Elastic Storage Server (ESS)

Upgrade Process (Legacy to Modern)

Data in Science Technologies (DST)

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Agenda
ESS Upgrades (Legacy to Modern)

- Upgrade Overview / Helpful Options
- Deployment Guides, Upgrade Paths, & Packages
- Upgrade Process
- How DST Does Upgrades

Upgrade Overview / Helpful Options

Upgrade Overview
ESS Upgrades (Legacy Process)

Prep Work
- Health checks
- Disable subscription manager & repositories
- Download/Copy RHEL ISO
- Download/Create Errata packages
- Extract packages
- Check for HW serviceable event
- Check for deployment errors
- Backup/Cleanup xCAT database
- Update ESS repositories on EMS
- Customize gssdeploy.cfg

Update the EMS node
- Reinstall/restore xCAT
- Health checks
- Unmount / Stop GPFS on EMS
- Update EMS Node
- Reboot EMS Node
- Re-run Update EMS Node
- Update OFED
- Update IP RAID Adapter FW
- Reboot EMS Node
- Update config parameters
- Update System Firmware
- Start GPFS on EMS

Update the I/O server nodes
- Health Checks
- Move recovery group
- Unmount / Stop GPFS on IO node
- Update IO node
- Reboot IO node
- Re-run Update IO Node
- Update OFED on IO Node
- Update IP RAID FW on IO Node
- Reboot IO node
- Update SAS adapter FW on IO Node
- Update the node configuration
- Update System Firmware
- Start GPFS on IO node
- Move recovery group

Repeat full process for the next IO Node

Update Encl Firmware

Update Drive Firmware

Update Protocol Nodes
- Health Checks
- Unmount / Stop GPFS on CES node
- Update CES node
- Reboot CES node
- Re-run Update CES Node
- Update OFED on CES Node
- Update IP RAID FW on CES Node
- Reboot CES node
- Update the node configuration
- Update System Firmware
- Recompile GPFS on CES node
- Start GPFS on CES node
- Manually update GPFS w/Toolkit on CES Nodes

Upgrade Overview
ESS Upgrades (Modern Process)

Prep Work
- Health checks
- Clean up old container/network environment
- Extract/Install/Start container
- Run Config Load
- Run Upgrade Precheck

Update the EMS node
- Update EMS Node
- Reboot EMS Node
- Re-run EMS Update Node
- Update System Firmware

Update the I/O server nodes
- Run Upgrade Precheck
- Update all IO Nodes, Encl FW and Drives
- Update System Firmware (power servers only)

Update Protocol Nodes
- Update CES node
- Recompile GPFS on CES node
- Update System Firmware
- Start GPFS on CES node
- Manually update GPFS w/Toolkit on CES Nodes

Upgrade Options
Flexibility

- Include/Exclude Firmware Updates (Drive, SAS Adapter, Enclosure)
  - Default is to perform fw updates (less control… long running processes)
  - essrun --no-fw-update
- Offline options
  - All nodes at the same time, excludes many checks.
  - Single node at a time, excludes many checks (can be helpful)
  - essrun --offline
- Serial Execution
  - essrun --serial #

Deployment Guides, Upgrade Paths, & Packages

Deployment Guides

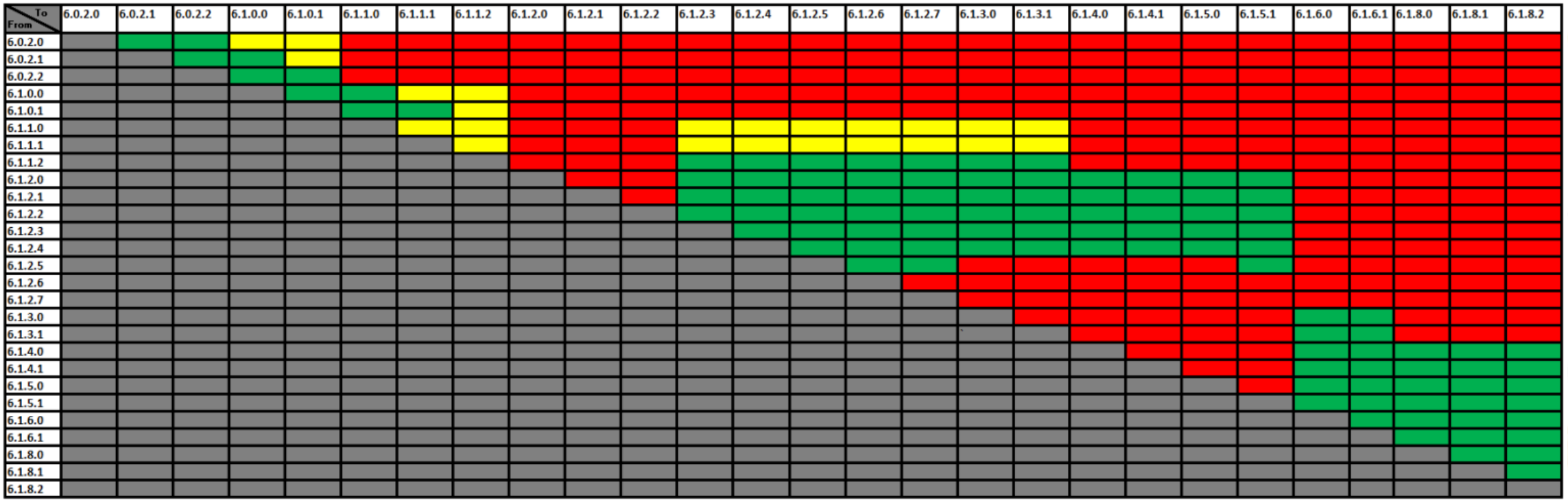
Deployment Guide & Quick Deployment Guide (QDG)

- Legacy: Single doc: “Quick Deployment Guide”
  - 100+ pages
  - Lots a great information, but just too much
- Modern: Two docs: “Quick Deployment Guide” & “Deployment Guide”
  - Quick Deployment Guide is down to 7 pages.
  - QDG provide minimal info– great if you have some experience already.

Upgrade Paths

Deployment Guide & Quick Deployment Guide (QDG)

- Legacy: No real direction… One RH hop at a time.
- Modern: Nice color-coded chart



DST PEACE OF MIND

Package Download

Architecture / Package Naming Examples

https://www.ibm.com/support/fixcentral

Legacy 3000: ESS_DME_BASEIMAGE-6.1.0.1-x86_64-Linux

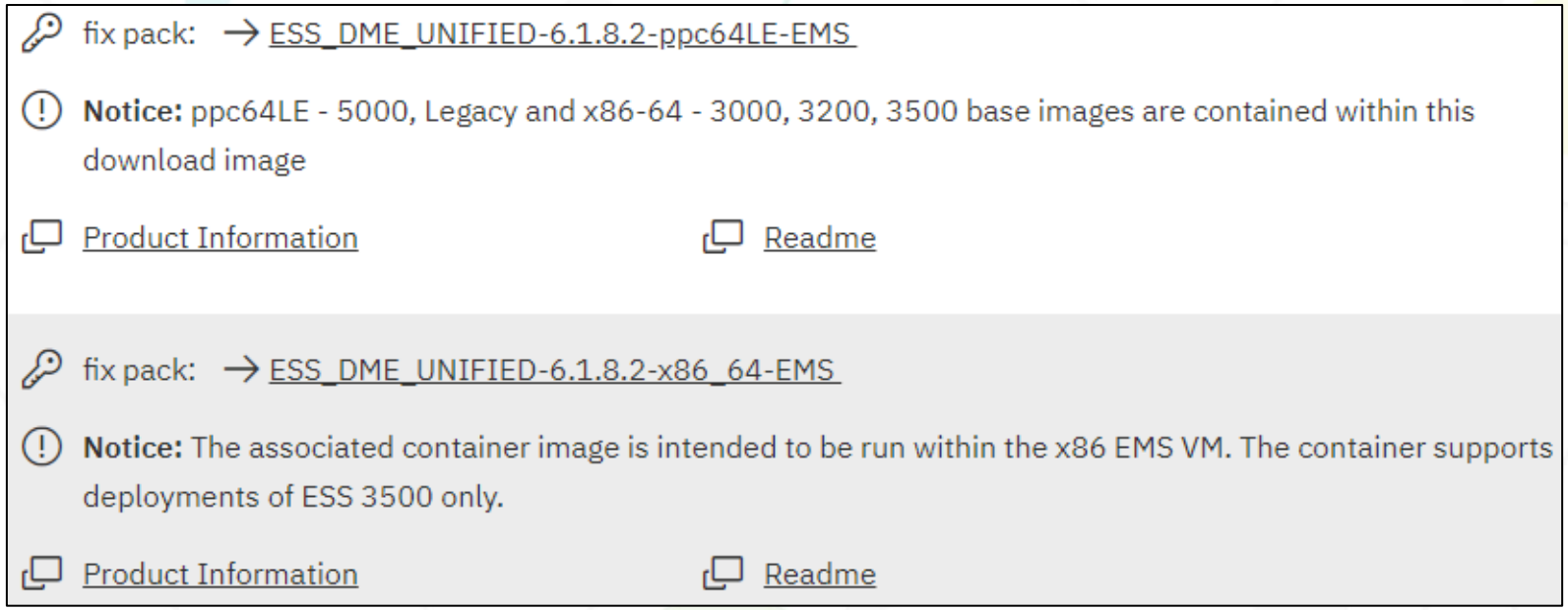
Legacy P8: ESS_DME_BASEIMAGE_Legacy-6.1.0.1-ppc64LE-Linux

Legacy 5000: ESS_DME_BASEIMAGE-6.1.1.0-ppc64LE-Linux

Legacy 3200: ESS_DME_BASEIMAGE_3200-6.1.1.0-x86_64-Linux

Legacy 3200: ESS_DME_BASEIMAGE_3200-6.1.1.0-x86_64-Linux

Modern: ESS_DME_UNIFIED-6.1.6.0-x86_64-EMS
ESS_DME_UNIFIED-6.1.6.0-ppc64LE-EMS



Cont. Package Download

Firmware Packages Explained

- Fix Central Download
  - ESS and Firmware packages are grouped on the same page
- Every ESS package includes a version of the firmware package within it
  - It could be down-level depending on when you install the ESS Package
- ESS Package and Firmware Example
  - ESS_DME_UNIFIED-6.1.8.2-ppc64LE-EMS.tgz (14.43 GB)
  - ESS_FIRMWARE-6.1.8.2-ppc64LE-Linux.tgz (2.19 GB)
- ESS package and Firmware packages are independent of each other
  - Any firmware package can be installed on any ESS version
    - Newer firmware can be installed on older ESS code
  - Firmware will need to be upgraded when drive fru stock is changed
  - When doing a multi-hop ESS upgrade, you can just use the latest firmware package

Upgrade Process

High-Level Modern Upgrade Process

Summary Example

- **Download/Unpack Files**
  - ESS Pkg (and Spectrum Scale if you have protocol nodes)
- **Remove old container**
- **Install new container**
- **Upgrade EMS Node**
- **Upgrade All IO Nodes**
  - Includes SAS adapter, enclosure and drive firmware updates
- **Upgrade Protocol Nodes**
  - Base OS, OFED, Internal RAID Adapter (NOT GPFS!)
- **Upgrade GPFS on Protocol Nodes**
  - Using Spectrum Scale Package and Toolkit
- **Upgrade System Firmware on each node, one at a time**
- **Optional Post-work**
  - Update Recovery Group Version, Upgrade Spectrum Scale Version, Upgrade File System Version

Modern Upgrade Process

Detailed Example – Prep & EMS

Remove Existing Container on EMS / Network Bridges

```
[EMS]# podman rm cems0
[EMS]# podman image rm 1d291838ce4a -f
[EMS]# nmcli c del fsp_bridge [repeat for: mgmt_bridge, and slave devices]
```

Extract ESS Package / Create Container

```
[EMS]# tar -zxvf ESS_DME_BASEIMAGE_Legacy-6.1.0.1-ppc64LE-Linux.tgz
[EMS]# tar -zxvf ess_legacy_6.1.0.1_0512-22_dme_ppc64le.tgz
[EMS]# ./ess_legacy_6.1.0.1_0512-22_dme_ppc64le.sh --start-container -silent
```

Load Configuration / Verify Config on Container

```
[CONTAINER]# essrun -N <NODE A>,<NODE B>,<ETC...> config load
[CONTAINER]# cat /vpd/Inventory
[CONTAINER]# cat /vpd/hosts.yml
```

Upgrade EMS Node

```
[EMS]# mmshutdown
[CONTAINER]# essrun -N <EMS> update -offline
[EMS]# scp cems0:/install/ess/otherpkgs/rhels7/ppc64le/firmware/01SV860_212_165.img /tmp/
[EMS]# update_flash -f /tmp/01SV860_212_165.img
[EMS]# mmstartup -N ems1
```

Cont. Modern Upgrade Process

Detailed Example – IO Nodes

Upgrade IO Nodes (Online)

```
[EMS]# essinstallcheck -N <IO NODE X>
[CONTAINER]# cat /vpd/Inventory
[CONTAINER]# cat /vpd/Inventory | grep bottom -A1
[CONTAINER]# cat /vpd/Inventory | grep top -A1
[CONTAINER]# essrun -N gss_ppc64le update
[EMS]# essinstallcheck -N <IO NODE X>
[IO NODE]# scp cems0:/install/ess/otherpkgs/rhels7/ppc64le/firmware/01SV860_212_165.img /tmp/
[IO NODE]# mmvdisk recoverygroup change --rg <RG X> --active <IO NODE Y>
[IO NODE]# mmshutdown
[IO NODE]# update_flash -f /tmp/01SV860_212_165.img
[IO NODE]# mmvdisk recoverygroup change --rg <RG X> --active <IO NODE X>
```

Cont. Modern Upgrade Process

Detailed Example – CES Nodes

Upgrade Protocol Nodes (One at a time)

```
[EMS]# essinstallcheck -N <PROTO>
[EMS]# mmchconfig autoload=no -N <protoX - gpfs>
[EMS]# mmces node suspend --stop -N <protoX - gpfs>
[EMS]# mmshutdown -N <protoX - gpfs>
[CONTAINER]# time essrun -N <protoX> update –offline
[EMS]# ssh <protoX> "mmbuildgpl"
[EMS]# essinstallcheck -N <PROTO>
[PROTO]# scp cems0:/install/ess/otherpkgs/rhels7/ppc64le/firmware/01SV860_212_165.img /tmp/
[PROTO]# update_flash -f /tmp/01SV860_212_165.img
[EMS]# mmstartup -N <PROTO>
[EMS]# mmces node resume --start -N <PROTO>

=== REPEAT FOR REMAINING PROTOCOL NODES ===
```

Upgrade GPFS on Protocol Nodes

```
[PROTO]# chmod +x /tmp/5.1.0.3/Spectrum_Scale_Data_Access-5.1.0.3-ppc64LE-Linux-install
[PROTO]# /tmp/5.1.0.3/Spectrum_Scale_Data_Access-5.1.0.3-ppc64LE-Linux-install --text-only –silent
[PROTO]# /usr/lpp/mmfs/5.1.0.3/installer/spectrumscale upgrade precheck
[PROTO]# /usr/lpp/mmfs/5.1.0.3/installer/spectrumscale upgrade run
```

Cont. Modern Upgrade Process

Detailed Example –Optional Post-work Items

MMVDISK: Update Recovery Group Version

```
[EMS]# mmvdisk rg change --rg rg_gssio1 --version LATEST
[EMS]# mmvdisk rg change --rg rg_gssio2 --version LATEST
```

Update Spectrum Scale Version

```
[EMS]# mmchconfig release=LATEST
```

Update File System Version

```
[EMS]# mmchfs gpfs0 -V full
```

How DST Does Upgrades

How we do upgrades
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- Review Customer environment
  - Make sure all the different pieces are understood to prevent unplanned downtime.
- Build a Detailed Upgrade Plan
  - Develop a playbook that will include all of the commands needed for the upgrade.
  - Customize it to the exact environment.
  - Include actual server names and package names for each command.
  - Include example output of what you would expect to see.
- Execute Plan
  - Perform health checks before, during, after.
  - Debug any issues that may arise.
  - Ensure all code/firmware is updated as expected.

Cont. How we do upgrades

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- Show Example Doc

Thank you