

Enrique Orbeagozo

Independent Consultant

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# Real Life Successful Upgrade Project

# Sobre mi



**ORACLE MAGAZINE**

## Close Encounters

Three peers extol the virtues of in-person classes and conf



**DOMINIC DELMOLINO**  
ORACLE ACE

**Company:** Agilex Technologies, a technology solution provider serving the national security, healthcare, and public sectors  
**Job title/description:** Vice president of data architecture and engineering, responsible for reviewing and supporting Agilex projects at customer locations  
**Location:** Lima, Peru



**ENRIQUE ORBEOGOZO**  
ORACLE ACE

**Company:** Self-employed  
**Job title/description:** Independent Oracle consultant, responsible for database upgrades and migration, database and application tuning, incident resolution, and design and configuration of high-availability solutions  
**Location:** Lima, Peru

Diagnostico Enrique

Desde: Self Ayuda País - Comunidades - Soy un... - Necesito... Search

Productos Soluciones Descargas Tienda Soporte Capacitación Socios Acerca de OTN

Oracle Technology Network - Artículos - Administración de Servidores y Storage

Financiero para el Desarrollo de Aplicaciones

Aplicación Express

Business Intelligence

Cloud Computing

Controladores

Desarrollo y Disponibilidad de Bases de datos

Data Warehousing

NET

Lenguajes de Programación

Operación

Entendimiento

Enterprise 2.0

Arquitectura Enterprise

Database Management

Grid Computing

Integración y Seguridad

Java

Linux

Monitor-Managed Architecture

OCI: A PL/SQL

Administración de Servidores y Storage

Desarrollo de Memoria

Storage

Hardware y Arquitectura de Sistemas

Virtualización

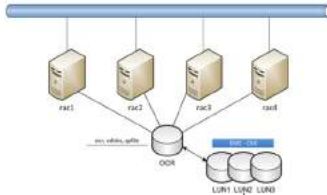
### ¿Cómo mover ocr y ydisk a nuevo disk array?

Por Enrique Orbeagozo

Publicado en noviembre 2012

No hace mucho, uno de mis clientes inició el proceso de migración de su data storage system, desde EMC CX4 hacia EMC VNX. Ellos tienen sus bases de datos alojadas con Oracle RAC 11.2.0.3, por lo que siguieron el procedimiento de agregar LUNs del nuevo EMC VNX a los discos de datos, para luego mover los LUNs del antiguo EMC CX4, aprovechando el mecanismo automático que hace ASM al agregarle y verificación de datos. Desde ese momento, inicié el trabajo sobre el diagnóstico que contiene el ocr, ydisk, ocrdb y salida de ASM, basado en este caso OCR, para el cual el procedimiento no es tan simple como agregar y mover datos. La continuación los mostraré en detalle el procedimiento que siguió para cumplir con este objetivo paso a paso en la migración de disk storage system para este diagnóstico, cumpliendo el requerimiento expresado del cliente: **no afectar el servicio.**

Encontrar por mencionar el concepto sobre el cual se trabajó:



**Toad World**  
Connected Intelligence

DISCUSS in the community | LEARN from expert resources | DOWNLOAD our freeware | FOCUS on a platform

## Enrique Orbeagozo

Profile | Activity | Blog Posts | Following | Groups | Likes



**Community Expert**

**Title:** Oracle Independent Consultant - Oracle ACE  
**Location:** Lima, Perú  
**Education:** Systems Engineering

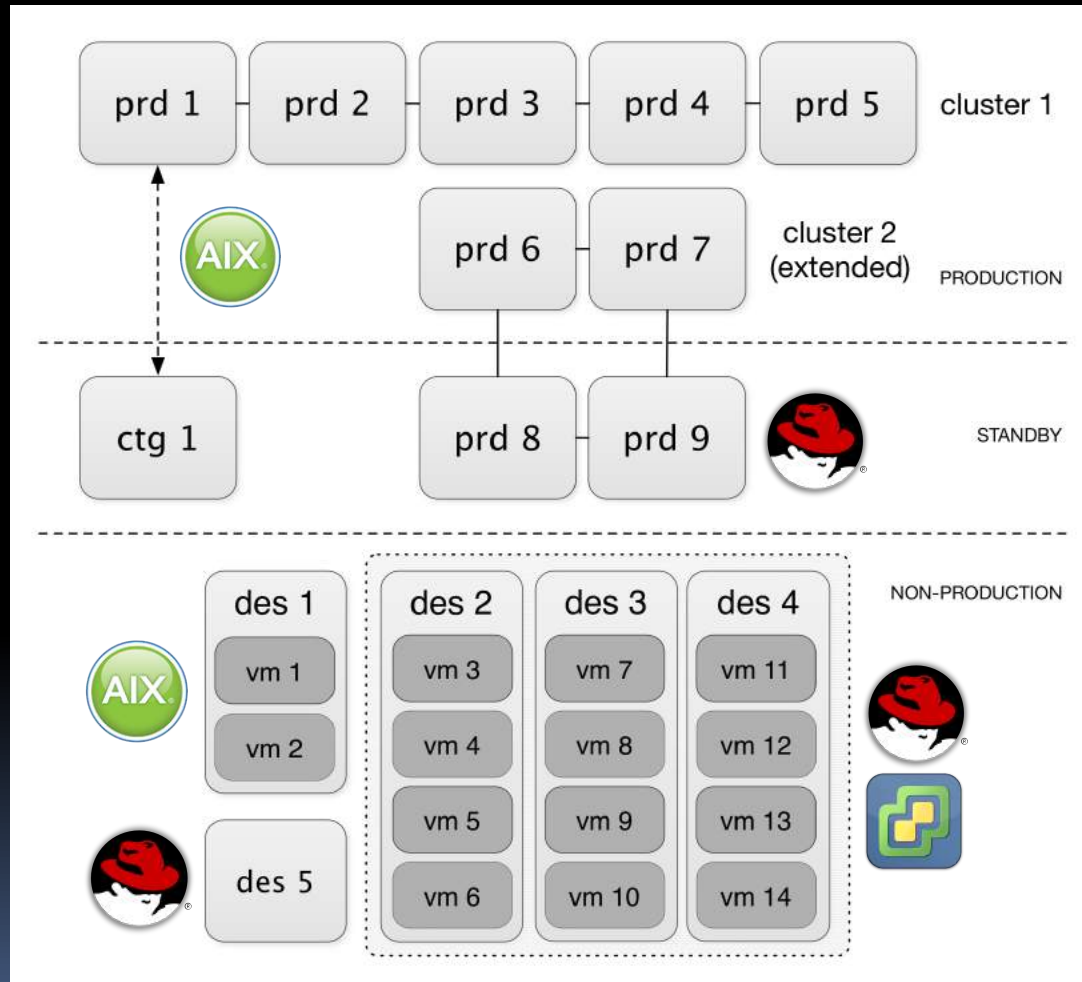
**More About Me:**  
Enrique started with Oracle in 1994 while studying Systems Engineering at National University of Engineering. He designed and coded applications with SQL Forms, SQL and PL/SQL, and his proficiency quickly led him to join Oracle of Peru as a Support Engineer. In 1995 he began a career as an independent contractor, providing many services in both modernization projects for the government and important businesses in the private sector.

After more than a decade of work, he decided to contribute his experience and knowledge back to the community. In 2007, he became an instructor of Oracle University courses. A short time later, he created Snapshot Too Old, a blog primarily serving the Spanish-speaking community. At the same time, he also began participating in the OTN Forums, where his solutions were so well received that within a few weeks he was listed as one of the Top Users.

# Agenda

- Existing situation
- Alternative
- Migration & upgrade
- Issues
- Recommendations
- Q&A

# Current Architecture



# Goals

- Remain on a supported release
- Resolve bugs and issues
- Increase performance
- Cost savings

# Supported Versions

Release	Patching Ends	Notes and Exceptions*
12.1.0.2	31-Jul-2021	Extended Support begins 1-Aug-2018
12.1.0.1	31-Aug-2016	
11.2.0.4	31-Dec-2020	Extended Support fees waived until May 31, 2017. An ES service contract is required starting 1-Jun-2017.
11.2.0.3	27-Aug-2015	
11.2.0.2	31-Oct-2013	End date extended beyond normal.
11.2.0.1	13-Sep-2011	Patch end date for Exadata is 30-Apr-2012

# Let's go to 12c!?

Response [REDACTED]

07/23/2015 06:35 AM

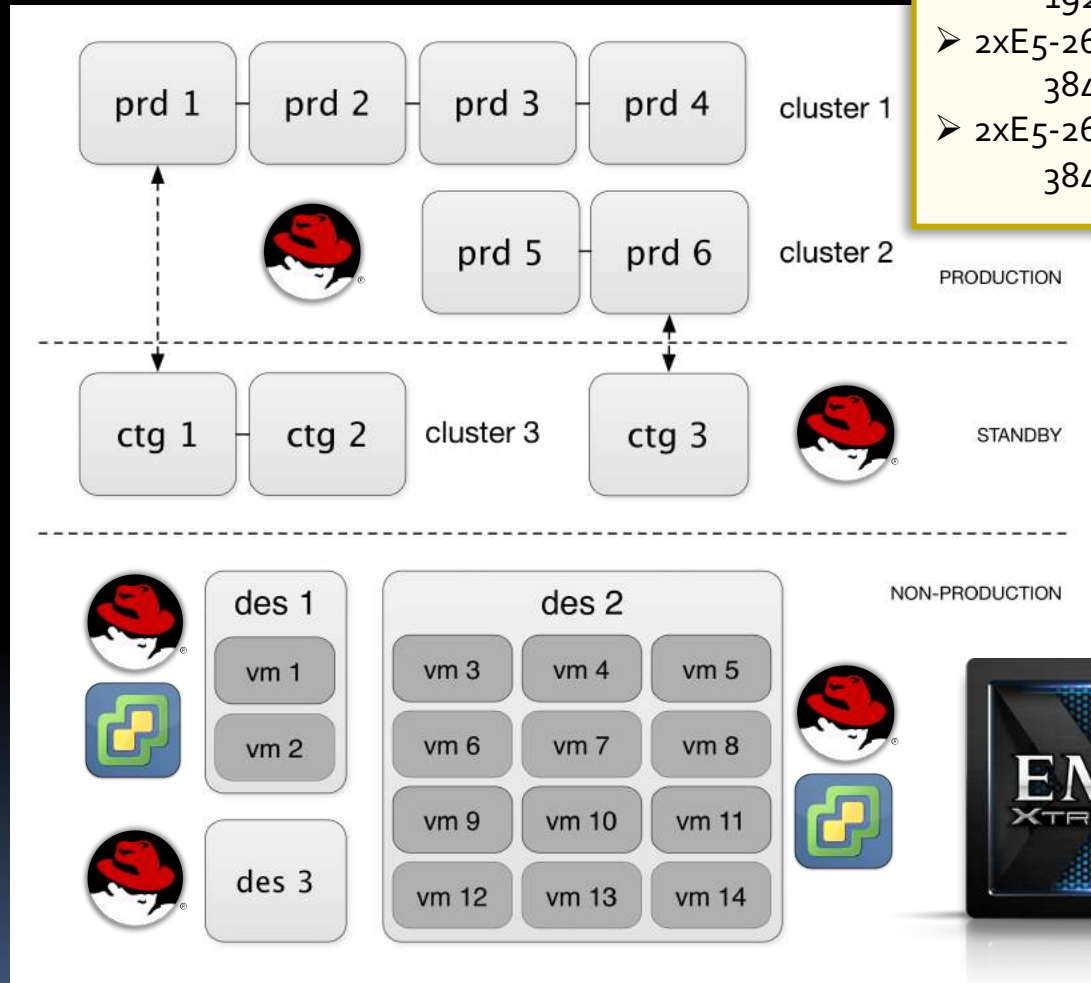
Hi [REDACTED]

[REDACTED] had requested for the exact same information. Please find DEV's response below :

-----  
-----  
-----  
The patching end date for 11.2.0.3 is August 27, 2015, but for 11.2.0.4 is January 21, 2018, with the extended support option, which is a supported Oracle version for [REDACTED], so they should consider upgrading to 11.2.0.4 instead of 12c. After January 2018 they'll still have indefinite sustaining support.

# Planned Architecture

- 1xE5-2637 v3 (4 cores)  
192GB RAM
- 1xE5-2643 v3 (6 cores)  
192GB RAM
- 2xE5-2637 v3 (8 cores)  
384GB RAM
- 2xE5-2699 v3 (36 cores)  
384GB RAM





# Any savings?

**-\$3'500,000**

Scenario	Cores	Specs	High Availability	Disaster Recovery	Licenses
Current	****	**	Yes	Partial	
Planned	**	****	Yes	Yes	

# The “Heroes”

- Team Leader
- Oracle Expert
- DBA
- Sys Admin
- Storage Admin
- Networking Admin



# Recommended Patches: PSU

MOS Note 756671.1

## 12.1.0.2 Current Recommended Patches

### Patch Set Updates

Document	Description	Rolling RAC	Patch Download
<a href="#">Note:21150768.8</a>	Combo of 12.1.0.2.4 OJVM PSU and 12.1.0.2.4 DB PSU (Jul 2015)	Part	<a href="#">Patch:21150768</a>
<a href="#">Note:21068507.8</a>	Oracle JavaVM Component 12.1.0.2.4 Database PSU (Jul 2015) (OJVM PSU)	No	<a href="#">Patch:21068507</a>
<a href="#">Note:20831110.8</a>	12.1.0.2.4 (Jul 2015) Database Patch Set Update (DB PSU)	Yes	<a href="#">Patch:20831110</a>

### Grid Infrastructure

Document	Description	Rolling RAC	Patch Download
<a href="#">Note:21150782.8</a>	Combo of 12.1.0.2.4 OJVM PSU and 12.1.0.2.4 GI PSU (Jul 2015)	Part	<a href="#">Patch:21150782</a>
<a href="#">Note:20996835.8</a>	12.1.0.2.4 (Jul 2015) Grid Infrastructure Patch Set Update (GI PSU)	Yes	<a href="#">Patch:20996835</a>

# Recommended Patches:Optimizer

No PSU	PSU 1	2	3	4	Bugs Fixed
					<a href="#">Document 19855835.8</a> Upgrade slow when reorganizing large stats history tables <b>NB: Only applicable for upgrades from 11.2.0.3 or below. Apply before running the 12.1.0.2 upgrade script. There is no benefit to applying it later on.</b>
					<a href="#">Patch 19855835</a> for 12.1.0.2.0
					<a href="#">Document 20476175.8</a> High VERSION_COUNT (in V\$SQLAREA) for query with OPT_PARAM('_fix_control') hint <a href="#">Document 20807398.8</a> ORA-600 [kgl-hash-collision] with fix to bug 20465582 installed
					<a href="#">Patch 21386421</a> for 12.1.0.2.0
					<a href="#">Document 21091518.8</a> Extend fix of bug 18304693 to Partition Views
					<a href="#">Patch 21091518</a> for 12.1.0.2.0

MOS Note 2034610.1 (12.1.0.2)  
 MOS Note 1645862.1 (11.2.0.4)  
 MOS Note 1392633.1 (11.2.0.3)  
 MOS Note 1320966.1 (11.2.0.2)

# Recommended Patches:OGG

MOS Note 1557031.1

11.2.0.4 PSU level	OGG RDBMS Patch ID	Patch Description
11.2.0.4.7	<a href="#">Patch:21360686</a>	MERGE REQUEST ON TOP OF DATABASE PSU 11.2.0.4.7 FOR BUGS 2990912 14705949
11.2.0.4.6	<a href="#">Patch:21417957</a>	MERGE REQUEST ON TOP OF DATABASE PSU 11.2.0.4.6 FOR BUGS 16674686 17031322
11.2.0.4.5	<a href="#">Patch:20593645</a>	MERGE REQUEST ON TOP OF DATABASE PSU 11.2.0.4.5 FOR BUGS 17201159 17208934
11.2.0.4.3	<a href="#">Patch:20409915</a>	MERGE REQUEST ON TOP OF DATABASE PSU 11.2.0.4.3 FOR BUGS 15913355 16194160

# More Recommended Patches

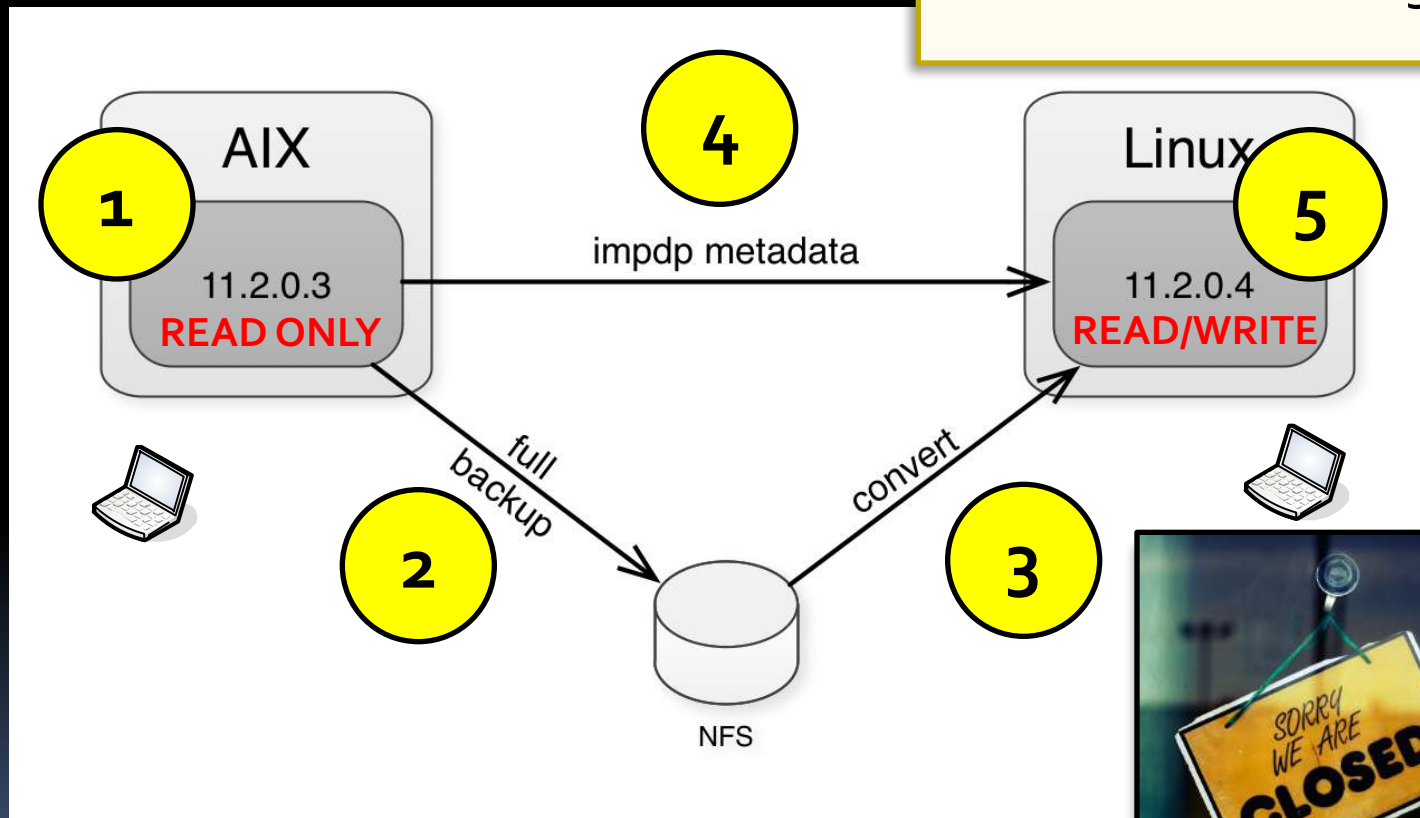
- Bug Issues Known to Affect the Shared Pool (Doc ID 102305.1)
- Checklist For Slow Performance Of DataPump Export (expdp) And Import (impdp) (Doc ID 453895.1)

# Special requirements (AIX)

- “Zero” downtime
- “Zero” interference with production
- “Zero” time to failback
- Read only apps must work but no space for creating a physical standby on linux
- Keep IPs (no IPs available on subnet)

# Cross Platform Transportable Tablespaces (XTTS)

MOS Note 1166564.1





# XTTS- The Right Way

MOS Note 1389592.1 (11.2)  
MOS Note 2005729.1 (12.1+)

Automated and with no need for read only!!!

- Download: rman-xttconvert\_2.0.zip
- Set environment

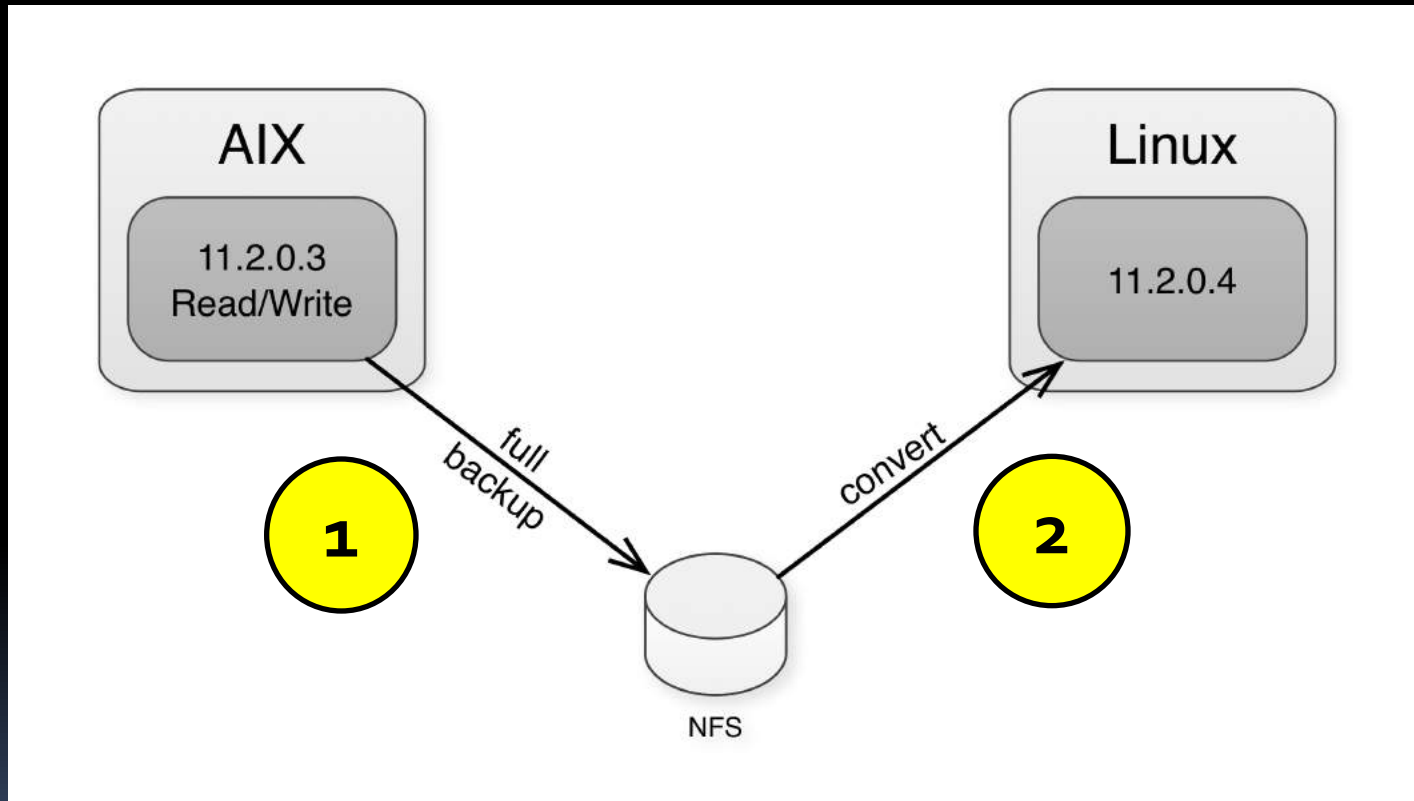
```
export TMPDIR=/home/oracle/xtts  
cd $TMPDIR
```

- Edit file: xtt.properties

```
tablespaces=tbs1,tbs2,...,tbs<n>  
platformid=<v$database.platform_id>  
dfcopydir=/path/on/aix/DB  
backupformat=/path/on/aix/DB  
stageondest=/path/on/linux/DB  
storageondest=+DG_ON_LINUX/DB/datafile
```

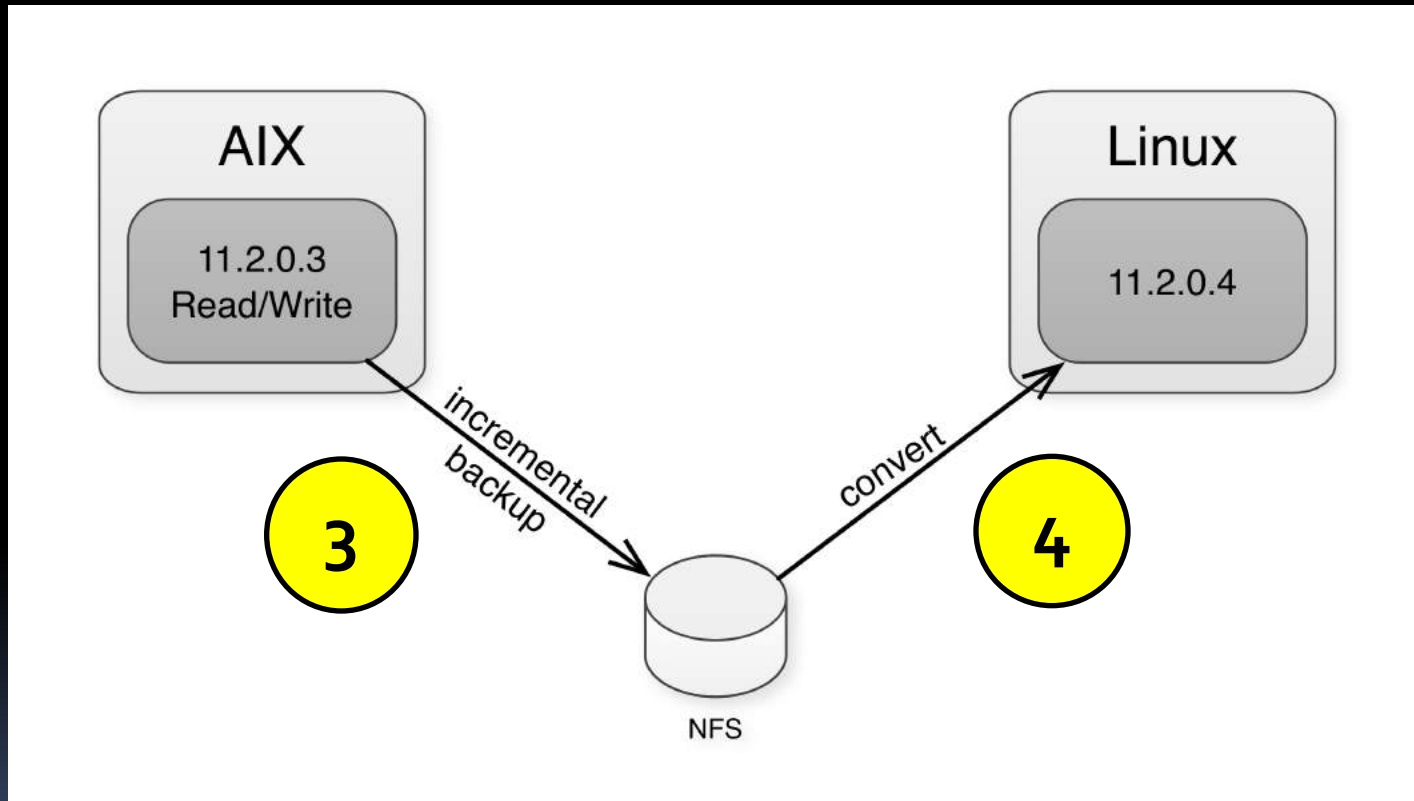
# Prepare

```
[aix]$ xttdriver.pl -p  
[lnx]$ xttdriver.pl -c
```



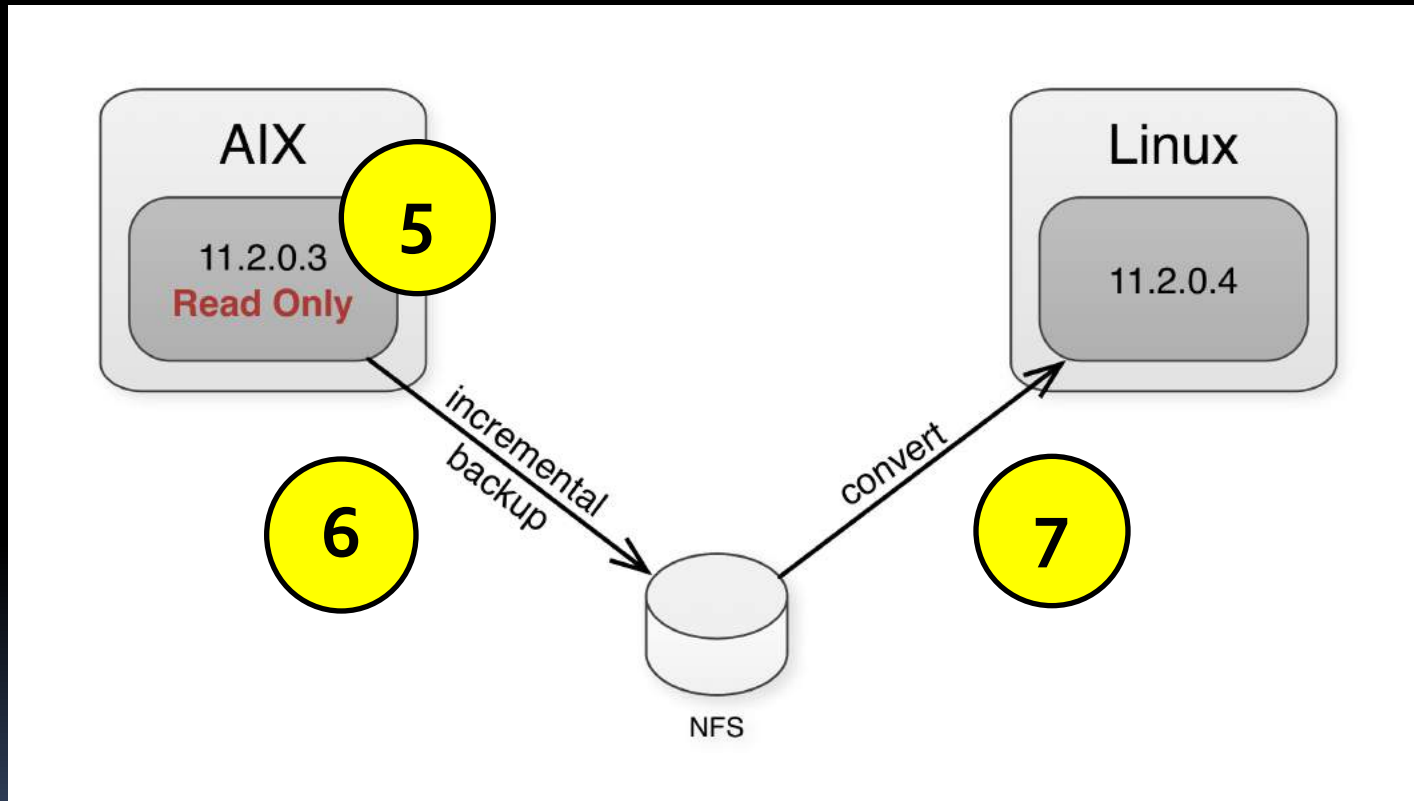
# Roll Forward

```
[aix]$ xttdriver.pl -i  
[lnx]$ xttdriver.pl -r
```

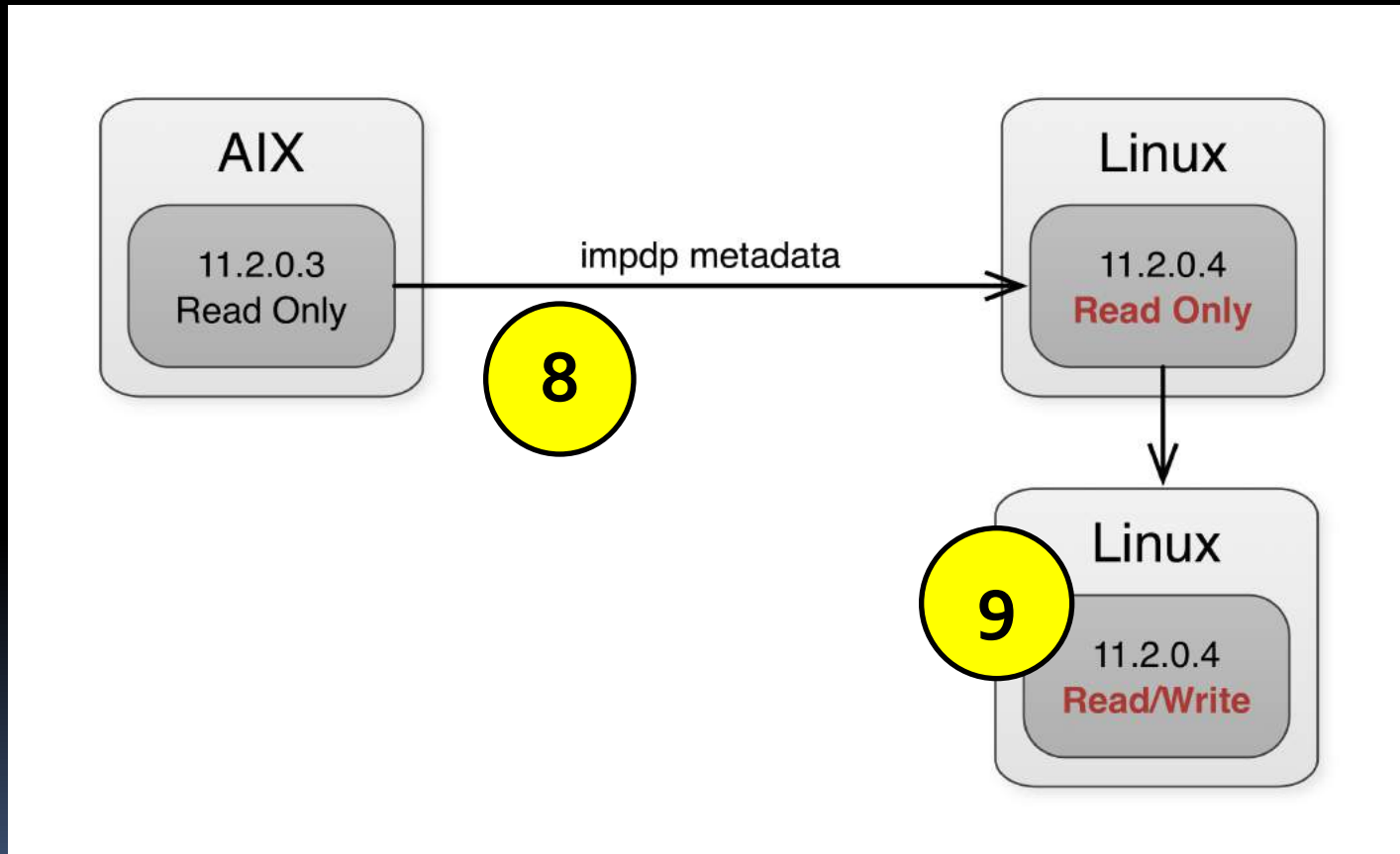


# Transport

```
[aix]$ xttdriver.pl -i  
[lnx]$ xttdriver.pl -r
```



# Transport (cont)



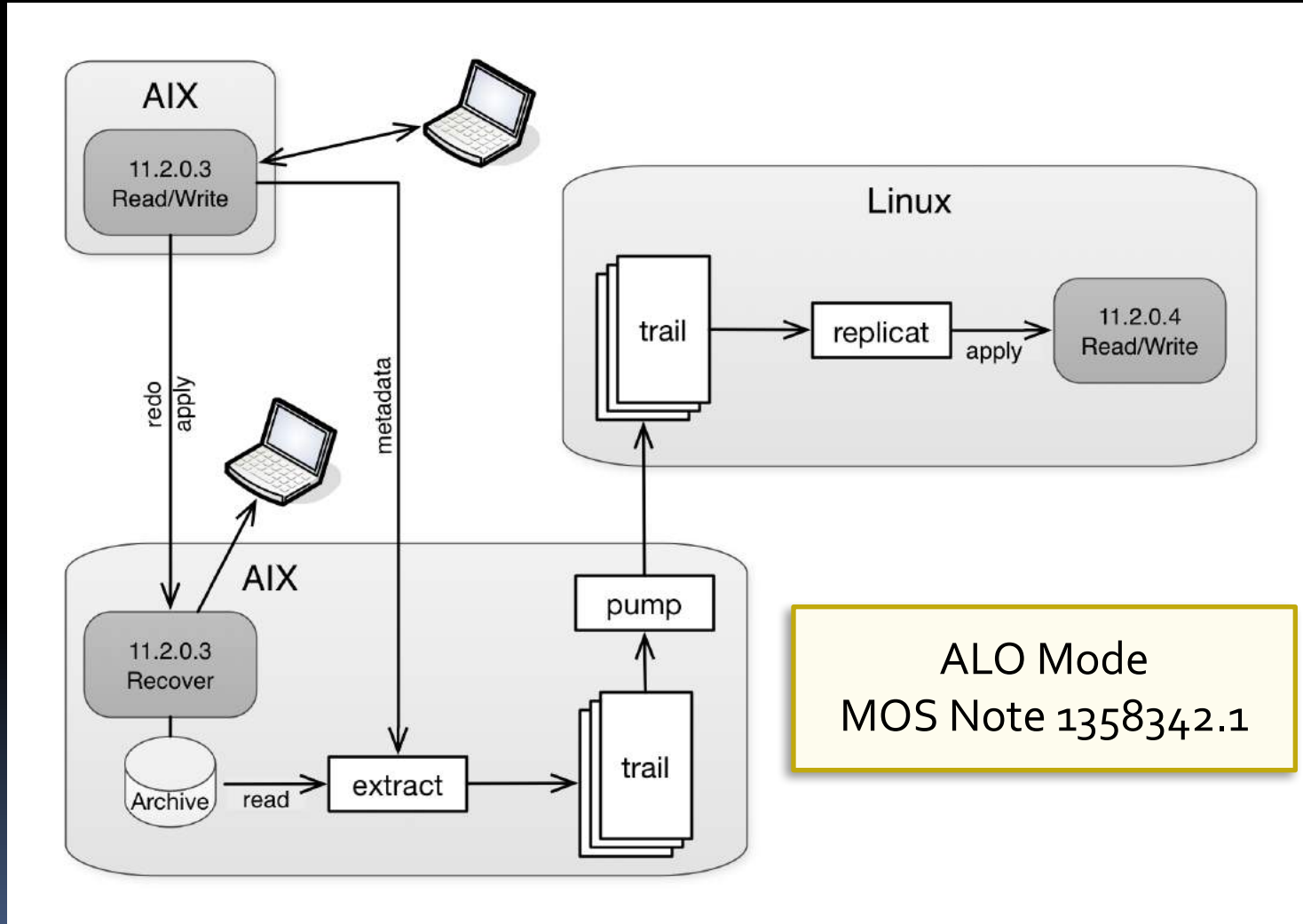
# XTTS Issues

- BCT limit  
`_bct_bitmaps_per_file` ( MOS Note 1192652.1)
- Paralellism and NO compression  
`CONFIGURE DEVICE TYPE DISK PARALLELISM 2  
BACKUP TYPE TO BACKUPSET;`
- Materialized views  
*Complete refresh with `atomic_refresh = false`*
- ACL  
MOS Note 1634275.1

# XTTS Issues (cont)

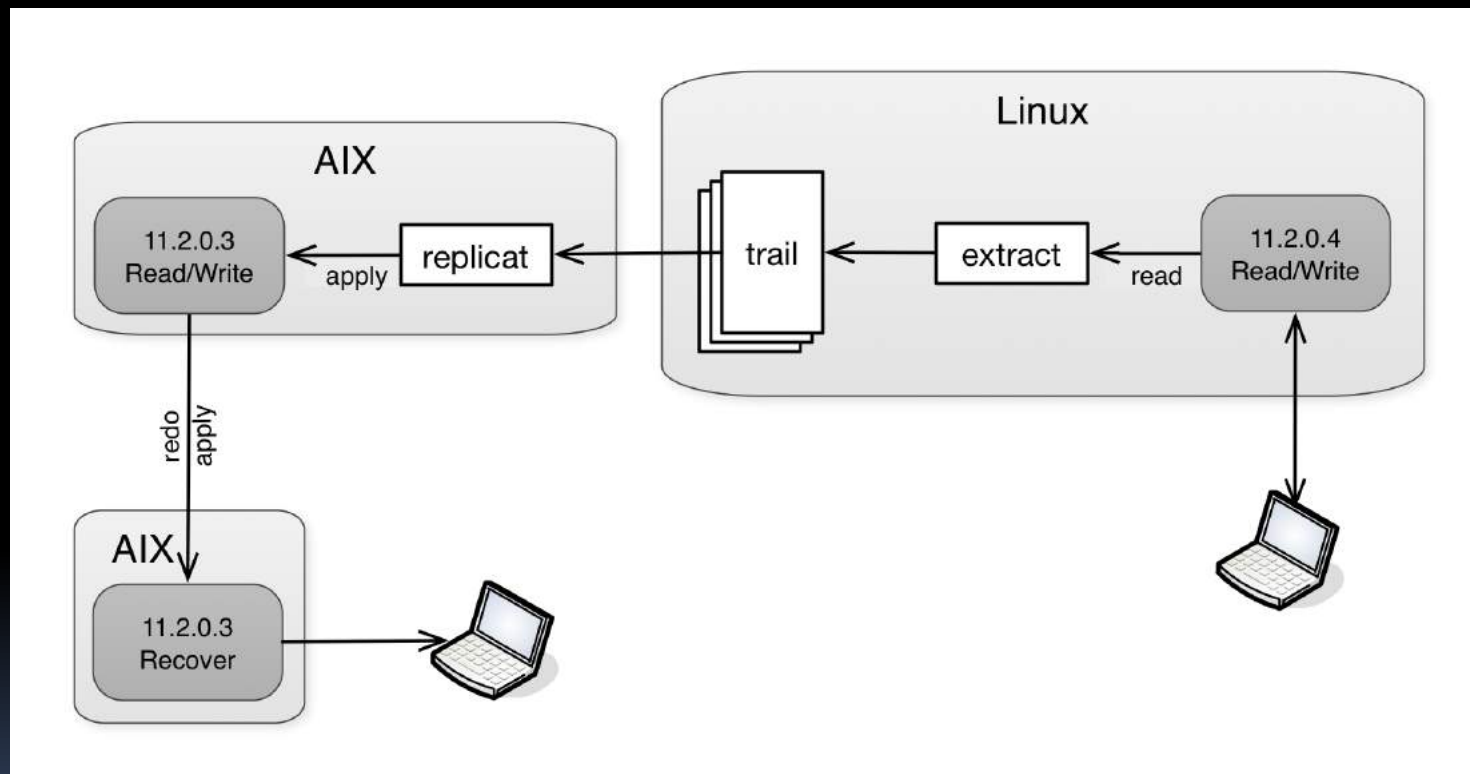
- Copy SPM, SQL Profiles
  - MOS Note 880485.1
  - MOS Note 457531.1
- Jobs/Scheduler
  - job\_queue\_processes=0
- SSD & 4KB
  - MOS Note 1681266.1
  - "\_DISK\_SECTOR\_SIZE\_OVERRIDE"=TRUE
  - alter database add logfile group 5 size 1G
  - blocksize 4096;

# Zero downtime?





# Failback / read only apps?



# OGG Issues

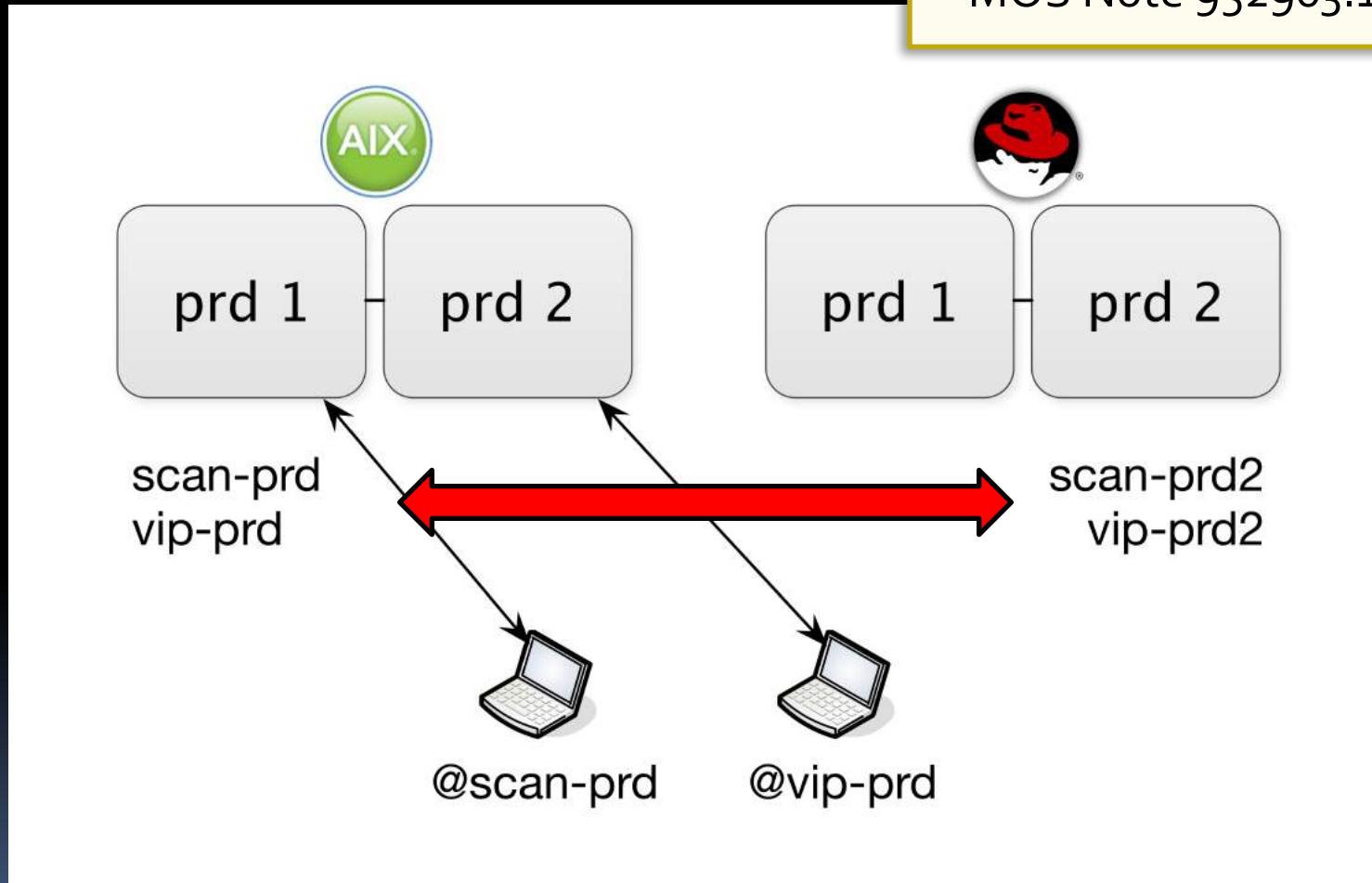
- Lack of examples  
**Trial and error**
- Thousands of tables with no primary key  
**Index reactively**
- Hundreds of sequences  
**Synchronize with script**
- High redo generation (1TB+/day)  
**DB excluded from migration**

# OGG Issues (cont)

- High memory usage  
**CACHEMGR CACHESIZE 10240MB,  
CACHEDIRECTORY /dirtmp**
- OGG-01875 Classic Extract doesn't support RAC parallel direct load of table  
**Bug? Switch to Integrated Extract**
- Extract hangs  
**Bug? send extract dbe, forcestop**
- Replicat abbends  
**REPERROR/RESOLVECONFLICT**

# Dealing with IPs

MOS Note 276434.1  
MOS Note 952903.1

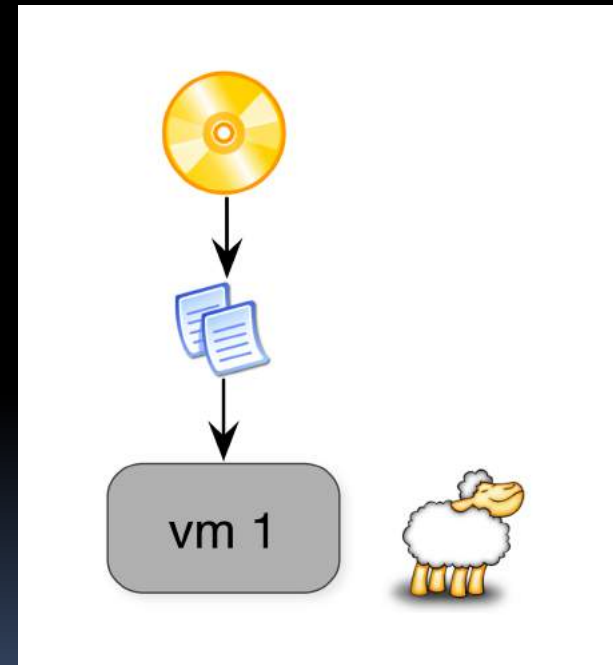
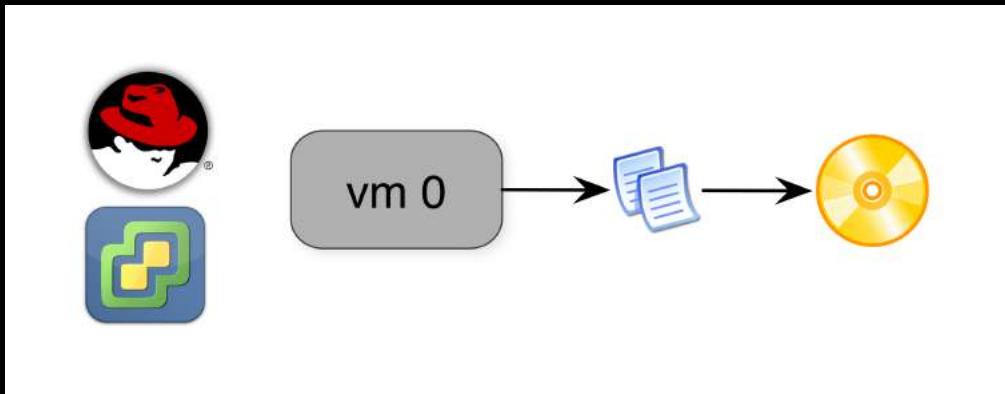


# Special requirements (Linux)

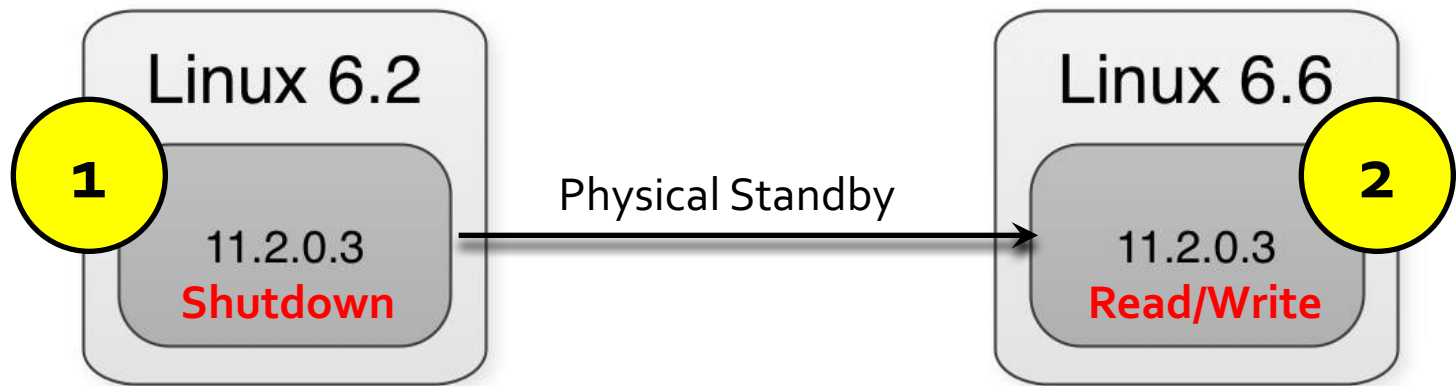
- Minimal downtime
- Minimal time to failback
- Keep IPs
- 12 VMs to migrate (ASM/Oracle SE)
- Up to 18 databases to upgrade simultaneously

# Cloning VMs

Change hostname/IP  
MOS Note 1552810.1

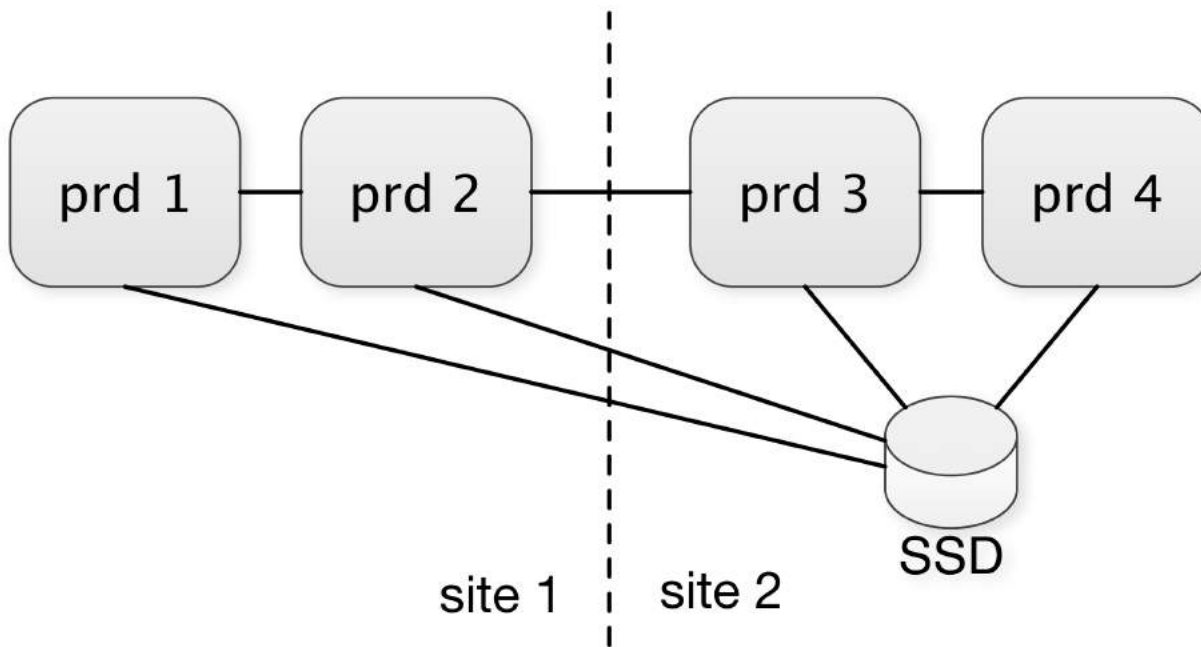


# Migration (Non RAC/SE)



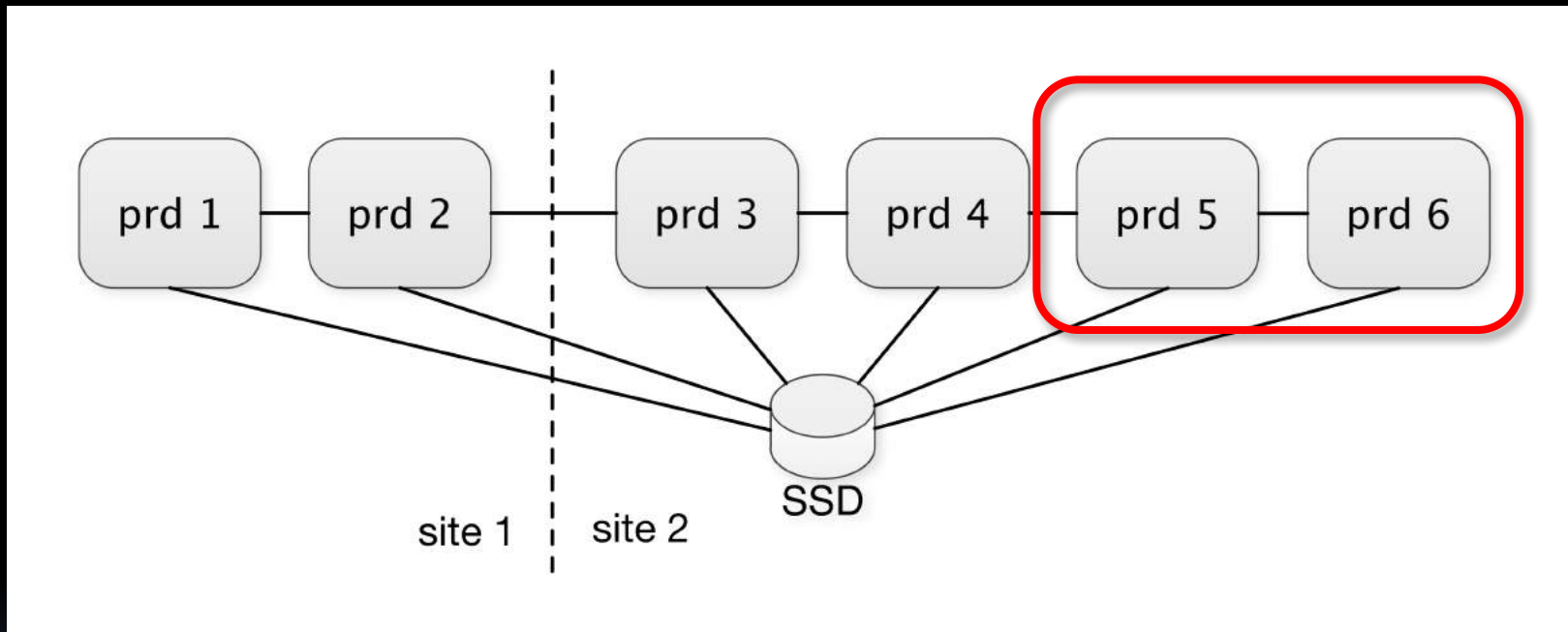
# Migration (RAC/EE)

MOS Note 438580.1

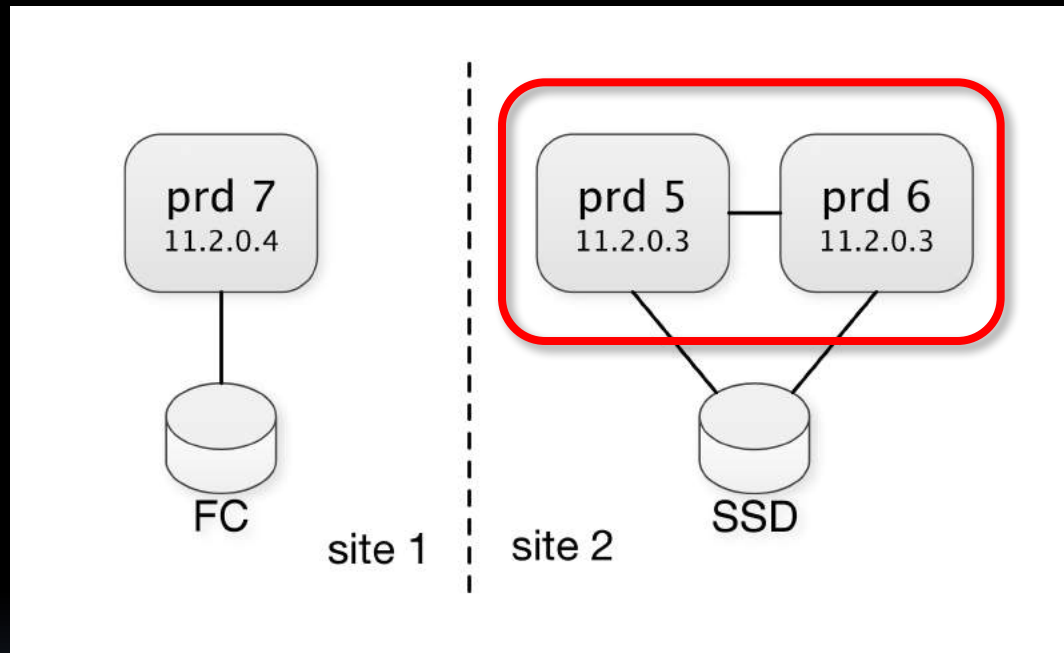




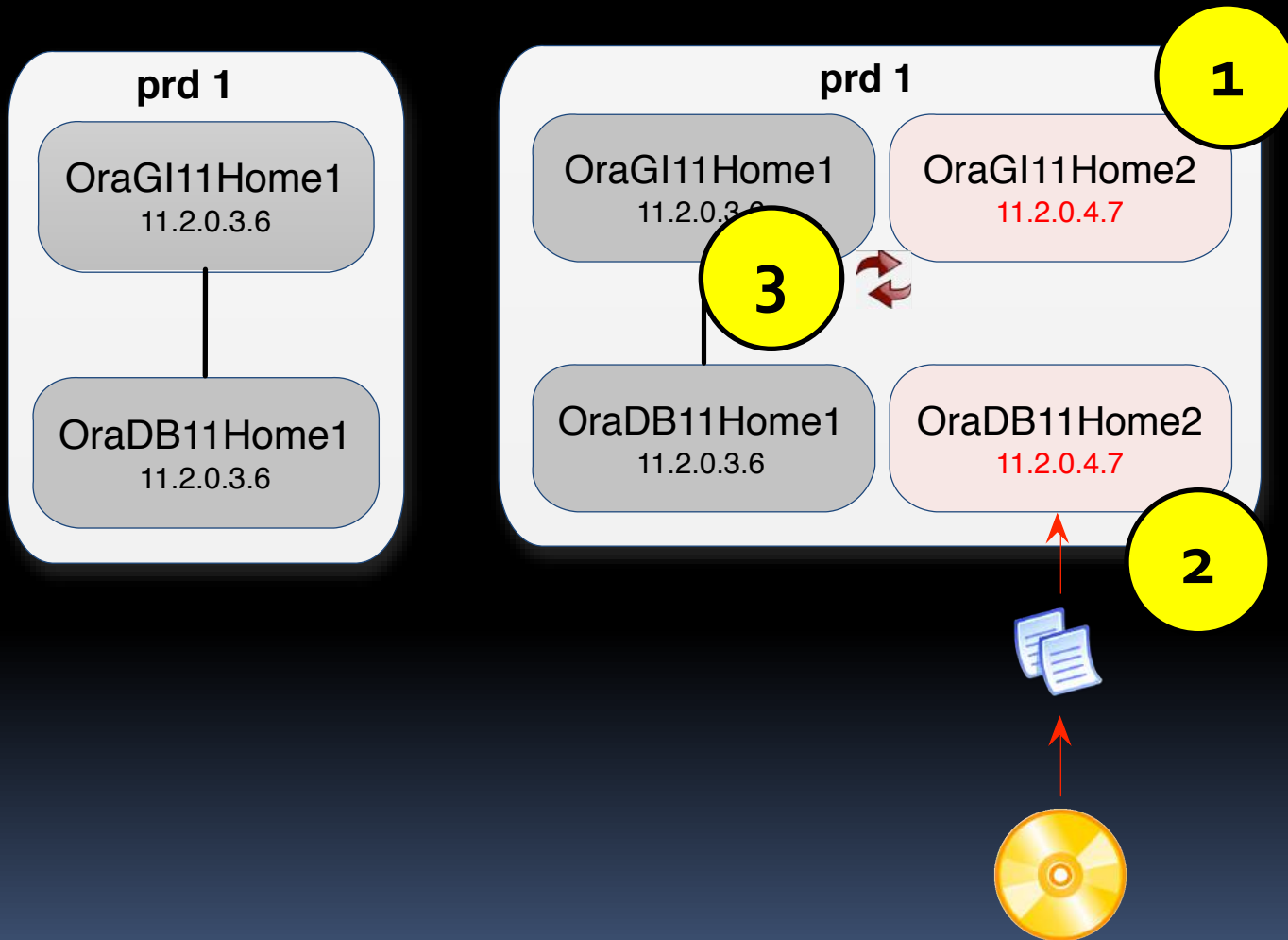
# Migration (cont)



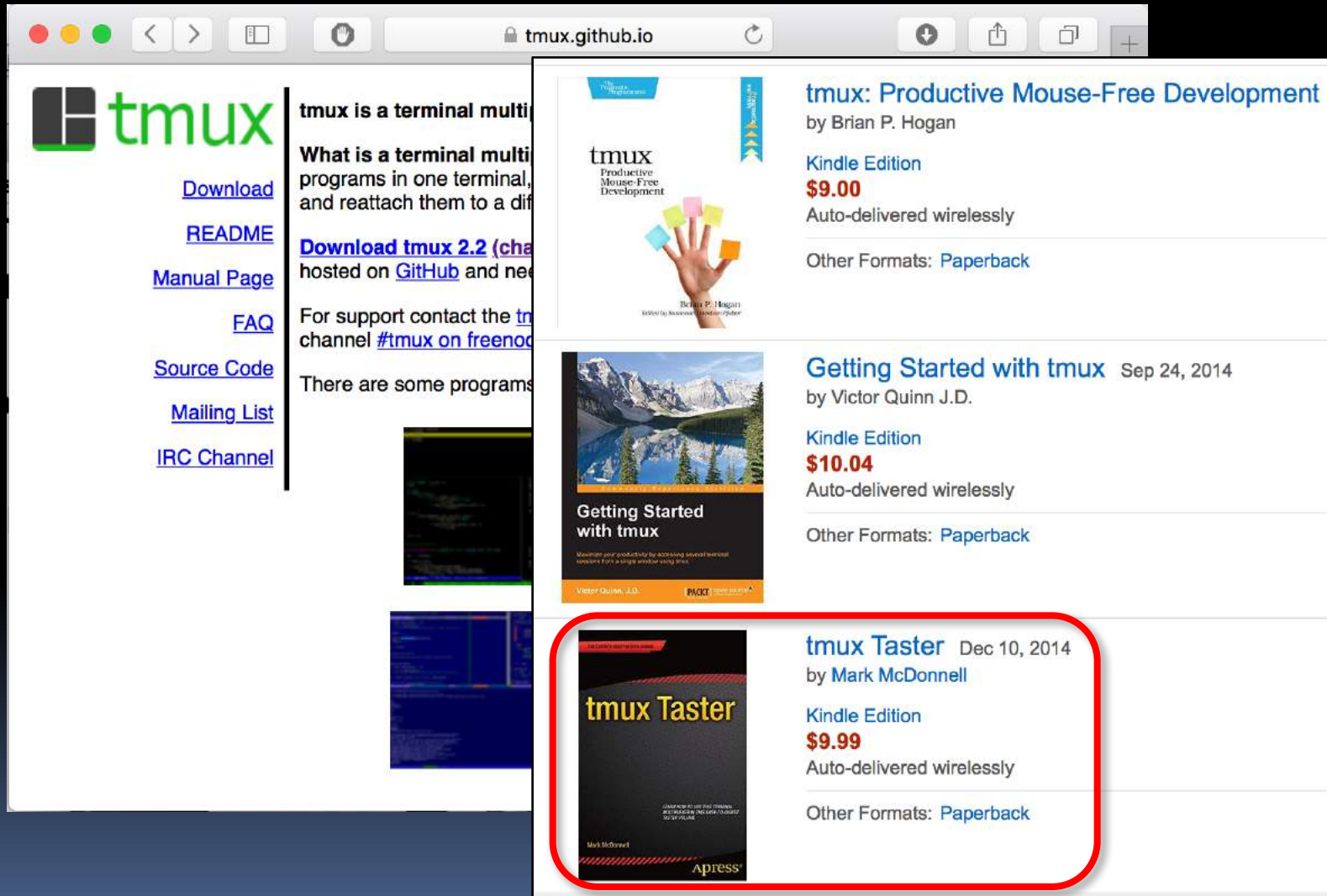
# Migration (cont)



# Software Upgrade (RAC/EE)



# Parallelize upgrade



The screenshot shows a web browser window with the URL `tmux.github.io`. The page content is split into two main sections. On the left, the tmux logo is displayed above a navigation menu with links for [Download](#), [README](#), [Manual Page](#), [FAQ](#), [Source Code](#), [Mailing List](#), and [IRC Channel](#). The main text on the left describes tmux as a terminal multiplexer and provides instructions for downloading tmux 2.2, including a link to the GitHub repository. On the right, there is a list of books. The first book is 'tmux: Productive Mouse-Free Development' by Brian P. Hogan, priced at \$9.00. The second is 'Getting Started with tmux' by Victor Quinn J.D., priced at \$10.04. The third book, 'tmux Taster' by Mark McDonnell, is highlighted with a red rounded rectangle and priced at \$9.99. The browser's address bar and navigation icons are visible at the top.

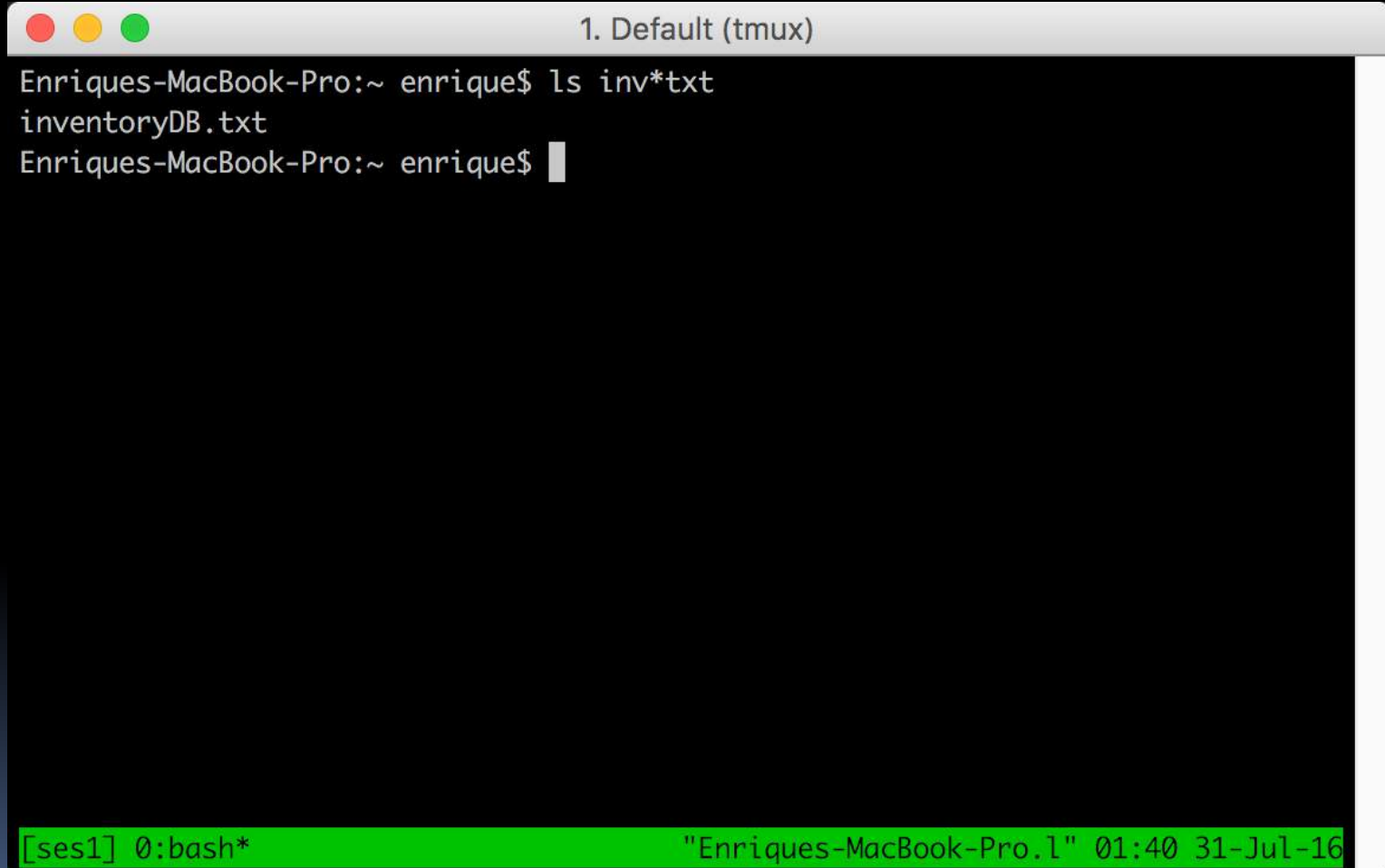
tmux is a terminal multi...  
What is a terminal multi...  
and reattach them to a dif...  
[Download tmux 2.2 \(cha...](#)  
hosted on [GitHub](#) and ne...  
For support contact the [tr...](#)  
channel [#tmux on freenod](#)...  
There are some programs...

**tmux: Productive Mouse-Free Development**  
by Brian P. Hogan  
Kindle Edition  
**\$9.00**  
Auto-delivered wirelessly  
Other Formats: [Paperback](#)

**Getting Started with tmux** Sep 24, 2014  
by Victor Quinn J.D.  
Kindle Edition  
**\$10.04**  
Auto-delivered wirelessly  
Other Formats: [Paperback](#)

**tmux Taster** Dec 10, 2014  
by Mark McDonnell  
Kindle Edition  
**\$9.99**  
Auto-delivered wirelessly  
Other Formats: [Paperback](#)

# Tmux in action



```
1. Default (tmux)
Enriques-MacBook-Pro:~ enrique$ ls inv*txt
inventoryDB.txt
Enriques-MacBook-Pro:~ enrique$
```

[ses1] 0:bash\* "Enriques-MacBook-Pro.l" 01:40 31-Jul-16

# DBUA automation

```
#!/bin/bash
DB_HOME=/u01/app/oracle/11.2.0/db_1
SCRIPT_DIR=/scripts
SID_LIST=${SCRIPT_DIR}/db2upgrade.${hostname}
for DB_UNIQUE_NAME in ${SID_LIST}
do
    FILE_NAME=${SCRIPT_DIR}/upgrade.${DB_UNIQUE_NAME}.sh
    cat <<_EOF_ > ${FILE_NAME}
    #!/bin/bash
    ${DB_HOME}/bin/dbua -silent \
    -sid ${DB_UNIQUE_NAME} \
    -oracleHome /u01/app/oracle/11.2.0/db_0 \
    -diagnosticDest /u01/app/oracle \
    -autoextendFiles \
    -recompile_invalid_objects false \
    -degree_of_parallelism 4 \
    -emConfiguration NONE
    _EOF_
    chmod +x ${FILE_NAME}.sh
    tmux new -s ${DB_UNIQUE_NAME} -d &>/dev/null
    tmux send-keys -t ${DB_UNIQUE_NAME} "${FILE_NAME}" "C-m"
done
```

```
$ cat db2upgrade.server1
accounting
billing
sales
crm
```

# Upgrade Issues

- Can fail

Flashback database (EE)

MOS Note 780318.1 (SE)

```
alter tablespace user_data offline;
backup tablespace system, sysaux, undotbs;
<upgrade ok>
alter tablespace user_data online;
<upgrade fails>
run {
    set until scn <pre_upg_scn>;
    restore database;
    recover database;
}
```

# Results

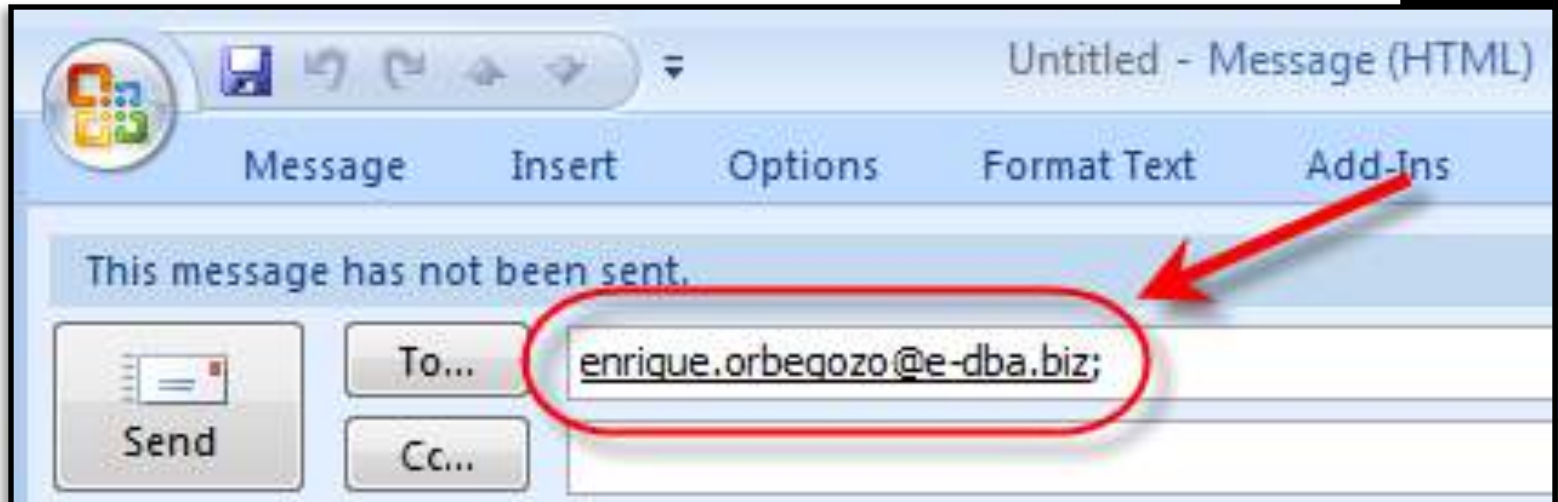
- Supported release
- No bugs or issues
- Free CPU
- Faster applications
- Huge savings



# Final Recommendations

- Question everything
- Apply latest PSU and recommended patches
- Use VMs to test all procedures
- Create Golden Images library
- Automate all you can
- Don't forget:
  - Not more patches for versions < 11.2.0.4
  - Upgrade to 12.1.0.2 or 11.2.0.4 to get access to new patches

# Thank You!



AGREGA TU COMENTARIO   Recomendar esto en Google

TAGS: [11GR2](#), [ASM](#)