



SMI-S; Manage the Storage in Your Data Center

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➤ SMI-S and Storage in your Data Center

- ◆ SMI-S is the standards-based way to expose and modify storage directly; discover and control RAID groups and Primordial disks; configure thin provisioning, initiator Groups and Mappings and File Shares.
- ◆ Best of all, all of these activities are cross-vendor and incorporated end to end from the host through the switching infrastructure to the controllers and down to the storage devices.
- ◆ A chronicle of the development and evolution of the SMI-S protocol that manages multi-vendor environments.

How I manage thee, let me count the ways



- Telnet/SSH/Serial access
- LCD panels / Buttons
- API – Direct Code Access
- WBEM hosted on device
- Client based CLI Program
- Client based Application

Embedded on Device – Update controllers = update software

May require update independently of controller – Across many hosts

Method needs to exist too;

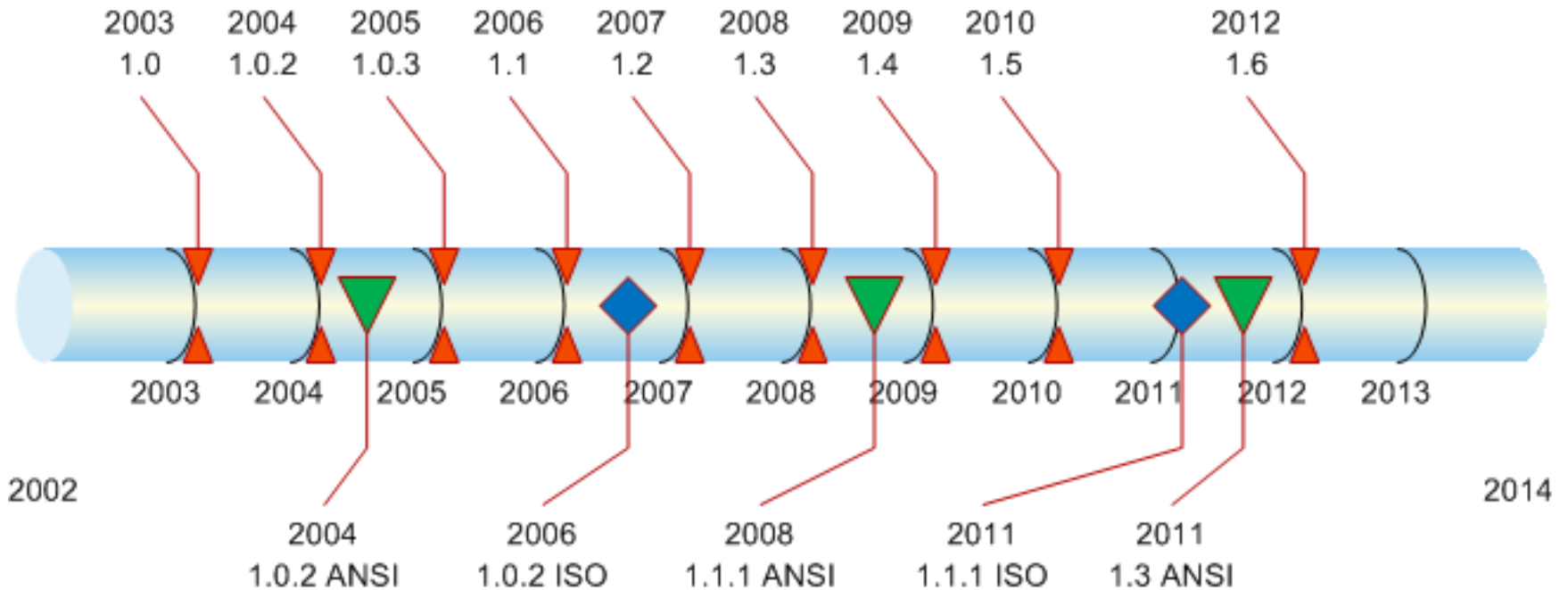
- ◆ Give ubiquitous access like Telnet/SSH
- ◆ Allow for modeling of any device to be managed
- ◆ Scale to cover many devices on a large site
- ◆ Run across well known ports like WBEM
- ◆ Not require API level knowledge

How SMI-S does this



- Separate the SMI-S Provider from the SMI-Client
 - ◆ Hardware vendor only responsible for building a compliant SMI-S Provider
 - ◆ SMI-S Client consume multi-vendor without re-coding.
- SMI-S Client can be either a Management Application or an advanced function of the OS itself

SNIA SMI-S Standards Timeline



Standards Based Adoption

Proprietary vs. Standards based



Feature	Vendor Specific	SMI-S
Communication between Mgmt. tool and Target	Vendor Proprietary	Standard XML Based
Cross platform Support	Specific to that vendor only	Any SMI-S supporting hardware
Support for Platform Specific Metrics	No distinction between standard and platform specific metrics	Protocol requires minimum number of fields, supports vendor extensions for extra fields and components
Third Party Access	Usually requires writing to vendor API if public one exists.	Open specification for any tool vendor or SMI-S consumer
Initial Hardware Provisioning	Process is by vendor platform and is specific	Difficult to support using SMI-S

- ◆ SNIA is a vendor-neutral trade organization and ALSO a standards body:
 - ◆ Fast-tracking of standard proposals through INCITS/ANSI
 - ◆ On-going standard projects include:
 - › IP Storage
 - › Shared Storage Model
 - › Storage Management
 - › Storage Security
 - › Data Management

- ◆ SNIA contributes to the development of the DMTF CIM standard
 - ◆ Many object and schema changes/extensions in the CIM Specification are the result of SNIA Change Requests

- ◆ SNIA Technical Working Groups are working to extend the DMTF Common Models to achieve a comprehensive Storage Management Specification (SMI-S)

➤ Victory with Microsoft.

- ◆ Install free feature 'Windows Standards Based Storage Management'
- ◆ Gives access to PowerShell commands & GUI
 - › Now scripts and GUI work CROSS-VENDOR to deploy storage

□ Victory with RedHat Enterprise Linux 7

- Install free feature as follows
 - `$ sudo yum install libstoragemgmt --smis-plugin`
 - Plug-ins exist for Generic SMI-S, NetApp, NexentaStor, and TargetD

Video



SMI-S Provider inside of Windows 2012r2

Manage All the Things



- **Discovery**
 - ◆ Search for SMI-S agents via SLP or configure manually.
 - ◆ Arrays (Subsystems, Pools, Volumes, LUNs, etc.)
- **Provisioning**
 - ◆ Create/Delete/Modify Storage Pools
 - ◆ Create/Delete/Modify Storage Volumes
 - ◆ Create/Delete/Modify Storage LUNs
- **Replication**
 - ◆ Snapshots and Clones
- **Monitoring (via indications and polling of health)**
 - ◆ Performance (via Pass-through commands)
 - ◆ Instance Lifecycle Changes

Video



Windows 2012r2 connecting to a Target Device

➤ **Extent:**

- ◆ An extent consists of a collection of physical blocks. The extents are grouped together and assigned to an Extent Pool. In some platforms, extents are transparent in the sense you cannot configure them directly. Extent sizes vary depending on the platform.

➤ **Storage Pools:**

- ◆ These are groupings of Extents from a set of RAID Parity Groups. These are sometimes referred to as extent pools.

➤ **Logical Volume:**

- ◆ They refer to a specific grouping of extents from a single extent pool, or in cases where extent pooling is not employed, they consist of physical blocks located on one or more physical drives or RAID Parity Groups. They can be “provisioned” directly to hosts or indirectly as part of a larger Logical Volume Set.

➤ **Logical Volume Set:**

- ◆ On some storage platforms multiple logical volumes can be coalesced to create a larger volume. These volumes are provided as a discrete unit to the host who sees the Logical Volume Set as a single entity (for example as one LUN). On the back-end disks, the logical volumes can be concatenated or striped to create the larger Logical Volume Set.

➤ **RAID Parity Group:**

- ◆ A Raid Parity Group is a grouping of RAID formatted physical devices.

Video



Creating, Mapping and Deploying a new LUN

SMI-S Models

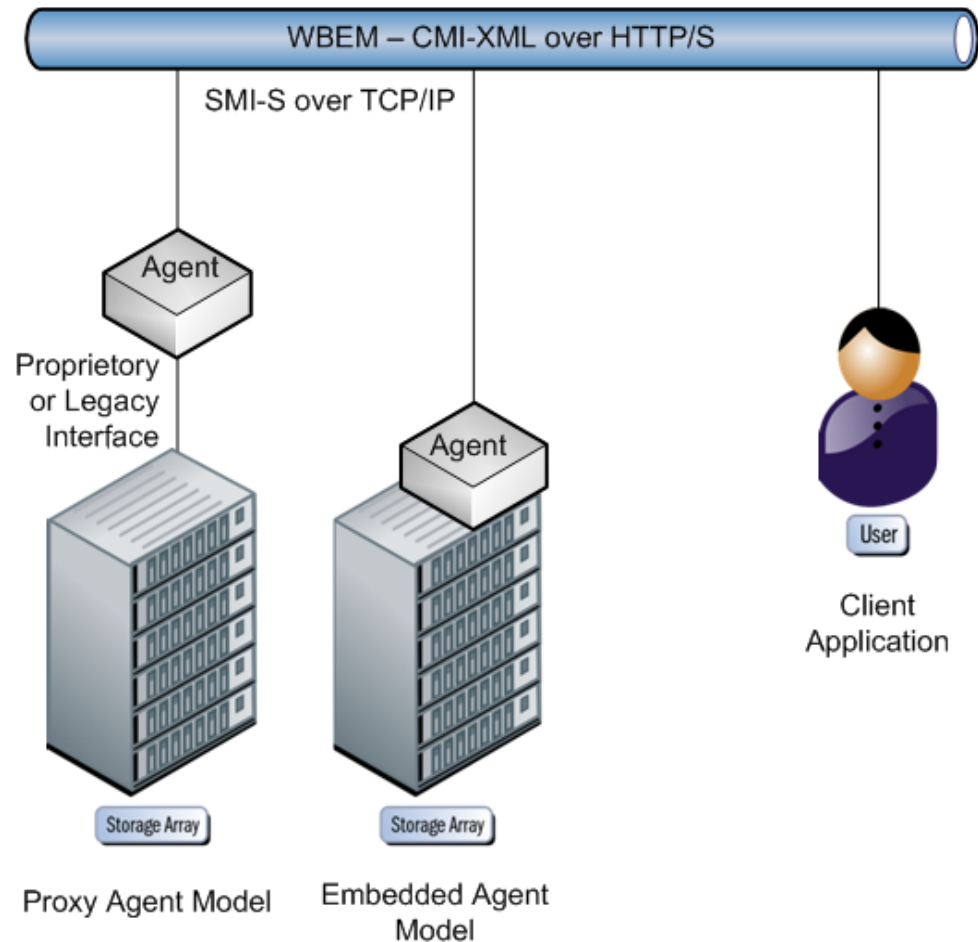
➤ Models

- ◆ Proxy Agent
- ◆ Embedded Agent

➤ Foundation for On-Demand Self Service

➤ Definition for Ubiquitous Network Access

➤ Enabler for Resource Pooling and Rapid Elasticity



Conformance Test Program



- All testing results posted online,
 - ◆ Agent name and version
 - › Brocade Network Advisor 12.0.0
 - ◆ SMI-S Version
 - › SMI-S Spec 1.4
 - ◆ Tested Autonomous Profiles
 - › Fabric, Server, Switch
 - ◆ Tested Component Profiles
 - › Access Points, Blades, Object Manager Adapter, etc
 - ◆ Level of Test
 - › Active & Passive
 - ◆ Supported Functions
 - › Discovery, Fabric Topology Discovery, Instance Discovery, etc
 - ◆ Product Family
 - › Brocade Directors
 - See <http://www.snia.org/ctp/conformingproviders/index.html> for more results.

SMI-S results by Company



Only These Vendors support 1.4 or 1.5

SMI-S Participation



33

Companies Participating

393

Test Submissions

1135

Conformant Products

Updated ; May 16, 2013

Upcoming SMI-S Lab Plugfest



- Lab14 Plugfest 1 Jan 13-16,2014
- Lab14 Plugfest 2 Mar 24-27, 2014 (hosted by NetApp)

- Microsoft Developer Airlift May 8-9, 2014 (hosted by Microsoft)
- Lab14 Plugfest 3 May 19-22, 2014 (hosted by Microsoft)
- Lab14 Plugfest 4 Aug 18-21, 2014
- Lab14 Plugfest 5 Oct 20-23, 2014
- Lab14 Plugfest 6 Dec 1-4, 2014

- We need your participation

References



➤ Specs

http://www.snia.org/tech_activities/standards/curr_standards/smi/

➤ Technology Forum

http://www.snia.org/forums/smi/tech_programs/smis_home