
I MIGRATED OUR NORTHERN DATA CENTER TO THE CLOUD.
Dilbert.com DilbertCartoonist@gmail.com
BUT THE CLOUD STOPPED WORKING AND I CAN'T FIND THE PHONE NUMBER FOR OUR CLOUD GUY.
SO . . . WHATEVER.
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YOU LOST OUR DATA CENTER?
THAT'S ONE WAY TO LOOK AT IT.

The problem

- Last night report took 30 minutes instead of 1!
- Developer: I believe i can make this part of the job run many times faster - when can i test it?

Boris Oblak
Abakus plus d.o.o.

ORACLE CERTIFIED PROFESSIONAL

Déjà Vu virtual databases

Data at your service.

dejavu

HrOUG 2016
18.-22. LISTOPADA 2016.

Abakus plus d.o.o.

ORACLE Gold Partner
Specialized
Oracle Database 11*g*

History
from 1992, ~20 employees

Applications:
special (DMS – Document Management System, DB – Newspaper Distribution, FIS – Flight Information System)
ARBITER – the ultimate tool in audit trailing
APPM – Abakus Plus Performance and Monitoring Tool

Services:
DBA, OS administration, programming (MediaWiki, Oracle)
networks (services, VPN, QoS, security)
open source, monitoring (Nagios, OCS, Wiki)

Hardware:
servers, Backup server, **SAN storage**, firewalls

Infrastructure:
from 1995 GNU/Linux *(>20 years of experience!)*
>20 years of experience with High-Availability!

Sava
Gorenjska Banka
Banka s poslubom
Aerodrom Ljubljana
Mercator
GOODYEAR
BANKA SLOVENIJE
EVROSISTEM
Mestna občina Ljubljana
MESTNA OBČINA KOPER
COMUNE CITTA DI CAPODISTRIA
futuraplus
Iskra
Iskra MIS
DELO PRODAJA
KONTROLA ZRAČNEGA PROMETA SLOVENIJE

GENERALI Zavarovalnica

Aerodrom Ljubljana

BANKA SLOVENIJE
BANK OF SLOVENIA
EUROSYSTEM

DELO PRODAJA

KONTROLA ZRAČNEGA PROMETA SLOVENIJE

Gorenjska Banka
Vse, kar šteje.

GOODYEAR

HRANILNICA LON
Bančništvo na Ljubezniv Oseben Način

Mestna občina Ljubljana

Mercator

NLB Vita
Življenjska zavarovalnica

MESTNA OBČINA KOPER
COMUNE CITTÀ DI CAPODISTRIA

Sava

The problem

The problem

- Beyond every prod ...
  - There is TEST, DEV ...

The problem

- Beyond every prod ...
  - There is TEST, DEV ...
  - ... and other project-specific environment.

The problem

- PROD grows

The problem

- Trying to migrate the problem by copying subsets of PROD …

The problem

- Trying to migrate the problem by copying subsets of PROD …

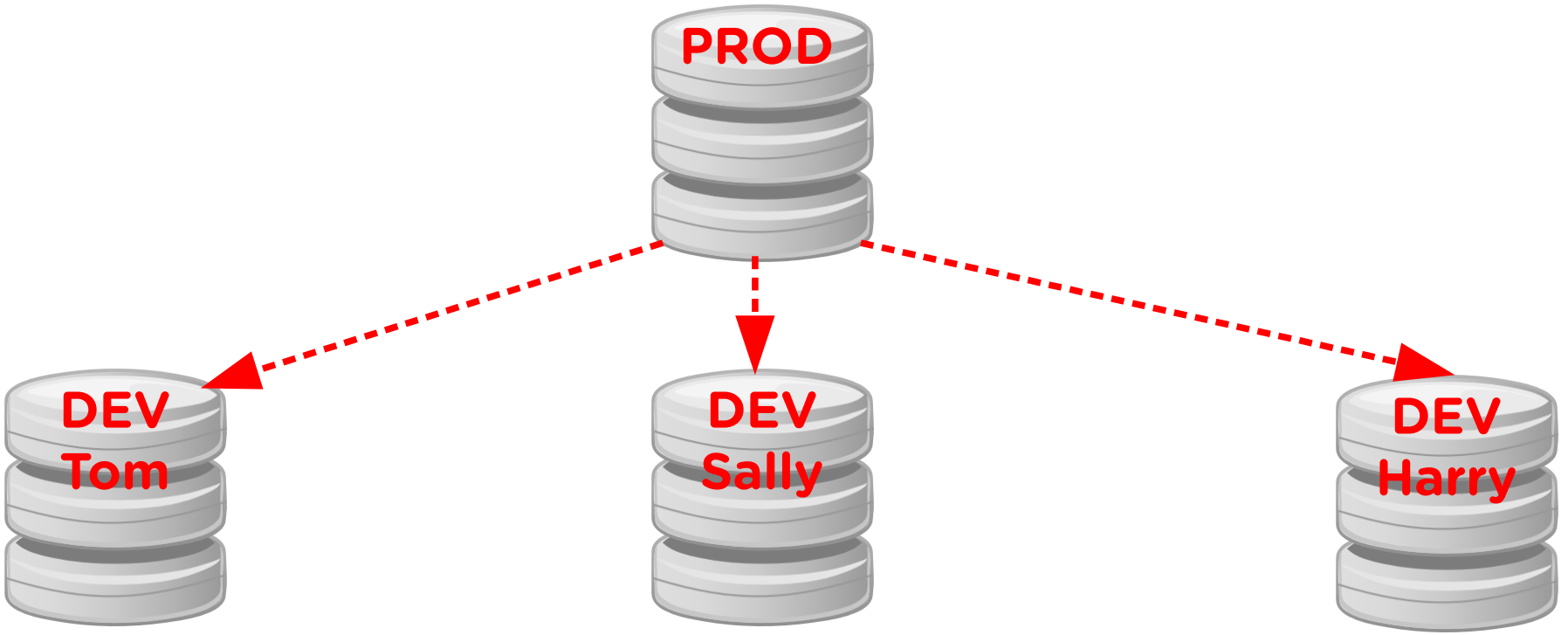
- … but it is difficult and time-consuming.
  Most give up …

The problem

- The environment become stale …

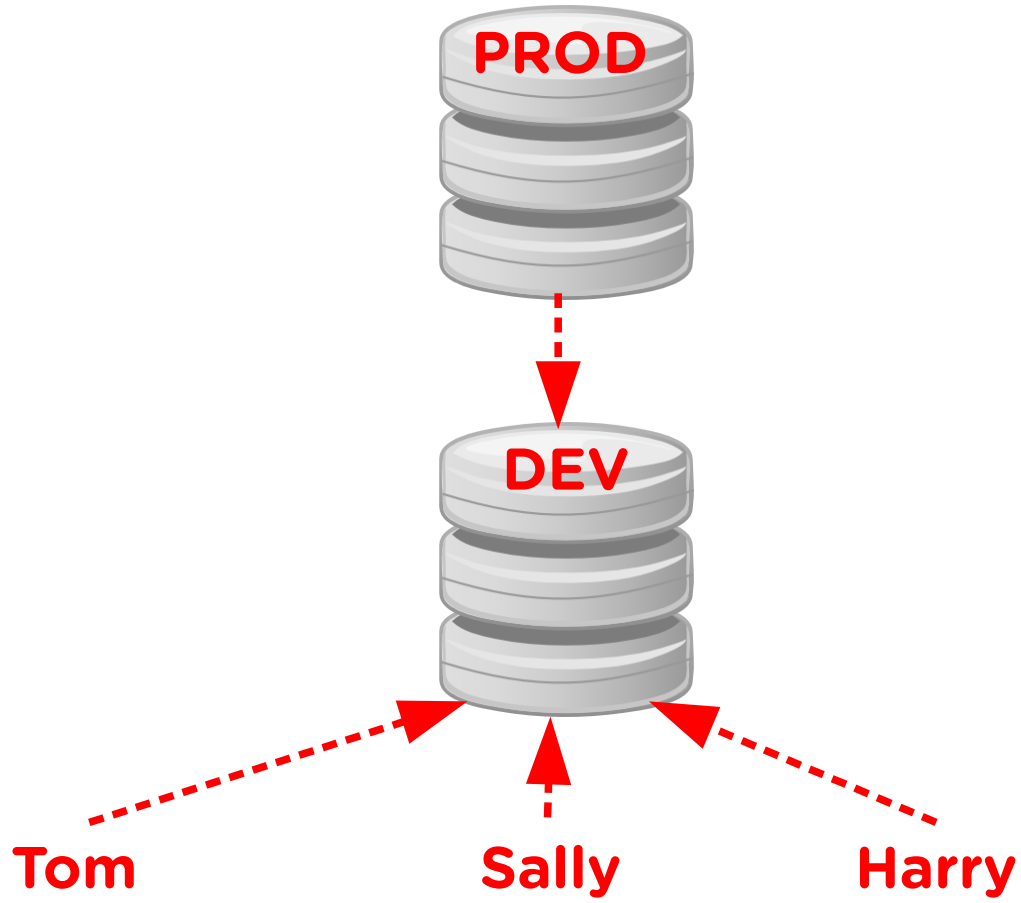
Attempting to solve problem

Attempting to solve problem



In a perfect world ...

Attempting to solve problem



In a real world ...

Attempting to solve problem

- It is not easy for developers or testers to share environments simultaneously.
  - Changes made by each user conflict with one another.
- Serialize access to the limited number of environments.
  - Each user queues at the resource – their project takes more time.
  - Each user destructively changes the resource.
- We need a way and time to reset or cleanup environment between each use.
  - Reset or clean up takes time and resources.

Test

- The best place to test is on production.
  - Right data, right stats, right hardware.
  - End-users may disagree.
  - At least competition for resources is a threat.
  - Cannot test code on »history« data.
- Next best is a »good« copy of production.
  - How good, how often, how quickly?
  - How do you supply a terrabyte sized database to five different developer teams without 5TB of disk space?
  - How do you supply one week old database?

The problem

> ----- Original Message -----
> From: xxxxxxxxxxxxxxxxxxxx
> To: "Boris Oblak" <boris.oblak@abakus.si>
> Sent: Tuesday, 8. March 2014 11:43:55
> Subjects: The database from Friday
>
> Boris,
a procedure that ran over the weekend went wrong. Can you restore the friday's database somewhere where we could repeat the procedure and debug it?
>

The problem

> ----- Original Message -----
> From: xxxxxxxxxxxxxxxxxxxx
> To: "Boris Oblak" <boris.oblak@abakus.si>
> Sent: Tuesday, 8. March
> Subjects: The database from Friday
>
> Boris,
a procedure that ran over the weekend went wrong. Can you restore the friday's database at 20pm somewhere where we could repeat the procedure and debug it?
>

- Last night report took 30 minutes instead of 1!
- Developer: I believe i can make this part of the job run many times faster - when can i test it?
- Different versions in PROD and DEV or TEST databases!

The problem: debuging

- Test on actual data.

PROD
today

The problem: debuging

- Test on actual data.

PROD
today

TEST
Friday, march 4th, 20pm

The problem: debuging

- Test on actual data.

PROD
today

TEST
Friday, march 4th, 20pm

The problem: debuging

- Test on actual data.

PROD
today

TEST
Friday, march 4th, 20pm

The problem: debuging

- Test on actual data.

PROD
today

TEST
Friday, march 4th, 20pm

TEST
Friday, february 26th, 20pm

The problem

- Different versions on PROD, TEST and DEV

PROD V1.0

TEST V1.1

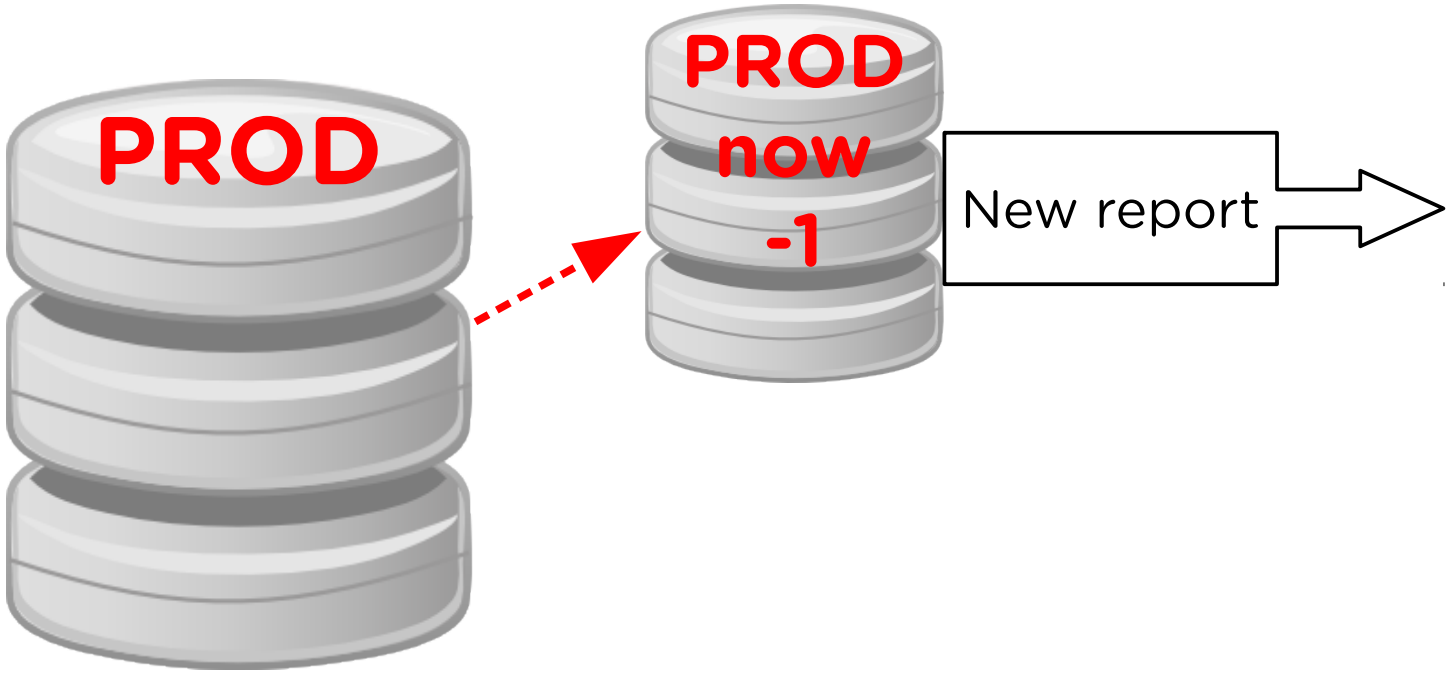
DEV V1.1

The problem: reporting

- Last night report took 30 minutes instead of 2. Why? Make sure it doesn't do it again tonight.
  - data change,
  - statictics might change,
  - is execution plan same as yesterday?

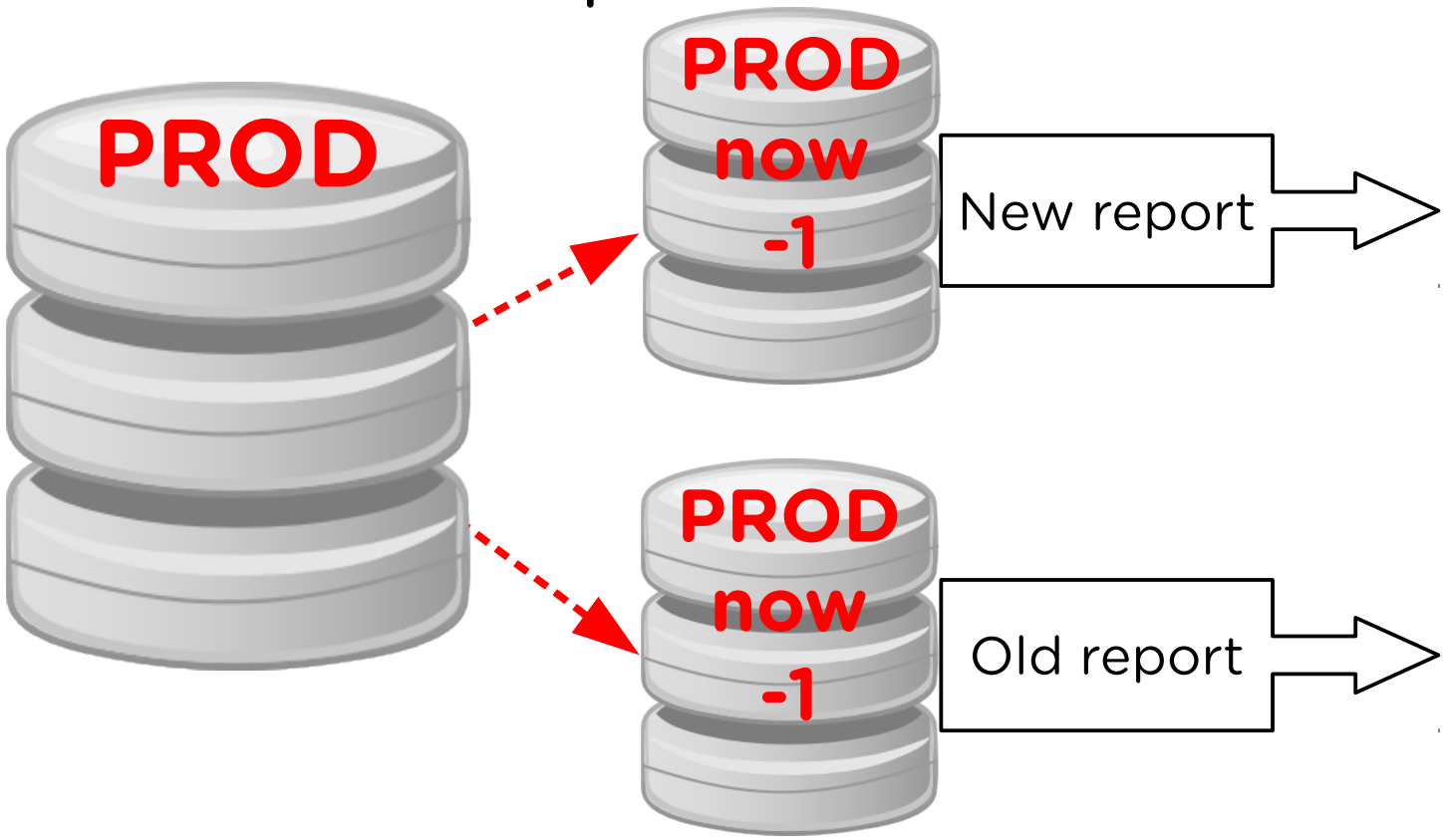
A solution

- Virtual database of PROD from yesterday.
- Run new report.



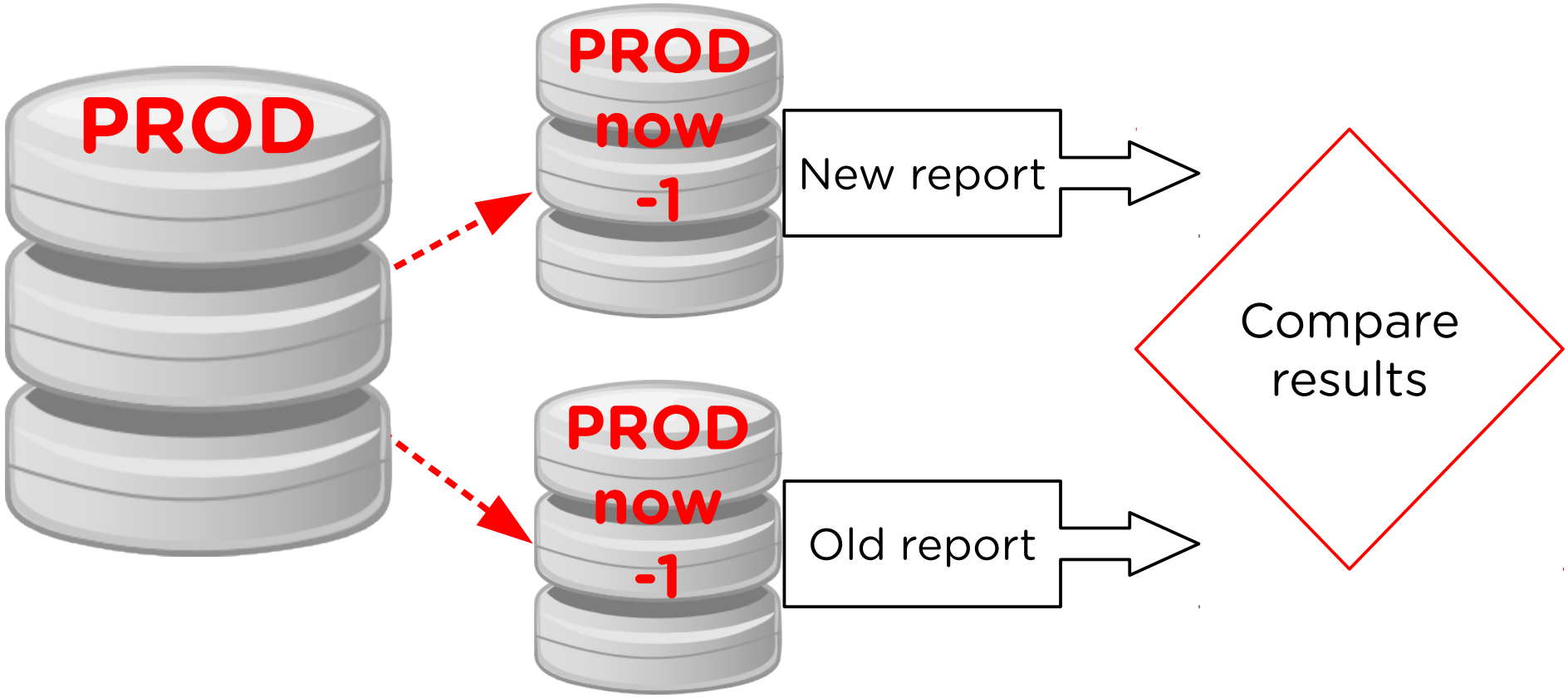
A solution

- Another virtual database of PROD from yesterday.
- Run old report.



A solution

- Virtual database from PROD.
- Run new and old report and compare results.



A solution

- Virtual database of PROD from history.
- Run new and old report and compare results.

The problem: reporting

- Last night report took 30 minutes instead of 2. Why? Make sure it doesn't do it again tonight.
  - data change,
  - statictics might change,
  - is execution plan same as yesterday?
- Open database from yesterday.
  - check/debug report, check workload, compare results.
- Open database from any day in last week/month.
  - check updated report on all virtual databases.

The problem: optimizing

- Developer: I believe i can make this part of the job run many times faster - when can i test it?
- Open database from yesterday.
  - check/debug job, check workload, check results.
- Open database from any day in last week/month.
  - check updated job on all virtual databases, compare results between »old« and »new« job.

The problem: different versions

- Different versions on PROD, TEST and DEV

PROD V1.0

TEST V1.1

DEV V1.1

The problem

- Debug on PROD!? Or ...

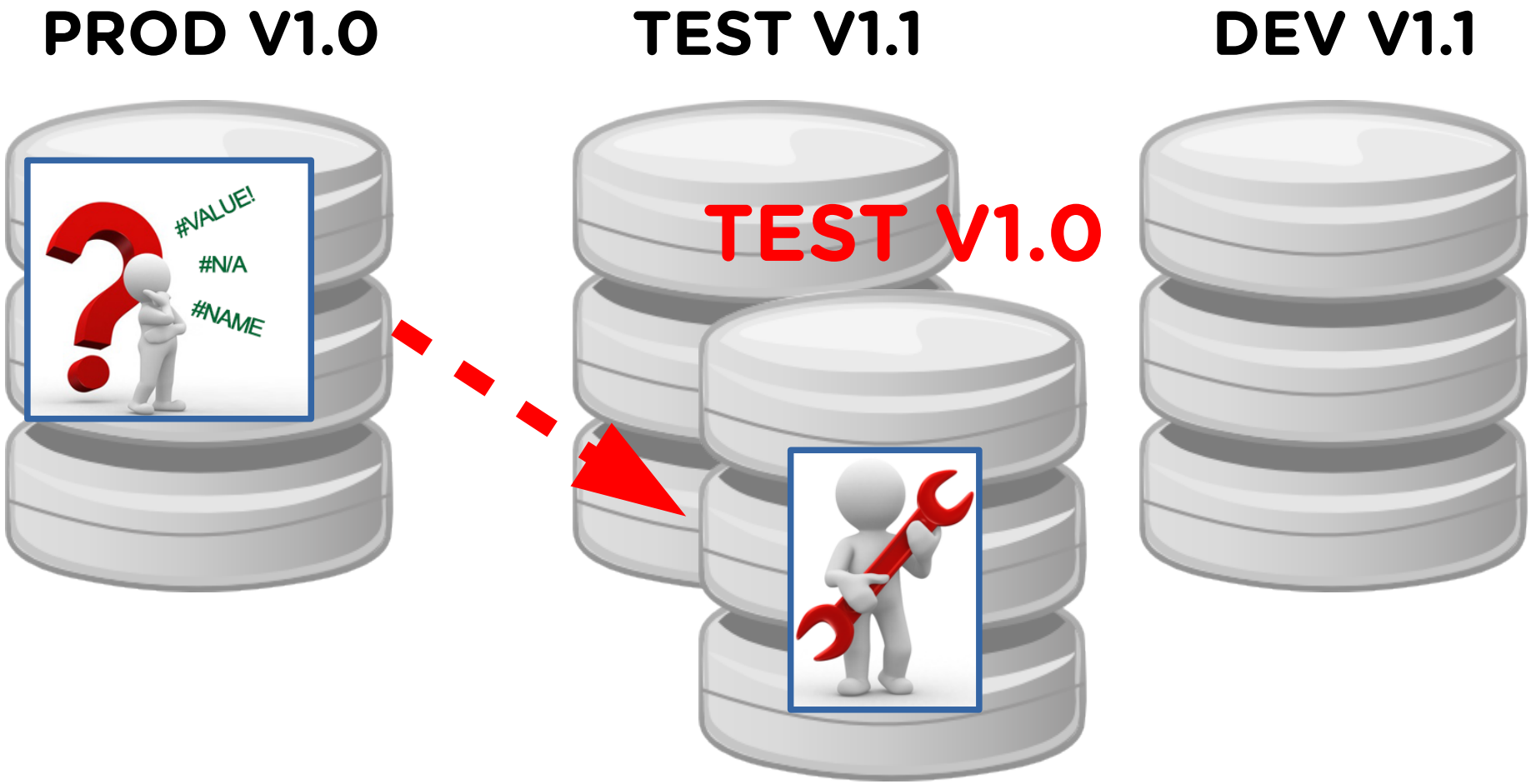
PROD V1.0

TEST V1.1

DEV V1.1

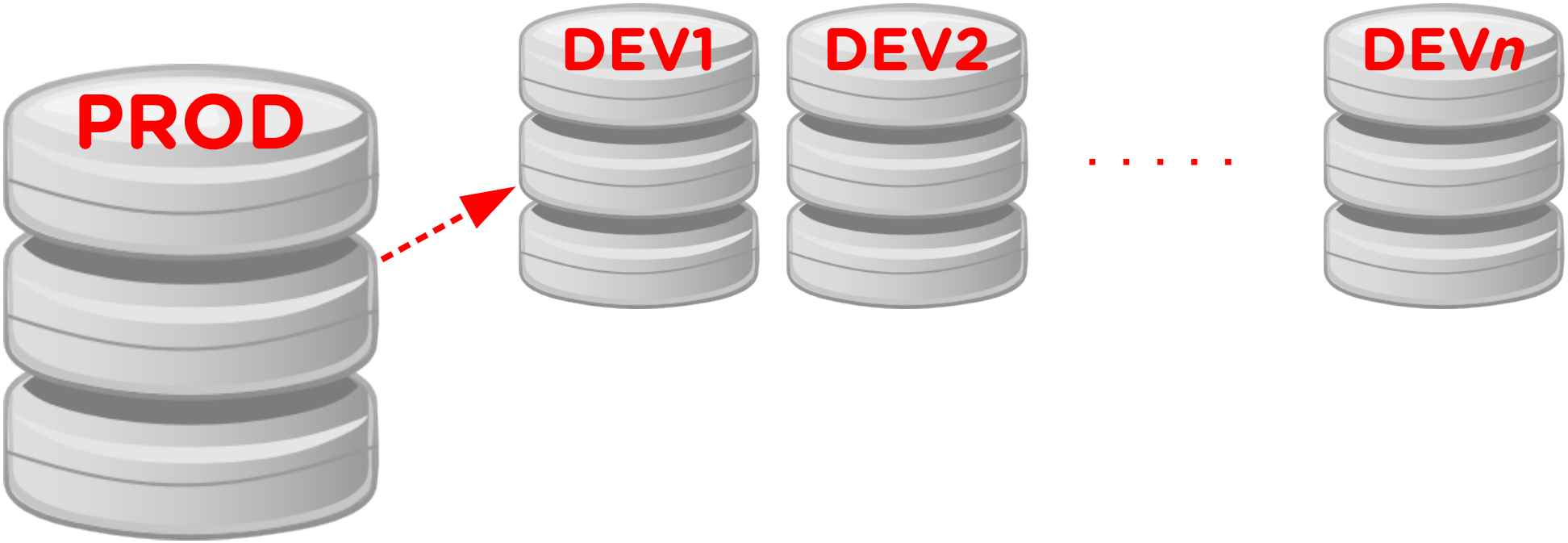
The problem

- Debug on PROD!? Or …
- … create V1.0 TEST clone and debug it.



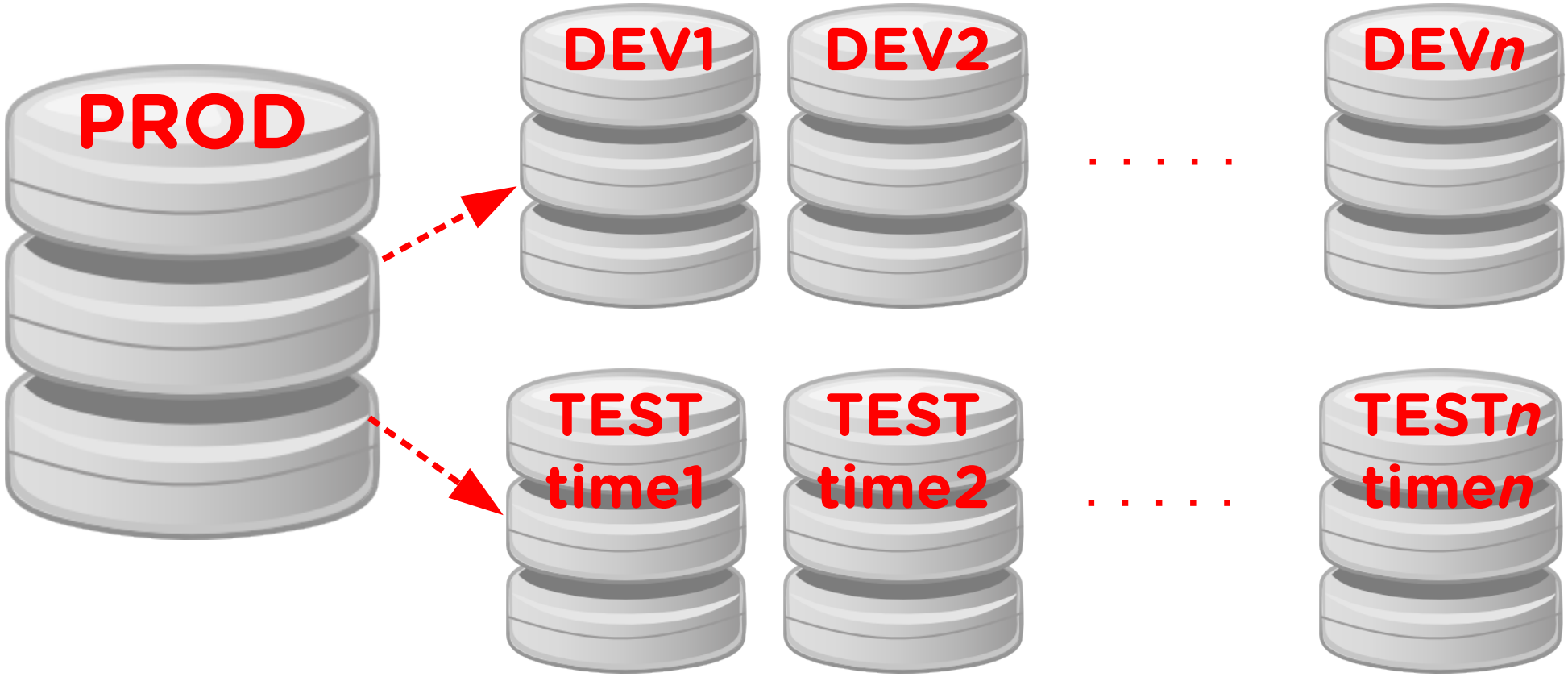
A solution

- DEV database for each developer team.



A solution

- DEV database for each developer team.
- Point in time database for each problem.



DBA

- Leadership.

- Developers,
- testers.

Point In Time Recovery

- Setup a new server and restore the backup.
- Open the standby database in read only mode (if we have old enough standby database).
- Import data or metadata from exports (if we have one).

Point In Time Recovery

- Setup a new server and restore the backup.
- Open the standby database in read only mode (if we have old enough standby database).
- Import data or metadata from exports (if we have one).
- Time to complete procedure?
- Cost (DBA work, servers, ...)?

MISSION: IMPOSSIBLE

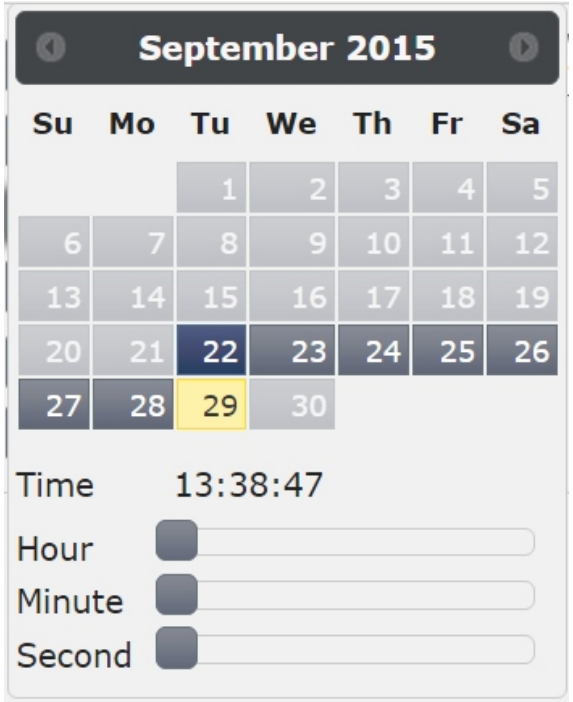
MISSION: IMPOSSIBLE

Backup Server – Deja Vu

- Connect to the Backup server.
- Open the database from required time in read-only or read-write mode.

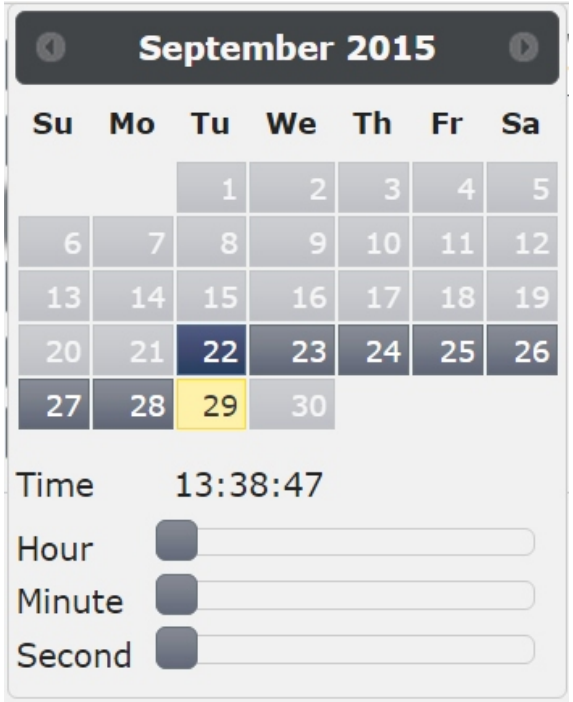
The solution

Tom

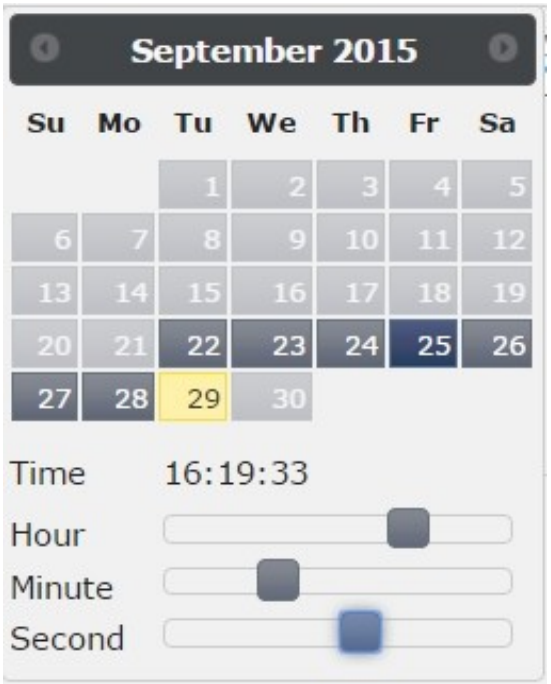


The solution

Tom

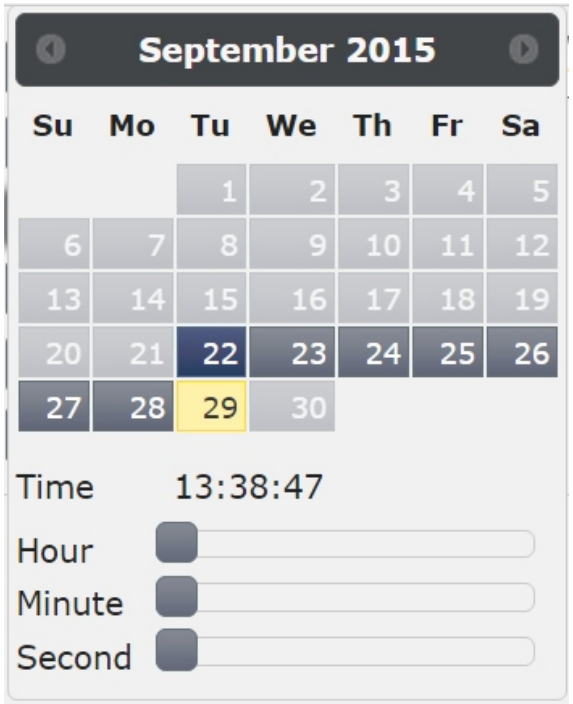


Sally



The solution

Tom



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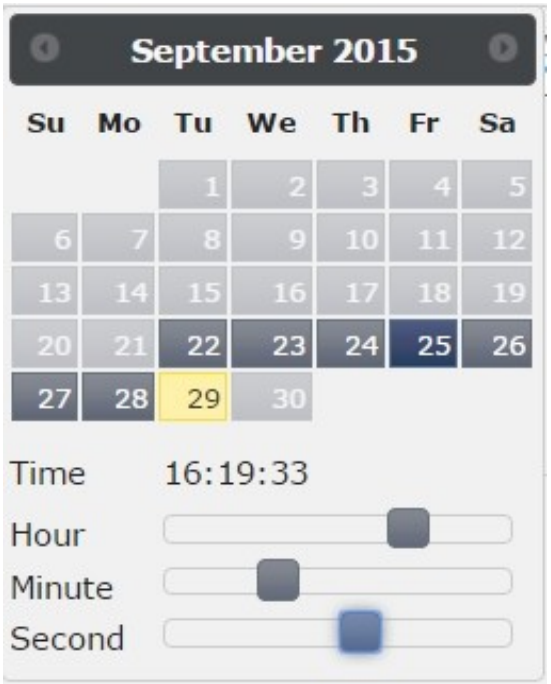
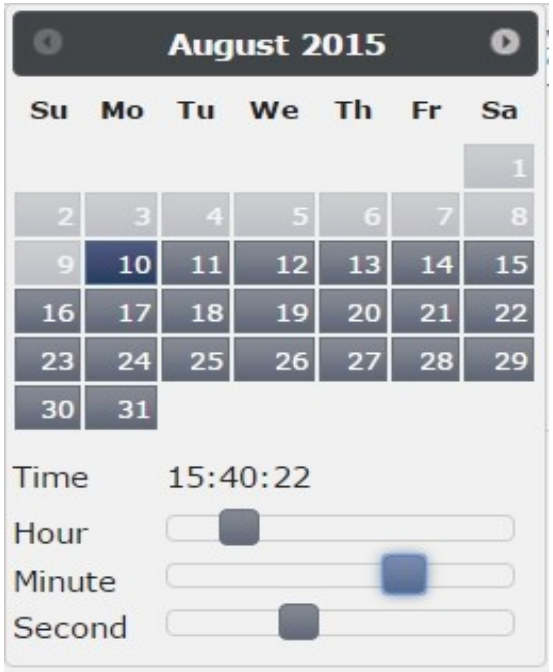
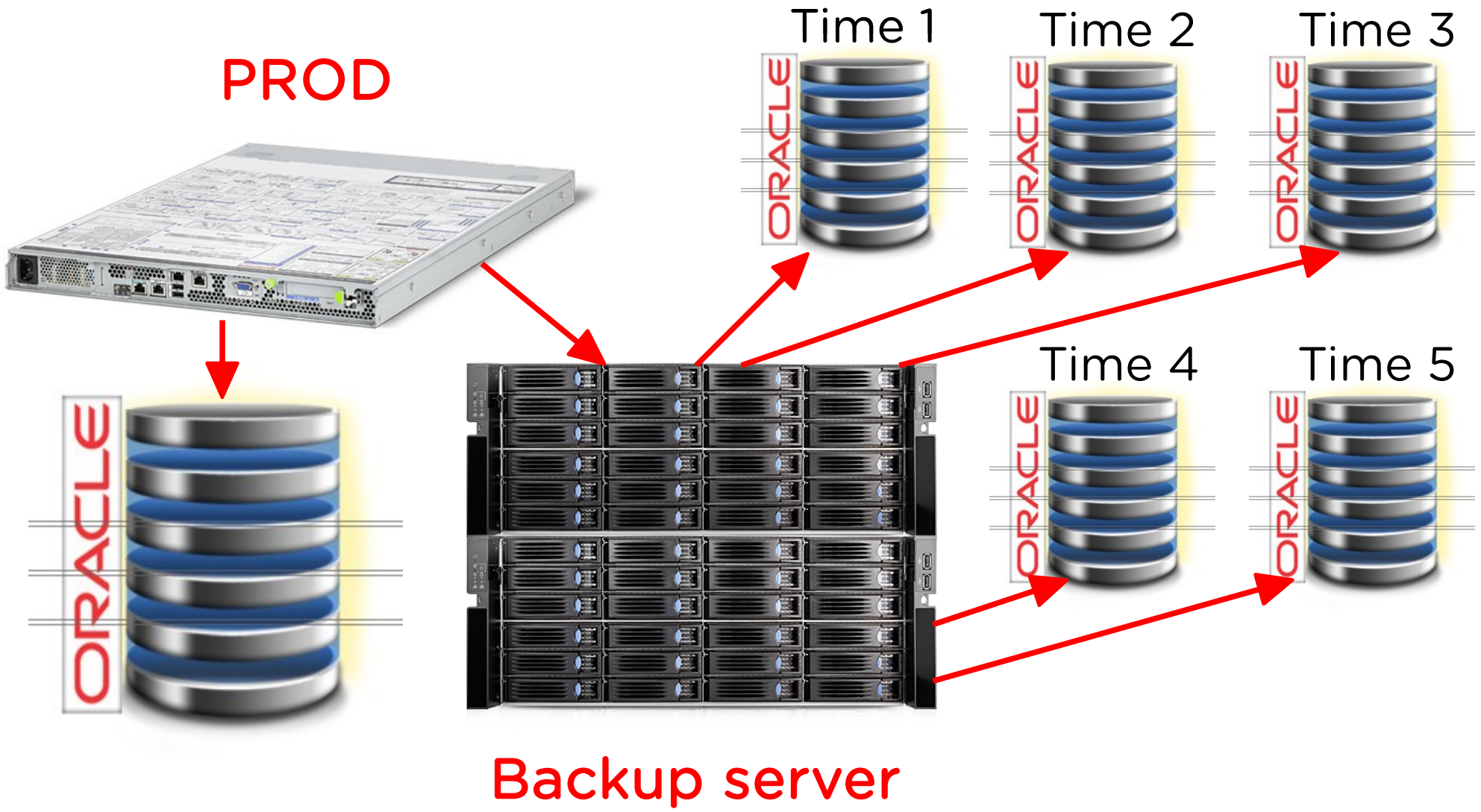


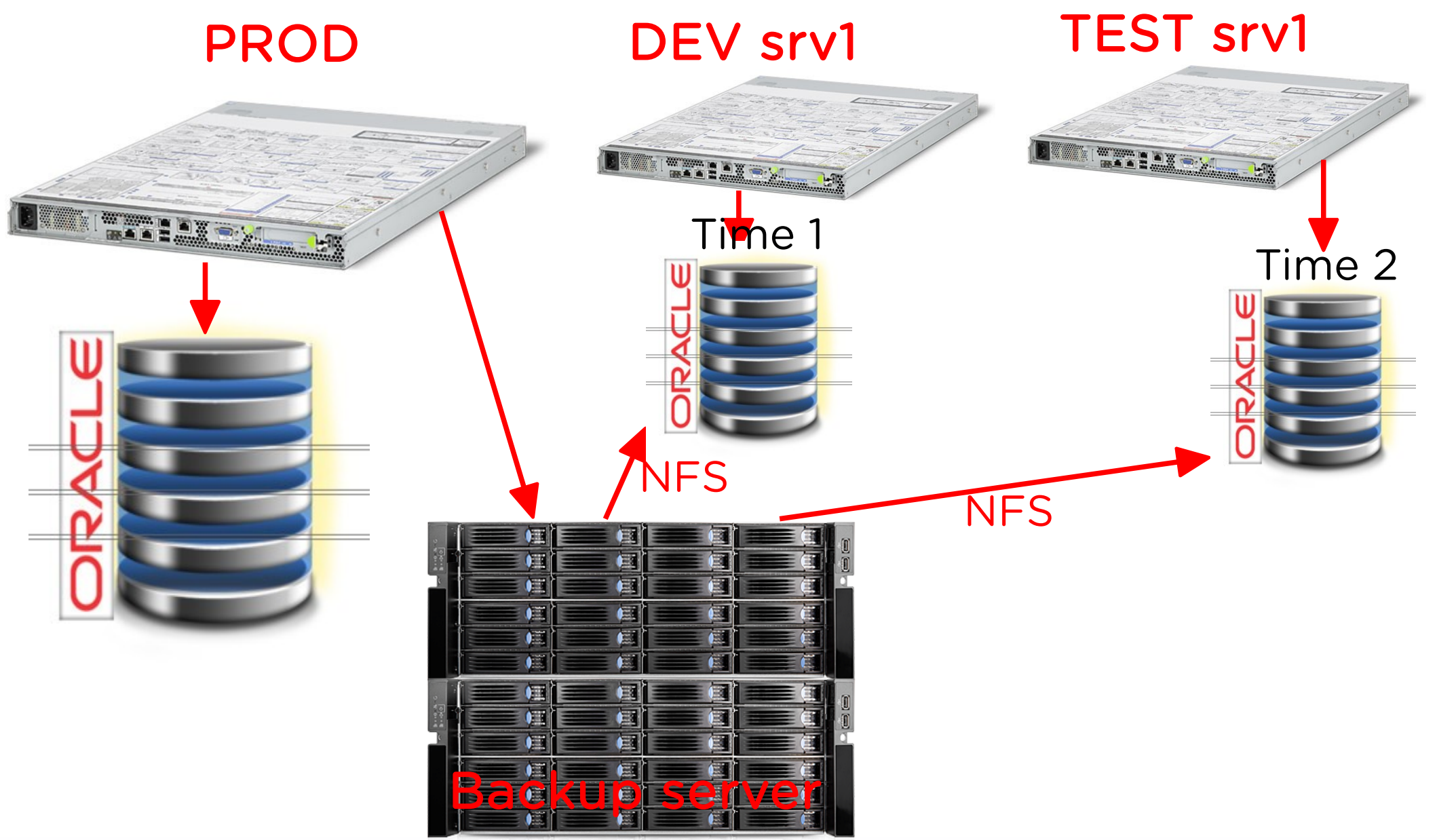
Harry



The solution



The solution



Backup Server – Deja Vu

Notifications

Check Name	Check Time	Check State	
com.abakus.cron.backup_server.master.checks.B	2016-10-14 01:16:02	WARNING	
com.abakus.cron.backup_server.master.checks.L	2016-10-14 14:14:00	CRITICAL	

Resources

Type	Name	Actual Date	First Date	Last Date	Monthly Growth
database_oracle	**DEMO**	**2016-10-14 12:18:49**	**2016-10-06 00:15:30**	**2016-10-14 08:18:48**	**73MB**
database_oracle	XE	2016-10-14 13:04:58	2016-10-14 09:05:03	2016-10-14 09:05:03	0B

Schedule Matrix Create Resource

Backup Server – Deja Vu

Resources

Type	Name	Actual Date	First Date	Last Date	Monthly Growth
database_oracle	**DEMO**	**2016-10-14 13:18:50**	**2016-10-06 00:15:30**	**2016-10-14 08:18:48**	**73MB**
database_oracle	XE	2016-10-14 13:04:58	2016-10-14 09:05:03	2016-10-14 09:05:03	0B

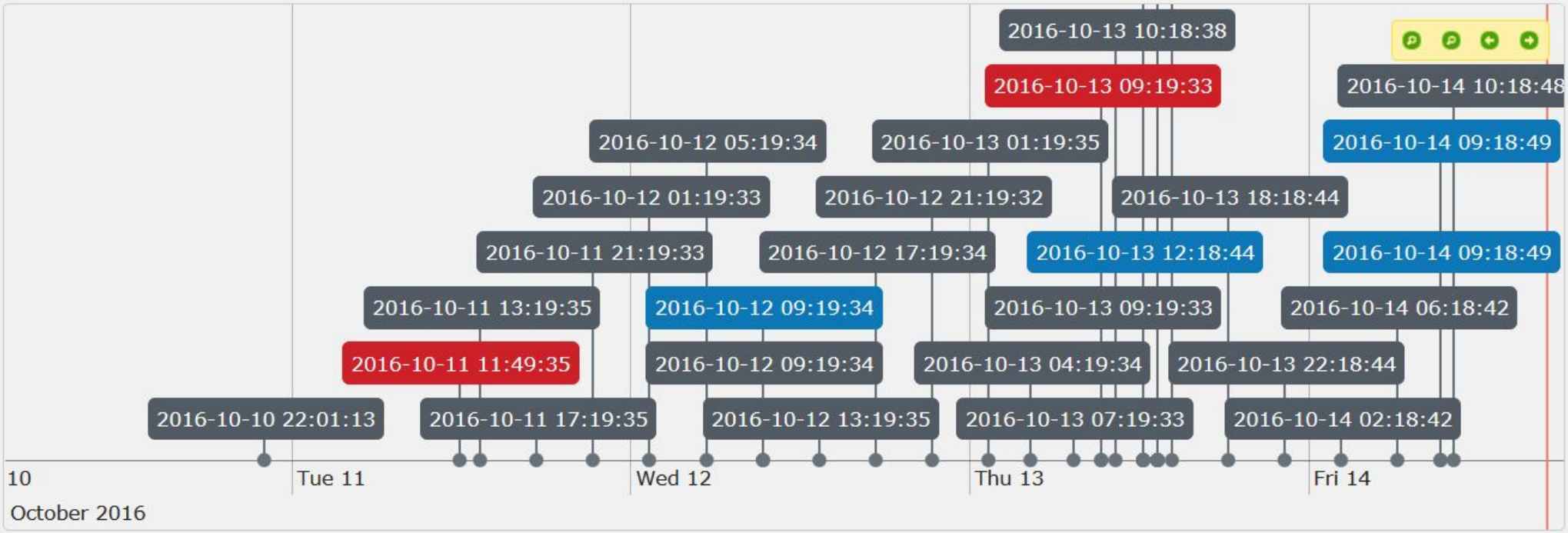
Schedule Matrix Create Resource

Backups | Slots | Standby Database

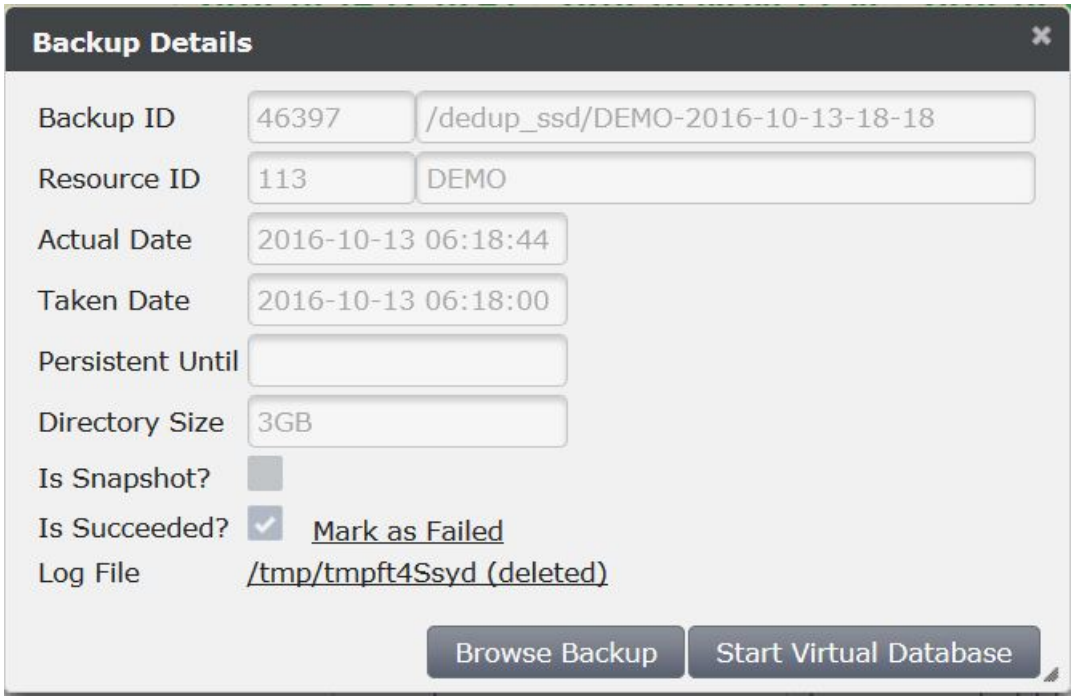
From 2016-10-04

To 2016-10-14

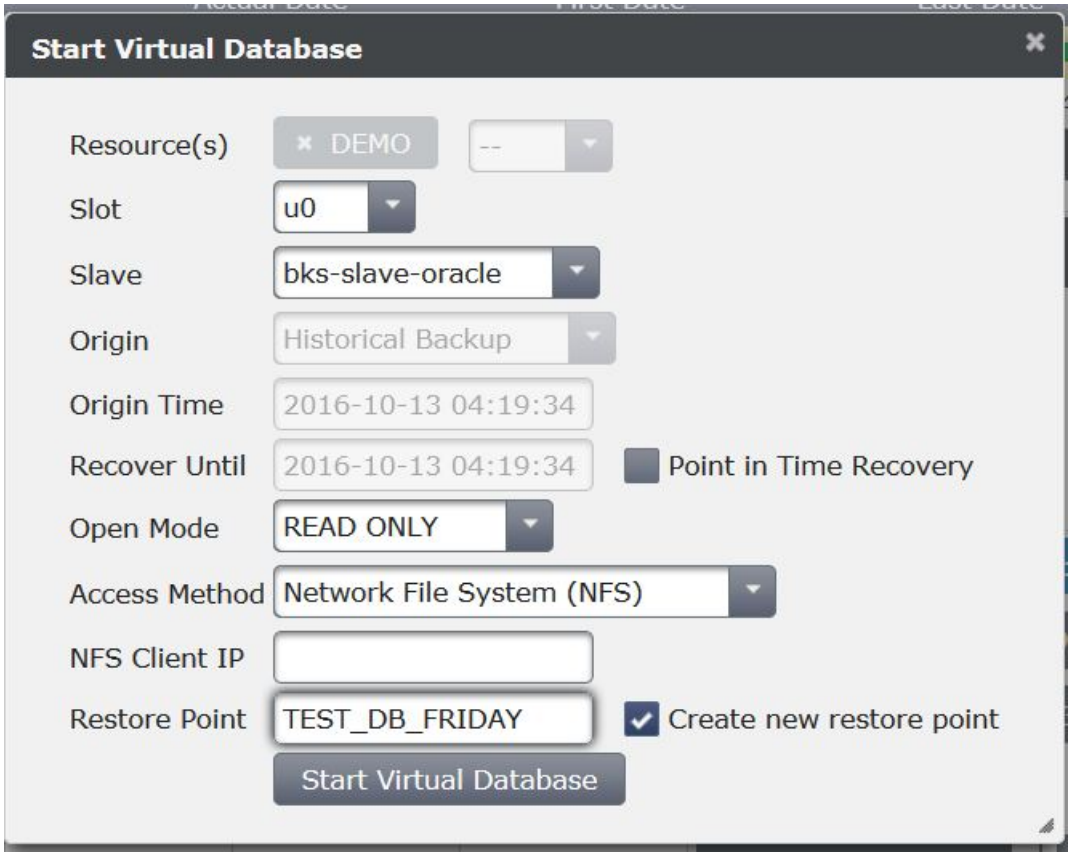
Refresh



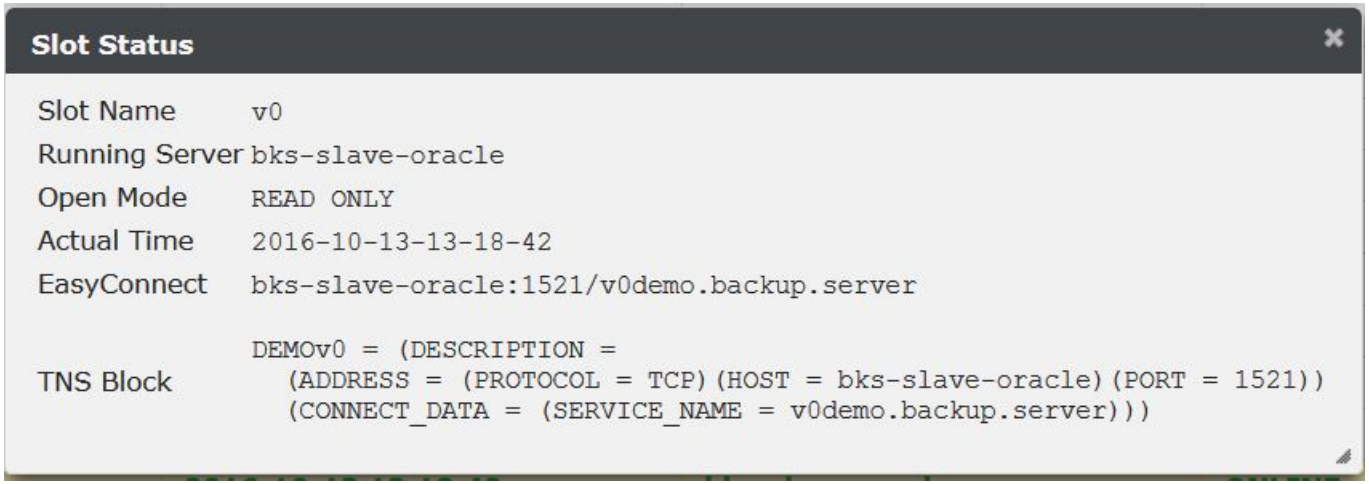
Backup Server – Deja Vu



Backup Server – Deja Vu



Backup Server – Deja Vu



Backup Server – Deja Vu

Backups | Slots | Standby Database

Slot Name	Actual Time	Running Server	Status
ac			OFFLINE
tt			OFFLINE
u0			OFFLINE
u1			OFFLINE
u2			OFFLINE
u3	**2016-10-12 09:19:34**	**bks-slave-oracle**	**INVALID**
u4			OFFLINE
u5			OFFLINE
u6			OFFLINE
u7			OFFLINE
u8			OFFLINE
u9			OFFLINE
v0	**2016-10-13 13:18:42**	**bks-slave-oracle**	**ONLINE**
v1			OFFLINE
v2			OFFLINE
v3	**2016-10-14 09:18:49**	**bks-slave-oracle**	**ONLINE**
v4			OFFLINE
v5			OFFLINE

Disk space

Disk space

- 577 days of history
- 416,40 TB of data occupies 22 TB of physical disk space

Backup Server *backup*
563 backups provide **577 days** days of history until 2015-02-27.
234.06 TB of backup data is stored on 3.75 TB / **4.00 TB** physical volume.

Backup Server
398 backups provide **113 days** days of history since 2016-06-06.
416,40 TB of backup data is stored on 21,90 TB / **39,09 TB** physical volume.

Backup Server - Editions

	Lite	Standard	Deja Vu
Primary purpose	backup & recovery	backup & recovery	**test & development**
Oracle license required	NO	**YES**	**YES**
Perfect Recall	Optional	Optional	Optional

The Solution

- Backup server & Deja Vu
- Virtual databases.
- Fast data provisioning in continous delivery.
- Restore points.
- Faster development and accurate testing.
- Fast and accurate debuging.
- Reduces IT cost.

ORA-03113: end-of-file on communication channel

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dejavu

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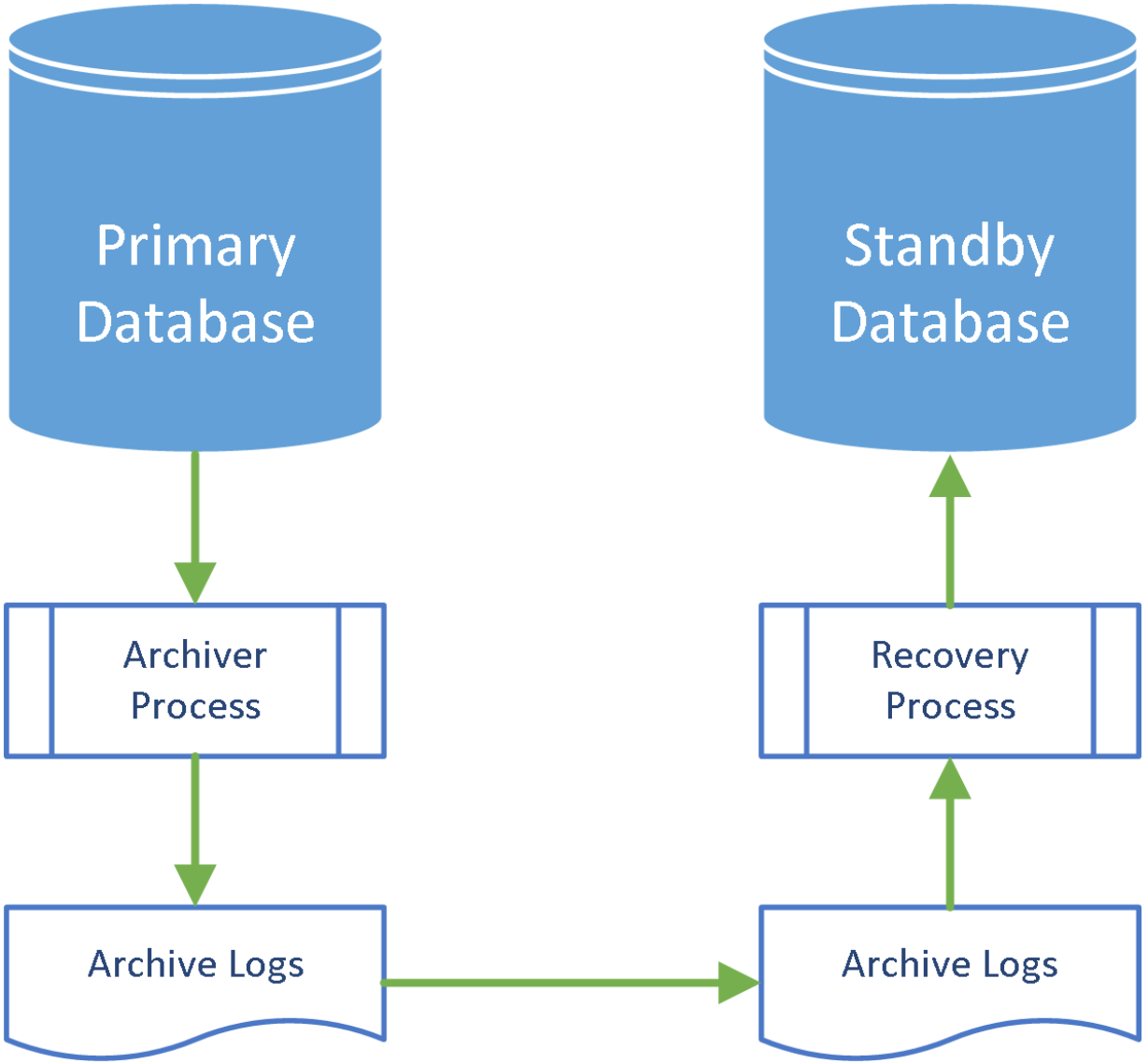
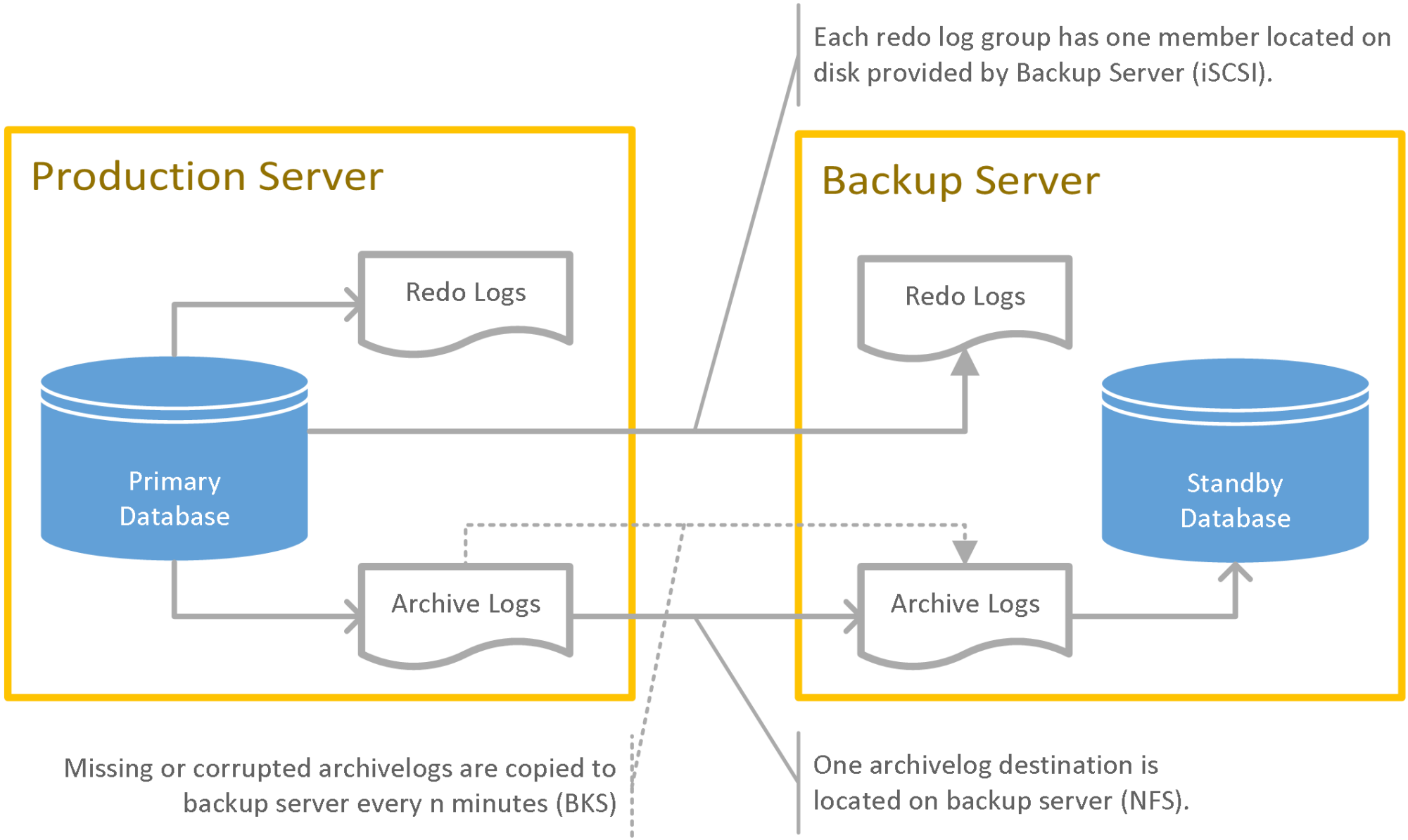
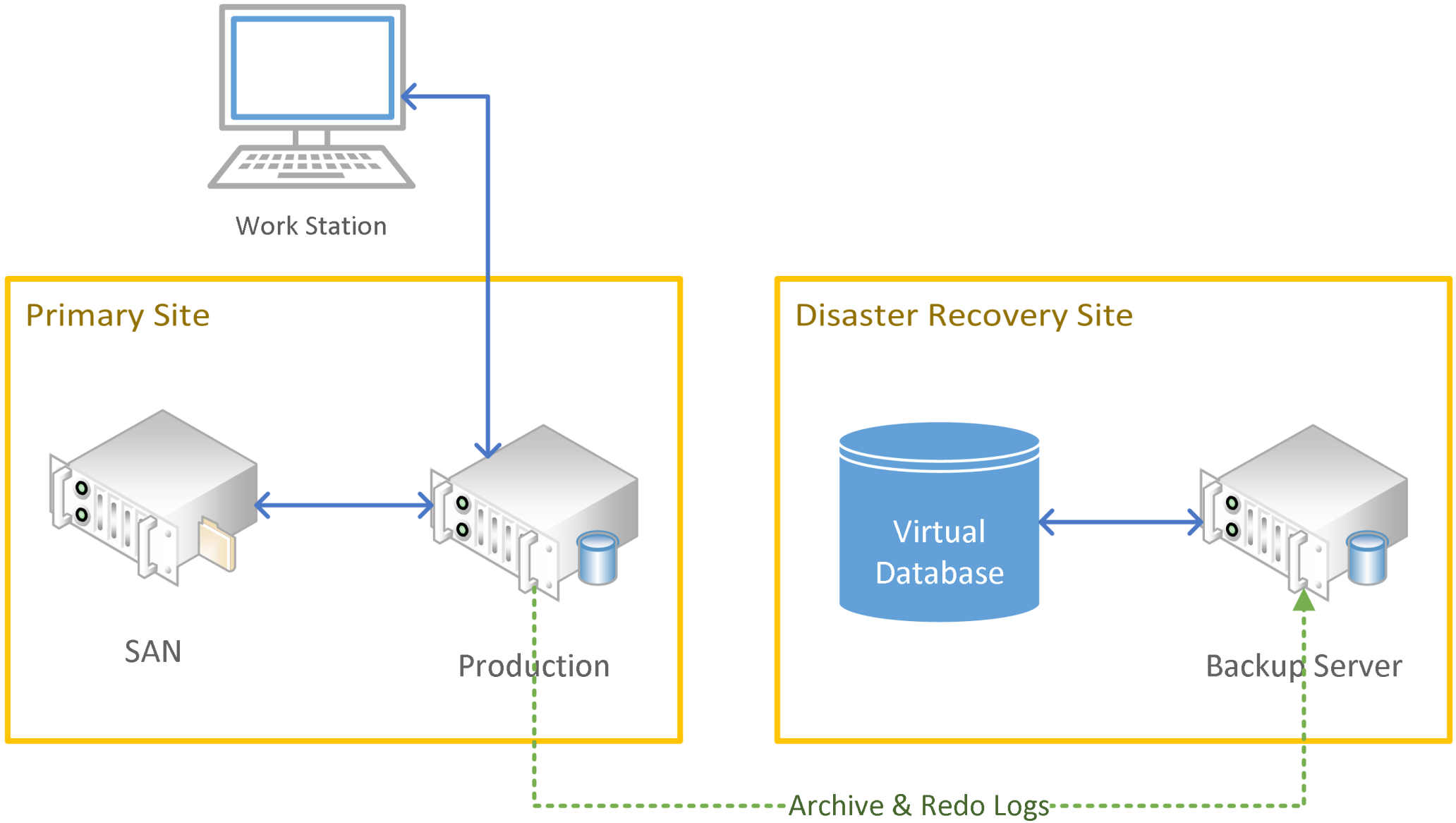
Oracle Physical Standby



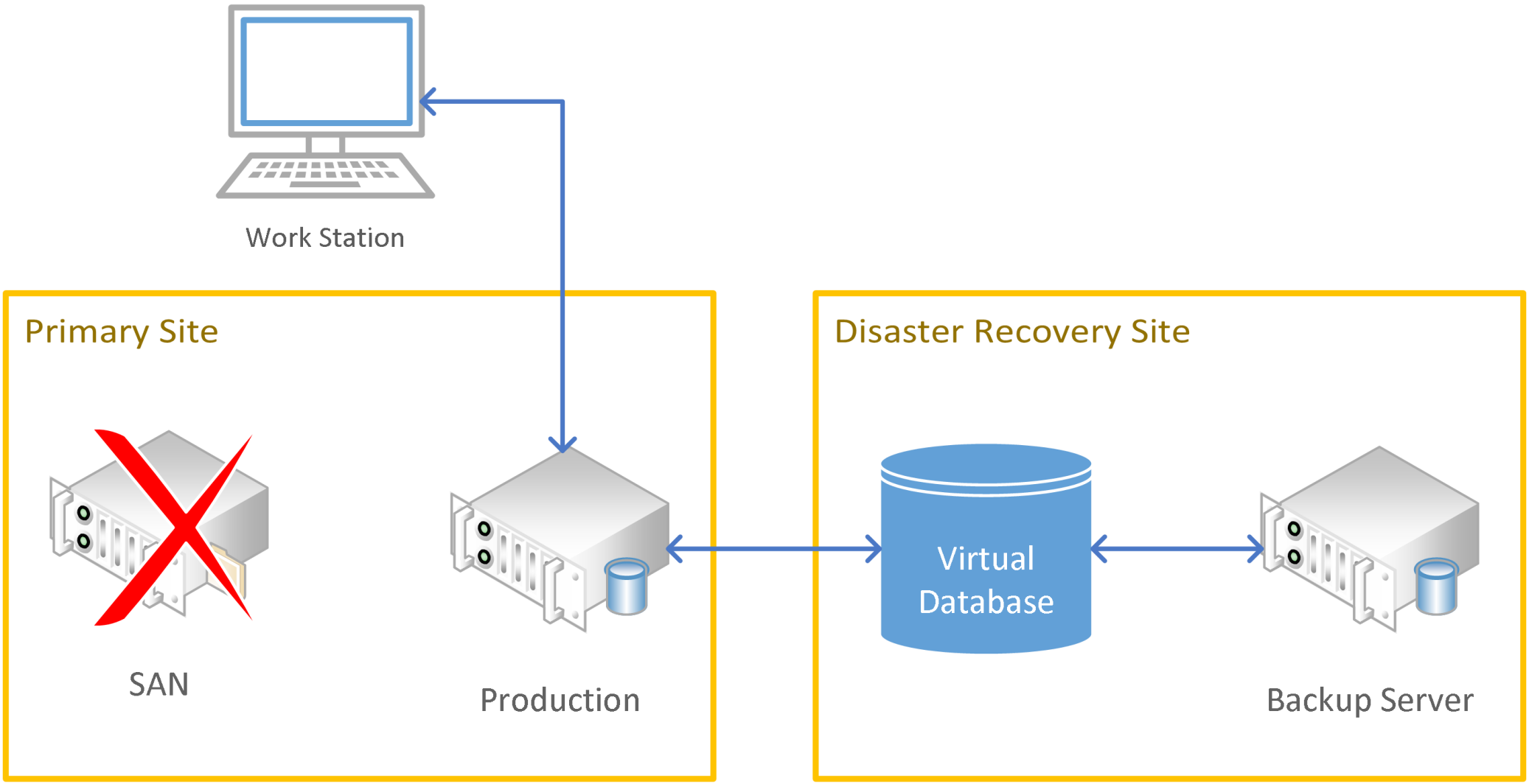
Perfect Recall



Environment



Disaster scenario – SAN(disk) failure



Recovery scenario