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.
7-5-13 ©2013 Scott Adams, Inc./Dist. by Universal Uclick
YOU LOST OUR DATA CENTER?
THAT'S ONE WAY TO LOOK AT IT.

The problem

> ----- Original Message -----
> From: xxxxxxxxxxxxxxxxxxxxx
> To: "Boris Oblak" <boris.oblak@abakus.si>
> Sent: Tuesday, 4. Marec 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?
>

Abakus ARBITER

ORACLE Gold Partner

Boris Oblak

Abakus plus d.o.o.

ORACLE | CERTIFIED PROFESSIONAL

Testing & development

Abakus plus d.o.o.

ORACLE Gold Partner

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
GROUP
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 Ljubeznив Oseben Način

Mestna občina
Ljubljana

Mercator

NLB
Vita
Življenjska zavarovalnica

MESTNA OBČINA KOPER
COMUNE CITTÀ DI CAPODISTRIA

Sava

The problem

Abakus
As na disku.

The problem

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

AS Abakus
As na disku.

The problem

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

As na disku.

The problem

- PROD grows

Abakus
As na disku.

The problem

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

Abakus
As na disku.

The problem

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

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

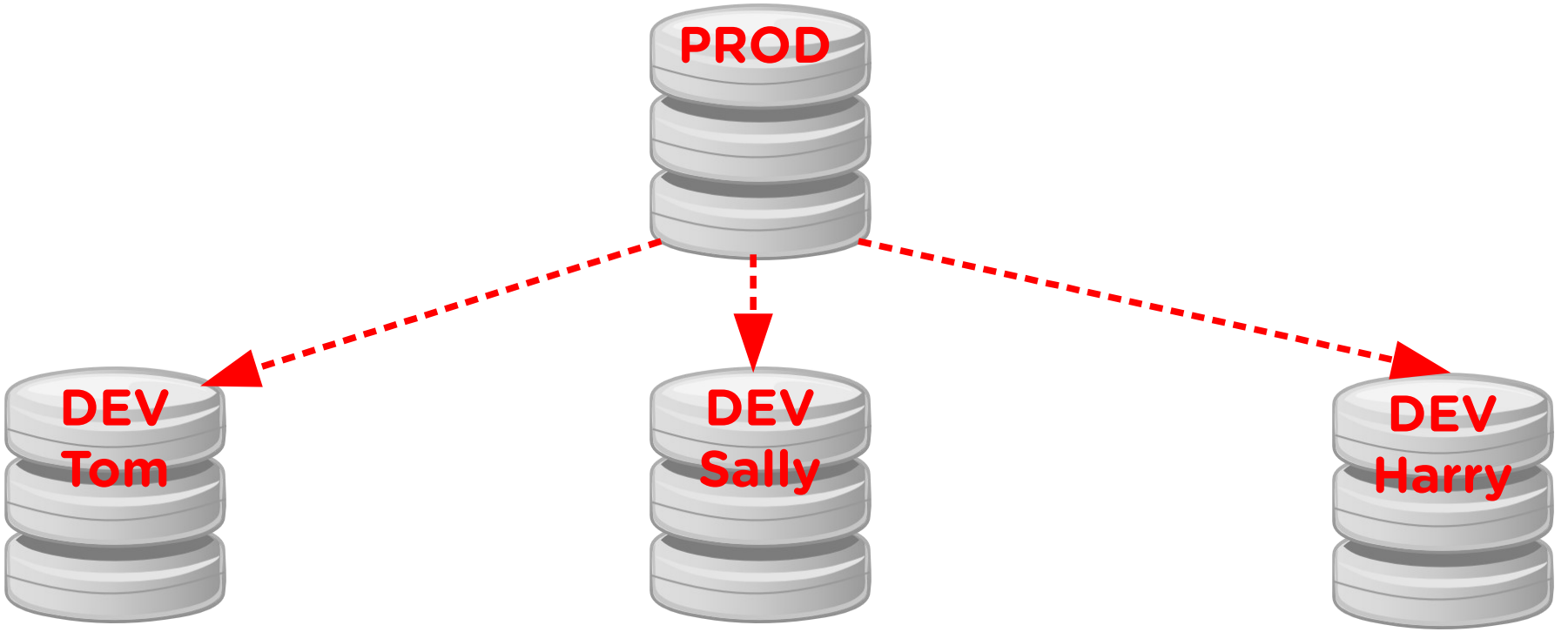
Abakus
As na disku.

The problem

- This environments become stale ...

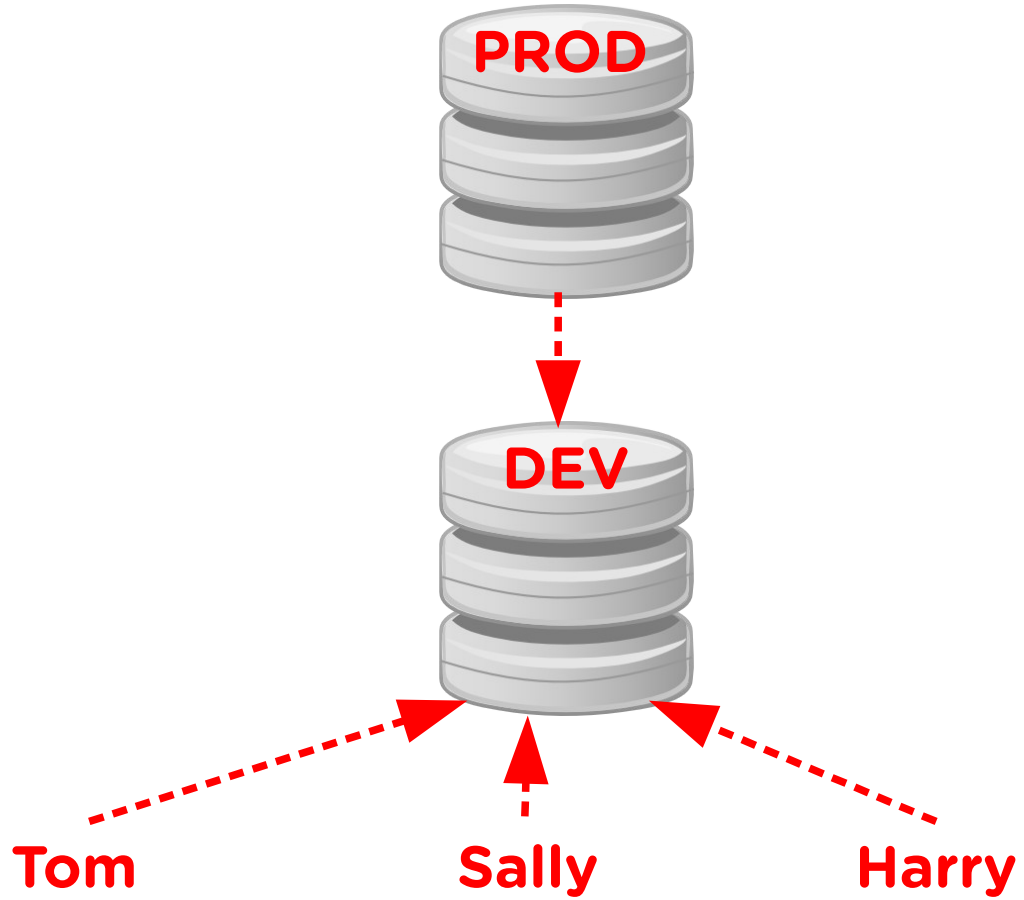
Attempting to solve problem

Attempting to solve problem



In a perfect world ...

Attempting to solve problem



In a real world ...

Abakus
As na disku.

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.

AS Abakus As na disku.

The problem

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>
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>

- Report usually runs 15 minutes, last night runs 3 hours!

AS Abakus As na disku.

The problem

- Different versions on PROD and TEST, DEV.

PROD V1.0

TEST V1.1

DEV V1.1

The problem

- Different versions on PROD and TEST, 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

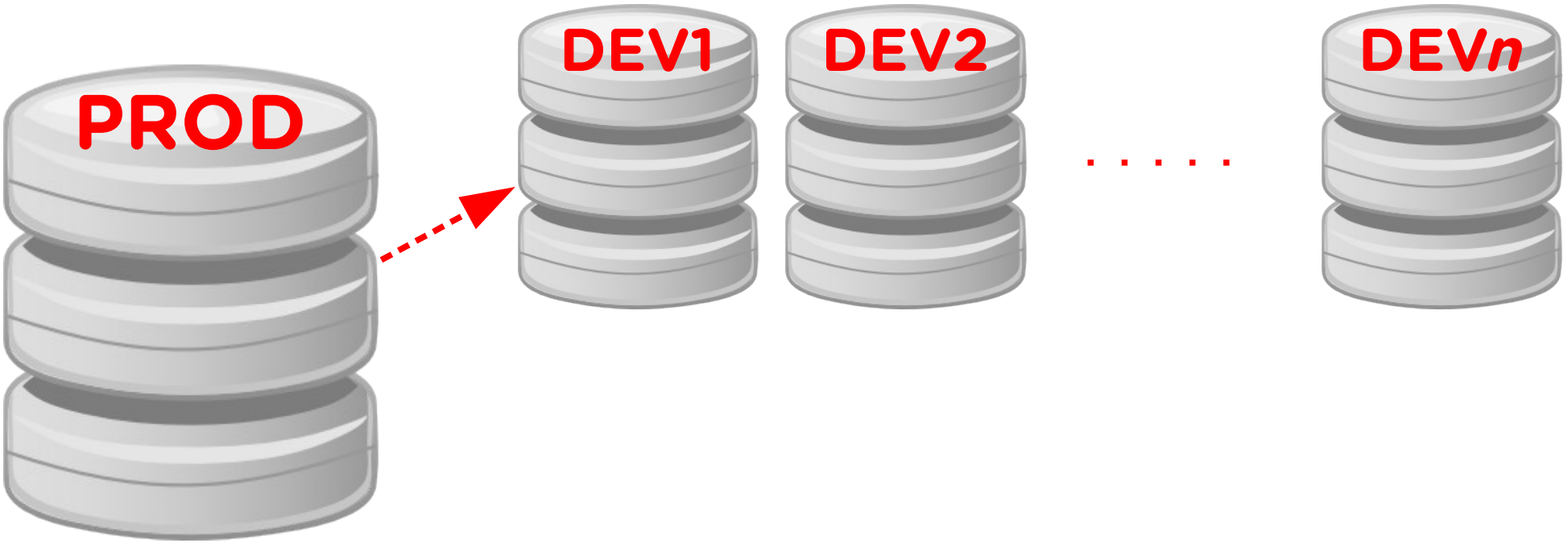
The problem

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

PROD V1.0 **TEST V1.1** **DEV V1.1**

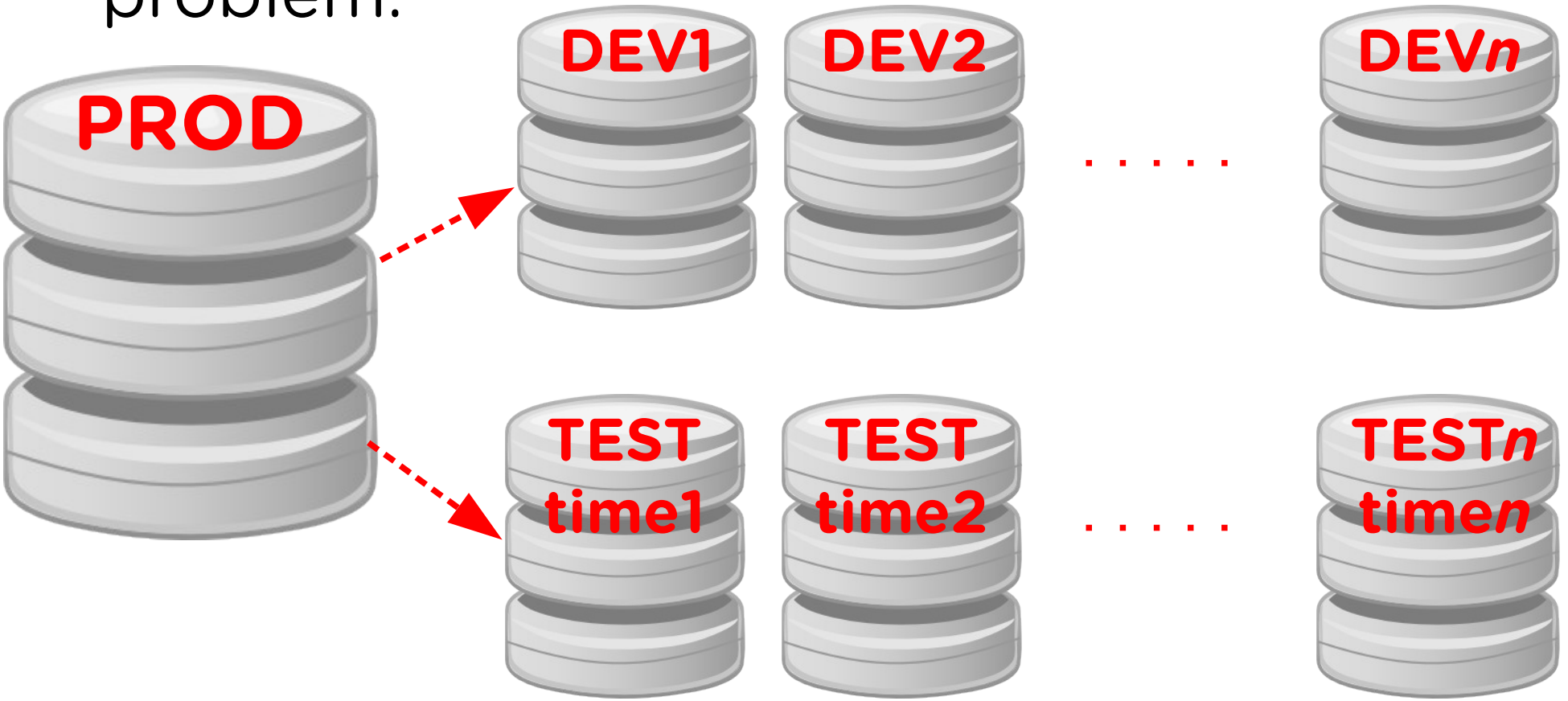
A solution

- DEV database for each developer team.



A solution

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



DBA

•Leadership.

•Developers,
•testers.

AS Abakus
As na disku.

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 the procedure?
- Cost (DBA work, server, ...)?

MISSION: IMPOSSIBLE

AS
Abakus
As na disku.

MISSION: IMPOSSIBLE

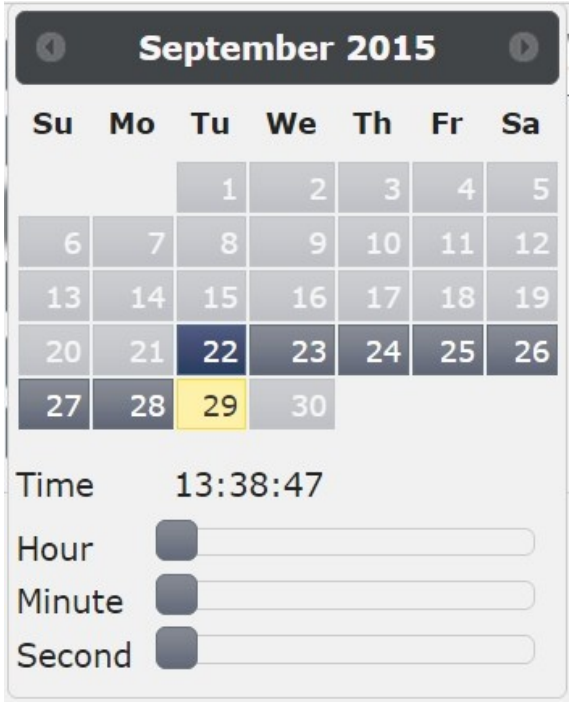
Backup server – Deja Vu

- Connect to the Backup server.
- Open the database from required time in read-only or read-write mode.
- Execute failed job and debug it.

AS
Abakus
As na disku.

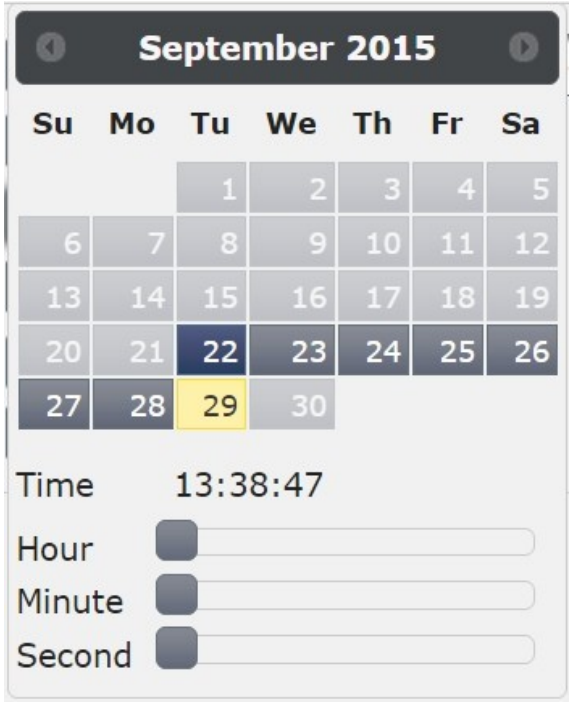
The solution

Tom

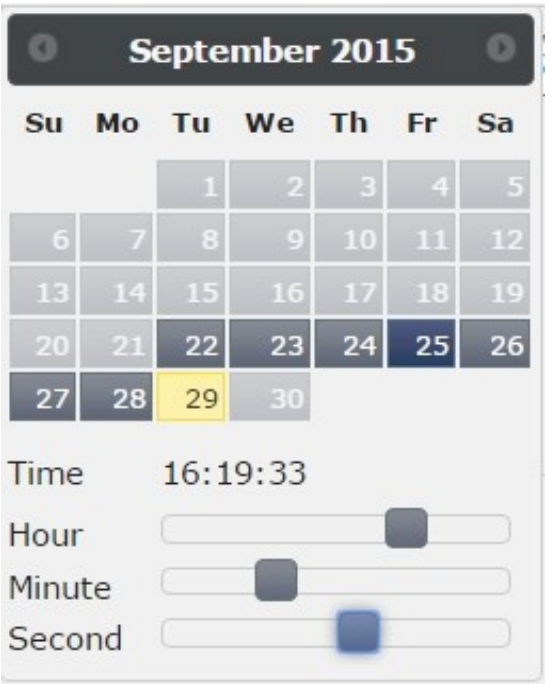


The solution

Tom

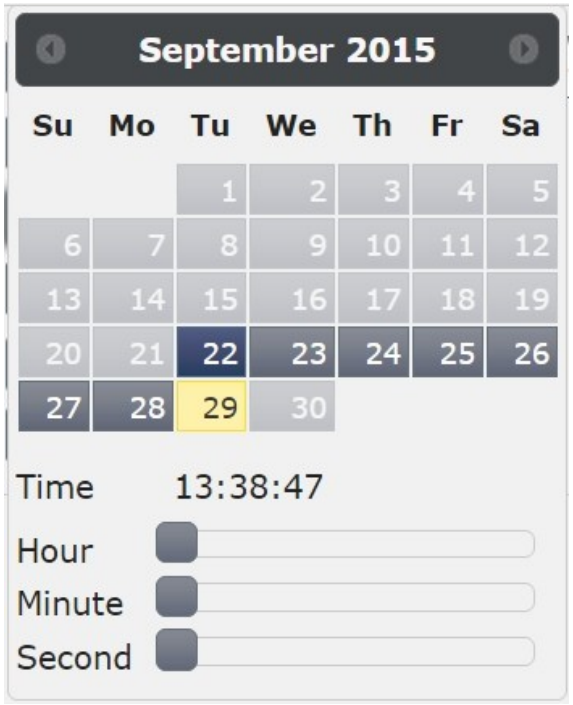


Sally

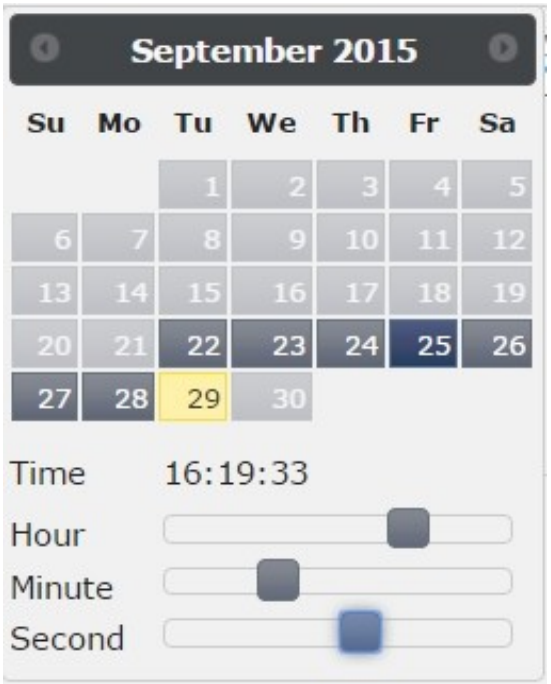


The solution

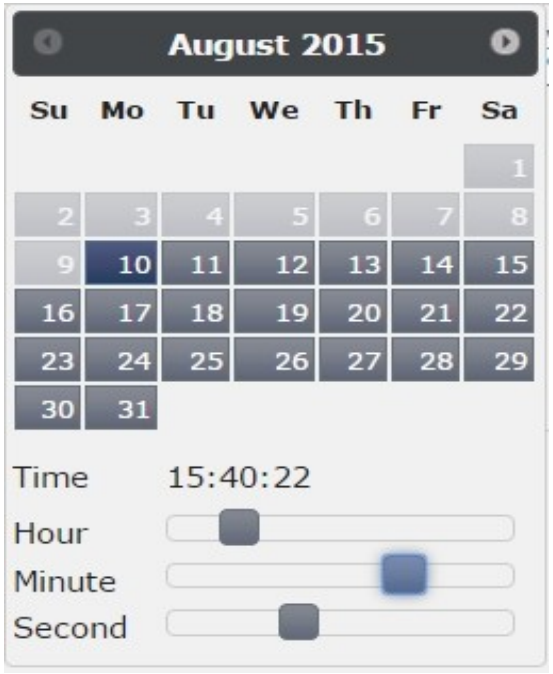
Tom



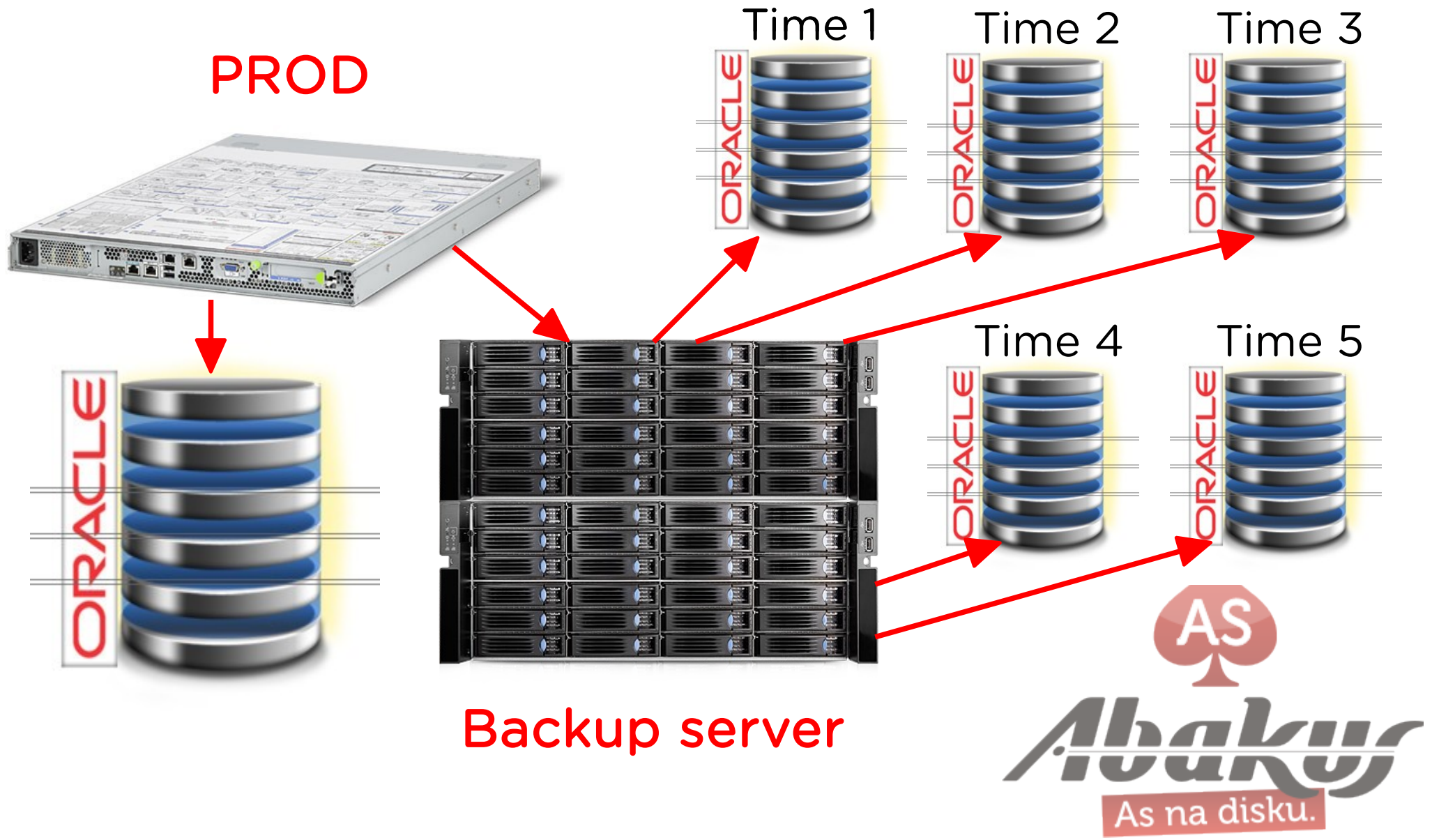
Sally



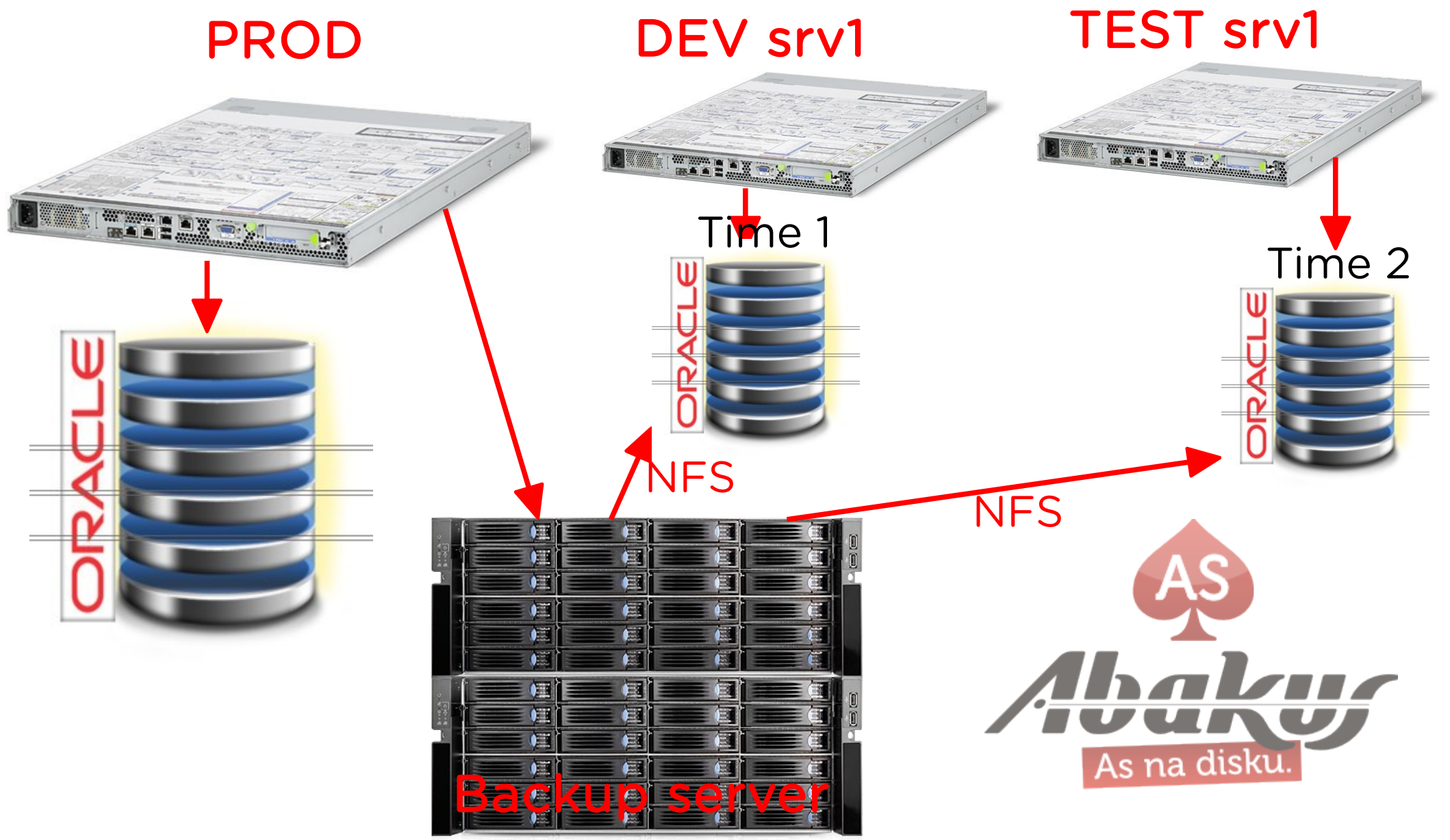
Harry



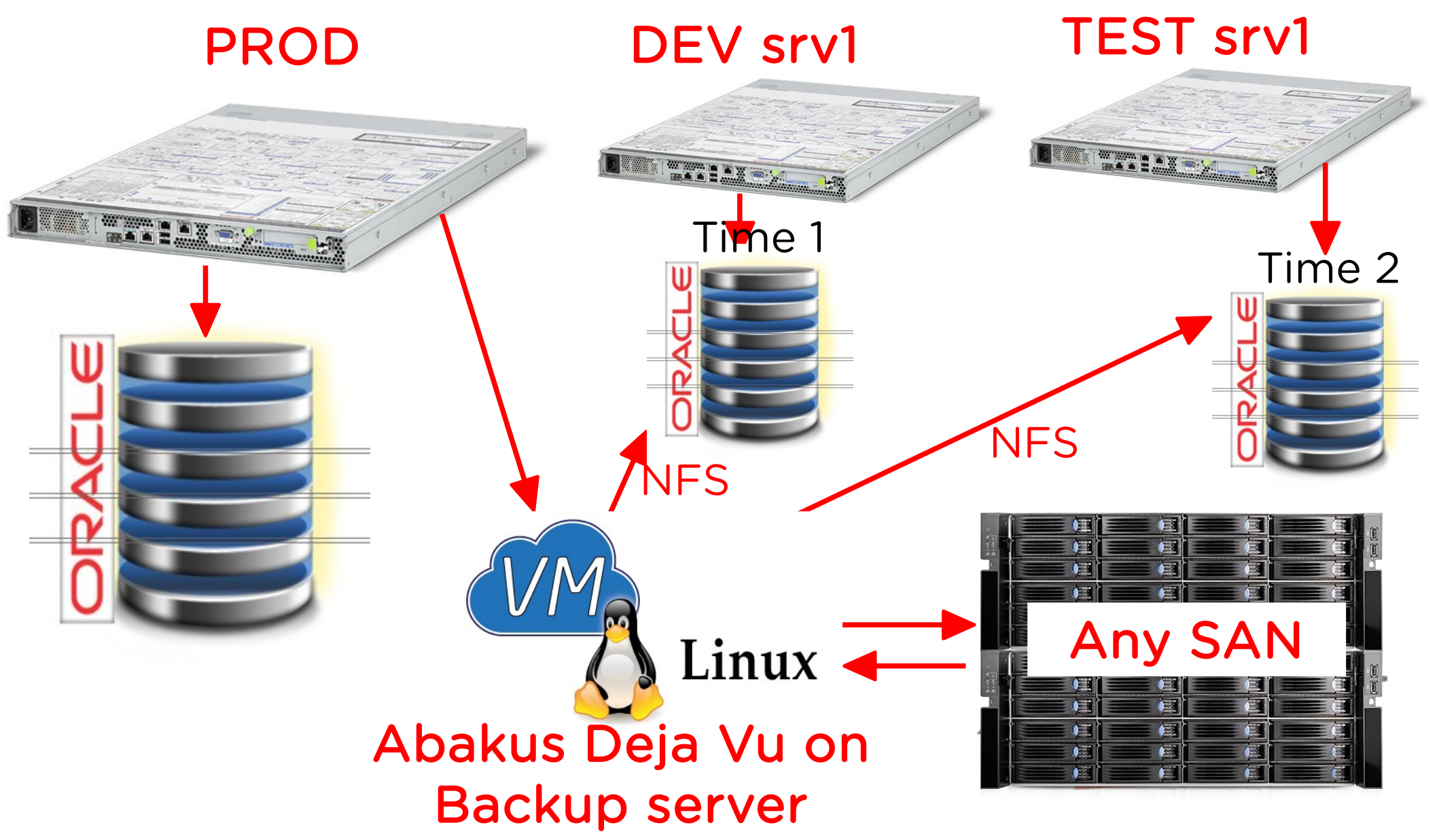
The solution



The solution



The solution



Backup server – Deja Vu

Resources

Status	Type	Name	Flash Date	First Date	Last Date
OFFLINE	database	DWSTAGE1	2014-10-02 18:10:13	2014-10-03 23:00:00	2014-06-20 23:00:00
OFFLINE	database	DWTARGET	2014-10-02 19:10:30	2014-10-03 23:00:00	2014-06-20 23:00:00
OFFLINE	database	EB	2014-10-02 18:10:07	2014-10-03 23:00:00	2014-06-20 23:00:00
OFFLINE	database	ORCL10	2014-10-02 21:10:49	2014-10-03 23:00:00	2014-06-20 23:00:00
OFFLINE	database	RIS10G	2014-10-02 23:10:16	2014-10-03 23:00:00	2014-06-20 23:00:00
	vm-incremental	san1		2014-10-03 18:00:00	2014-06-20 18:00:00

Oracle PITR Instance | Refresh

Backups

Path	Size	Taken	Actual	Status
/zbackup/ORCL10-2014-10-03-23-00		**2014-10-03 23:00:00**		**UNKNOWN**
/zbackup/ORCL10-2014-10-02-23-00	861 G	2014-10-02 23:00:00	2014-10-02 21:10:49	OK
/zbackup/ORCL10-2014-10-01-23-00	860 G	2014-10-01 23:00:00	2014-10-01 21:10:42	OK
/zbackup/ORCL10-2014-09-30-23-00	860 G	2014-09-30 23:00:00	2014-09-30 21:09:22	OK
/zbackup/ORCL10-2014-09-29-23-00	859 G	2014-09-29 23:00:00	2014-09-29 21:09:44	OK
/zbackup/ORCL10-2014-09-28-23-00	858 G	2014-09-28 23:00:00	2014-09-28 05:09:04	OK
/zbackup/ORCL10-2014-09-27-23-00	858 G	2014-09-27 23:00:00	2014-09-27 21:09:59	OK
/zbackup/ORCL10-2014-09-26-23-00	858 G	2014-09-26 23:00:00	2014-09-26 21:09:23	OK
/zbackup/ORCL10-2014-09-25-23-00	858 G	2014-09-25 23:00:00	2014-09-25 19:09:28	OK
/zbackup/ORCL10-2014-09-24-23-00	857 G	2014-09-24 23:00:00	2014-09-24 19:09:45	OK
/zbackup/ORCL10-2014-09-23-23-00	857 G	2014-09-23 23:00:00	2014-09-23 19:09:47	OK
/zbackup/ORCL10-2014-09-22-23-00	857 G	2014-09-22 23:00:00	2014-09-22 19:09:53	OK
/zbackup/ORCL10-2014-09-21-23-00	857 G	2014-09-21 23:00:00	2014-09-21 19:09:46	OK
/zbackup/ORCL10-2014-09-20-23-00	857 G	2014-09-20 23:00:00	2014-09-20 19:09:38	OK
/zbackup/ORCL10-2014-09-19-23-00	857 G	2014-09-19 23:00:00	2014-09-19 19:09:55	OK
/zbackup/ORCL10-2014-09-18-23-00	857 G	2014-09-18 23:00:00	2014-09-18 19:09:50	OK
/zbackup/ORCL10-2014-09-17-23-00	857 G	2014-09-17 23:00:00	2014-09-17 19:09:47	OK
/zbackup/ORCL10-2014-09-16-23-00	857 G	2014-09-16 23:00:00	2014-09-16 19:09:53	OK
/zbackup/ORCL10-2014-09-15-23-00	857 G	2014-09-15 23:00:00	2014-09-15 19:09:10	OK
/zbackup/ORCL10-2014-09-14-23-00	857 G	2014-09-14 23:00:00	2014-09-14 19:09:32	OK

Backup server – Deja Vu

Resources

Status	Type	Name	Flash Date	First Date	Last Date
OFFLINE	database	DWSTAGE1	2014-10-02 18:10:13	2014-10-03 23:00:00	2014-06-20 23:00:00
OFFLINE	database	DWTARGET	2014-10-02 19:10:30	2014-10-03 23:00:00	2014-06-20 23:00:00
OFFLINE	database	EB	2014-10-02 18:10:07	2014-10-03 23:00:00	2014-06-20 23:00:00
OFFLINE	database	ORCL10	2014-10-02 21:10:49	2014-10-03 23:00:00	2014-06-20 23:00:00
OFFLINE	database	RIS10G	2014-10-02 23:10:16	2014-10-03 23:00:00	2014-06-20 23:00:00
	vm-incremental	san1		2014-10-03 18:00:00	2014-06-20 18:00:00

Oracle PITR Instance | Refresh

Backups

Path	Size	Taken	Actual	Status
/zbackup/ORCL10-2014-10-03-23-00				UNKNOWN
/zbackup/ORCL10-2014-10-02-23-00	861 G		21:10:49	OK
/zbackup/ORCL10-2014-10-01-23-00	860 G		21:10:42	OK
/zbackup/ORCL10-2014-09-30-23-00	860 G		21:09:22	OK
/zbackup/ORCL10-2014-09-29-23-00	859 G		21:09:44	OK
/zbackup/ORCL10-2014-09-28-23-00	858 G		05:09:04	OK
/zbackup/ORCL10-2014-09-27-23-00	858 G		21:09:59	OK
/zbackup/ORCL10-2014-09-26-23-00	858 G		21:09:23	OK
/zbackup/ORCL10-2014-09-25-23-00	858 G		19:09:28	OK
/zbackup/ORCL10-2014-09-24-23-00	857 G		19:09:45	OK
/zbackup/ORCL10-2014-09-23-23-00	857 G		19:09:47	OK
/zbackup/ORCL10-2014-09-22-23-00	857 G	2014-09-22 23:00:00	2014-09-22 19:09:53	OK
/zbackup/ORCL10-2014-09-21-23-00	857 G	2014-09-21 23:00:00	2014-09-21 19:09:46	OK
/zbackup/ORCL10-2014-09-20-23-00	857 G	2014-09-20 23:00:00	2014-09-20 19:09:38	OK
/zbackup/ORCL10-2014-09-19-23-00	857 G	2014-09-19 23:00:00	2014-09-19 19:09:55	OK
/zbackup/ORCL10-2014-09-18-23-00	857 G	2014-09-18 23:00:00	2014-09-18 19:09:50	OK
/zbackup/ORCL10-2014-09-17-23-00	857 G	2014-09-17 23:00:00	2014-09-17 19:09:47	OK
/zbackup/ORCL10-2014-09-16-23-00	857 G	2014-09-16 23:00:00	2014-09-16 19:09:53	OK
/zbackup/ORCL10-2014-09-15-23-00	857 G	2014-09-15 23:00:00	2014-09-15 19:09:10	OK
/zbackup/ORCL10-2014-09-14-23-00	857 G	2014-09-14 23:00:00	2014-09-14 19:09:32	OK

Details

Resource is OFFLINE

Target	Static Backup
Point-in-Time	2014-08-24 19:08:54
Log Level	INFO

Open Read-Only | Open Read-Write

Log Files: alert_pthibis.log, bks_task_pthibis.log

Backup server – Deja Vu

Resources

Status	Type	Name	Flash Date	First Date	Last Date
OFFLINE	database	DWSTAGE1	2014-10-02 18:10:13	2014-10-03 23:00:00	2014-06-20 23:00:00
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OFFLINE	database	EB	2014-10-02 18:10:07	2014-10-03 23:00:00	2014-06-20 23:00:00
ONLINE	**database**	**ORCL10**	**2014-10-02 21:10:49**	**2014-10-03 23:00:00**	**2014-06-20 23:00:00**
OFFLINE	database	RIS10G	2014-10-02 23:10:16	2014-10-03 23:00:00	2014-06-20 23:00:00
	vm-incremental	san1		2014-10-03 18:00:00	2014-06-20 18:00:00

Oracle PITR Instance | Refresh

Details

Resource is ONLINE

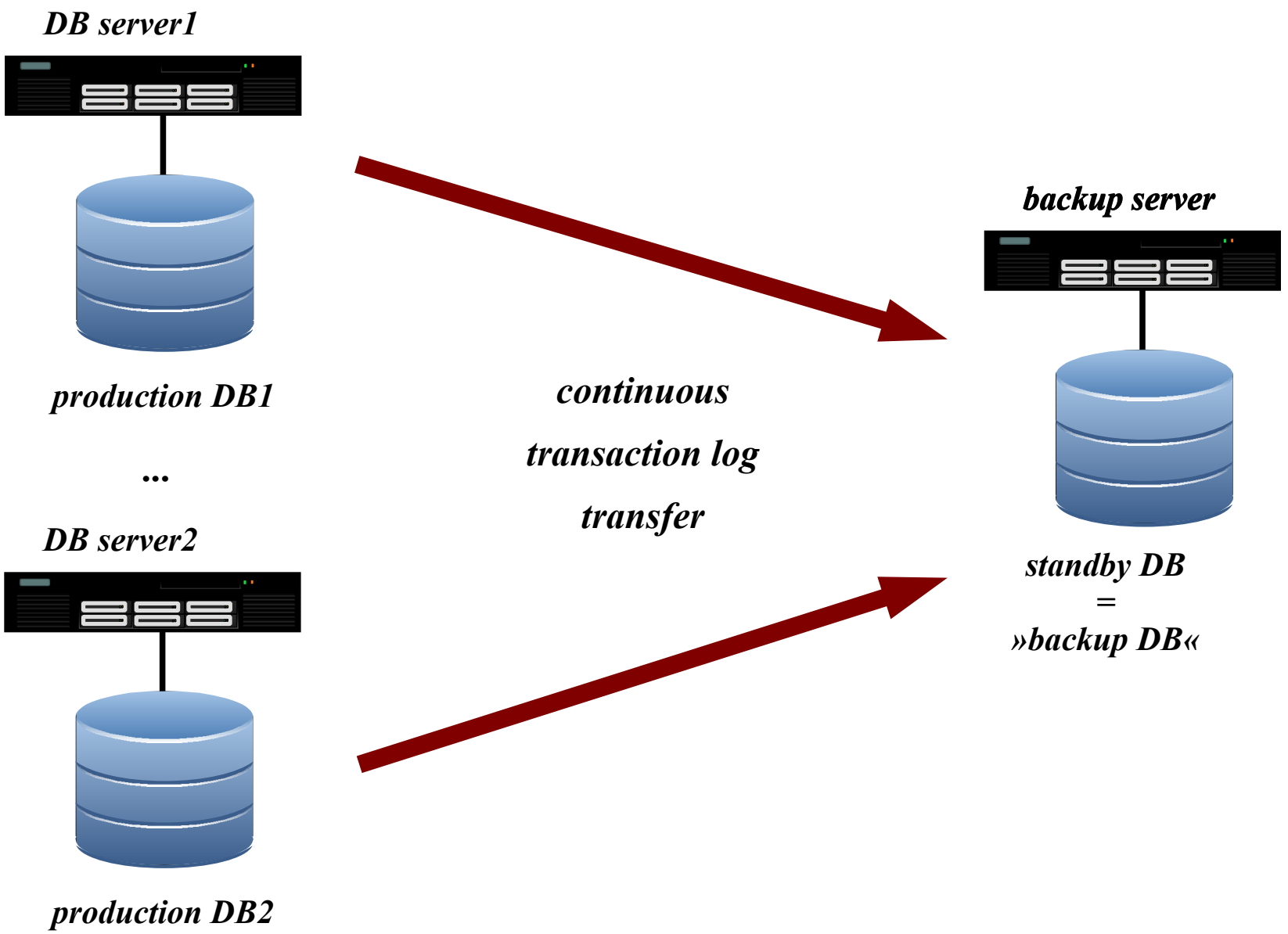
Point-in-Time	2014-08-24-19-08-54
Simple Connect String	//backup.hlon.local:1521/pthibis
TNS Block	ORCL10_BACKUP = (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP) (HOST = backup.hlon.local) (PORT = 1521)) (CONNECT_DATA = (SERVICE_NAME = pthibis)))
Log Level	INFO

Close Database

Log Files: alert_pthibis.log, bks_task_pthibis.log

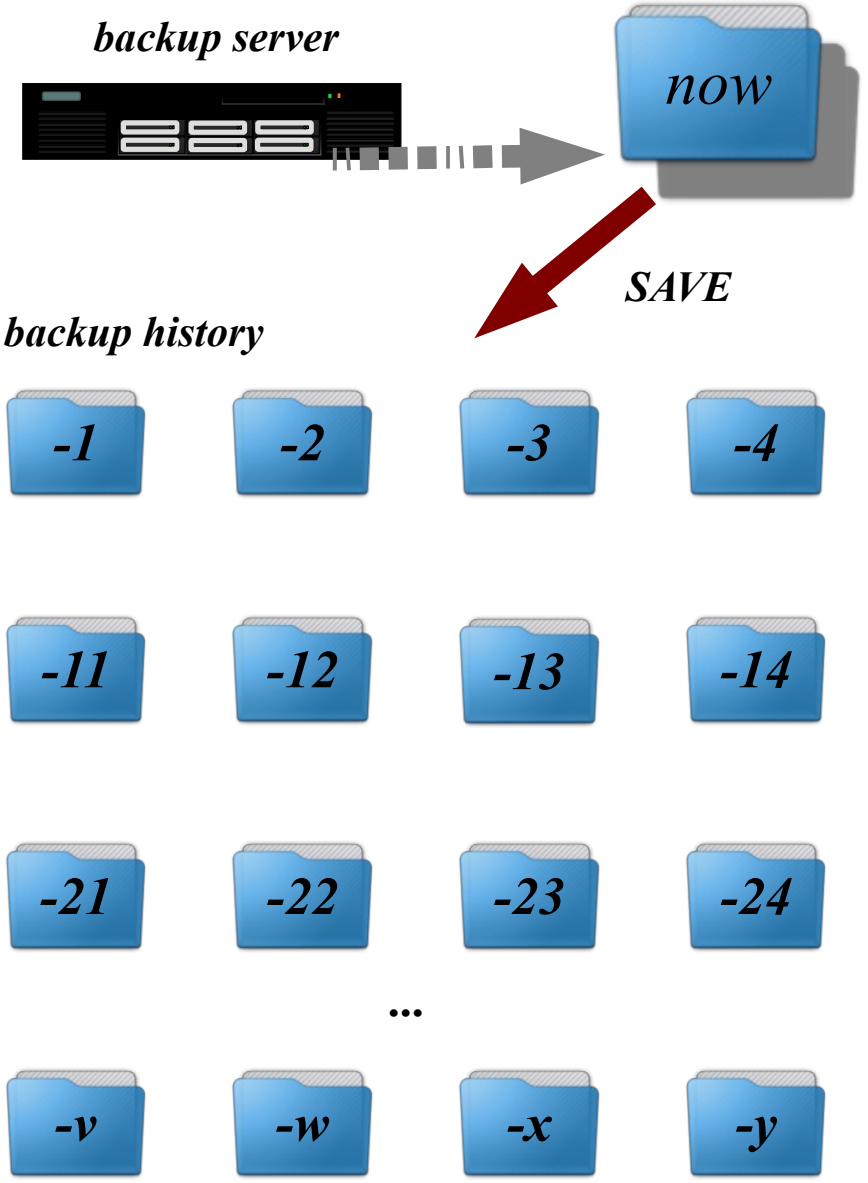
Path	Size			Status
/zbackup/ORCL10-2014-10-03-23-00				**UNKNOWN**
/zbackup/ORCL10-2014-10-02-23-00	861 G			OK
/zbackup/ORCL10-2014-10-01-23-00	860 G			OK
/zbackup/ORCL10-2014-09-30-23-00	860 G			OK
/zbackup/ORCL10-2014-09-29-23-00	859 G			OK
/zbackup/ORCL10-2014-09-28-23-00	858 G			OK
/zbackup/ORCL10-2014-09-27-23-00	858 G			OK
/zbackup/ORCL10-2014-09-26-23-00	858 G			OK
/zbackup/ORCL10-2014-09-25-23-00	858 G			OK
/zbackup/ORCL10-2014-09-24-23-00	857 G			OK
/zbackup/ORCL10-2014-09-23-23-00	857 G			OK
/zbackup/ORCL10-2014-09-22-23-00	857 G			OK
/zbackup/ORCL10-2014-09-21-23-00	857 G			OK
/zbackup/ORCL10-2014-09-20-23-00	857 G			OK
/zbackup/ORCL10-2014-09-19-23-00	857 G	2014-09-19 23:00:00	2014-09-19 19:09:55	OK
/zbackup/ORCL10-2014-09-18-23-00	857 G	2014-09-18 23:00:00	2014-09-18 19:09:50	OK
/zbackup/ORCL10-2014-09-17-23-00	857 G	2014-09-17 23:00:00	2014-09-17 19:09:47	OK
/zbackup/ORCL10-2014-09-16-23-00	857 G	2014-09-16 23:00:00	2014-09-16 19:09:53	OK
/zbackup/ORCL10-2014-09-15-23-00	857 G	2014-09-15 23:00:00	2014-09-15 19:09:10	OK

Backup server: behind the scenes



… and history

- snapshot
- save snapshot
- Time and resources are consumed exclusively on backup server
- Backup occupies a lot of disk space !?



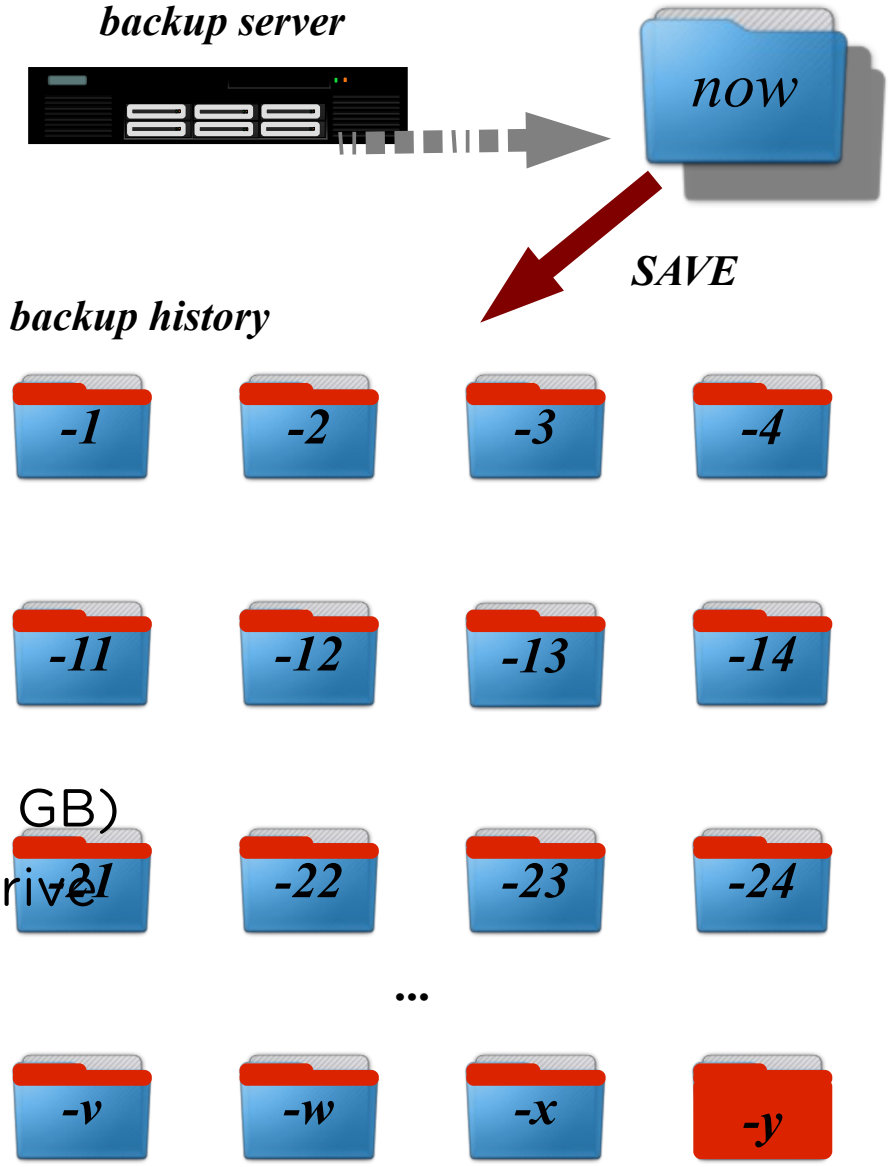
… and (almost) no disk space

… by using data deduplication

- snapshot
- save snapshot
  to deduplicated area

Example:

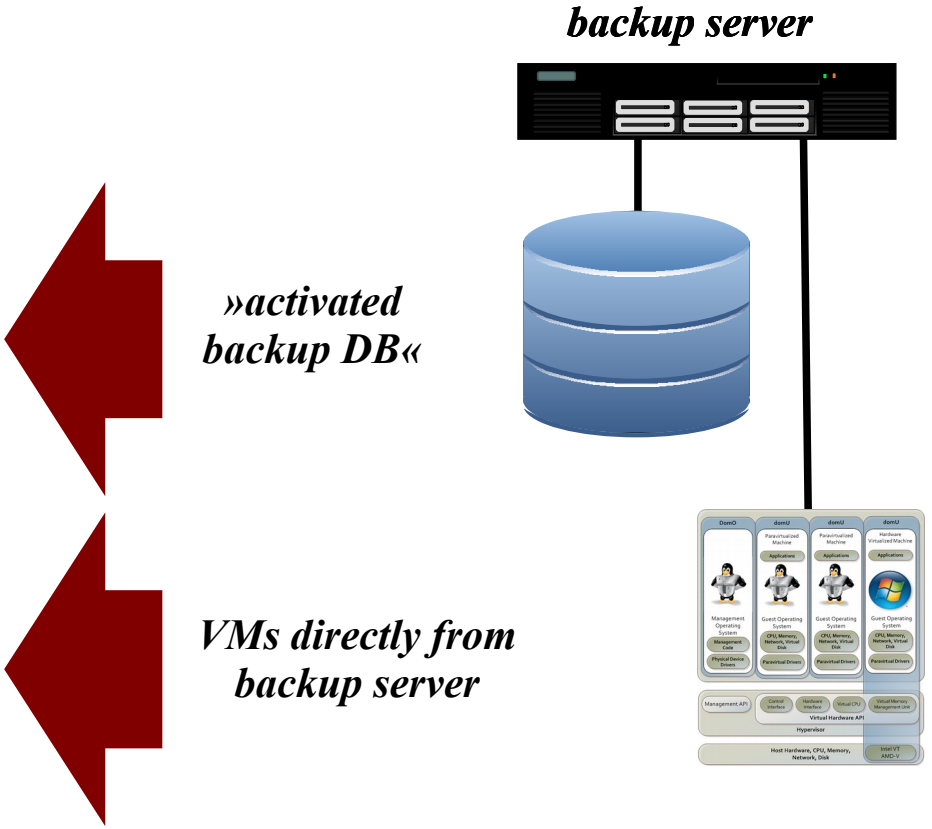
- DB size 1 TB
- 1% changed/added data per day (~10 GB)
- ~200 days backup fits on 3 TB disk drive



Recovery in no time – scenario 1

Recovery as a Service (RaaS)

- services are offered directly from the backup server

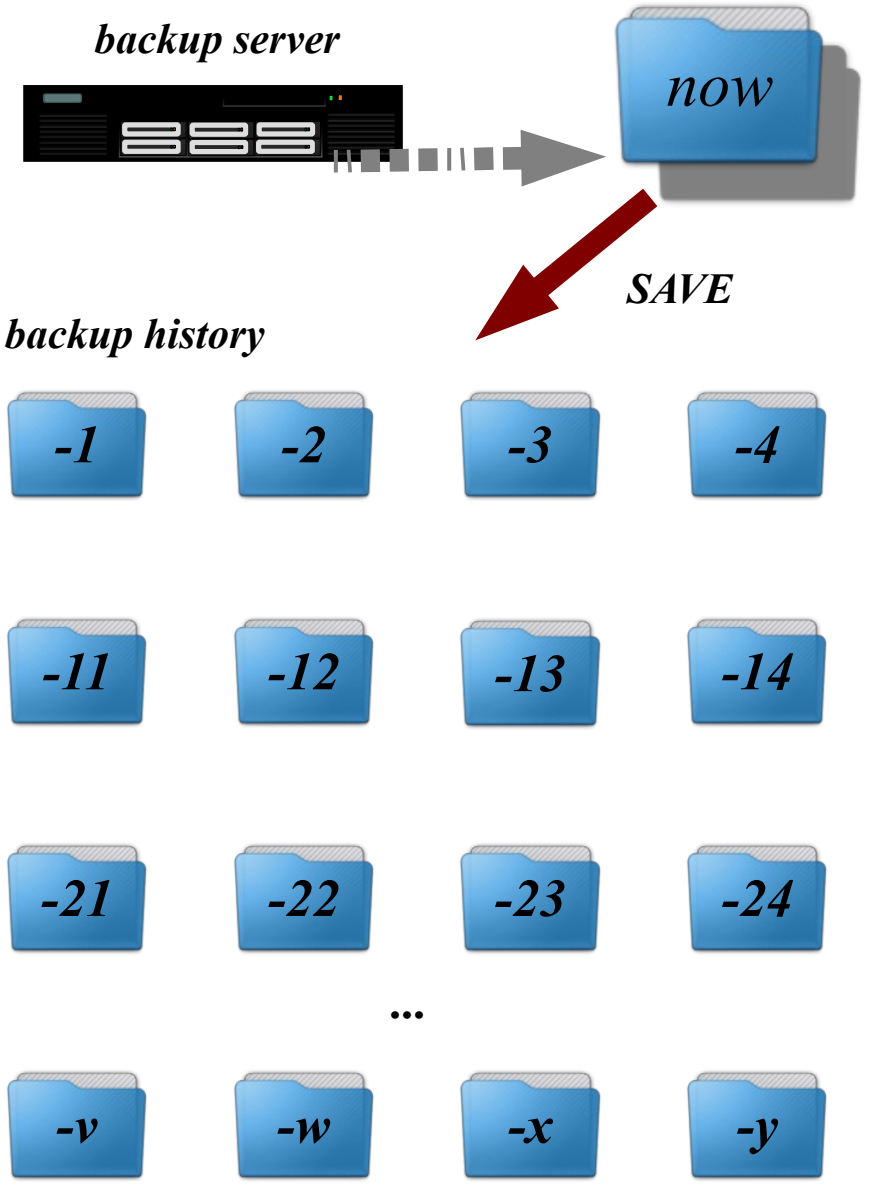


BACK IN BUSINESS IN NO TIME!*

* real restore in more appropriate time

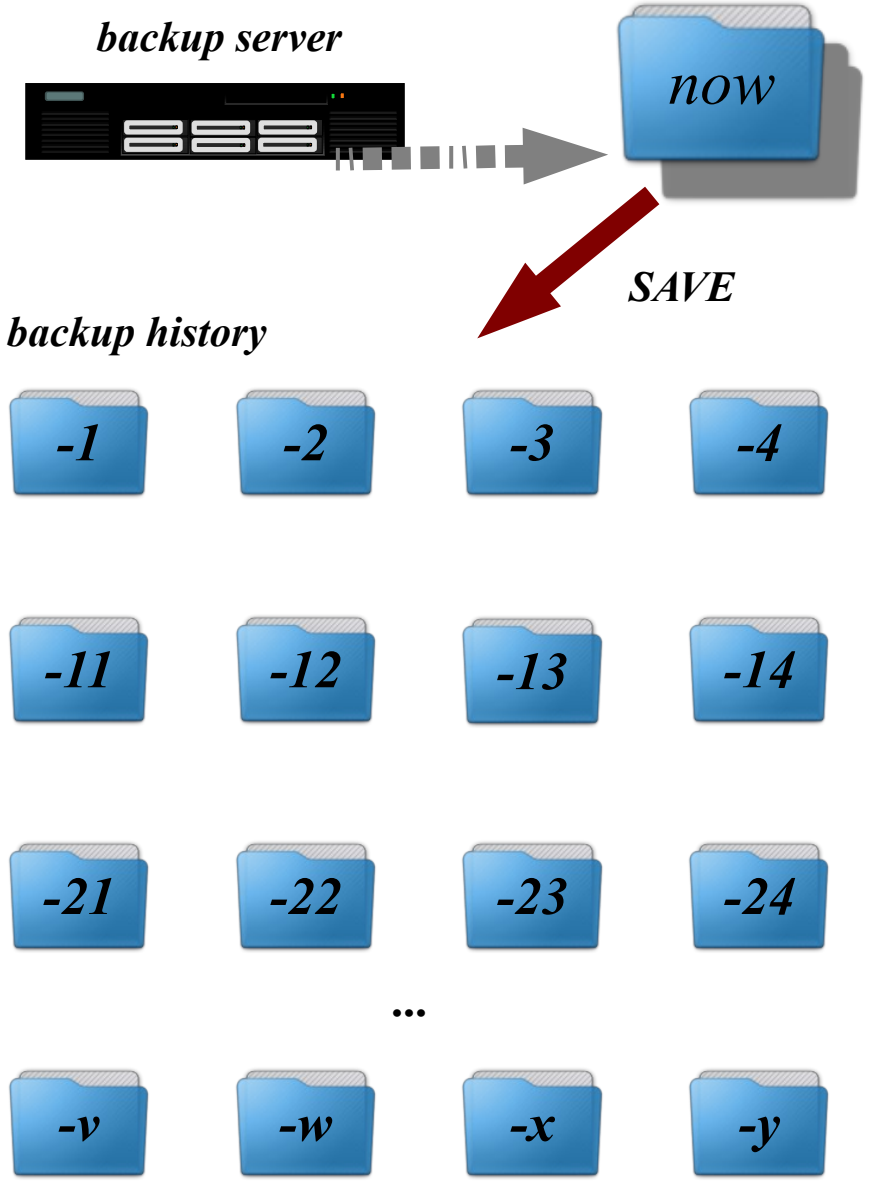
Alternative use

- BI – business analysis purposes and reporting
- testing upgrade
- development & test



Sources

- Oracle databases
- virtual machines
- SANs
- servers
- clients
- databases
- ...



Space utilization

Bank

- Everyday backups.
- **6** databases, largest **13 TB.**
- Total disk capacity **60 TB.**
- Total saved since jun 2015: **380 TB.**

Abakus
As na disku.

The solution

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

Abakus
As na disku.

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

Boris Oblak
Abakus plus d.o.o.

ORACLE CERTIFIED PROFESSIONAL

ORACLE Gold Partner

Testing & development