

Building a Community to Tackle Cloud Object Storage Incompatibilities

Report from SNIA CSTI Cloud Object Storage Plugfest held at September SDC'24

November 21st, 2024

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Cloud Object Storage Plugfest Team at SDC'24



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Agenda

- Introduction and SNIA Cloud Object Storage Plugfest Summary
- SNIA Plugfest Operation
- Plugfest Participant Perspectives From:
 - Dell
 - Google
 - Hammerspace
 - IBM
 - Vast Data
 - Versity Software
- Audience Poll Question
- Q&A Round Table
- Invitation to April '25 Plugfest - Join Open Forum Community
- Birds of a Feather (BoF) and Conclusion

Building a Community to Tackle Cloud Object Storage Incompatibilities

*Report from SNIA CSTI Cloud Object Storage
Plugfest held at September SDC'24*

- Unique multi-vendor community of expert interoperability test engineers
- S3-compatible object storage and other cloud software APIs that deploy object storage in any use case
- Develop best practice, open source test tools and resolve bugs before customers find them
- Conduct public forums, formalize consumption of testable technical documentation and promote API / behavioral standardization

CLOUD OBJECT STORAGE PLUGFEST

UNDERWRITTEN BY
SNIA[®] | CLOUD STORAGE
CSTI | TECHNOLOGIES



Google



SAMSUNG



SNIA CSTI Partnered with SNIA Cloud Storage Technical Work Group (TWG)

Plugfest members (protocol experts) seek to test distinct code libraries with diverse source heritage and expose compatibility issues, especially on API changes, feature deprecation and behavioral characteristics (security and error handling)

- Compatibility challenges...
- Server & Client applications support different API options
- Complexity and variety of APIs vs. basic interoperability
- Access control mechanisms to support simultaneous multi-protocol access to objects
- Performance and scalability requirements
- Real-world incompatibilities found in various object storage implementations
- Missing or incorrect response headers
- Unsupported API calls and unexpected behavior



SNIA CSTI Plugfest Operation and Benefits

- Key Point - Cloud Object Storage is fundamentally Storage Networking
 - **All Storage and Networking Protocols Require Plugfest Validation**
 - SCSI / SAS, SMB3, NFS, iSCSI, Fibre Channel, CXL...
- Benefits - Plugfest members compare experience and immediately know trouble spots to examine and test
- Bug fix resolution expedited (everyone is at the same table)
- Plugfest under NDA (engineer to engineer test focus)
- SNIA membership not required for Plugfest participation
- SNIA is not-for-profit vendor neutral organization that develops international standards and specifications



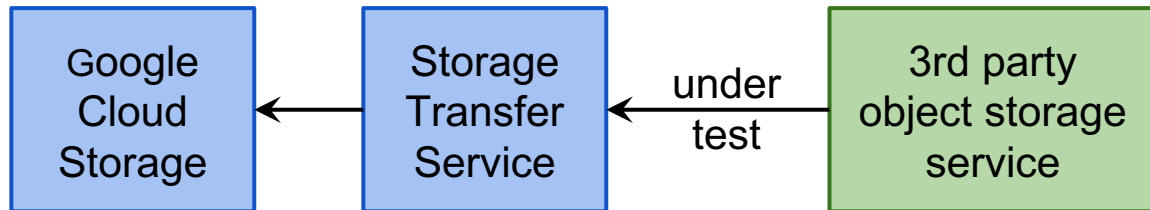
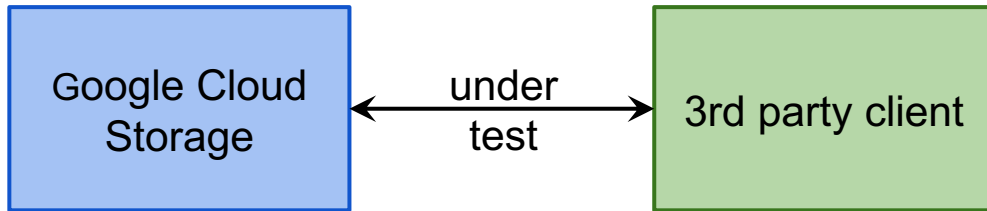
First Cloud Object Storage Plugfest
BY Developers FOR Developers

Dell - Perspective - Cloud Object Storage Testing

- **General feedback about the event:**
 - Positive initiative by SNIA with potential to grow and offer value to community
 - Reasonable participation from server vendors – will benefit from participation of additional clients and users of object storage
- **Feedback from service perspective:**
 - Interaction among participants was productive and was helpful to quickly resolve issues/provide clarifications on behavior observed
 - Validated some of our internal expectations/observations
- **Feedback from customer pain point perspective:**
 - Future engagement from additional clients can help vendors and their customers if we can arrive at common test suite/validation framework – which can lead to standardization of protocol behavior/expectations

Google Perspective - Cloud Object Storage Testing

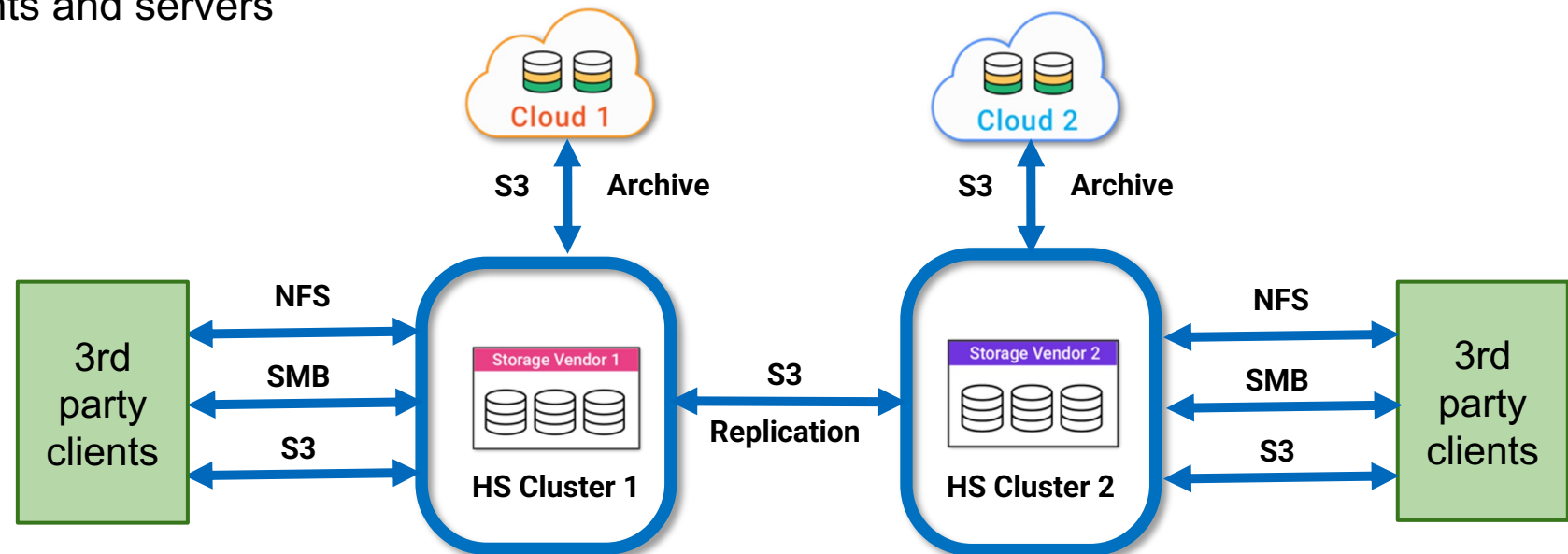
- SNIA Object Storage Plugfest was successful for Google. We tested two services (Google Cloud Storage and Storage Transfer Service) and discovered several interoperability issues between those services and third-party software that might otherwise impact our customers in the field.
- Plugfest created a collaborative environment for interactions among engineers from different companies, which helps the cloud storage industry. Presentations from the SNIA Developer Conference that ran in parallel provided broader industry understanding to Google engineers who participated in the Plugfest.



- Conversations with engineers from other companies validated our previous findings that there is a lot of ambiguity in how popular object storage APIs are defined, e.g. around object versioning and data upload semantics.
- Plugfest gave us an opportunity to test STS against 6 object storage service implementations which we never rigorously tested against before. This led to a discovery of multiple incompatibility issues, including one prevalent compatibility issue around URL encoding of ListObjects responses.

Hammerspace Perspective - Cloud Object Storage Testing

- Protocol Interoperability Testing
 - Long History
 - NFS Connectathon (1985), SMB PlugFest (2000)
 - Focus: Protocol interoperability, not product/features
 - Implementation validation
 - Early identification of client/server interoperability issues
 - Reduce/eliminate potential deployment problems
 - Access to a diverse set of clients and servers
 - Access to protocol expertise
 - Knowledge exchange
 - Diverse perspectives
 - Test scenario diversity
- Desires/Goals
 - Protocol versioning
 - Define features, functionality, behavior
 - Define core (minimum expected) behavior
 - Well-defined interoperability test suites & test cases
 - Identify incompatibility and/or regressions



IBM - Perspective - Cloud Object Storage Testing

- **General feedback about the event:**

- SNIA set the foundation for a successful future in terms of S3 protocol interoperability
- SDC offers a venue for cloud storage providers to learn and share, which isn't really the focus of other tech conventions

- **Feedback from service perspective:**

- Would love more ISVs/clients/open source participation
- In depth conversations with other service providers was an incredibly valuable and productive experience

- **Feedback from customer pain point perspective:**

- Plugfest is the first step toward eliminating customer headaches when dealing with diverse implementations of S3-based object storage APIs
- Customers may see S3 storage as a universal standard but implementations and expectations may differ from provider to provider

Vast Data - Perspective - Cloud Object Storage Testing

- **General feedback about the event:**
 - Great initiative
 - Need more participants (client/server/application)
- **Feedback from service perspective:**
 - Open discussion and share perspective / concerns
 - Interop and bug identification
- **Feedback from customer pain point perspective:**
 - Established backend engineering communication

Versity Perspective - Cloud Object Storage Testing

- Varsity had a very productive week with Plugfest testing
 - Varsity software uses cloud objects as a client
 - We need to validate interoperability across multiple vendors as well as our open source Varsity Gateway to support the customer choice of cloud providers
 - Varsity also has our own S3 Varsity Gateway to provide our customers with an object interface to ingest data into an archive
- Interoperability and plugfest testing are a foundational part of storage technologies
 - History shows how other technologies used this to mature
 - Fibre Channel interop, NFS connectathon and SMB plugfest
- One key conclusion from the week was the need to invest in an open collection of object storage tests
 - Interested in discussing how to leverage what we have and others to pool this together in an open way

Audience Poll Question (yes / no)

Have you encountered compatibility issues between various object storage implementations?

Q&A

Birds of a Feather (BoF) Consensus Building

Expedite Industry Best Practice and Future Direction

- Document community agreement on base level interoperability
- Collaboratively build open source validation test suites
- Develop open source robustness / protocol punishment tools
- Conduct public forums to drive participation and consensus
- Formalize consumption of testable technical documentation
- Promote API / behavioral standardization
- Join team, contact us at askcloudplugfest@snia.org

Invitation to April '25 and September '25 Plugfests

Join Open Forum, Build Community and Gain Seat at the Table

The NEXT SNIA CSTI Cloud Object Storage Plugfest

Three Day Plugfest - April 28-30, 2025
Denver, CO

Co-located with One Day Regional SDC Denver
Scan QR Code for details and registration



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