

OpenWorld 2018

Perform In-Place Upgrade for Large-Scale Cloud Infrastructure

ORACLE
OPEN
WORLD

Jeffery Yoder, Director, Cloud Engineering
Rodolfo Martinez, Sr Principal Sys Admin, Cloud Engineering

October 22, 2018

Program Agenda

In-Place Upgrade for Large-Scale Cloud Infrastructure

- 1 ➤ Scope of the Problem
- 2 ➤ Possible Solutions
- 3 ➤ In-place Upgrade
- 4 ➤ More Challenges
- 5 ➤ Other Interesting Bits
- 6 ➤ Q&A – With Prizes

Scope of the Problem

Scope of the Problem

In-Place Upgrade for Large-Scale Cloud Infrastructure

- Spectre/Meltdown affected Dom0s and DomUs
- 22,000 Dom0
- 101,000 DomU
- 23,000 individual environments
- 24 Data centers
- Heterogeneous environments

Possible Solutions

Possible Solutions


In-Place Upgrade for Large-Scale Cloud Infrastructure

- Live migrate DomUs to upgraded Dom0, rebuild vacated Dom0, repeat
- Upgrade via attrition
- YUM upgrade of Dom0 with short outage for reboot
- In-Place Upgrade

In-Place Upgrade

In-Place Upgrade » High Overview

In-Place Upgrade for Large-Scale Cloud Infrastructure

- Back up Dom0 configuration
 - Copy OVM 3.4 installation boot files to running system
 - Update DomUs
 - Stop DomUs
 - Rebuild Dom0
 - Restore Dom0 config
 - Start up DomUs
- 
- Downtime**

In-Place Upgrade » Phases

In-Place Upgrade for Large-Scale Cloud Infrastructure

The complete process is divided in 3 phases:

- **Pre-Stage**

- Run weeks before scheduled outage (**validation**)

- **Staging**

- Run weeks before scheduled outage (**preparation**)

- **Deploy**

- Run at the time of the outage (**migration**)

In-Place Upgrade » Phases » Pre-Stage

In-Place Upgrade for Large-Scale Cloud Infrastructure

- Inventory
- Check **infrastructure** (network, YUM connectivity)
- Check **software** (RPMs, upgrade scripts)
- Check **hardware** (ILOM, serial console functionality)
- Check for **other issues** (Dom0 space constrains, orchestration agents)

In-Place Upgrade » Phases » Stage

In-Place Upgrade for Large-Scale Cloud Infrastructure

- Include **Pre-Stage tasks**
- Configure **one-time YUM repo** file (Dom0 and DomUs)
- **Back up Dom0** configuration files
- Copy **OVM 3.4 installation boot files** on running Dom0
- Rebuild installation **initrd.img with customized kickstart** file

In-Place Upgrade » Phases » Deploy » Details (1/3)

In-Place Upgrade for Large-Scale Cloud Infrastructure

- Final Dom0 **configuration back up**
- Final **sanity check**
- **Update DomUs**
- Convert **DomUs to PVHVM**

In-Place Upgrade » Phases » Deploy » Details (2/3)

In-Place Upgrade for Large-Scale Cloud Infrastructure

- Setup **autofsck** on DomUs
- Set **blackout** for Dom0 and DomUs (Oracle Enterprise Manager)
- **Shut down applications** on DomUs
- **Shut down DomUs**
- Modify boot loader to start the OVM 3.4 **installation in the next boot**
- **Reboot** Dom0

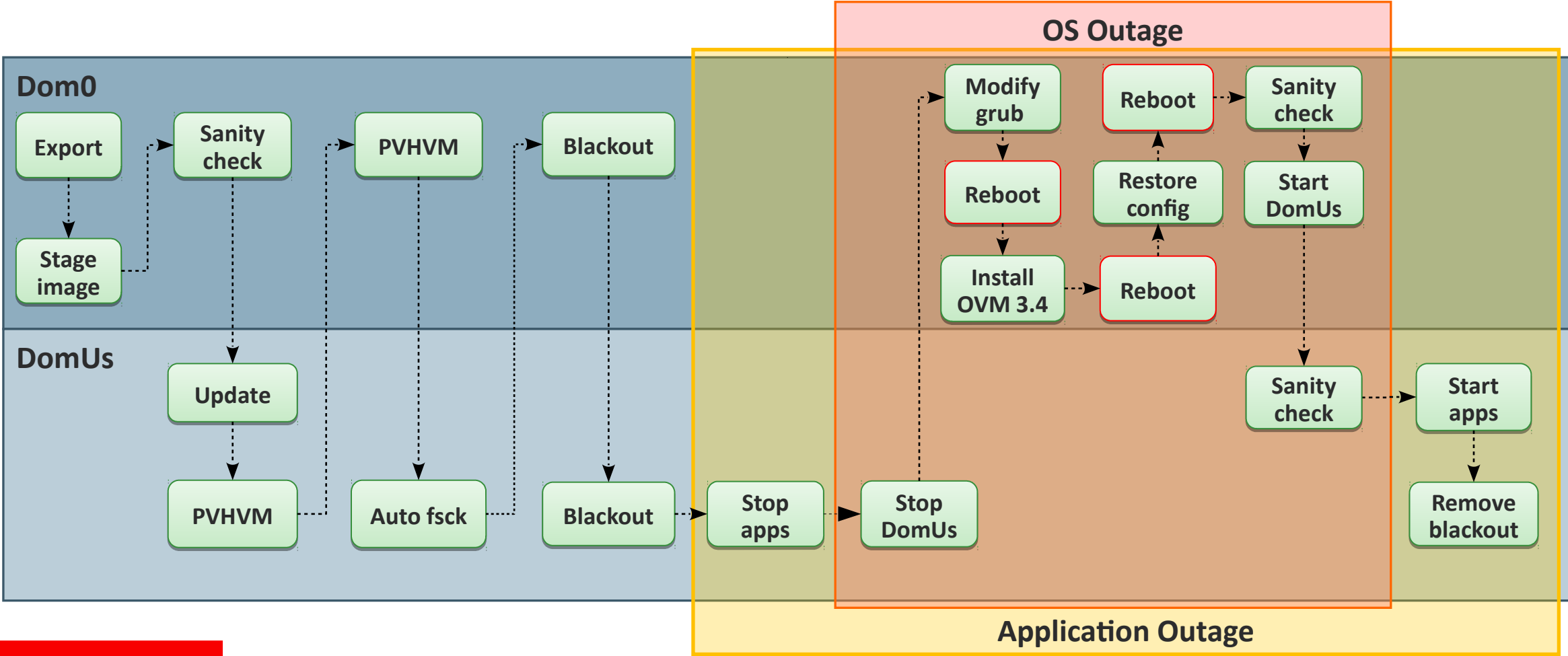
In-Place Upgrade » Phases » Deploy » Details (3/3)

In-Place Upgrade for Large-Scale Cloud Infrastructure

- **Restore** Dom0 configuration
- **Reboot** Dom0 to ensure there are no issues after restore
- **Reinstall** EM and infrastructure tools
- **Sanity check** Dom0
- Start DomUs
- Sanity check DomUs
- Start applications
- Remove EM blackout

In-Place Upgrade » Phases » Deploy » Eye Chart

In-Place Upgrade for Large-Scale Cloud Infrastructure



More Challenges

More Challenges

In-Place Upgrade for Large-Scale Cloud Infrastructure

- **Restart installation** process if it fails.
- Identifying the **installation disk** correctly.
- High performance networks where **LACP** is the standard
 - Predict **network card names** during the installation due to Anaconda options to configure bonded interfaces.
 - Original Anaconda version in **OVM 3.4 had a bug for LACP**.
- How to avoid **overwhelming the YUM servers**.
- Other minor issues.

Other Interesting Bits

Other Interesting Bits

In-Place Upgrade for Large-Scale Cloud Infrastructure

- ZFSSA Storage
- Internal orchestration tool
- Applications
- **~45,000 lines of source code** (not counting comments or blank lines)

Questions with prizes