

Exadata Patching Deep Dive

April, 2014



About Enkitech

- Global systems integrator focused on the Oracle platform
- Established in August, 2004
- Headquartered in Dallas, Texas
- Consultants average 15+ years of Oracle experience
- Worldwide leader in Exadata implementations



About Me

- 8 years at Enkitech
- Supporting Oracle since 1999
- Working with Exadata since 2010
- Oracle ACE
- Author of Expert Oracle Exadata second edition
- Blog – blog.oracle-ninja.com
- Twitter - @acolvin



Enkitech E4 2014

- 2 day Exadata conference in Dallas
 - June 1 – 3, 2014
 - <http://www.enkitec.com/e4>
- Tom Kyte
- Maria Colgan
- Tanel Poder
- Kerry Osborne
- Sue Lee
- Doug Burns
- Martin Bach

Where to Start?



- MOS Note #888828.1
 - Single destination for patch news
 - Latest patch updates
 - New patching methods
 - Links to patch notes for other products

What Patches Does Oracle Provide?

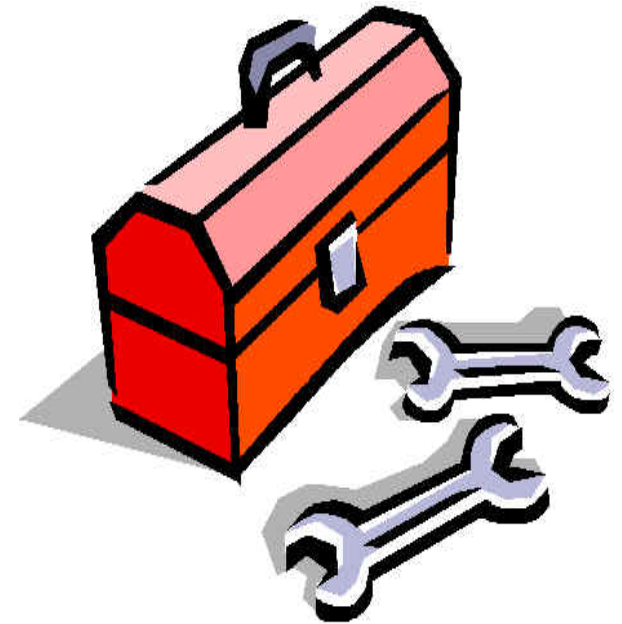
- InfiniBand Switch Patches
 - InfiniBand switch OS updates
- Exadata Storage Server Patches
 - OS updates (for storage and compute tiers)
 - Firmware updates
- Quarterly Database Patches
 - Standard GI/RDBMS binary updates

Patching Order of Precedence

- InfiniBand Switch Patches
 - Will be provided with storage server updates
- Exadata Storage Server Patches
 - Rolling or full outage
- Database OS Updates
 - Use dbnodeupdate.sh
- Quarterly Database Patches

Patching Toolbox

- patchmgr – storage servers
- yum/dbnodeupdate – compute nodes
- OPatch – Oracle homes
 - OPlan - optional

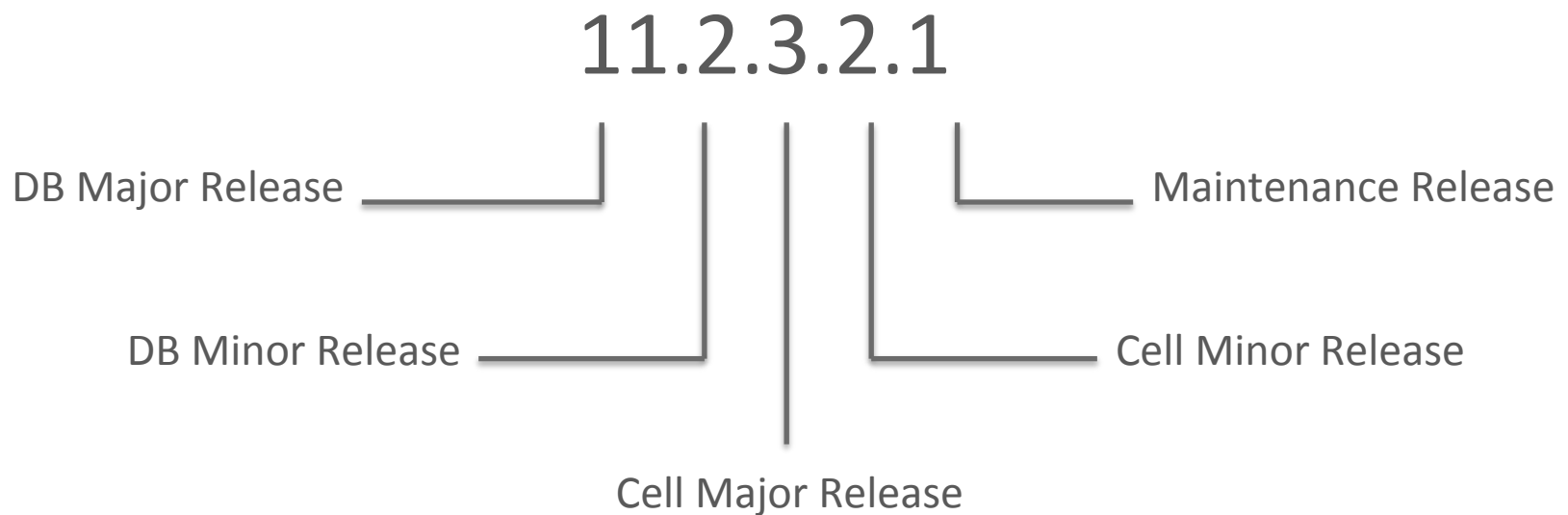


Exadata Storage Server Patches

- Single patch
 - Operating system
 - Firmware
 - Drivers
- Updates storage and compute nodes
- Released quarterly (usually)
- New releases update IB switches



Exadata Storage Server Versions



- Changes to the cell major release version include new features

Exadata Storage Server Versions

- What version am I running?

```
[root@enkcel03 ~]# imageinfo
```

```
Kernel version: 2.6.18-274.18.1.0.1.el5 #1 SMP Thu Feb 9 19:07:16 EST 2012 x86_64
```

```
Cell version: OSS_11.2.3.1.1_LINUX.X64_120607
```

```
Cell rpm version: cell-11.2.3.1.1_LINUX.X64_120607-1
```

```
Active image version: 11.2.3.1.1.120607
```

```
Active image activated: 2012-06-28 21:45:30 -0500
```

```
Active image status: success
```

```
Active system partition on device: /dev/md6
```

```
Active software partition on device: /dev/md8
```

Exadata Storage Server Patches

- Rolling or full outage
- Apply with patchmgr – included with the patch release
- Run from compute node
- Uses dcli and SSH keys to deploy patch across storage grid
- Run once, execute on all cells

Rolling vs. Non-Rolling Storage Server Patches

Non-Rolling Patches

- Require full outage on the rack
- Run once, execute on all cells
- Can be applied to standby first
- Known execution time

Rolling Patches

- Don't require planned downtime
- Run once, execute on all cells
- Should use high redundancy
- Unknown duration due to disk resync

Storage Server Patch Process (1)

- USB recovery media is recreated to ensure a good backup exists
- New OS image pushed to inactive partitions on each cell
- Grub is pointed to newly patched partitions (via `/boot/I_am_hd_boot`)
- The cell reboots and firmware is patched – multiple reboots can be common
- Post-install validation checks are run
- USB recovery media is updated to match the new software version

Storage Server Patch Process (2)

- Cells reboot multiple times after OS is pushed out
 - First pass – cell comes up, executes scripts in /install
 - Second pass – firmware is updated

Storage Server Patch Log Files

- `/root/_patch_hctap_/_p_` on each cell for log files
 - `wait_out` - main log file
 - `wait_out_tmp` – verbose log file

Patching Database Servers

- Database servers updated along with storage servers
- Utilize yum for updates
 - Replaces old “minimal pack”
- Each version has a yum channel
 - exadata_dbserver_11.2.3.2.0_x86_64_base
 - exadata_dbserver_11.2.3.2.1_x86_64_base

Patching Database Servers

- Oracle provides `dbnodeupdate.sh` to make process easier
 - MOS note #1553103.1
- Several options for installation
 - Update directly from ULN
 - Configure local yum repository
 - Mount ISO file containing RPMs
- Can be performed serially, or in parallel with `dcli`

dbnodeupdate.sh

- dbnodeupdate.sh performs the following tasks for you
 - Stop/unlock/disable CRS for host restart
 - Perform LVM snapshot backup of / filesystem
 - Mount yum ISO image and configure yum
 - Apply OS updates via yum
 - Relink all Oracle homes for RDS protocol
 - Lock GI home and enable CRS upon host restart

Quarterly Database Patch for Exadata

- Patches for RDBMS & Grid Infrastructure
- Applied using OPatch – no different from “traditional” kit
- Each BP/QDPE contains 3 patches, applied together
 - RDBMS
 - CRS
 - Diskmon
- Patches are cumulative

QDPE / BP Versions

- Check patch version with “opatch lsinventory”

```
[oracle@enkdb01 ~]$ opatch lsinventory
```

```
Interim patches (3) :
```

```
Patch 13688022      : applied on Fri Apr 27 14:52:31 CDT 2012
```

```
Unique Patch ID: 14639565
```

```
Patch description: "Diskmon Patch for Exadata (APR 2012 - 11.2.0.3.5) : (13688022)"
```

```
Patch 13696251      : applied on Fri Apr 27 14:51:36 CDT 2012
```

```
Unique Patch ID: 14639565
```

```
Patch description: "CRS Patch for Exadata (APR 2012 - 11.2.0.3.5) : (13696251)"
```

```
Patch 13734832      : applied on Fri Apr 27 14:49:34 CDT 2012
```

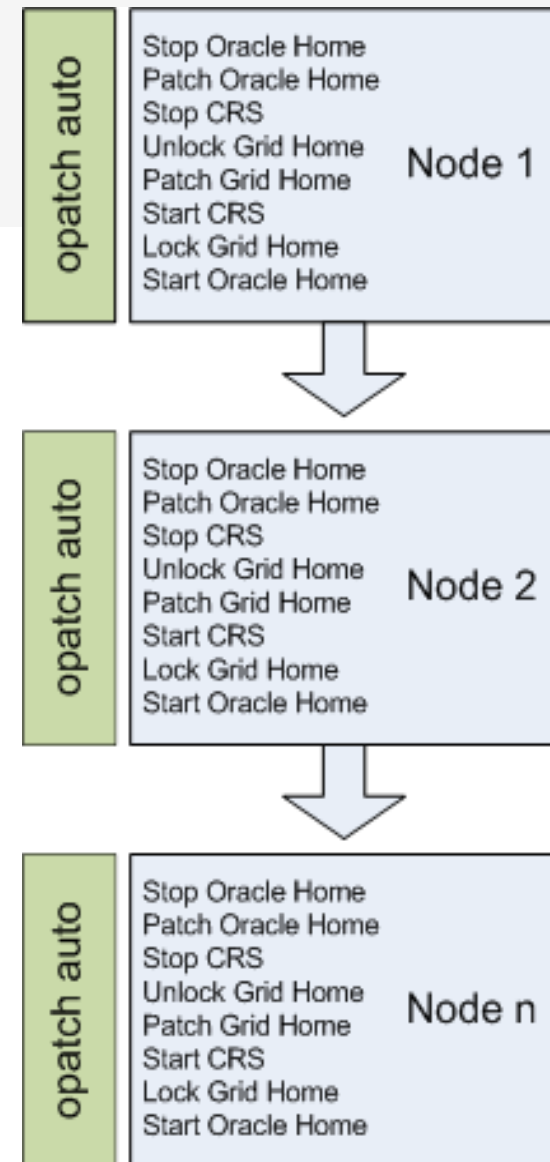
```
Unique Patch ID: 14639565
```

```
Patch description: "Database Patch for Exadata (APR 2012 - 11.2.0.3.5) : (13734832)"
```

- No more cross-referencing with 888828.1

QDPE / BP Application

- Always rolling patches
- Applied one node at a time
- Use opatch auto to apply
- Requires root privileges
 - sudo is acceptable
- Post-install database scripts



Patchset Upgrades

- Check MOS #888828.1 for certification
- Read upgrade-specific notes before upgrading
 - 11.2.0.3 – MOS #1373255.1
 - 11.2.0.4 – MOS #1555036.1 and 1565291.1
 - 12.1.0.1 – MOS #1555059.1
- GI upgrade always rolling
- Database upgrade requires an outage*



Patchset Upgrades

- Minimum cell version requirements
 - 11.2.0.3 – cell version 11.2.2.4.1+
 - 11.2.0.4 – cell version 11.2.3.2.1+
 - 12.1.0.1 – cell version 12.1.1.1.0+
- Install latest BP on current release before upgrading GI/RDBMS
- Relink and apply BP/QDPE after installing software, before running upgrade scripts

Infiniband Patches

- Released yearly
- Infiniband switches run CentOS Linux
- New patches applied by patchmgr
- Rolling patches – no outage required
 - Spine switch first, followed by leaf switches

What's a QFSDP?

- Quarterly Full Stack Download Patch
- Released January, April, July, October
- Contains latest patches for all stacks
 - Infrastructure
 - Database
 - OEM
- Patches still installed individually
- You may not need to apply all patches (Infiniband, PDU, etc)

Minimizing Patching Risk



- Create a concise patching plan
- Read all of the notes before starting
- Patch a non-production system first
- Patch the same way on all systems

Standby First Patch Apply

- Apply patches to standby system
- Perform testing with snapshot standby or active data guard
- Dataguard switchover
- Patch previous production system
- Switch back to production or leave as is for next patch cycle



OPlan

- Used with BP/QDPE deployment
- Creates patch deployment report customized to your environment
- Includes steps for in place, out of place patch and rollback
- MOS Note #1306814.1



Final Notes

- Plan accordingly
- Keep to your plan
- Don't rush in
- Give patches 1 month or more to “bake in”

Useful MOS Notes

- Supported versions (11.2) - #888828.1
- e-Business Suite patch compatibility - #1392527.1
- OPlan – #1306814.1
- Exachk – #1070954.1
- Patchset Upgrades
 - 11.2.0.3 – MOS #1373255.1
 - 11.2.0.4 – MOS #1555036.1 and 1565291.1
 - 12.1.0.1 – MOS #1555059.1

Questions



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