ADVANCED TECHNOLOGY GROUP (ATG)

Accelerate with ATG Webinar

IBM Storage Ceph
Innovation and updates

John Shubeck – ATG Storage Technical Specialist

Date: February 6, 2024

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Accelerate with ATG Technical Webinar Series

Advanced Technology Group experts cover a variety of technical topics.

Audience: Clients who have or are considering acquiring IBM Storage solutions. Business Partners and IBMers are also welcome.

To automatically receive announcements of upcoming Accelerate with IBM Storage webinars, Clients, Business Partners and IBMers are welcome to send an email request to accelerate-join@hursley.ibm.com.

2024 Upcoming Webinars – Register Here!

IBM Storage Fusion: Exploring the Differences between Data Foundation & Global Data Platform – February 13th, 2024

IBM Storage Virtualize CDR 8.6.1 Technical Update - February 27th, 2024

IBM Storage Virtualize CDR 8.6.2 Technical Update – March 26th, 2024

Important Links to bookmark:

ATG Accelerate Site: https://ibm.biz/BdSUFN

ATG MediaCenter Channel: https://ibm.biz/BdfEgQ

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Offerings

Client Technical Workshops

- **IBM DS8900F Advanced Functions:** Feb. 7-8 in Dallas, TX
- **IBM Cyber Resiliency with IBM Storage Defender:** Feb. 14-15 in Dallas, TX
- **IBM Storage Fusion:** Feb. 21-22 in Dallas, TX
- **IBM Storage Scale & Storage Scale System:** Feb. 28-29 in Costa Mesa, CA
- **IBM FlashSystem Deep Dive & Advanced Functions:** March 6-7 in Dallas, TX
- **IBM Storage Ceph:** March 20-21 in Costa Mesa, CA
- IBM FlashSystem and Storage Virtualize
- IBM Cloud Object Storage

TechZone Test Drive / Demo's

- IBM Storage Scale and Storage Scale System GUI
- IBM Storage Virtualize Test Drive
- IBM DS8900F Storage Management Test Drive
- Managing Copy Services on the DS8000 Using IBM Copy Services Manager Test Drive
- IBM DS8900F Safeguarded Copy (SGC) Test Drive
- IBM Cloud Object Storage Test Drive - (Appliance based)
- IBM Cloud Object Storage Test Drive - (VMware based)
- IBM Storage Protect Live Test Drive
- IBM Storage Ceph Test Drive - (VMware based)

Please reach out to your IBM Representative or Business Partner for more information.

***IMPORTANT* The ATG team serves clients and Business Partners in the Americas, concentrating on North America.**

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Save the date

Storage @ IBM TechXchange Conference 2024

(Registrations open in March)

October 21-24, 2024

Mandalay Bay | Las Vegas

#IBMTechXchange

Key Learnings

- Practical how-to advice
- Patterns and best practices
- Success stories, IBM PoV, proven techniques

Featured Products

IBM Storage Defender | IBM Storage Fusion | IBM Storage Scale + IBM Storage Ceph | IBM Tape + IBM SAN | IBM Storage FlashSystem + IBM Storage DS8000

Collaborate. Learn. Play.

Community

IBM Champions | User Groups | Tech Peers | Business Partners

Sandbox

Network | Learn | Collaborate | Play

Roadmaps

Go deep with people in the know and set the stage for where IBM is going in the future

Breakout Sessions

Trends and Directions | User Groups | Product Deep Dives | Meet the Expert | Professional Development | Show the Code | Birds of a Feather | Academic/Research

Accelerate your Career

Labs (Instructor-Led, Self-paced) | IBM Certification Testing | Earn up to 25 hours in CPE credits

https://www.ibm.com/community/ibm-techxchange-conference/

Game On! →

Accelerate with ATG Survey

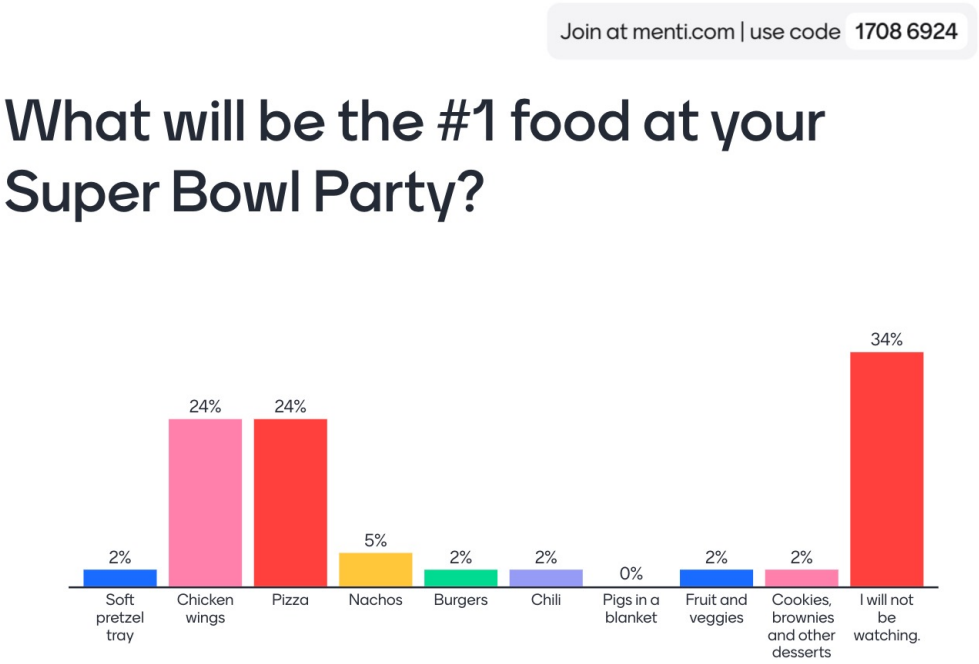
Please take a moment to share your feedback with our team!

You can access this 6-question survey via Menti.com with code 1708 6924 or

Direct link https://www.menti.com/alwhyze7z1gz

Or

QR Code



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About the Presenter

John Shubeck is an information technology professional with over 42 years of industry experience spanning both the customer and technology provider experience. John is currently serving as a Senior Storage Technical Specialist on IBM Object Storage platforms across all market segments in the Americas.

Introducing our panelists

Shu Mookerjee is a Level 2 Certified Technical Specialist with over twenty years at IBM, working in a variety of roles including sales, management and technology. For the last decade, he has focused exclusively on storage and has been the co-author of four (4) Redbooks. Currently, Shu is part of the Advanced Technology Group where he provides education, technical guidance, Proofs of Concept and Proofs of Technology to IBMers, business partners and clients.

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Introducing our panelists

Jerrod Carr is an IBM Principal Storage Technical Specialist in IBM Storage Solutions. Jerrod Carr has been in the Storage industry for over 21 years selling hardware and software for various large technology companies. With beginnings in the Cleversafe IBM team for 8 years providing expertise in Cloud Object Storage, the last 3 years working on the Americas SWAT team as a Senior Storage Specialist providing unstructured data experience to the various markets.

Todd Johnston is a proven applied technologist bringing decades in customer advocacy, technology implementations, service provider enablement, sales engineering, and solution architecture. Todd is especially focused on Ceph innovation and early adoption, technical agility, and disruptive technologies. Todd's expertise in lies storage software, virtualization, and container and hybrid cloud infrastructures. Todd joins us from the IBM SWAT practice in our cross functional team.

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Content

- IBM Storage Ceph review
- IBM Storage Ceph 6 highlights
- IBM Storage Ceph Ready Nodes
- IBM Storage Ceph 7 update
- IBM Storage Ceph 7 tech preview
- Next steps and resources
- Q&A wrap up

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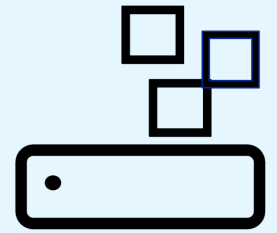
IBM Storage Ceph review



IBM Storage Ceph Offering

IBM Storage Ceph and Red Hat Ceph packaging

IBM Storage Ceph
On-prem S3 storage at scale and performance

- Object storage
- Block storage
- File storage
- Presence at the on-prem object market at 10-Petabyte+ scale
- S3 compatibility with AWS

Red Hat OpenStack Platform

Red Hat Ceph Storage

Ceph for OpenStack
 # 1 in OpenStack storage

- Cinder block storage
- Nova ephemeral storage
- Glance image storage
- Swift object store
- Manila file storage
- Advanced integration
- Unified management
- Hyperconverged and Edge capabilities

IBM Storage Fusion
Ceph for OpenShift

- Self-managing storage powered by Red Hat Ceph Storage
- Automated by Rook and completed with Multicloud object gateway (MCG)
- Advanced integration, automation, ease of use
- Persistent storage for OpenShift stateful workloads

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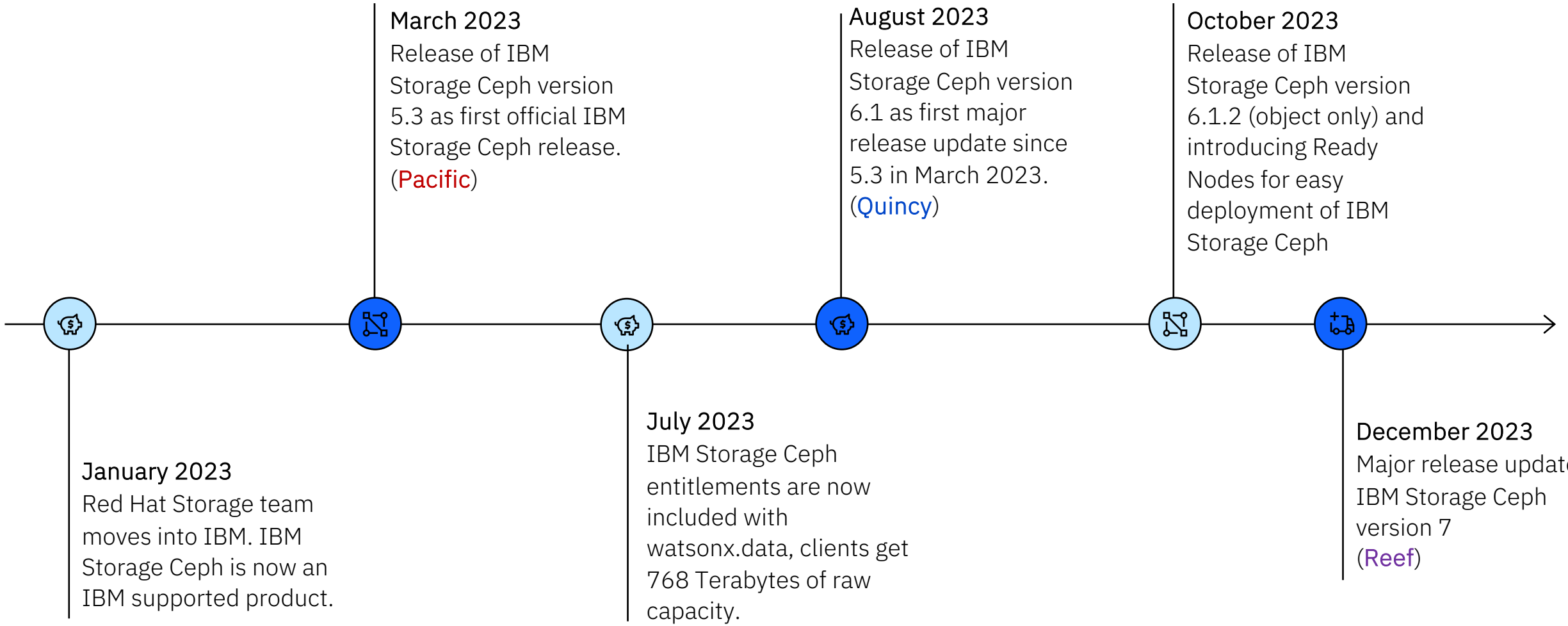
IBM Storage Ceph 2023 timeline



IBM Storage Ceph

IBM Storage Ceph

An enterprise-grade distributed, universal, software defined storage solution, proven at scale

Implementation

Flexible, scale-out architecture running on clustered x86 industry-standard hardware

IBM Storage Ceph provides

A single, efficient, unified storage platform for object, block, and file storage

IBM Storage Ceph Easy

An IBM Storage Ceph cluster can literally be installed by running one single command.

IBM Storage Ceph also features a dashboard UI and APIs for lights out data center operations.

IBM Storage Ready Nodes

Validated hardware for IBM Storage Ceph, ready for immediate use, with published performance data.

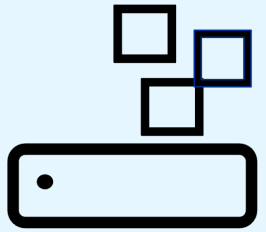
Scale from 4 to 400 nodes
384TB to 96 PB capacity
N+1 scalability option

Enterprise level solution

IBM Storage Ceph is an enterprise-level storage solution, with an open source development model.

IBM holds a premier membership seat inside the Ceph Foundation.

IBM Storage Ceph 6 Update



IBM Storage Ceph 6.1 Overview

Block (RBD)	• SSD Write-back cache (GA)
File (CephFS)	• NFS for CephFS [Tech Preview]
Object (RGW)	• Policy based data archiving to AWS(GA)/Azure(TP) • Policy based Bucket Granularity Replication(GA)
Management	• Day-2 management UI enhancements in the dashboard • N+2 Upgrades
Deployment	• Support for deploying Ceph on VMware

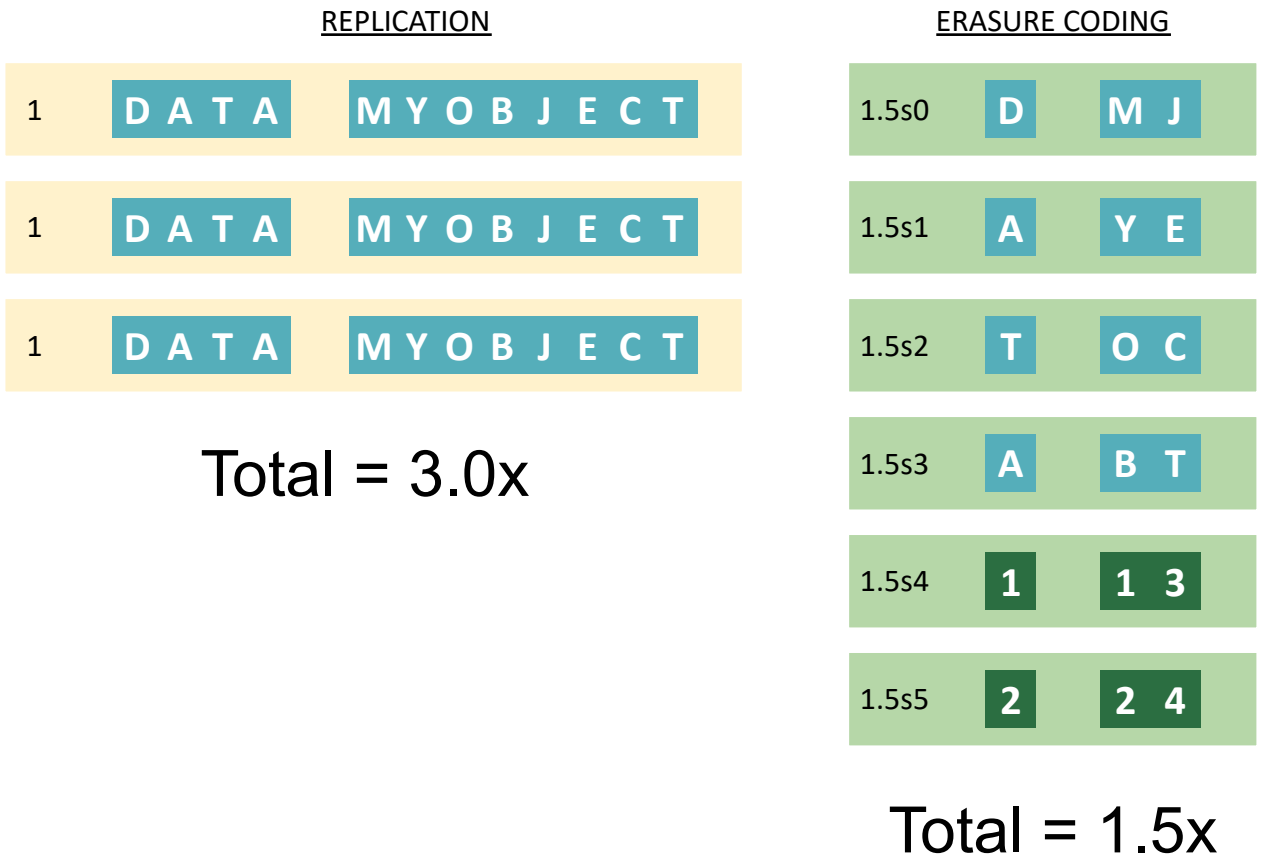
Replication and Erasure Coding

Replicas

- Replica 2x (SSD/Flash pool)
- Replica 3x (HDD pool): min 4 nodes
- Replica 4x (Metro cluster)

Erasure Coding (EC Profiles)

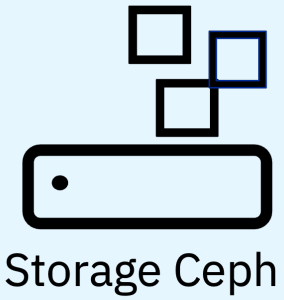
- EC 4+2 : minimum 7 hosts
- EC 8+3 : minimum 12 hosts
- EC 8+4 : minimum 13 hosts
- EC 2+2 : minimum 4 nodes



IBM TechXchange / © 2023 IBM Corporation

IBM Storage Ceph 6 Update

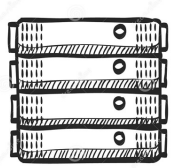
IBM Storage Ready Nodes



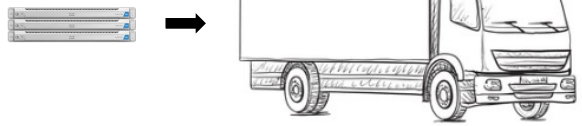
Ceph buying & delivery options

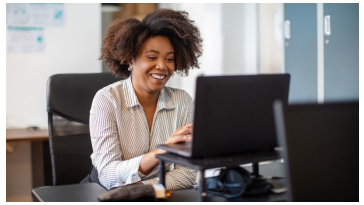
1 Software only

IBM Storage Ceph



2 Ready Node



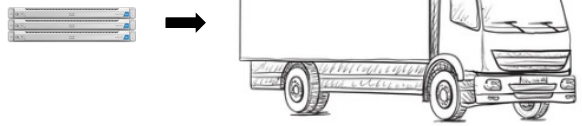


IBM Storage Ceph System

Future - *exploring…*

3 NVMe

4 Appliance



IBM Storage Ceph System

IBM Confidential

IBM Storage Ready Node for Ceph

Storage Ceph

IBM validation

IBM qualified and supported hardware for running IBM's Storage Ceph cluster platform.

Single point of contact

Single point of contact for procurement, support, services and lifecycle care.

One vendor: IBM

IBM Storage Insight

IBM Storage Insights for monitoring health, capacity and performance of your IBM Storage Ceph environment.

Storage use patterns

An IBM Storage Ceph cluster supports object, block, and file access methods from a centralized underlying pool of storage capacity.

High resilience

Self healing storage solution with no single point of failure.

Erasure coded storage for efficiency and cost effectivity.

Predictive analytics

To quickly identify health, performance and capacity of IBM Storage Ceph cluster–or server nodes that need attention.

IBM Storage Ready Node highlights

Storage Ceph

Storage Ready nodes

IBM Storage Ready Nodes are a simple, cost-effective way for clients to deploy IBM Storage software on industry-standard server hardware.

Building blocks

A simple building block approach to software defined storage and infrastructure, all supported by IBM.

Incremental growth

Start with a cluster configuration that meets current needs and then simply scale along further, with additional nodes when required.

Expansions can be N+1

Use cases

Suitable for all IBM Storage Ceph use cases.

Data analytics
Watsonx.data
Datalake houses
Datalakes
Cyber secure backup

IBM tested software

IBM qualified and supported hardware for running IBM's Storage Ceph cluster platform.

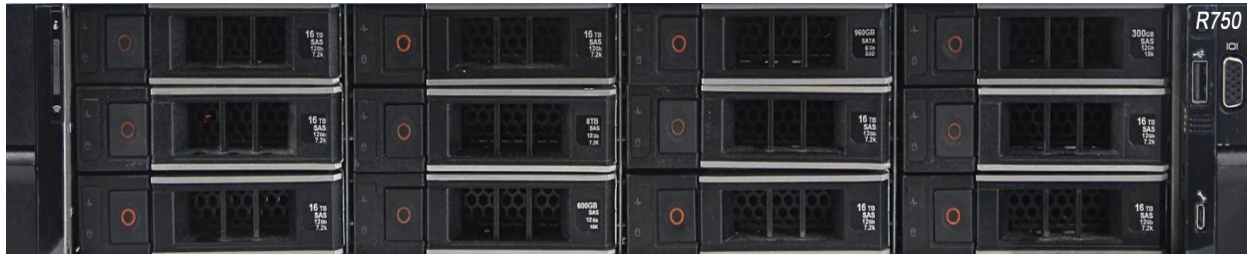
Configuration options tested and certified with IBM Storage Ceph software.

IBM product integration

Investment protection, IBM Storage Ready Nodes can be integrated into existing IBM Storage software configurations.

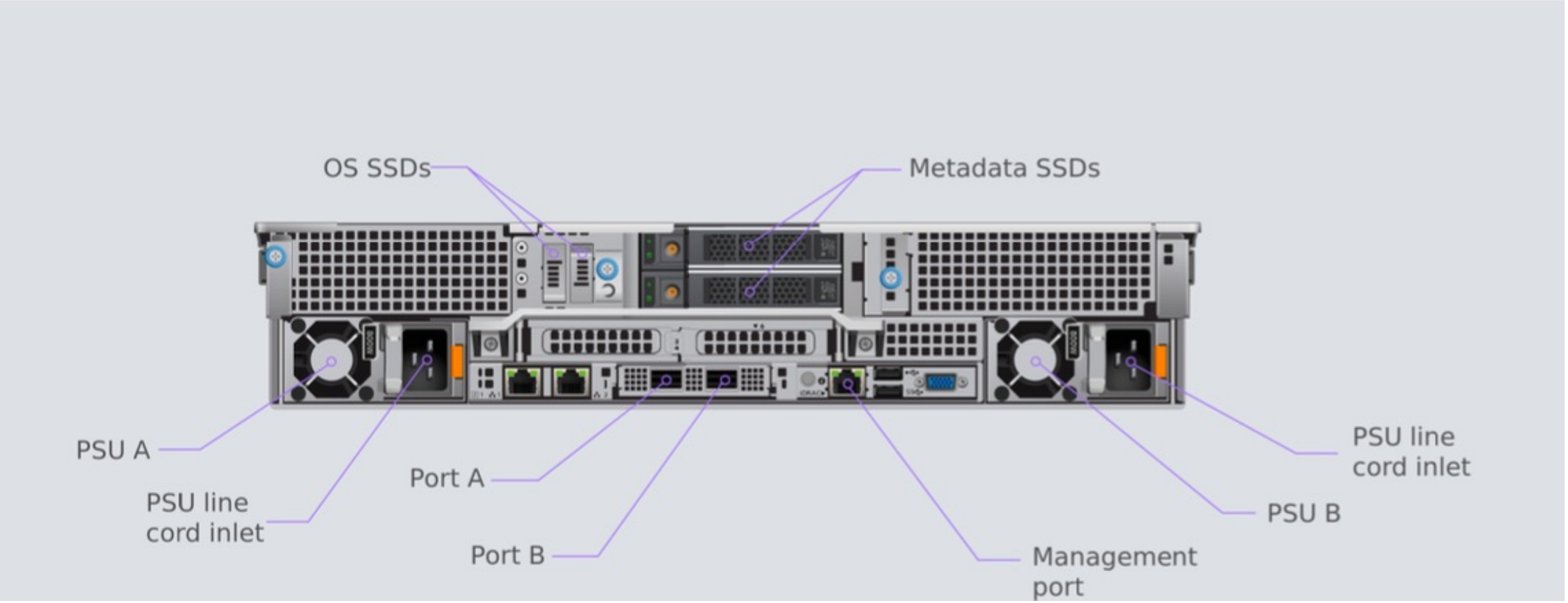
IBM Storage Ceph Ready Node (R750)

Descriptions	Specifications
CPU	2 x Intel® Xeon® Silver 4314 2.4G
Memory	16 x 16GB RDIMM (256GB)
OS Disks	2 x 240GB SSD (BOSS RAID 1)
Data Acceleration Disks	2 x 3.84TB NVMe 2.5” rear bay
Data Disks	8TB / 12TB / 16TB / 20TB SATA
Data Disk Quantities	12 disks fully populated front bays
Network	2 x 10GbE (SFP+ Optical Transceivers Included)
Dimensions	3.41" H x 18.97" W x 29.85" D (2U rack height)
Software Support	IBM Storage Ceph 5.3 and later

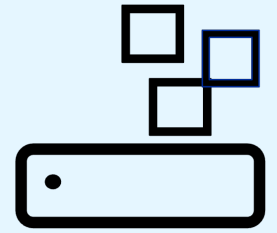


https://www.ibm.com/downloads/cas/OV6RDQX7

IBM Storage Ceph Ready Node – rear view



IBM Storage Ceph 7
What’s new
highlights



Functionality

IBM Storage Ceph 7 What's new!

https://www.ibm.com/docs/en/storage-ceph/7?topic=notes-whats-new

Call Home

IBM Storage Ceph is integrated into Call Home. Some of the data is also sent to Storage Insights through Call Home.

S3 WORM certification

S3 WORM feature is certified with an external entity

NFS over CephFS is re-introduced

With this release, NFS capabilities are re-introduced on top of CephFS volumes for servers and applications that cannot use CephFS natively.

Ceph Dashboard enhancements

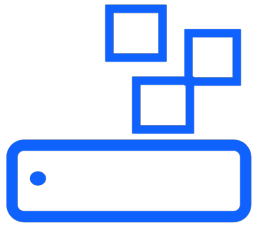
- RBD capacity
- CephFS management
- RGW multi site
- Cluster upgrade

Functionality

Certified WORM compliance IBM Storage Ceph Object lock

COMPLIANCE ASSESSMENT
by Cohasset Inc. 2023

- SEC 17a-4(f)
- SEC 18a-6(e)
- FINRA 4511(c)
- CFTC 1.31(c)-(d)



Storage Ceph

https://www.ibm.com/downloads/cas/PJZN8VE3

Cohasset Inc.

Cohasset Associates, Inc. assessed IBM Storage Ceph Object lock relative to the electronic records requirements, specified by multiple regulatory bodies

SEC Rules

U.S. Securities and Exchange Commission (SEC) stipulates recordkeeping requirements, including retention periods.

Cohasset findings

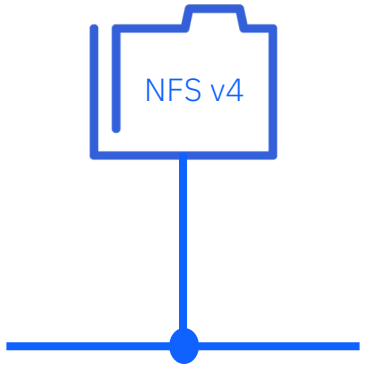
Cohasset asserts that IBM Storage Ceph, configured and used with Object Lock, meets the electronic recordkeeping system requirements of SEC and FINRA Rules

FINRA

Financial Industry Regulatory Authority (FINRA) rules regulate member brokerage firms and exchange markets.

Functionality

NFS support for CephFS for non-native Ceph clients



Linux clients

CephFS kernel driver is part of the Linux kernel
Mounts CephFS as a regular filesystem.

NFS

CephFS namespaces can be exported over NFS protocol using NFS-Ganesha service.

NFS Ganesha

A file server for NFS

NFSv4.1 GA support

More NFS versions to come available in future releases.

NFS parameters

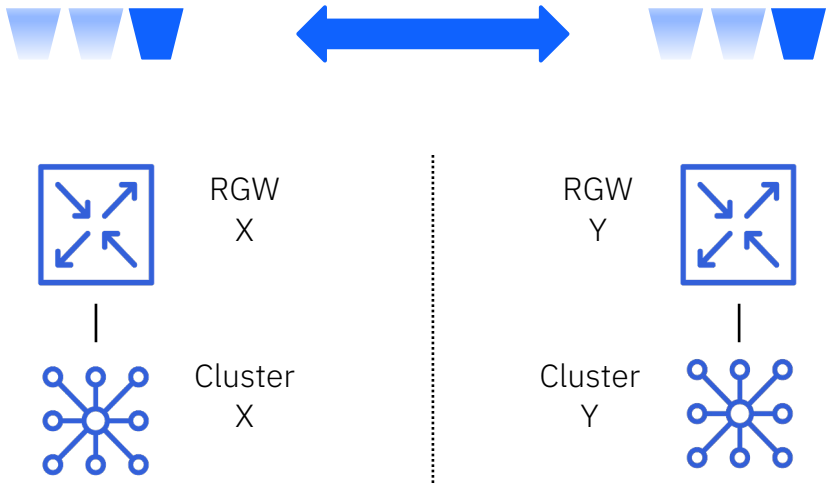
Access type
RW, RO, or NONE.

Squash
No_Root_Squash, None, or Root_Squash.

Security label
Can be true or false.

Functionality

Multi-site replication with bucket granularity



Bucket granularity

Ability to replicate a selected bucket or group of buckets to a different IBM Storage Ceph cluster

RGW multi-site similarity

Similar functionality as RGW multi-site, but now with bucket granular support

Bi-directional

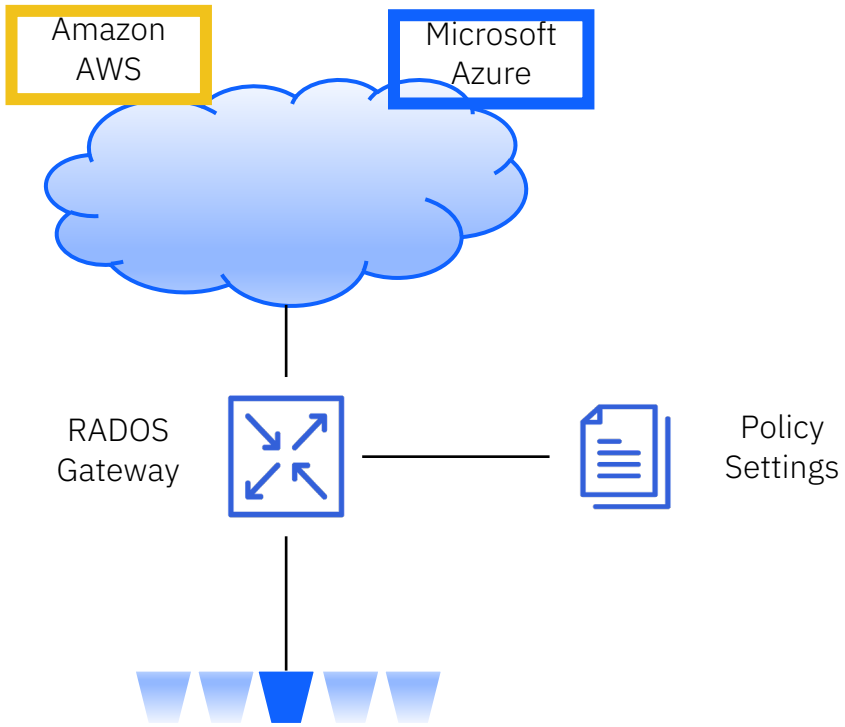
Bi-directional replication of selected buckets

Active-active

Active-active replication between two sites, with bucket granularity

Functionality

RGW policy-based data archive/migration to public cloud



Archive or migrate

Object lifecycle transition into AWS compatible S3 cloud endpoints.

Data lifecyle

Extends current lifecycle transition and storage class model

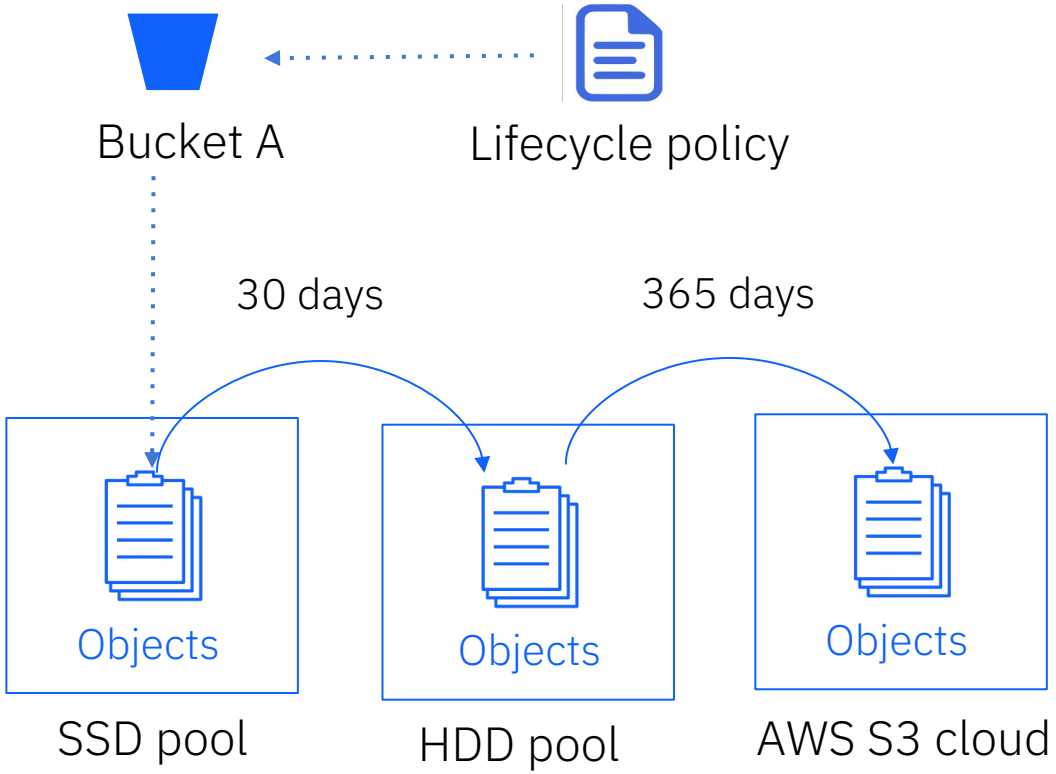
Policy-based

Move data which meets policy criteria to an AWS compatible S3 bucket for archive, for cost, and manageability reasons

In overall

Cloud archiving provides a cost-effective, scalable, secure, and accessible way to store and preserve data

IBM Storage Ceph Object S3 Lifecycle Management



Lifecycle management

Ability for transitioning and/or expiration of objects.

Example policy:
Transition object to cold tier after 30 days.
Delete after 365 days

Granular object filtering

Granularly filter which objects in a bucket are susceptible of lifecycle management by object prefix or tags.

S3 Lifecycle Transition

Can be defined between arbitrary storage classes(tiers) in a cluster or to other S3 compatible endpoints (Including AWS),

Transition to cloud is a one-way only process.

S3 Lifecycle Expiration

Includes:

Current/Non-current
Delete Marker Expiration
Abort MultiPart Upload

Object storage for ML/analytics: S3select

S3select support general available

Support for all three defined S3select data formats:

- CSV
- JSON
- Parquet

Data analytics apps consume object

The data analytics market is a heavy consumer of object storage.

IBM Storage Ceph is first-class citizen in on-premise data analytics object Storage solutions.

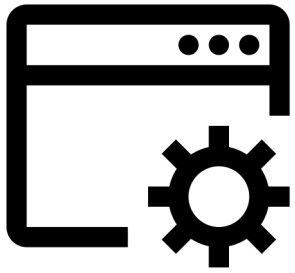
Achieve reduced query times

IBM Storage Ceph keeps improving its features and integrations with market-leading tools like Presto, Trino and other apps.

Analytical tools use Parquet.

IBM Storage Ceph provides improved performance for these tools pushing down the queries into the RGWs.

Dashboard UI functionalities CephFS: volume management



CephFS UI interaction

Creation, listing, changing options, and deletion of CephFS filesystem(s), volumes, subvolume groups and subvolumes

CephFS access and encryption

Access management for CephFS resources.

Encryption management options for CephFS.

CephFS snapshots management

List all snapshots for a particular FS, volume subvolume or directory.

Create or delete a one-time snapshot. Display occupied capacity by a snapshot.

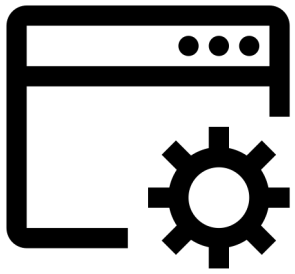
CephFS monitoring

Health status, basic read/write throughput and capacity utilization for filesystems, volumes and subvolumes.

Including historical graphs.

Functionality

Dashboard UI functionalities
RGW: Ceph object gateway



RGW multi-site UI configuration

RGW multi-site setup and configuration from the dashboard UI.

Easy setup without having to go through manual setup steps.

RGW bucket level view and management

Improved per-bucket view, removing unnecessary information.

Labeled performance counters per user/bucket

Reporting into Prometheus monitoring stack

Bucket operations and statistics

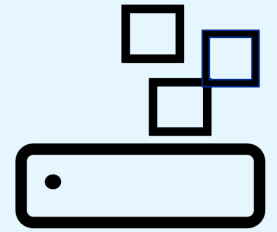
User operations and statistics

Multisite synchronization status

Synchronisation status RGW operation metrics client and replica traffic

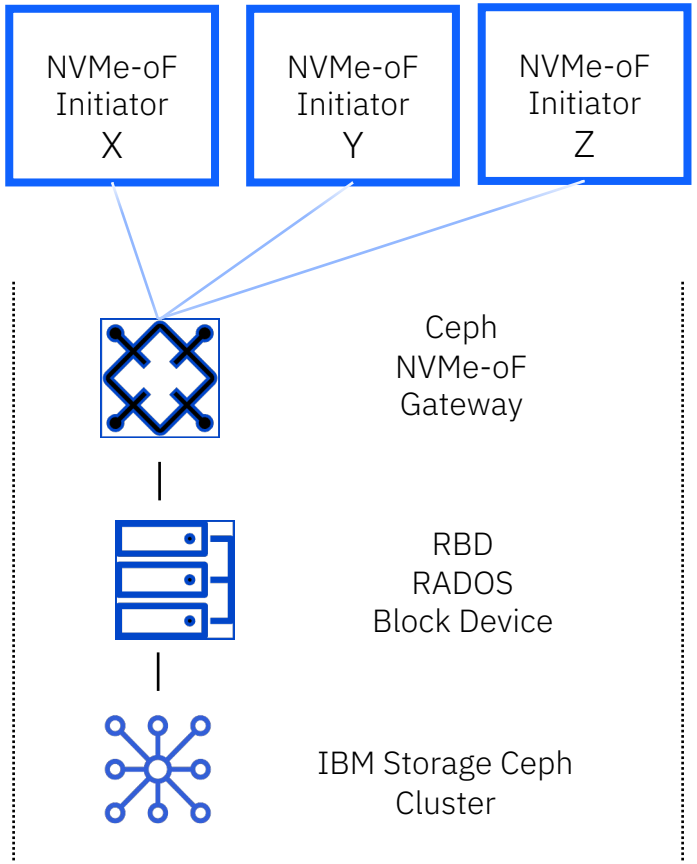
Dashboard visibility of a RGW latest sync status.

IBM Storage Ceph 7
Tech Preview



Functionality

NVMe over Fabrics Tech Preview



NVMe over Fabrics for block storage

Similar in scope and design to RBD over iSCSI in the past.

A new management layer via a new ceph-NVMe-of daemon, coordinates configuration of NVMe-oF targets, across multiple cluster nodes.

No kernel dependencies. SPDK-based code.

NVMe over Fabrics use case examples

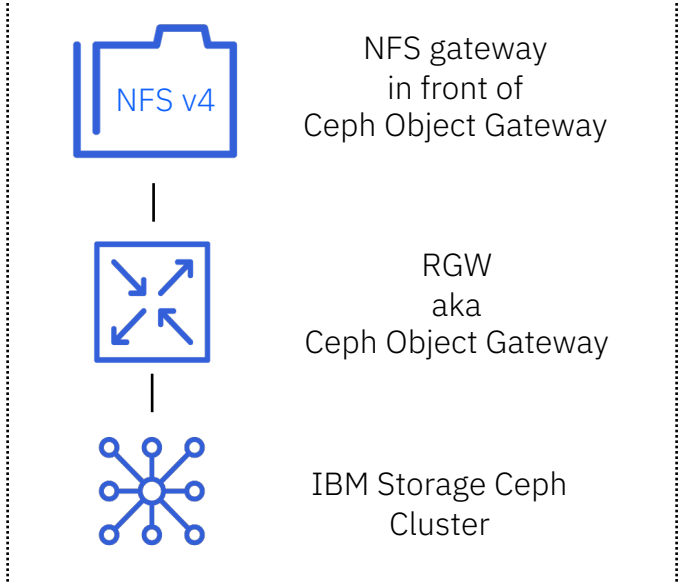
Initial target use case is providing bare metal storage support.

An NVMe-oF target and initiator combination to access storage from the Ceph RADOS subsystem.

Block storage for VMware or Windows storage consumption.

Functionality

NFS to RGW backend Tech Preview



IBM Storage Ceph RGW NFS gateway

NFS with RGW backend integration.

Allows for object access through NFS protocol.

This can be useful for easy ingests of object data from legacy applications which do not support the S3 object API.

Use case examples for Data Scientists

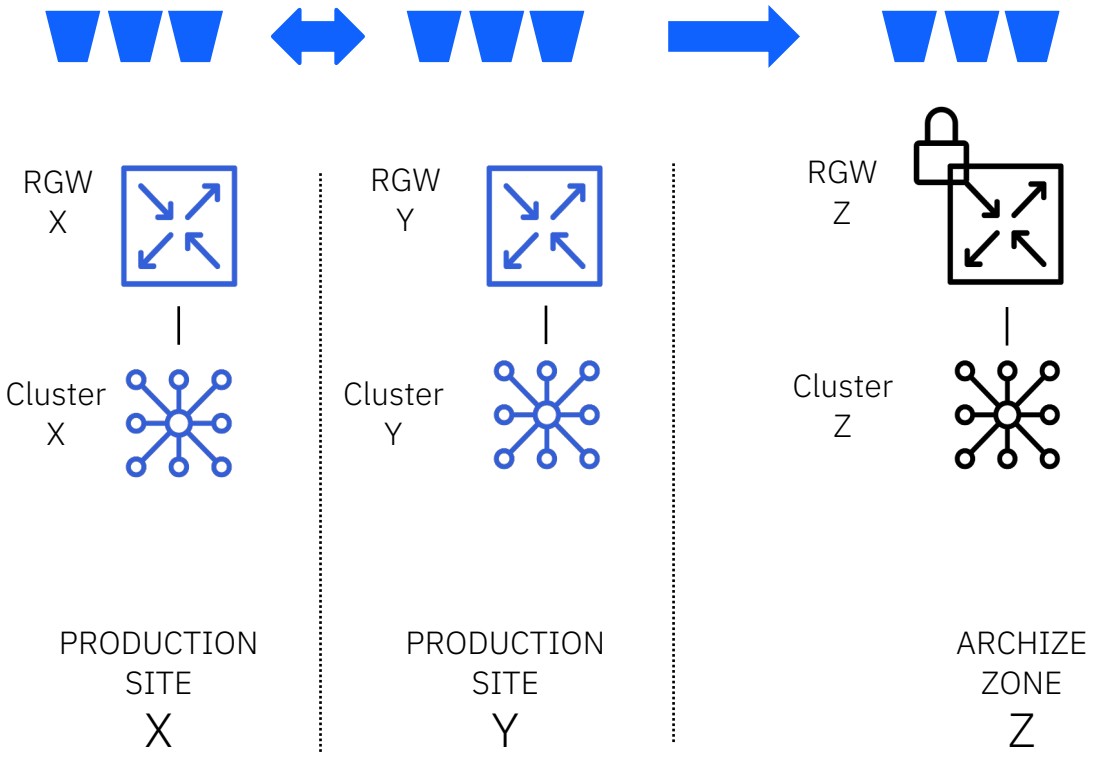
A method to easily ingest existing business data from Windows and Linux clients into the Ceph object store.

An easy way to export results from analytics jobs and share results

Specifically, to users or applications that are unable to use the S3 API natively.

Functionality

Object archive zone Tech Preview



IBM Storage Ceph archive zone

The archive zone receives all objects from the production zones.

It keeps every version for every object, providing the user with an object catalogue that contains the full history of the object.

Archive zone provides immutable objects that cannot be deleted nor modified from RGW endpoints.

Archive zone purpose and benefit

Ability to recover data from the archive zone.

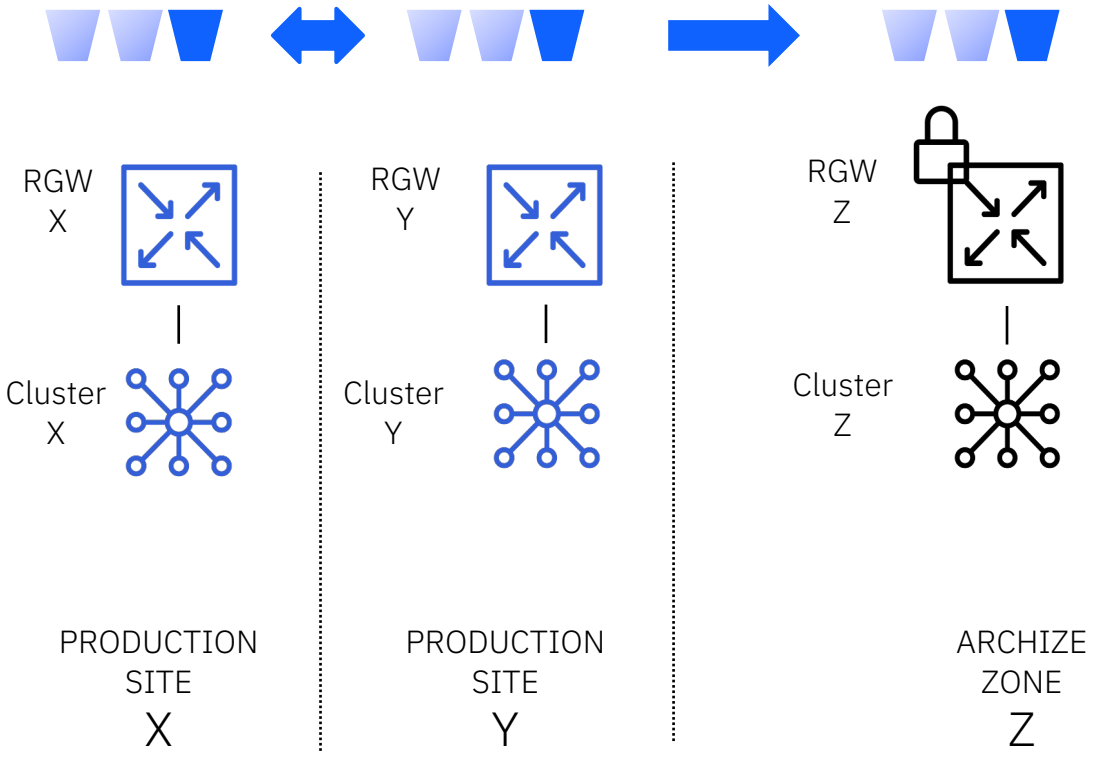
Enables for recovery of any version of any object that existed on production sites.

In case of data loss, ransomware or disaster recovery, still all valid versions of all objects can be recovered easily.

Also suitable for compliancy related use cases.

Functionality

Object archive zone with bucket granularity



Object archive zone bucket granularity

Allows clients to enable or disable replication to the archive zone on a per object bucket case.

Distinctions can be made based on a single bucket granular level.

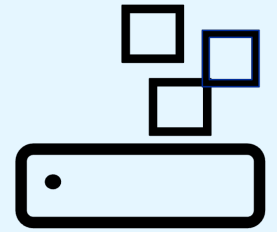
Object archive zone granular choice

Goal is to reduce data storage in the archive zone.

In example, a set of test/development buckets are probably non-business critical.

System administrators may than decide to disable replication to the archive zone for these types of object data buckets.

IBM Storage Ceph
Next steps



IBM Storage Ceph resources

IBM website

IBM Storage Ceph enterprise downstream
https://www.ibm.com/products/ceph

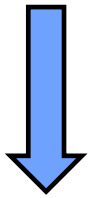
IBM Seismic

Ceph
Sales Kit on Seismic
http://seismic.ceph.blue

Cohasset Inc. Report

Ceph Object Lock (WORM) certification

Report download link



https://www.ibm.com/downloads/cas/PJZN8VE3

IBM Ceph easy demo videos

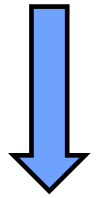
IBM Storage Ceph video demos
http://easy.ceph.blue

IBM Storage Ceph

IBM Storage Ceph Documentation
http://docs.ceph.blue

IBM Community Blog

Blogpost about IBM Storage Ceph 7.0
Link to blogpost

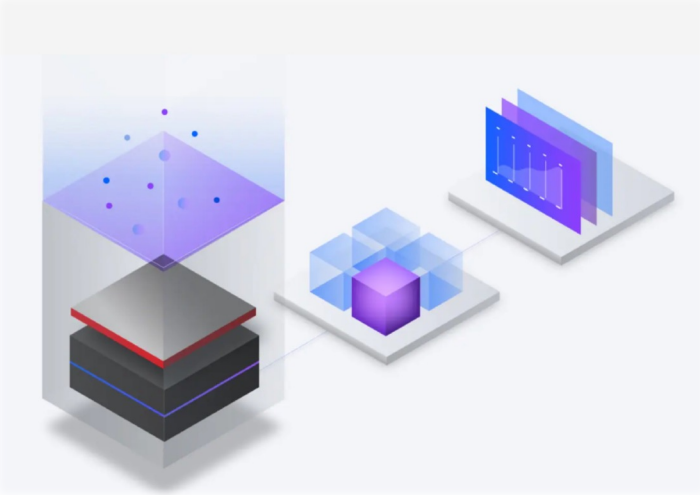


https://community.ibm.com

How to get started with IBM Storage Ceph

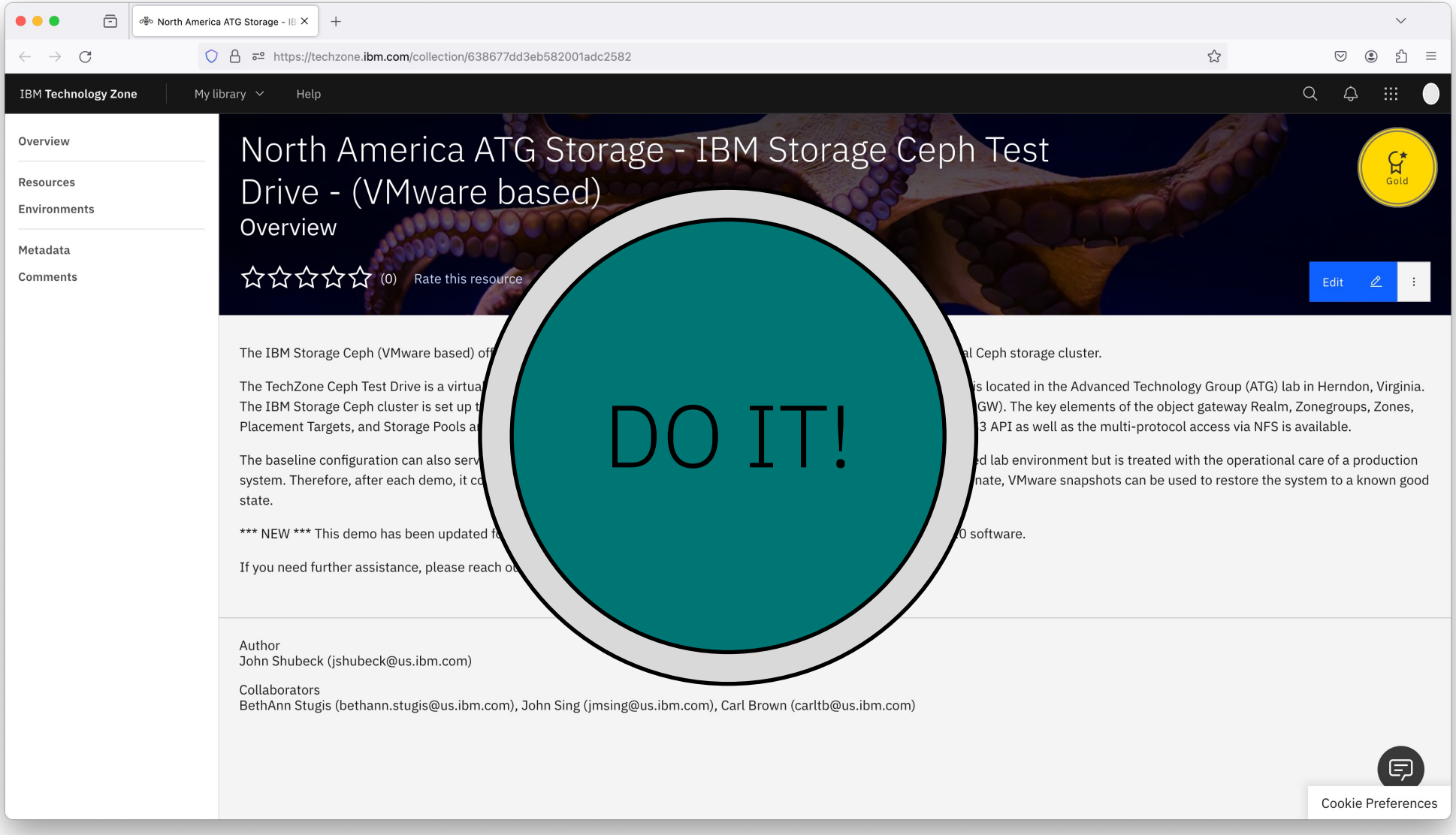
- Visit the IBM Storage Ceph website
- Download the IBM Storage Ceph solutions brief and datasheet
- Schedule a free demo on the website

How to get started with IBM Storage Fusion



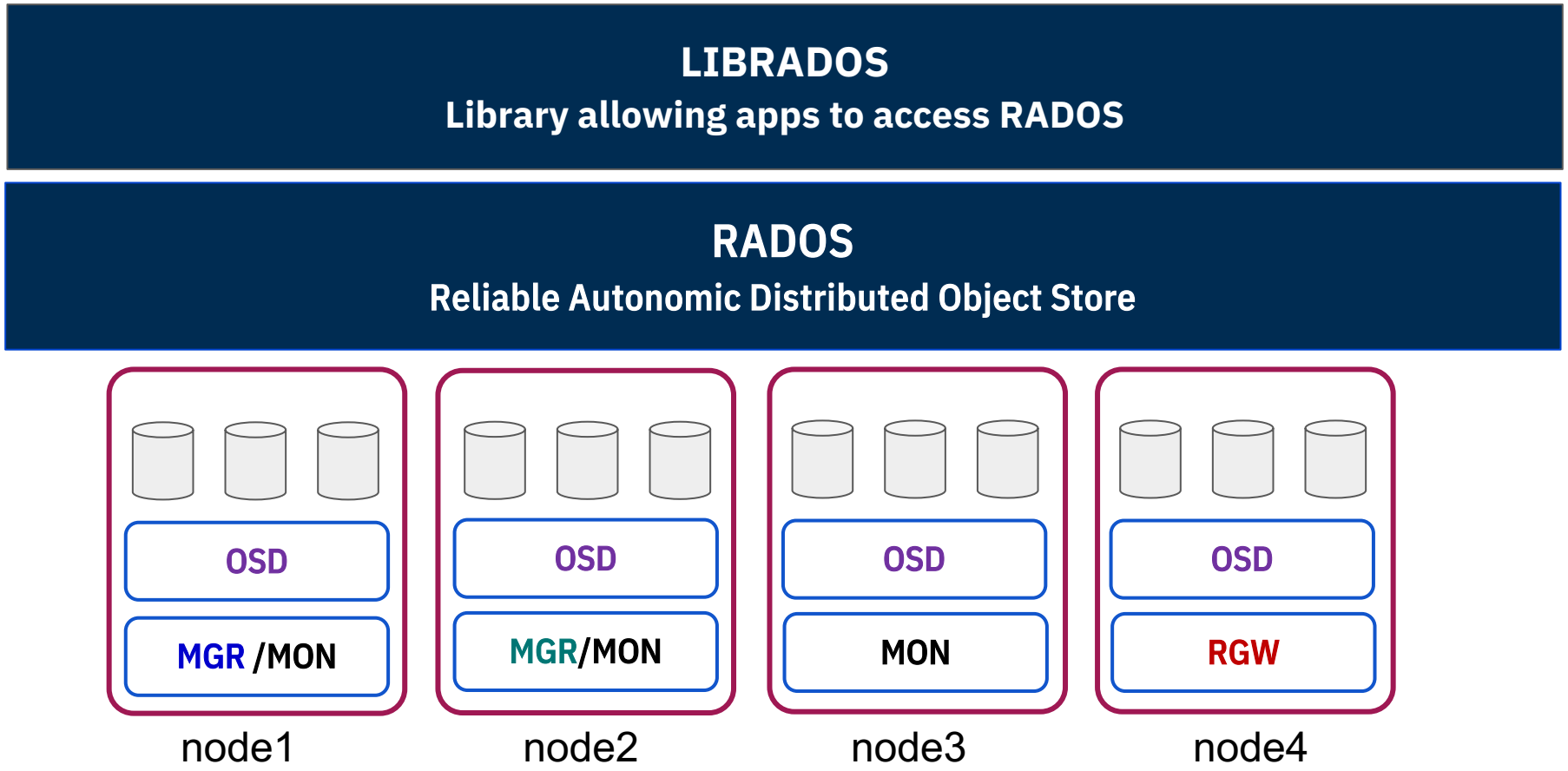
- Visit the IBM Storage Fusion website
- Learn how easy IBM Storage Fusion is with a free demo
- Start a proof of concept

IBM TechZone for IBM Storage Ceph Test Drive

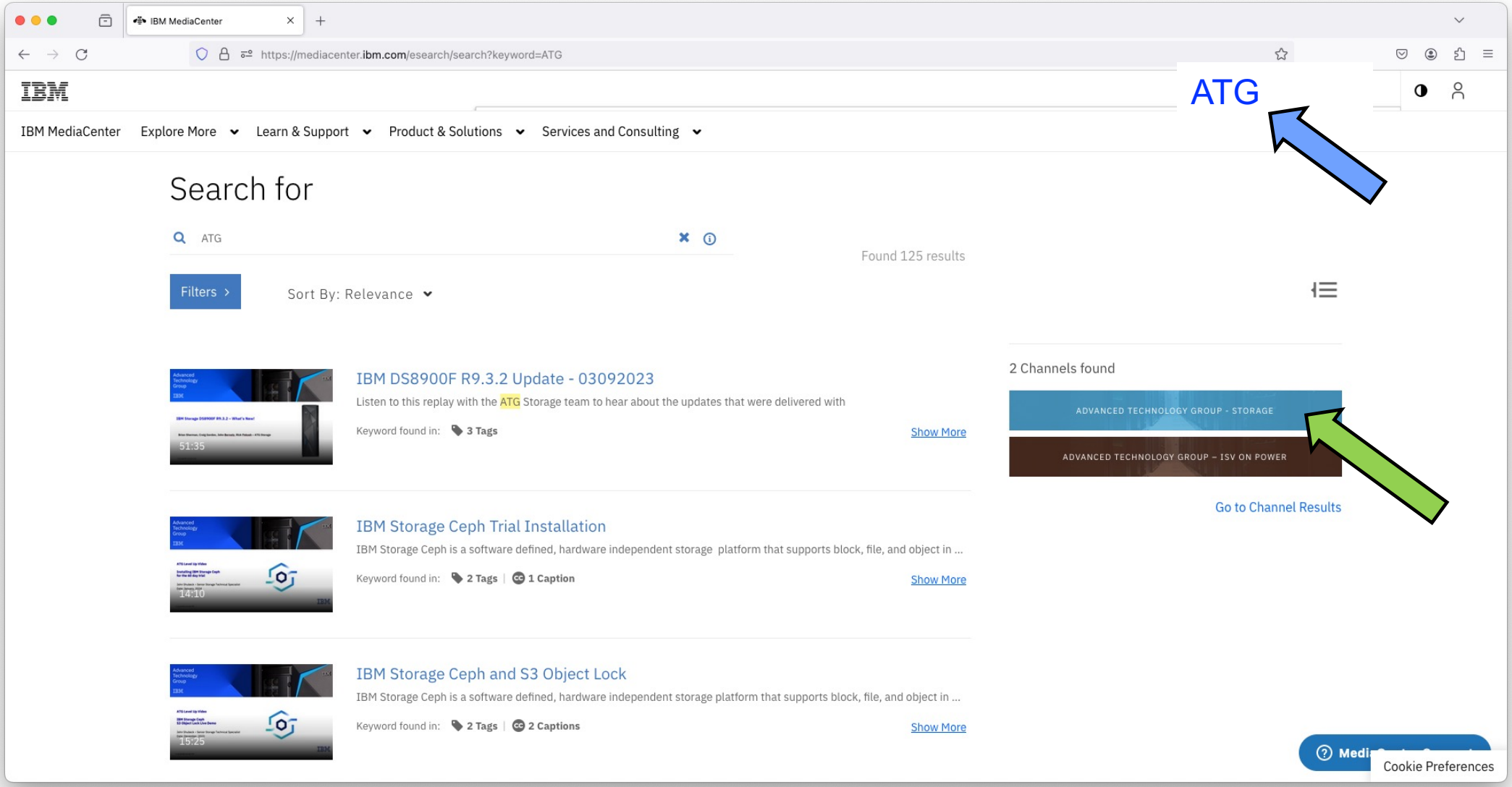


IBM Storage Ceph – 4 nodes with colocated daemons

IBM Storage Ceph trial node layout

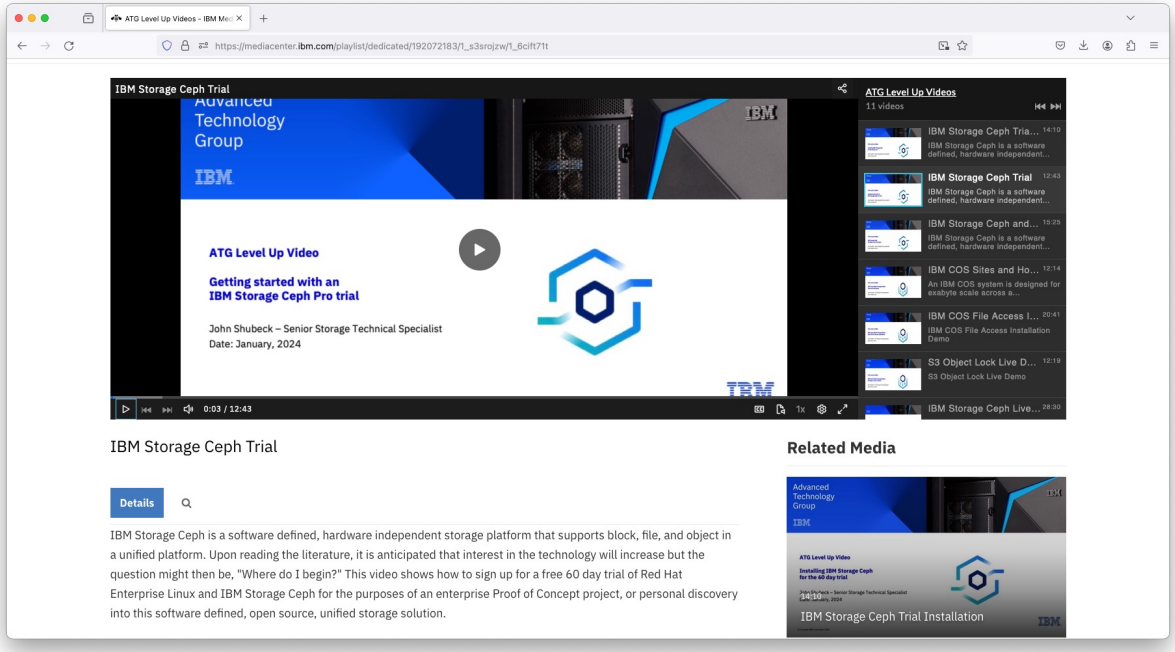


IBM Storage Ceph Videos at https://mediacenter.ibm.com



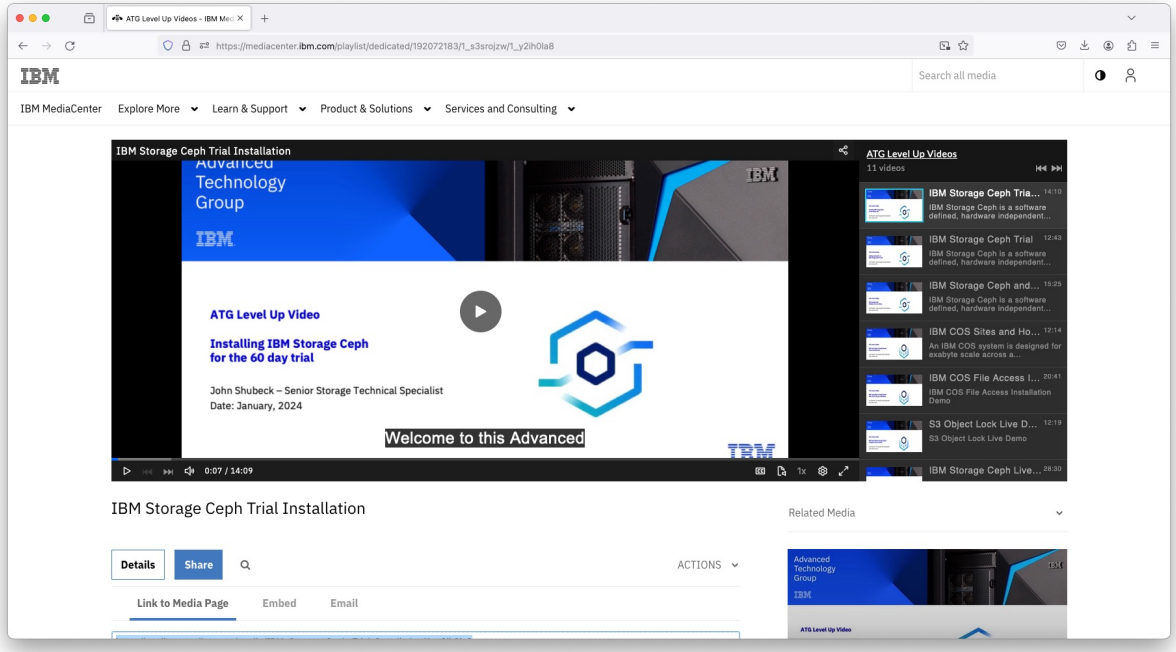
IBM Storage Ceph Trial videos

How to sign up and get subscriptions



https://mediacenter.ibm.com/media/IBM+Storage+Ceph+Trial/1_6cift71t

How to install a POC cluster



https://mediacenter.ibm.com/media/IBM+Storage+Ceph+Trial+Installation/1_y2ih0la8

Thank you!

Accelerate with ATG Survey

Please take a moment to share your feedback with our team!

You can access this 6-question survey via Menti.com with code 1708 6924 or

Direct link https://www.menti.com/alwhyze7z1gz

Or

QR Code