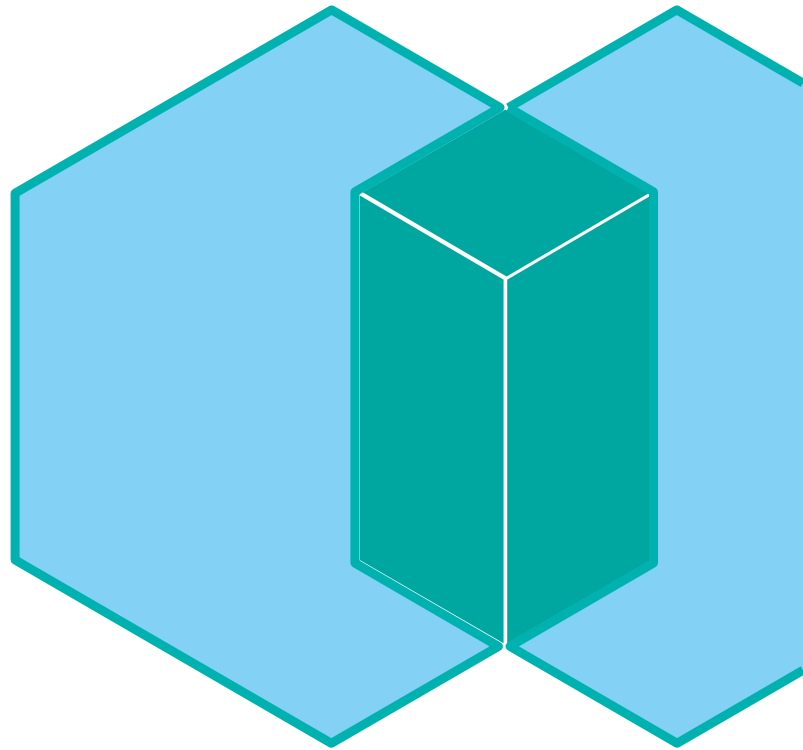# IBM Spectrum Scale
What's new in 5.0

File Audit Logging

- Events captured - Open, Close, Destroy (Delete), Rename, Unlink, Remove Directory, Extended Attributed Change, ACL change
- Events are placed on a multi-node message queue.
- Audit all protocols and native GPFS file access
- Events are logged in a JSON formatted string
- Configurable options for log output include the device where it is mounted, name, retention period.
- Integrated into the system health infrastructure for easy monitoring of audit logging message queues and components

Related Commands

- mmmsgqueue enable
- mmaudit Device enable

Technologies

- Light Weight Events
- Kafka
- JSON Formatted output

GUI Improvements

- AFM improvements
  - View AFM status
  - AFM relationships
  - Access remote GUIs
  - Enhanced monitoring: View events from multiple cache sites on a home cluster
- File System Creation on existing NSDs (non ESS)
- Transparent Cloud Tiering (TCT)
- Detailed display for Filesets and Pools

- Mount management
- Node Health Tips
- Performance and capacity threshold management
- Network Monitoring (IP and RDMA)
- Upload diagnostic data to a PMR automatically
- Configure call-home
- Additional directed maintenance procedures to assist with failure recovery

Active File Management (AFM)

- Monitoring for AFM with mmdiag, system health and GUI
- Control recovery on Gateway node with --afmMaxParallelRecoveries
- Distribution of filesets across Gateway Nodes with --afmHashVersion=3
- Optimized AFM fileset recovery to avoid repeated recovery failure

Coming soon

- Better distribution of filesets across gateway node with --afmHashVersion=4
- Testing AFM DR 100 filesets having 1Billion files across filesets
- Compression support and Support for snapshot ILM

Cluster Export Services (CES)

- Netgroup caching – Better performance when resolving nested netgroups
- Failover (write verifier) – avoids data loss on NFS failover
- Option to use file system blocksize instead of fixed 1M in Ganesha config
- Improvements to debugging tools: *mmadquery* (Active Directory) and *mmprotocoltrace*

Coming soon
- Ganesha 2.5 and Samba 4.6
- Ubuntu 16.04 support as a CES protocol node
- Dynamic modification of NFS exports
  - Add or remove a host from an NFS export without impacting other hosts

REST API V2

- Threshold management
- Nodeclass management
- Add and remove nodes
- Create and delete peer snapshots
- Cancel jobs
- Performance data collection
- Problem-determination snap creation

Big Data and Analytics
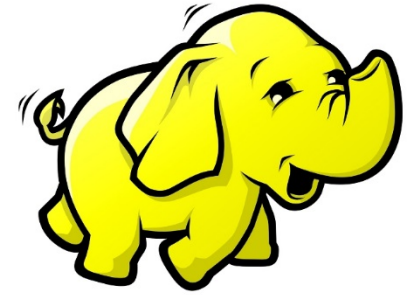
Certification with HortonWorks Hadoop Data Platform 2.6

- Power and x86 platforms

- Ambari 2.5 for rapid deployment

- Redpaper - "Hortonworks Data Platform with IBM Spectrum Scale: Reference Guide for Building an Integrated Solution"

- Solution Brief - "Hortonworks Data Platform on IBM Power Systems for Financial Service"

Coming Soon

- Migration support from IBM BigInsights to Hortonworks HDP

- Performance improvements to HDFS Transparency Connector

Transparent Cloud Tiering (TCT)

- Clients can access TCT migrated through a remote mount
- Ability to tier different filesets to different cloud containers
- Enhanced support for multiple cloud accounts and containers
- Usability improvements, updated CLI and enhanced GUI support
  - CLI has been enhanced for ease of deployment with multiple cloud accounts

Administration Improvements

- ***mmchqos*** – assign IOPS to nodes. Display detailed stats on IOPS for QoS programs.

- ***mmfsck*** displays a summary of errors that were found with the severity of each error

- ***mmkeyserv*** – get a fresh certificate from an Remote Key Management server without rebuilding the connection.

- GPFS log time stamp with time zone information (ISO 8601)

File System Updates

- More than 32 subblocks
- 4MiB default blocksize
- Change NSD server configuration with the file system mounted
- Metadata performance improvements for shared directory (file create, etc)

Blocksize	Subblock size	# Subblocks
64 KiB	2 KiB	32
128 KiB	4 KiB	32
256 KiB	8 KiB	32
512 KiB	8 KiB	64
1 MiB	8 KiB	128
2 MiB	8 KiB	256
4 MiB	8 KiB	512
8 MiB	16 KiB	512
16 MiB	16 KiB	1024

Cloud and Object

- Openstack Swift and Keystone packages upgraded to Mitaka release
- Open source project to auto-tag objects using cognitive services (on GitHub)
- Object migration tool - migrate data from compliant cloud storage to object storage (currently with LBS and presales as a service tool)
- Juju charms for automated deployment < Ubuntu
- Amazon AWS Quick Starts Program (90 day trial)
  - https://aws.amazon.com/quickstart/architecture/ibm-spectrum-scale/

Coming soon

- Object support on Ubuntu
- Improved upgrade support for Object
  - Removes intermediate levels in upgrade paths
  - Simplifies upgrades on clusters running the object protocols

Installation Toolkit

- Configuration populate simplifies upgrades

- Extended platform architecture support to Power LE

- Heterogeneous OS clusters

- Improved integration between the Installation Toolkit and ESS

- Enhanced problem determination

  - pre-checks - base OS repository setup, software requirements, authentication prerequisites and error reporting to console for faster problem resolution

- Cluster upgrade enhancements

  - Extended upgrade pre-checks, detection of GPFS kernel module unload errors and guidance on host reboot and Spectrum scale upgrade when in an LTFS environment

Installation Toolkit

Coming Soon

- Extended operating system support (Ubuntu 16.04 x86, SLES12 x86, RH Power LE)

- Improved deployment integration with ESS: the ability to detect ESS nodes (EMS and IO) and ensures validation of permitted operations when adding protocol/client nodes to an ESS cluster.

- File Audit Logging installation and configuration

- Call-home configuration enabled by default

- Cumulative object upgrade support

- Further network connectivity pre-checks: passwordless SSH validation from admin node and validate /etc/hosts file formatting

System Health

- More monitored services: GUI, GNR, Transparent Cloud Tiering
- Performance monitoring bridge for Grafana
- *mmhealth* changes: reduced system load, show date and time of last state change, detail info for events, notification thresholds, AFM, RDMA
- *mmnetverify* – can be used before or after a cluster is created for improved debugging. Tests include address checks, ping tests, remote shell and file copy tests, time-date checks, TCP connection checks, message size tests, bandwidth tests, and flooding tests.
- New TIPS "event" for *mmhealth* (ie gpfs_pagepool_small)
- Ability to control the health monitoring frequency (tradeoff between failure detection time vs resource consumption)

Coming soon

- Monitoring of critical threads
- Time sync checks
- *mmcallhome* improvements: upload snap data to existing PMRs, semi-automatic PMR creation

Linux on z Systems

- Geographically Dispersed Parallel Sysplex (GDPS)

- Optimized compression for LZ4

- Call-home support on zLinux

- Ubuntu 16.04 support

- 9,620 nodes in a cluster

- Remote cluster mount

- Heterogeneous cluster

- Encryption

Performance

- *mmrestripefs –b* performance; Measured 20% improvement

- *mmfsck* performance improvements; measured 50% improvement during inode scan phase of mmfsck

- 4.2.3 performance improvements as high as 35% with NFS protocol and 13% with SMB protocol

Coming Soon

- Reduce jitter impact of Spectrum Scale monitoring services

- Improved file metadata performance

- Improved file data encryption performance

- Further *mmrestripefs –b* performance improvements

- fileSizeMutex enhancements enabling PIT operations like *mmrestripefs* to be executed in parallel with creation/deletion of snapshots as well as inode expansion.

- Performance improvements NFS and SMB.

IBM Spectrum Scale

Store **Everywhere**. Run **Anywhere**.