

Microsoft Storage Management

Mohamed Lawindi - mlawindi@microsoft.com
Software Development Engineer II, Microsoft

Michael Brasher - mikbras@microsoft.com
Principal Software Development Engineer, Microsoft

- ❑ Microsoft® is building a storage management infrastructure on the following pillars:
 - ❑ Develop centralized enterprise management (mid-tier)
 - ❑ Align storage management and server management infrastructures
 - ❑ Utilize standards to reach as wide a range of storage devices as possible:
 - ❑ Storage Management Initiative - Specification (SMI-S)
 - ❑ Common Information Model (CIM)
 - ❑ Service Location Protocol (SLP)
 - ❑ WS-Management
 - ❑ CIM-XML
 - ❑ Provide client applications with a simplified model for enterprise storage management.

- Overview
- Microsoft Storage Management
 - Architecture
 - Storage Services (client application layer)
 - Host resources layer (implements SMI-S profiles)
- WS-Management

- ❑ Create a unified, standards-based infrastructure for the entire storage domain.

- ❑ Build services and primitives for common storage tasks
 - ❑ Discovery, Provisioning, Data Movement, Monitoring, Reporting, Security, etc

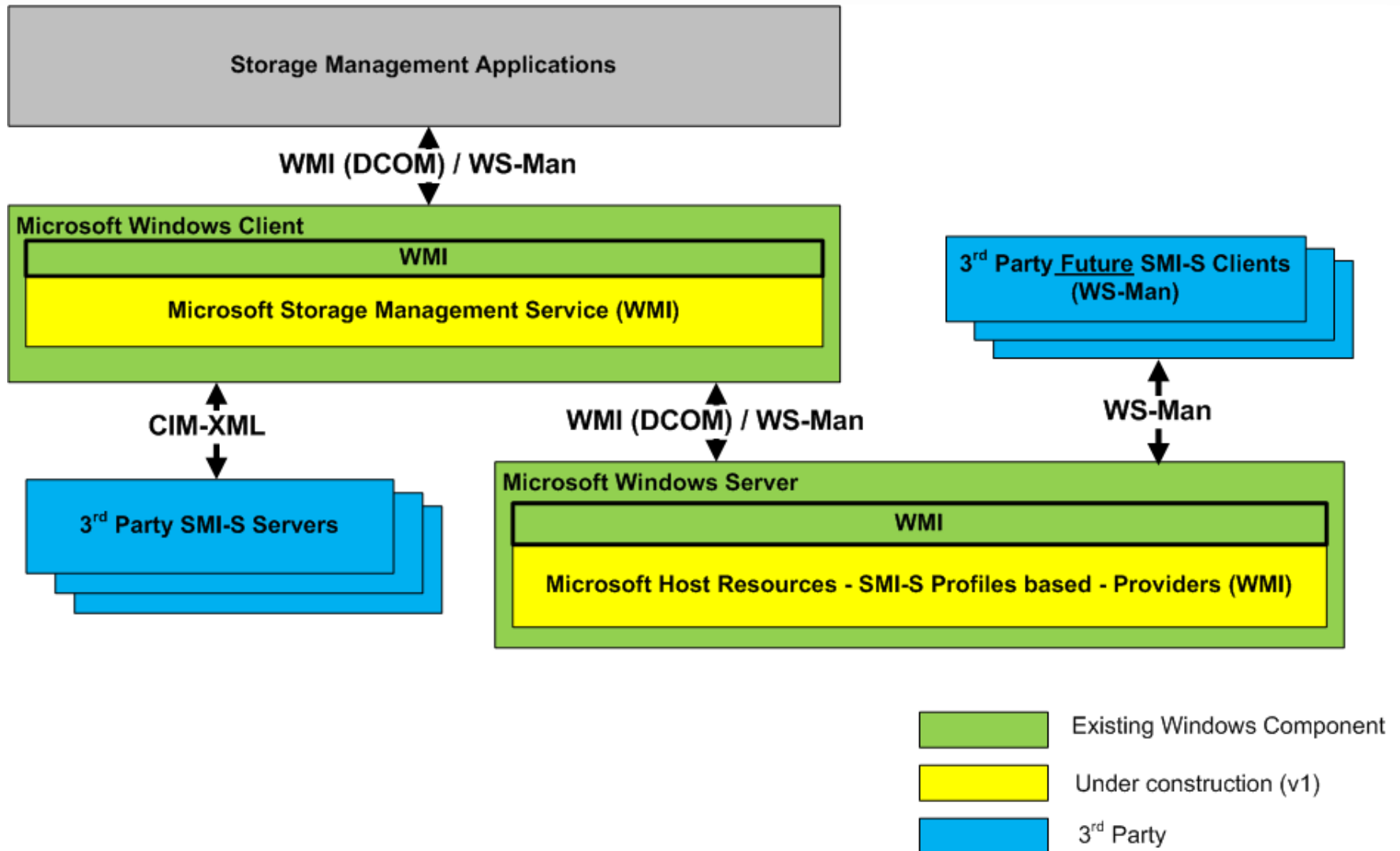
- ❑ Align Storage Management standards and protocols with Server Management (WS-Management) *over time*

- ❑ Work towards adopting Storage Management standards and help promote driving SMI-S schemas to WS-Management protocols

- ❑ **Microsoft:** Consistent & rationalized storage management platform for new Storage Management applications, as well as existing management apps.
- ❑ **Partners:** Alignment with industry standards, complete & consistent management architecture
- ❑ **Customers:** Administrative consistency across storage technologies (NAS, DAS, SAN) and across vendor implementations

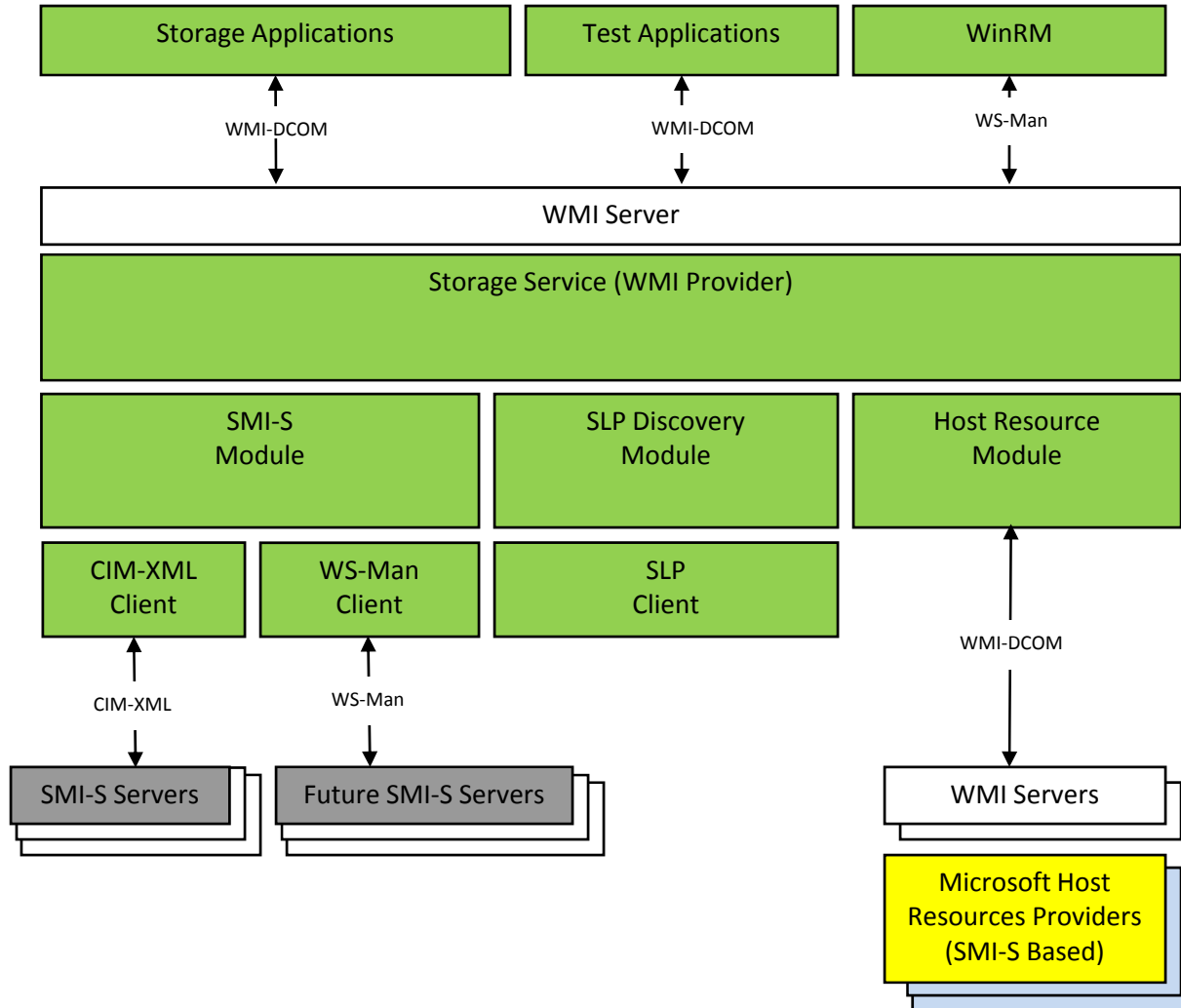
- ❑ Microsoft storage management consists of:
 - ❑ Microsoft Storage Management Service
 - ❑ Middle-tier client application layer
 - ❑ SMI-S client
 - ❑ Highly available service
 - ❑ Support for Windows Host resources
 - ❑ Windows Management Instrumentation (WMI)/CIM based Host Resource Providers
 - ❑ Implements SMI-S profiles

Microsoft Storage Management Architecture



- ❑ Allows an application to communicate with SMI-S compliant servers
 - ❑ Application developer does not have to be proficient in XML or SMI-S
 - ❑ Higher level unified interface
- ❑ Implemented as WMI providers
- ❑ Will support Discovery, Provisioning, Monitoring (through Indications)

Microsoft Storage Management Service (Client Application Layer)



- ❑ Manages **SMI-S servers** and **Microsoft Host Resources** on behalf of client applications
 - ❑ Discovery
 - ❑ Provisioning
 - ❑ Monitoring
- ❑ Introduces an enterprise-level schema.
- ❑ Services client requests per that schema
 - ❑ Enumeration (of discovered objects)
 - ❑ Association (of discovered associators)
 - ❑ Extrinsic Methods (Discover, Mask, Map, etc.)

- Discovery
 - SMI-S agents via SLP or manual configuration
 - Arrays (Storage Systems, Storage Pools, Storage Volumes, etc.)
 - Switches / Fabrics
 - Host resources
- Provisioning
 - Creation/Deletion of Storage pools
 - Creation/Deletion of Storage Volumes / Logical Disks
 - Masking/Unmasking/Mapping of LU
 - Addition/Deletion of NPIV ports for FC HBAs
 - Zoning for Fibre Channel fabrics
- Monitoring
 - Indications
 - Polling
 - Performance

- ❑ The Microsoft mid-tier storage service discovers SMI-S servers using
 - ❑ SLP
 - ❑ Manual configuration
- ❑ The discovered parameters include
 - ❑ Host address of the SMI-S servers
 - ❑ CIM namespace of registered profiles

- ❑ Discovers array-profile objects for each SMI-S server. Examples:
 - ❑ Storage System
 - ❑ Storage Pools
 - ❑ Storage Volumes

- ❑ Discovers switch objects for each SMI-S server.

Examples:

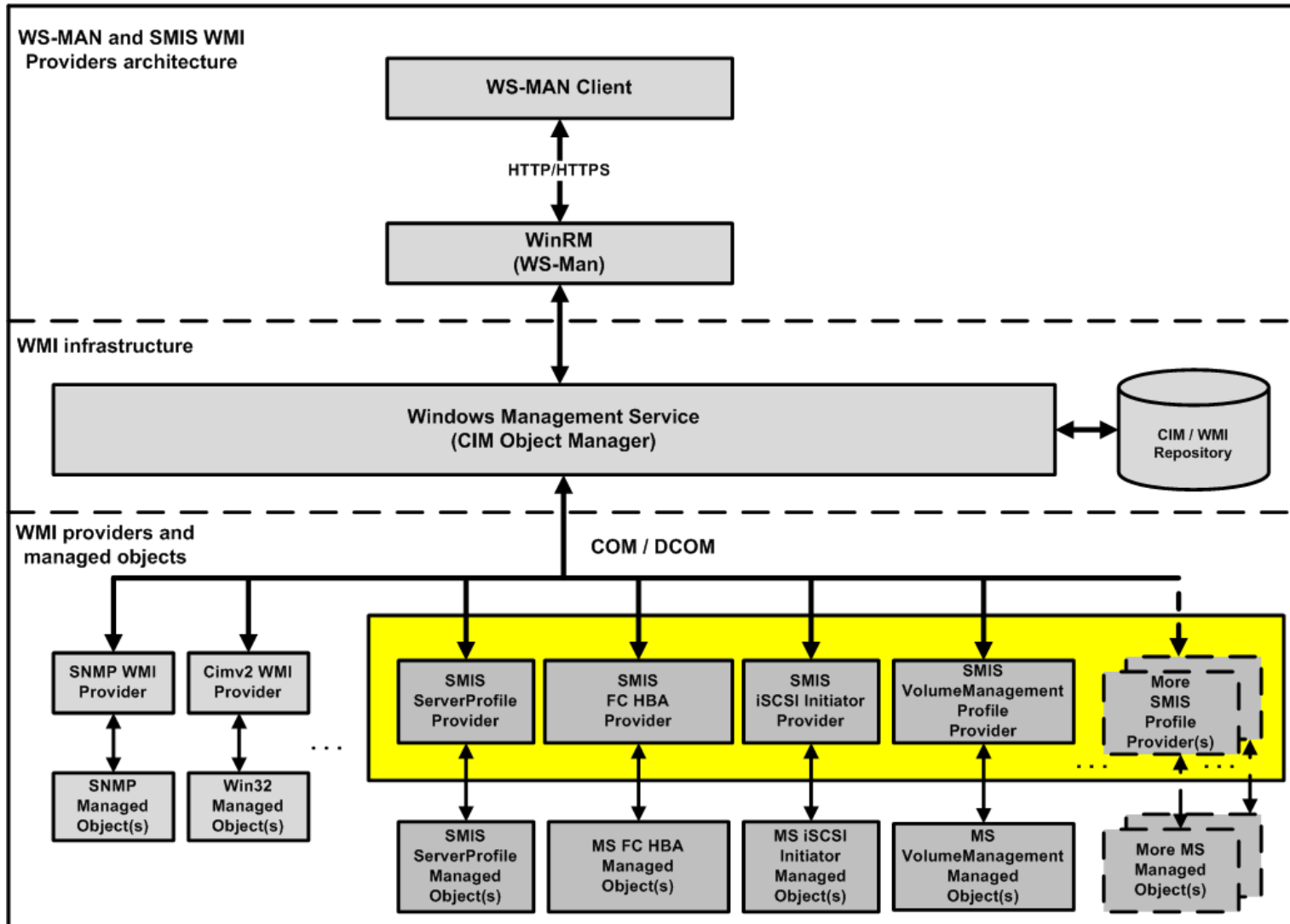
- ❑ FC Ports
- ❑ Protocol Endpoints
- ❑ Active Connections

- ❑ Discovers fabric objects for each SMI-S server.
Examples:
 - ❑ Zones
 - ❑ Zone Sets
- ❑ Discovers the Fabric Topology (how zones, switches, and connections are linked).

- ❑ Discovers Microsoft (CIM/SMI-S based) Host Resources objects. Examples:
 - ❑ FC Port
 - ❑ Protocol Endpoint
 - ❑ Controller
 - ❑ Storage Pool (Volume Management)
 - ❑ Logical Disk (Volume Management)
 - ❑ Disk Partition
 - ❑ File System

- ❑ Exposes host resources
 - ❑ FC, SAS, iSCSI, RAID HBAs
 - ❑ iSCSI Initiator
 - ❑ Local storage – Windows Volumes and Filesystems
- ❑ CIM 2.xx compliant
- ❑ Based on SMI-S Profiles
- ❑ Allows discovery, end-to-end configuration and monitoring of storage objects contained within a Windows server

WMI Host Resource Provider(s)



- ❑ Mandated by a wide range of customers supporting Web Services / SOAP applications.
- ❑ Builds on existing standards
 - ❑ Simple Object Access Protocol (SOAP)
 - ❑ Web Services Description Language (WSDL)
 - ❑ WS-Addressing
 - ❑ WS-Transfer
 - ❑ WS-Enumeration
- ❑ Widely supported by 3rd party tools
- ❑ Supported by Microsoft infrastructure/tools
 - ❑ Windows Remote Management (WinRM) – WS-Man implementation
 - ❑ PowerShell - provides WS-Man scripting.
 - ❑ C# - has WS-Man interfaces
- ❑ Compatible with CIM through WS-CIM mapping

SMI-S Profiles – Windows Host Resources*

Area	Profile
Host	
	Host Discovered Resources Profile
	iSCSI Initiator Profile & iSCSI Initiator Ports Profile
	FC-HBA Profile & Fibre Channel Initiator Ports Profile
	Health
	Physical Package
	Storage HBA
	SAS Initiator Ports
	Host Hardware RAID Controller Profile
SMI-S infra	
	Server Profile
	Profile Registration Profile

SMI-S Profiles - External Storage

	Profile
Array s	Array
	Block Services Package
	Masking and Mapping
	FC Target Ports, iSCSI Target Ports
	Block Server Performance
	Health, Physical Package
	Disk Drive Lite
Software snapshots	
	Copy Services
	Replication services
SMI-S infra	
	Server Profile
	Profile Registration
	Indication Profile
	Multiple Computer System

SMI-S Profiles – Fabric Elements

	Profile
FC Switch	
	Fabric
	Zone Control
	Fabric Path Performance Subprofile
	Switch profile

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