Spectrum Scale Expert Talks

Episode 1:

What is new in Spectrum Scale 5.0.5?

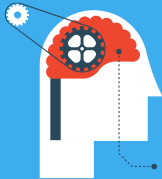IBM
Spectrum
Scale

Show notes:
www.spectrumscaleug.org/experttalks

Join our conversation:
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SSUG::Digital

Welcome to digital events!

IBM
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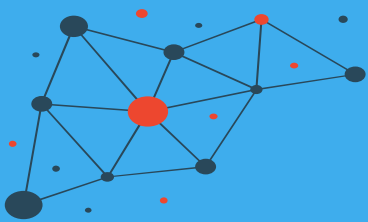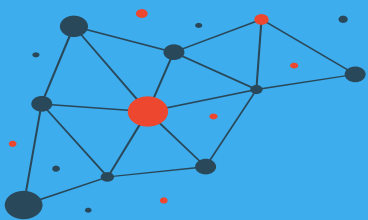
About the user group

- Independent, work with IBM to develop events

- Not a replacement for PMR!

- Email and Slack community

- www.spectrumscaleug.org/join

We are ...

- Simon Thompson (UK)
- Kristy Kallback-Rose (USA)
- Bob Oesterlin (USA)
- Bill Anderson (USA)
- Chris Schipalius (Australia)

IBM **CHAMPION**
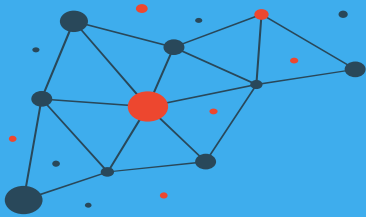
Check https://www.spectrumscaleug.org
for upcoming talks

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What is new in Spectrum Scale 5.0.5?

IBM Spectrum Scale

Show notes:
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Join our conversation:
www.spectrumscaleug.org/join

IBM Spectrum Scale
Release Update 5.0.5

Mathias Dietz
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IBM

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Spectrum Scale Early Programs

IBM **Spectrum** Scale

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

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

IBM **Spectrum Scale**

HTML or PDF

Spectrum Scale version compatibility with OS or kernels

Updated regularly!

Spectrum Scale 5.0.5

Extended Update Support (EUS) Release

Feature Updates

Changes, Deprecation …

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 supp

Numbered element	Example	Description
V - Version number	(**7**.0.0.0)	• Indicates a separate IBM licen significant new code or new fu
		• Number limit from 0-99
		• Major feature changes.
		• Starts a 5 year maintenance cl
		• Downloads found on Passport
R - Release number	(7.**0**.0.0)	• Minor feature change release.
		• Number limit from 0-99
		• Starts a 5 year maintenance cl
		• Downloads found on Passport
M - Modification number	(7.0.**0**.0)	• Manufacturing refresh also ref **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)

KEEP
CALM
AND
SCALE
OUT

Compare the predictable RHEL plan
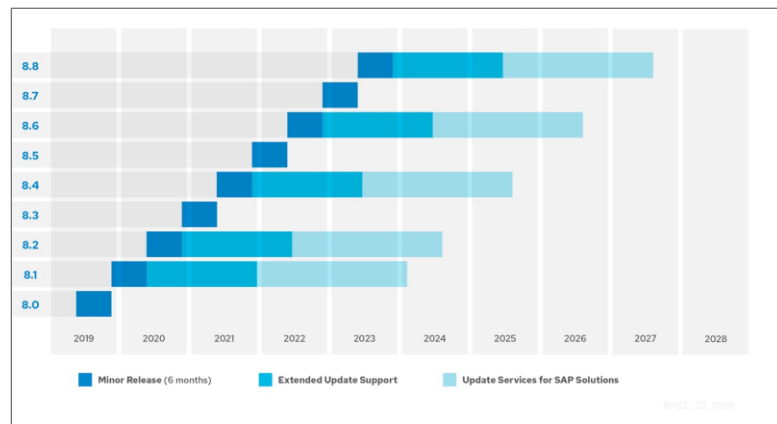
Every third release has extended updates with additional 18 months of PTFs

Scale Support lifetimes

Support status ▬ PTFs ▬ EUS with PTFs ▬ Ext Support (no PTFs)
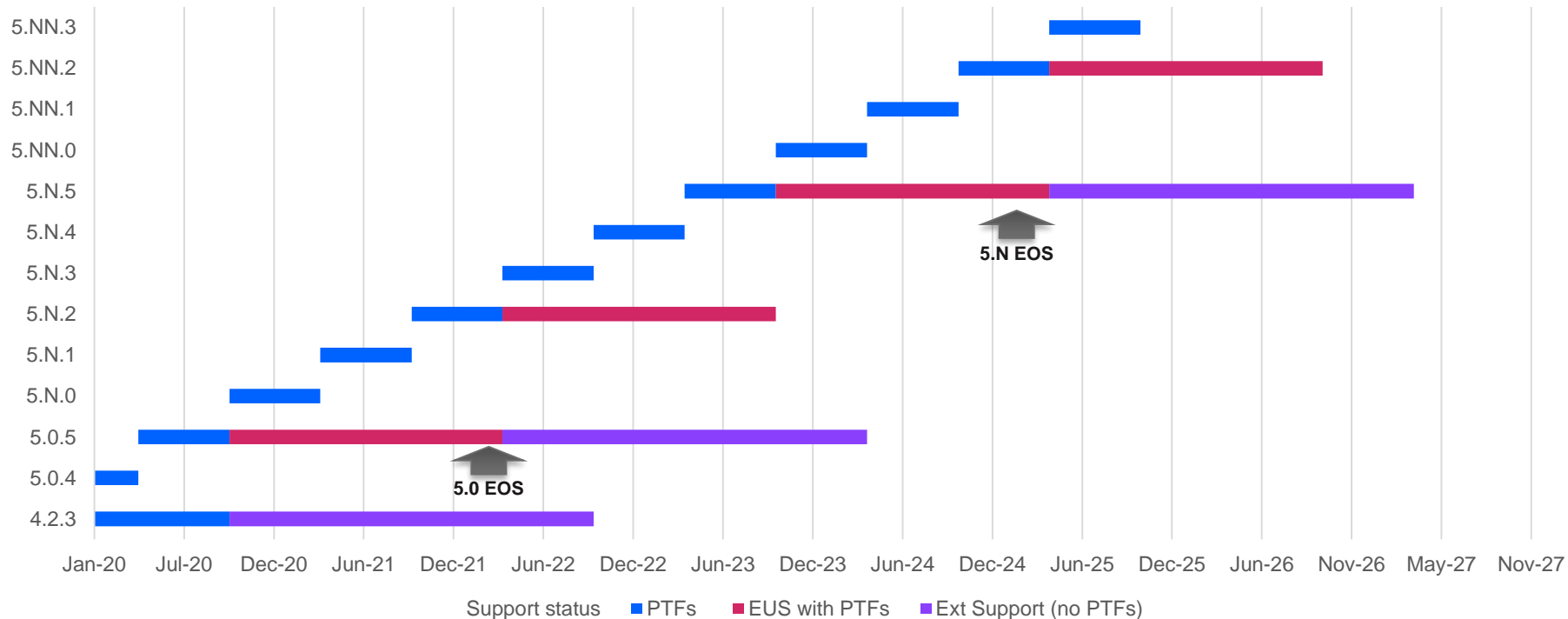
Scale EUS and RHEL EUS Alignment

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:

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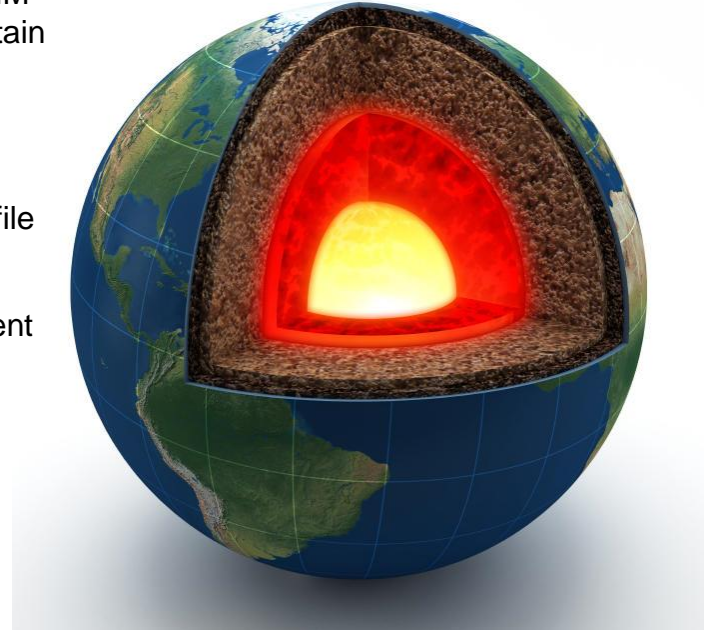
Core Improvements

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.
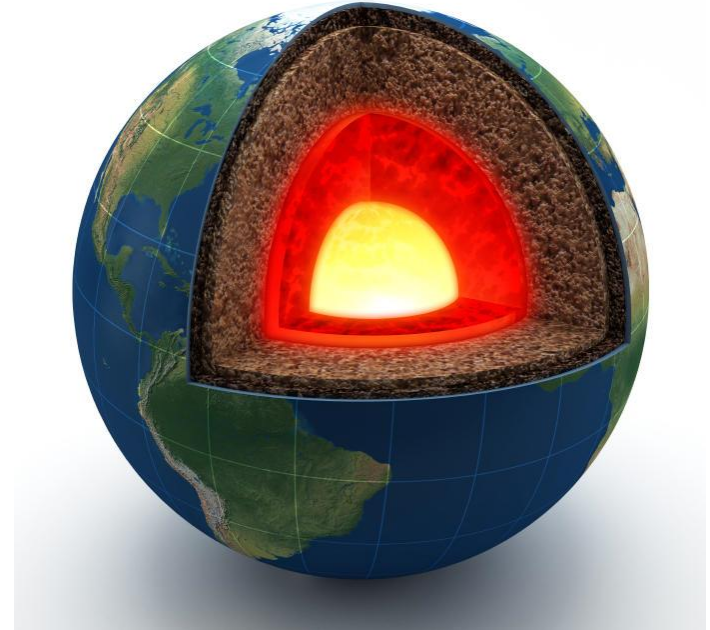
Core Improvements

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
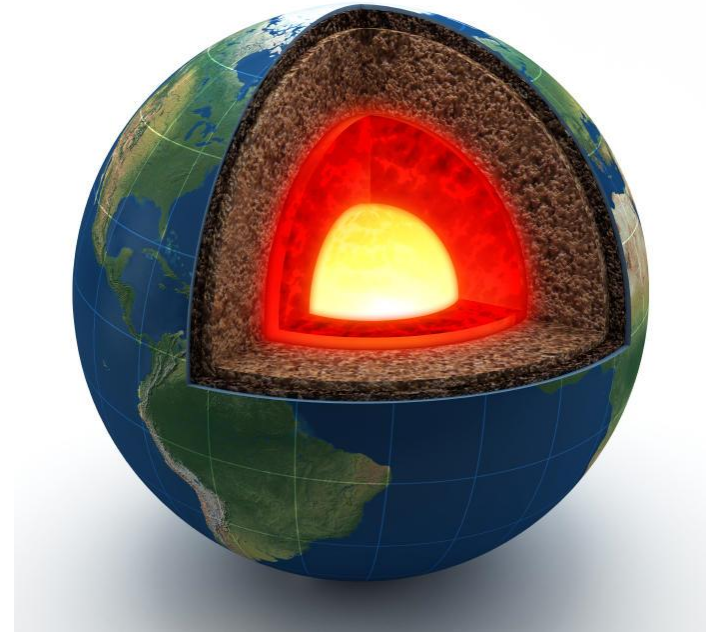
Core Improvements

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

IBM Spectrum Scale

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 customer filters to filter out virtual temporary docker interfaces

– Use "mmperfmon config" command to modify the filter
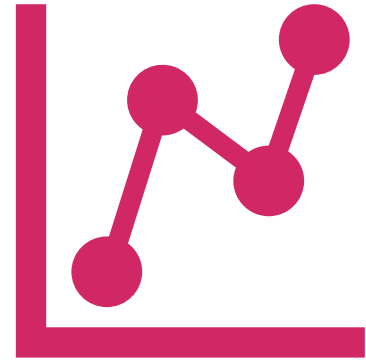
Performance Threshold Improvements

– 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:

Display NVMe information for physical Disks that are NVMes (for ESS and ECE)

Configure overlapping ID ranges for AD + RFC2307

Protocols: SMB

IBM Spectrum Scale

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

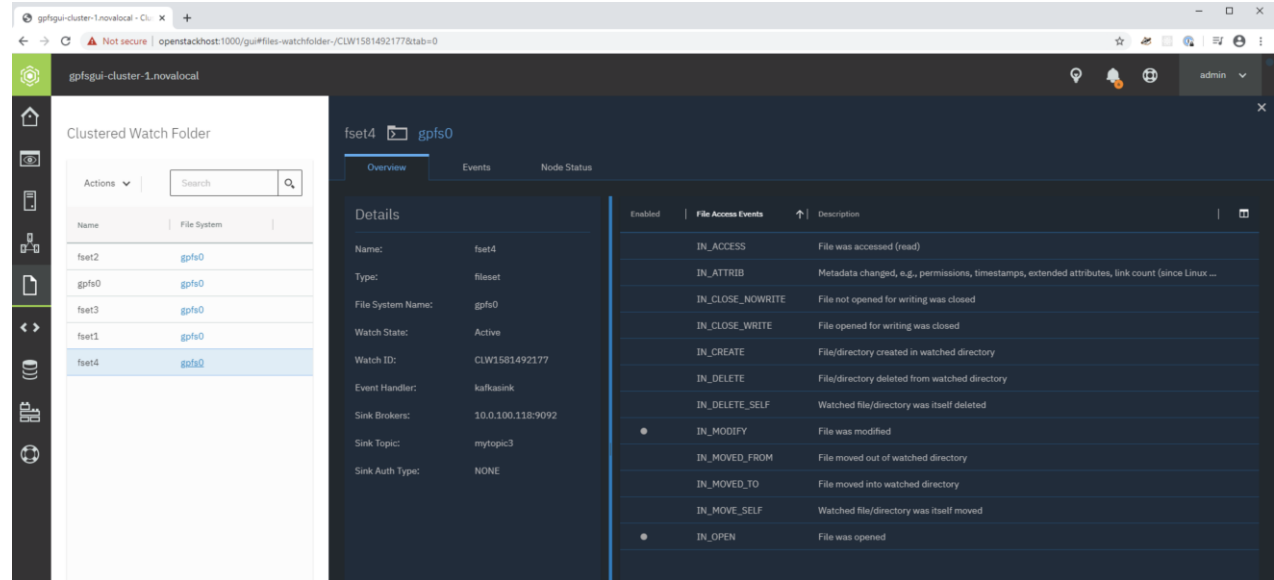**Recovery lock:** The SMB clustering component now uses a global file lock to maintain cluster integrity.

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

IBM Spectrum Scale

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 1.1

IBM Spectrum Scale

Allow a Spectrum Scale file system to surface into a pod/container running inside OpenShift 4.3

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

Upgraded sidecar images

- csi-attacher: v2.1.1
- csi-provisioner: v1.5.0
- csi-node-driver-registrar:v1.2.0

Improvements in the debug data collection tool

Scale for Containers v2

OpenShift Interoperability

Kubernetes

CSI 1.1

Spectrum Scale

OS Support

Infrastructure

IBM & Partners
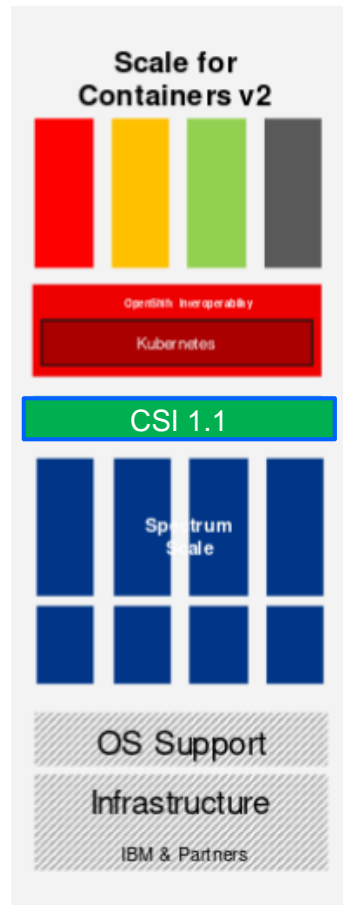
Protocols: HDFS Transparency 3.1.1

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
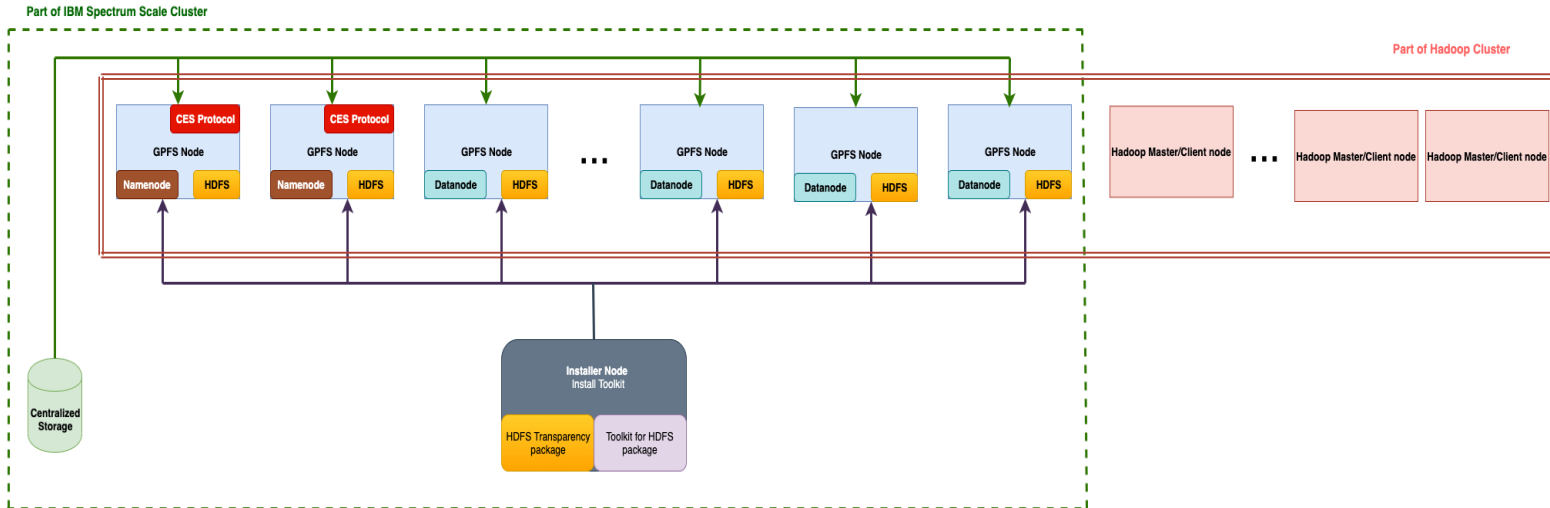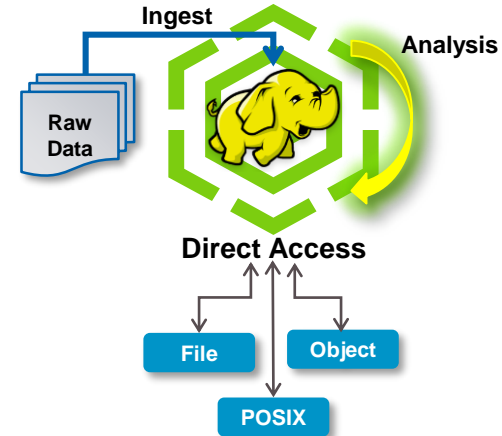
Cloudera and Spectrum Scale

https://www.ibm.com/analytics/partners/cloudera

We are working on something … ;-)

https://tinyurl.com/ycdwcgte

WEBINAR

Meeting the New Intelligent Data Economy Head On

Adopting cloud-native, highly scalable, and AI-driven data storage practices on-premise

June 25, 2020 10:00am EST | 3:00pm BST

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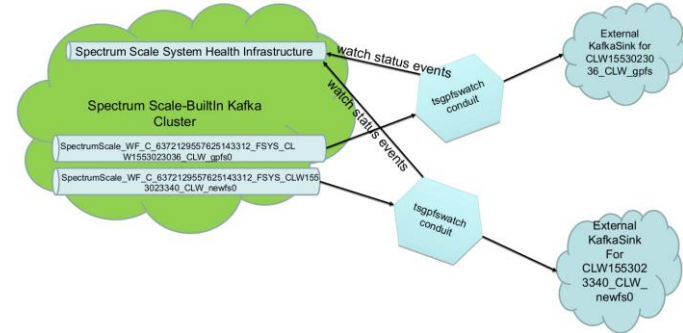
Security-Enhanced Linux (SELinux) enforcing mode is supported.

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

IBM Spectrum Scale

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

IBM Spectrum Scale

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!

IBM Spectrum Scale

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