Eclipse APERI Storage Management Project
Integrated Development Verification Test Plan
-Phase 4-

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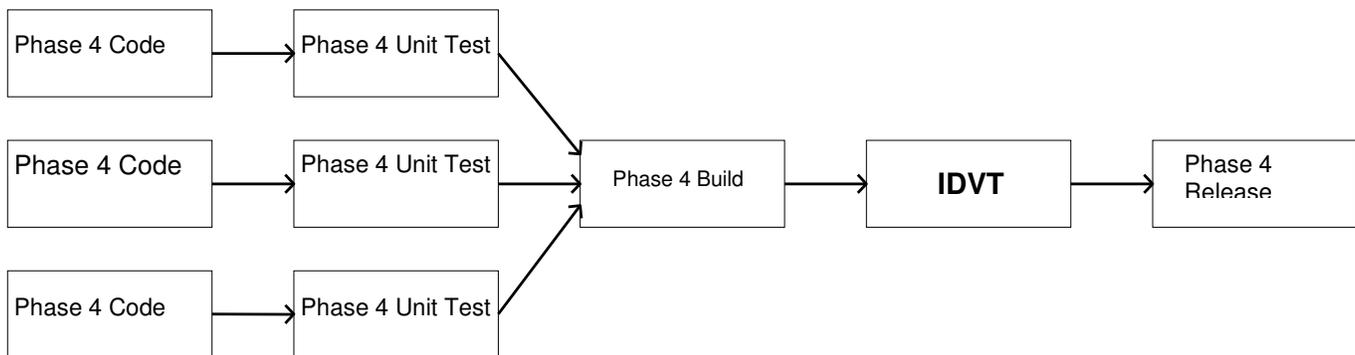
1. Introduction

This document specifies the Integrated Development Verification Test (IDVT) Plan for APERI, Phase 4. It identifies the items to be tested, the features to be tested, the types of testing to be performed, the personnel responsible for testing, the resources required to complete testing, and the risks associated with this plan.

This IDVT is performed by development after all unit testing is completed for Phase 4. IDVT concentrates on "good path" testing. Summarized test results are tracked via a document in the APERI External Development wiki Individual test cases are tracked by the test team using an external database, where individual test cases are defined in detail. A complete summary of the test cases are listed in this document.

IDVT for APERI is performed as follows:

```
Phase 4 Code  →  Phase 4 Unit Test
                                      ↘
Phase 4 Code  →  Phase 4 Unit Test  →  Phase 4 Build  →  IDVT  →  Phase 4 Release
                                      ↗
Phase 4 Code  →  Phase 4 Unit Test
```

1.1 Objectives

The purpose of this IDVT is to test new features added to APERI since the phase 3 release and to verify that all phase three requirements are completed with only a limited number of minor bugs.

Testing includes, but is not limited to the following items:

- Base enablement for SMIS Fabric Profile Topology, Zone Discovery, Zone Control, Indications
- NetApp SMI-S Array profile support
- The Self-Contained NAS Profile support
- NetApp Unified Storage Appliance report.
- CBE/WEF event generation
- Viewing HTML pages with SWT browser widget

IDVT will test the Aperi Storage Manager as a complete application. This includes functions of the platform layer and application layer. IDVT will not directly test any of the extensibility or componentization product, vendors will eventually leverage to create features, plug-ins, or plug-in frames.

1.2 Scope

IDVT will cover new features implemented into the Aperi Storage Manager R0.4 (includes Eclipse Europa components) and its new GUI Installer. Some effort will also be made to test and benchmark Aperi's performance.

Phase 4 development utilizes SMI-S to support Block storage devices. This work item is to plan and execute the validation of the legacy SNMP based Aperi functionality working concurrently with the new Network Appliance SMI-S implementation for the profiles that Network Appliance has implemented. NetApp devices represent themselves in three different ways (Traditional NAS filer, FC block storage array, iSCSI block storage array). Combined, we create a new Unified Storage Appliance Report. Port connectivity to the Self-Contained NAS, the filesystems and file sharesof the Self-Conatined NAS form the report only support. The SMI-S fabric and switch support implements the following Fabric-related features – Topology Discovery, Zoning Discovery, Zone Control of ZoneSets and Zones, Alerts from Fabric and switch Events. Finally, WEF Events published via WS-Notification

1.3 IDVT Ecosystem Overview

For most test situations, the interim build is installed on existing acceptance test hardware, and IDVT test cases are performed in the acceptance test environment. In some cases, access to specialized hardware devices may require IDVT to be performed in a different site.

IDVT test cases are normally executed by members of the Aperi development team.

Defects found during IDVT will be logged in Bugzilla at Eclipse.

1.4 IDVT Entry Criteria

The entry criteria for Phase 4 of IDVT are:

- The IDVT Plan is approved by the Project Lead.
- The phase 4 user interface code is checked into the CVS repository.
- If special workarounds are required, they are specified in a handover document provided by the appropriate development area owner.
- The Phase 4 interim build can be installed through GUI installer for both Windows & Linux platforms
- The IDVT build passes an acceptance test (see below for details of the acceptance test).

Any deviation from these entry criteria requires the approval of the Project Lead.

Specific environmental requirements are identified below.

1.5 IDVT Exit Criteria

The IDVT exit criteria for this phase are:

- 100% of IDVT test cases attempted
- 95% of all IDVT test cases passed

- No 'blocked', 'critical' or 'major', severity defects, or viable workarounds provided for any 'blocked', critical' or 'major' severity defects.

- A "handover document" is produced to describe any manual procedures, workarounds, or limitations that the community needs to be aware of for this phase. This includes configuration instructions.

Any deviation from these exit criteria requires the approval of the Project Lead, and the Test Lead.

1.6 Domains of Testing

IDVT Phase 4 testing emphasizes SMI-S CIMOM agent support. This interface will be used to test functions as the user would execute them. No special testing at the API level is performed during IDVT. It is expected that the nucleus of the IDVT Phase 4 test cases will be the NetApp and SMI-S fabric & switch support.

In addition, install/configuration testing is performed as part of IDVT. IDVT phase 4 concentrates on the following scenario:

- All servers located on a single machine

- Windows platform

- Derby as repository

- Fresh install

- Limited number of tested hardware devices

Some IDVT phase 4 test cases specifically address the limitations of this scenario; that is, there will be some cases to test:

- Linux platform (NetApp support)

- Replacing the Derby repository with DB2

IDVT does not thoroughly test all supported hardware devices. Since IDVT concentrates on "good path" testing, any devices beyond the core set we concentrate on are not required to be tested by IDVT if they would exercise the same code paths as tested devices. But any hardware device that requires its own code path is tested during IDVT.

IDVT does not include publications, globalization, or accessibility.

2. Approach

2.1 Testing

2.1.1 Acceptance Testing

In order to insure that IDVT starts as scheduled, at least two comprehensive acceptance tests will be performed the week before IDVT is scheduled to begin. Acceptance tests (smoke test) will be conducted to determine whether or not Aperi Storage Manager satisfies basic requirements. Successful completion of the final test will allow for entry into the more detailed integration development verification testing.

A successful attempt of all of the following tasks constitutes a successful acceptance test:

1. Download and install the interim build (includes Eclipse Europa components)

2. Use of the gui installer in \install to install and configure the Data Server, Device Server, Report Server, Agents, and the GUI.

3. Verification that the Data Agent starts and is able to successfully register with the Data Server.

4. Verification that the Fabric Agent starts and is able to successfully register with the Device Server

5. Verification that the GUI comes up with no noticeable problems.

6. The initial agent probe works.

7. No errors appear in the Data Server log.

8. No errors appear in the Device Server log

9. No errors appear in the Report Server log

10. Verifying the add CIMOM agent works

11. Verifying the add Out Of Band Fabric agent works

12. Verifying manual add NAS device to Linux Aperi works

13. Verifying the legacy SNMP discovery works.

14. Verifying the legacy CIMOM discovery works

15. Verifying the probe of Storage Subsystems works

16. Verifying the legacy probe of NAS works

17. Verifying default OS ping job executes

18. Verify the default OS probe job executes

19. Verifying discovered subsystems appear via the Topology Viewer

20. Verifying discovered volumes appear via the Topology Viewer

21. A random run through of various reports (system reports, Disk Manager reports, Data Manager reports) to verify their accessibility.

2.1.2 Performance Testing

Some testing will be conducted to ensure that Aperi Storage Manager response time and scalability performs to expectations.

3. Environmental Requirements

This section lists both the necessary and desired properties required for the test environment.

3.1.1 Hardware

- One Windows server to host APERI server and agent components
- One Linux machine running APERI server and agent components
- Brocade switch with SMI agent
- McData switch with OPENconnectors SMI-S Interface
- Cisco SAN-OS CIM server
- IBM N Series and NetApp devices
- DS8K, DS4K, ESS and SVC storage subsystems

3.1.2 Software

- DB2 to test as a replacement to derby

3.1.3 Risks and Assumptions

- **Performance** - In some cases it will be difficult to create an environment required to emulate some of the desired performance tests. For example, create volume in large configurations will not be possible due to the limited hardware available. Efforts will be made to simulate environments for performance tests where the actual physical environment will not be possible to create.

4. Status Reporting

4.1 Status Reporting

Testing progress will be formally reported during the weekly Status Meetings. The status will include all critical defects and all defects that impede the completion of IDVT.

A status report will be prepared by the test team to facilitate the meeting and inform management of IDVT status. This report will be posted on the Aperi external wiki by the end of each Friday until the exit of IDVT. The report will contain the following information:

Test Cases

- The projected number of exposed test cases for each week in IDVT
- The projected number of successful test cases expected each week
- The actual number of exposed test cases each week
- The actual number of successful test cases each week
- The number of test cases being blocked due to defects

Defects

- The number of open defects
- The number of defects being worked on
- The number fixes to defects waiting to be verified
- The number of transferred defects
- The number of closed defects
- The number of returned defects
- The number of canceled defects
- The number of defects categorized by severity
- The number of open and working severity 1 and severity 2 defects

5. IDVT Test Cases

5.1 Phase 4

5.1.1 Required Environment

- See section **3.1.1** Hardware requirements

5.1.2 Required Staff

One IDVT testers.

5.1.3 Target Dates

- September 4, 2007 – start IDVT testing
- November 16, 2007 – end IDVT testing

5.1.4 Test Cases

5.1.4.1 Initial NetApp Support – Array Profile Support

Source: work item WI209: initial NetApp Support

5.1.4.1.1 Collect Information from the Network Appliance SMS-S Agent

• Install the Network Appliance SMI-S agent on a supported platform - RedHat Linux AS 3.0 and AS 4.0 only. Add the filers that the SMI-S agent will manage using it's smis command. Configure the Network Appliance SMI-S agent using the Aperi GUI. Use the Administrative Services->Agents-CIMOM->Add CIMOM panel. Make sure to use /interop as the namespace.
• Discover the SMI-S agent using the Aperi GUI. Use the Administrative Services->Discovery-CIMOM->Run now feature.
• Create and run a probe job against the SMI-S agent using the Aperi GUI. Use the Aperi Storage Management ->Monitoring->Probes->Create Probe panel.

5.1.4.1.2 Provision the Network Appliance

• Create a volume using the Aperi GUI at the Disk Manager->Storage Subsystems report. Select the subsystem and press the 'Create Volume' button.
• Create a volume and map a previously unused host ports.
• Create a 2nd volume and map to the previously used host ports.
• Add mapping to a previously created volume.
• Delete a volume using the Aperi GUI at the Disk Manager->Storage Subsystems report. Select the subsystem and press the 'Volumes' button. At the Volumes panel, select an array to filter by, press the 'Go' button. Select a volume and press 'Delete'.
• Delete a volume with mapped host ports.

5.1.4.1.3 View reports for the Network Appliance - SMIS only Test & SNMP + SMIS Test

• View 'Disk Capacity' and 'Disk Unallocated Space' on the Dashboard
• View 'Disk Capacity' and 'Disk Unallocated Space' on the Summary line on the panel at Aperi Storage Management->My Reports->System Reports->Data->Disk Capacity Summary
• Drill into the report to see details of Network Appliance (since SNMP shows the filer as a computer this only applies to the SNMP+SMIS scenario)
• Drill into disk drives of interest (since SNMP shows the filer as a computer this only applies to the SNMP+SMIS scenario)
• View 'Primary Defects' on the panel at Aperi Storage Management->My Reports->System Reports->Disk Defects
• Drill into disk drives of interest
• View 'Total Capacity' and 'Total Unallocated Space' on the Summary line on the panel at Aperi Storage Management->My Reports->System Reports->Data->Storage Capacity
• Drill into the report to see details of Network Appliance (only applies to the SNMP+SMIS scenario)
• Drill into disk drives of interest (only applies to the SNMP+SMIS scenario)
• (intentionally left blank)
• View Alerts generated at the Aperi Storage Management->Alerting->All, Aperi Storage Management->Alerting->Storage Subsystem, Aperi Storage Management->Alerting->Disk, Aperi Storage Management->Alerting->External panels
• View Storage Pools for the Network Appliance at the Data Manager->Reporting->Asset->By Storage Subsystem->(subsystem name)->Storage Pools panel
• Drill in to see Disks that make up the Storage Pool
• View Disks for the Network Appliance at the Data Manager->Reporting->Asset->By Storage Subsystem->(subsystem name)->Disks panel
• Drill in to see LUNs on the Disks
• View LUNs for the Network Appliance at the Data Manager->Reporting->Asset->By Storage Subsystem->(subsystem name)->LUNs panel
• Drill in to see Disk allocation for the LUNs
• View Capacity information for the Network Appliance at the Data Manager->Reporting->Asset->System-wide-

>Storage Subsystems->By Storage Subsystem report
• Drill in to see disk information
• Drill further to see individual disks
• View Capacity information for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->Storage Subsystems->By Storage Subsystem report
• Drill in to see disk information
• View Disk Unallocated Space information for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->Disks->By Unallocated Space report
• Drill in to see disk information
• View Disk Grown Defect information for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->Disks->By Grown Defects report
• Drill in to see disk information
• View Disk Primary Defect information for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->Disks->By Primary Defects report
• Drill in to see disk information
• View Disk Recovered Errors information for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->Disks->By Recovered Errors report
• Drill in to see disk information
• View Disk Unrecovered Errors information for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->Disks->By Unrecovered Errors report
• Drill in to see disk information
• View Disks by Probe Time information for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->Disks->By Probe Time report
• Drill in to see disk information
• View Disks by Discovered Time information for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->Disks->By Discovered Time report
• Drill in to see disk information
• View LUN by Storage Subsystem for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->LUNs->By Storage Subsystem
• Drill in to see LUN information
• View LUNs by Capacity for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->LUNs->By Capacity
• Drill in to see LUN information
• View LUN by Probe Time for the Network Appliance at the Data Manager->Reporting->Asset->System-wide->LUNs->By Probe Time
• Drill in to see LUN information
• View Capacity information for the Network Appliance at the Data Manager->Reporting->Capacity->Disk Capacity->By Disk report
• Drill in to see disk information
• View Capacity By Storage subsystem information for the Network Appliance at the Data Manager->Reporting-

	>Capacity->Disk Capacity->By Storage Subsystem report
•	Drill in to see disk information
•	Drill further to see individual disk
•	View Network wide Capacity information for the Network Appliance at the Data Manager->Reporting->Capacity->Disk Capacity->Network-wide report
•	Drill in to see disk information
•	View and set Storage Subsystem information for the Network Appliance at the Disk Manager->Storage Subsystems report
•	View and volume information for the Network Appliance at the Disk Manager->Storage Subsystems report. Select the subsystem and press the 'Volumes' button.
•	View LUN information by Storage Subsystem for the Network Appliance at the Disk Manager->Reporting->Storage Subsystems->Storage Subsystems Views->By Storage Subsystem report.
•	View LUN information by LUN for the Network Appliance at the Disk Manager->Reporting->Storage Subsystems->Storage Subsystems Views->By Volume report.
•	View LUN information by Disk for the Network Appliance at the Disk Manager->Reporting->Storage Subsystems->Storage Subsystems Views->By Disk report.
•	View LUN to HBA information by Storage Subsystem for the Network Appliance at the Disk Manager->Reporting->Storage Subsystems->LUN to HBA Assignment->By Storage Subsystem report.
•	View LUN to HBA information by Capacity for the Network Appliance at the Disk Manager->Reporting->Storage Subsystems->LUN to HBA Assignment->By Capacity report.
•	View LUNs with No Data Agent on the assigned host information by Capacity for the Network Appliance at the Disk Manager->Reporting->Storage Subsystems->LUN to HBA Assignment->With No Data Agent report
•	View LUNs on a Data Agent, but not visible on the assigned host information by Capacity for the Network Appliance at the Disk Manager->Reporting->Storage Subsystems->LUN to HBA Assignment->With Data Agent but Not Visible report

5.1.4.1.4 Alerts for the Network appliance from detectability – SMIS only test

•	**ALR1114W**=New Storage Subsystem discovered
•	**ALR0048W**=Storage Subsystem {1} is no longer accessible from host {0}.
•	Is this the 'Storage Subsystem Not Found' alert ???
•	**ALR4243W**=The subsystem version has changed from {0} to {1} on Subsystem {2}.
•	**ALR4244W**=The allocated capacity has changed from {0} to {1} on Subsystem {2}.
•	**ALR4245W**=The available capacity has changed from {0} to {1} on Subsystem {2}.
•	**ALR0050W**=The amount of cache on storage subsystem {0} has changed from {4} to {3}
•	**ALR4278W**=The property for Subsystem {0} has changed.
•	**ALR4241W**=Subsystem {0} has gone offline.
•	**ALR4242I**=Subsystem {0} has gone online.
•	**ALR4250I**=Volume {0} on Subsystem {1} has gone online.
•	**ALR4249W**=Volume {0} on Subsystem {1} has gone offline.
•	**ALR4251W**=The capacity has changed from {0} to {1} for Volume {2} on Subsystem {3}.
•	**ALR4249W**=Volume {0} on Subsystem {1} has gone offline.
•	**ALR4250I**=Volume {0} on Subsystem {1} has gone online.
•	**ALR4253I**=Pool {0} on Subsystem {1} has been discovered.
•	**ALR4252W**=The state for Pool {0} on Subsystem {1} has changed from {1} to {2}
•	**ALR4256W**=The pool capacity has changed from {0} to {1} for Pool {2} on Subsystem {3}.
•	**ALR4257W**=The pool available space has changed from {0} to {1} for Pool {2} on Subsystem {3}.

•	**ALR4254W**=Pool {0} on Subsystem {1} has gone offline.
•	**ALR4255I**=Pool {0} on Subsystem {1} has gone online.
•	**ALR1057W**=New disk discovered
•	**ALR1058W**=Disk not found
•	**ALR4280I**=Data Path to Volume {0} on Subsystem {1} has been discovered.
•	**ALR4283W**=The state for the Data Path to Volume {0} on Subsystem {1} has changed from {2} to {3}.

5.1.4.1.5 Topology View

L0: Storage view
 	
    • Does Network Appliance subsystem show up after SMI-S discovery?
    • Right click the subsystem and launch the element manager
    • Are all the values in the bottom panel correct?

Double click the subsystem to go to L2: Storage
 	
    • Are the counts disks, pools, volumes and LUNs correct after probing the subsystem?
    • Expand the device group
    • Are all the disks, pools, volumes and LUNs shown correctly?
    • Are the disks grouped by pool correctly?
    • Are the pools grouped by RAID level correctly?
    • Are the volumes grouped by pool correctly?
    • Are the luns grouped by volume correctly?

5.1.4.2 NetApp Self-Contained Profile Support

Source: Support the Self-Contained NAS Profile (reporting only)

5.1.4.2.1 Topology View

1. View the topology of the Network Appliance that implements the SMI-S 1.1.0 Self-Contained NAS system profile using the topology viewer at Aperi Storage management->Topology->Storage if probed by a Network Appliance SMI-S agent
2. View the topology of the Network Appliance that implements the SMI-S 1.1.0 Self-Contained NAS system profile using the topology viewer at Aperi Storage management->Topology->Computer if probed by a proxy data agent.

Note:

Network Appliance devices will be displayed in the GUI as both a 'computer' and a 'subsystem' if probed by both a proxy data agent and a Network Appliance SMI-S Agent. We need to correlate this SMI-S Agent information to the information from the data agent. The code will be analyzed to identify areas of the code that need to be adjusted to ensure that data is not duplicated and that data is properly displayed for all affected reports.

5.1.4.2.2 New Attributes

The existing file system asset reports will be enhanced to display the additional attributes.

New asset reports will be defined:

Data Manager->Reporting-Asset->By Storage Subsystems->File Systems or Logical Volumes

Data Manager->Reporting-Asset->By Storage Subsystems->Exports or Shares

These will be similar to the **By Computer asset** reports.

5.1.4.2.3 Exports or Shares report using BIRT report server

The reporting on file shares was experimentally implemented using BIRT as well.

1. The report can be displayed using the Aperi RCP GUI application or a browser.
2. The report can be printed in pdf format and has export capabilities.

Note:
BIRT supports web oriented report design and has extensive customization and reuse capabilities.

5.1.4.2.4 Regression tests fro Data Manager Reports

The following reports should be regression tested

Dashboard

Data Manager
    System-wide
      File Systems or Logical Volumes
        By Freespace
        By Probe Time
        By Scan Time
        By Discovered Time
        Removed File Systems
        Logical Volumes without File Systems
      Exports or Shares
     Capacity
      Filesystem Capacity
        By Filesystem
        By Filesystem Group
        By Cluster
        By Computer
        By Computer Group
        By Domain
        Network-wide
      Filesystem Used Space
        By Filesystem
        By Filesystem Group
        By Cluster
        By Computer
        By Computer Group
        By Domain
        Network-wide
      Filesystem Free Space
        By Filesystem
        By Filesystem Group
        By Cluster
        By Computer
        By Computer Group
        By Domain

Network-wide

5.1.4.3 NAS Unified Storage Appliance Report

Source: NetApp Unified Storage Appliance report in Aperi - design document

- The top level report displays general information about a NetApp storage subsystem. A row in this report has the following columns:

    1. Two drill down icons for accessing "Volume Details" and "Aggregate Details" reports

    2. "Filer Name"

    3. "Raw Storage" - total disk capacities

    4. "Assigned Storage" - storage capacity assigned to aggregates. This is calculated as sum of TotalManagedSpace for all the concrete pools of a filer.

    5. "Free Space on Aggregates" - space that has not been consumed by the existing FlexVols and can be used to create new FlexVols. This is the sum of RemainingManagedSpace for all the concrete pools of a filer. A traditional volume consumes all the space in its aggregate.

    6. "Spare Space" - total space on spare disks

    7. "Spare Disks" - total number of spare disks

    8. "Files Space" - total space occupied by files

    9. "LUNs Space" - total space occupied by LUNs

    10. "Snapshot Area Space" - total space occupied by snapshots

    11. "Free Space on Volumes" - total free space on all volumes

    12. "RAID Overhead" - space reserved for RAID overhead

- Second level reports

    1. Volume Details. Each row corresponds to a volume and contains the following columns:

        1. One drill down icon for accessing "Volume Content: LUNs and Shares" report

        2. "Filer Name"

        3. "Volume Mount Point"

        4. "Volume Type" - flexible or traditional.Will be determined based on the StorageExtent type of the volume.

        5. "Total Volume Space" - Collected and displayed here from CIM_LocalFileSystem.FileSystemSize

        6. "Free Space" - free space on the volume Collected from CIM_LocalFileSystem.AvailableSpace

        7. "Number of LUNs" - number of LUNs created on this volume

        8. "Number of Share" - total number of File Shares

9. "Files Space" - space occupied by files in this volume

10. "LUNs Space" - space occupied by LUNs in this volume

11. "Snapshot Area Space" - space occupied by snapshots in this volume

12. "Aggregate the Volume Resides On

2. Aggregate Details. The columns of this report are:

   1. "Filer Name"

   2. "Aggregate Name",

   3. "Aggregate Raid Level"

   4. "Aggregate Total Space" - is collected from CIM_StoragePool.TotalManagedSpace, where CIM_StoragePool is a concrete pool representing this aggregate.

   5. "Aggregate Free Space" - if this aggregate contains FlexVols this value is the space that can be used for the creation of new volumes. If it contains a traditional volume, this column is 0. Collected from CIM_StoragePool.RemainingManagedSpace

   6. "Number of disks in the Aggregate"

   7. "Files Space" - space occupied by the files in the volumes that resides on the aggregate

   8. "LUNs Space" - space occupied by LUNs in the volumes that resides on the aggregate

   9. "Snapshot Area Space" - space occupied by snapshots in the volumes that resides on the aggregate

   10. "Free Space on Volumes" - total free space in the volumes of the aggregate

- "Volume Content: LUNs and Shares". Describes the file shares and LUNs that are part of the volume. The columns of this report are:

   1. Drill down icon that will be activated only if the row represents a LUN that is mapped to hosts. This icon will drill down to the "LUN Mapping Details"

   2. "Filer Name"

   3. "Volume Mount Point"

   4. "LUN/Share Name" - LUN name, which is an absolute file name or the export name (the name with which a file/directory is exported/shared)

   5. "Protocol" - CIFS or/and NFS for shares and iSCSI or/and FC for LUNs. A file can be shared using both CIFS and NFS and a LUN can be mapped both through FC and iSCSI.

   6. "Allocated Space" - for exported files and directories this will be "N/A", for LUNs will represent the LUN's capacity

- LUNs Mapping Details. Displays what FC initiator ports or iSCSI initiator nodes have access to this LUN.

   1. "Filer Name"

   2. "Volume Mount Point"

   3. "LUN Name"

   4. "Protocol"

5.   "Host Node/Port name"

5.1.4.4 SMI-S support of Fabric CIMOMs

Source: Base enablement for SMIS Fabric Profile Topology, Zone Discovery, Zone Control, Indications

5.1.4.4.1 SMI-S Fabric & Switch Discovery

The Discovery IDVT Test Cases are to be run separately for each switch CIMOM vendor: McData and Brocade.

1.   Manually enter the CIMOM(s) into Aperi. Run Discovery, which discovers the existence of the fabric through the CIMOM(s).

2.   Remove the CIMOM(s) from Aperi.

3.   Run Discovery again to discover the existence of the fabric through the CIMOM(s).

4.   Verify in Aperi database that the tables containing fabrics, switches, and registered Profiles and Subprofiles are properly populated.

5.1.4.4.2 SMI-S Fabric & Switch Probe

Scheduled Probes

The following Probe Unit Test Cases are to be run separately for each switch CIMOM vendor: McData and Brocade. Each Unit Test Case should be run with a fabric of two or more switches, unless multiple switches are not available. In addition, the Probes must be run with different combinations of T_RES_FABSMI_PROBE_POLICY. BEGIN_ENTITY_TYPE and CIM_ALG.

1.   Probe the Fabric.

2.   Verify the Active ZoneSet in the Aperi GUI, including the Zones, Zone Aliases, and ZoneMembers.

3.   Verify the set of Inactive ZoneSets, Zones, ZoneAliases, and ZoneMembers; including "orphan" Zones and ZoneSets; "childless" ZoneSets, Zones, and ZoneAliases; and including all relationships between entities.

4.   Verify the topology of the Fabric.

5.   Verify the list of Ports, port statuses, and port properties such as WWN.

6.   Verify the switch manufacturer, model, and firmware level.

7.   Verify the Blades' properties such as model and slot, the relationship between ports and Blades, and each ports' Area number (for Brocade only).

8.   Verify the Management 'Access Point' address for each switch

Fabric Segmentation

The following test cases are to be run with all switch vendors except Brocade, due to their segmentation limitation. Run these tests against: McData:

1.   Schedule a Probe job for a fabric. Set T_RES_FABSMI_PROBE_POLICY. BEGIN_ENTITY_TYPE to use 'Policy 1'. Invoke a Probe by segmenting a fabric (in other words, physically pull the ISL). This should trigger a Probe. Verify the results as in Steps 2 -7 from the *Scheduled Probes* Section.

2.   Verify that the scheduled probe job is defined for the original fabric and the new fabric.

3.   Run the Probe and re-verify steps 2 – 7 from the *Scheduled Probes* Section.

4. Schedule a Probe job for a fabric. Set T_RES_FABSMI_PROBE_POLICY. BEGIN_ENTITY_TYPE to use 'Policy 2'. Invoke a Probe by segmenting a fabric (in other words, physically pull the ISL). This should trigger a Probe. Verify the results as in Steps 2 – 7 from the *Scheduled Probes* Section.

5. Verify that the scheduled probe job is defined for only the original fabric.

6. Run the Probe and re-verify steps 2 – 7 from the *Scheduled Probes* Section.

5.1.4.4.3 SMI-S Fabric & Switch Alerts

Homogeneous Fabrics – CIMOM Agent Only

The Alerts IDVT Test Cases are to be run separately for each switch CIMOM vendor: McData and Brocade. Verify that each of these actions from outside of Aperi generate an Alert, caused by a CIM Indication:

1. Add a switch to a fabric and if necessary to the CIMOM configuration.

2. Remove a switch from a fabric and if necessary from the CIMOM configuration.

3. Disable an enabled switch FCPort through the switch Element Manager.

4. Enable a disabled switch FCPort through the switch Element Manager.

5. Modify one or more inactive ZoneSets.

6. Activate a ZoneSet.

7. Deactivate the active ZoneSet.

8. Add a node to the fabric.

9. Remove a node from the fabric.

Heterogeneous Fabrics – CIMOM Agent Only

Test one heterogeneous fabric, by running the following IDVT Test Cases:

1. Add an ISL between switches of two different vendors.

2. Unconnect an ISL between switches of two different vendors.

3. Modify one or more inactive ZoneSets.

4. Activate a ZoneSet.

5. Deactivate a ZoneSet.

Co-existence with Legacy Agents

Re-run the set of Homogeneous Fabrics IDVT Test Cases for Alerts for one Homogeneous Fabric with the following combinations:

1. CIMOM Agent managing Fabric and one or more Inband Agents managing Fabric as well.

2. CIMOM Agent managing Fabric and one or more Out-of-band Agents managing Fabric as well.

Alerts

Alerts should be generated for fabric changes even if a CIM Indication for such an event was never received. This may happen, for instance, if a CIMOM goes down, a Fabric splits, and then the CIMOM is restarted. The Aperi Probe of the Fabric should generate an Alert for such an event. These scenarios should be   tested, but it is not necessary to test these for each vendor. To test these, choose one vendors' CIMOM and run the following test cases:

1. Probe the fabric. Turn the CIMOM off. Split the fabric into two fabrics. Start the CIMOM. Run a Probe again. Verify that a Aperi Alert was generated by Detectability.

2. Probe the fabric. Turn the CIMOM off. Disable a FCPort. Start the CIMOM. Run a Probe again. Verify that a

Aperi Alert was generated by Change Detection.

3. Probe the fabric. Turn the CIMOM off. Change the Active ZoneSet. Start the CIMOM. Run a Probe again. Verify that a Aperi Alert was generated by Change Detection / Detectability.

5.1.4.4.4 SMI-S Zone Control Agent

CIM Zone Control Agent invoked by UI

Each of these tests need to be run for fabrics managed by each of the major CIMOM vendors – Brocade and Mcdata. Also, wherever possible test with both single-switch and multiple-switch fabrics.

Following tests involve making **zone** changes for only inactive copies of zonesets (user hits the "Update Only" button after selecting "Apply"). Set up

1. Create a new zones with only one member. Repeat test so that each member type can be tested – port WWN, node WWN, domain port and FCID. Create a new zoneset that contains one zone. Repeat test so that a zoneset can be created for each of the 4 new zones created.

2. Create a new zones with more than one member of same type. Repeat test so that each member type can be tested – port WWN, node WWN, domain port and FCID. Create a new zoneset that contains one zone. Repeat test so that a zoneset can be created for each of the 4 new zones created.

3. Create a new zones with members of various types. Create a new zoneset that contains the newly created zones.

4. Create a zoneset with more than one zone.

5. Modify a zone by removing one or more zone members.

6. Modify a zone by adding one or more zone members.

7. Modify a zone by exchanging zone members.

8. Modify a zoneset by removing one or more zones.

9. Modify a zoneset by adding one or more zones.

10. Modify a zoneset by exchanging zones

11. Delete a zone

12. Delete a zoneset

13. Create orphan zone and zoneset

14. Delete orphan zone and zoneset

15. Verify zone capabilities for creating/modifying zoning using SMIS agent – zone/zoneset name restrictions, empty zones and zonesets, etc

16. For cascaded fabrics verify that candidate zone members from all switches in fabric are displayed and can be used when creating zones

17. Verify that zones and zonesets can be created for a fabric that has no zoning defined (empty full zone db configuration)

18. Delete all zoning entities for a fabric and verify that the all zoning entities are deleted on fabric and Aperi displays the update appropriately

19. Add a zone to a existing zoneset

20. Add a zone to all existing zonesets

21. Remove a zone from a existing zoneset

22. Remove a zone to all existing zonesets

23. Remove a zone from a zoneset which is the only zoneset that the zone belongs to

24. Verify that zone control information is logged to various log files – audit log, job log and trace log

CIM ZoneSet Control Agent invoked by UI

Each of these tests need to be run for fabrics managed by each of the major CIMOM vendors – Brocade and Mcdata. Also, wherever possible test with both single-switch and multiple-switch fabrics.

Following tests involve making zoneset changes for only inactive copies of zonesets (user hits the "Update And Activate" button after selecting "Apply")

1. Activate a zoneset for a fabric that has no previously active zoneset. Verify that both the active and inactive zoneset information is displayed appropriately.

2. Make some zoneset changes and activate a zoneset for a fabric that has no previously active zoneset. Verify that both the active and inactive zoneset information is displayed appropriately

3. Activate a different zoneset for a fabric (different from current active zoneset). Verify that both the active and inactive zoneset information is displayed appropriately.

4. Make some zoneset changes and activate a different zoneset for a fabric (different from current active zoneset). Verify that both the active and inactive zoneset information is displayed appropriately.

5. Reactivate currently active zoneset after making a few changes to it. Verify that the modified information is displayed correctly in both the active and inactive zoneset panels

6. Deactivate currently active zoneset. Verify that both the active and inactive zoneset information is displayed appropriately.

7. Make some zone changes and deactivate currently active zoneset. Verify that both the active and inactive zoneset information is displayed appropriately.

8. Delete currently active zoneset. Verify that both the active and inactive zoneset information is displayed appropriately.

Zone Aliases Invoked By UI

Each of these tests need to be run for fabrics managed by each of the major CIMOM vendors – Brocade and Mcdata. Also, wherever possible test with both single-switch and multiple-switch fabrics.

1. Create a new alias with only one member. Repeat test so that each member type can be tested – port WWN, node WWN, domain port and FCID. Create a new zoneset and new zone that will contain that alias. Repeat test so that a zoneset can be created for each of the 4 new aliases created.

2. Create a new aliases with more than one member of same type. Repeat test so that each member type can be tested – port WWN, node WWN, domain port and FCID. Create a new zone that contains one alias. Repeat test so that a zone can be created for each of the 4 new aliases created.

3. Create a new aliases with members of various types. Create a new zone that contains the newly created aliases

4. Create a zone with more than alias.

5. Modify a zone by removing one or more aliases.

6. Modify a zone by adding one or more zone aliases.

7. Modify a zone by exchanging zone aliases.

8. Delete a zone containing one or more aliases

9. Delete a alias

10. Create orphan zone alias

11. Delete orphan alias

12. For cascaded fabrics verify that candidate zone members from all switches in fabric are displayed and can be used when creating aliases

13. Verify that aliases can be created for a fabric that has no zoning defined (empty full zone db configuration)

14. Delete all zoning entities for a fabric and verify that the all zoning entities are deleted on fabric and Aperi displays the update appropriately

15. Add a alias to a existing zone

16. Add a alias to all existing zones

17. Remove a alias from a existing zone

18. Remove a alias from all existing zones

19. Remove a alias from a zone which is the only zone that the zone belongs to

20. Test that alerts are logged for zone alias changes – creation, deletion and update

CIM Zone Control Agent invoked by UI

Following are general test cases to test robustness of CIM zone control agent

1. Specify more than one CIMOM agent for a fabric using Aperi. Just prior to making zone changes through Aperi, disable all the CIMOM agents (except one) for that fabric. Verify that the remaining active CIMOM agent get picked as the zone control agent. Take turns disabling the CIMOMs so that irrespective of the order in which Aperi attempts to determine zone control agent, the active CIM zone control agent always get picked.

2. Simulate a error condition to test that the UI does a rollback of zoning changes appropriately

3. Verify that the switch transaction lock is released after every zone update through Aperi

4. Verify that device server shutdown releases switch transaction locks for transactions that were not completed prior to device server shutdown

5. Simulate a situation where a CIM call made by CIM zone control is hanging. Verify that the zone update times out, appropriate error code is returned to client and the zone control job completes

6. Disable a CIMOM when a zone update made though Aperi CIM zone control agent is in progress. Verify that the zone update operation is aborted, appropriate error code is returned to client and the zone control job completes

Coexistence With Non-Aperi Clients Making Zone Changes

The purpose of the tests is to verify that both Aperi and non-Aperi clients can interleave to update zoning for a fabric and that zone changes can be made appropriately through Aperi.

1. Create zones and zonesets for a fabric using switch management application and verify that they can be modified through Aperi.

2. Create zones and zonesets for a fabric using Aperi and verify that they can be modified through switch management application.

3. Make zone changes to inactive zones/zonesets using switch management application. Make sure that Aperi does not do a probe after the changes are made (Aperi database does not reflect the changes made on the switch). Attempt to make zone changes using Aperi UI. Verify that a error is displayed to the user that zoning has changed on fabric after the user brought up Aperi screens to modify zoning

4. Attempt to modify zoning for a fabric using Aperi and switch management application simultaneously. Verify

that the user gets a error for one of the two clients that indicates that zone updates are been made by another client.

Proxy CIMOM Movement

The following unit test case need only be run against either the McData CIMOM or the Brocade CIMOM. The list of steps for this unit test case is:

Prerequisite Steps: Have a proxy CIMOM installed and managing a fabric. Aperi must have already Discovered the switches and fabric through the CIMOM and at least one full Probe must have been run.

Step 1: Stop the proxy CIMOM.

Step 2: Uninstall the proxy CIMOM.

Step 3: Install the proxy CIMOM on a different host and configure it to manage the same fabric as before.

Step 4: Remove the old proxy CIMOM location from Aperi's list of CIMOMs and add the new CIMOM with credentials.

Step 5: Run Discovery.

Step 6: Check that all Reports for the Fabric and Switch are still available.

Step 7: Run a Probe of the Fabric and ensure the Probe completes successfully

5.1.4.5 WEF Events Support

Source: WEF Events published via WS-Notification

5.1.4.5.1 WSDM Alert triggered action

Aperi currently handles a number of different storage and network events. These events may be published in various formats via various notification channels. Aperi refers to this system as alert management. Each alert has a triggered condition (the storage or network event), and a triggered action (the response to the event). Each triggered action has its message format. The existing triggered actions are:
SNMP Trap – creates and sends a trap
Login Notification – produces a user notification at login
Windows Event Log – creates an entry into this log
Run Script – runs a custom script as defined by the user
Email – creates a custom email and sends it to the specified users
This feature allows for one additional triggered action – **a web service notification (WS-Notification) that conforms to the WSDM event format (WEF).**

5.1.4.5.2 The WEF Event Format

Using the WefFactory, ManagementEvent objects are created to conform to the WEF event standard. These events have the following data:

Event Id (String)
Reporter (Component object)
Report Time (Date object)
Sequence Number (long)
Situation (Situation Object)
Source (Component Object)

Each Component object has a qname, address, and a resource id (string). Each Situation object has a category type, message, priority, severity, time, and a success disposition (string).

5.1.4.5.3 Generating WEF Events

Generating various Aperi WEF events

Fabric -
Switch -
Disk –

5.1.4.6 Viewing HTML pages with SWT browser widget

Source : Rodica

- Test on Windows w/IE6
- Test on Windows w/IE7
- Test on Windows w/FF2
- Test on SuSE Linux w/FF2/GTK
- Test on SuSE Linux w/Moz5/GTK
- Test on RedHat AS Linux w/FF2/GTK
- Test on RedHat AS Linux w/Moz5/GTK