

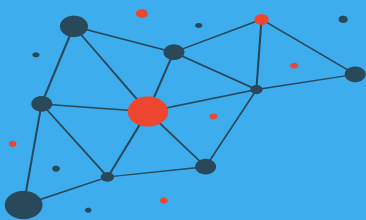
Spectrum Scale User Group, Australia

**What is new in
Spectrum Scale 5.0.5?**



IBM
**Spectrum
Scale**

Join user group:
www.spectrumscaleug.org/join



About the user group

- Independent, work with IBM to develop events
- Not a replacement for PMR!
- Email and Slack community
- www.spectrumscaleug.org/join



#SSUG



IBM Spectrum Scale

Release Update 5.0.5

Chris Maestas
Executive Architect

Ismael Solis
Spectrum Scale Performance
Analyst



Disclaimer



IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

IBM reserves the right to change product specifications and offerings at any time without notice. This publication could include technical inaccuracies or typographical errors. References herein to IBM products and services do not imply that IBM intends to make them available in all countries.

Spectrum Scale Early Programs



Types of Programs:

Alpha

Influence the development of new technology by gaining before market access to product code. Alpha programs are typically confidential and the first opportunity for you to interact with a feature or function.

Beta

Try out a new offering with the team who owns the product and influence its usability and design. A Beta program gives you the ability to evaluate and provide feedback on IBM products before the products general availability. Beta programs are typically confidential and run prior to GA.

Early Support Program (ESP)

Be one of the few selected participants to validate new Software or Hardware and potentially give your enterprise an edge over the competition. The IBM early support programs give you and IBM the opportunity to develop, evaluate, and gain experience with a product or a set of products in your enterprise environment.



Customer Success

- ☐ Evaluate new IBM HW or SW in your environment.
- ☐ Validate procedures and interoperability with other products in your enterprise.
- ☐ Opportunity to Influence Product Design
- ☐ Early Enablement and education
- ☐ Strengthen Partnership with IBM

Talk to your IBM contact or Partner to be nominated!

Spectrum Scale Developer Edition!



Fully functional!

- Derived from **Data Management Edition (DME)**
- Limited to 12 TBs:
enough for a small test cluster
- Available from the Scale "try and buy" page on ibm.com
- Released after ptf of new release (5.0.5.1)

A screenshot of the IBM Spectrum Scale Developer Edition offer page. The background is blue. The text 'IBM Spectrum Scale' is in white. Below it, in smaller white text, is 'Advanced storage management of unstructured data for cloud, big data, analytics, objects and more'. Further down, it says 'Starting at \$18.55 per terabyte'. At the bottom, there are two white buttons with blue borders: 'Free 30-day trial' and 'Try free developer edition'.

Free for non-production use, e.g. test, learning, upgrade prep...

- If you have to ask, it's probably not permitted

Not formally supported

Spectrum Scale on GitHub!

<https://github.com/IBM/SpectrumScaleTools>



- IBM Spectrum Scale Bridge for Grafana
- IBM Spectrum Scale cloud install
- IBM Spectrum Scale Container Storage Interface driver
- IBM Spectrum Scale install infra
- IBM Spectrum Scale Security Posture
- Oracle Cloud Infrastructure IBM Spectrum Scale terraform template
- SpectrumScale_ECE_CAPACITY_ESTIMATOR
- SpectrumScale_ECE_OS_OVERVIEW
- SpectrumScale_ECE_OS_READINESS
- SpectrumScale_ECE_STORAGE_READINESS
- SpectrumScale_ECE_tuned_profile
- SpectrumScale_NETWORK_READINESS

Find open source tools that are related with IBM Spectrum Scale.

Unless stated otherwise, the tools compiled in this list come with no warranty of any kind from IBM.

Check out the FAQ!

<https://www.ibm.com/support/knowledgecenter/en/STXKQY/gpfsclustersfaq.html>

<https://www.ibm.com/support/knowledgecenter/STXKQY/gpfsclustersfaq.pdf?view=kc>

<https://www.ibm.com/support/knowledgecenter/SSYSP8/gnrfaq.html>

HTML or PDF

Spectrum Scale version compatibility with OS or kernels

Updated regularly!



Spectrum Scale 5.0.5

An Extended Update Support (EUS) release
Simplifies ownership of Spectrum Scale

Scale V4.2.3 "incidentally" became an EUS-like release

- As the next final pack for the 4.2 release, 4.2.3 continues to receive PTFs, so it's not for an EUS release.
- The extended the 4.2.3 release covers to stay supported for a very long time, partly because it's the last release to support older Linux distros.
- However, until we announced End of Service (EOS), nobody knew for sure how long that would be, which is not good for planning.

This time, we are doing EUS officially with V5.0.5

- You can remain current on security and other fixes without the expense of functional upgrades.
- You can choose to take advantage of features and releases while shipping final patches.
- You will know even before GA how long to expect support and can plan accordingly.

IBM Spectrum Scale



Extended Update Support (EUS) Release

Feature Updates

Core Improvements

Monitoring, Availability and Proactive Services (MAPS)

Protocols

Security



IBM Spectrum Scale / Spectrum Scale User Group – What's new with 5.0.5 / © 2020 IBM Corporation

Changes, Deprecation ...

Changed	
Command	Summary of Changes
mapfs	Parameter 'Show' added to display all the existing maps. Each row displays the mapping of a gateway node and home NFS server pair that is separated by a comma (,).
mapfs	Various changes to the 'show' command. This option is used for pre-checking the contents from home before the application requests for the contents. This reduces the network delay when the application performs data transfers on the file and also that is not to occur.
mapfs	Using --compress option is possible to specify that the multi-logging feature that is created to hold the multi-logging files will be IBM node compatible. It is also possible to feature a list of files within the filesystem to add or skip files by using the options --add-files and --skip-files respectively.
mapfs	It allows to change the value of new file system attributes including: mapfs:cache:threads, mapfs:cache:cache and mapfs:cache:flushing.
mapfs	It allows to change the value of new file system attributes to configure AFM including: afm:fastCreate, afm:fastDelete and afm:fastDelete.
mapfs	--update attribute has been added to replace an expired or corrupted client certificate with a new one in the specified key store.
mapfs	--update parameter has been added to convert all active clustered watches to use the IBM Spectrum Scale system health infrastructure. During the conversion process, conducts are disabled and then re-enabled.
mapfs	--update parameter added to set the installation build to prompt users to shut down their workloads before an upgrade. The same type must be used for using the option.

An Extended Update Support (EUS) release Simplifies ownership of Spectrum Scale

Scale V4.2.3 “incidentally” became an EUS-like release

- As the last Mod pack for the 4.2 release, 4.2.3 continues to receive PTFs, so it’s a lot like an EUS release
- We allowed the 4.2.x release stream to stay supported for a very long time, partly because it is the last release to support older Linux distros
- *However*, until we announced End of Service (EOS), nobody knew for sure how long that would last, which is not good for planning

This time, we are doing EUS officially with **V5.0.5**

- You can remain current on security and other fixes without the expense of functional upgrades
- You can choose to take advantage of Versions and Releases while skipping Mod packs
- You will know even before GA how long to expect support and can plan accordingly



Sidebar: Release nomenclature at IBM

IBM identifies software by V.R.M.F

- V = Version number (“5.0.0.0”)
 - Indicates a separate IBM licensed program that usually has significant new code or new function
 - Typically has new Part Numbers
 - Major feature changes
- R = Release number (“5.1.0.0”)
 - Minor feature changes
- M = Mod level (“5.0.4.0”)
 - Can include new functionality
 - Can include OS currency updates
 - Typically twice a year for Scale
- F = Fix pack, commonly known as PTF (“5.0.4.1”)
 - Security and functional fixes
 - Cumulative
 - No new functionality

For details, see: <https://www.ibm.com/support/pages/vrmf-maintenance-stream-delivery-vehicle-terminology-explanation>

IBM is using a standard version format for MDV. The product numbering is based on the IBM and Fix Level structure within the V.R.M.F format.

The following table provides details of the individual version elements.

Note: Although not all of the version elements are publically available, they are all fully supported.

Numbered element	Example	Description
V - Version number	(7.0.0.0)	<ul style="list-style-type: none">• Indicates a separate IBM licensed program that usually has significant new code or new function• Number limit from 0-99• Major feature changes.• Starts a 5 year maintenance cycle• Downloads found on Passport
R - Release number	(7.0.0.0)	<ul style="list-style-type: none">• Minor feature change release.• Number limit from 0-99• Starts a 5 year maintenance cycle• Downloads found on Passport
M - Modification number	(7.0.0.0)	<ul style="list-style-type: none">• Manufacturing refresh also referred to as a Pack.• Number limit from 0-9999

Releases and the support lifecycle at IBM

Support life is determined by V.R numbers and the “3+2” support lifecycle

- Each Version or Release of Scale is supported for *at least* three years from the GA date. A change to the V or R digit starts a new clock
- A new Mod level or Fix pack does *not* start a new clock
- After EOS, IBM *may* offer “extended support” for up to two years. This does *not* include PTFs

Typical Scale release cadence

- New Version or Release every 3 – 5 years
- New Mod level six months (5.0.1, 5.0.2, 5.0.3, 5.0.4, 5.0.5)
- PTFs delivered ~6 to 8 weeks apart

What is supported?

- All Mod levels of a currently active release remain supported, i.e. you can call IBM for help
- PTFs are provided ONLY for the **most current** Mod level of **each** supported release
 - Currently 4.2.3 and 5.0.5
- **This will be important later!**



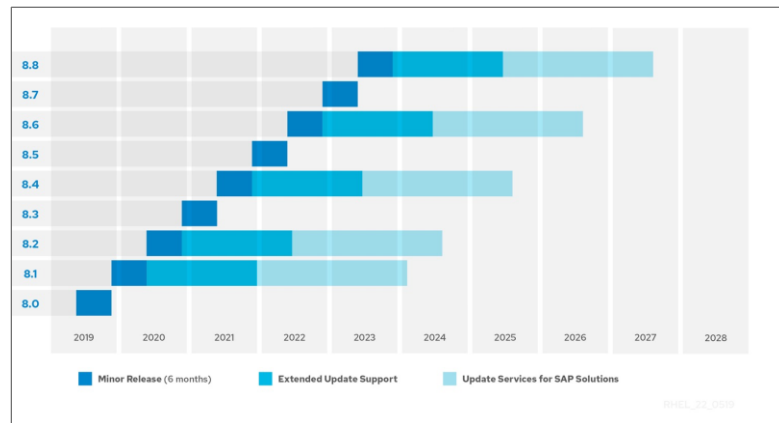
An Extended Update release simplifies ownership

An extended update support release allows customers to receive a fix stream without taking new features

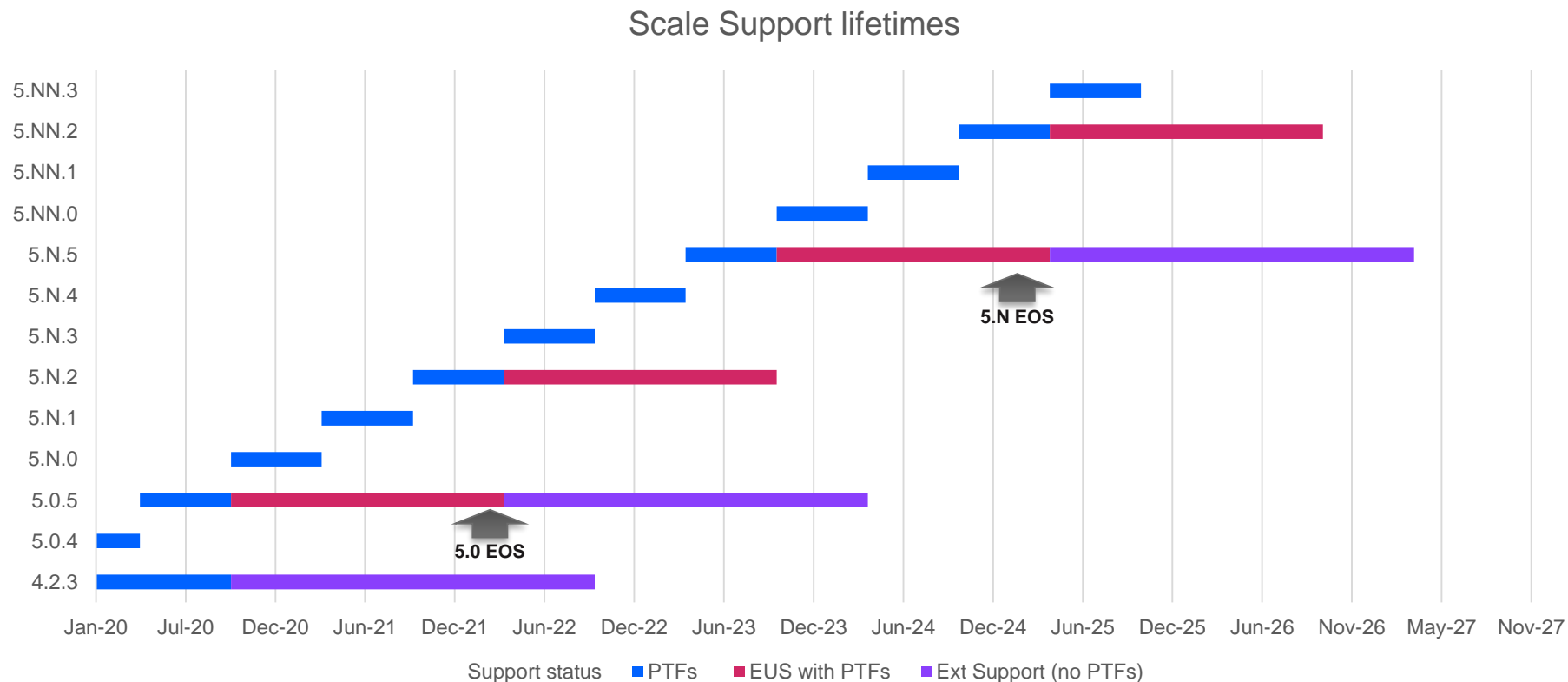
- Security and other fixes continue even after the next release
- On Linux distros, known as EUS (Extended Update Support) or LTS (Long Term Support)
- Eliminates need for extensive re-testing in order to stay secure
- Allows better dependency management both upstream (OS) and downstream (apps such as SAP or Oracle)



Compare the predictable RHEL plan



Every third release has extended updates with additional 18 months of PTFs



Scale EUS and RHEL EUS Alignment

Scale release	Planned date	7.x*	8.0	8.1	8.2	8.4	8.6	8.8	9.x?
5.0.4	4Q2019								
5.0.5 EUS	2Q2020								
5.N.0	4Q2020								
5.N.1	2Q2021								
5.N.2 EUS	4Q2021								
5.N.3	2Q2022								
5.N.4	4Q2022								
5.N.5 EUS	2Q2023								
5.NN.0	4Q2023								
5.NN.1	2Q2024								

*See Knowledge Center for details of RHEL7 support. Subject to changes to Red Hat release plans beyond RHEL7.8

Executive Summary

New Scale Version or Release every three years *or more* (as today)

Mod packs ~every six months (as today)

Extended Update release every 18 months

- i.e. every third Mod pack comes with EUS

Customers can get a PTF stream...

- Either by staying with the Extended Update release
- Or (as today) by moving with each Mod pack

5.0.5 will be our first planned Extended Update release

- Will release six months before 4.2.3 goes EOS to allow for managed migration
- Will also be the last 5.0.x and eligible for Extended support

Subsequent Extended Update releases will overlap by six months to support managed migration



Core Improvements

Monitoring, Availability and
Proactive Services (MAPS)

Protocols

Security



Core Improvements

TRIM support for NVMe devices

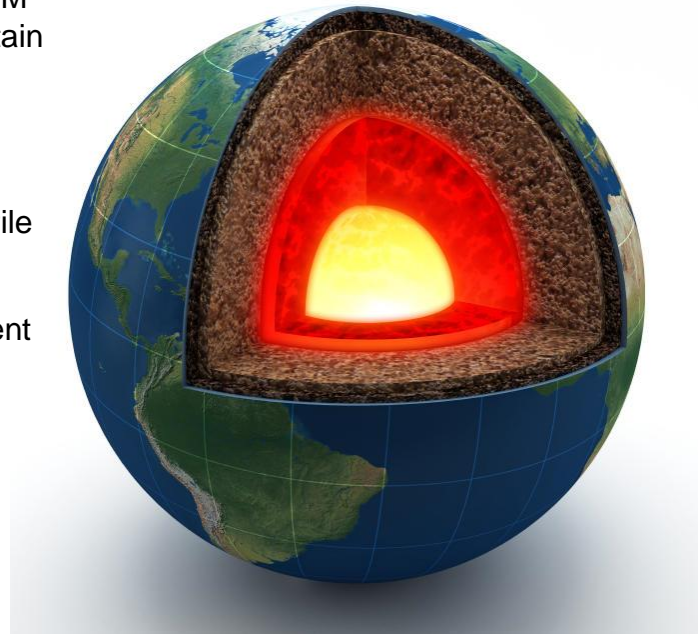
- NSD configuration and the new **mmreclaimspace** command to enable TRIM support, which reduces write amplification on solid-state devices under certain workloads

Thin provisioning support (**RPQ only**)

- Add the ability to use thinly provisioned and compressed volumes for both file system data and metadata
- Contact your sales or account team (RPQ / SCORE process) for assessment on the use of thin provisioning

The following features are added to thin provisioning:

- Online disk type change for space reclaim
- Autodetection on space reclaimable disk
- Methods to reclaim space



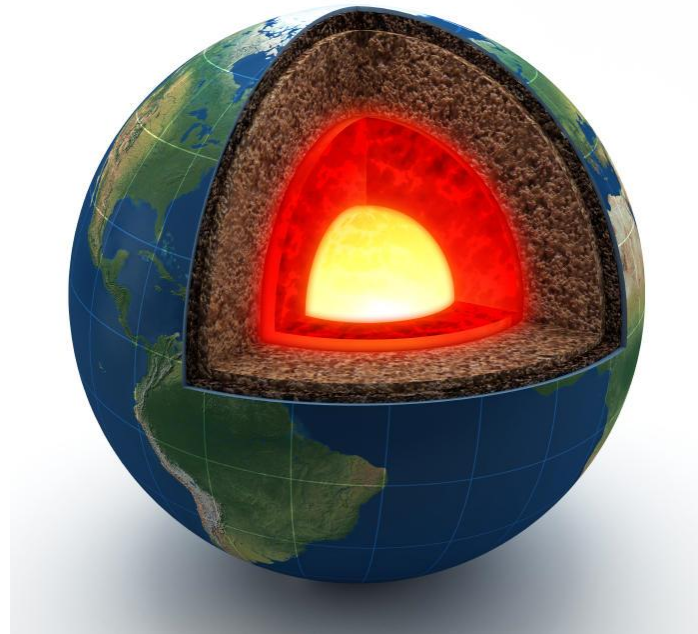
Core Improvements

RHEL 7.8/8.1 support

Windows Server 2019 NSD Server and NSD Client support

Support `cp --preserve=xattr`

- E.g. for migrating into a 5.x "variable subblock" file system
- POSIX and NFSv4 ACLs are copied.



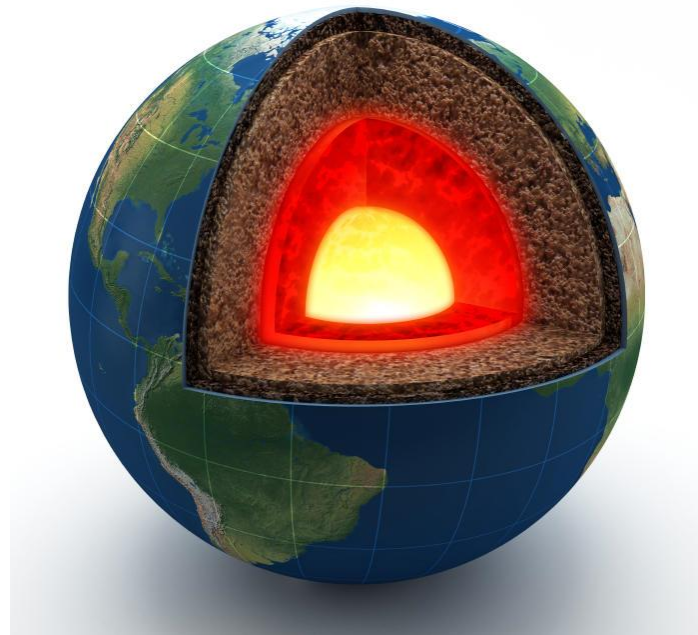
Core Improvements

Install / Upgrade toolkit

- Better handling short vs FQDN hostnames during install / upgrade
- ECE Rolling Upgrade from 5.0.4.3 to 5.0.5

Spectrum Scale on Z

- CES with NFS and SMB are **RPQ** only supported
- CES GUI, Health, Performance Monitors
- **mmuserauth** authentication setup



Core Improvements

mmchconfig has **minIndBlkDescs** attribute

- ensure that more indirect block descriptors are cached in memory. Increasing the value of this attribute can improve the performance of some applications that do direct I/O.

mmchconfig has **maxReceiverThreads**

- can improve TCP performance by reducing the number of sockets that each receiver thread must handle.

mmchattr --compact has suboptions **indblk** and **fragment**

- increase available disk space by recovering unused indirect blocks or data subblocks from files.



Core Improvements

mmcheckquota improved performance

- Fix slow down in while traversing very large sparse inode zero file
- Improvement for certain FSs with several independent filesets

Improve **mmrestripefs** performance

- Better self-tuning on the number of threads for ESSs

Speed up "ls -l" on a large directory with lots of fileset junctions

- Less time spent on lookups



Core Improvements

Eliminate zero link count inodes in snapshots

- E.g. avoid moving unnecessary blocks when snapshot is deleted

Add a configuration option that will establish all-to-all daemon connections after mmfsd starts

Performance is improved for **mmap** read workloads when multiple threads read the same file.



MAPS: Health Improvements

Detect OOM killer runs

- Detect if Linux Out of memory killer has run and warn about it
- New command “*mmhealth event resolve*” to manually clear OOM event

NumaMemoryInterleave enabled but dependencies missing

- Numactl command required to control NUMA settings



NFS Monitoring improvements

- NFS Monitoring RPC Nullcheck behavior improved
- Prevent NFS from starting up when remote mount is not available

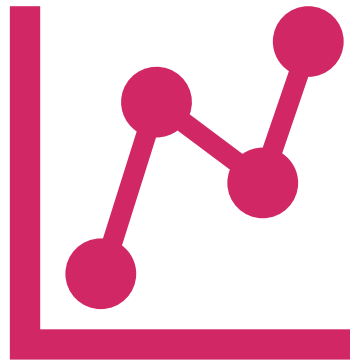
MAPS: Performance Monitoring

Top-k Performance Sensor

- Collect the Top 10 processes (by CPU Usage) and provide a reporting with CPU/Memory
- New command “mmperfmon report”

Improve Network sensor for Docker

- allow custom filters to filter out virtual temporary docker interfaces
- Use “mmperfmon config” command to modify the filter



Performance Threshold Improvements

- New measurement MemoryAvailable_percent
- Default threshold rules deactivated if the corresponding sensor is not configured

MAPS: Call Home Improvements

Show Configuration changes between two call home uploads

- New command “mmcallhome status diff”

```
[root@g5050-11 blah_old]# mmcallhome status diff --last-days 2
```

```
Active Config      (modified)
  Maxfilestocache  : 100010  --> 10
```

```
Cluster Data       (modified)
  Maxfilestocache  : 100010  --> 10
```



Enforce config options like customer name, customer ID.

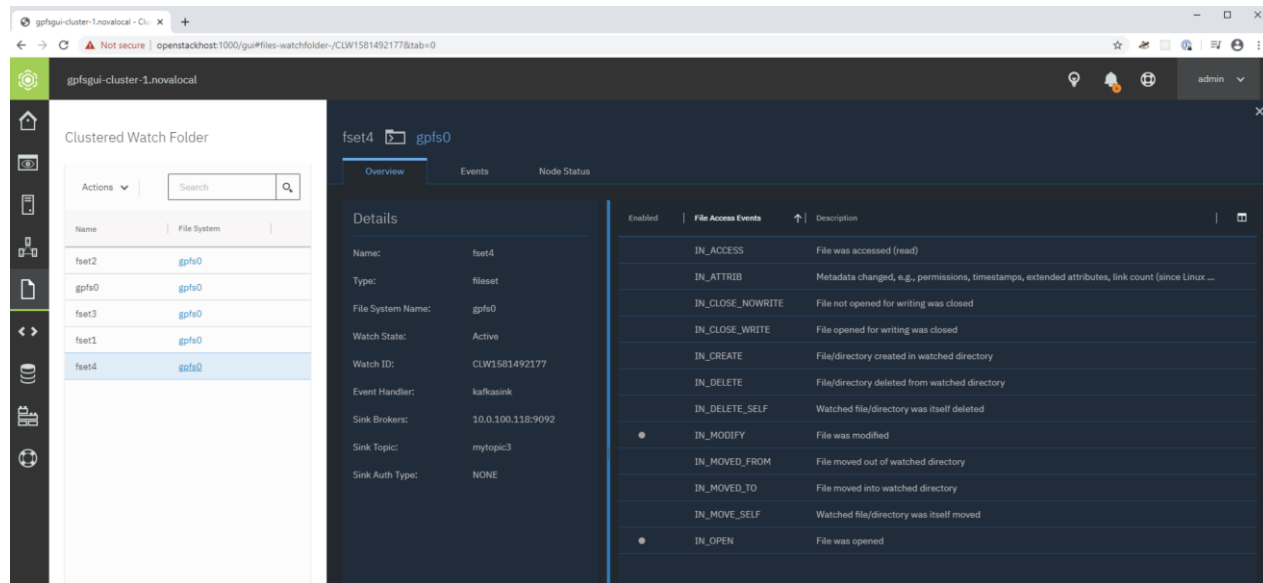
- Show health tip if missing

And more....

- sudo wrapper support, Test connection of ungrouped nodes, add/del nodes from group

MAPS: GUI Improvements

Support for Watch Folders:



The screenshot shows the IBM Spectrum Scale GUI interface for configuring watch folders. The left sidebar contains navigation icons. The main content area is titled 'Clustered Watch Folder' and includes a search bar and a table of watch folders. The table lists several folders, with 'fset4' selected. The right panel shows the details for 'fset4', including its file system, status, ID, and event handler. Below the details, there is a table of file access events.

Name	File System
fset2	gpfs0
gpfs0	gpfs0
fset3	gpfs0
fset1	gpfs0
fset4	gpfs0

Details for fset4:

- Name: fset4
- Type: Riset
- File System Name: gpfs0
- Watch Status: Active
- Watch ID: CLW1581492177
- Event Handler: kafkasink
- Sink Brokers: 10.0.100.118:9092
- Sink Topic: mytopic3
- Sink Auth Type: NONE

Enabled	File Access Events	Description
	IN_ACCESS	File was accessed (read)
	IN_ATTRIB	Metadata changed, e.g., permissions, timestamps, extended attributes, link count (since Linux ...
	IN_CLOSE_NOWRITE	File not opened for writing was closed
	IN_CLOSE_WRITE	File opened for writing was closed
	IN_CREATE	File/directory created in watched directory
	IN_DELETE	File/directory deleted from watched directory
	IN_DELETE_SELF	Watched file/directory was itself deleted
•	IN_MODIFY	File was modified
	IN_MOVED_FROM	File moved out of watched directory
	IN_MOVED_TO	File moved into watched directory
	IN_MOVE_SELF	Watched file/directory was itself moved
•	IN_OPEN	File was opened

Display NVMe information for physical Disks for ESS and ECE

Configure overlapping ID ranges for AD + RFC2307

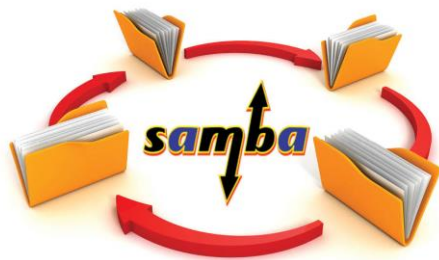
Protocols: SMB

Added the best practices for using SMB to the Knowledge Center.

Recovery lock: The SMB clustering component now uses a global file lock to maintain cluster integrity.

File handles for Mac clients: The SMB service returns file handles built upon the GPFS inode number, generation number, and snapshot number to Mac clients instead of just 0.

Error messages and trouble shooting procedures have been improved for SMB share modes.



Spectrum Scale Release	General Availability	Samba Version	Platform Support (accum.)
4.1.1	2Q15	4.2	x86_64/RHEL7
4.2.0	4Q15	4.3	ppc64/RHEL7
4.2.1	2Q16	4.3	x86_64/SLES12
4.2.2	4Q16	4.4	ppc64le, ppc64, x86_64 / RHEL7.2
4.2.3.0 - 4.2.3.8	2Q17	4.5	x86_64, ppc64, ppc64le / RHEL 7.3, 7.4
5.0.0	4Q17	4.6	x86_64/Ubuntu 16.04.2
5.0.1	1Q18	4.6	RHEL 7.5 (5.0.1.1)
5.0.2 >= 4.2.3.9	3Q18	4.6	+ Ubuntu 18.04
5.0.3	2Q19	4.9	RHEL 7.6 (bringing mutex fixes)
5.0.4	4Q2019	4.9	RHEL8
5.0.5	2Q2020	4.11	

Protocols: NFS-Ganesha V2.7.5-ibm057.00



Use the **ganesha_stats** command to enable, disable, or retrieve these statistics.

- **client_io_ops** - READ, WRITE of all supported NFS protocols (NFSv3, NFSv4.0) exerted by the NFS client (client IP address).
 - Understand I/O workload exerted by a specific NFS client.
- **client_all_ops** - NFSv3, NLM, NFSv4.0. Disabled by default.
 - Understand all workload exerted by the NFS client.

DNS-related stats can be captured as a part of the authentication statistics collection.

Various improvements in metadata caching module (MDCACHE), which includes the directory listing area.

Prevent NFS from starting up when remote mount is not available.

NFS Monitoring RPC Nullcheck behavior improved.

System health monitor sends NFSv3 / NFSv4 NULL requests to check if Ganesha is active.

Protocols: Containers

Container Storage Interface (CSI) version 2.0.0

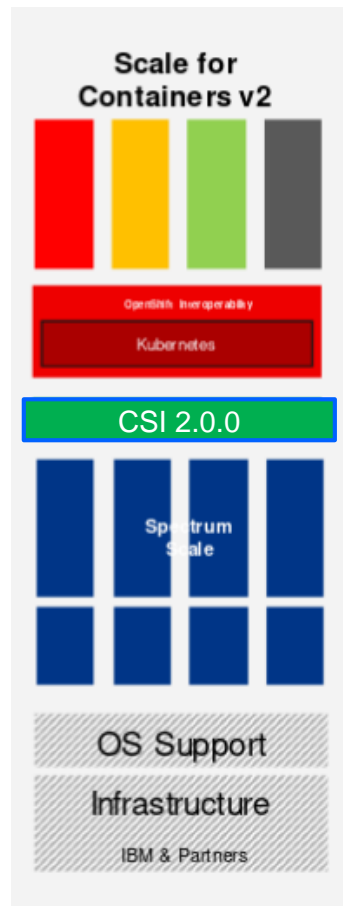


Allow a Spectrum Scale file system to surface into a pod/container running inside OpenShift or Kubernetes

<https://github.com/IBM/ibm-spectrum-scale-csi>

Upgraded sidecar images

- Support for Red Hat® OpenShift® 4.4 and Kubernetes 1.18
- Support for imagePullSecrets
- Upgraded the operator-sdk version from 0.11.0 to 0.17.0
- Upgraded the ansible-operator version from v0.14.0 to v0.17.0
- Improved custom resource parameter validation and error messages
- Improvements in the debug data collection tool

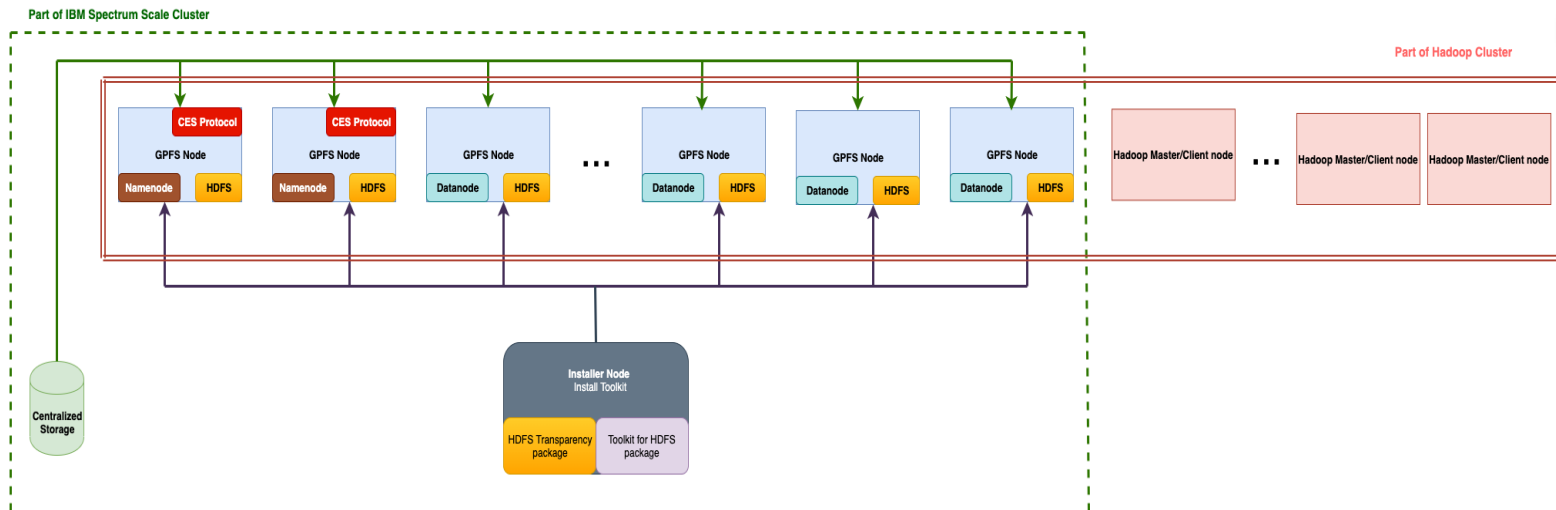
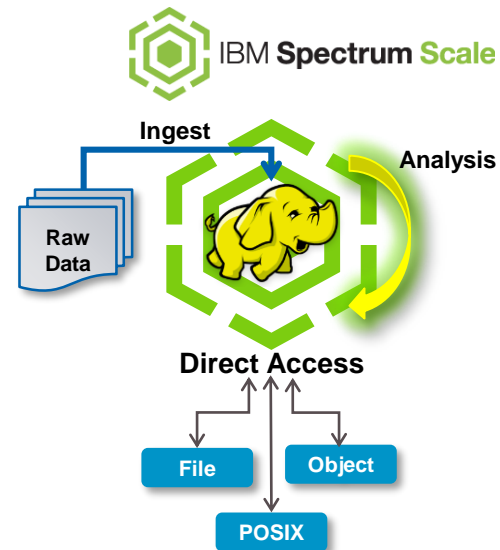


Protocols: HDFS Transparency 3.1.1

Integrates with CES protocol and IBM Spectrum Scale installation toolkit for NameNode service

Supports Open Source Apache Hadoop distribution and RedHat Enterprise Linux operating systems.

gpfs.snap --hadoop to collect logs



Active File Management (AFM)

Support **dependent filesets** inside an AFM or AFM-DR fileset.

Increase number of threads for prefetch operation:

```
– # mmafmctl <fs> prefetch -j <fileset> --list-file <listfile_path> --  
prefetch-threads 6
```

Migration enhancements for AFM data migration.

- Set the **afmReadDirOnce** and **afmRefreshOnce** parameters of AFM to improve performance during the data migration procedure.

Support of fast create for AFM and AFM-DR.

- Fast create reduces the number of operations that are generated at the time of file creation at the cache.
- E.g. for applications which are generating a lots of files ex. tar, git, make etc.



Security

TLS 1.3 Support

- Spectrum Scale GUI & REST API

Encryption

- File encryption now supports SKLM 4.0 as a Remote Key Management (RKM) server.
- Qualification of Thales DSM 6.3
- Renew expired client certificates without recreating a new client



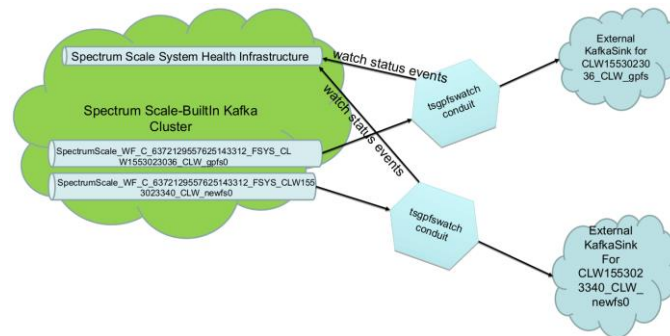
RPM Package signing support for installation & upgrade

Security-Enhanced Linux (SELinux) enforcing mode is supported.

File Audit Logging (FAL) and Watch Folders

Watch Folders (**mmwatch**)

- Support for sending events to a secondary sink when a watch is suspended



Audit logging on fileset level

- With fileset file audit logging, you can specify a list of filesets to enable or skip from a file system.

Changed

Command	Summary of Changes
mmafmconfig	Parameter Show added. It displays all the existing maps. Each map displays the mapping of a gateway node and home NFS server pair that is separated by a comma ','.
mmafmctl	Various changes to “mmafmctl Device prefetch”. This option is used for pre-fetching file contents from home before the application requests for the contents. This reduces the network delay when the application performs data transfers on file and data that is not in cache.
mmaudit	Using --compliant option is possible to specify that the file audit logging fileset that is created to hold the file audit logging files will be IAM mode compliant. It is also possible to indicate a list of filesets within the filesystem to audit or skip filesets by using the options --filesets and --skip-filesets respectively.
mmchconfig	It allows to change the value of new file system attributes including: maxReceiverThreads, minIndBlkDescs and nsdRAIDBufferPoolSizePct.
mmchfileset	It allows to change the value of new fileset attributes to configure AFM including: afmFastCreate, afmReadDirOnce and afmRefreshOnce.
mmkeyserv	--update attribute has been added to replace an expired or unexpired client certificate with a new one in the specified key client.
mmwatch	--upgrade parameter has been added to converts all active clustered watches to use the IBM Spectrum Scale system health infrastructure. During the conversion process, conduits are disabled and then re-enabled.
spectrumscale	--workload parameter added to set the installation toolkit to prompt users to shut down their workloads before an upgrade. The setup type must be ece for using this option.

Deprecated

Category	Deprecated Functionality	Recommended Action
Security	The use of TLS 1.0 and 1.1 for authorization with the GUI/REST API server	Upgrade to TLS 1.2 or later
GUI/REST API	The use of TLS 1.0 and 1.1 for authorization with the GUI/REST API server	Upgrade to TLS 1.2 or later
Cloud	Storage Enabler for Containers (SEC)	Adopt the CSI driver. Note that we plan to discontinue support for SEC in the next release.
Platforms	Encryption acceleration library for Power7 (CliC)	If encryption performance is critical, plan to migrate to newer generations of Power systems. Note that we plan to discontinue support for CliC in the next release.
Platforms	Support for Power7	Plan to migrate to newer generations of Power systems.

Discontinued

Category	Discontinued Functionality	Recommended Action
HDFS Transparency	Support for IBM BigInsights for Apache Hadoop	IBM BigInsights for Apache Hadoop is no longer supported by IBM. Consequently, IBM Spectrum Scale no longer supports the use of BigInsights as a Hadoop connection.
Platforms	Windows 7 and Windows Server 2008 R2	Upgrade to a supported version of Windows.



Log your RFE!

https://www.ibm.com/developerworks/rfe/execute?use_case=productsList

- Spectrum Scale (formerly known as GPFS) - Private RFEs
- Spectrum Scale (formerly known as GPFS) - Public RFEs

contact

Filter the page content by brand and product

Servers and Systems So... ▼

Spectrum Scale (formerly known as GPFS) - Pu... ▼



[Hot](#)

[Top](#)

[New](#)

Search



35
votes

eleminate lack of I/O on mmdelsnapshot start

When deletion of bunch of snapshots starts we a lack of I/O for about three minutes. NFS Clients see a huge delay of I/O. Related applications hanging for this time and user connections and run into t...

Under Consideration

21
votes

start services after gpfs (filesystems) is ready using systemd

the current systemd units gpfs.service and <fs-mountpoint>.mount units can't be used to depend on (After/Required/.. systemd attributes) for other services. GPFS service is reporting itself as success...

Under Consideration

Thank you!



For further details:

<https://www.spectrumscaleug.org/event/ssugdigital-spectrum-scale-expert-talk-what-is-new-in-spectrum-scale-5-0-5/>

Please help us to improve Spectrum Scale with your feedback

- If you get a survey in email or a popup from the GUI, please respond
- We read every single reply

Provide Feedback



Tell IBM What You Think

Let us know what you think about IBM Spectrum Scale. It takes only a couple of minutes for you to help us improve our service. [IBM Privacy Policy](#)

Not Now

Provide Feedback



Spectrum Scale User Group

The Spectrum Scale (GPFS) User Group is free to join and open to all using, interested in using or integrating IBM Spectrum Scale.

The format of the group is as a web community with events held during the year, hosted by our members or by IBM.

See our web page for upcoming events and presentations of past events. Join our conversation via mail and Slack.

www.spectrumscaleug.org