Cloud Storage: Solving Interoperability Challenges

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Agenda

01 Cloud Storage; Vendor Lock-In Challenges
02 SNIA CDMI Conformance Test Program
03 Overall CTP Engagement Process
04 TCS CDMI Conformance Assurance Solution
05 Test Execution Process
06 Benefits for You
Customer Challenges | Cloud Storage

1. Security
2. Control/Vendor Lock-in/Interoperability Issues
3. Performance
4. Manageability
5. Costs
Challenges of Cloud | Interoperability

01. Data Lock-in
02. Seamless Adoptability
03. Focus on enterprise level feature
04. Market Pace
05. Agility and flexibility

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The SNIA Cloud Data Management Interface (CDMI) Specification

- An ISO/IEC international standard for cloud data interoperability
- Provides an industry standard to move metadata from cloud to cloud
- Validates interoperability and portability of data stored in public, private or hybrid clouds
- Enables end users to control the destiny of their data
- CDMI is a maturing standard now available in more than 20 products (List of CDMI compliant products)
Benefits of CDMI

- Data Portability Standard
  - Move Data (and most importantly - Metadata) from cloud to cloud
  - Now ALSO via LTFS Tape (SNIA standard)

- Advanced Cloud Services
  - Data System Metadata allows cloud vendors to up-sell!
  - Specialized storage clouds for specific use cases

- Logging, Security, Audit Trails

- Extensible to accommodate rapid innovation in cloud market
  - Proposed Extensions - CIMI/OVF, Versioning, Jobs

- Shrink-to-fit
  - Only implement what makes sense for your cloud
  - Profiles - Simple Storage (i.e. S3), Simple Storage Management (NAS)
Data System Metadata

Capabilities

- cdmi_data_redundancy
  - If present, this capability specifies the maximum number of redundancy copies that may be specified. If absent, redundancy copies specified shall be ignored.

- cdmi_infrastructure_redundancy
  - If present, this capability specifies the maximum number of infrastructure redundancy copies that may be specified. If absent, infrastructure redundancy copies specified shall be ignored.

- cdmi_data_dispersion
  - If present and "true", indicates that the cloud storage system shall disperse data. If absent, redundancy copies specified shall be ignored.

- cdmi_data_retention
  - If present and "true", indicates that the cloud storage system shall support retention.
Data System Metadata Capabilities

- **cdmi_value_hash**
  - This metadata is used to indicate if the object data is to be hashed and indicates the desired hash algorithm and length. Supported algorithm/length values are provided by the cdmi_value_hash capability.

- **cdmi_latency**
  - If present and "true", indicates that the cloud storage system shall tier data based on desired latency. If absent, the max latency specified shall be ignored.

- **cdmi_throughput**
  - If present and "true", indicates that the cloud storage system shall tier data based on desired throughput. If absent, the max throughput specified shall be ignored.
Multi-Protocol in the Cloud

- S3 Client
  - S3 API
  - Signature Version 4 (proprietary)

- Swift Client
  - Swift API
  - Keystone
  - Front End Scale out Server Implementing Multiple APIs

- CDMI Client
  - CDMI API
  - TLS Key Management (KMIP)
  - Oauth 2.x
  - Auth Server
  - Authentication/Authorization Server Implementing Multiple Proprietary and Standard Security Protocols

- Proxy
  - Object Server Node
  - Object Server Node
  - Object Server Node
  - Integration with backend LDAP or other directory services

- Ring or Cluster
Introducing the CDMI Conformance Test Program

- CTP offers 3rd-party unbiased validation of CDMI conformance
- Tests for conformance against the CDMI specification 1.0.2
- Builds on SNIA’s proven track record of offering CTPs for SMI-S and KMIP standards
- Ensures data storage interoperability across a wide range of cloud storage solutions

“SNIA’s CDMI Conformance Test Program is a great step forward helping IT customers, VARs or others in the industry navigate their way through the fog of cloud interoperability requirements in a streamlined fashion.”

-Greg Schulz, Founder of StorageI0
SNIA has appointed TCS as SNIA Authorized Certification Services and Test Provider for CDMI Conformance Test Program

CDMI CTP executed through Tata Consultancy Services (TCS)

TCS is a global IT services, consulting and business solutions organization

TCS offers an automated testing suite compliant with the SNIA CDMI CTP

SNIA and non-SNIA member companies can validate cloud solutions for CDMI conformance.
Overview of the CTP Process | 3 Phases

Application

- Start
- Publish CDMI Test Specifications
- Apply for CDMI CTP
- Forward Request to TCS
- Accept Profiles/Capabilities
- Provide license to Vendor

Test Execution

- Execute Internal Testing
- Resolve any issues on CDMI Specifications (Cloud TWG)
- Ready for Certification

Reporting

Validation

Certificate

Company - CDMI Implementer
SNIA
TCS
Overview of the CTP Process

3 Phases

Application
- Start
  - Publish CDMI Test Specifications
  - Apply for CDMI CTP
  - Forward Request to TCS
  - Accept Profiles/Capabilities
  - Provide license to Vendor
  - Apply for CDMI Certification
  - Forward Request to TCS
  - Notify Vendor of Test Schedule

Test Execution
- Execute Internal Testing
- Resolve any issues on CDMI Specifications (Cloud TWG)
- Ready for Certification
- Execute Certification Test
- Prepare Test Result Report

Reporting
- Send Test Result report to SNIA & Vendor
- Notify TCS and Vendor certification ineligibility
- Issue Resolved
- Notify TCS and Vendor certification eligibility

Validation
- Validate test results
- Vendor approved for certification?

Certificate

Company - CDMI Implementer

SNIA

TCS
Overview of the CTP Process | 3 Phases

Application:
- Start
- Publish CDMI Test Specifications
- Apply for CDMI CTP
- Forward Request to TCS
- Accept Profiles/Capabilities
- Provide license to Vendor
- Apply for CDMI Certification
- Forward Request to TCS
- Notify Vendor of Test Schedule

Test Execution:
- Execute Internal Testing
- Resolve any issues on CDMI Specifications (Cloud TWG)
- Ready for Certification
- Execute Certification Test
- Prepare Test Result Report
- End

Reporting:
- Send Test Result report to SNIA & Vendor
- Notify TCS and Vendor certification ineligibility
- Issue Resolved
- Notify TCS and Vendor certification eligibility
- Publish Results on SNIA web page

Validation:
- Validate test results
- Vendor approved for certification?
- Issue Certificate
- Ready for Certification

Certificate:
- Company - CDMI Implementer
- SNIA
- TCS
What will you get?

TCS CDMI Conformance Assurance Solution (CAS) (Approved by SNIA)
First solution that enables storage & cloud storage companies to
- Test conformance to CDMI specifications by Storage Networking Industry Association’s (SNIA)
- Based on CDMI Conformance Test Specification

Test Software As a Service
Web based Interface where user (vendor) can login can execute the following
- **User Profile** - Create/Manage
- **Configure** - Add/Edit CDMI Servers
- **Execute** - Perform new RUN on added servers
- **Report** - Generate detailed report in PDF/Excel format for any particular RUN
- **Monitor**
  - Track on RUN History
  - Summary dashboard for latest user runs
What will you get?

TCS CDMI Conformance Assurance Solution (CAS) - Functionality

Following features are supported as per CDMI CTP Test Specifications

- Coverage of Capability, Container and Data Object CRUD operations
- Collection of 128 Test Scenarios which cover
  - Capability - Read/Update/Delete
  - Container - Create/Read/Update/Delete
  - Data Object - Create/Read/Update/Delete
- Profile Based support
  - Basic Service-Based Profile
  - Self -Storage Management Profile
- Coverage of CDMI and Non-CDMI based operations
- Authentication and Security
  - Basic and Digest Authentication
  - Support for TLS enabled CDMI Server

Additional details

- CDMI Version Supported: Based on CDMI v1.0.2
  [http://snia.org/sites/default/files/CDMI%20v1.0.2.pdf](http://snia.org/sites/default/files/CDMI%20v1.0.2.pdf)
- CDMI Test Specifications (WIP) against which the conformance testing will be executed
  [http://snia.org/sites/default/files/CDM_Test_Spec_v1.0a.pdf](http://snia.org/sites/default/files/CDM_Test_Spec_v1.0a.pdf)

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<tr>
<th>Name of Deliverables</th>
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<tbody>
<tr>
<td>Conformance Test specifications</td>
<td>SNIA (TCS is editor)</td>
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<tr>
<td>CDMI Conformance Assurance Solution</td>
<td>TCS</td>
<td>Web based access</td>
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<td>CDMI CAS Report</td>
<td>Vendor (through TCS CAS)</td>
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<tr>
<td>CDMI Conformance CAS Report</td>
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<tr>
<td>SNIA CTP Logo award for Vendor's product for the applicable scenarios</td>
<td>SNIA</td>
<td>Snia.org &amp; certificate</td>
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What is the future?

CDMI Specifications*:

New Test Scenarios based on following areas
- Nameless (POST) Data and Queue Object operations
- Domain & Queue CRUD Operations
- Serialization and De-Serialization
- Hold and Retention
- Exported Protocols

New CDMI Versions:
- Upgrade to CDMI v1.1.1 & future versions

CDMI Extensions*:
- Following extensions will be supported as per CDMI v1.1.1 Specifications
  - Summary Metadata for Bandwidth
  - Expiring Access Control Entries
  - Group Storage system Metadata
  - Versioning

*As per requirement from SNIA
Benefits for you

**Comprehensive testing - specifications, execution, reports and analysis.**
Our exhaustive test reports detail the product testing outcome, with clear identification of noncompliant instances/defects. Report which consist of Server details, test case summaries and object summaries pinpoint the exact issues, and enable defect correction early in the PDLC.

**Quicker time-to-market**
Accelerate product launch with our easy to use and round the clock available (as Test Software as a Service) automated testing solution with comprehensive test coverage.

**Reduced cost of testing**
Through optimal fixed price engagement model that utilizes TCS' assurance expertise, you would get regular upgrades to TCS CDMI Conformance Assurance Solution as per the CDMI Specifications and CDMI Test Specifications. Hence you do not need to invest in internal Testing Framework and administration overhead.

**Ensured CDMI conformance and display SNIA CDMI CTP logo your product**
Leverage SNIA verified TCS CDMI Conformance Assurance Solution, to conform your product with CDMI functionality through multiple rounds of internal testing and fixing issues.

**Increased market share by meeting growing CDMI compliance requirements of cloud consumers**
Deliver an interoperable solution based on industry standard specifications and include CTP logo while responding to RFPs. Certify your products for greater credibility, and capture larger market share through the SNIA CDMI Conformance Test Program.
Questions?

http://snia.org/content/cdmi-ctp
After This Webcast

- This Webcast and a copy of the slides will be on the SNIA Cloud Storage website and available on-demand
  - [http://www.snia.org/forum/csi/knowledge/webcasts](http://www.snia.org/forum/csi/knowledge/webcasts)
- A Q&A from this webcast, including answers to questions we couldn't get to today, will be on the SNIACloud blog
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