

Database Patch at 1,000 Scale:

Nationwide's Oracle Enterprise Manager Fleet Maintenance Odyssey

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Nationwide[®]
is on your side



Nationwide

Insurance and Financial Services Company

Fortune 100 Company

Founded in 1925

34.5 Billion in Revenues

171 Billion in Assets

33,000 Employees

**26 core DBAs with combined 410 years
DBA experience**

Agenda

- Problem: Software Currency for Oracle Databases
- Fleet Maintenance
- Step 1: Assess Your Environment
- Step 2: Evaluate Alternatives
- Step 3: Choose an Approach
- Step 4: Map out Route
- Step 5: Results To Date
- Our Big Challenge ahead.
- Emcli Routines
- Advice, Kudos, & Questions

Problem: Software Currency for Oracle Databases

Nationwide has made software currency a top priority.

- **Security** - *Many security frameworks consider Software currency one of the most essential security controls*
- **Stability**
- **Consistency**
- **Supportability**
- **Cost of being on old versions**

Challenges

- Variety of Clustering
- Proliferation of DB Versions
- Scheduling difficulties for Consolidated Servers (shared) hosting multiple customers (20-130 db)
- Required success level of 99%
- Traditional Oracle Database Patching (Opatch)
 - an onerous, manual, time consuming operation
 - requiring skilled DBA's
 - scales to the size of your DBA staff
- No Oracle Enterprise level solution

Fleet Maintenance – A Game Changer

How many times do you patch your ENTIRE fleet of databases?

- NeverAs needed
- Yearly
- Semiannual
- Quarterly
- And what happens if Oracle starts releasing patches monthly?

With Fleet Maintenance, Nationwide

- Will Patch entire database Fleet Semiannual
- Minimize database downtime
- Have fewer patching windows (events)
- Have higher success rate
- View quarterly as possible with additional fleet capability.

... the payoff will be significant... instead of dedicating the entire DBA staff to constantly patch and coordinate schedules you will be able to patch more in less time with less risk.

Step 1: Assess Your Environment: Software Standardization Advisor

ORACLE Enterprise Manager Cloud Control 12c Setup | HENDERG

Enterprise | Targets | Favorites | History | Search Target Name:

Database Maintenance

Page Refreshed **Aug 15, 2016 12:25:01 PM EDT**

Welcome to Software Standardization Advisor!

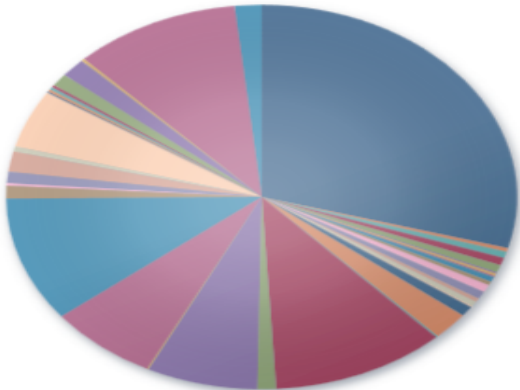
Software Standardization Advisor can be used as a suggestion to:

- Standardize software configurations.
- Reduce the number of configurations based on the patch levels across your databases.
- Streamline and automate software upgrades and patching.

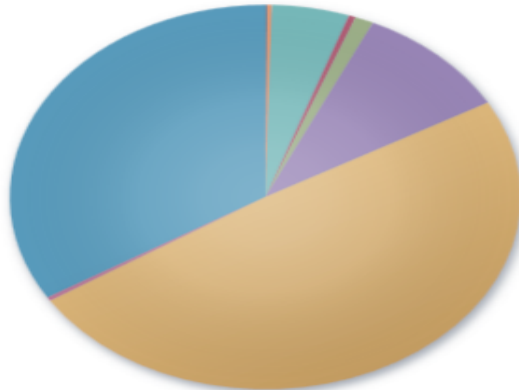
Analysis of your Enterprise

Software Installations: 939 Collections Completed: 939

Current Unique Software Configurations (39)



Recommended Software Configurations (9)



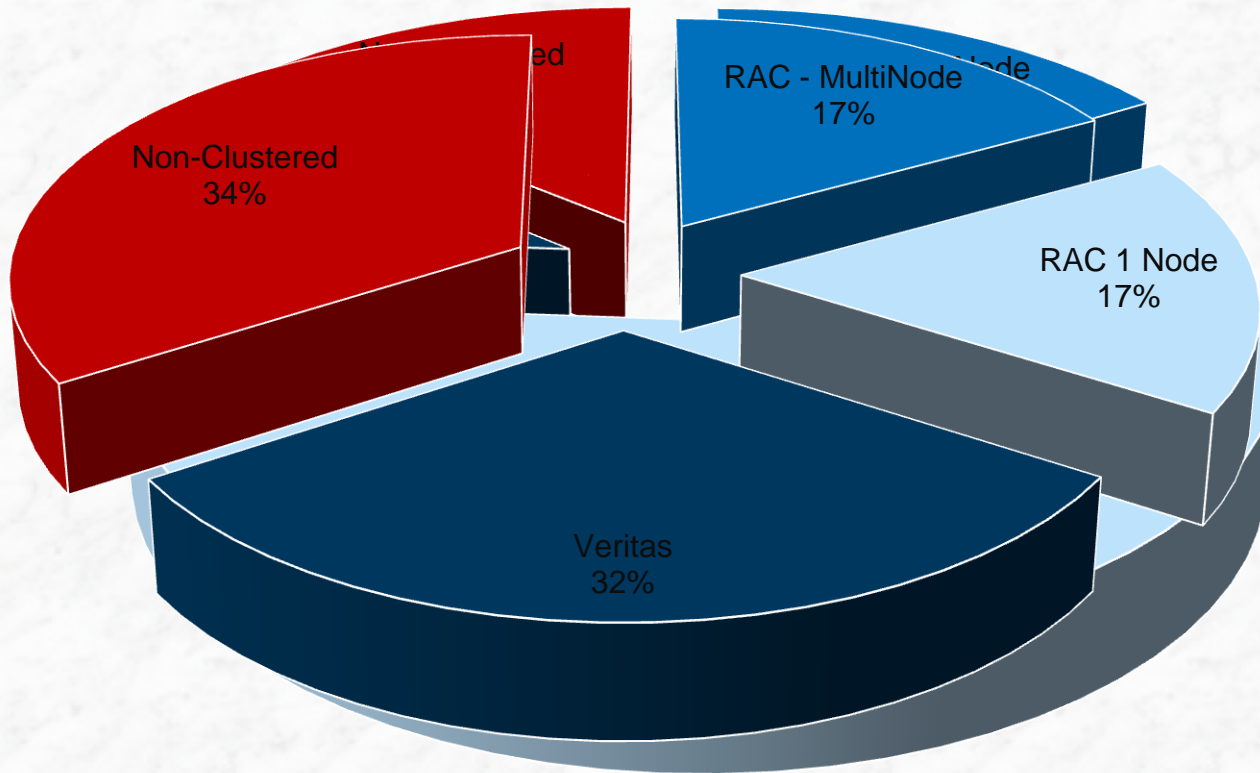
Criteria Used: Product, Release, Platform

Last job run: Aug 15, 2016 04:01:52 AM [Re-run](#)

Generated Date: Not yet generated. [Generate Report](#)

Step 1: Assess Your Environment - Clustering

2014 Current

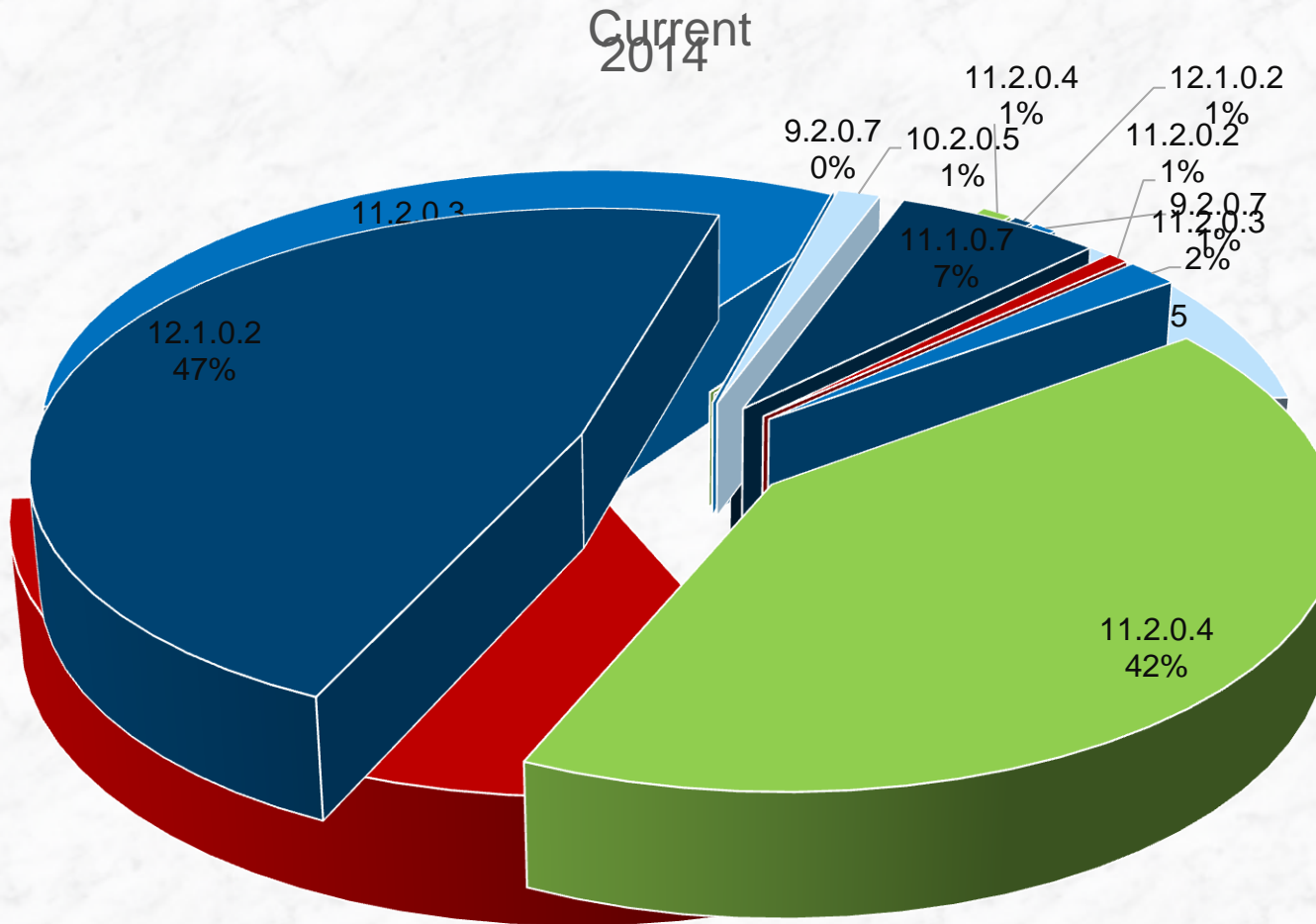


Each Clustering Technology may present it's own patching challenges

Reduce/Eliminate those that don't provide strategic value/capability

Embrace those that are strategic

Step 1: Assess Your Environment – DB Versions



Choose Current Standards/Versions and create Gold Images


Upgrade and Patch to reach those Standards



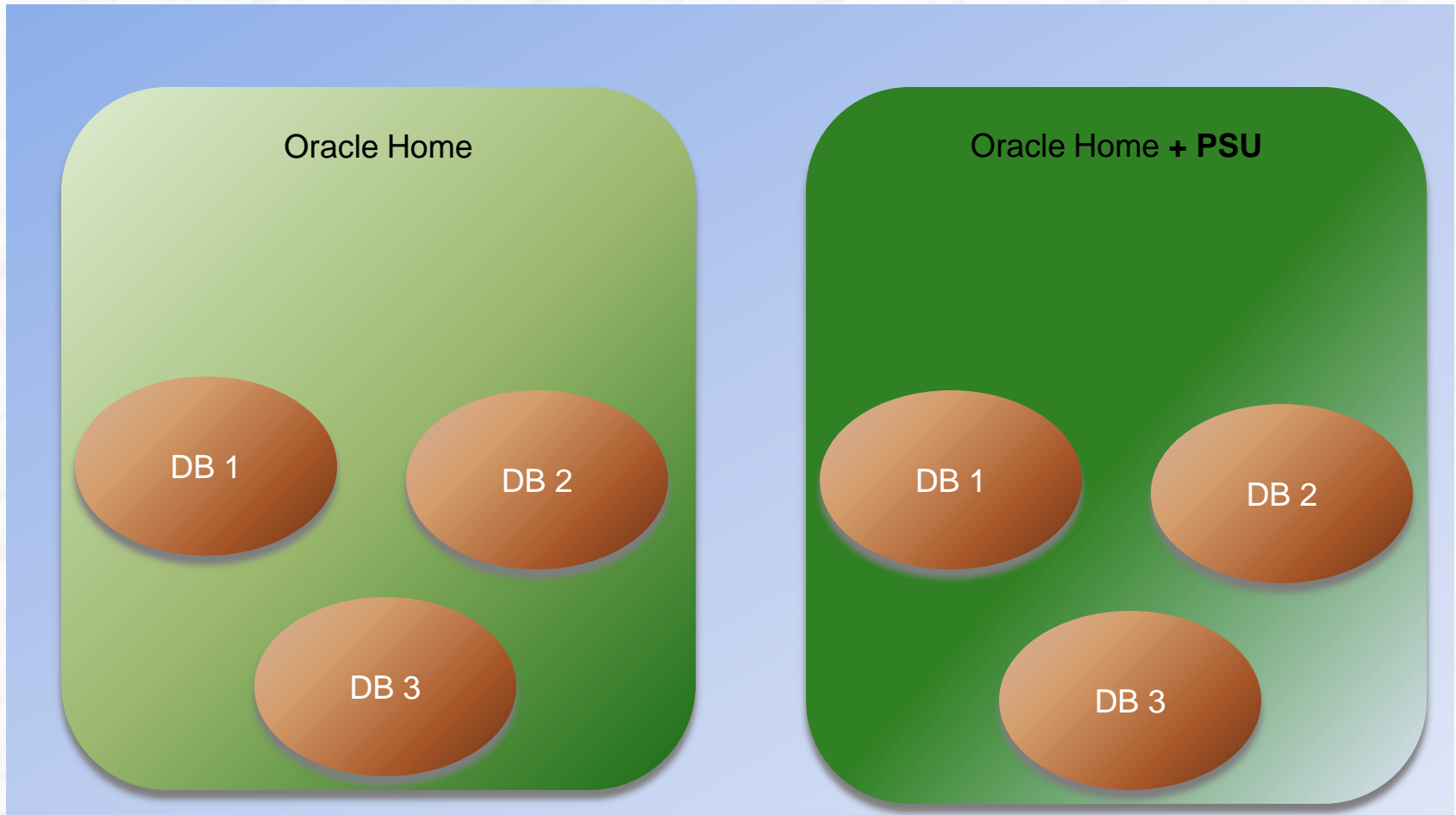
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Step 2: Evaluate Alternatives

- Out of Place Patching with Fleet Maintenance

	Deploy Homes	Switch
Manual		60 Minutes 1 DB at a time Experienced DBA Required
Scripted Patching	60+ Minutes + Patching Time 1 Home at a time	30 Minutes 1 DB at a time Experienced DBA Required
 Fleet Maintenance	20 Minutes with all patches Scalable Concurrency Possible	7-15 Minutes Scalable Concurrency Possible

Step 3: Choose an Approach - Out of Place patching



Step 3: Choose an Approach –In Place vs Out of Place patching

In Place Patching	Out of Place Patching
All DBs on codeset patched together	Each DB patched individually
Manual Known/Familiar Process	New best practice
Requires coordination between customers for common outage window.	Each DB patched individually
Constant drift from standard build	Re-alignment to Gold Standard each cycle
Less work	More work *
Revert to pre-patch state DIFFICULT	Revert to pre-patch state simple
Less Space required for code ... only one copy per version	More Space required as you may have multiple version of the code (pre-patch, post-patch, one-off)
Does not scale	Scales well
Less Stable/more risk	More Stable/less risk
Monolithic Patching	Atomic operation/concurrent

Step 4: Map out Route: Patching Steps (text size comparable to effort)

- Download Patches, Test, and build Gold Images (one per version-2 + GI)
- **Patch Clusterware** (one per cluster-146)
- Deploy new Database Home(s) (one per supported db home -100's)

- **Switch Database one by one to new PATCHED home** (once per database -1234)

- Remove old Database home (once per obsolete/abandoned home 100's)

Step 4: Map out Route: Nationwide's Route

2014 Gold Image Provision of Database Homes

2015 RAC Clusterware Upgrade from 11.2 to 12.1 (60)
Some Database upgrades 11.2.0.2/3 to 11.2.0.4

2016 (Q1 & Q2) Mandate ALL DB homes OEM provisioned
Mandate ALL RAC Clusters built with OEM
Continue upgrades 11.2.0.2/3 to 11.2.0.4

2016 Q3 – Shared Env Begin upgrade of 11.2.0.4 to 12.1.0.2
Patch 584 databases (incl 94 dataguard)

2016 Q4 - Dedicated Patch 548 databases (incl 65 dataguard)
Continue upgrade of 11.2.0.4 to 12.1.0.2

Step 4: Map out Route –Suggested- Crawl ... Walk ... Run ... Fly

Crawl

- Use Gold Images for DB Home Provisioning
- Start Provisioning CRS
- Upgrades via OEM

Walk

- Complete provisioning via OEM
 - Homes
 - Grid
 - DB
- Out of Place patching

Run

- Fleet Maintenance
- Patch frequency increased to semiannual or quarterly

Fly

- Cloud Provisioning
- Fleet Maintenance

OEM ... Provision Home, Clusterware, Upgrade, Patch

ORACLE Enterprise Manager Cloud Control 12c Setup | HENDERG

Enterprise | Targets | Favorites | History | Search Target Name

Provisioning

Page Refreshed **Aug 15, 2016 10:29:12 AM EDT** Refresh

View Data Real Time: Manual Refresh

Deployment Procedure Manager

Procedure Library | **Procedure Activity** | Recycle Bin

All deployment procedures in various stages of their lifecycle are shown below. Set the refresh settings to update the page automatically. Click on the link in the Run column to get more details on that run.

Search Text Fields Go Advanced Search

Edit Permissions... Stop Suspend Resume Retry Delete Reschedule

Select	Run	Status	Procedure	Type	Owner	Start Date
<input checked="" type="radio"/>	Upgrade Single Instance Database_SOUND1_08_15_2016_09_02_AM	Succeeded	NW Upgrade Standalone Database	Oracle Database Upgrade	SOUNDAV1	Aug 15, 2016 9:03:11 AM EDT
<input checked="" type="radio"/>	Upgrade Cluster Database_SOUND1_08_15_2016_07_57_AM	Succeeded	NW Upgrade RAC Database	Oracle Database Upgrade	SOUNDAV1	Aug 15, 2016 7:58:05 AM EDT
<input checked="" type="radio"/>	NW Provision Database Software for _NORMANJ8_08_10_2016_18_07_PM	Succeeded	NW Provision Database Software for STANDALONE	Oracle Database Provisioning	NORMANJ8	Aug 10, 2016 6:08:57 PM EDT
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Upgrades

Provision DB Software

Provision Clusterware

Out of Place Patching

Step 5: Results To Date: Your Mileage may Vary

- Across 14 patching windows (2-55 dbs per window)
- Databases patched 379
- The process ran total of 50+ hours (avg 8 min per)
- Due to concurrence 25+ hours real time
 - with greater concurrence expect this time to decrease
- If done manually/scripted 30 minutes per DB ... 190 hours.
- And our 379 databases.
 - Were done by 1 DBA
 - Had greater than a 97% success factor
 - 100% Consistent
 - Low Risk

Our Big Challenge Ahead

- When we return Sept 25 will be infrastructure weekend and our biggest test of this process to date.
- Within a 6 hour window we are tasked to patch
 - 205 Production Databases (94 dataguard) (2 DBA)
 - 26 Veritas databases (non-standard) (1 DBA)
 - 21 RAC Grid Infrastructures (Remaining DBA's 7) *

Would not have been possible without Fleet Maintenance!!

* Until grid infrastructure update is employed

emcli db_software_maintenance

- -createSoftwareImage
- -subscribeTarget
- -performOperation
 - DEPLOY_DB_SOFTWARE
 - DEPLOY_GI_SOFTWARE
 - Migrate_listener
 - UPDATE_DB
 - UPDATE_RACDB
 - UPDATE_GI
 - ROLLBACK_DB
 - ROLLBACK_RACDB
 - ROLLBACK_GI
- db_cloud_maintenance ... similar suite for DBaaS (Cloud)

Our Advice

If you're not using Oracle Enterprise Manager ... it provides great capabilities .. Adopt it

If you don't currently have the Lifecycle management pack ...investigate it

Home Provisioning, upgrades, and forthcoming fleet management make it worthwhile

Providing you have Lifecycle management pack

Leverage it for gold copy provisioning, database upgrades, cluster upgrades,

Be prepared for fleet ... make your database landscape consistent (Software Standardization Advisor)

Expect your patching cadence to intensify ... Quarterly may become a requirement

More Patched in ever reducing maintenance windows.

Fleet is there in the EMCLI commands ... but stay tuned for new features.

Summary:

Recognition:

NW OEM Provisioning Lead:

Oracle Senior Director of Development:

Oracle Senior Director of Development:

Oracle Senior Director:

EM Master Principal Sales Consultant:

Oracle Technology Sales Manager:

Oracle Key Account Director for Nationwide:

Vaithianathan Soundararajan

Bala Kuchibhotla

Bharat Paliwal

Ramesh Bhattiprolu

Robyn Cincinnati

Ken Leonard

Justin Southwell

Joe Johnston

Questions???