ZABBIX '25
CONFERENCE
BENELUX

Optional upgrade patches

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Zabbix

Zabbix versions and DB upgrades

DB upgrades can be:

1) **Automated** or **Manual**

2) **Mandatory** or **Optional**

https://www.zabbix.com/release_notes

Zabbix version has 3 parts:

ZABBIX 7.2.3

28 January 2025

ZABBIX 7.0.9

28 January 2025

ZABBIX 6.4.21

27 January 2025

ZABBIX 6.0.38

27 January 2025

ZABBIX 5.0.46

27 January 2025

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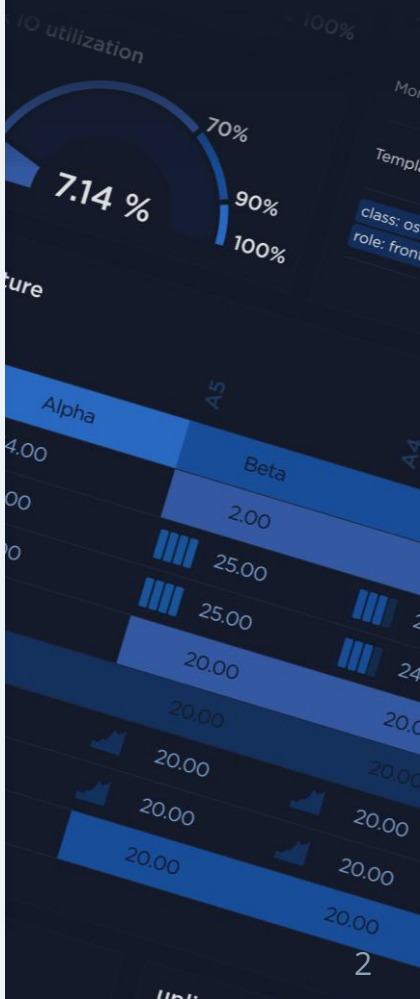
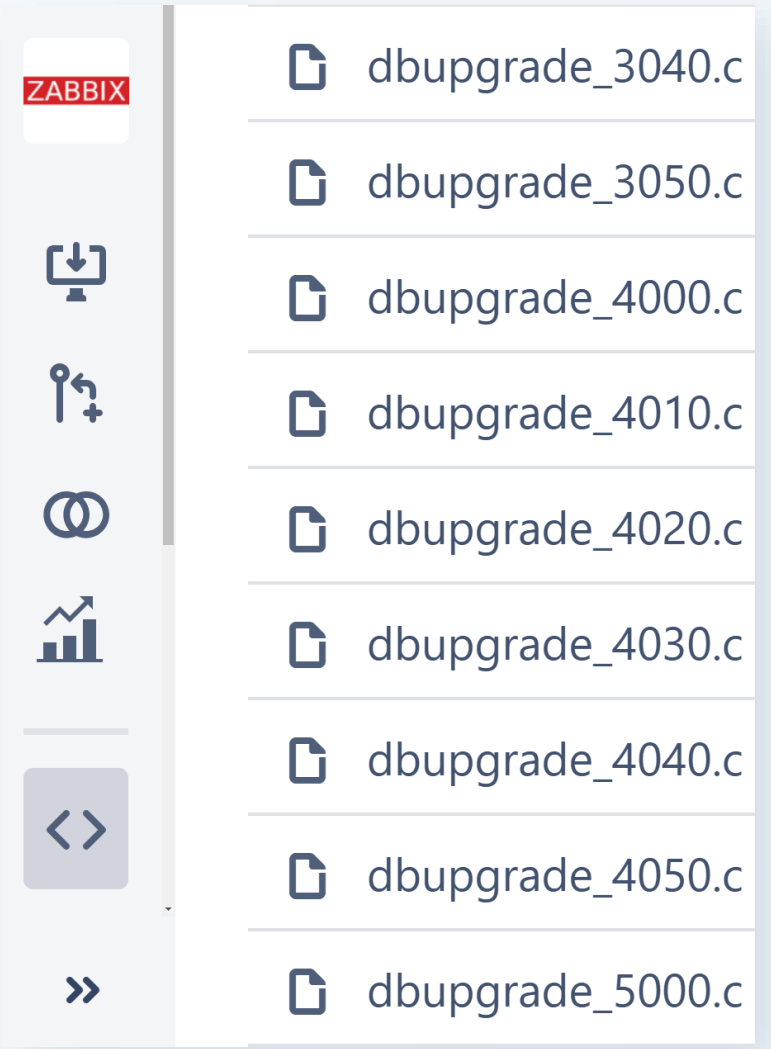


Automated DB upgrades

Every Standard release has its own file where DB upgrades are stored.

dbupgrade_3040.c

3 - LTS
4 - Standard



https://git.zabbix.com/projects/ZBX/repos/zabbix/browse/src/libs/zbxdbupgrade

Automated optional upgrade patches

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Zabbix upgrades happen one by one:

```
static int    DBpatch_3040006(void)
{
        return create_problem_3_index();
}

static int    DBpatch_3040007(void)
{
        return drop_c_problem_2_index();
}
```

```
/* version, duplicates flag, mandatory flag
*/

DBPATCH_ADD(3040000, 0, 1)
...
DBPATCH_ADD(3040006, 0, 0)
DBPATCH_ADD(3040007, 0, 0)
```

https://git.zabbix.com/projects/ZBX/repos/zabbix/browse/src/libs/zbxdbupgrade/dbupgrade_3040.c

The newest automated optional patch is 4050043...

Automated optional upgrade patches

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Optional patches do not change the schema (except indexes), only the data.

Let's say we upgraded server and front-end package from 7.0.**5** to 7.0.**8**

patches 5-8 are **optional**.

New binaries were installed, and DB was upgraded.

Zabbix front-end 7.0.**8**

Zabbix DB 7.0.**8**

Zabbix server 7.0.**8**

Automated optional upgrade patches

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But something was not suitable for us...

We can safely remove the server and front-end packages 7.0.**8** and install back 7.0.**5**

No need to update DB.

DB 7.0.**8** and still will work with server and front-end 7.0.**5**

Zabbix front-end 7.0.**5**

Zabbix DB 7.0.**8**

Zabbix server 7.0.**5**

Double precision DB upgrade

'trends' and **'history**' tables

before Zabbix 5.0:

```
CREATE TABLE history (
        itemid          bigint                  NOT NULL,
        clock           integer                 DEFAULT '0'             NOT NULL,
        value           numeric(16,4)           DEFAULT '0.0000'        NOT NULL,
        ns              integer                 DEFAULT '0'             NOT NULL
);
```

NUMERIC(precision, scale)

precision - the number of digits to both sides of the decimal point.

scale - the count of decimal digits in the fractional part.

Double precision

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Before Zabbix 5.0:

```
zabbix=> select * from history;
 itemid |   clock    |  value  |    ns
--------+------------+---------+-----------
  23300 | 1739177434 |  0.0000 | 320512767
  23299 | 1739177434 | 99.7059 | 333954336
```

1.000**05** -> 1.0001

100000000000 - Unsupported value

Double precision

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15 digits and range from approximately -1.79E+308 to 1.79E+308

```
ALTER TABLE history MODIFY value DOUBLE PRECISION DEFAULT '0.0000' NOT NULL;
```

1.00005 -> 1.00005

0.123456789012345678**90123456789** -> 0.1234567890123456 8

1000000000000 - Unsupported value

Double precision

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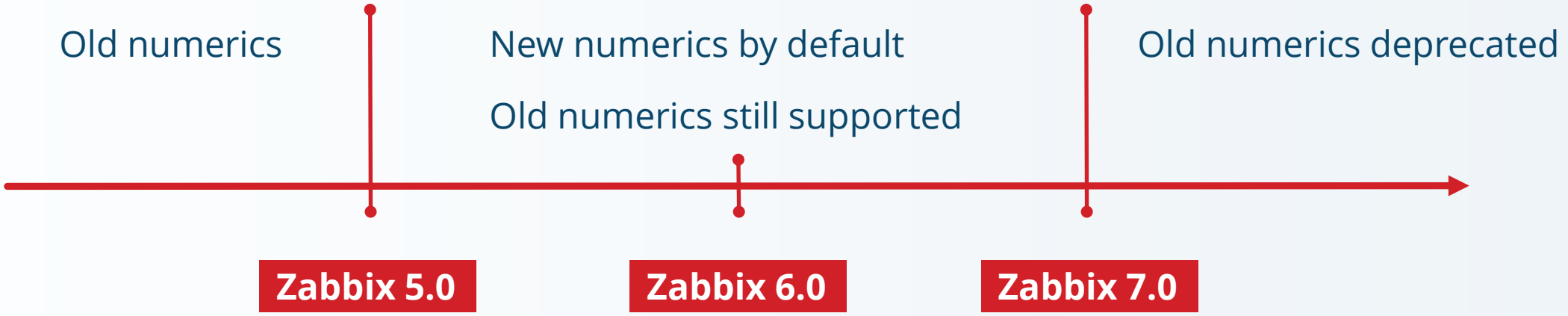
Mandatory when upgrading to 7.0

For TimescaleDB with compression, the database must be upgraded manually.

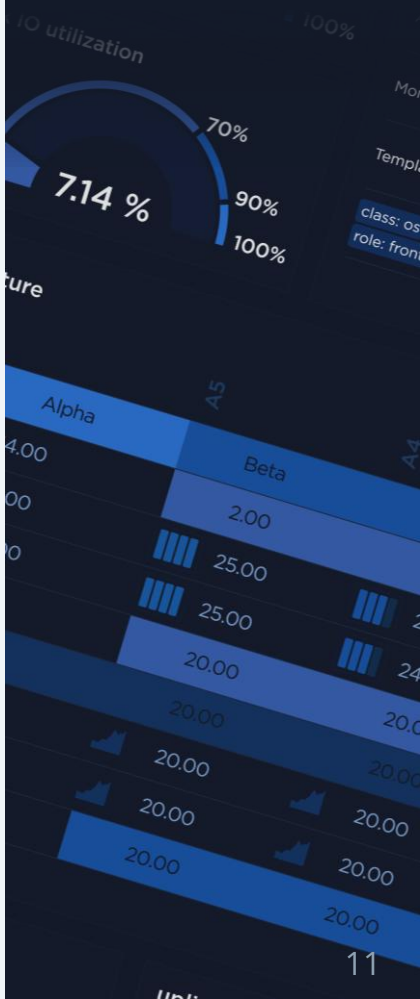
For others it is automated but still recommended to upgrade manually.



Primary key DB upgrade

history, history_uint, history_str, history_log and **history_text** tables before Zabbix 6.0:

```
CREATE TABLE `history_uint` (
        `itemid`        bigint unsigned                         NOT NULL,
        `clock`         integer         DEFAULT '0'             NOT NULL,
        `value`         bigint unsigned DEFAULT '0'             NOT NULL,
        `ns`            integer         DEFAULT '0'             NOT NULL
) ENGINE=InnoDB;
CREATE INDEX `history_uint_1` ON `history_uint` (`itemid`,`clock`);
```



Primary key DB upgrade - MySQL

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MySQL InnoDB engine needs every table to have clustered index to tell it how data would be physically stored. If there is no primary key, it takes **first unique index** with all non-NULL key columns. If it cannot generate one - it will generate a **hidden clustered index**.

Cluster systems for MySQL require tables to have **primary key**.

*"Percona XtraDB Cluster cannot properly propagate certain write operations to tables that do not have primary keys defined." (*https://docs.percona.com/percona-xtradb-cluster/5.7/limitation.html*)*

Check https://support.zabbix.com/browse/ZBXNEXT-3089 for more info.

Primary key DB upgrade - PostgreSQL

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On PostgreSQL primary key is not automatically clustered.

Main improvements come from the fact that primary key is unique, and index used to be non-unique.

Upgrade to primary key is important for consistency:

1) with history_bin table (added in 7.0)

2) with newer Zabbix installations from 6.0

History tables without primary key get are an edge-case setup. Like old numeric precision – eventually their support could be dropped.

```
CREATE TABLE `history_uint` (
        `itemid`        bigint unsigned   NOT NULL,
        `clock`         integer           DEFAULT '0'         NOT NULL,
        `value`         bigint unsigned   DEFAULT '0'         NOT NULL,
        `ns`            integer           DEFAULT '0'         NOT NULL,
        PRIMARY KEY (itemid,clock,ns)
) ENGINE=InnoDB;
```

Primary key DB upgrade

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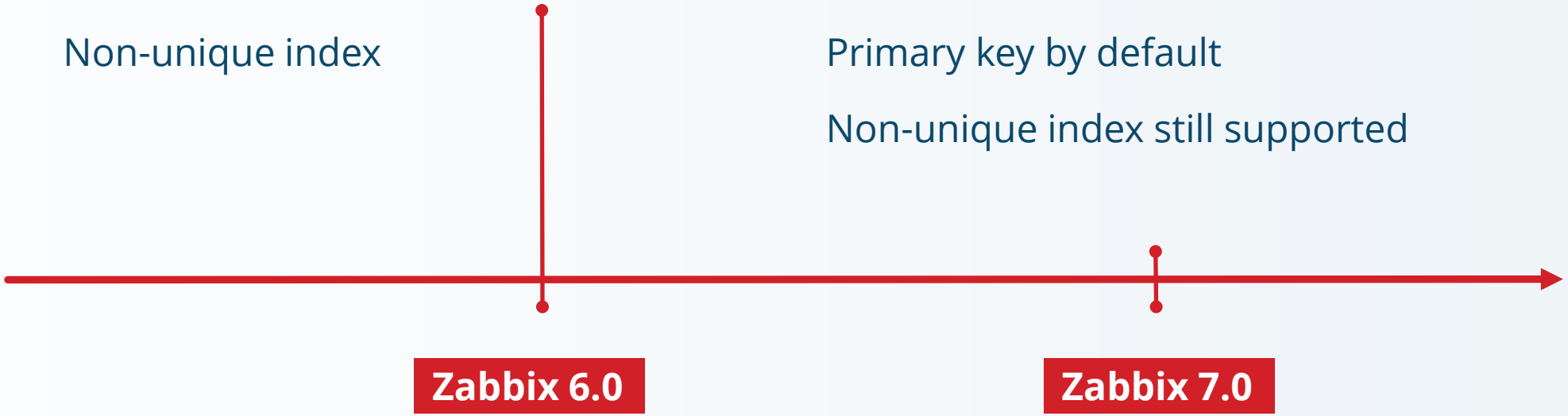
Added in 6.0.

Not mandatory but is desirable.

Includes double precision upgrade for 'history*' tables. (but not for the 'trends' table)



Zabbix proxy

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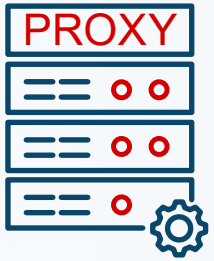
Double precision upgrade is automated for proxy when upgrading to 5.0

Proxy does not benefit from primary key upgrade



Directory structure change in 7.0

database folder before **6.4.8rc1 and 7.0.0alpha7**:

```
├── mysql
│   ├── data.sql
│   ├── double.sql
│   ├── history_pk_prepare.sql
│   ├── images.sql
│   └── schema.sql
│
├── postgresql
│   ├── tsdb_history_pk_upgrade_no_compression
│   │   ├── history_pk.sql
│   │   ├── history_pk_log.sql
│   │   ├── history_pk_str.sql
│   │   ├── history_pk_text.sql
│   │   └── history_pk_uint.sql
│   ├── tsdb_history_pk_upgrade_with_compression
│   │   ├── history_pk.sql
│   │   ├── history_pk_log.sql
│   │   ├── history_pk_str.sql
│   │   ├── history_pk_text.sql
│   │   └── history_pk_uint.sql
│   ├── data.sql
│   ├── double.sql
│   ├── history_pk_prepare.sql
│   ├── images.sql
│   ├── schema.sql
│   └── timescaledb.sql
```

database folder after **6.4.8rc1 and 7.0.0alpha7**

```
├── mysql
│   ├── option-patches
│   │   └── history_upgrade_prepare.sql
│   ├── data.sql
│   ├── images.sql
│   └── schema.sql
│
├── postgresql
│   ├── option-patches
│   │   └── history_upgrade_prepare.sql
│   ├── timescaledb
│   │   ├── option-patches
│   │   │   ├── with-compression
│   │   │   │   ├── history_upgrade.sql
│   │   │   │   ├── history_upgrade_log.sql
│   │   │   │   ├── history_upgrade_str.sql
│   │   │   │   ├── history_upgrade_text.sql
│   │   │   │   ├── history_upgrade_uint.sql
│   │   │   │   └── trends_upgrade.sql
│   │   │   └── without-compression
│   │   │       ├── history_upgrade.sql
│   │   │       ├── history_upgrade_log.sql
│   │   │       ├── history_upgrade_str.sql
│   │   │       ├── history_upgrade_text.sql
│   │   │       ├── history_upgrade_uint.sql
│   │   │       └── trends_upgrade.sql
│   │   └── schema.sql
│   ├── data.sql
│   ├── images.sql
│   └── schema.sql
```

Workshop

Overview

5.0 Zabbix server with Timescale DB with old precision

2) upgrade it to use double precision for history and trends tables

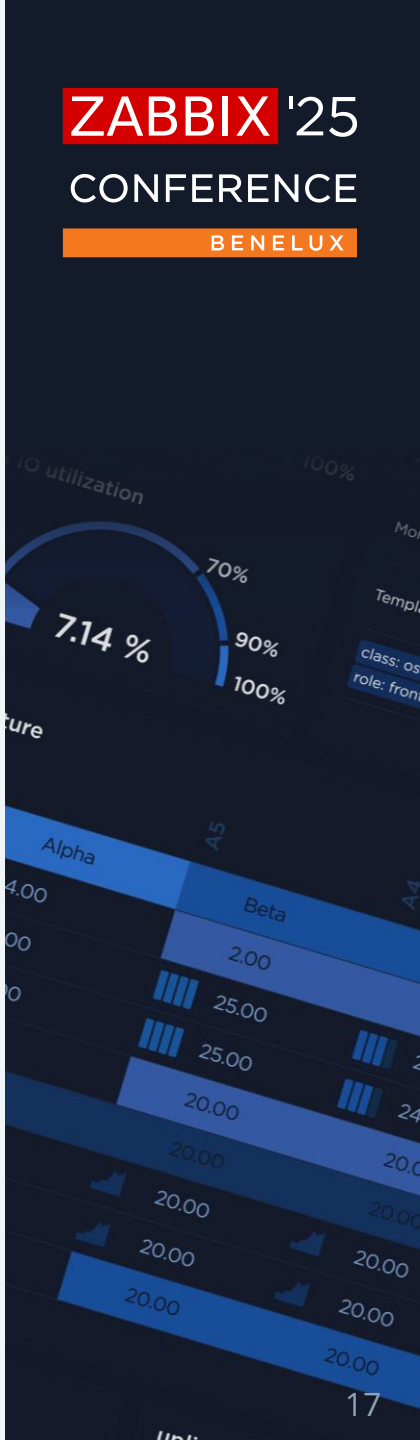
3) upgrade it to Zabbix 6.0

4) upgrade it to use new primary key for history tables

5) delete the setup completely and install 6.0 Zabbix server with MySQL from scratch

6) upgrade it to use new primary key for history tables

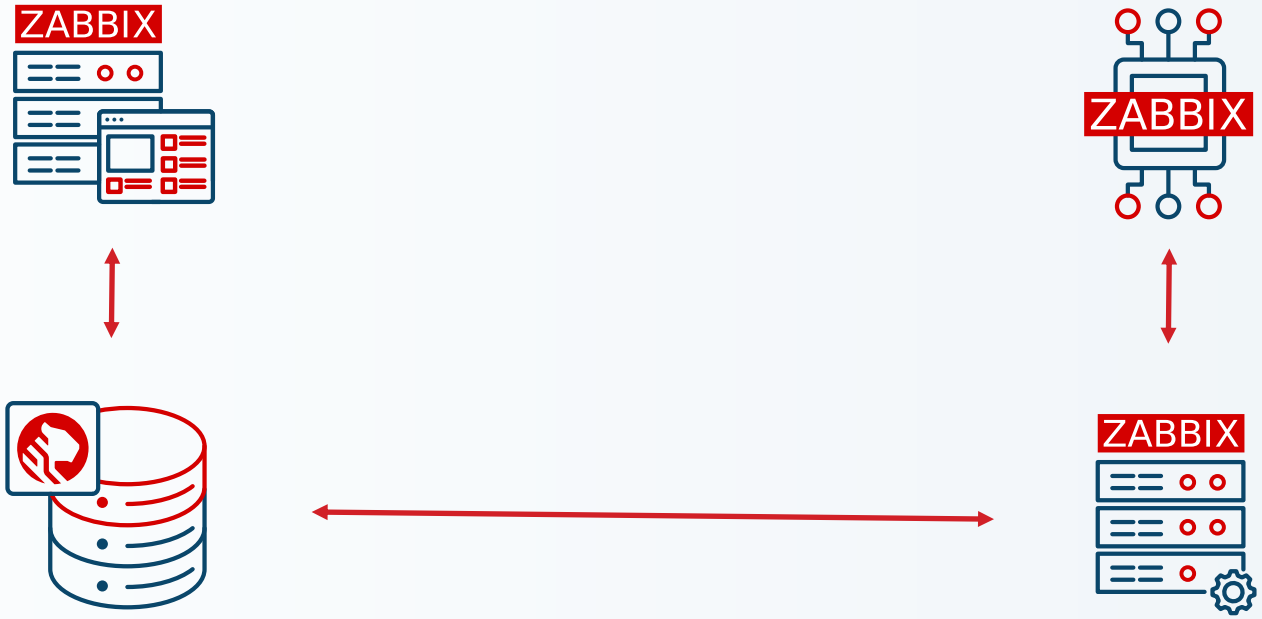
7) upgrade its audit table to use new primary key (bonus)



Workshop Setup, Rocky Linux 8.10

Apache 2.4

Zabbix agent 5.0.46



PostgreSQL 17.2
TimescaleDB 2.18

Zabbix server 5.0.46

Double precision upgrade

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- Make sure httpd is running and go to

http://<IP>/zabbix/zabbix.php?action=dashboard.view

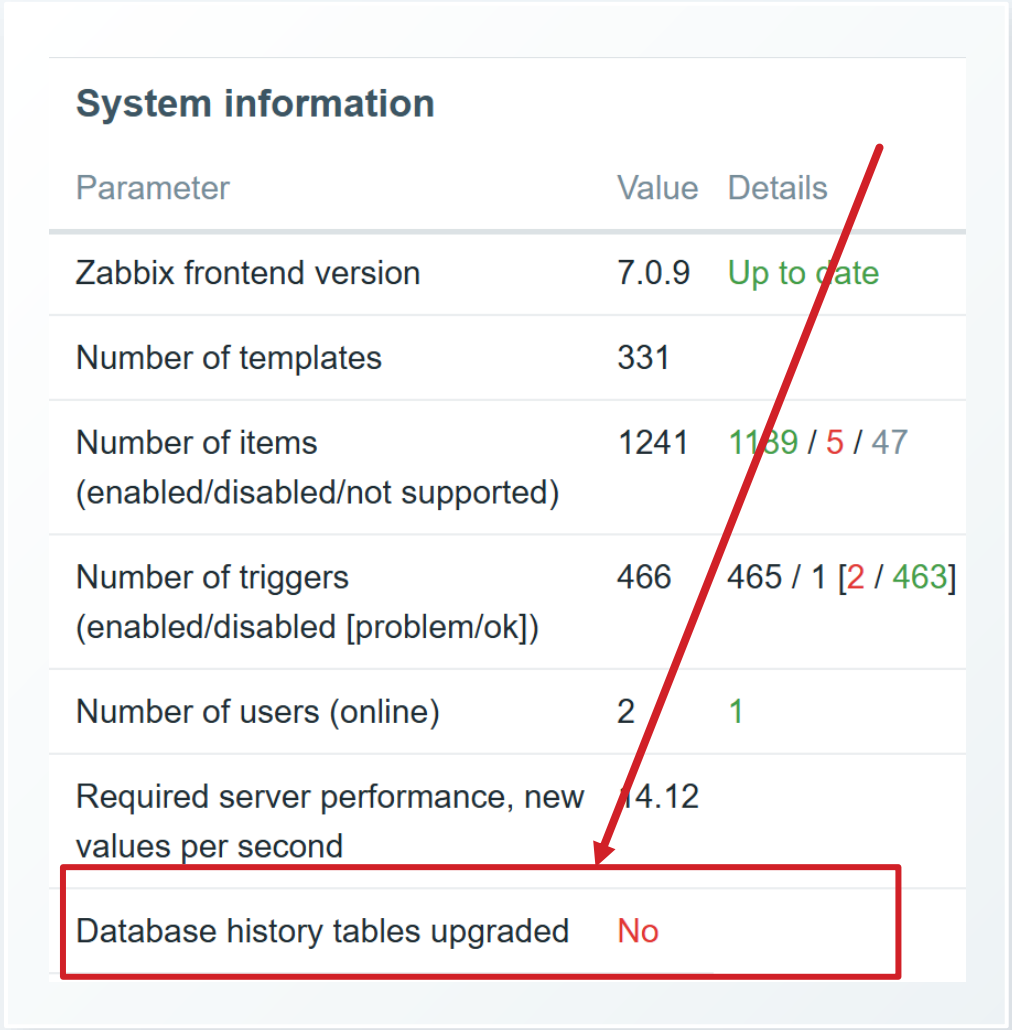
- Login with Admin/Zabbix
- Check the warning in UI, Reports > System information
- Make sure zabbix server is running and check server logs for the message:

```
# tail -n 100 /var/log/zabbix_server.log
```

"database is not upgraded to use double precision values”

- 5) check ’trends’ and ‘history’ tables in DB for the old precision:

```
# psql -U Zabbix
postgres=# \d trends;
postgres=# \d history;
```



Upgrade to use double precision

ZABBIX '25 CONFERENCE BENELUX

- Follow steps provided in the link

https://www.zabbix.com/documentation/5.0/en/manual/installation/upgrade_notes_500

- Go to front-end and disable compression:
- Administration->General->Housekeeping->"Enable compression"

```
# zabbix_server -R config_cache_reload
# systemctl stop zabbix-server
# pg_dump -U zabbix -h 127.0.0.1 zabbix > /tmp/dump_pg_dump
```

```
# psql -U zabbix
zabbix=> ALTER TABLE trends set (timescaledb.compress=false);
zabbix=> ALTER TABLE history set (timescaledb.compress=false);
```

Upgrade to use double precision

ZABBIX '25 CONFERENCE BENELUX

- Remove ‘ONLY’ from /usr/share/doc/zabbix-server-pgsql/double.sql
- Execute the upgrade script

```
# cat /usr/share/doc/zabbix-server-pgsql/double.sql | sudo -u zabbix psql zabbix
# systemctl start zabbix-server
```

- Update /etc/zabbix/web/zabbix.conf.php

```
# vi /etc/zabbix/web/zabbix.conf.php
```

- Replace false

```
$DB['DOUBLE_IEEE754']   = false;
```

- to true

```
$DB['DOUBLE_IEEE754']   = true;
```

Double precision upgrade

ZABBIX '25 CONFERENCE BENELUX

- Re-enable compression in UI.
- Check Monitoring->Dashboard->System information for the message: "database is not upgraded to use double precision values" to be gone..
- Check DB history and trends table:

```
# psql -U Zabbix
zabbix=> \d history
```

```
Column  |       Type             |Collation      |Nullable | Default
--------+------------------------+---------------+---------+-----------------------
 itemid | bigint                 |               | not null |
 clock  | integer                |               | not null | 0
 value  | double precision       |               | not null | '0'::double precision
```

Upgrade zabbix to 6.0

ZABBIX '25 CONFERENCE BENELUX

- Follow the steps described in

https://www.zabbix.com/documentation/6.0/en/manual/installation/upgrade/packages/rhel

```
# systemctl stop zabbix-server zabbix-agent
# mkdir /opt/zabbix-backup/
# cp /etc/zabbix/zabbix_server.conf /opt/zabbix-backup/
# cp /etc/httpd/conf.d/zabbix.conf  /opt/zabbix-backup/
# cp -R /usr/share/zabbix/ /opt/zabbix-backup/
# rpm -Uvh https://repo.zabbix.com/zabbix/6.0/rhel/8/x86_64/zabbix-release-latest.el8.noarch.rpm
# dnf remove zabbix-server-pgsql-5.0.46-2.el8.x86_64 -y
# dnf clean all
# dnf install zabbix-server-pgsql zabbix-agent zabbix-apache-conf zabbix-sql-scripts -y
```

Upgrade zabbix to 6.0

ZABBIX '25 CONFERENCE BENELUX

- Update /etc/zabbix/zabbix_server.conf
- Set AllowUnsupportedDBVersions=1
- Then execute

```
# pg_dump -U zabbix -h 127.0.0.1 zabbix > /tmp/zabbix_5.0_back_postgres
# systemctl start zabbix-server zabbix-agent
# systemctl restart httpd
```

- Check /var/log/zabbix/zabbix_server.log for:

```
# tail -n 100 /var/log/zabbix/zabbix_server.log
```

```
completed 100% of database upgrade
database upgrade fully completed
database could be upgraded to use primary keys in history table
```

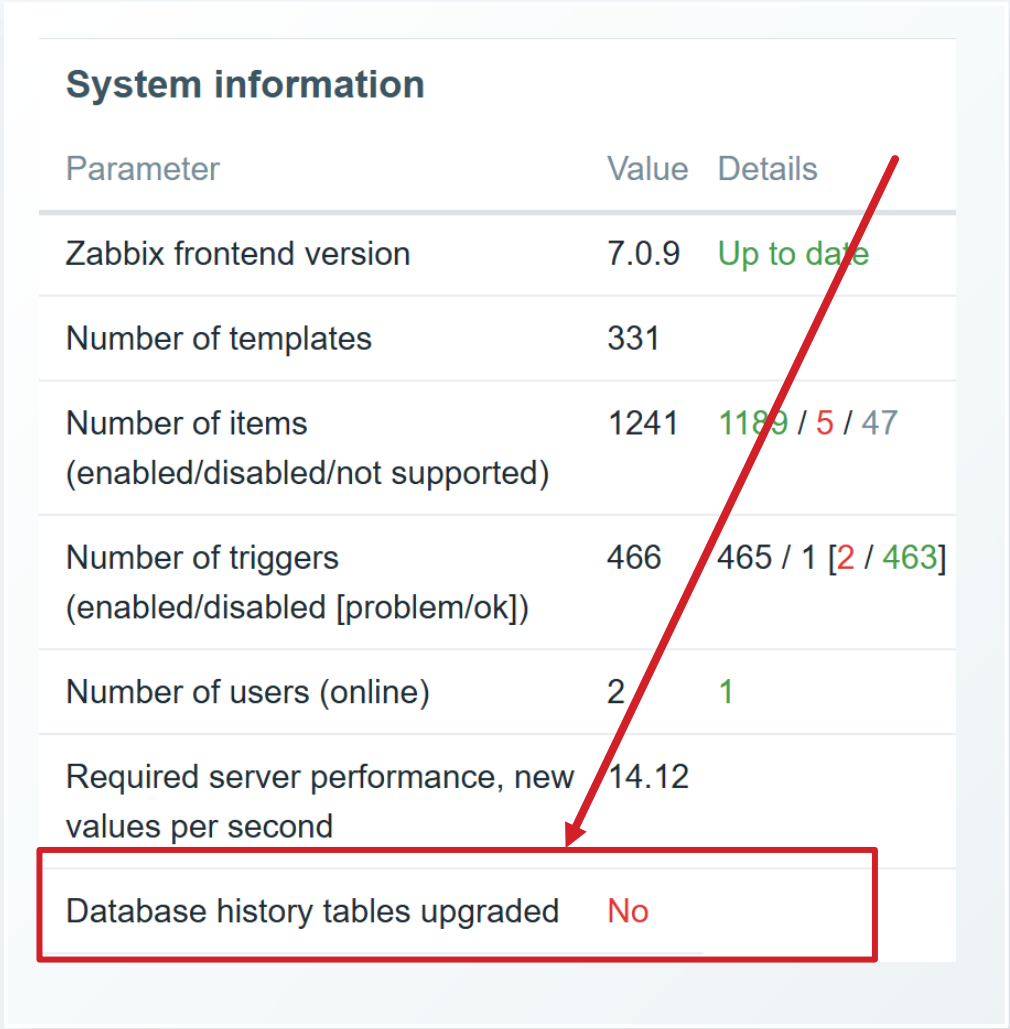
Primary key upgrade

ZABBIX '25 CONFERENCE BENELUX

- Go to UI 'System information' and check
- "Database history tables use primary key - No" warning

- Check history tables indexes, and that there are no primary keys on tables

```
# psql -U zabbix
zabbix=> \d history;
zabbix=> \d history_uint;
zabbix=> \d history_str
zabbix=> \d history_text
zabbix=> \d history_log
```



Primary key upgrade

ZABBIX '25 CONFERENCE BENELUX

- Follow https://www.zabbix.com/documentation/6.0/en/manual/appendix/install/db_primary_keys#timescaledb-v2

```
# systemctl stop zabbix-server
# sudo -u zabbix psql zabbix < /usr/share/zabbix-sql-scripts/postgresql/history_pk_prepare.sql
# cd /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_with_compression

# cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_with_compression/history_pk.sql | sudo -u zabbix psql zabbix

# cat /usr/share/zabbix-sql-scripts/postgresql/tsdb_history_pk_upgrade_with_compression/history_pk_uint.sql | sudo -u zabbix psql zabbix
```

- Do the same cat log, str and text scripts..

Primary key upgrade

```
# psql -U zabbix
zabbix=> \d history;
```

```
Table "public.history"
 Column |       Type       | Collation | Nullable |        Default
--------+------------------+-----------+----------+-----------------------
 itemid | bigint           |           | not null |
 clock  | integer          |           | not null | 0
 value  | double precision |           | not null | '0'::double precision
 ns     | integer          |           | not null | 0
Indexes:
    "history_pkey" PRIMARY KEY, btree (itemid, clock, ns).  <-------
    "history_clock_idx1" btree (clock DESC)
Triggers:
    ts_insert_blocker BEFORE INSERT ON history FOR EACH ROW EXECUTE FUNCTION
_timescaledb_functions.insert_blocker()
Number of child tables: 2 (Use \d+ to list them.)
```

Primary key upgrade


```
# systemctl restart httpd
# systemctl start zabbix-server
```

- Go to UI and check error is gone...
- Make sure server is up and running.

```
# systemctl status zabbix-server
# tail -f /var/log/zabbix/zabbix_server.log
```

- Primary key upgrade is DONE.

Delete Zabbix

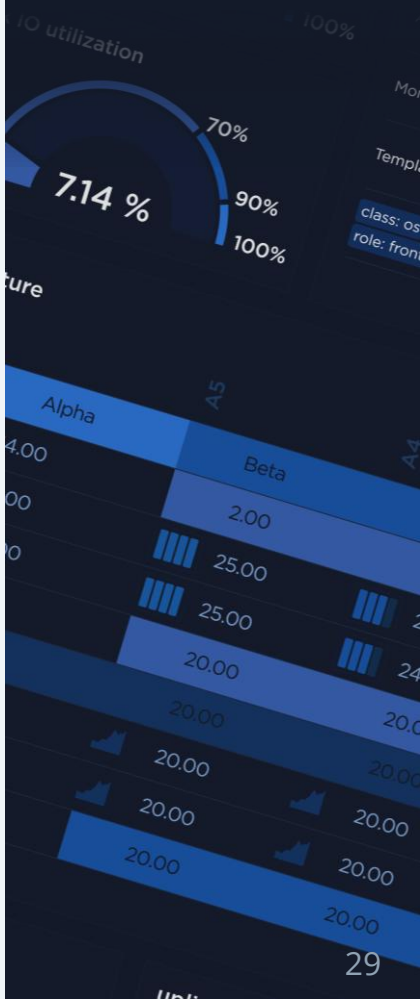
- Update /etc/yum.repos.d/zabbix.repo to remove 6.0 repo
- (should be the first block)

```
# dnf remove postgresql-17  zabbix-agent zabbix-server-pgsql zabbix-sql-scripts zabbix-apache-conf timescaledb-2-postgresql-17 postgresql17 -y

# dnf remove zabbix* -y

# dnf clean all

# dnf remove zabbix-release-6.0-5.el8.noarch -y
```

Install Zabbix 5.0 with MySQL

ZABBIX '25 CONFERENCE BENELUX

- Follow the steps provided here:

https://www.zabbix.com/download?zabbix=5.0&os_distribution=rocky_linux&os_version=8&components=server_frontend_agent&db=mysql&ws=apache

```
# rpm -Uvh https://repo.zabbix.com/zabbix/5.0/rhel/8/x86_64/zabbix-release-latest-5.0.el8.noarch.rpm

# dnf install zabbix-server-mysql zabbix-web-mysql zabbix-apache-conf zabbix-agent mysql-server    -y

# systemctl enable mysqld
# systemctl start mysqld
```

Install Zabbix 5.0 with MySQL

ZABBIX '25 CONFERENCE BENELUX

```
#  mysql -uroot

mysql> create database zabbix character set utf8 collate utf8_bin;
mysql> create user 'zabbix'@'localhost' identified by '<password>';
mysql> grant all privileges on zabbix.* to 'zabbix'@'localhost';
mysql> set global log_bin_trust_function_creators = 1;
mysql> quit;


#  zcat /usr/share/doc/zabbix-server-mysql/create.sql.gz |  mysql -uzabbix –p<password> zabbix
```

Install Zabbix 5.0 with MySQL 8.0

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- Edit file /etc/zabbix/zabbix_server.conf

```
# /etc/zabbix/zabbix_server.conf
```

- Set DBPassword=password

- Update to replace POSTGRESQL with MYSQL

```
# vi /etc/zabbix/web/zabbix.conf.php
```

- Restart the services

```
# systemctl restart zabbix-server zabbix-agent httpd php-fpm
```

- Check server logs
- Confirm you can login and see dashboard

http://157.230.25.58/zabbix/zabbix.php?action=dashboard.view

Install Zabbix 5.0 with MySQL

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Default 5.0 installation comes with double precision and no primary key

```
#  mysql -uroot zabbix
mysql> describe history;
```

```
+--------+--------------+-----------+--------+------------+
| Field| Type           |Null |Key    |Default| Extra       |
+--------+--------------+-----------+--------+-----+------+
|itemid| bigint unsigned| NO  |MUL    |NULL    |      |
|clock  | int           | NO  |       | 0      |      |
|value  | double        | NO  |       | 0      |      |
|ns     | int           | NO  |       | 0      |      |
+--------+--------------+----+------+---------+-----------+
```

```
#  systemctl stop zabbix-server zabbix-agent httpd php-fpm
#  mysqldump zabbix > /tmp/zabbix_5.0_back_mysql
```

Upgrade MySQL Zabbix to 6.0

- Follow to upgrade to 6.0

https://www.zabbix.com/download?zabbix=6.0&os_distribution=rocky_linux&os_version=8&components=server_frontend_agent&db=mysql&ws=apache

```
# rpm -Uvh https://repo.zabbix.com/zabbix/6.0/rhel/8/x86_64/zabbix-release-latest-6.0.el8.noarch.rpm

# dnf clean all
# dnf install zabbix-server-mysql zabbix-web-mysql zabbix-apache-conf zabbix-sql-scripts zabbix-selinux-policy zabbix-agent -y

# systemctl restart zabbix-server zabbix-agent httpd php-fpm
```

Upgrade MySQL Zabbix to 6.0

ZABBIX '25 CONFERENCE BENELUX

- Check logs /var/log/zabbix/zabbix_server.log

```
253523:20250206:161907.176 completed 100% of database upgrade
253523:20250206:161907.176 database upgrade fully completed
253523:20250206:161907.183 database could be upgraded to use primary keys in history
tables
```

- Execute

```
# systemctl stop zabbix-server
```

Primary key upgrade for MySQL

ZABBIX '25 CONFERENCE BENELUX

```
#  mysql -uzabbix -puseruser zabbix < /usr/share/zabbix-sql-scripts/mysql/history_pk_prepare.sql

#  mysql -u zabbix -puseruser zabbix
mysql>
        #SET SESSION bulk_insert_buffer_size= 1024 * 1024 * 256;
        SET @@max_execution_time=0;

        INSERT IGNORE INTO history SELECT * FROM history_old;
        INSERT IGNORE INTO history_uint SELECT * FROM history_uint_old;
        INSERT IGNORE INTO history_str SELECT * FROM history_str_old;
        INSERT IGNORE INTO history_log SELECT * FROM history_log_old;
        INSERT IGNORE INTO history_text SELECT * FROM history_text_old;
mysql>
mysql> drop table if exists history_old,history_uint_old,history_str_old,history_log_old,history_text_old;
```

Primary key upgrade for MySQL

```
mysql> describe history;
```

```
+--------+-------------------------+----------+---------+----------+-----------+
| Field  |Type                     | Null     |Key      |Default |Extra|
+--------+-------------------------+----------+---------+----------+-----------+
|itemid  |bigint unsigned | NO      |PRI      |NULL    |           |
|clock   |int             | NO      |PRI      | 0      |           |
|value   |double          | NO      |         | 0      |           |
|ns      |int             | NO      |PRI      | 0      |           |
+--------+-------------------------+----------+---------+----------+-----------+
```

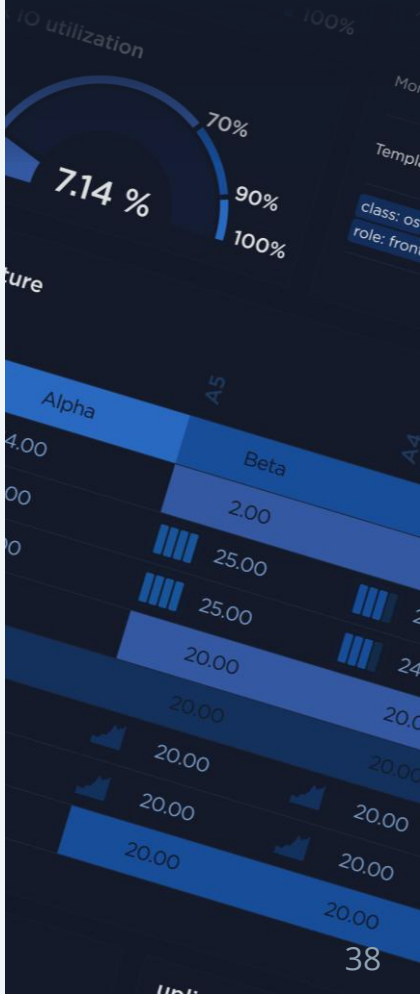
```
mysql> exit

# systemctl start zabbix-server
```

Upgrade audit to primary key

Bonus (if you have free time)

Follow

https://www.zabbix.com/documentation/7.0/en/manual/appendix/install/auditlog_primary_keys



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Thank you

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C Developer

Zabbix