ZABBIX 5.0

UPGRADING TO 5.0 - BEST PRACTICE AND COMMON PITFALLS.

01

PREPARING FOR THE UPGRADE

NEW REQUIREMENTS, BACKUPS AND SCHEDULING DOWNTIMES

- Updated requirements for PHP and DB backend
- Backing up your zabbix infrastucture
- Estimating the potential downtime

UPDATED REQUIREMENTS FOR 5.0

- Minimum supported version for PHP is now 7.2 (from 5.4)
- mbedTLS (former polarSSL) is no longer supported for encryption.
- Added support of LIBSSH to support newer platforms like RHEL 8
- MySQL 5.5.62-8.0.x (from 5.0.3)
- Oracle 11.2 (from 10g)
- PostgreSQL 9.2.24 (from 8.1)
- Timescale 1.0 or later
- IBM DB2 support dropped

PREPARING FOR THE BACKUP

- Check for any OS updates. If the decision is made to apply the updates for stability/performance reasons, apply the updates and give your environment a few days to detect any new potential issues
- The same rule applies for DB backend upgrades and configuration changes
- This helps us to rule out any performance issues/instabilities caused by any of the performed changes which are unrelated to Zabbix itself.

PREPARING FOR THE BACKUP

- Check for any custom solutions used in your Zabbix instance
- For upgrading from versions <= 3.0, partitioning will have to be turned off before proceeding with the upgrade
- Are there any custom modules or patches applied on your instance?
- Are packages available on the underlying OS? Does my policy allow using packages to install Zabbix? Am I able to compile Zabbix or Zabbix packages from source?

BACKING UP YOUR ZABBIX INFRASTRUCTURE

- Perform the Zabbix database backend, server and frontend file backup
- Perform the backup of any custom scripts, modules or any other customizations that are applied to your Zabbix instance
- Back up the configuration files

BACKING UP YOUR YOUR ZABBIX CONFIGURATION

```
#cp -r /usr/lib/zabbix/externalscripts/ /tmp/zabbix_backup
#cp -r /etc/zabbix/ /tmp/zabbix_backup/
#cp -r /etc/httpd/ /tmp/zabbix_backup/
#cp -r /usr/share/zabbix/ /tmp/zabbix_backup/web/
#cp -r /usr/share/doc/zabbix-* /tmp/zabbix_backup/doc/
```

BACKING UP YOUR DB CONFIGURATION TABLES

```
mysqldump -uroot -p --skip-lock-tables --single-
transaction --ignore-table=zabbix.history --ignore-
table=zabbix.history_uint --ignore-
table=zabbix.history_text --ignore-
table=zabbix.history_log --ignore-table=zabbix.history_str
--ignore-table=zabbix.trends --ignore-
=table=zabbix.trends_uint zabbix | gzip >
zabbix_backup.sql.gz
```

ESTIMATING THE DOWNTIME

- Check the size of the database

```
SELECT table_schema AS "<zabbix>",
ROUND(SUM(data_length + index_length) / 1024 / 1024 /
1024, 2) AS "Size in Gb"
FROM information_schema.TABLES
GROUP BY table_schema;
```

ESTIMATING THE DOWNTIME

- Check the size of the database tables

```
SELECT table_name, table_rows, data_length, index_length,
round(((data_length + index_length) / 1024 / 1024 ),2)
"Size in MB" FROM information_schema.tables WHERE
table_schema = "zabbix" order by round(((data_length +
index_length) / 1024 / 1024 ),2) DESC LIMIT 20;
```

ESTIMATING THE DOWNTIME

- Configuration tables usually take a relatively small amount of space

table_name	table_rows	data_length	index_length	Size in GB
alerts	2049491	1431306240	324812800	1.64
items	2199915	1116225536	448479232	1.46
triggers	1277344	298336256	119996416	0.39
item_discovery	1921170	245071872	161660928	0.38
history_text	2623617	187858944	199557120	0.36
items_applications	2115352	147439616	188497920	0.31
auditlog	1588337	203145216	71483392	0.26
trigger_discovery	1057864	63160320	43188224	0.10
graphs	277365	61440000	42909696	0.10
functions	723781	41500672	54525952	0.09

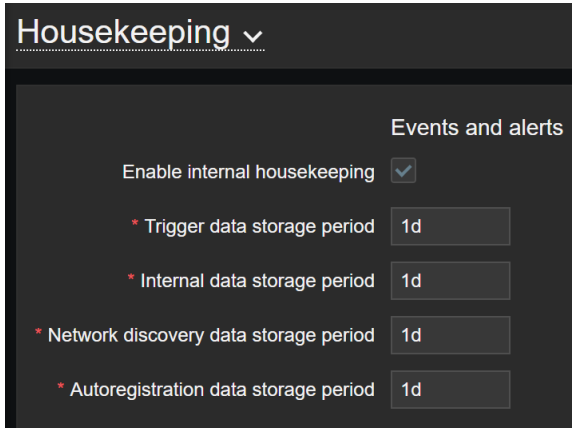
ESTIMATING THE DOWNTIME

- On the other hand, history*, trend* and events tables tend to rapidly grow in size on large scale instances

table_name	table_rows	data_length	index_length	Size in GB
history	2383675122	143353069568	92952838144	220.08
events	1079791931	68071456768	99840163840	156.38
trends	1397366123	136157478912	0	126.81
trends_uint	1114431630	110791983104	0	103.18
history_uint	415753897	25146097664	16716546048	38.99
history_str	161111152	11504795648	6574358528	16.84

CLEANING UP THE EVENTS TABLE (1)

- Set Event storage period to 1 day
- Manually execute the housekeeper process until the tables are cleared




```
#zabbix_server -R housekeeper_execute
```

```
housekeeper [deleted 20764 hist/trends, 0 items/triggers, 41934 events, 2301 problems, 0 sessions, 0 alarms, 0 audit, 0 records in 0.646578 sec, idle for 1 hour(s)]
```

CLEANING UP THE EVENTS TABLE (2)

- Use a basic for loop to execute DELETE statements with a LIMIT clause
- Can take a long time if the events table has grown extremely large over time

```
#!/bin/bash
for i in {1..50}
do
    mysql -uroot -ppassword -e "DELETE FROM zabbix.events where source in
(1,2,3) limit 100000;"
done
```

This is a workaround, use only if you're having issues with the first method!

CLEANING UP THE EVENTS TABLE (3)

- Copy events with source 0 (trigger events) to a new table

```
create table events_new like events;
insert into events_new select * from events where source=0;
RENAME TABLE events to events_old;
RENAME TABLE events_new TO events;
```

- You will have to drop and recreate all of the constraints referencing events on other tables – since they will be linked to the renamed events_old table!

```
 CONSTRAINT `c_acknowledges_2` FOREIGN KEY (`eventid`) REFERENCES
`events_old` (`eventid`) ON DELETE CASCADE
```

This is a workaround, use only if you're having issues with the first method!

NO changes to events table when upgrading from 4.0 – 5.0!

CREATING THE TEMPORARY HISTORY TABLES

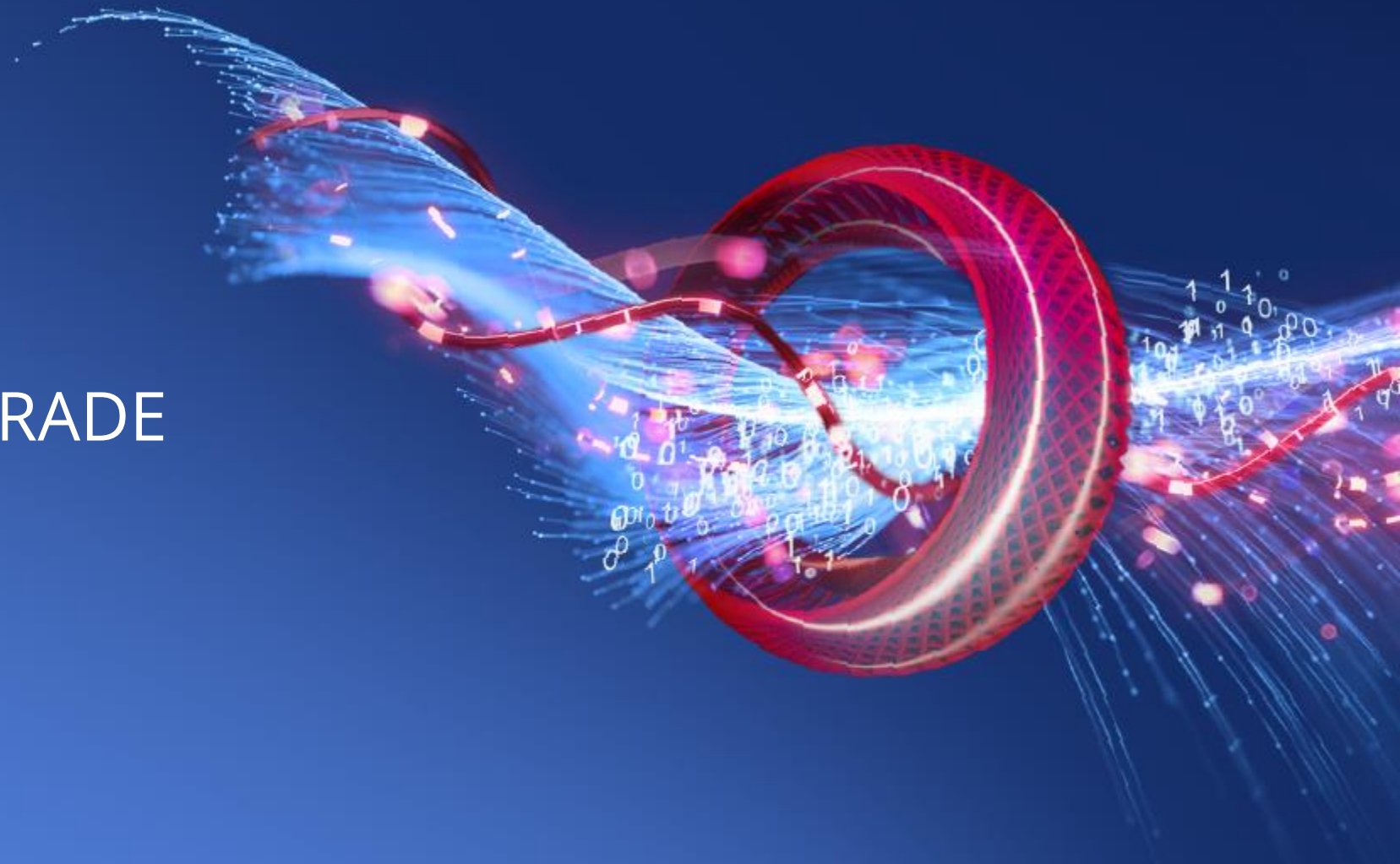
```
RENAME TABLE history_text TO history_text_old;
RENAME TABLE history_log TO history_log_old;

CREATE TABLE history_text like history_text_old;
CREATE TABLE history_log like history_log_old;
```

NO changes to history tables when upgrading from 4.0 – 5.0!

02

STEP BY STEP UPGRADE



EXAMPLE USE CASE

- CentOS 7 with Zabbix 3.0 server, frontend and 3 proxies
- One of the proxies uses Amazon Linux AMI OS
- Zabbix server uses MariaDB 10.2 as the DB backend
- Zabbix Proxies use a mix of MariaDB 5.5 and SQLite

UPGRADE THE SERVER

```
#rpm -Uvh https://repo.zabbix.com/zabbix/5.0/rhel/7/x86_64/zabbix-release-5.0-1.el7.noarch.rpm
#yum clean all
#yum -y upgrade zabbix-server-mysql zabbix-agent
```

UPGRADE THE FRONTEND

- Install the Zabbix 5.0 repository and the CentOS SCL repository

```
#rpm -Uvh https://repo.zabbix.com/zabbix/5.0/rhel/7/x86_64/zabbix-release-
5.0-1.el7.noarch.rpm
#yum clean all
#yum -y install centos-release-scl
```

- Enable the frontend repo

```
#vi /etc/yum.repos.d/zabbix.repo

[zabbix-frontend]
enabled=1
```

UPGRADE THE FRONTEND

- Reinstall the web server with the apache configuration
- Make sure that you have backed up your php and web server configuration!

```
#yum remove zabbix-web-3.*
#yum -y install zabbix-web-mysql-scl zabbix-apache-conf-scl
```

UPGRADE THE FRONTEND

- Change the default php configuration

```
php_value[max_execution_time] = 300
php_value[memory_limit] = 128M
php_value[post_max_size] = 16M
php_value[upload_max_filesize] = 2M
php_value[max_input_time] = 300
php_value[max_input_vars] = 10000
php_value[date.timezone] = Europe/Riga
```

IMPORT BACK THE OLD HISTORY DATA

```
insert into history_log select
itemid,clock,timestamp,source,severity,value,logeventid,ns from
history_log_old;

insert into history_text select itemid,clock,value,ns from history_text_old;
```

- Can be done with the Zabbix server process running

UPGRADE THE PROXIES (1)

- Upgrade the CentOS proxies

```
#rpm -Uvh https://repo.zabbix.com/zabbix/5.0/rhel/7/x86_64/zabbix-release-
5.0-1.el7.noarch.rpm
#yum clean al
#yum -y upgrade zabbix-proxy-mysql
```

- Since the proxy uses MariaDB backend DB, the database schema upgrade process is performed automatically on the Zabbix proxy startup.

UPGRADE THE PROXIES (1)

- For SQLite3 – remove the DB file and it will be recreated after the upgrade.

```
19892:20200626:160201.397 The proxy does not match Zabbix database. Current
database version (mandatory/optional): 04000000/04000006. Required mandatory
version: 05000000.
19892:20200626:160201.397 Zabbix does not support SQLite3 database upgrade.
```

UPGRADE THE PROXIES (2)

- Proxy runs on the Amazon Linux AMI which uses CentOS 6 packages
- No server or proxy Zabbix 5.0 packages are available for CentOS 6

What is the best course of action?

- Compile the Zabbix proxy from source
- Bring up a new VM with the up to date supported OS and install the proxy from official packages

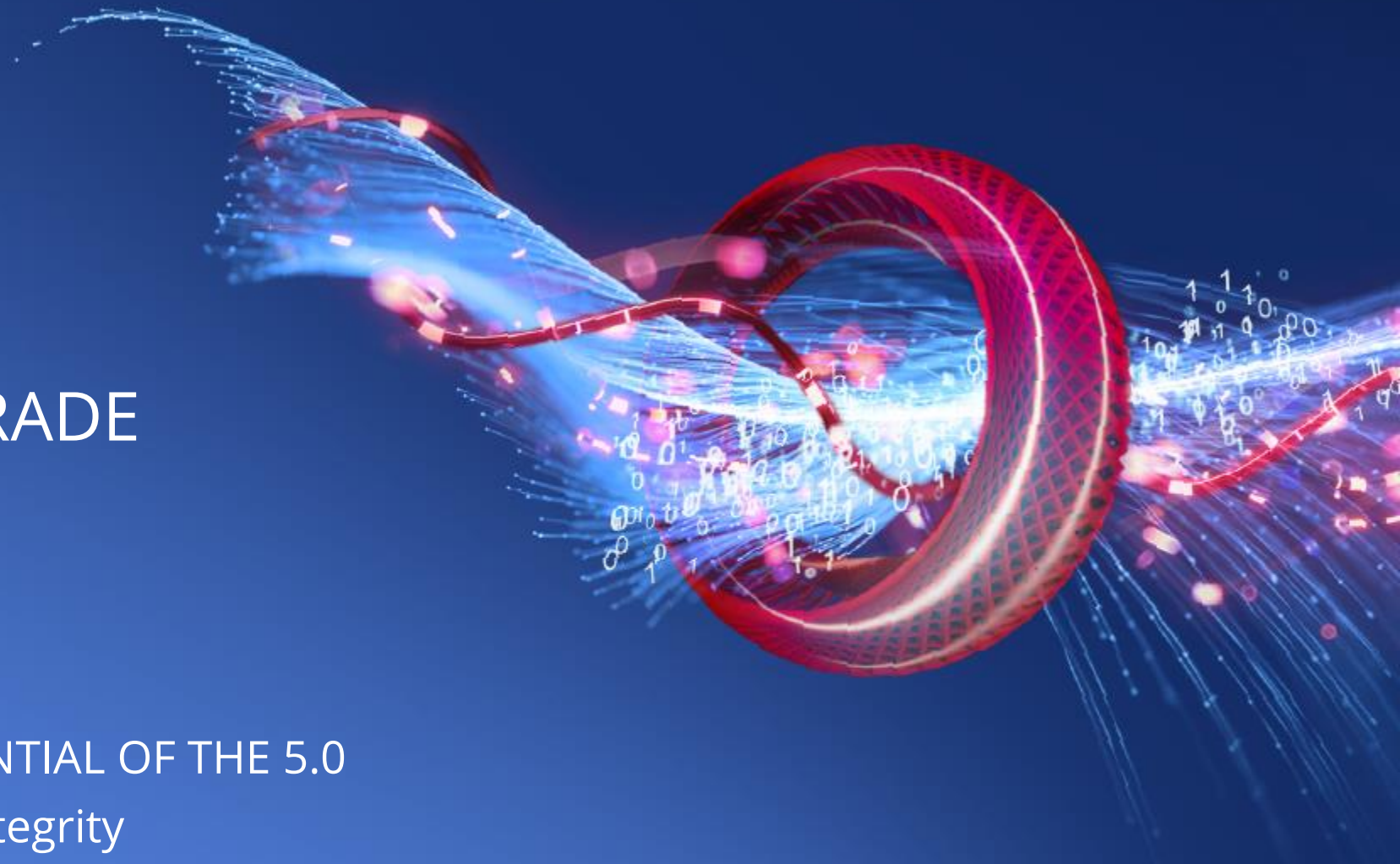
UPGRADE OR REPLACE THE AGENTS

- Remember, that agents are backwards compatible!
- In 5.0 you have an option to choose between the GO agent or the C agent

```
#yum install zabbix-agent
#yum install zabbix-agent2
```

03

TO DO POST UPGRADE



ENABLING THE FULL POTENTIAL OF THE 5.0

- Verifying the instance integrity
- Performance and configuration tuning
- Implementing the new features

CHECK FOR ANY ERROR MESSAGES - LOGS

```
3801:20200130:144010.260 [Z3005] query failed: [1025]
Error on rename of './zabbix/items' to './zabbix/#sql2-
caf-2f' (errno: 152) [alter table items drop foreign key
c_items_1]
3801:20200130:144010.260 database upgrade failed
```

- Any errors and issues encountered during the upgrade process will be logged to the Zabbix server log file.
- You need to fix the issues and restart the server for the upgrade to continue!
- Most of the time these are caused by implementing custom changes on Zabbix DB tables

CHECK FOR ANY ERROR MESSAGES - LOGS

```
6448:20200625:175048.726 Zabbix supports only "utf8_bin"
collation. Database "zabbix" has default collation
"utf8_general_ci"
6448:20200625:175048.734 character set name or collation
name that is not supported by Zabbix found in 29
column(s) of database "zabbix"
```

- The log file will point out the DB schema component which needs to have its collation changed.
  E.g. – database default collation or column collation (ZBX-17357)

CHECK FOR ANY ERROR MESSAGES - LOGS

```
6448:20200625:175048.735 database is not upgraded to use
double precision values
```

- Upgrade the history tables – Float64 support (ZBXNEXT-5691)

CHECK FOR ANY ERROR MESSAGES - FRONTEND

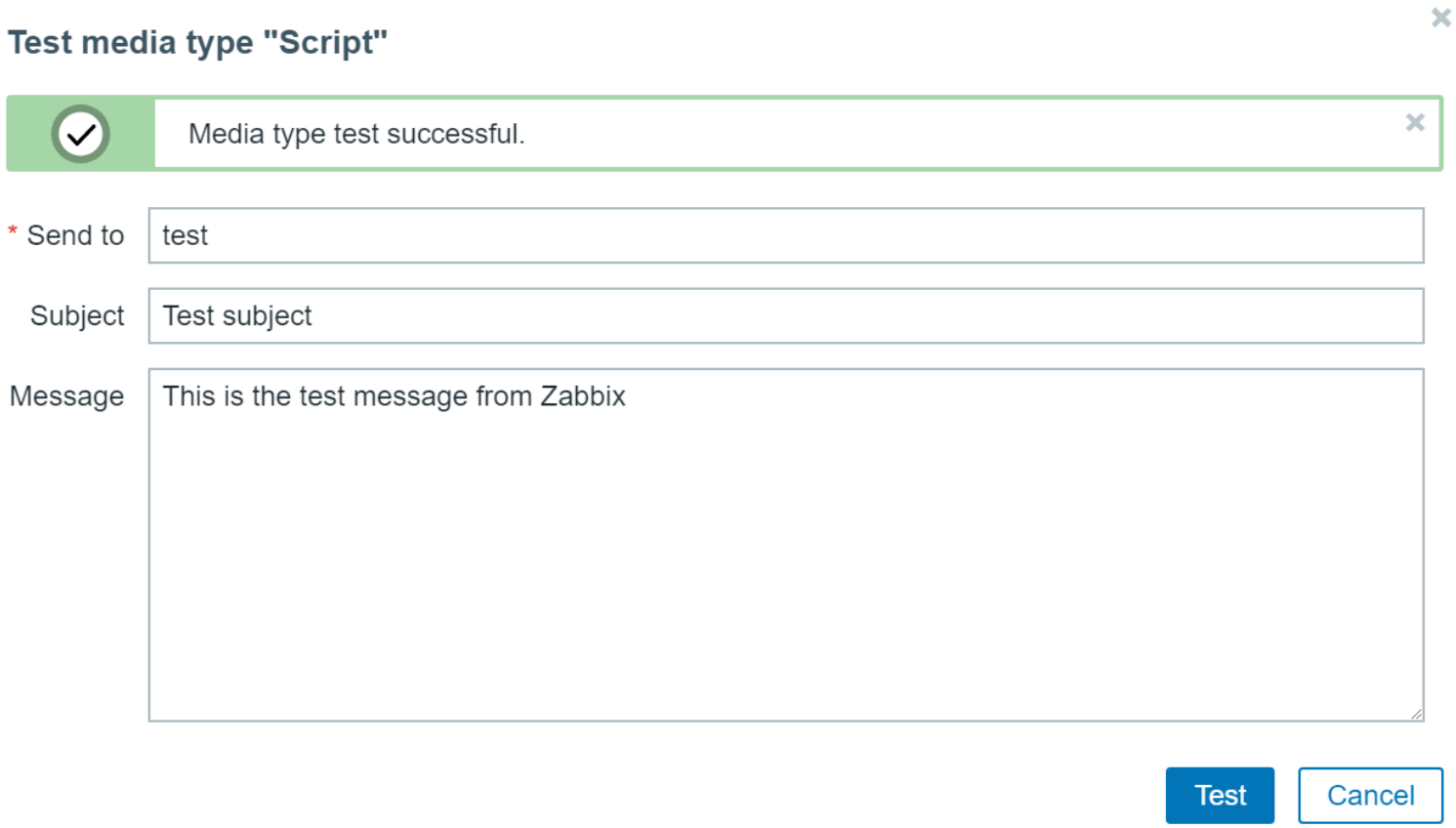
System information

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (enabled/disabled/templates)	138	7 / 0 / 131
Number of items (enabled/disabled/not supported)	122	117 / 0 / 5
Number of triggers (enabled/disabled [problem/ok])	61	61 / 0 [3 / 58]
Number of users (online)	2	1
Required server performance, new values per second	2.64	
Incorrect default charset for Zabbix database: "latin1" instead "UTF8".		
Database history tables upgraded	No	

- Fix the collation for the corresponding DB schema component (ZBX-17357)
- Upgrade the history tables – Float64 support (ZBXNEXT-5691)

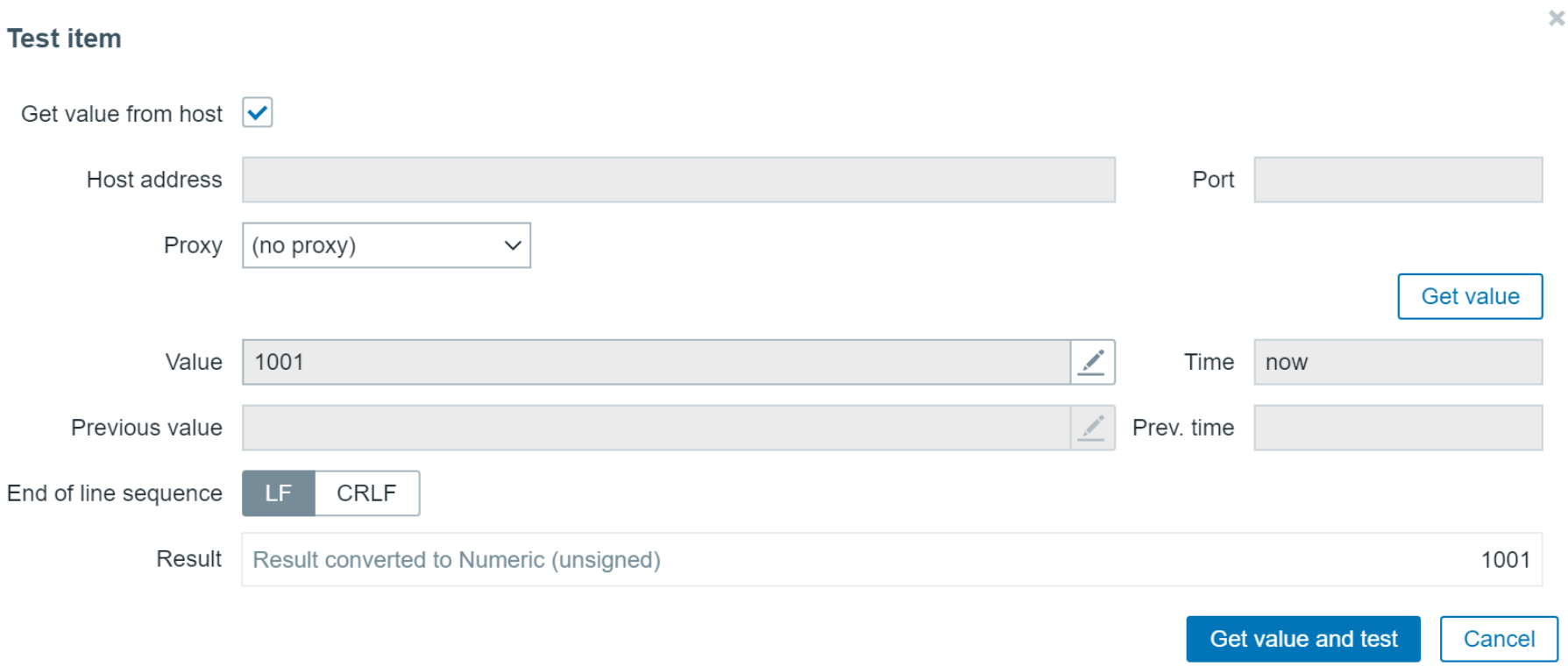
TEST YOUR SCRIPTS AND INTEGRATIONS

- Confirm that all of your global scripts and alert scripts are working
- Verify that your existing integrations are properly sending out notifications



TEST YOUR SCRIPTS AND INTEGRATIONS

- Make sure that your script based items are receiving data



VERIFY PERFORMANCE AND CONFIGURATION

- Confirm that there's no significant queue increase post-upgrade
- Make sure that Zabbix server and proxy performance graphs are not showing any performance anomalies
- Check for any slow queries or unexpected error message in the server or proxy log files

Queue overview by proxy

Proxy	5 seconds	10 seconds	30 seconds	1 minute	5 minutes	More than 10 minutes
Berlin proxy	0	0	0	0	0	0
Riga proxy	0	0	0	0	78	0
Server	0	0	0	0	0	0

Total: 3

OPTIMIZE THE DATA COLLECTION LOGIC

- Apply the new preprocessing rules such as throttling or data validation
- Modify existing items to use the new features, such as ODBC connection string
- Double check your API scripts – some changes were made to API syntax! (For example – details property is now required for SNMP interface type. Might break legacy host.create scripts)

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

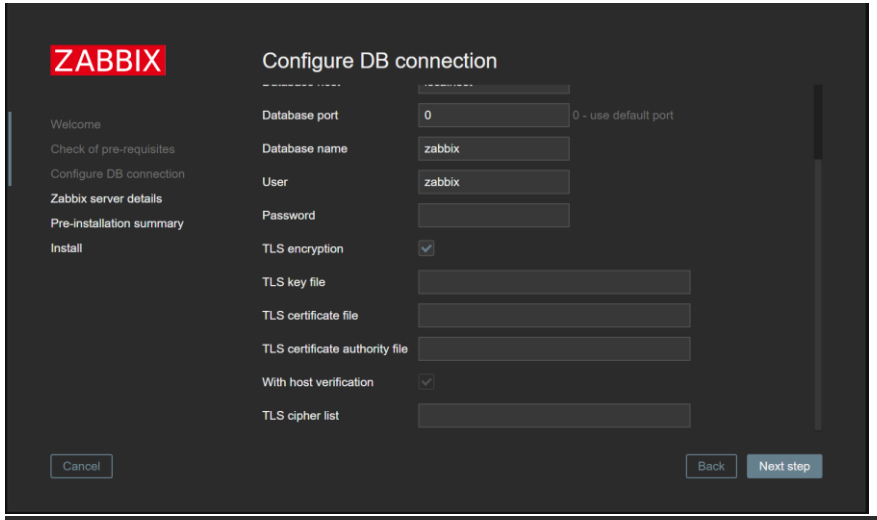
SWITCH FROM SCRIPTS TO WEBHOOKS

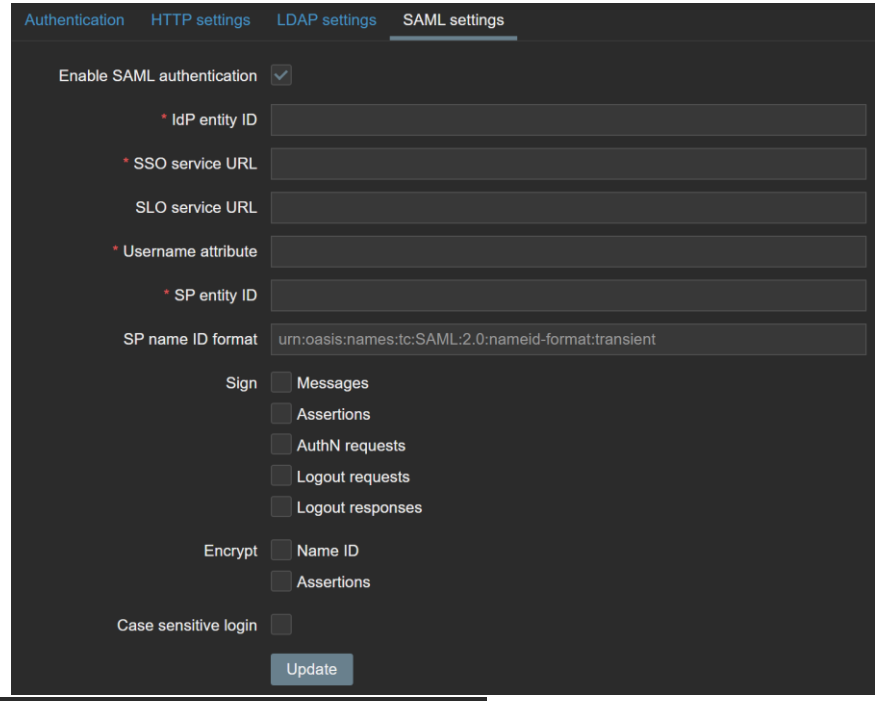
- Many new webhook integrations added starting from 4.2
- Official integrations developed and maintained by Zabbix
- No more need for external scripting – just import the XML file and you're good to go!

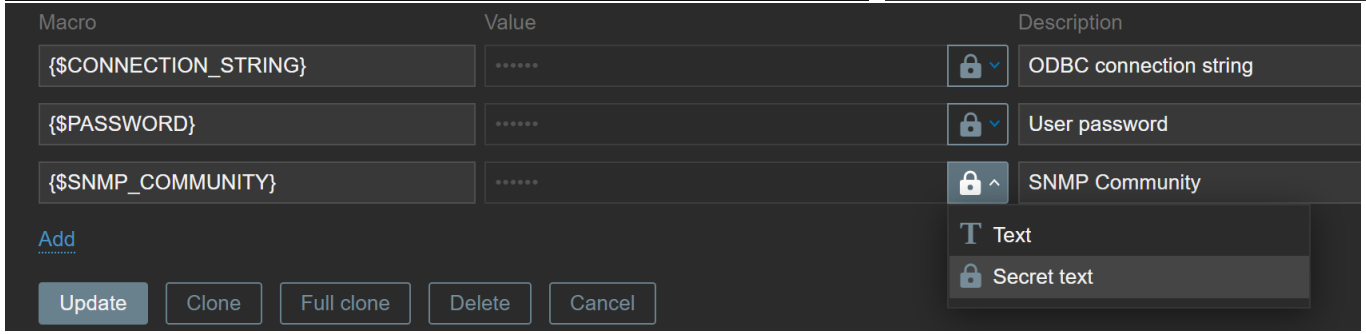
Name ▲	Type	Status	Used in actions	Details
Discord	Webhook	Enabled		
Email	Email	Enabled		SMTP server: "mail.example.com", SMTP helo: "example.com", SMTP email: "zabbix@example.com"
Email (HTML)	Email	Enabled		SMTP server: "mail.example.com", SMTP helo: "example.com", SMTP email: "zabbix@example.com"
Jira	Webhook	Enabled		
Jira ServiceDesk	Webhook	Enabled		
Jira with CustomFields	Webhook	Enabled		
Mattermost	Webhook	Enabled		
MS Teams	Webhook	Enabled		
Opsgenie	Webhook	Enabled		
OTRS	Webhook	Enabled		
PagerDuty	Webhook	Enabled		
Pushover	Webhook	Enabled		
Redmine	Webhook	Enabled		
ServiceNow	Webhook	Enabled		
SIGNL4	Webhook	Enabled		
Slack	Webhook	Enabled		
SMS	SMS	Enabled		GSM modem: "/dev/ttyS0"
Telegram	Webhook	Enabled		

IMPLEMENT THE ADDED SECURITY FEATURES

- Communication with the Zabbix database backend can now be encrypted
- Mask your macros!
- Migrate to out of the box SAML support







THANK YOU!