Kim Anthonisen
Team Lead & Senior Consultant

Miracle42
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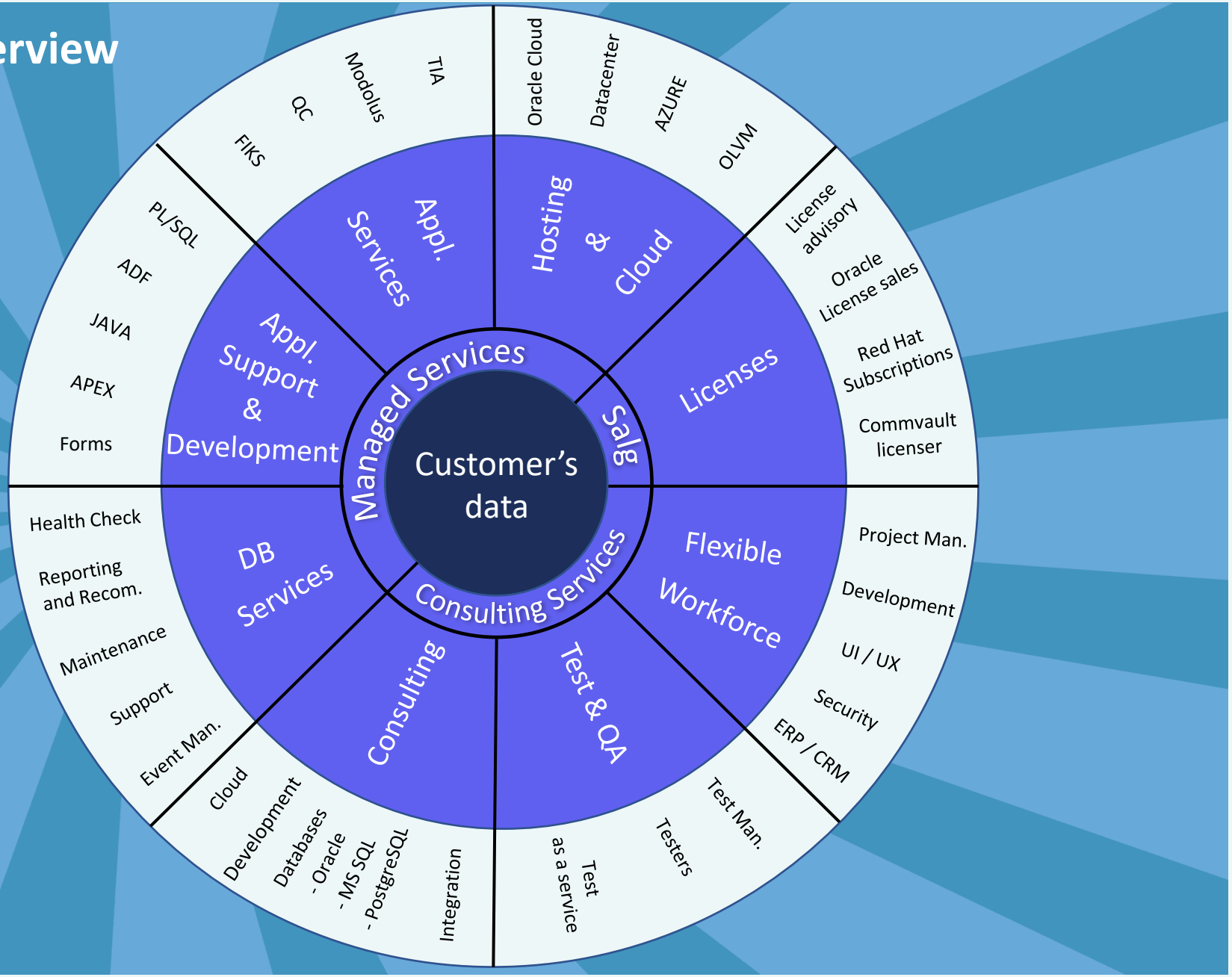
NORDIC Excellence

Powerhouse of databases

Managed Service Center

Service overview

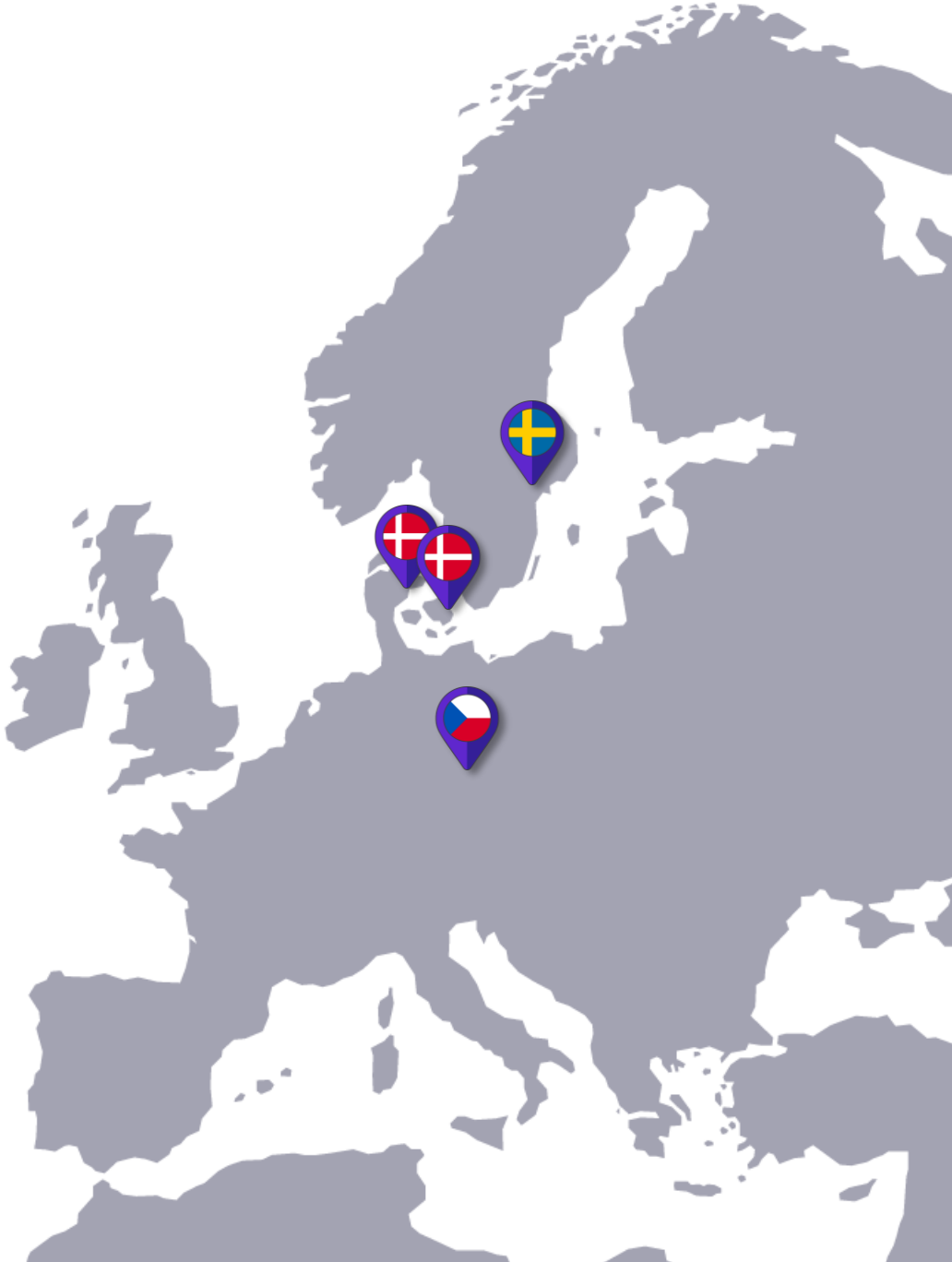


NORDIC Excellence

Powerhouse of databases

Locations

- Ballerup
- Aarhus
- Stockholm
- Prague



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Zabbix migrations: securing minimal downtime

How we secured minimal downtime

when we migrated from one hosting center to another,

and also between database vendors

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Our Zabbix

Monitoring our customers databases, servers and applications

We are the designated Database Administrators (DBA's)

Zabbix is our tool

Internally

- Zabbix as our own internal monitoring tool

Zabbix as a Service (ZaaS ?)

We offer Zabbix to our customers which they use, primarily govermental

Zabbix as a Service

Principles:

We facilitate the Zabbix installation – we administrate users, hostgroups etc, we install and maintain the proxies, but the customers installs the agents, and sets up their own monitoring.

Typically, we help setting up the monitoring together with the customer, and after this, the customer maintains the monitoring them selves, with support from us.

Zabbix Support subscriptions (MSP) are part of this, Miracle42 as 1st level support and Zabbix Support as 2nd level.

Our Zabbix: System information

Number of hosts (enabled/disabled)	869	738 / 131
Number of templates	138	
Number of items (enabled/disabled/not supported)	164173	58383 / 88897 / 16893
Number of triggers (enabled/disabled [problem/ok])	37718	20214 / 17504 [140 / 20074]
Number of users (online)	75	11
Required server performance, new values per second	804.12	
High availability cluster	Enabled	Fail-over delay: 1 minute

Name	Address	Last access	Status
M42-ZBX-ND02	[redacted]:10051	1s	Active
M42-ZBX-ND01	[redacted]:10051	-2s	Standby

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Why did we migrate ?

Scott/Tiger was merged with Miracle42 in 2020.

Two physical data centers.

To simplify the setup and, it was decided to merge the data centers, by moving the contents from the Scott/Tiger servers to the Miracle42 servers, including our Zabbix.

Our Ambition

Our ambition is to offer our customers a state-of-the-art Zabbix with as close to 100 percent uptime as possible.

Downtime ?

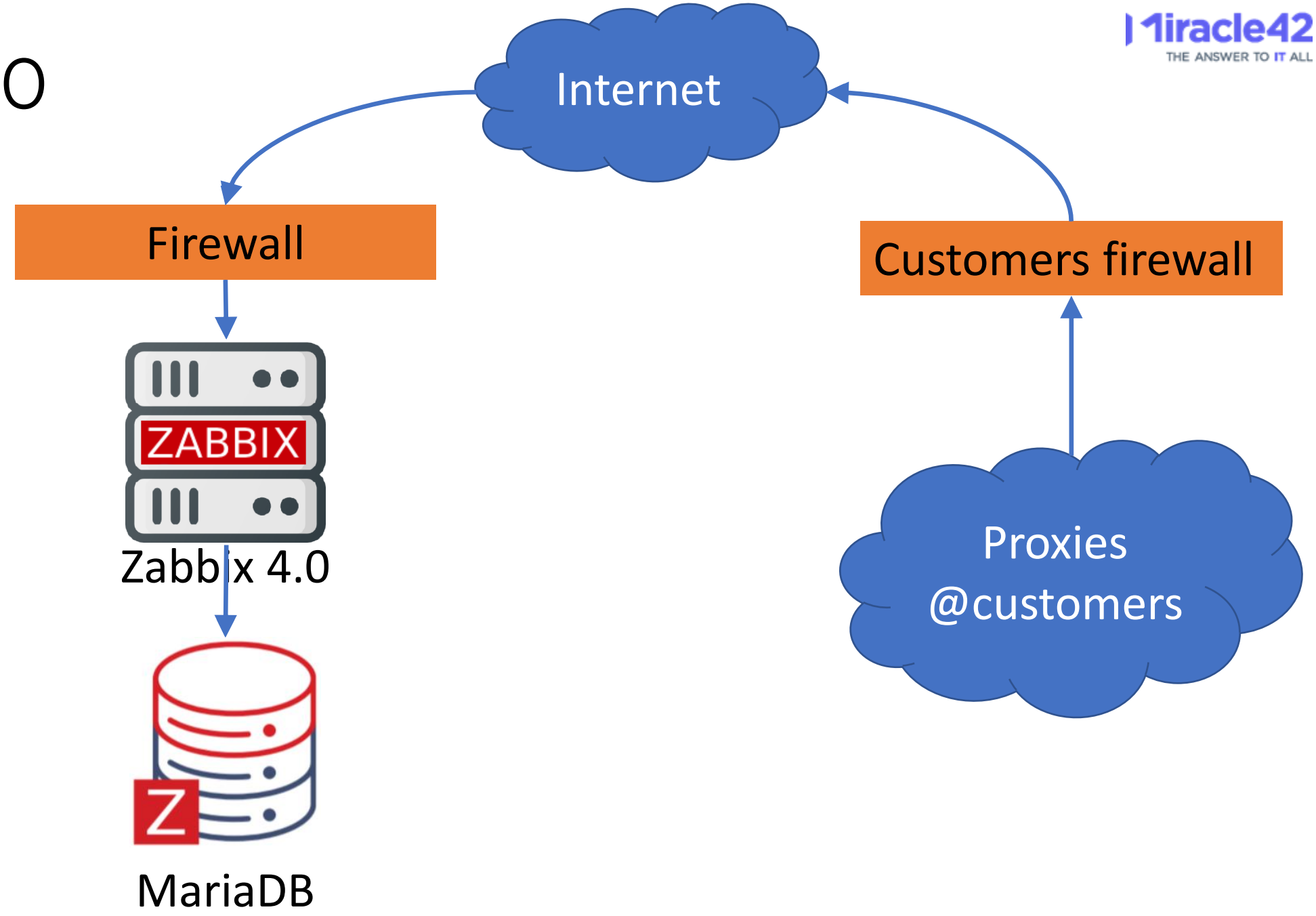
Downtime is difficult for us, as we must agree with many customers about a service window.

Some customers can afford a service window in the daytime when they use the systems, while others prefer downtime in out of office hours.

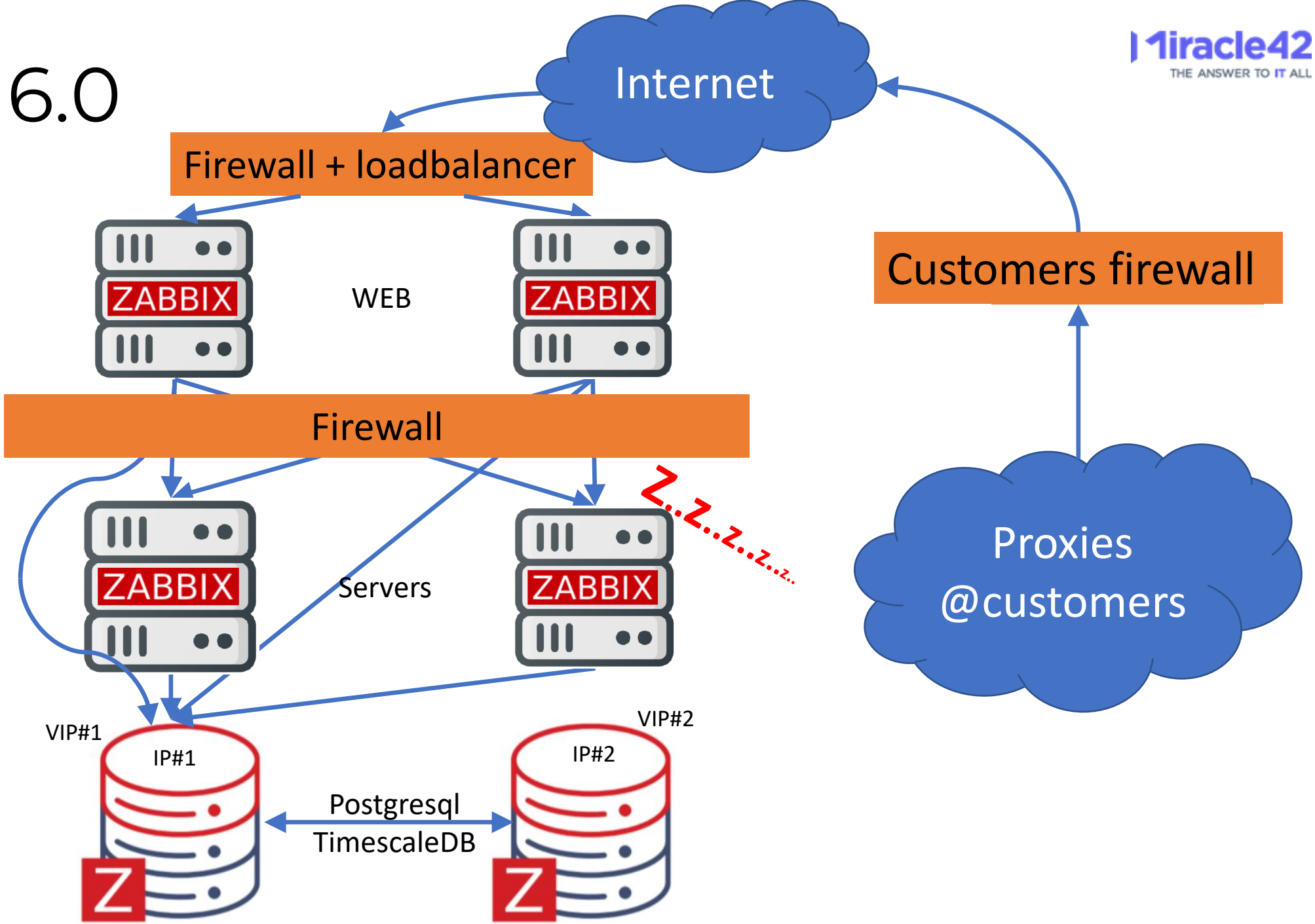
Downtime ?

Conclusion: downtime is not an option!

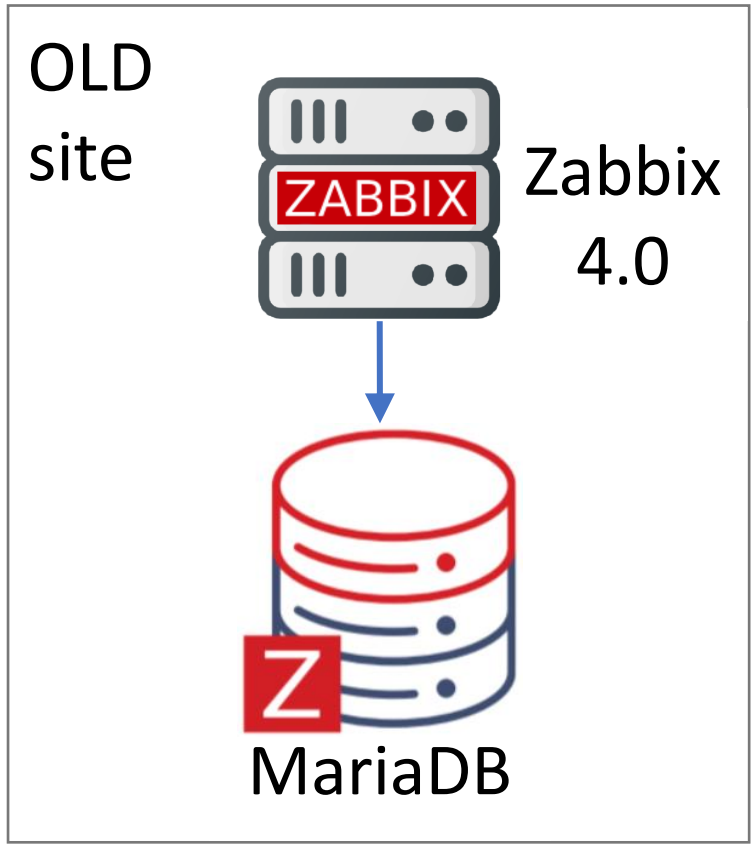
Zabbix 4.0 (was)



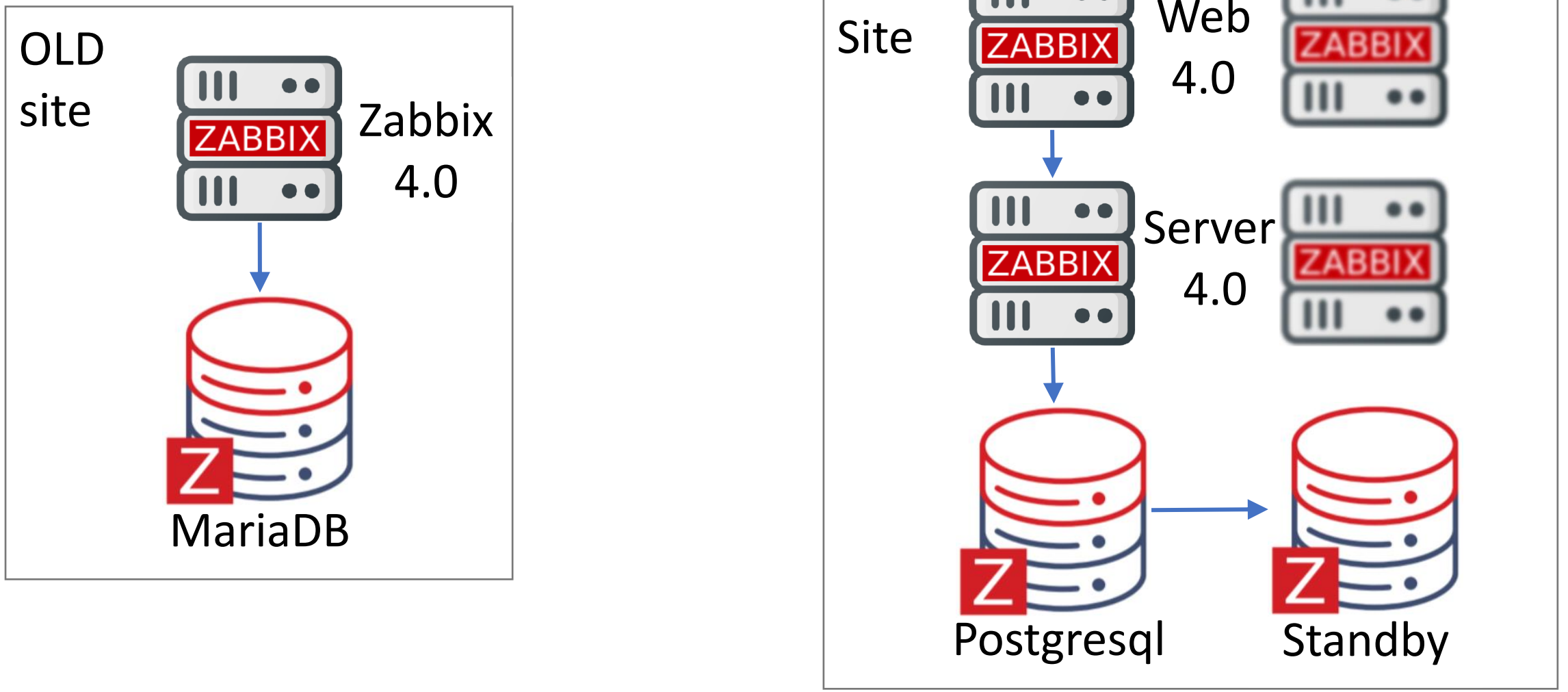
Zabbix 6.0 (goal)



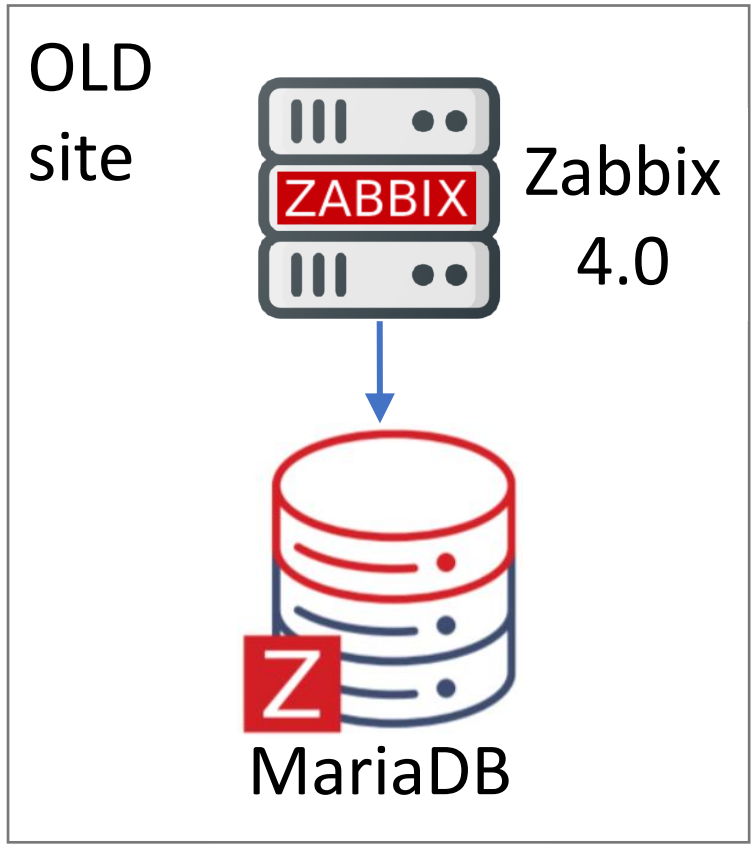
New hosting center

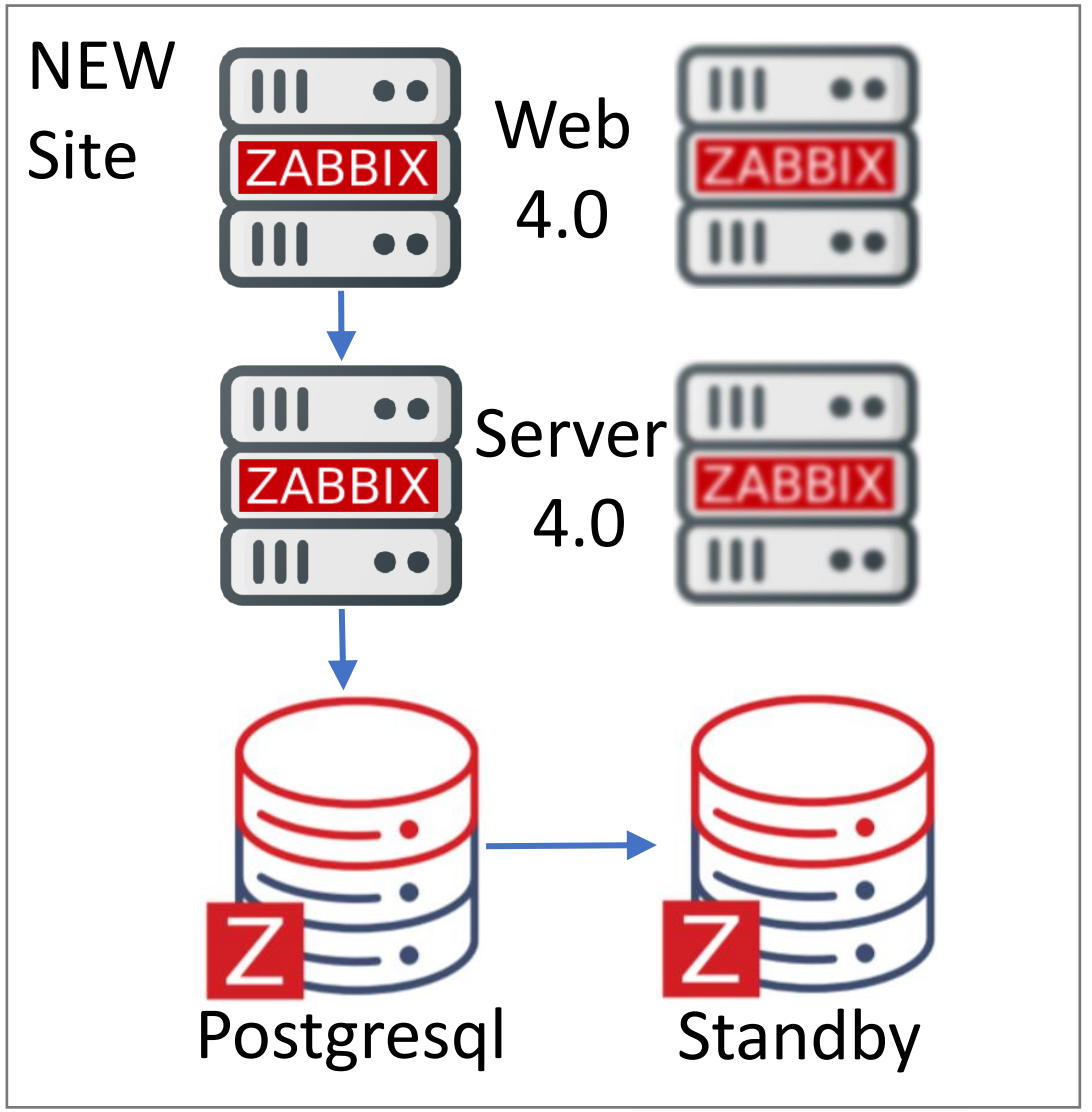


New hosting center



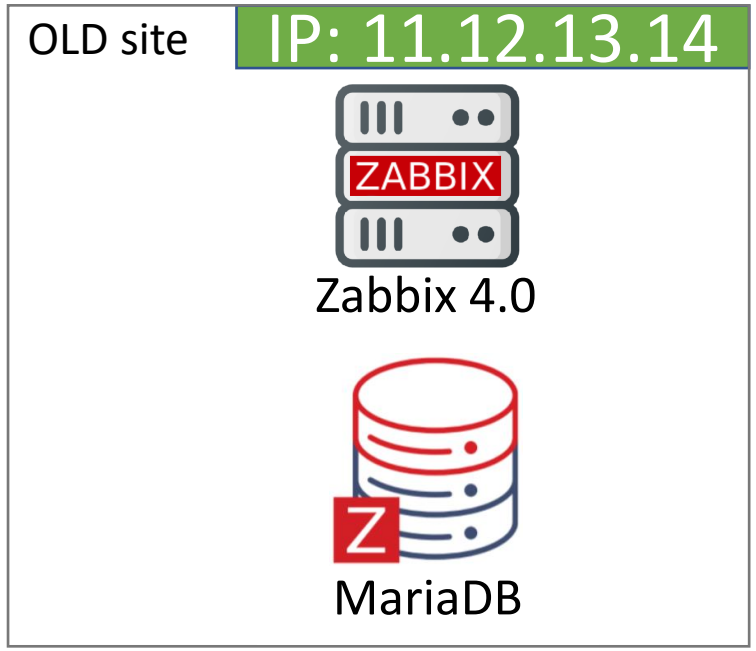
Actual migration

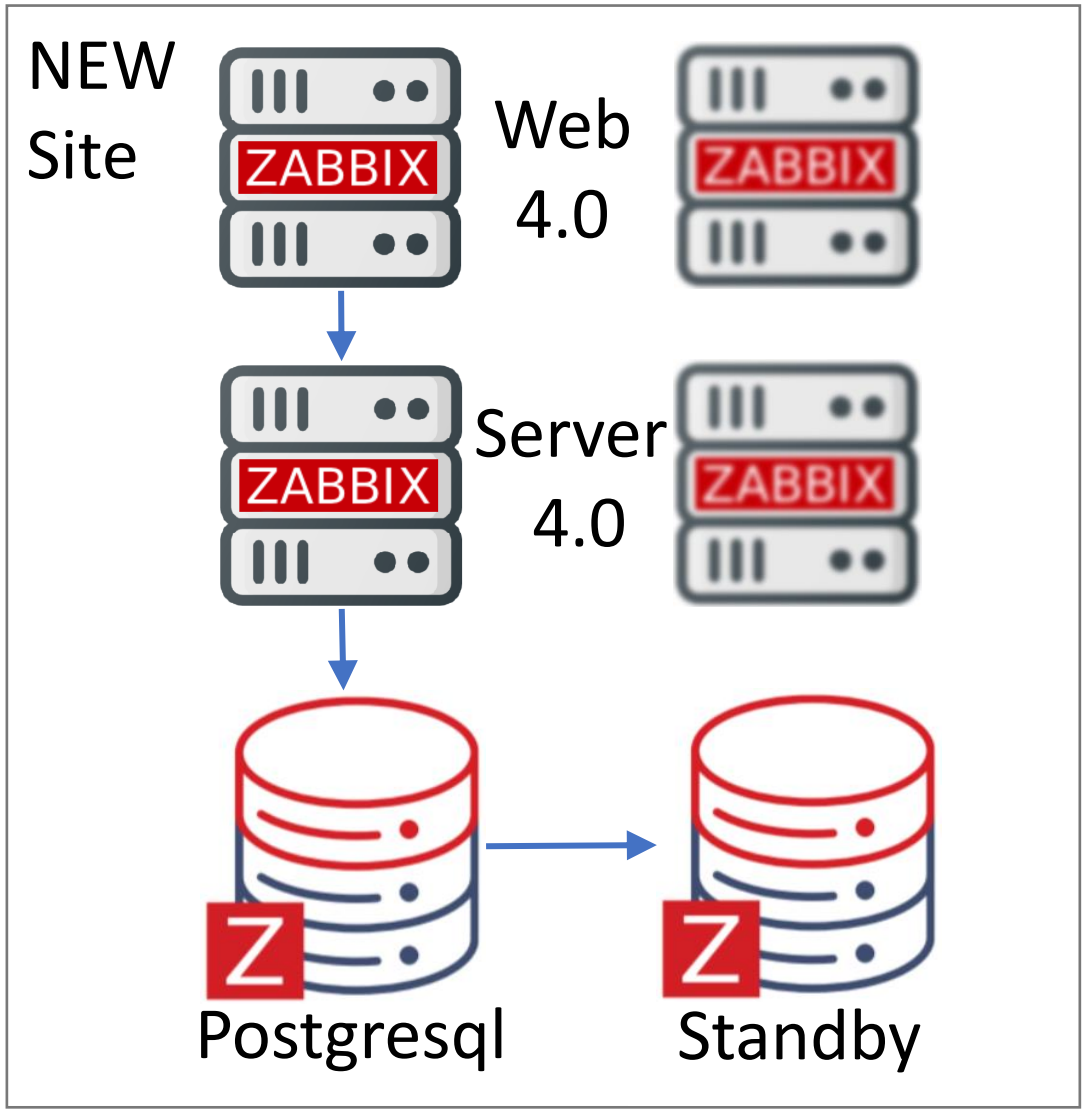




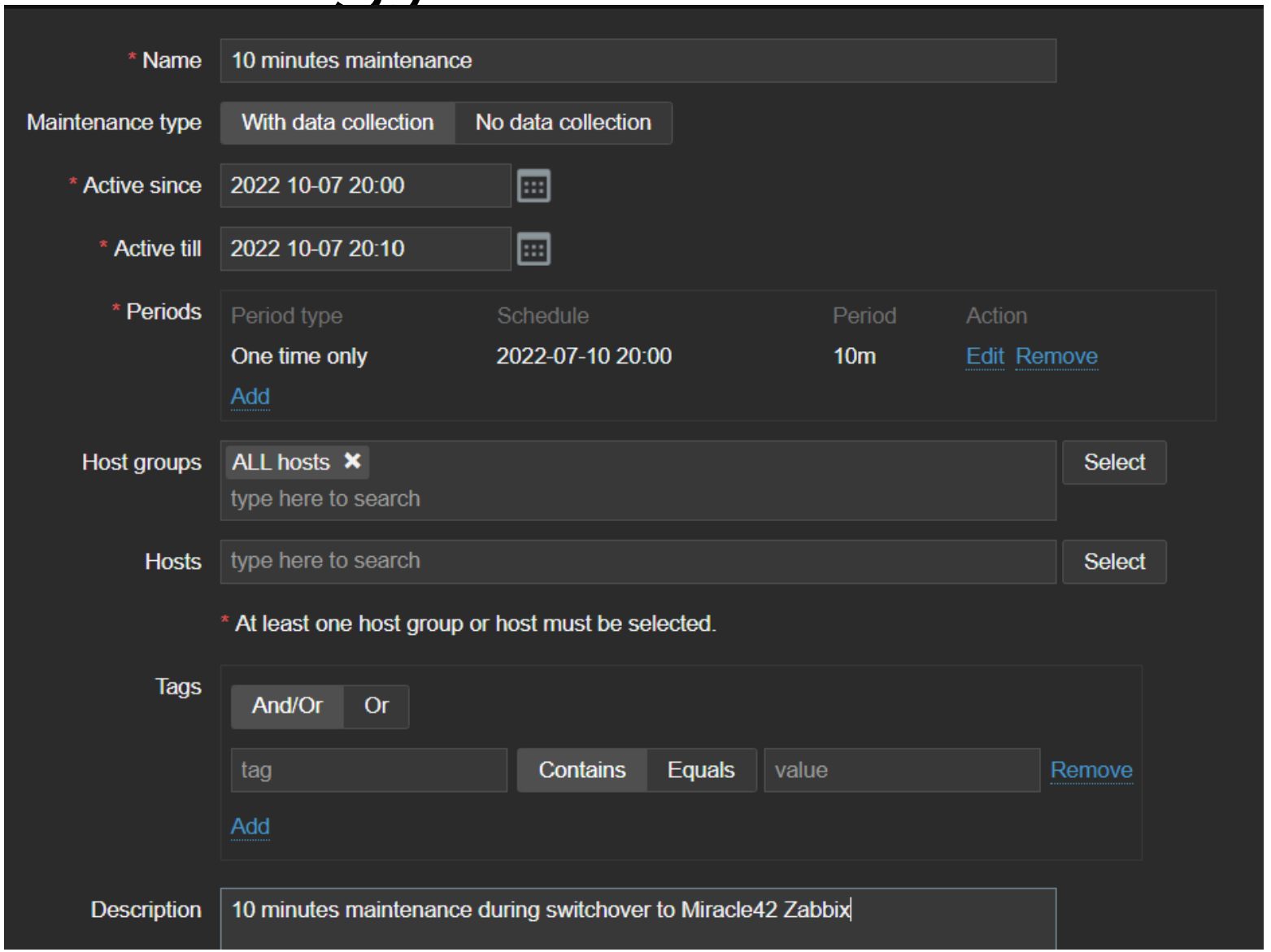
Actual migration

1) Maintenance window on ALL hosts





The final strategy: Maintenance



Actual migration

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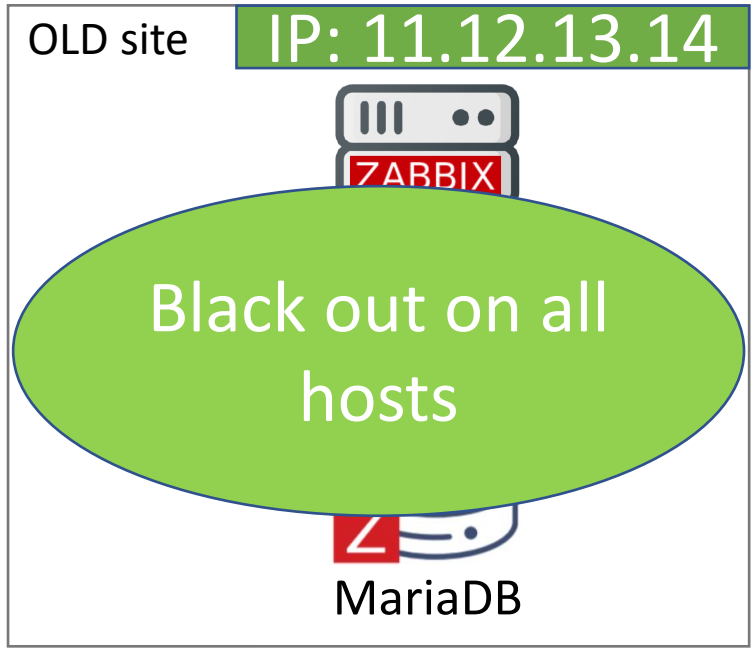
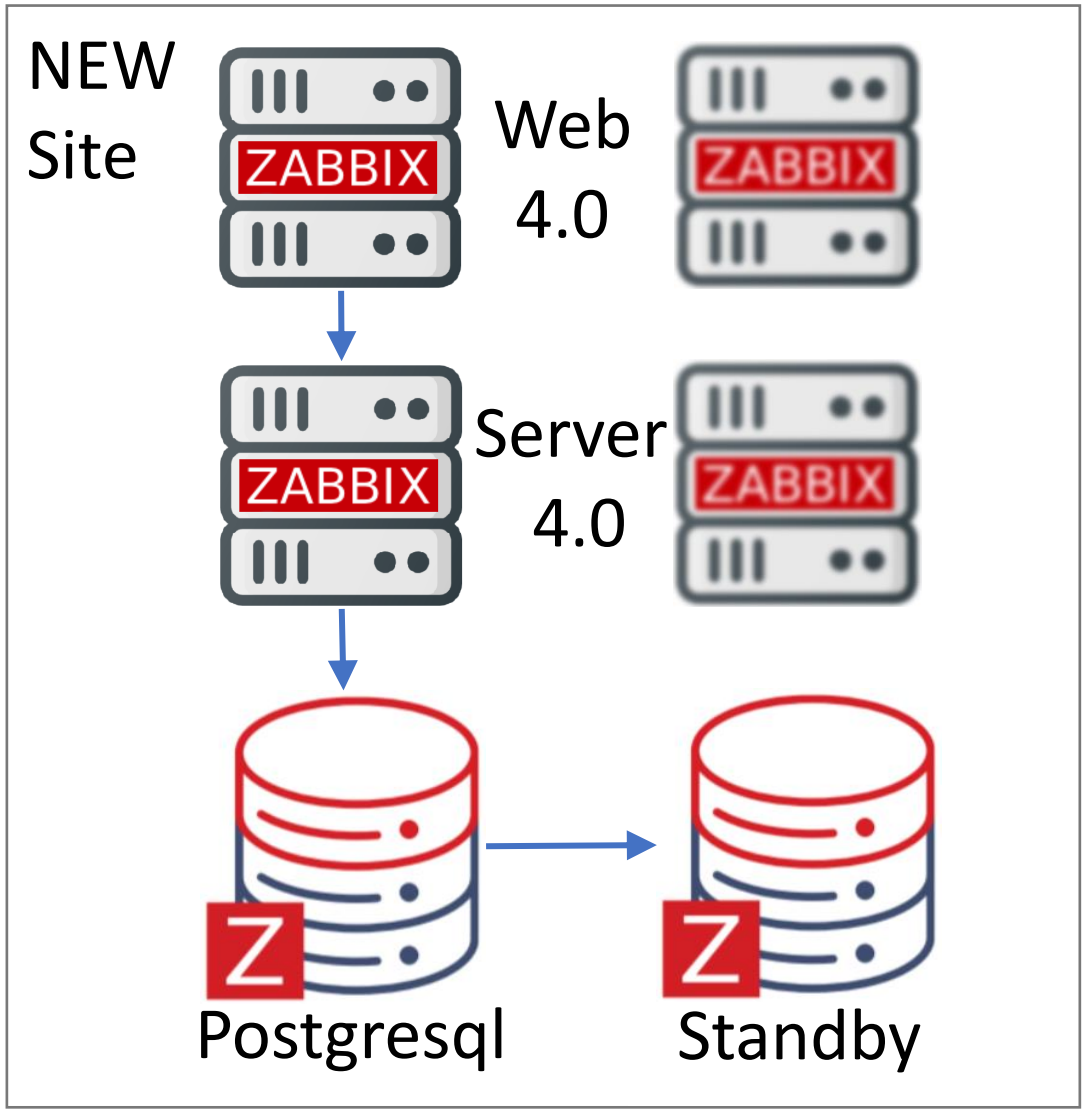
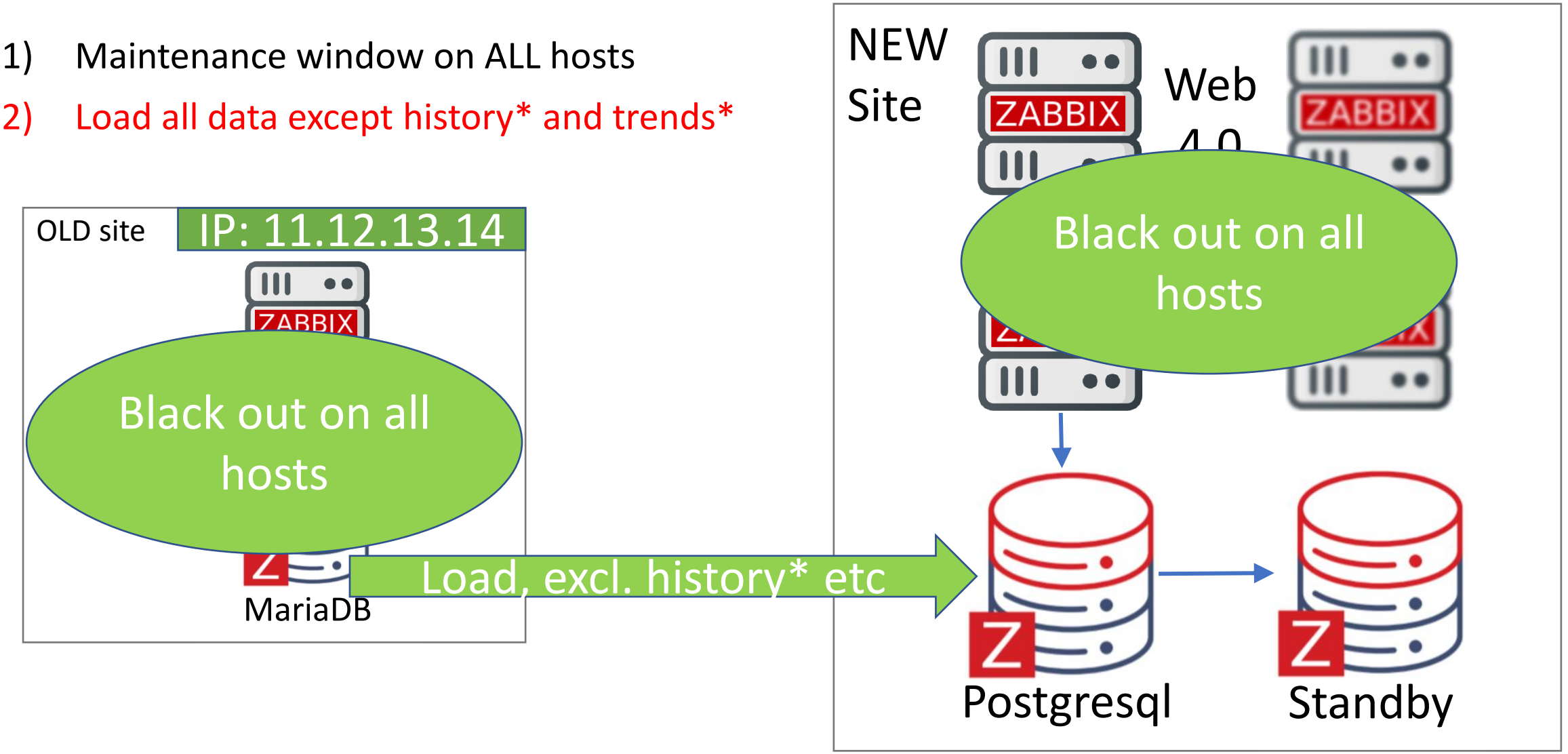




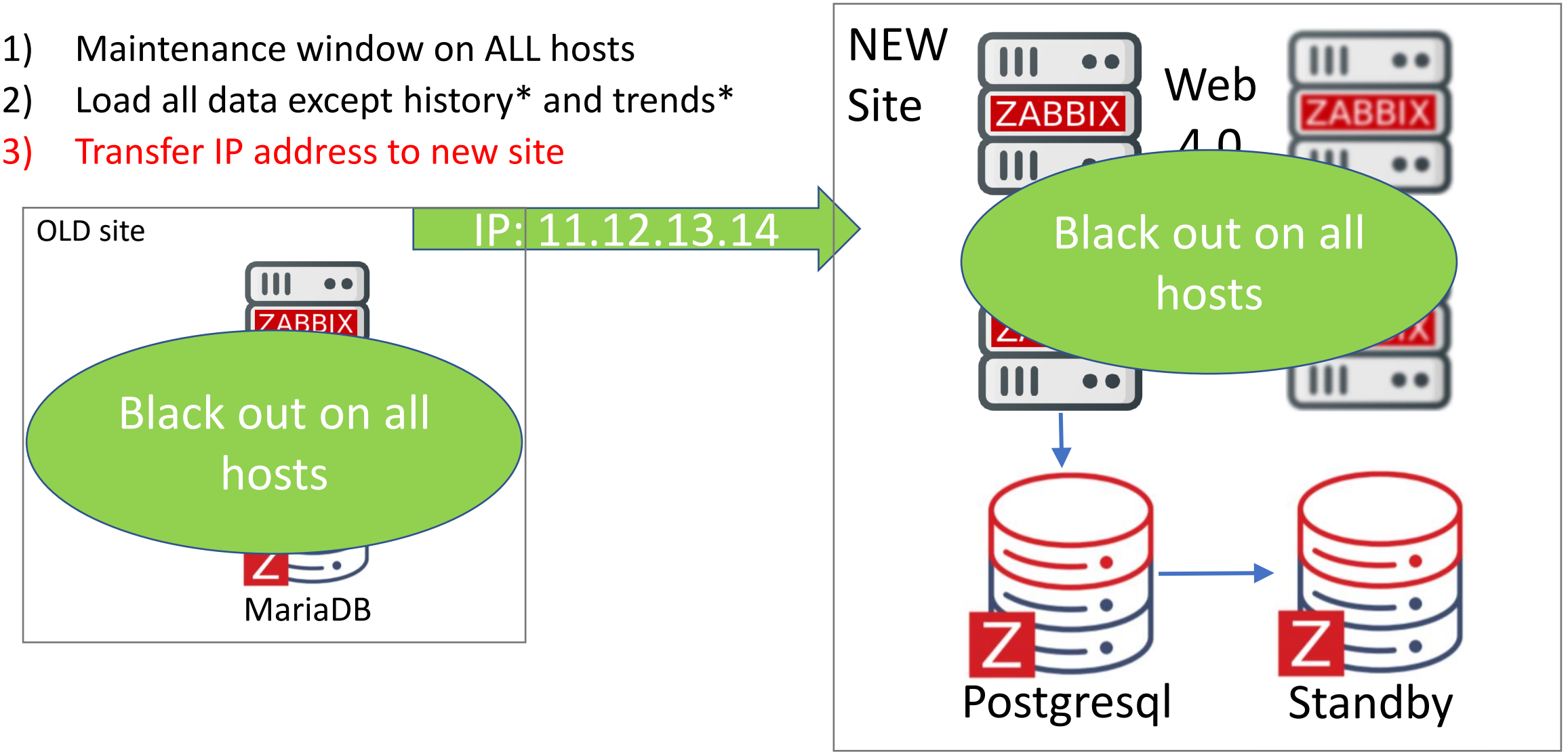
Actual migration

1) Maintenance window on ALL hosts
2) Load all data except history* and trends*



Actual migration

1) Maintenance window on ALL hosts
2) Load all data except history* and trends*
3) Transfer IP address to new site



Actual migration

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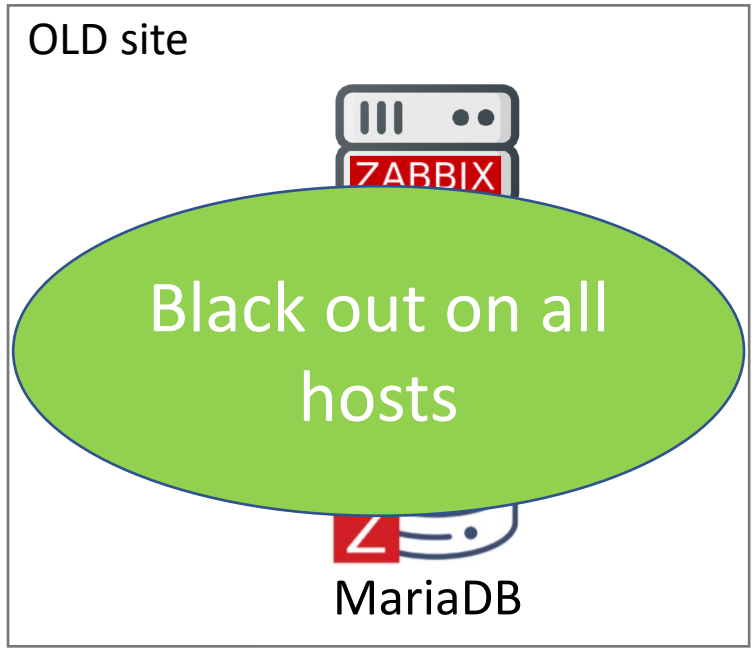
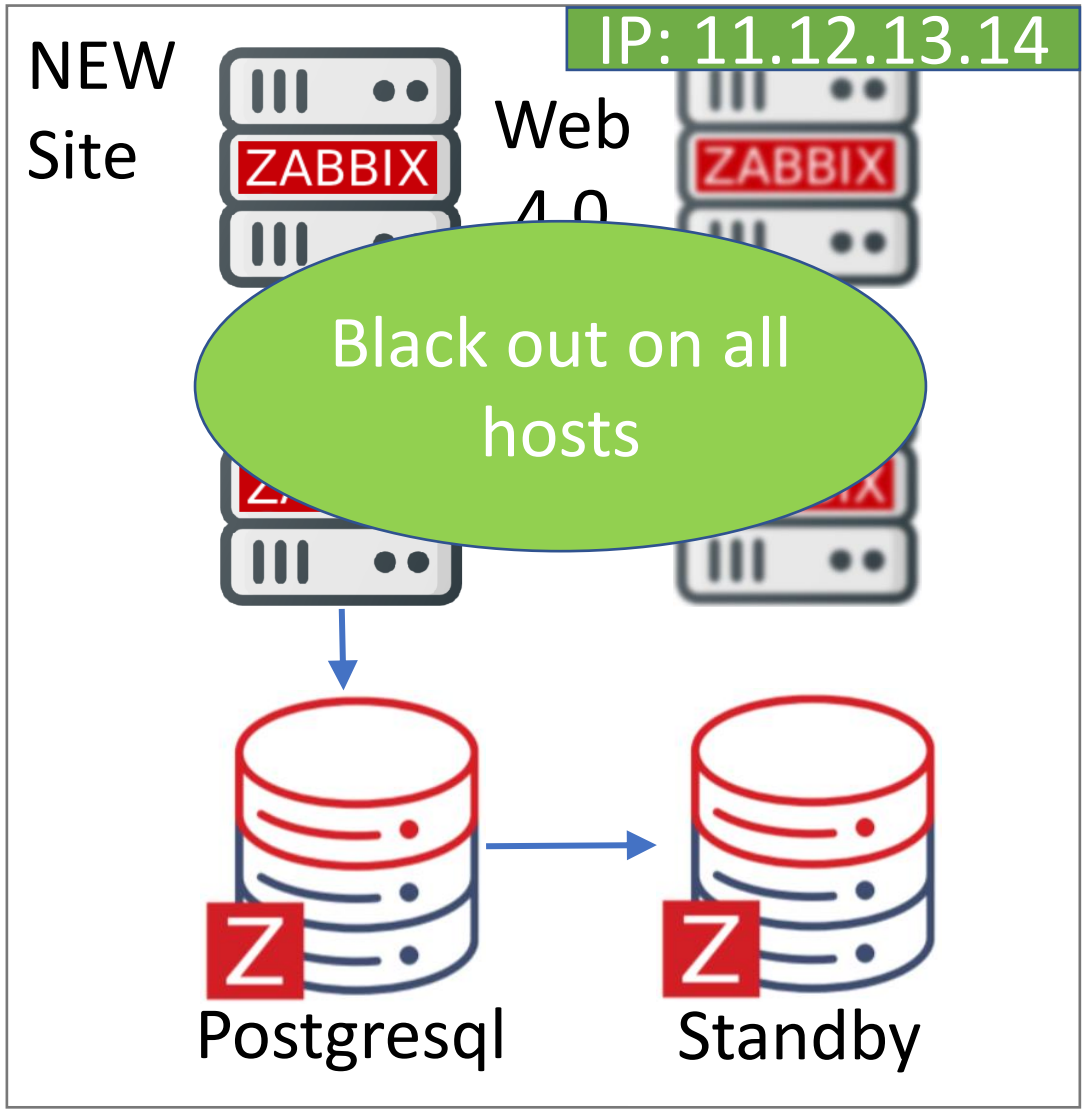
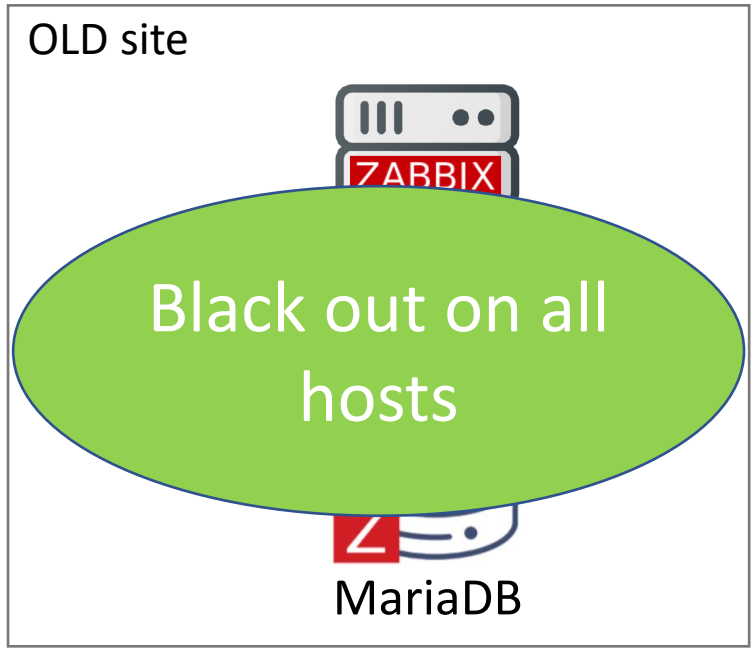
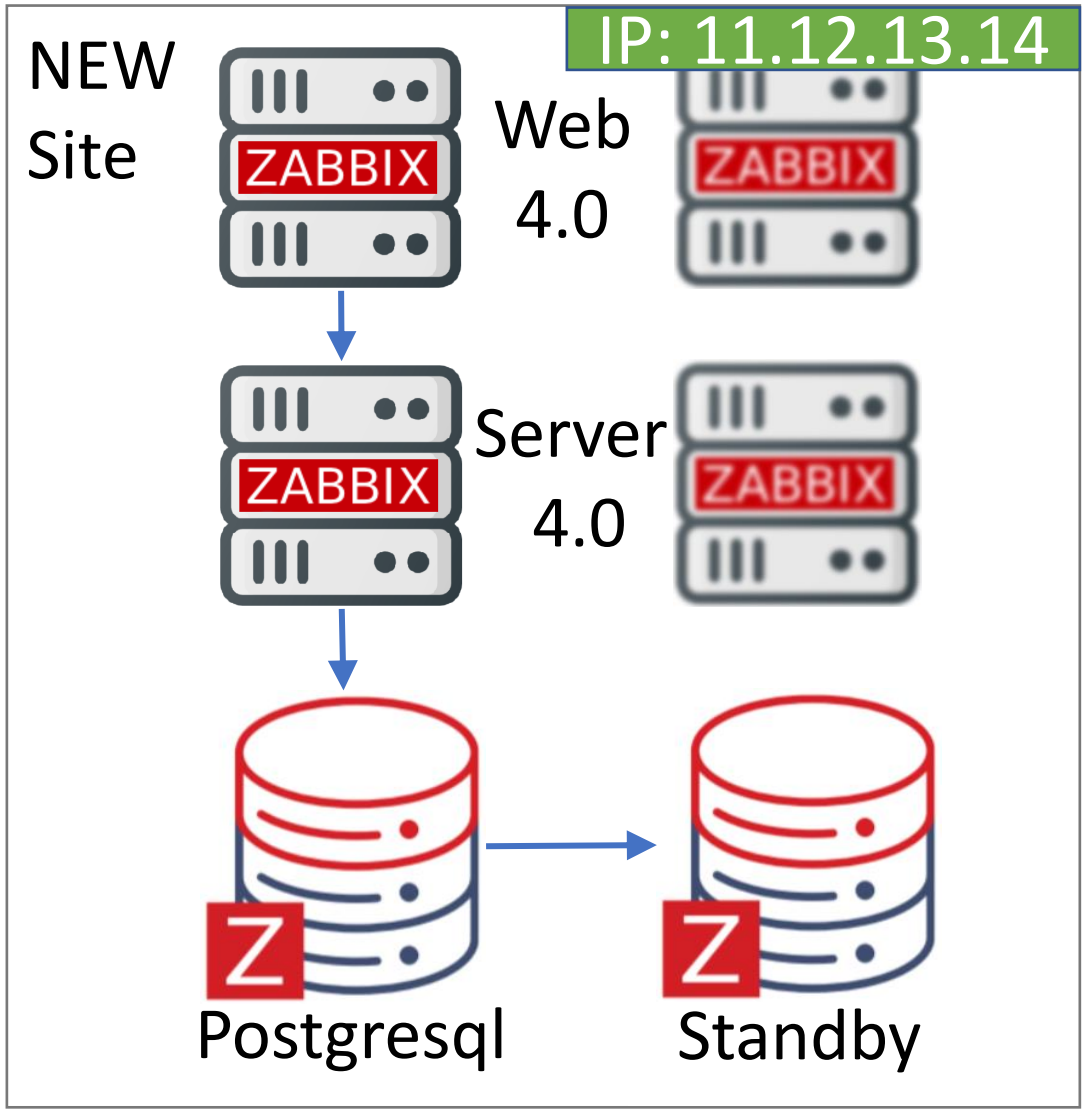




Actual load

4) Delete maintenance window after some minutes on new the Zabbix

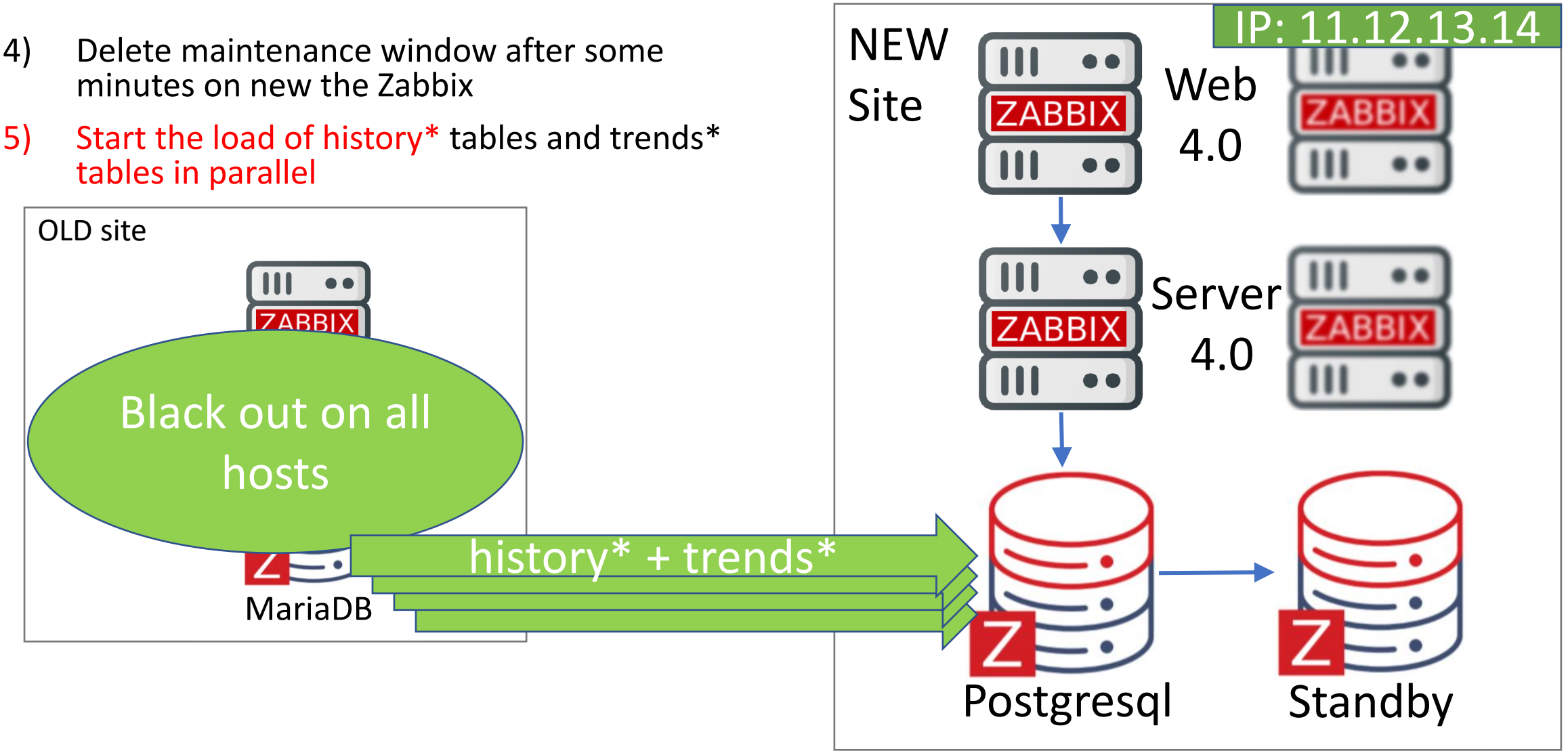




Actual migration

4) Delete maintenance window after some minutes on new the Zabbix

5) Start the load of history* tables and trends* tables in parallel



The tool used: pg_loader

For migrating the data from MariaDB to PostgreSQL, we used the tool pg_loader.

- https://pgloader.io/
- https://github.com/dimitri/pgloader

With pg_loader, it is possible to migrate a table/schema/database to PostgreSQL with a single command-line

pg_loader: minimal parameter file

```
LOAD DATABASE
FROM mysql://user:pwd@host/db
INTO postgresql://user:pwd@host/db

EXCLUDING TABLE NAMES MATCHING
'history*', 'trends*';
```

pg_loader

But (!) check that the schema You are migrating from are equivalent to the schema You are migrating to.

Test….test….test…. DON’T test in production !

pg_loader

If You do not specify CAST parameters, You can expect to see warnings like this:

WARNING Source column… is casted to type "float"

which is not the same as "double precision",

the type of current target database column …

A real world example

```
2022-10-07T05:37:08.076007Z WARNING Source column "public"."history_text"."itemi
d" is casted to type "numeric" which is not the same as "bigint", the type of cu
rrent target database column "public"."history_text"."itemid".
2022-10-07T05:37:08.076007Z WARNING Source column "public"."history_text"."clock
" is casted to type "bigint" which is not the same as "integer", the type of cur
rent target database column "public"."history_text"."clock".
2022-10-07T05:37:08.076007Z WARNING Source column "public"."history_text"."ns" i
s casted to type "bigint" which is not the same as "integer", the type of curren
t target database column "public"."history_text"."ns".
2022-10-07T06:44:38.418767Z LOG report summary reset
             table name     errors       rows      bytes      total time
-----------------------  ---------  ---------  ---------  --------------
        fetch meta data           0          1                     0.724s
-----------------------  ---------  ---------  ---------  --------------
    public.history_text           0  368985184    53.3 GB     1h7m30.191s
-----------------------  ---------  ---------  ---------  --------------
COPY Threads Completion           0          4                1h7m30.191s
        Reset Sequences           0          0                    0.092s
       Install Comments           0          0                    0.000s
-----------------------  ---------  ---------  ---------  --------------
      Total import time           ✓  368985184    53.3 GB     1h7m30.283s
```

The load balancer issue

After the load balancer was configured, we discovered TLS related errors in the Zabbix server log:

failed to accept an incoming connection: from 10.11.12.13: TLS handshake set result code to 1: file ssl/t1_lib.c line 2827: error:14201076:SSL routines:tls_choose_sigalg:no suitable signature algorithm: TLS write fatal alert "handshake failure"

The load balancer issue

These errors is caused by the load balancer checking if the Zabbix server is responding on port 10051.

We have not found a fix to remove these errors from the Zabbix log, but the HA setup works.

Other details

There was also extensions and scripts etc. which was transferred to the new Zabbix servers

- SSL certificate checks

- Several custom monitoring scripts

- Separate server introduced - used for various scripts monitoring different customers web applications

Conclusion

Zabbix approved our migration plan.

Preparation and test was a key element.

Our Zabbix migration from one hosting centre to another and from MariaDB to Postgresql was a success with downtime measured in minutes.

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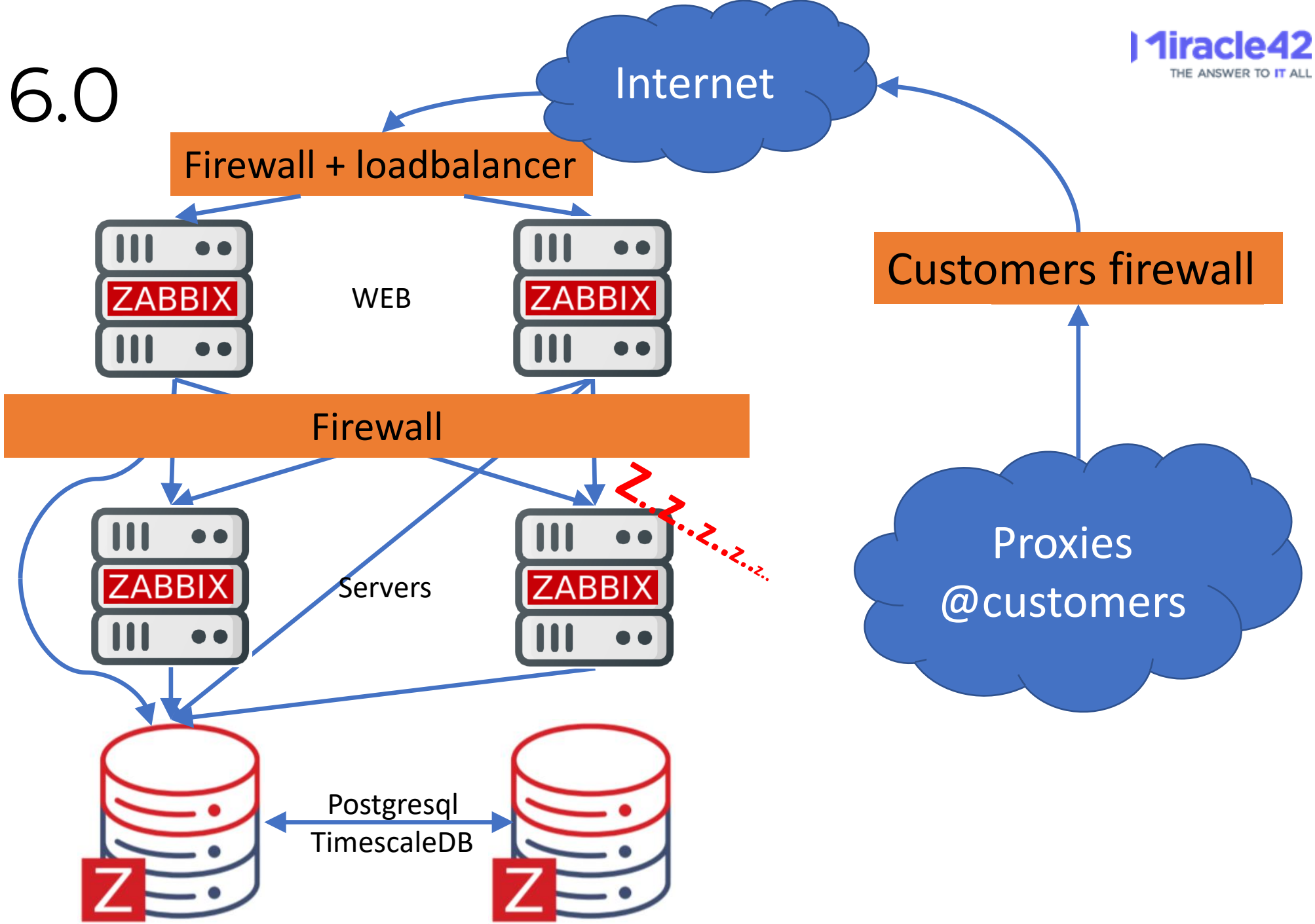
M42 Zabbix – next steps

The next step was to upgrade Zabbix to 6.0, which proved to be a straightforward and painless operation.

We prefer LTS versions to ensure a stabile installation to our customers, so they can sleep with confidence that no news is good news.

Zabbix 6.0 (today)



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M42 Zabbix – next steps

Now we have switched from Mysql to Postgresql, and upgraded to Zabbix 6.0, the next step is to implement TimescaleDB.

Partitioning will remove the housekeepers work of deleting data, as old partitions can be dropped instead.

Compression will reduce storage demand from around 5 Tb to a few hundred Gb.

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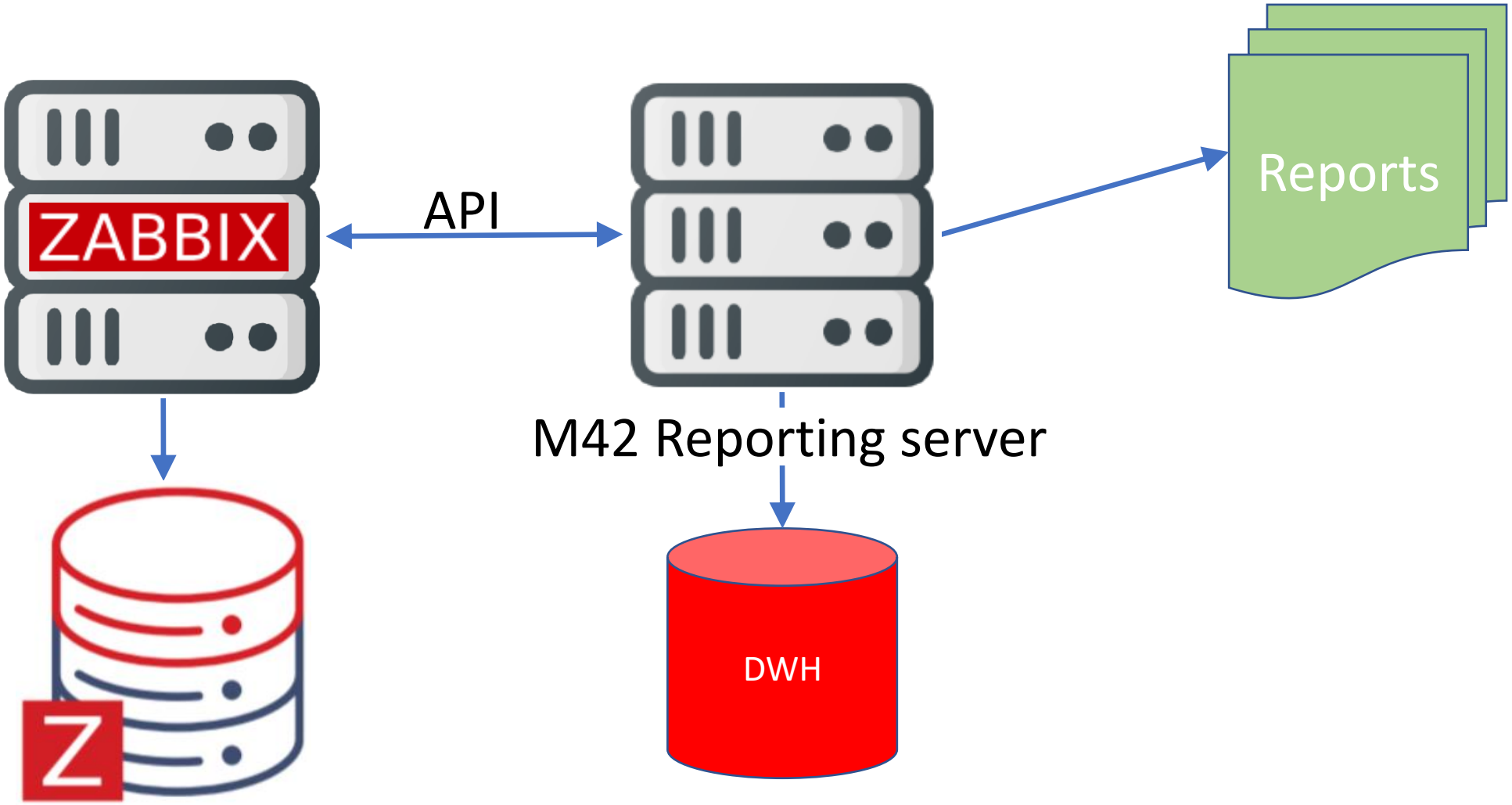
M42 Zabbix – next steps

We found, that with TimescaleDB is implemented, and data is compressed, adding the primary key can be difficult, if there are duplicates in Your data etc.

For this reason, we wanted to add the primary keys to the history and trends tables before implementing TimescaleDB.

(Having primary keys on history and trends is not required, but has potential and hard to introduce once TimescaleDB has been implemented)

M42 Zabbix: Reporting project



M42 Zabbix: Potential project