Storage Management Tutorial
Part I

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Agenda

- Why is storage management important?
- Terminology & strategies.
- Standards based vs. proprietary management
- The Storage Management Initiative

Why is storage management important

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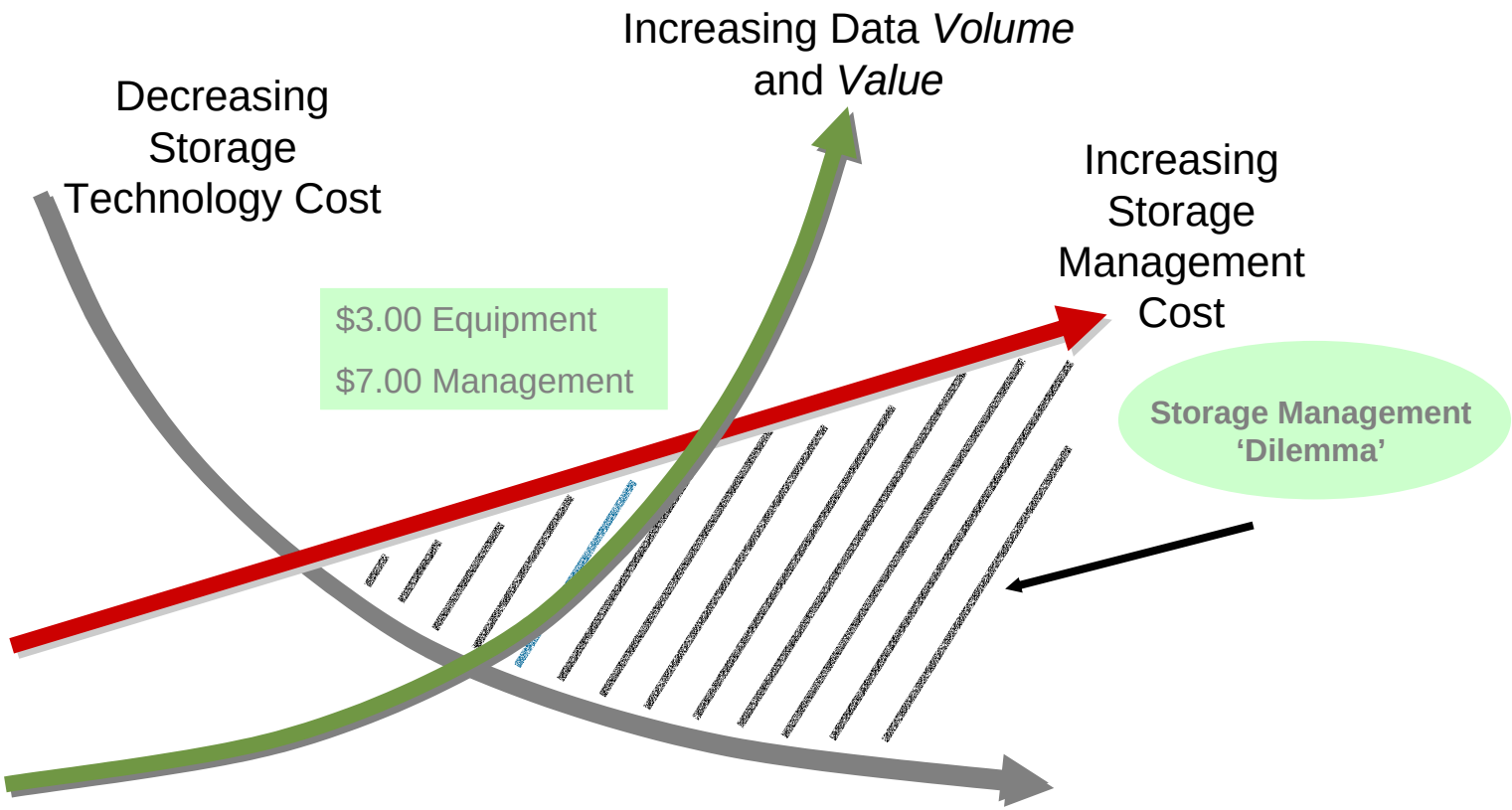


Source: Michael Peterson, Strategic Research

Terminology and Strategies

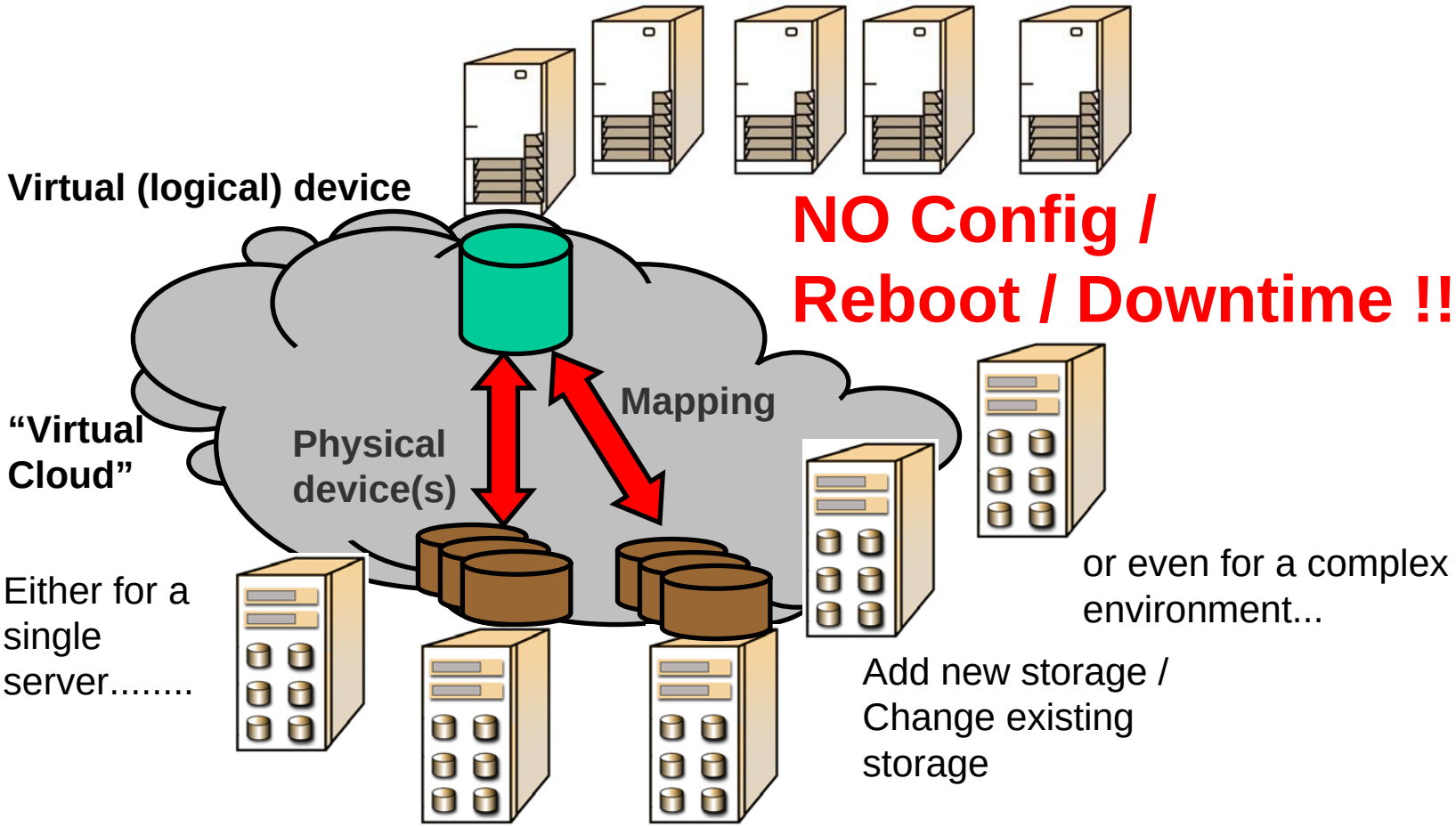
Storage Management Technologies

- Storage Virtualization a solution?
- Management Terminology and Architectures
- Storage Resource Management
- Storage Device Management
- Management Standards
  - SNMP
  - CIM/WBEM
- What is the SNIA doing?

What is Storage Virtualization?

- Abstraction of storage
  - Separate host's view of storage from the storage system implementation
    - Make interconnect invisible to host
    - Make data location invisible to host
- Dynamic abstraction of storage
  - Allow substantial changes within the storage system to be invisible to applications and host environment
    - Allow data location to change without impact to host environment

A “virtual storage connection”



Storage Virtualization – Issues Facing the Storage Industry

- Different understandings of virtualization
- Different approaches to virtualization
- Opportunity:
  Standards for managing virtualized storage that
  - span various understandings and approaches
  - enable exploitation of capabilities of virtualized storage to fully achieve customer benefits

Does Virtualization Solve the Problem?

- Still need to manage the storage devices
  - Multiple proprietary User Interfaces
- Still need to manage the storage network
- Yet more devices to manage
- Scaling points of virtualization
  - Multiple places to do virtualization
- Still no automation/policy
- Service Levels unmet

Existing Management Products

- Logical Data Managers
- Network/Enterprise Management Systems
- Storage Network Managers
- Device Managers
- Non-Resource Managers (not covered):
  - Backup/Restore, Archive
  - Data Movement (Remote Copy, Point in Time)
  - Virtualization (Volume Managers, etc.)
  - File Systems

Logical Data Managers

- Logical View of how customers utilize their storage
- Monitor capacity usage, warn of space problems
- Monitor individual usage, quota management
- Report on trends, predict problems
- Mine File Systems, Databases, Email and other applications

Network and Enterprise Management Systems

- Comprehensive Frameworks with Storage Management Integration
- Common Event, Topology Mechanisms
- Proprietary API & Plug-in Mechanisms
- Largely SNMP based
- Use to Monitor resources, Manage Events and Alarms
- Backup SW Integrated

Storage Network Managers

- Display SAN Fabric(s) Topology
- Perform Zoning Operations
- Show Device Asset Information
- Minimal Event Information
- Launch Device Managers
- Some with advanced features
  - Integrate with other products

Device Managers

- Management of Storage Devices
  - Vendor supplied
  - Usually proprietary interfaces
  - Some standards supported
    - SNMP Agents, Trap support
    - Web server UI, syslog integration
    - Telnet, RS-232 interface
    - CIM Providers
  - Monitor and Configure individual devices
  - Front and Rear Device views with status

Device Managers

- Switch Device Managers:
  - Topology View of Whole Fabric
  - Multiple Switches from one interface
  - Port Status, Some Statistics
  - Some with Thresholds, Alarms Available
  - Zoning commands for access control
  - Traps, Inband indications for Fabric changes

- Storage Device Managers
  - LUN Creation, Configuration, Masking/Mapping
  - Device Status, Some Thresholds available

Storage Management Strategies

- What is your existing management infrastructure?
  - Enterprise Manager?
- Is there a predominate vendor for your storage?
  - What does the vendor offer/integrate with?
- What are you willing to invest for reducing administration?
  - More visibility into storage problems?
  - More integration and automation?

Storage Management Strategies: Basic Visibility

- Enterprise Management Integration:
  - Existing Management Framework for your IT
- Look for software and hardware that at least support SNMP traps
  - Configure Traps to be sent to enterprise manager
- Configure Launch of Device Managers
  - Some vendors offer plug-ins: launch from icon on receiving trap
  - Drill down to device and fix problem

Storage Management Strategies: Basic Visibility

- Invest in Storage Network Manager:
  - Use as integration point for managing storage
- Common console for the SAN
  - Launch device managers from this console
  - Look for specific device support from SNM vendor
  - Look for zoning operations from SNM vendors (support for your switch vendor)
- Invest in common event management
  - Netcool, other event correlation products

Storage Management Strategies: Basic Visibility

- Predominate Storage/Server Vendor:
  - Best support for management of their own storage and networks
- Look for integration with systems management
- How much support for other servers and storage
  - Beware of vendor lock-in
- How much support for management interoperability

Storage Management Strategies: Basic Visibility

- Poor Man's Storage Management Integration:
  - Develop web page for launching device managers
    - List of device management URLs
  - Purchase devices and switches with a web based management GUI
  - Look to open source software for further integration possibilities

Storage Management Strategies: Increased Visibility

- Invest in Storage Resource Management
- View of how storage resources are being used
- Minimize costs of over-provisioning
- Relate usage to devices being used
- If you have an existing Enterprise Framework:
  - Look for plug-in SRM products
  - Ask about integration from SRM vendor

Storage Management Strategies

- What is your vendor's management vision?
- Is interoperability important?
  - Or are they trying to lock you in?
- What automation features are available or envisioned?
  - Policies, Automatic allocation
  - Service Level Management
- How integrated are the products?
- What devices are planned to be supported?

Standard vs. proprietary management

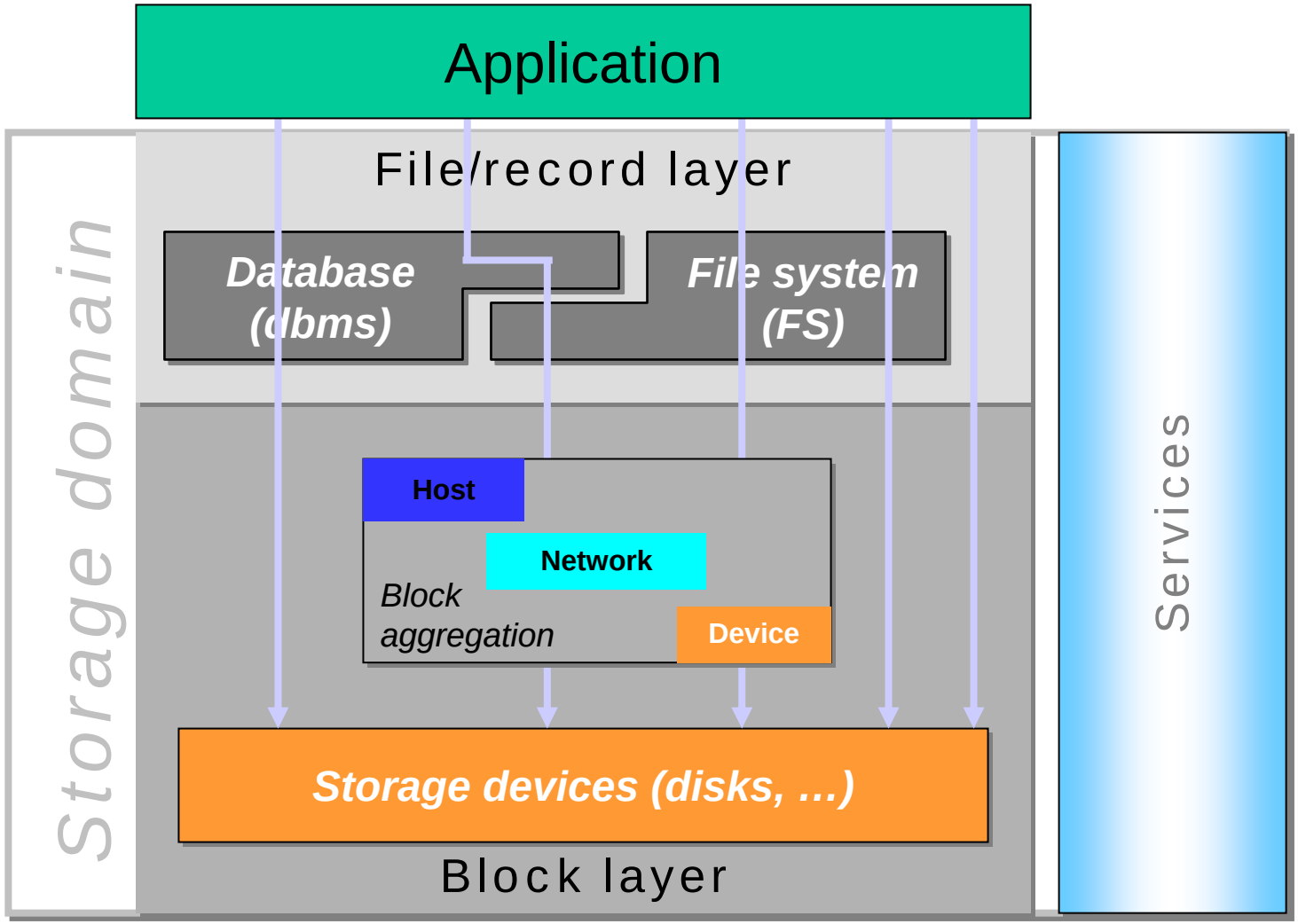
The State of Technology in the Industry

- Proprietary vendor APIs
- Proliferation of management interface styles:
  - Local Procedure Call
  - Remote Procedure Call
  - SNMP
  - Ad hoc Messaging Based Interfaces
- For a given device/service, disparate transports and object models

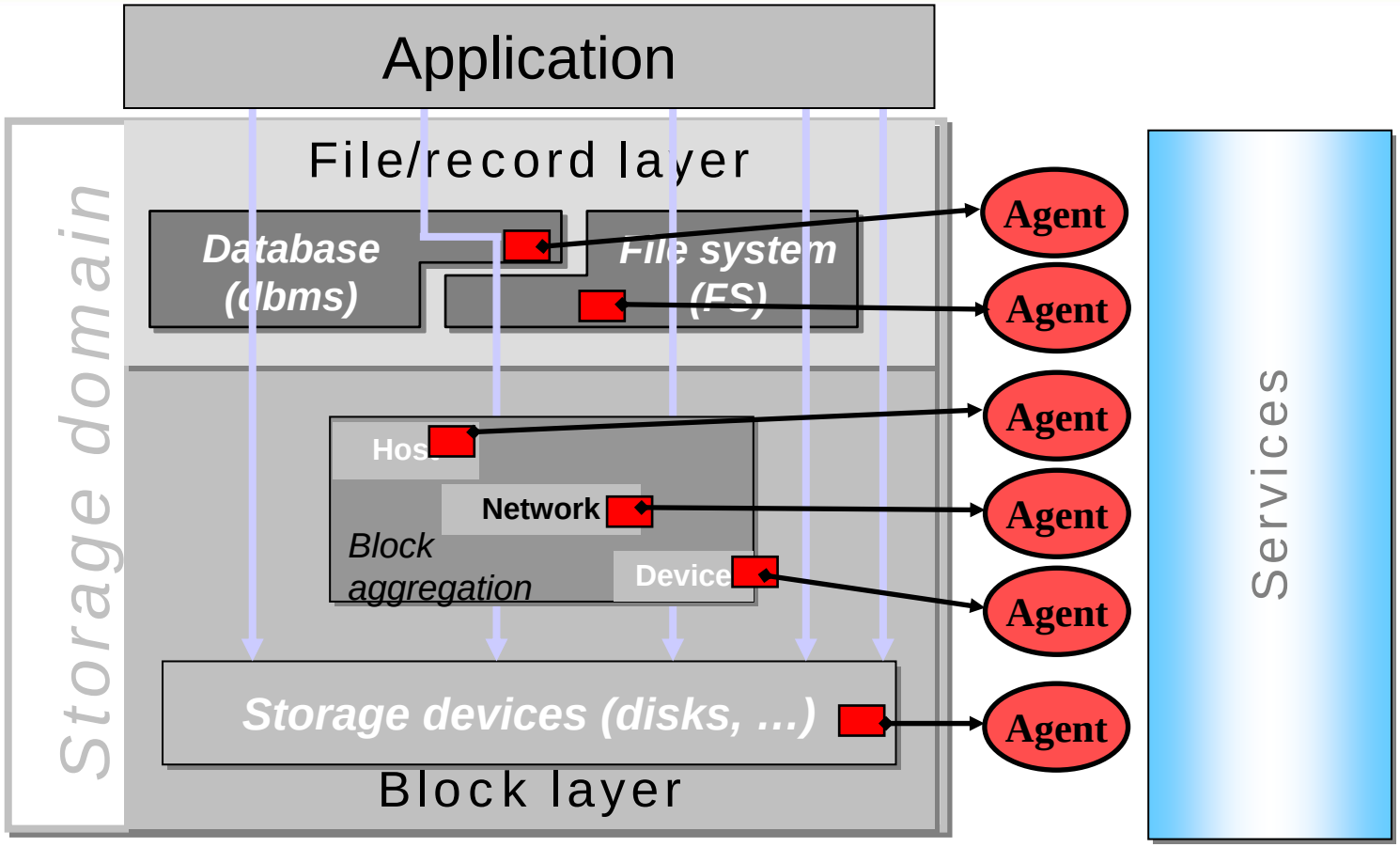
Results in:

- Development of ‘plumbing’ not features
- Huge and growing test matrix
- Slow development of multi-vendor/heterogeneous application support

The SNIA shared storage model

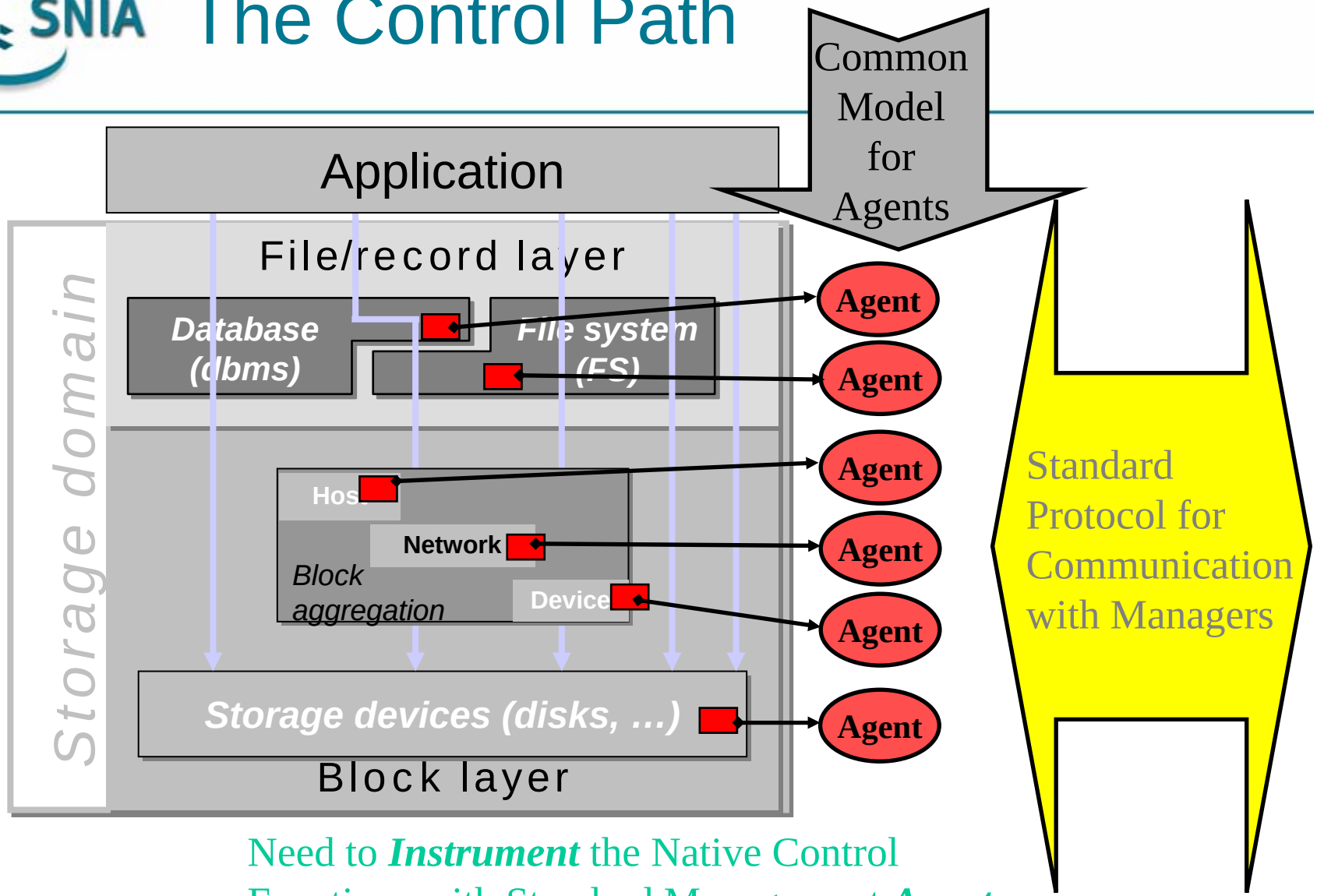


The Control Path



Foundation to build interoperable services for any storage resource

The Control Path



Need to ***Instrument*** the Native Control Functions with Standard Management ***Agents***

What you'd like in a device interface ….

- OS & Language neutral
- Embeddable
- Leverage existing standards
  - Simplify support & testing.
  - Security & transport
- Allow for future extensions and technology migration
- Allow for compatible device and vendor extensions
- Not problem domain specific
  - Leverage other industry investments.
  - Model consistency

API vs. interface vs. CLI

- Command Line
  - ~Language neutral
  - – Scripting (eg. perl)
  - – No standards
  - – Very sensitive to chages
  - – Difficult to parse results.

‘go to a shop .. ☹’

- API
  - – Language specific
  - – Platform specific
  - – Requires a ‘library’ (eg .DLL) to be delivered

‘mail order’

- Interface
  - – Language neutral
  - – Platform neutral
  - – Can be embedded
  - – ‘wire protocol’
  - – just open a network port

‘web based order form’

Kudos go to…

- Please send any questions or comments on this presentation to: tut-sanmanagement@snia.org
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