix
```



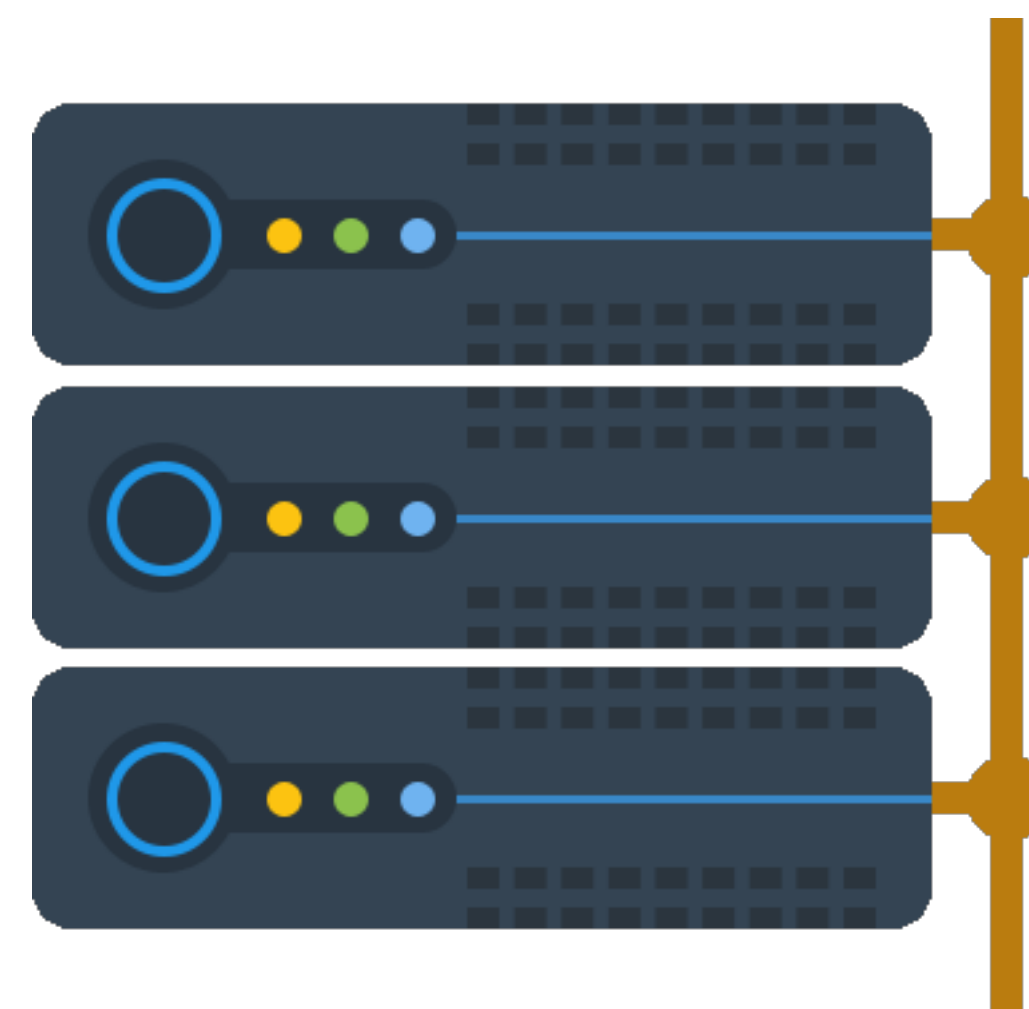
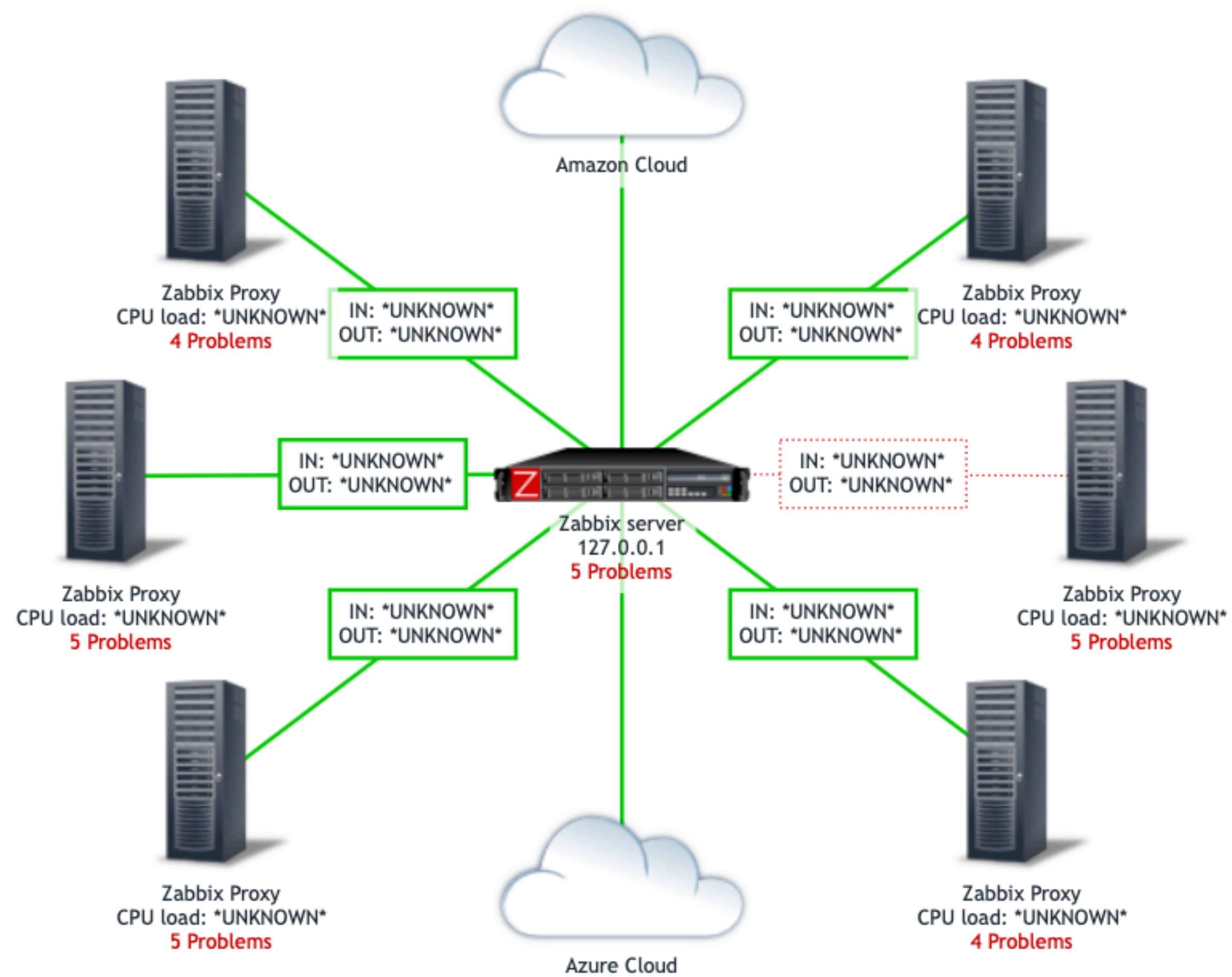
**TIMESCALE**

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# Поддержка анимированных GIF в картах

<https://support.zabbix.com/browse/ZBXNEXT-4857>

# Карты



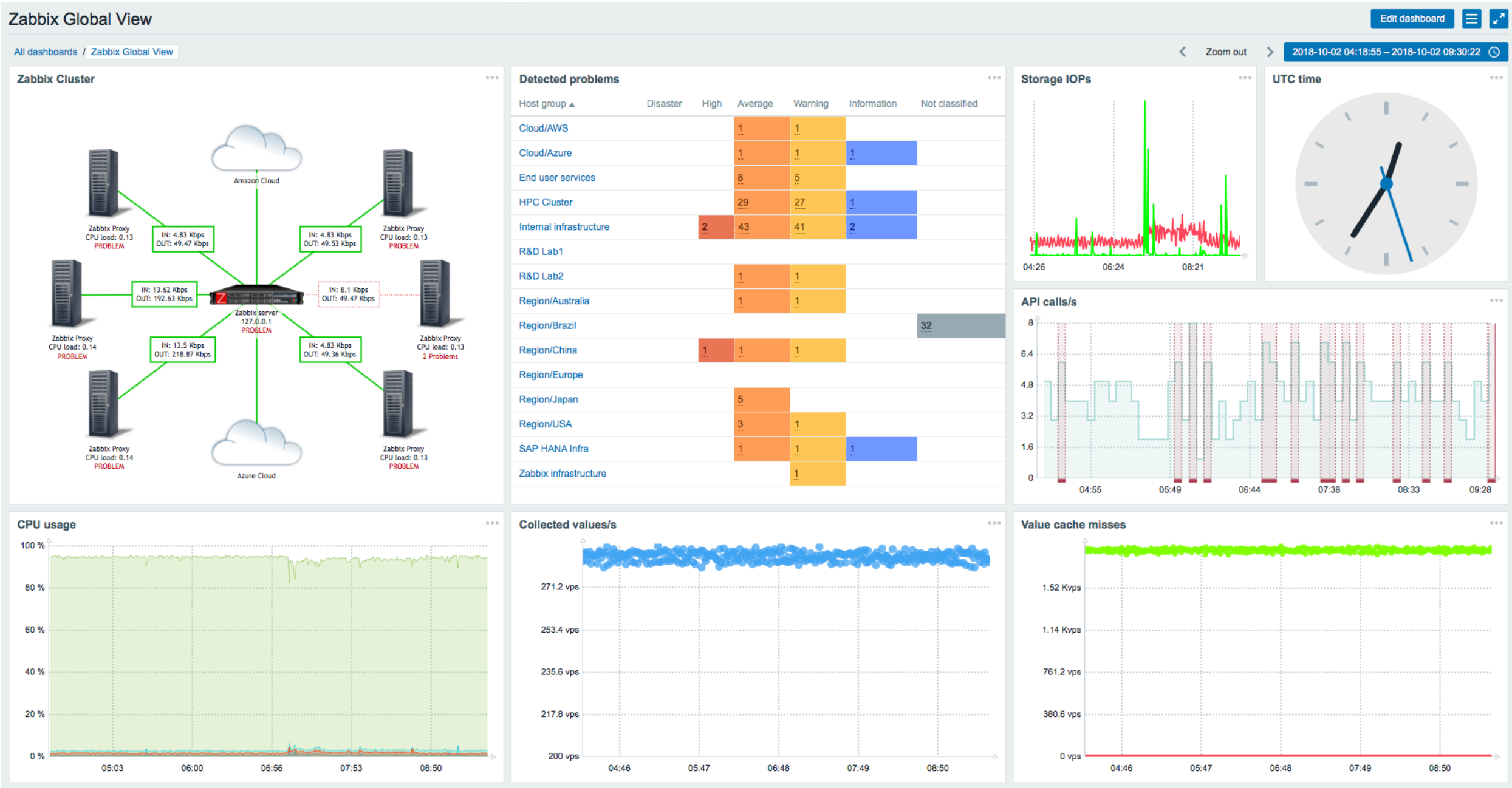
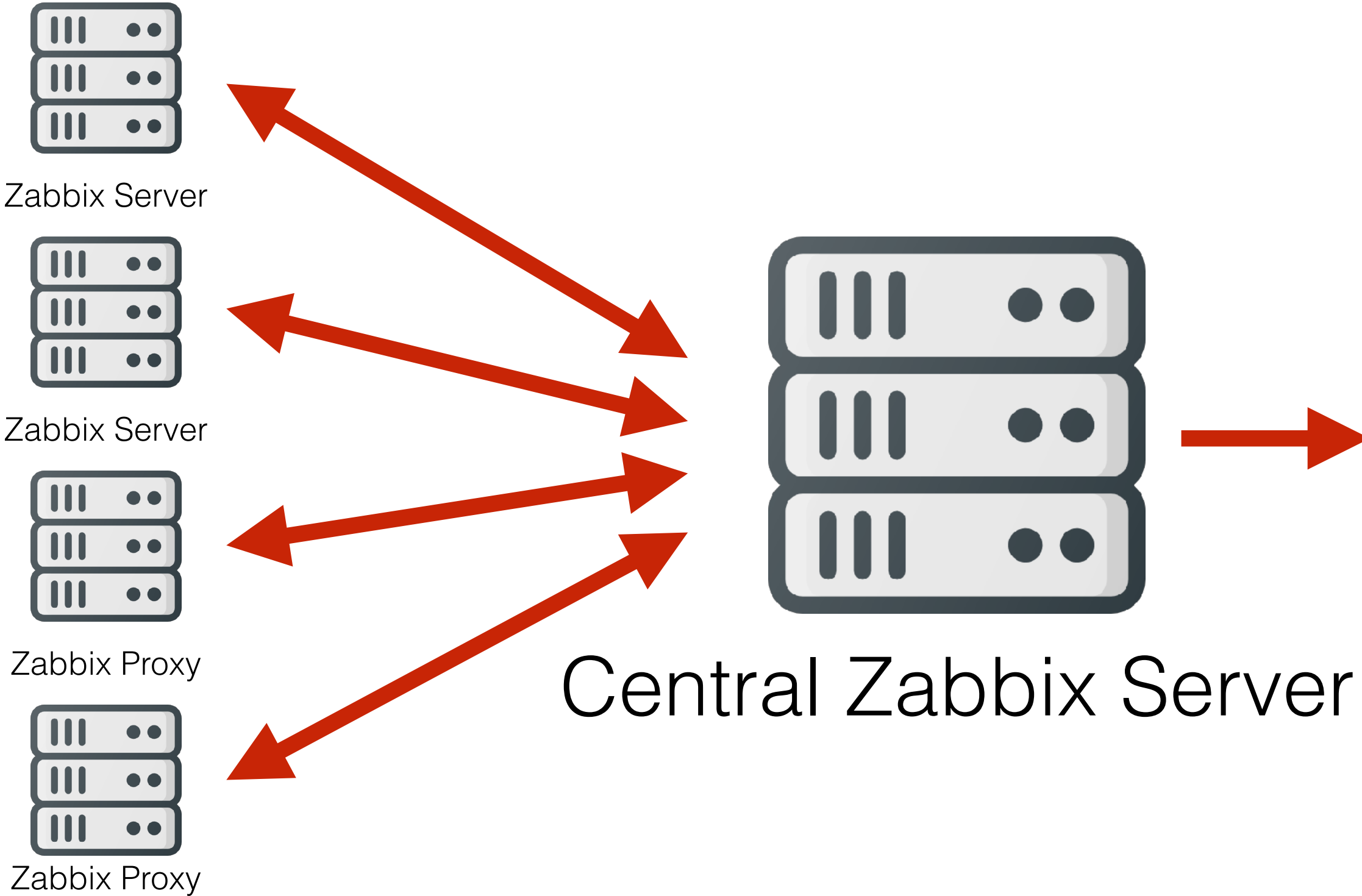
## 12

# Удалённый мониторинг инфраструктуры Zabbix

<https://support.zabbix.com/browse/ZBXNEXT-401>



# Внешний мониторинг серверов и прокси



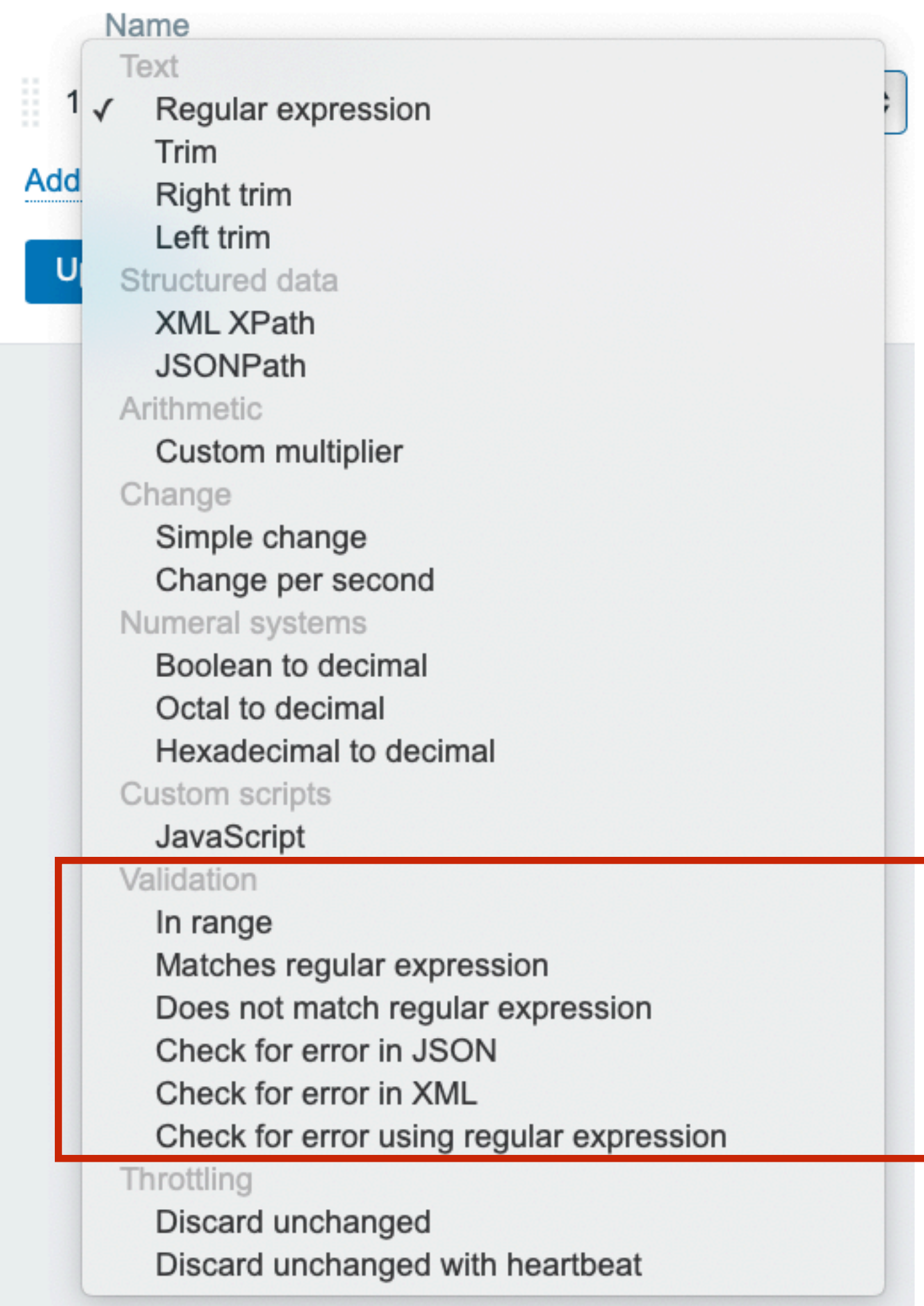
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# Расширенный препроцессинг

<https://support.zabbix.com/browse/ZBXNEXT-4724>

# Валидация входных данных

Preprocessing steps



## ОПЦИИ:

- In range: A->B
- Matches regular expression: Pattern
- Does not match regular expression: Pattern
- Check for error in JSON/XML: Path
- Check for error using regex: Pattern Output

# Обработка ошибок

Default error

Discard out of range value

Set to default value

Set to custom error message



# Троттлинг

Preprocessing steps

1

✓

Regular expression

Trim

Right trim

Left trim

Structured data

XML XPath

JSONPath

Arithmetic

Custom multiplier

Change

Simple change

Change per second

Numeral systems

Boolean to decimal

Octal to decimal

Hexadecimal to decimal

Custom scripts

JavaScript

Validation

In range

Matches regular expression

Does not match regular expression

Check for error in JSON

Check for error in XML

Check for error using regular expression

Throttling

Discard unchanged

Discard unchanged with heartbeat

## Опции

Discard unchanged (игнорировать)

Discard unchanged with heartbeat: Seconds



mm:ss	value	Discard unchanged	Discard unchanged with heartbeat 30s
00:00	0	0	0
00:05	0		
00:10	0		
00:15	1	1	1
00:20	1		
00:25	1		
00:30	1		
00:35	1		
00:40	0	0	0
00:45	0		
00:50	0		
00:55	0		
01:00	0		
01:05	0		
01:10	0		0
01:15	0		
01:20	1	1	1
01:25	1		
01:30	0	0	0
01:35	0		
01:40	0		
01:45	0		
01:50	0		
01:55	0		
02:00	0		0
02:05	0		

# Троттлинг

## Сценарии использования

Высокочастотный мониторинг, но:

- экономим место на диске
- можем видеть графики

Мониторинг дискретных значений: статусы, состояния

Subsampling для зависимых метрик:

- Мастер: 10s
- Зависимые метрики: 60s троттлинг с пульсом

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# Любые JSON для LLD

<https://support.zabbix.com/browse/ZBXNEXT-4877>

<https://support.zabbix.com/browse/ZBXNEXT-4087>

# Препроцессинг для правил LLD

Discovery rules

All templates / Template App Zabbix Agent Applications 1 Items 3 Triggers 3 Graphs Screens **Discovery rules** Web scenarios

Discovery rule Preprocessing **LLD macros** Filters

Preprocessing steps

Name	Parameters	Custom on fail	Action
1 ✓ Regular expression	pattern output	<input type="checkbox"/>	<a href="#">Remove</a>

Add

Custom scripts

JavaScript

Validation

- Does not match regular expression
- Check for error in JSON

Throttling

- Discard unchanged with heartbeat

# Обрабатываем обычный JSON

JSON ->

Discovery rules

[All templates](#) / [Template OS Linux](#) / [Discovery list](#) / [Mounted filesystem discovery](#) / [Item prototypes 5](#) / [Trigger prototypes 2](#) / [Graph prototypes 1](#) / [Host prototypes](#)

[Discovery rule](#) / [Preprocessing](#) / [LLD macros](#) / [Filters](#)

LLD macros

LLD macro	JSONPath	
<input data-bbox="1002 746 1379 789" type="text" value="{FSNAME}"/>	<input data-bbox="1402 746 1869 789" type="text" value="\$ .name"/>	<a href="#">Remove</a>
<input data-bbox="1002 812 1379 855" type="text" value="{MAXSIZE}"/>	<input data-bbox="1402 812 1869 855" type="text" value="\$ .size"/>	<a href="#">Remove</a>

[Add](#)

[Update](#) [Clone](#) [Delete](#) [Cancel](#)

Item prototypes

[All templates](#) / [Template OS Linux](#) / [Discovery list](#) / [Mounted filesystem discovery](#) / [Item prototypes 5](#) / [Trigger prototypes 2](#) / [Graph prototypes 1](#)

[Item prototype](#) / [Preprocessing](#)

\* Name

Type

\* Key  [Select](#)



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Препроцессинг  
без ограничений!

<https://support.zabbix.com/browse/ZBXNEXT-4944>

# JavaScript!

Items

All hosts / AWS N30

Enabled

ZBX

SNMP

JMX

IPMI

Applications 16

Items 84

Triggers 51

Graphs 14

Discovery rules 2

Web scenarios

Item

Preprocessing

Preprocessing steps	Name	Parameters	Custom on fail	Action
1:	JavaScript	return (value - 32 ) * 5 / 9	<input type="checkbox"/>	<div>Open</div> <div>Remove</div>

Add

Add

Cancel

# Может быть и сложным!

The screenshot displays the Zabbix web interface with the 'Configuration' menu highlighted. The 'Hosts' tab is selected in the top navigation bar. A modal window titled 'JavaScript' is open, showing a script for preprocessing item data. The script uses regular expressions to parse server status information from log lines. The background interface shows the 'Items' section with a list of items and a 'Preprocessing' tab selected. The footer of the interface indicates the version is Zabbix 4.2.0alpha3, © 2001–2019, Zabbix SIA.

**ZABBIX** Monitoring Inventory Reports Configuration Administration

Host groups Templates **Hosts** Maintenance Actions Event correlation Discovery Services ZBXNEXT-4944

Items

All hosts / Zabbix server

Item Preprocessing

Preprocessing

**JavaScript**

```
1 var stats = {};  
2 var lines = value.split("\n");  
3 var i = 0;  
4  
5 var reVersion = new RegExp("Server Version: ([^$]+)");  
6 var reUptime = new RegExp("Server uptime: ([0-9]+) days? ([0-9]+) hours? ([0-9]+) minutes? ([0-9]+) seconds?");  
7 var reLoad = new RegExp("Server load: ([^ ]+) ([^ ]+) ([^ ]+)");  
8 var reHits = new RegExp("Total accesses: ([^ ]+) \- Total Traffic: ([^ ]+) ([^ ]+)");  
9 var reCpu = new RegExp("CPU Usage: u([^ ]+) s([^ ]+)");  
10 var lines_num = lines.length;  
11  
12 for (i = 0; i < lines_num; i++)  
13 {  
14     var match = lines[i].match(reVersion);  
15     if (match)  
16     {  
17         stats.version = match[1];  
18         break;  
19     }  
20 }
```

5 symbols remaining

Save Cancel

Zabbix 4.2.0alpha3. © 2001–2019, Zabbix SIA

## 16

Тестируем  
препроцессинг прямо из  
UI

<https://support.zabbix.com/browse/ZBXNEXT-5011>

# Test preprocessing rules

Вход

\_1.234

Item prototypes

All templates / Template OS Linux

Discovery list / Mounted filesystem discovery

Item prototypes 5

Trigger prototypes 2

Graph prototypes 1

Host prototypes

Item prototype

Preprocessing

Preprocessing steps	Name	Parameters	Custom on fail	Action
1:	Trim	<input type="text" value="-"/>	<input type="checkbox"/>	<a href="#">Remove</a>
2:	Custom multiplier	<input type="text" value="8"/>	<input type="checkbox"/>	<a href="#">Remove</a>
3:	JavaScript	<div><input type="text" value="return Math.round(value)"/><div>Open</div></div>	<input type="checkbox"/>	<a href="#">Remove</a>

Add

Update

Clone

Delete

Cancel

Выход

1. 1.234
2. 9.872
3. 10

Test



## 17

# Собираем данные с агентов Prometheus

<https://support.zabbix.com/browse/ZBXNEXT-4865>

# Почему Prometheus?

## Databases

- Aerospike exporter
- ClickHouse exporter
- Consul exporter (**official**)
- Couchbase exporter
- CouchDB exporter
- Elasticsearch exporter
- EventStore exporter
- Memcached exporter (**official**)
- MongoDB exporter
- MSSQL server exporter
- MySQL server exporter (**official**)
- OpenTSDB Exporter
- Oracle DB Exporter
- PgBouncer exporter
- PostgreSQL exporter
- ProxySQL exporter
- RavenDB exporter
- Redis exporter
- RethinkDB exporter
- SQL exporter
- Tarantool metric library
- Twemproxy

## Hardware related

- apcupsd exporter
- Collins exporter
- IBM Z HMC exporter
- IoT Edison exporter
- IPMI exporter
- knxd exporter
- Netgear Cable Modem Exporter
- Netgear Router exporter
- Node/system metrics exporter (**official**)
- NVIDIA GPU exporter
- ProSAFE exporter
- Ubiquiti UniFi exporter

## Messaging systems

- Beanstalkd exporter
- EMQ exporter
- Gearman exporter
- Kafka exporter
- NATS exporter
- NSQ exporter
- Mirth Connect exporter
- MQTT blackbox exporter
- RabbitMQ exporter
- RabbitMQ Management Plugin exporter

## Other monitoring systems

- Akamai Cloudmonitor exporter
- Alibaba Cloudmonitor exporter
- AWS CloudWatch exporter (**official**)
- Cloud Foundry Firehose exporter
- Collectd exporter (**official**)
- Google Stackdriver exporter
- Graphite exporter (**official**)
- Heka dashboard exporter
- Heka exporter
- InfluxDB exporter (**official**)
- JavaMelody exporter
- JMX exporter (**official**)
- Munin exporter
- Nagios / Naemon exporter
- New Relic exporter
- NRPE exporter
- Osquery exporter
- OTC CloudEye exporter
- Pingdom exporter
- scollector exporter
- Sensu exporter
- SNMP exporter (**official**)
- StatsD exporter (**official**)

## Storage

- Ceph exporter
- Ceph RADOSGW exporter
- Gluster exporter
- Hadoop HDFS FSImage exporter
- Lustre exporter
- ScaleIO exporter

## HTTP

- Apache exporter
- HAProxy exporter (**official**)
- Nginx metric library
- Nginx VTS exporter
- Passenger exporter
- Squid exporter
- Tinyproxy exporter
- Varnish exporter
- WebDriver exporter

## APIs

- AWS ECS exporter
- AWS Health exporter
- AWS SQS exporter
- Cloudflare exporter
- DigitalOcean exporter
- Docker Cloud exporter
- Docker Hub exporter
- GitHub exporter
- InstaClustr exporter
- Mozilla Observatory exporter
- OpenWeatherMap exporter
- Pagespeed exporter
- Rancher exporter
- Speedtest exporter

## Logging

- Fluentd exporter
- Google's mtail log data extractor
- Grok exporter

# Формат

```
# HELP wmi_logical_disk_free_bytes Free space in bytes (LogicalDisk.PercentFreeSpace)
# TYPE wmi_logical_disk_free_bytes gauge
wmi_logical_disk_free_bytes{volume="C:"} 3.5180249088e+11
wmi_logical_disk_free_bytes{volume="D:"} 2.627731456e+09
wmi_logical_disk_free_bytes{volume="HarddiskVolume4"} 4.59276288e+08
```

```
wmi_service_state{name="devicesflowusersvc_7b100",state="running"} 1
wmi_service_state{name="devicesflowusersvc_7b100",state="start pending"} 0
wmi_service_state{name="devicesflowusersvc_7b100",state="stop pending"} 0
wmi_service_state{name="devicesflowusersvc_7b100",state="stopped"} 0
wmi_service_state{name="devicesflowusersvc_7b100",state="unknown"} 0
wmi_service_state{name="dhcp",state="continue pending"} 0
wmi_service_state{name="dhcp",state="pause pending"} 0
wmi_service_state{name="dhcp",state="paused"} 0
wmi_service_state{name="dhcp",state="running"} 1
wmi_service_state{name="dhcp",state="start pending"} 0
wmi_service_state{name="dhcp",state="stop pending"} 0
wmi_service_state{name="dhcp",state="stopped"} 0
wmi_service_state{name="dhcp",state="unknown"} 0
```

```
# HELP cpu_usage_system Telegraf collected metric
# TYPE cpu_usage_system gauge
cpu_usage_system{cpu="cpu-total",host="host1"} 1.1940298507220641
cpu_usage_system{cpu="cpu0",host="host1"} 1.1940298507220641
cpu_usage_system{cpu="cpu1",host="host1"} 1.1340298507220641
```

Item prototype Preprocessing

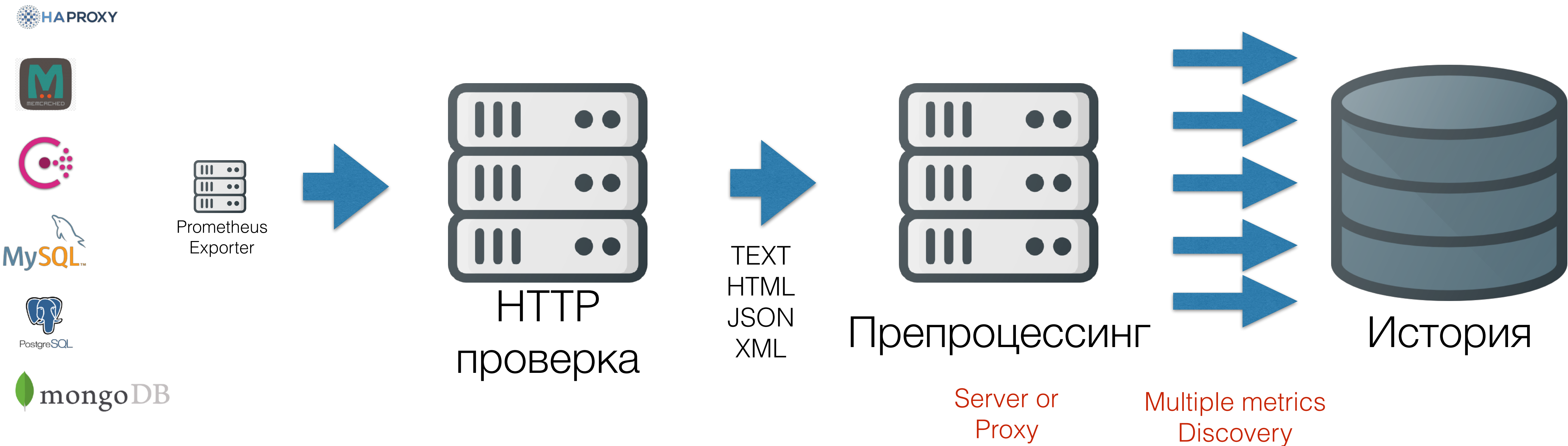
Preprocessing steps	Name	Parameters	Custom on fail	Action
1:	Prometheus pattern	<input type="text" value="&lt;metric name&gt;{&lt;label na value &lt;label name&gt;"/>	<input checked="" type="checkbox"/>	<a href="#">Remove</a>
	Custom on fail	<input type="button" value="Discard value"/> <input type="button" value="Set value to"/> <input type="button" value="Set error to"/>		
2:	Prometheus to JSON	<input type="text" value="&lt;metric name&gt;{&lt;label na value &lt;label name&gt;"/>	<input checked="" type="checkbox"/>	<a href="#">Remove</a>
	Custom on fail	<input type="button" value="Discard value"/> <input type="button" value="Set value to"/> <input type="button" value="Set error to"/>		

[Add](#)

cpu\_usage\_system{cpu="cpu-total"}  1.1940298507220641



# Data flow



Обработка данных Prometheus



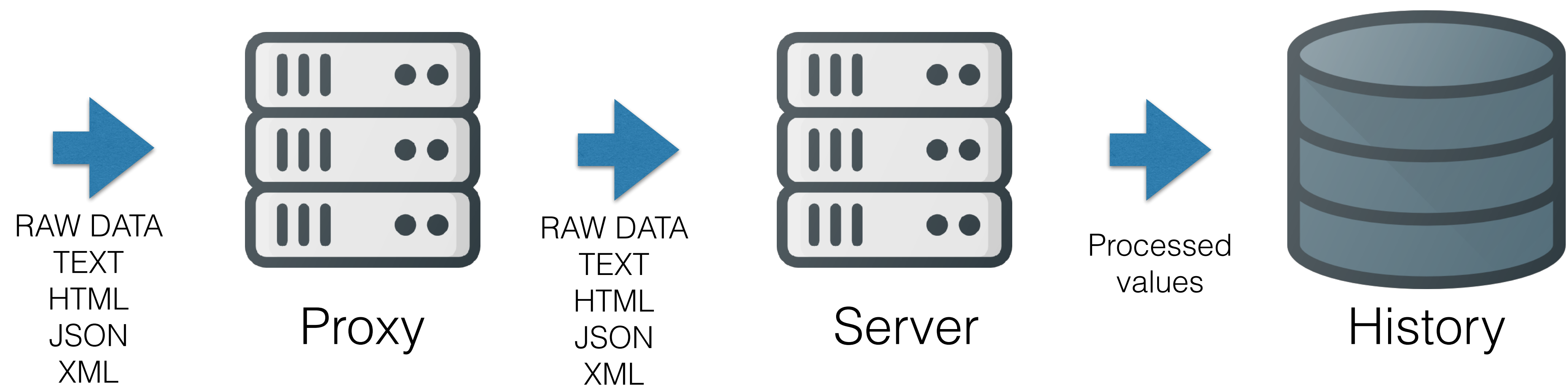


## 18

# Масштабируемся с помощью Zabbix Proxy

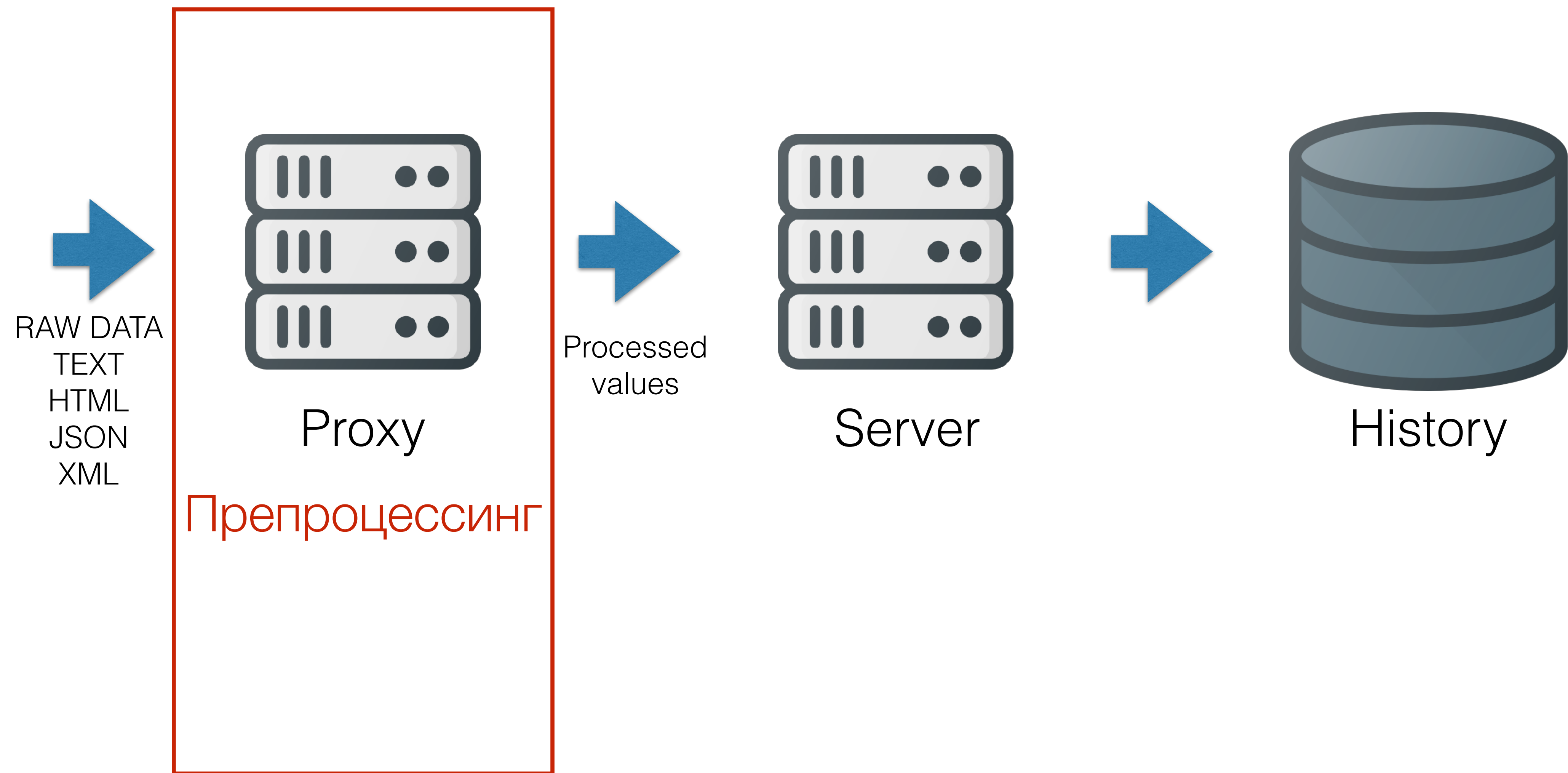
<https://support.zabbix.com/browse/ZBXNEXT-5081>

# Zabbix 4.0



Препроцессинг

# Zabbix 4.2



# Препроцессинг на стороне Proxu

Преимущества

Разгрузка Zabbix Server

Proxies + троттлинг для высокочастотного мониторинга

# Не слишком ли много внимания препроцессингу?

Это приближает нас к основной цели - **самодостаточным шаблонам**! Шаблоны должны содержать всю логику для мониторинга приложения, устройства или конкретной технологии.



# И другие изменения

**ZBXNEXT-4861** LLD rules as dependant item

**ZBXNEXT-4967** Zabbix Sender to send data to all IPs defined in ServerActive

**ZBXNEXT-221** implemented hosts and hostgroups multiselect in items and triggers table filter

**ZBXNEXT-5046** added non-destructive resizing and reordering of dashboard widgets

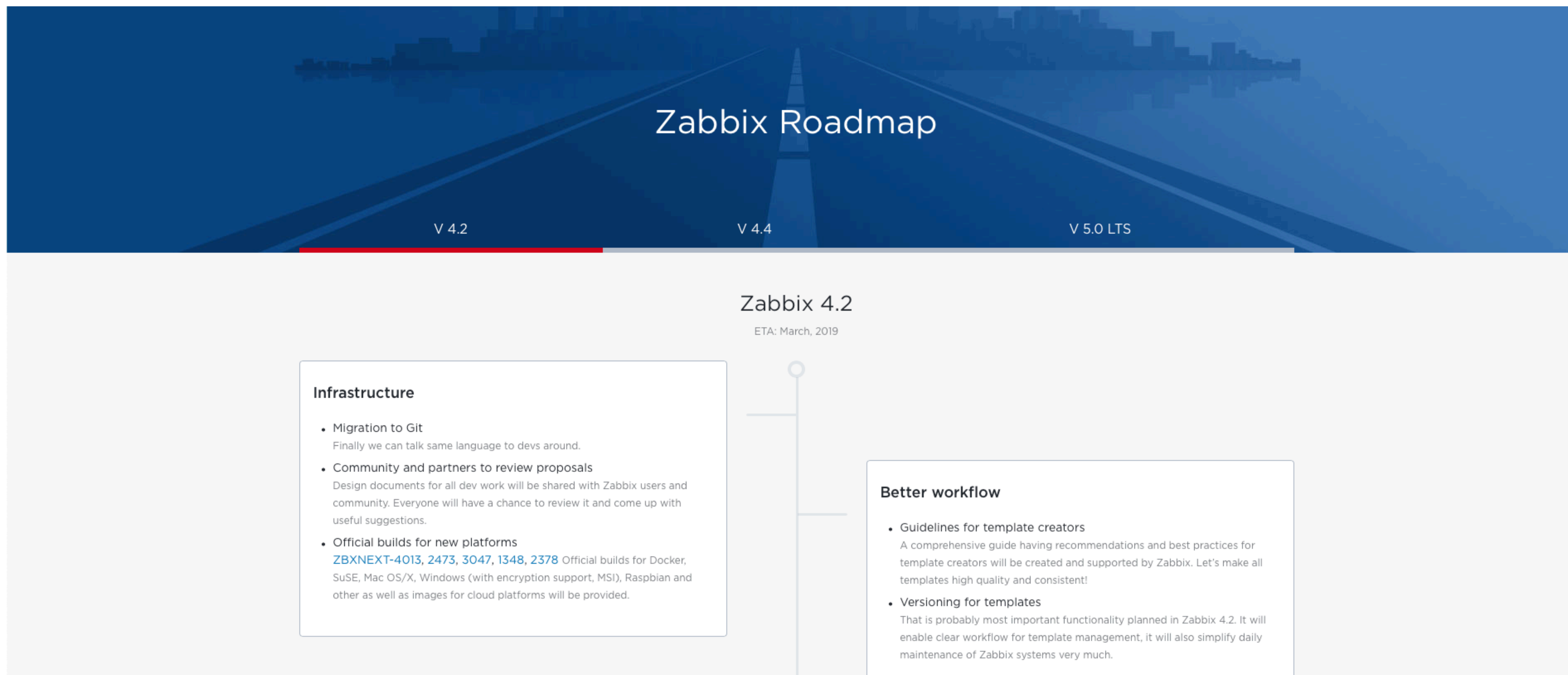
**ZBXNEXT-4873** implemented single dot datasets to be drawn as points in line vector graphs

**ZBXNEXT-4898** added support IPv6 for "net.dns" and "net.dns.record"

**ZBXNEXT-5037** added "skip" parameter for vmware.eventlog key

**ZBXNEXT-5016** extended preprocessing error messages to include intermediate step results

# Реализовано ~60% планируемой функциональности



# Когда ожидать Zabbix 4.2?

Начало Апреля 2019



# Спасибо!

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Основатель и исполнительный директор **ZABVIX**

