Spectrum Scale Installation Toolkit Overview

Kedar Karmarkar (kekarmar@in.ibm.com)

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Install toolkit: Introduction

- **What can I use Install toolkit for**
  - Initial Installation (Spectrum Scale only)
    - Installation of Spectrum Scale cluster
  - Addition of new nodes to the cluster (Spectrum Scale and ESS)
    - Install and add Protocol nodes to the cluster
    - Install and add client nodes to the cluster
    - Install and add GUI nodes to the cluster
  - Upgrade cluster to newer versions (Spectrum Scale and ESS)
    - Upgrade all nodes in the cluster (except ESS IO nodes)

- **What platforms it's supported on**
  - On all linux platforms supported by Spectrum Scale and ESS

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Install toolkit: Introduction

- **What additional tasks are performed by Install toolkit**
  - Perform verification before installing, deploying, or upgrading
  - Create new NSDs and File systems
  - Configure Performance Monitoring consistently across all nodes
  - Deploy and configure SMB, NFS, Object
  - Enable and configure call home and file audit logging functions.
  - Simplify upgrade with a single command to upgrade all components on all nodes
- **Where can I get it?**
  - Spectrum Scale Standard, Advanced, Data Management packages
  - /usr/lpp/mmfs/5.0.2.0/installer/
- **How do I first use it?**
  - Type: /usr/lpp/mmfs/5.0.2.0/installer/spectrumscale –h

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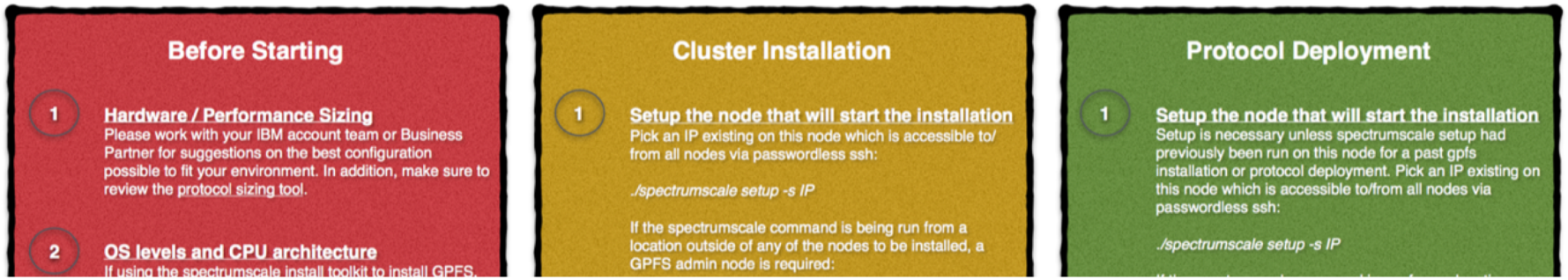
Install toolkit: Documentation

- **Is there a quick overview showing how to use the Install Toolkit?**

  Spectrum Scale Protocols Quick Overview on the GPFS Wiki



the self extracting package will give a URL link to this guide as well

- **Is the Install Toolkit documented in the Knowledge Center?**

  See the Knowledge Center sections for installing GPFS on Linux nodes

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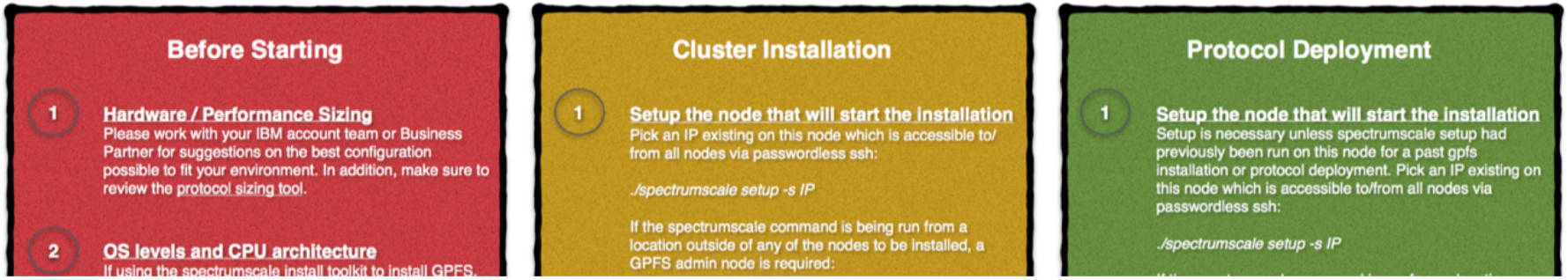
Adding protocol nodes to an ESS

- From Spectrum Scale 5.0, Install toolkit is ***aware*** of the ESS
- Ensure ESS is protected when adding protocols nodes to it.
- **Grab the Spectrum Scale Quick Overview pdf matching your code level**

  Spectrum Scale Protocols Quick Overview on the GPFS Wiki



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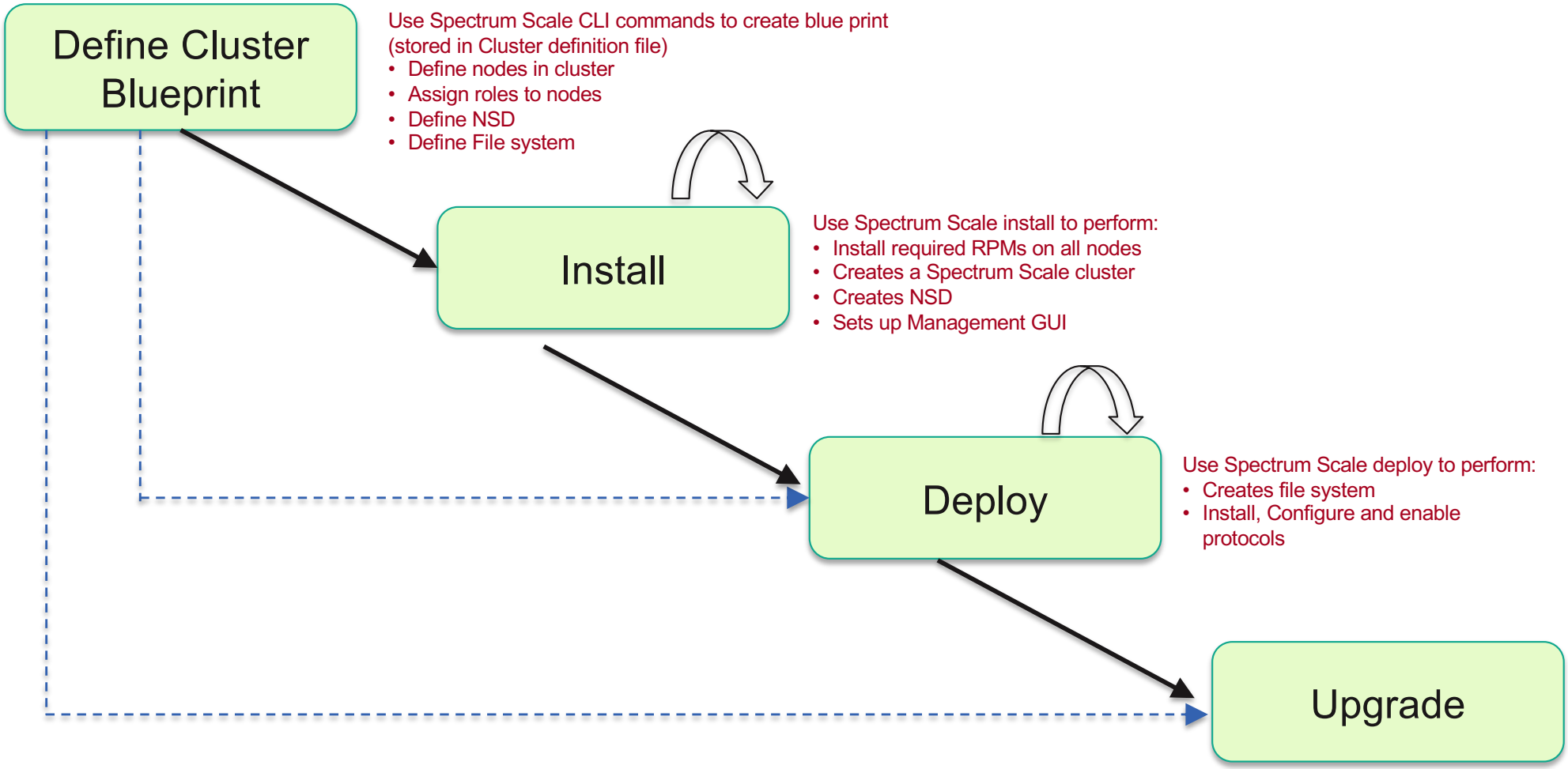
Install Toolkit: Work Flow



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Install Toolkit: Blue Print

- **What happens and when?**
- Creating the cluster Blue print:
  - User input via ‘spectrumscale’ commands:
    a) All user input is recorded into a clusterdefinition.txt file in /usr/lpp/mmfs/5.0.0.2/installer/configuration/
    b) Optionally the, *./spectrumscale config populate –N <node in cluster>,* command can be used to traverse an existing cluster and automatically populate the clusterdefinition.txt file.

Define Cluster Topology

- **spectrumscale node add** [--quorum, --manager, --admin, --nsd, --protocol, --gui, --callhome]
- **spectrumscale nsd add** [--primary, --secondary, --filesystem, --pool, --usage, --failuregroup]
- **spectrumscale config** [protocols, gpfs, object, ntp, perfmon]
  - [protocols: --filesystem, --mountpoint, --export-ip-pool]
  - [gpfs: --clustername, --profile, --remote_shell, --remote_file_copy ...]
- **spectrumscale enable/disable** [object, smb, nfs]

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Install Toolkit: Install

- **What happens and when?**
- A ‘spectrumscale install’ phase:
    a) Install will act upon all nodes inputted into the clusterdefinition.txt file
    b) GPFS and perfmon rpms will be installed
    c) GPFS portability layer will be created
    d) GPFS will be started
    e) A cluster will be created
    f) Server and Client licenses will be applied
    g) GUI nodes may be created and the GUI may be started on these nodes
    h) NTP, perfmon, audit logging, callhome, ephemeral ports, cluster profile... may be configured
    i) NSDs may be created - *note* filesystems are not created during install

Install

- **spectrumscale install** [--precheck, --postcheck]

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Install Toolkit: Deploy

- **What happens and when?**
- A ‘spectrumscale deploy’ phase:
    a) Deploy will act upon all nodes inputted into the clusterdefinition.txt file
    b) File systems will be configured - *note* it is possible to only configure file systems during deploy if you do not want protocols
    c) File Audit Logging *(FAL)* may be enabled
    d) SMB, NFS, Object protocol rpms will be copied to all protocol nodes
    e) SMB, NFS, Object services may be started
    f) Authentication may be configured

Deploy

– **spectrumscale deploy** [--precheck, --postcheck]

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Install Toolkit: Upgrade

What happens and when?

See this KC link for details on the upgrade flow

A ‘spectrumscale upgrade’ phase:

a) Upgrade will act upon all nodes inputted into the clusterdefinition.txt file
b) All installed/deployed components will be upgraded
c) Upgrades are sequential with multiple passes
d) Pass 1 of all GPFS only nodes will upgrade GPFS sequentially
e) Pass 2 of all Protocol nodes will upgrade GPFS, NFS sequentially
f) Pass 3 of all Protocol nodes will upgrade Object sequentially
g) Pass 4 of all Protocol nodes will upgrade SMB sequentially

Upgrade

- **spectrumscale deploy** [--precheck, --postcheck –showversions]

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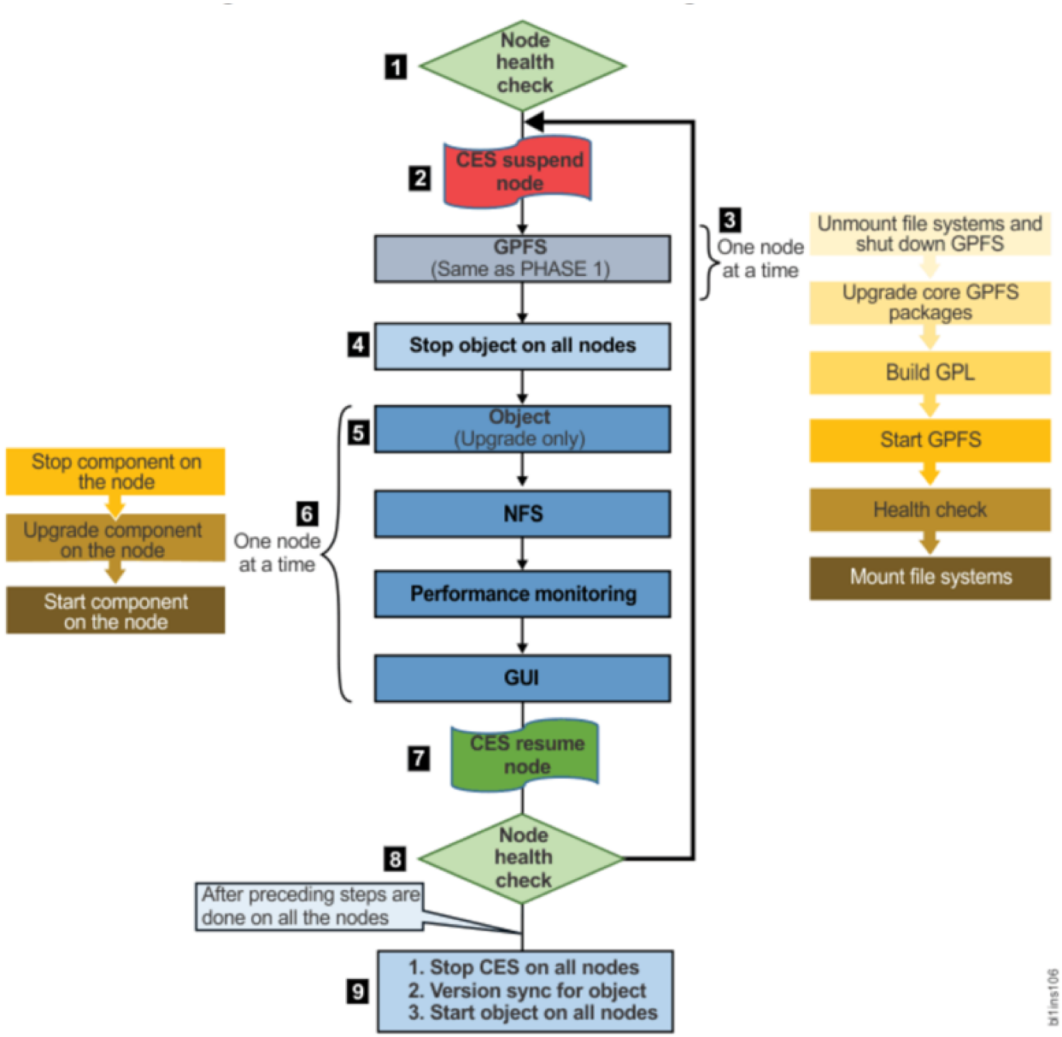
Install Toolkit: Upgrade 5.0.2



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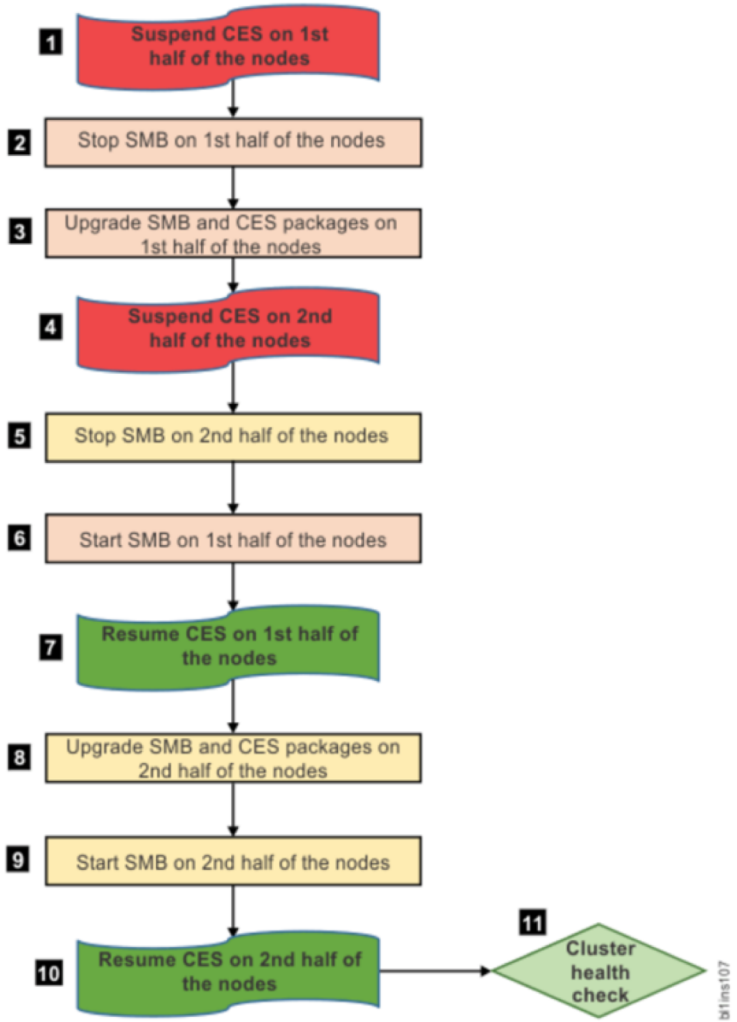
Install Toolkit: Upgrade 5.0.2



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5.0.2 upgrade enhancements

- **The Install Toolkit now allows for node to be marked for offline upgrade**

Potential use cases:

Node is offline and still desire to upgrade the node

Node is unhealthy and still desire to upgrade the node

Nodes offline can reduce the upgrade duration (reduced checking)

Keep the node offline to complete an OS upgrade

Keep the node offline to complete other software updates (OFED, drivers etc)

Keep the node offline so a reboot can be performed

Offline all nodes to perform an offline upgrade

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5.0.2 upgrade enhancements

- **The Install Toolkit now allows for node to be marked for offline upgrade**

Offline details:

The toolkit will not attempt to start up GPFS (mmstartup) nor start any services (mmces service start etc) on a node that is marked offline

The toolkit will perform some basic checks to ensure that minimum quorum nodes will remain online when placing nodes offline

The toolkit will require the node to be placed offline (mmshutdown) prior to placing the node in the offline upgrade list

***note* if any node is in arbitrating mode due to too many nodes offline and no quorum, some 'mm' commands can take additional time and slow the toolkit down**

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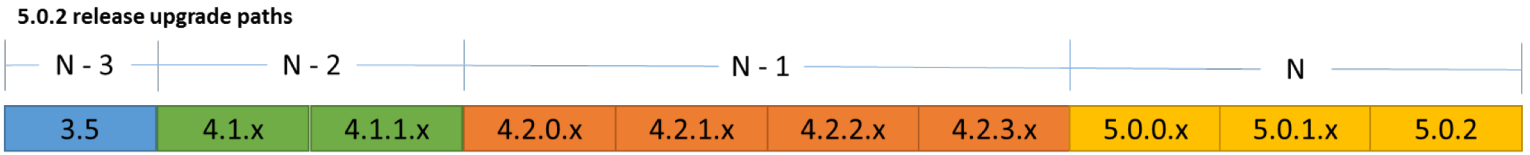
5.0.2 upgrade enhancements

- **The Install Toolkit now allows for an offline upgrade (all nodes offline)**

A direct upgrade path from N-2 4.1.1.x to 5.0.2.0 is now supported if the entire cluster is shutdown and all nodes are marked for an offline upgrade

The toolkit was introduced in 4.1.1.0. No offline upgrade for code < 4.1.1.0 supported

Offline upgrades supported from any N-2 (4.1.1.x) N-1 (4.2.x) or N (5.0.x) to 5.0.2



Online upgrade supported from N-1 to N

Offline upgrade supported from any level to N

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5.0.2 upgrade enhancements

- **The Install Toolkit now allows for an upgrade on a subset of nodes (exclude nodes)**

  Potential use cases:

  Node is not reachable or powered down

  Node can not be upgraded during a particular maintenance window

  Controlling which subset of nodes are upgraded

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5.0.2 upgrade enhancements

- **The Install Toolkit now allows for an upgrade on a subset of nodes (exclude nodes)**

```
[root@node-vm1 installer]# ./spectrumscale upgrade config exclude -h
usage: spectrumscale upgrade config exclude [-h] [-N NODE] [--clear]

optional arguments:
  -h, --help            show this help message and exit
  -N NODE, --node NODE  The node(s) within an existing gpfs cluster(comma
                        separated, ex: -N node1,node2). This node will not be
                        part of upgrade process and will need to be upgraded
                        at a later time.
  --clear               Clear the excluded node(s) detail(s).
```

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5.0.2 upgrade enhancements

- **The Install Toolkit now allows for an upgrade to resume after a failed upgrade attempt without recovering all nodes to a healthy state**

  Previous Install Toolkit versions < 5.0.2 required all nodes and protocol services to be online and healthy prior to allowing upgrade

  5.0.2 introduces the ability to resume a previously failed upgrade

  Recover from the error that caused the upgrade to fail

  ./spectrumscale upgrade run will determine that an upgrade was in progress and skip health checks and upgrade all nodes identified to the toolkit

  With upgrade resume, nodes that were previously upgraded will be shutdown again. 5.0.2 does not track which nodes were successfully upgraded.

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5.0.2 upgrade enhancements

- **The Install Toolkit now allows for an upgrade to resume after a failed upgrade attempt without recovering all nodes to a healthy state**

Upgrade resume will allow to do the upgrade even if some component becomes unhealthy . It will give the proper warning instead of fatal i.e component is not healthy on this node.

Upgrade resume will not try to stop to the services if they are already stopped.

Upgrade resume will not try to start any services if they are already running.

Upgrade resume will try to start the services if they are stopped.

Upgrade resume will not try to start/stop the services if node/component is kept in offline using ./spectrumscale config upgrade offline –N feature.

Upgrade pre-check with resume flag instruct user through proper warning message for all unhealthy component.

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Questions??

List of packages required for Linux nodes (as requested during the session):

- https://www.ibm.com/support/knowledgecenter/en/STXKQY_5.0.2/com.ibm.spectrum.scale.v5r02.doc/bl1ins_linsoft.htm
- https://www.ibm.com/support/knowledgecenter/en/STXKQY_5.0.2/com.ibm.spectrum.scale.v5r02.doc/bl1ins_protocolsprerequisites.htm

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