Brocade Advanced Fabric Services and Management

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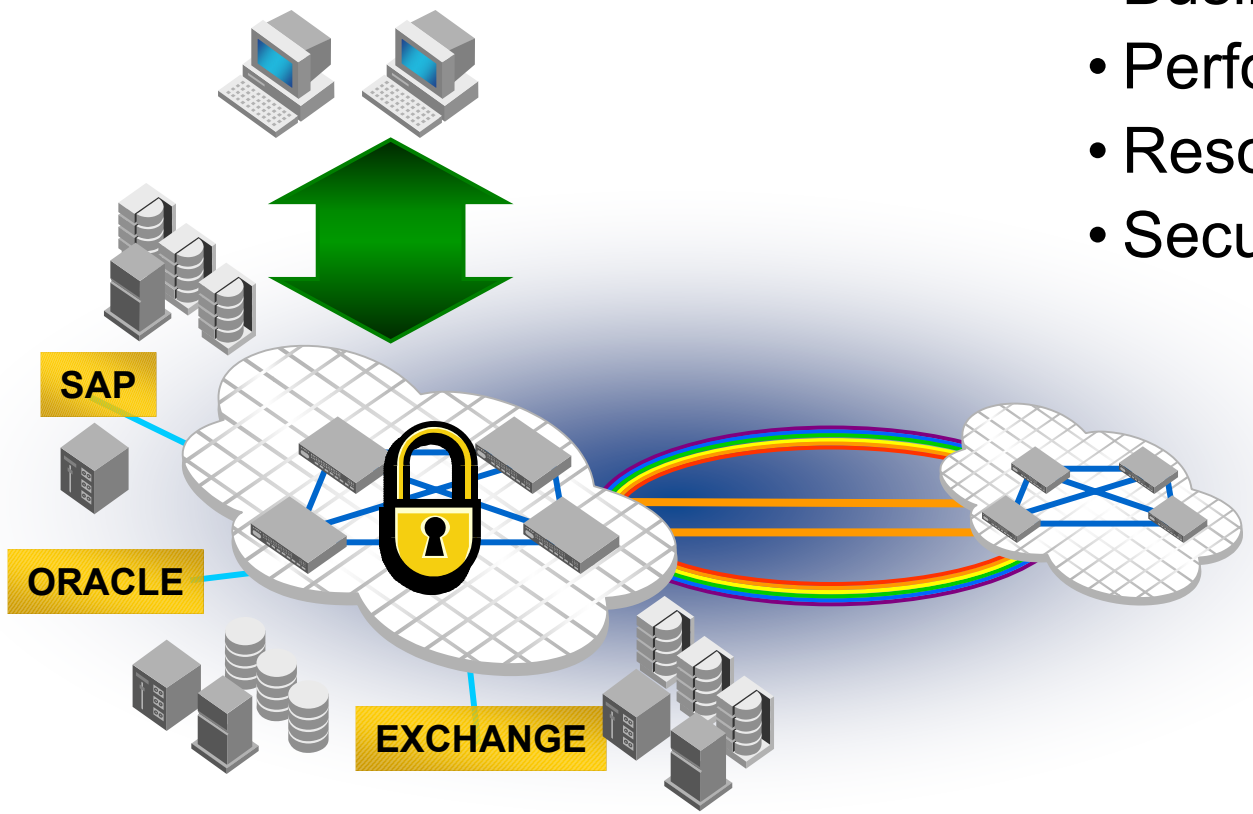
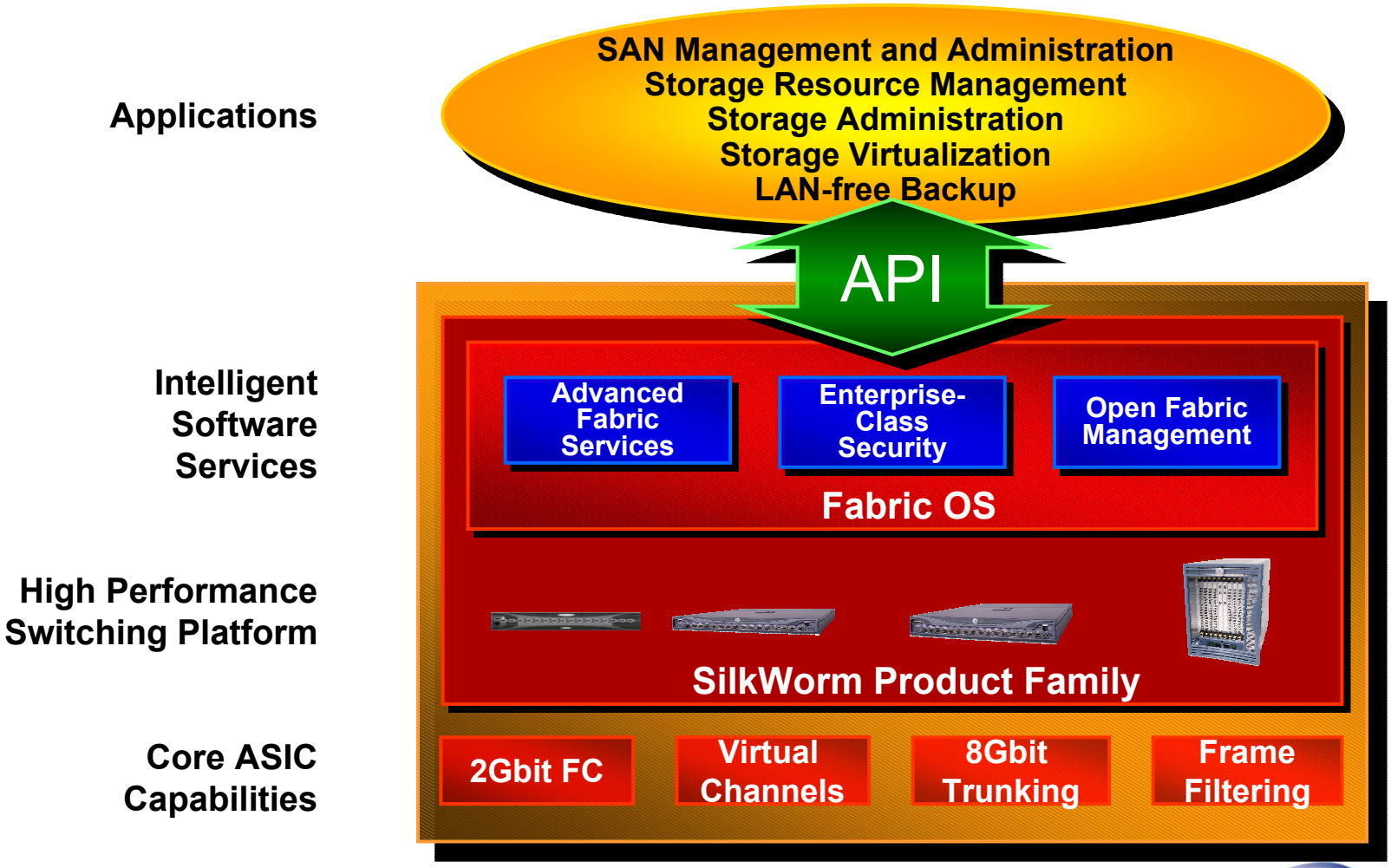
The New Storage Environment

- Manageability
- High availability
- Business continuance
- Performance
- Resource sharing
- Security



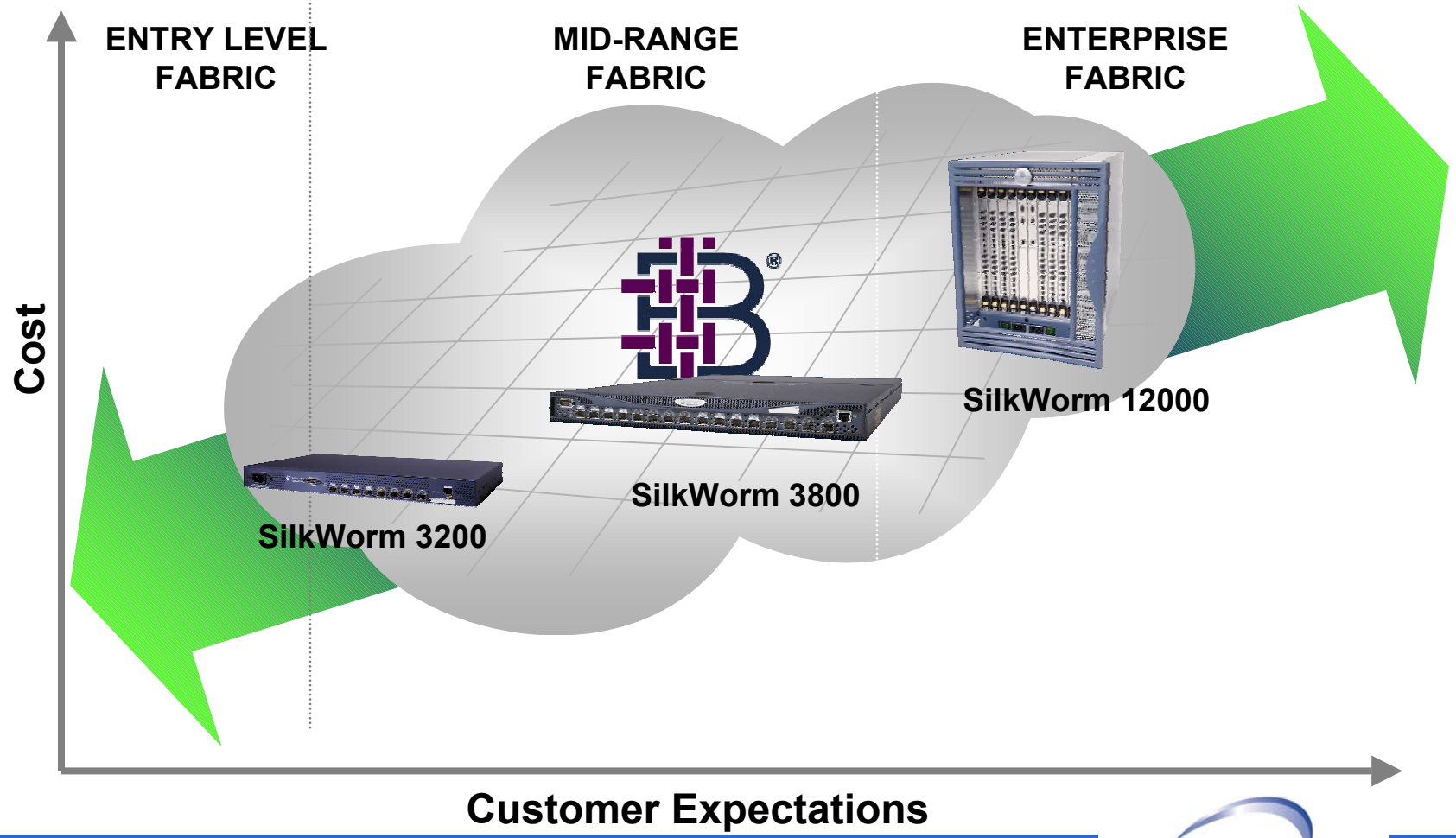
Intelligent Fabric Services Architecture



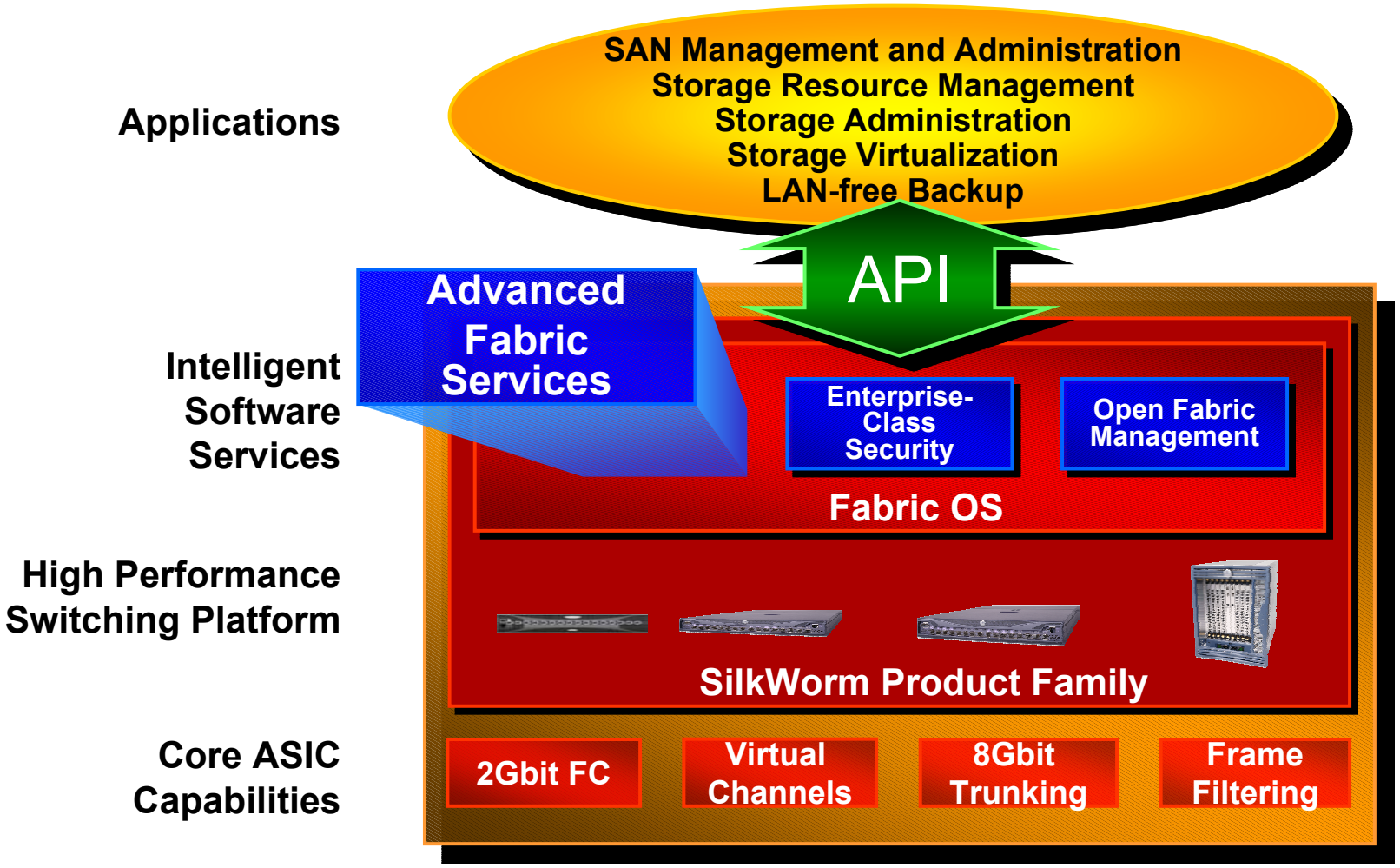
An Intelligent Platform

Entry Level to Enterprise

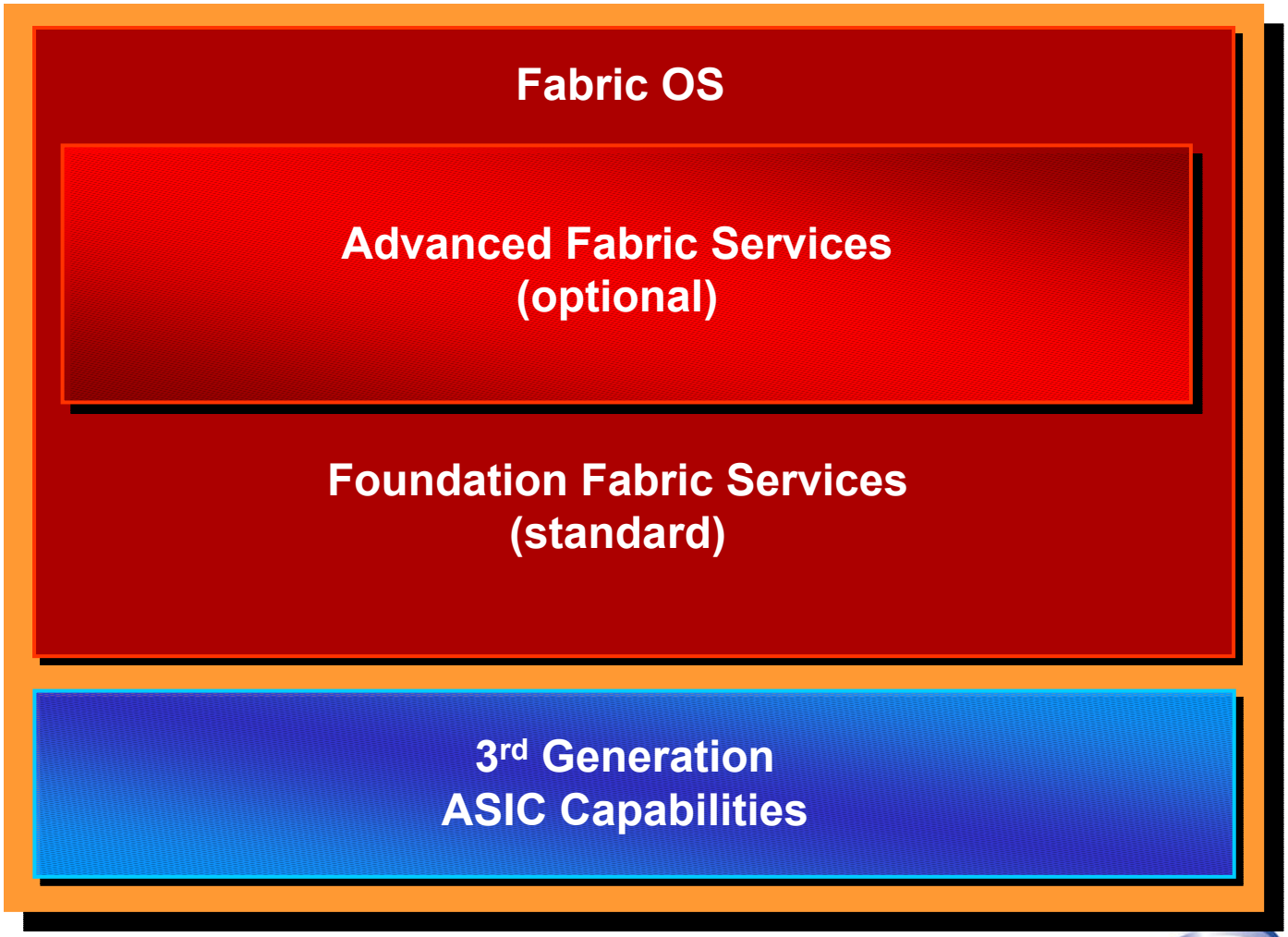
A Family of Solutions for all SAN Needs



Brocade
Intelligent Fabric Services Architecture



Foundations of Intelligence



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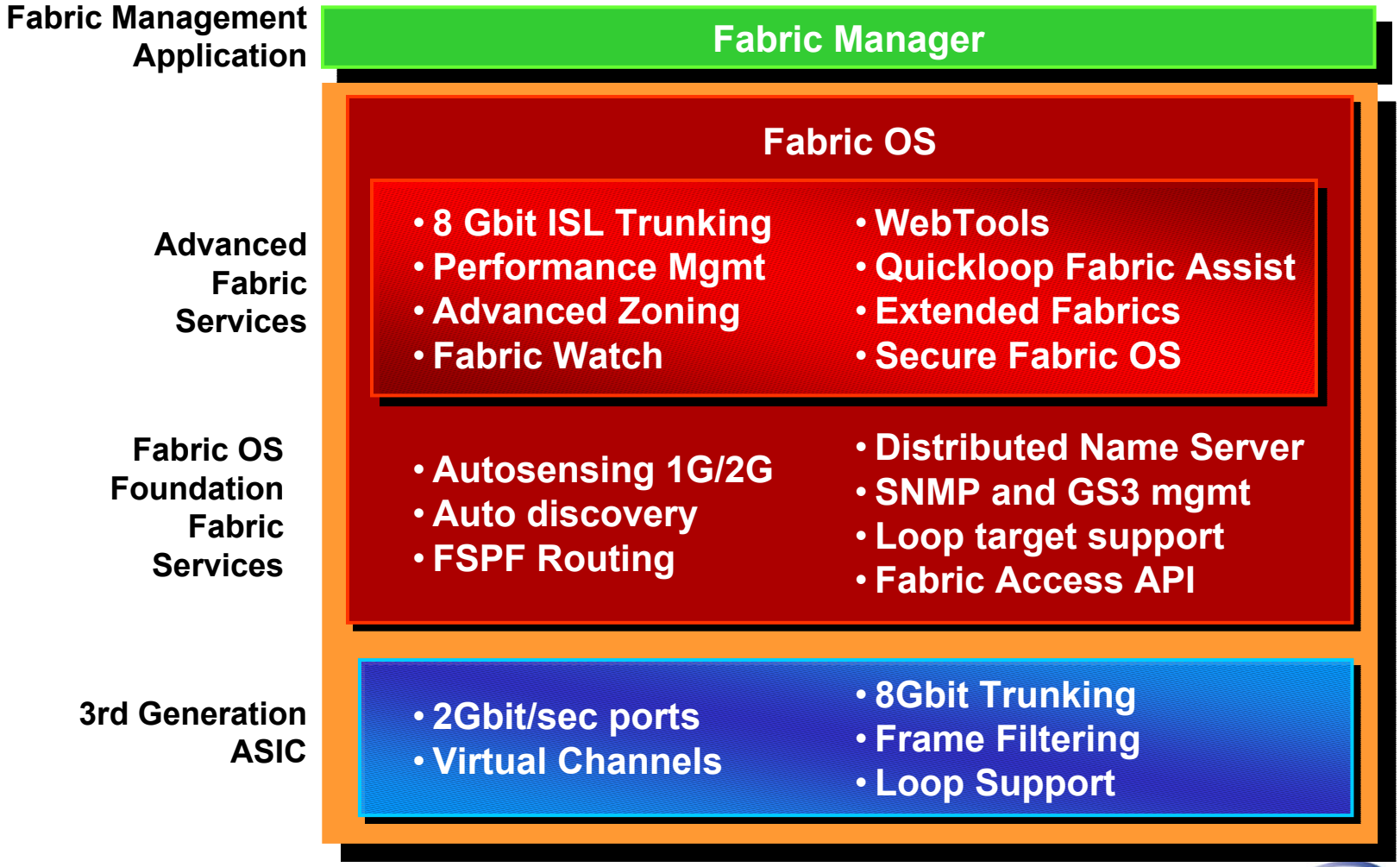
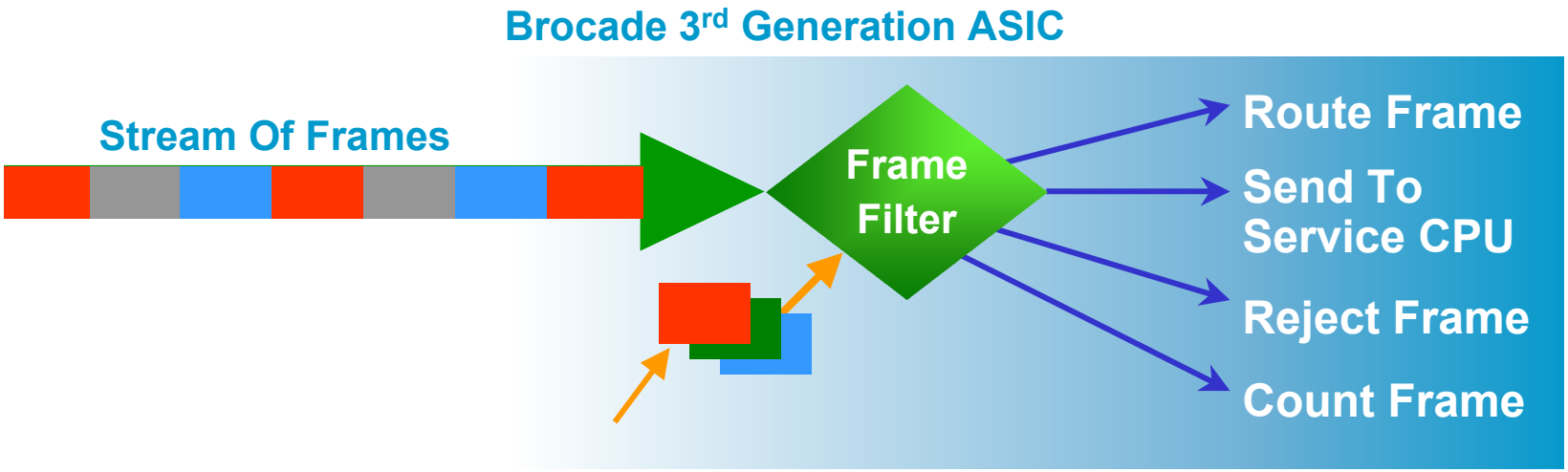
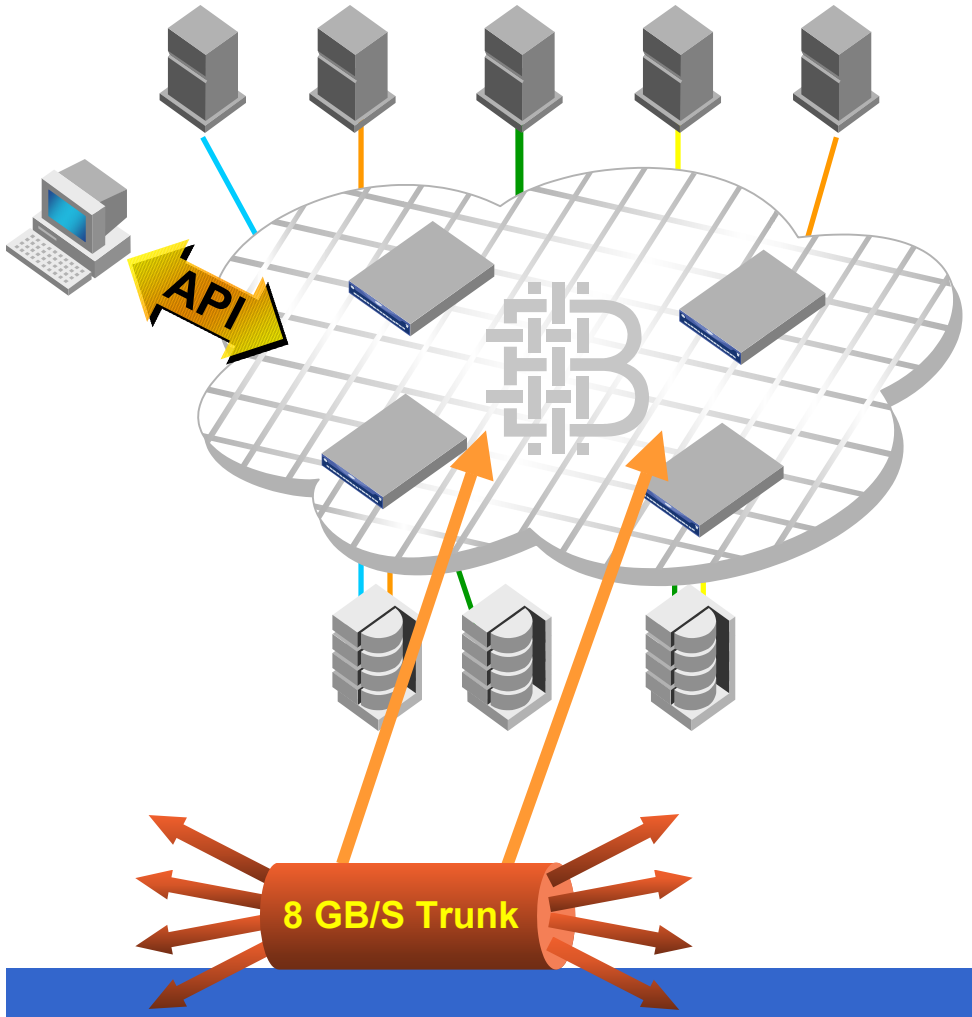


Frame Filtering



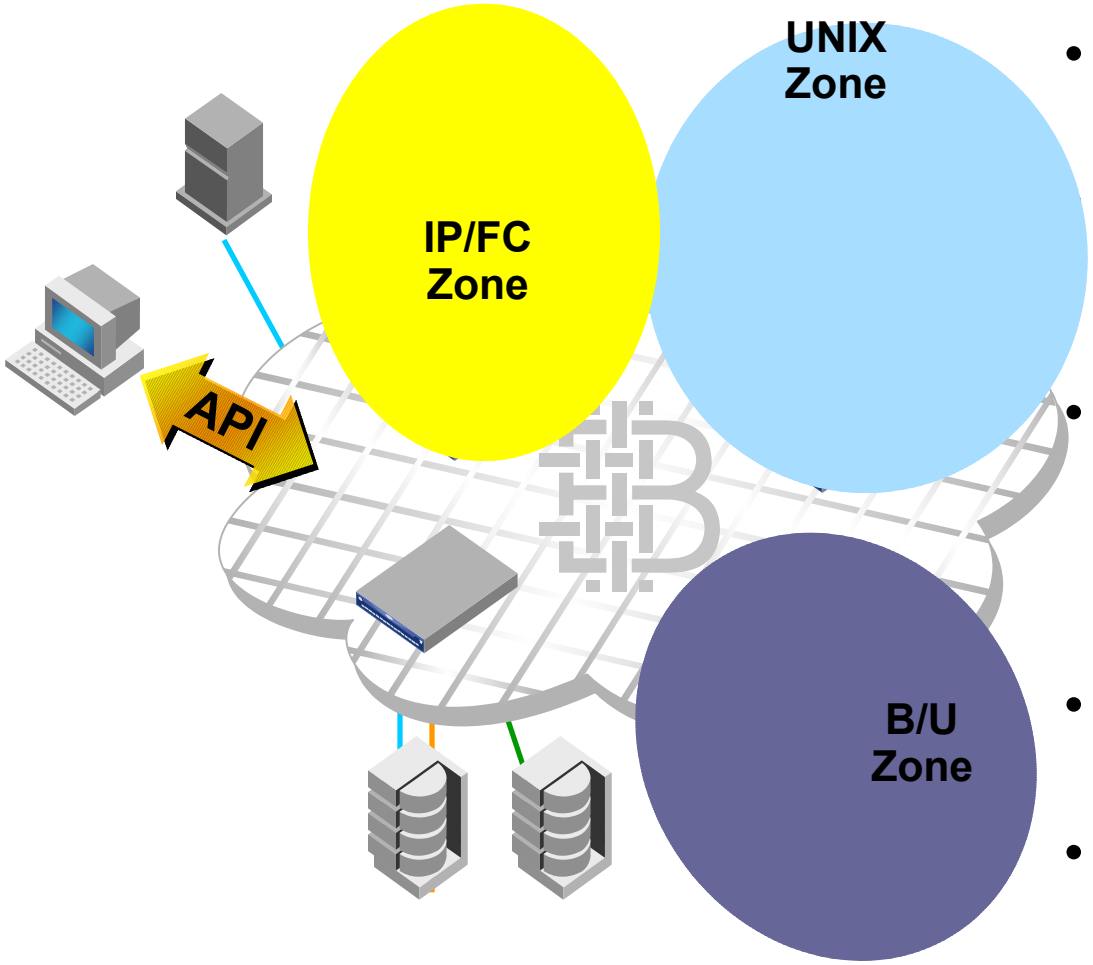
- Intelligent data routing through Frame Filtering

Inter-Switch Link Trunking



- ISL Trunking
  - 8 Gbit/sec logical links
  - Aggregate edge traffic
  - Zero management
- Simplify network design and management
- Simplifies administration (manage one link vs. four links)
- Maximizes fabric performance
- Enables increased Inter Switch Link availability

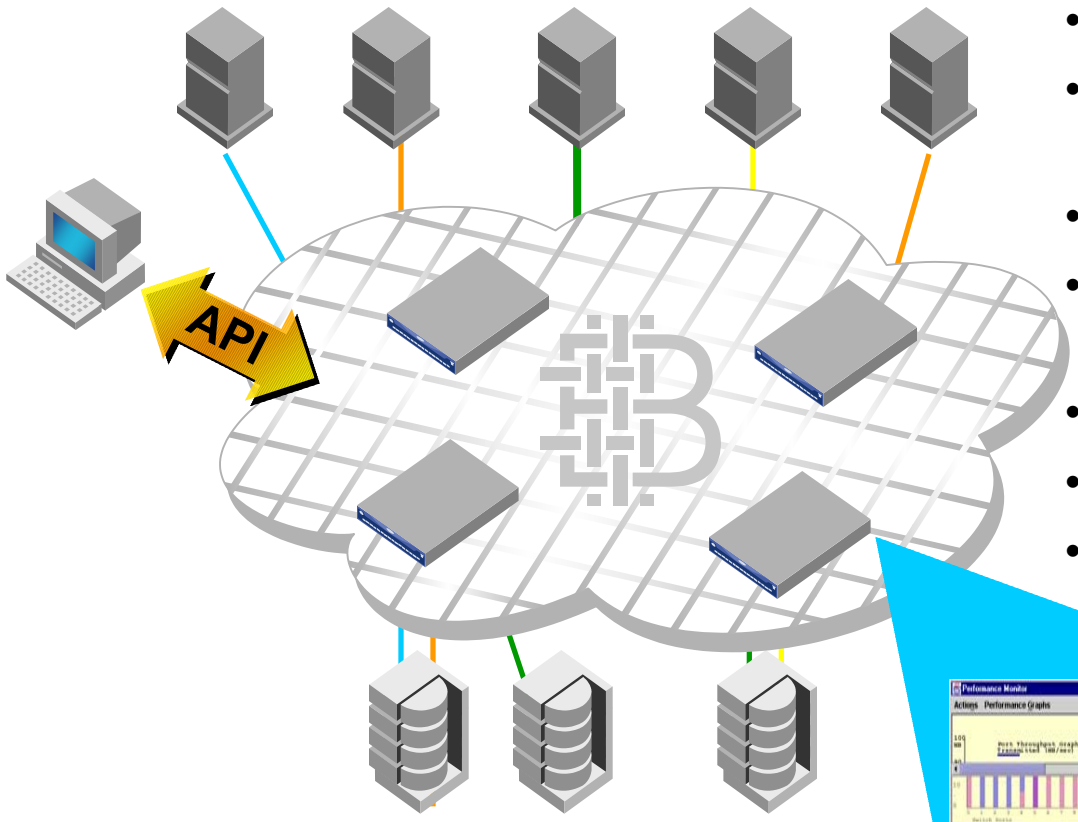
Advanced Zoning

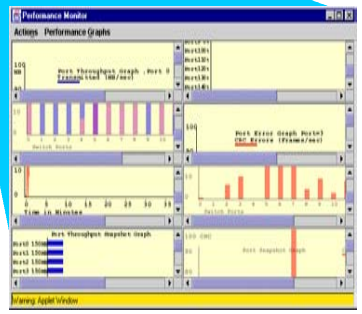


- Organize physical fabric into logical groups

  Prevent unauthorized access by devices outside of the zone
- WWN, Port Zoning
  - Hardware Enforced
  - Simple administration
  - Secure access control
- Hardware enforced access control
- Provides a safer, more secure SAN network

Performance Monitoring





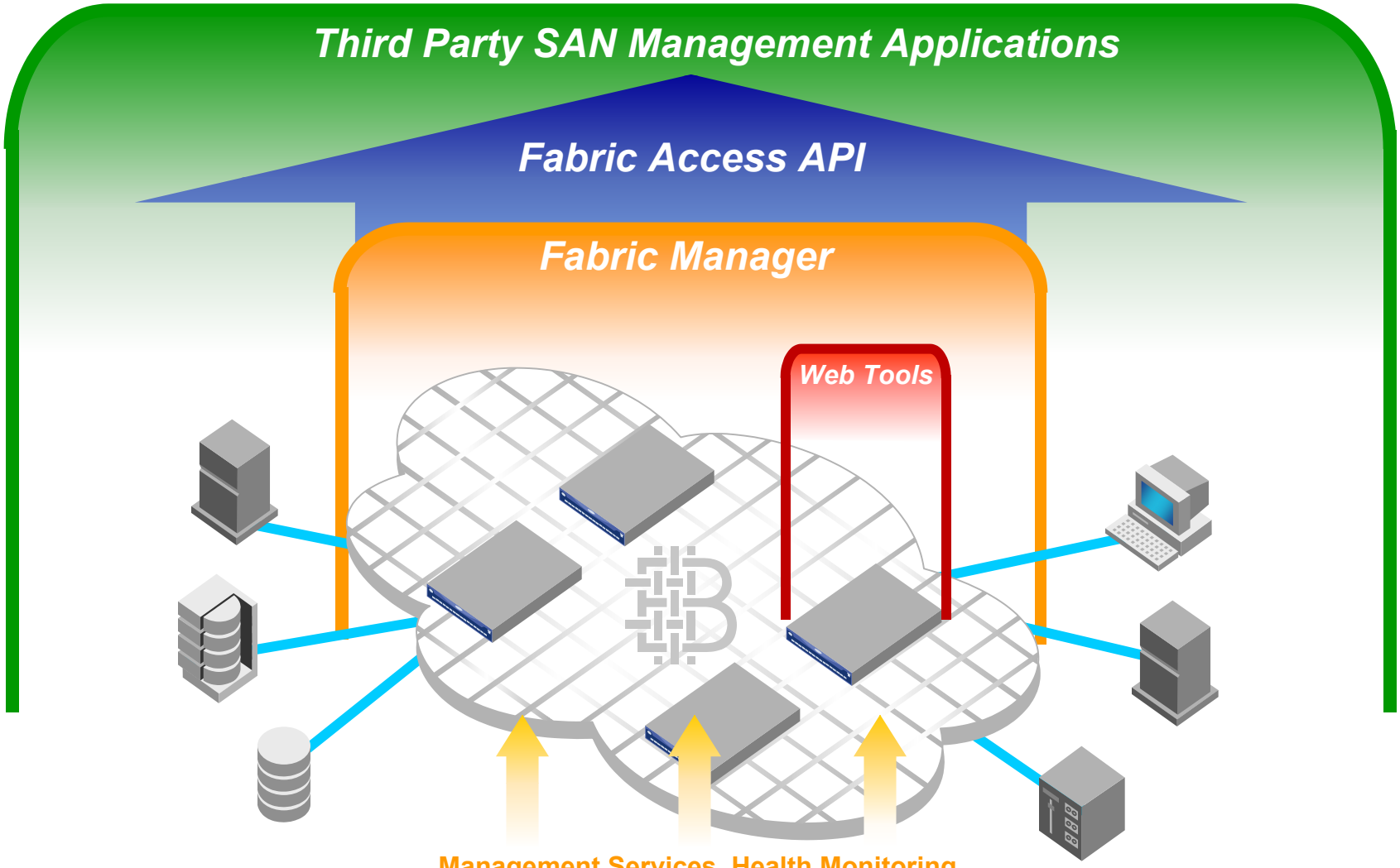
Frame-level filtering at wire speed

Object-oriented API

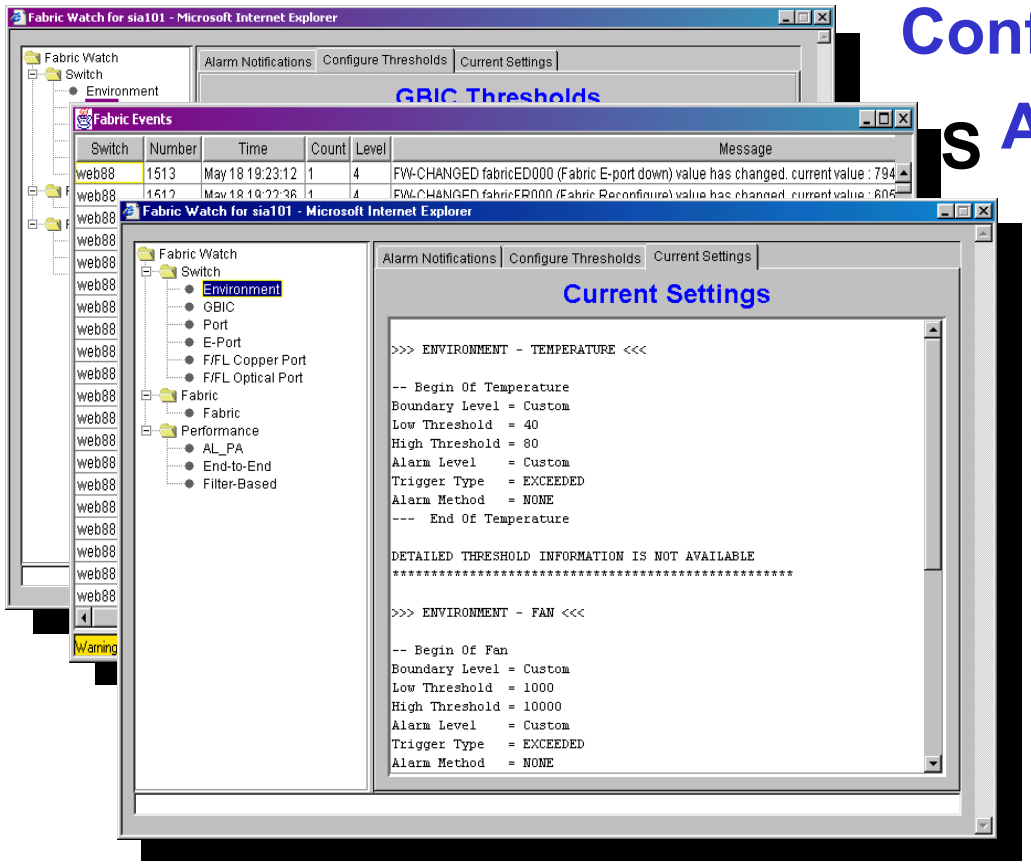
Performance Analysis

- Proactive SAN Management
- End-to-end performance measurement
- Maximizing performance tuning
- Predictive capacity planning
  - Congestion-free operation
- Optimizes Resource Utilization
- Auditable Service Level Agreements
- Reducing troubleshooting time
  - Integrated with Fabric Watch

Brocade SAN Management



Brocade Fabric Watch



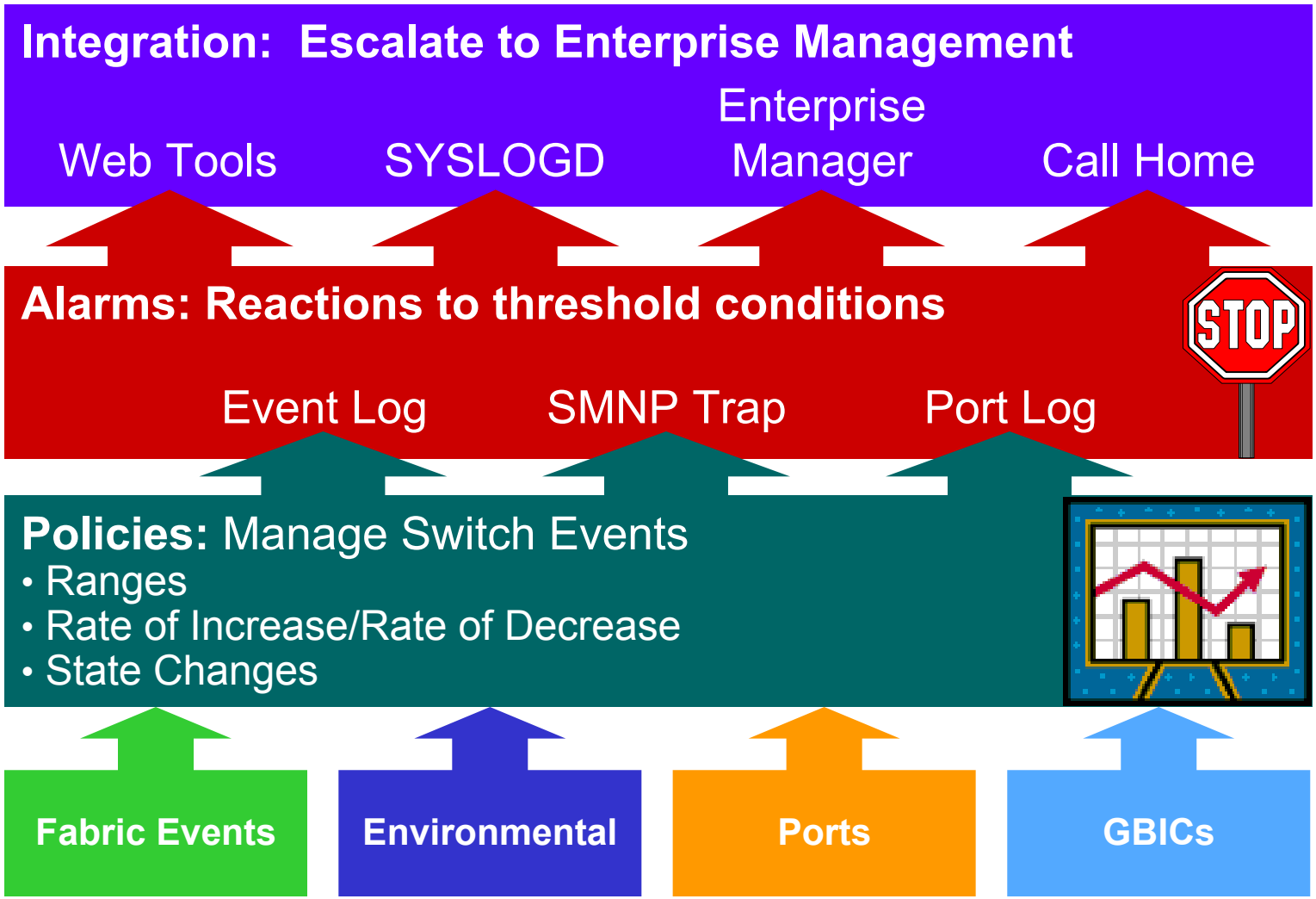
Configure Thresholds

Alarm Notifications

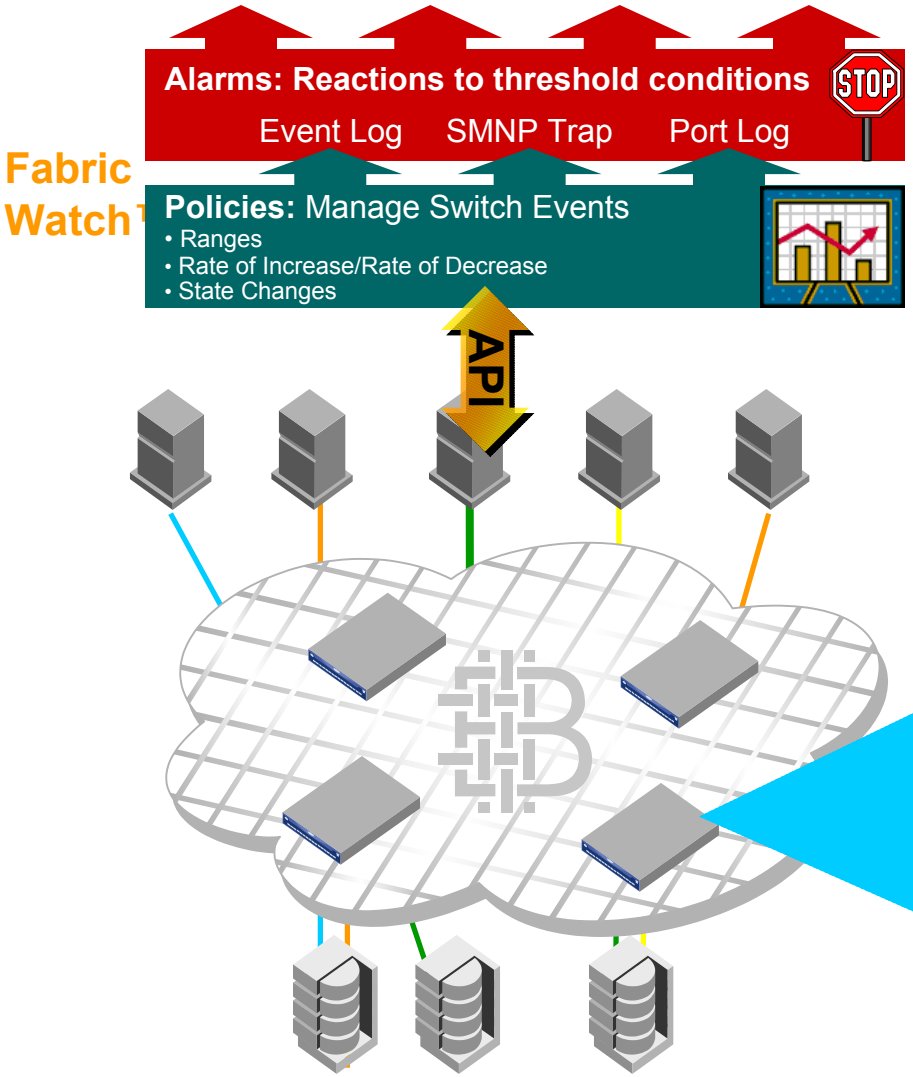
Current Settings

- **Switch, Fabric, and Performance Reports**
- **Detailed descriptions of current settings in an easy to read format**

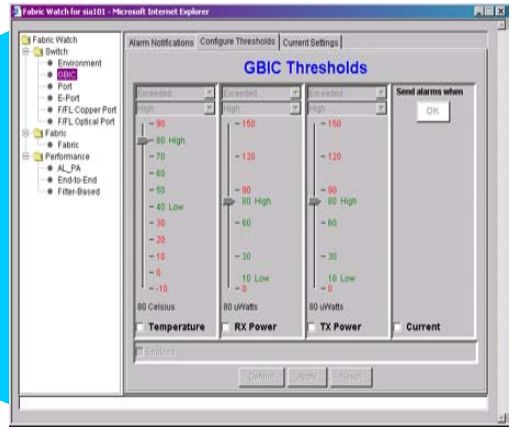
Fabric Watch overview



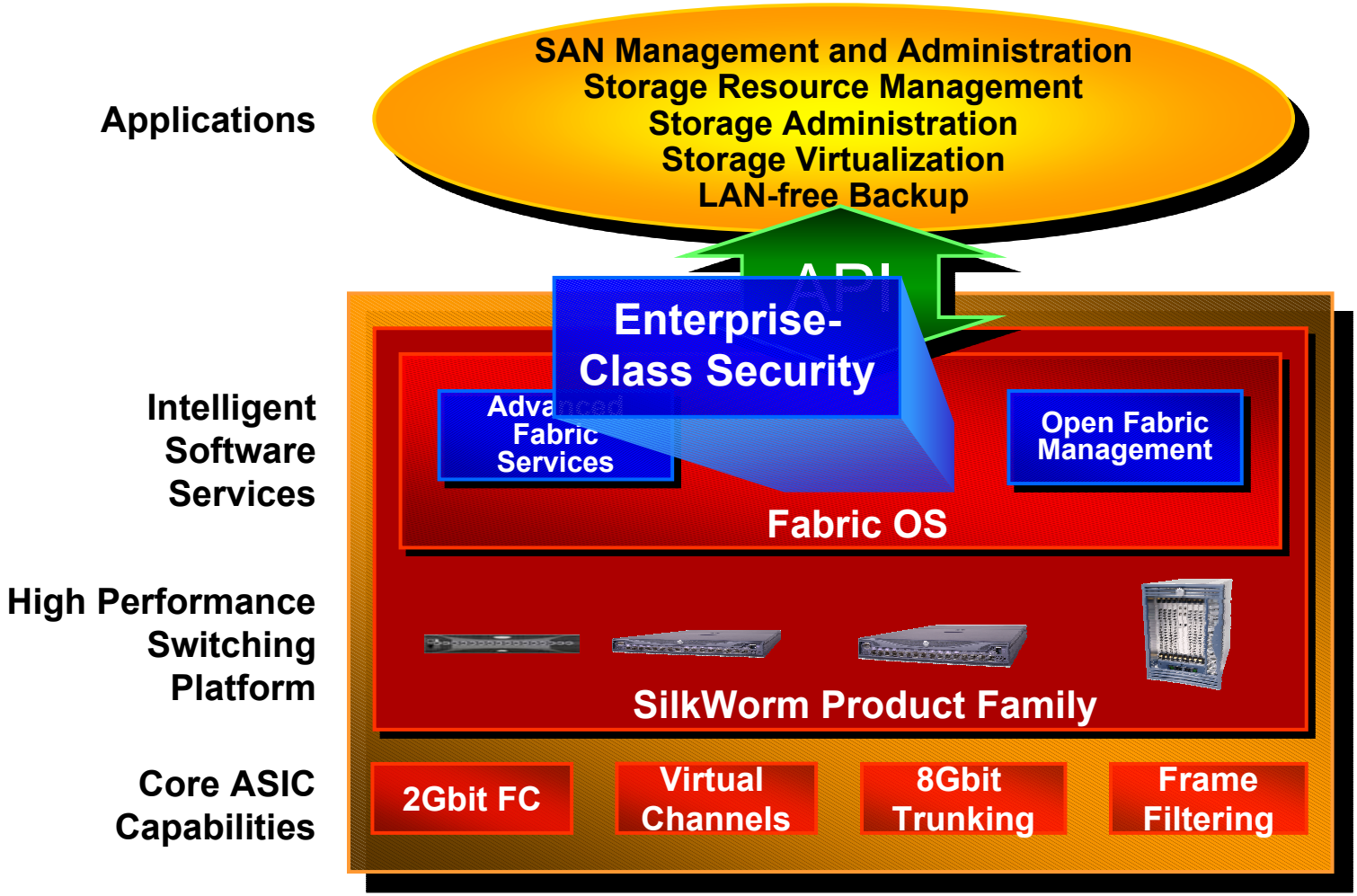
Fabric Watch™ Health Monitoring



- Intelligent, Proactive Monitoring
- Simple graphical threshold configuration
- Alarm Notifications
- Switch, Fabric, and Performance settings
- Default or user configurable settings
- Quickly diagnose problems
- Sends alerts to SNMP-based Applications
- Web Tools, FM and Fabric Access API

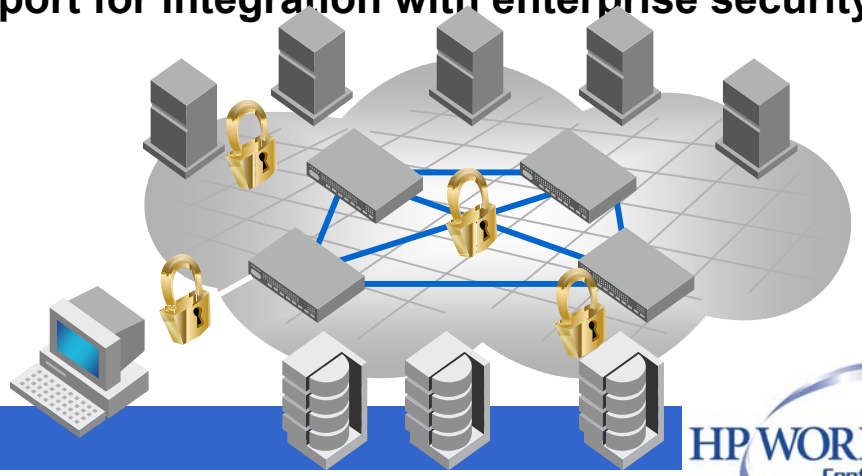


Brocade Intelligent Fabric Services Architecture



Brocade Secure Fabric OS™

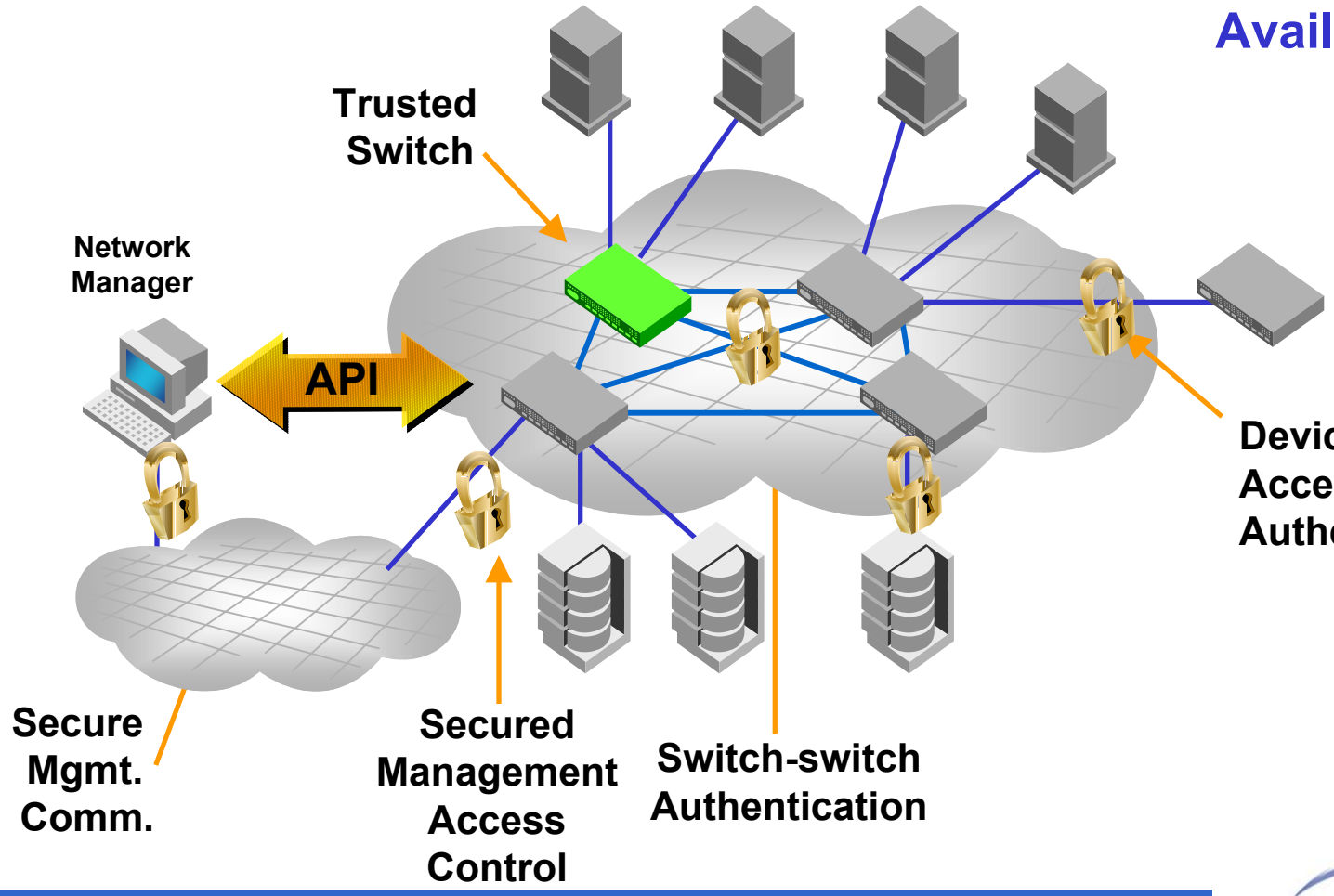
- *Fabric Based* Security
  - Next level above Advanced Zoning access control
  - Protection of Critical Corporate Data
- *Comprehensive* policy-based security infrastructure
  - Prevents unauthorized management access
  - Prevents unauthorized devices from joining the fabric
  - Eliminates the need for physical separation of fabrics
  - Simplifies administration of security
    - **Fabric Access API support for Integration with enterprise security infrastructure**
    - **Fabric Manager 3.0**
  - New standards proposal



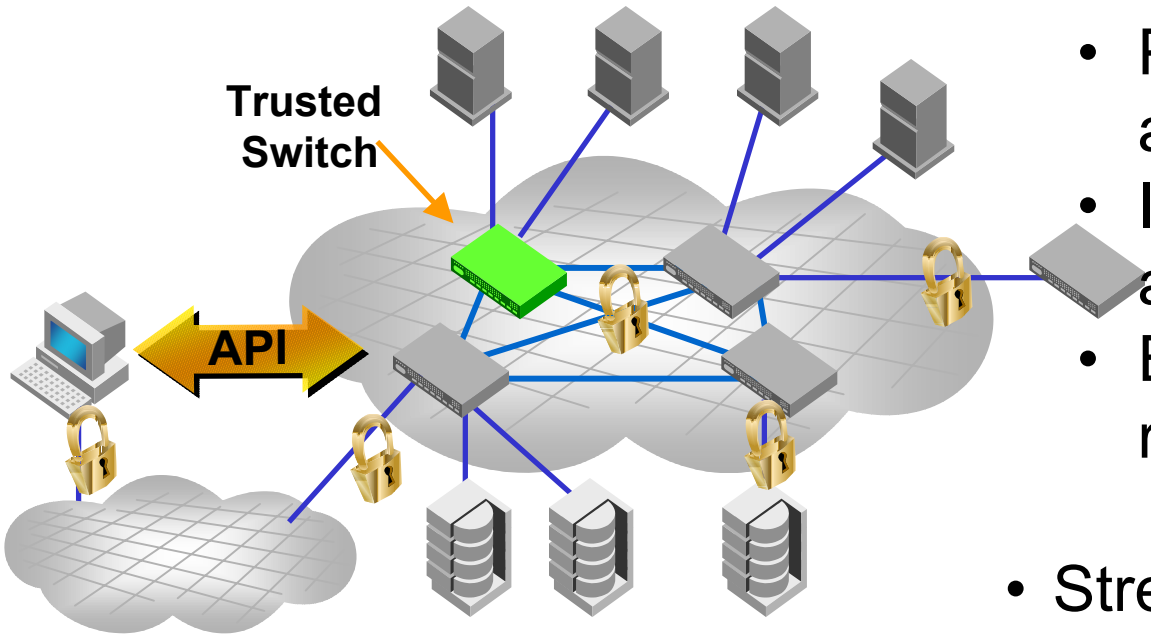
Secure Fabric OS

Ensures integrity of access to sensitive data

Available Now!



SAN Security: *Directions*

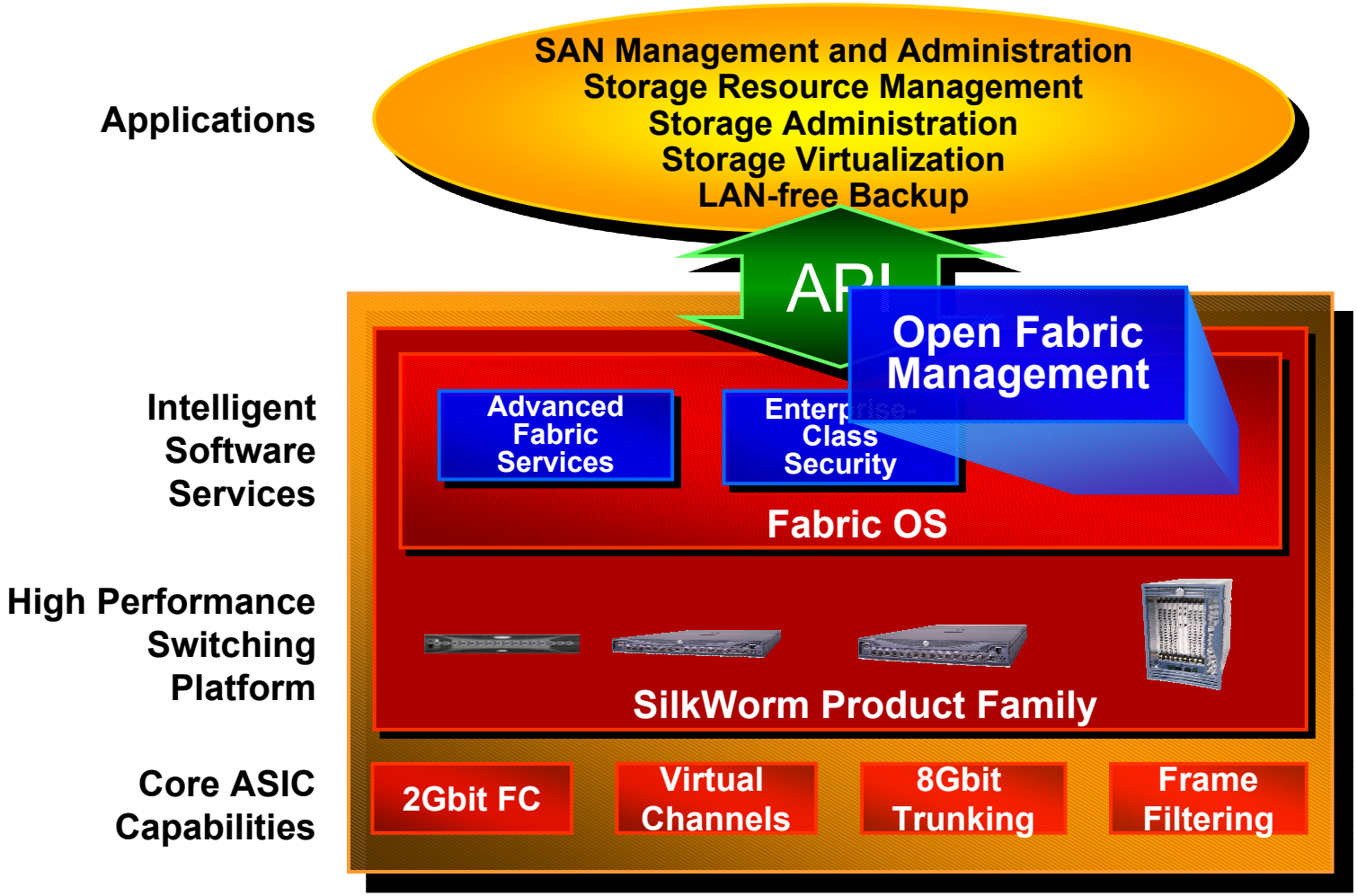


- Extend Secure Fabric OS
  - Policy-based response actions
  - Integration with existing authentication facilities
  - Expanded detection and reporting
- Strengthen security of the SAN
- Simplify administration

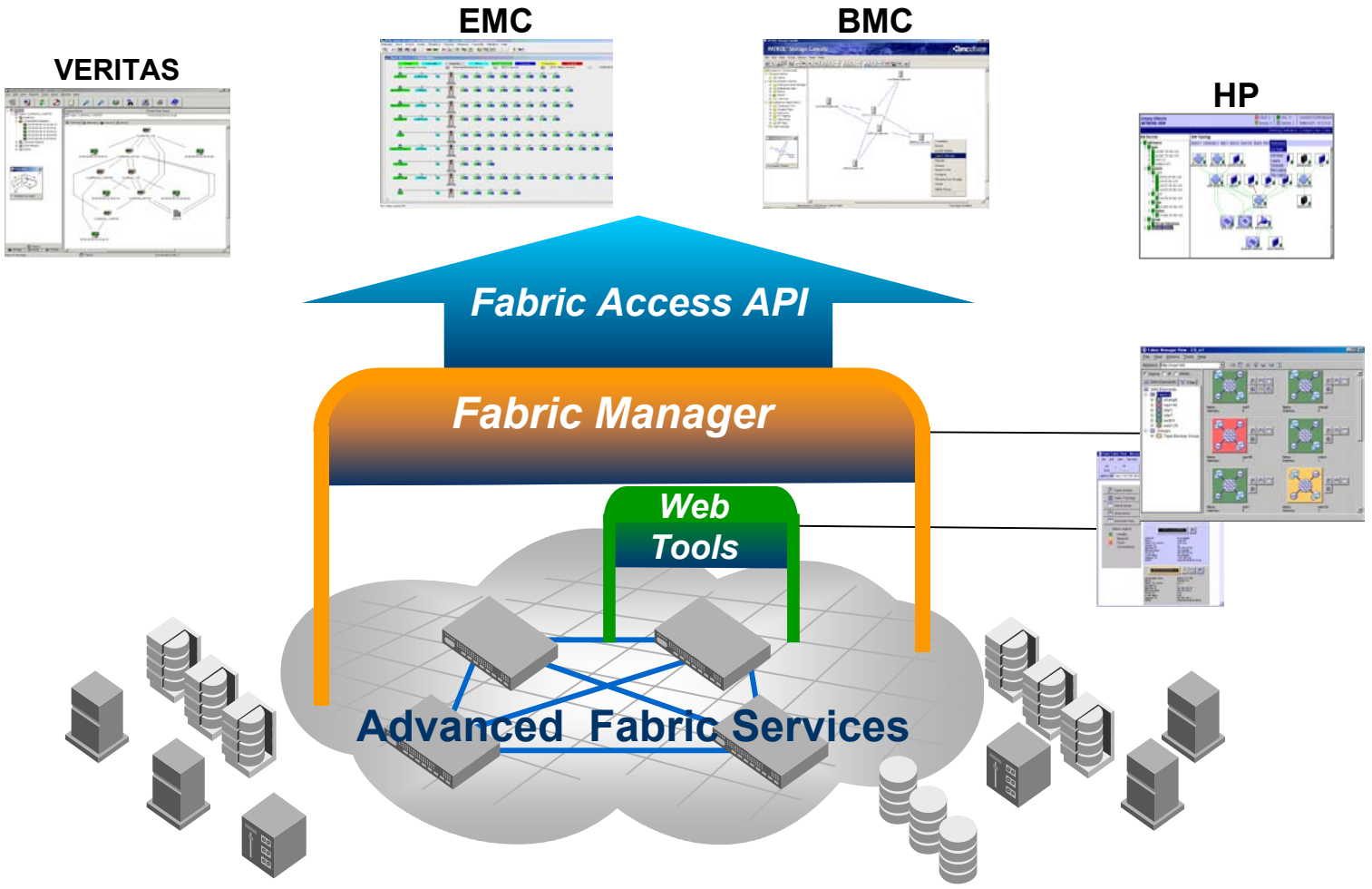
Brocade SAN Security Leadership

- Defined a comprehensive SAN security architecture based on proven LAN/WAN/Internet security technologies
- Set the agenda for strong policy-based SAN Security
- Delivered *first* Fabric based security offering to market
  - Only SAN infrastructure provider to offer a complete security product
  - A common services model across the entire Brocade SilkWorm product family
  - Integrated Management and Application

Intelligent Fabric Services Architecture



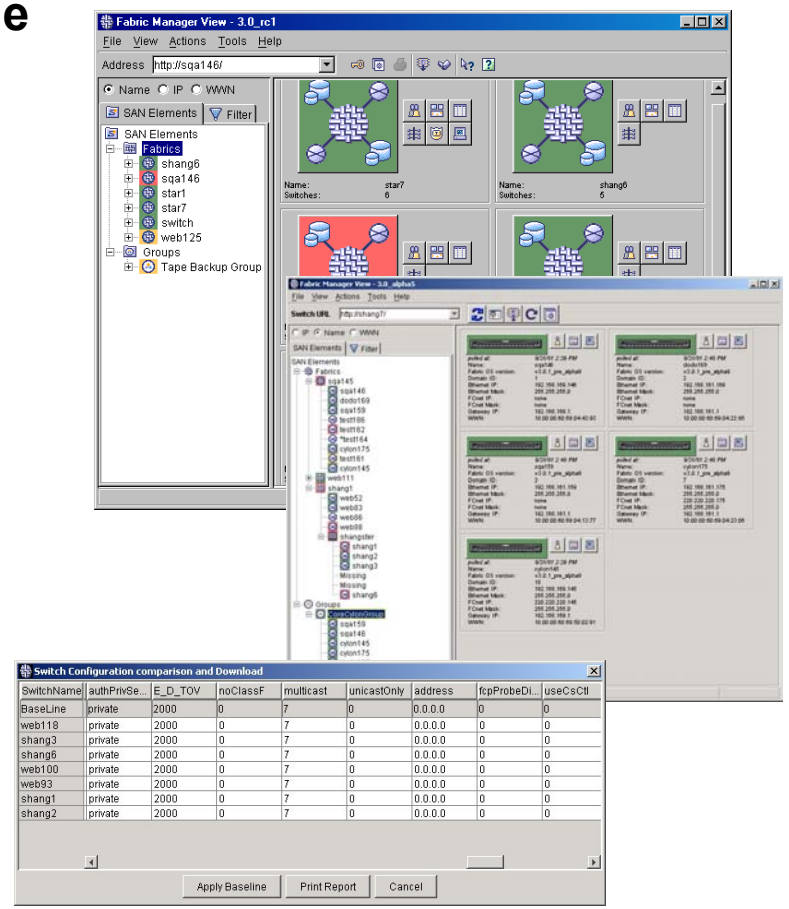
Open Fabric Management



Management Services, Health
Monitoring, Performance Monitoring

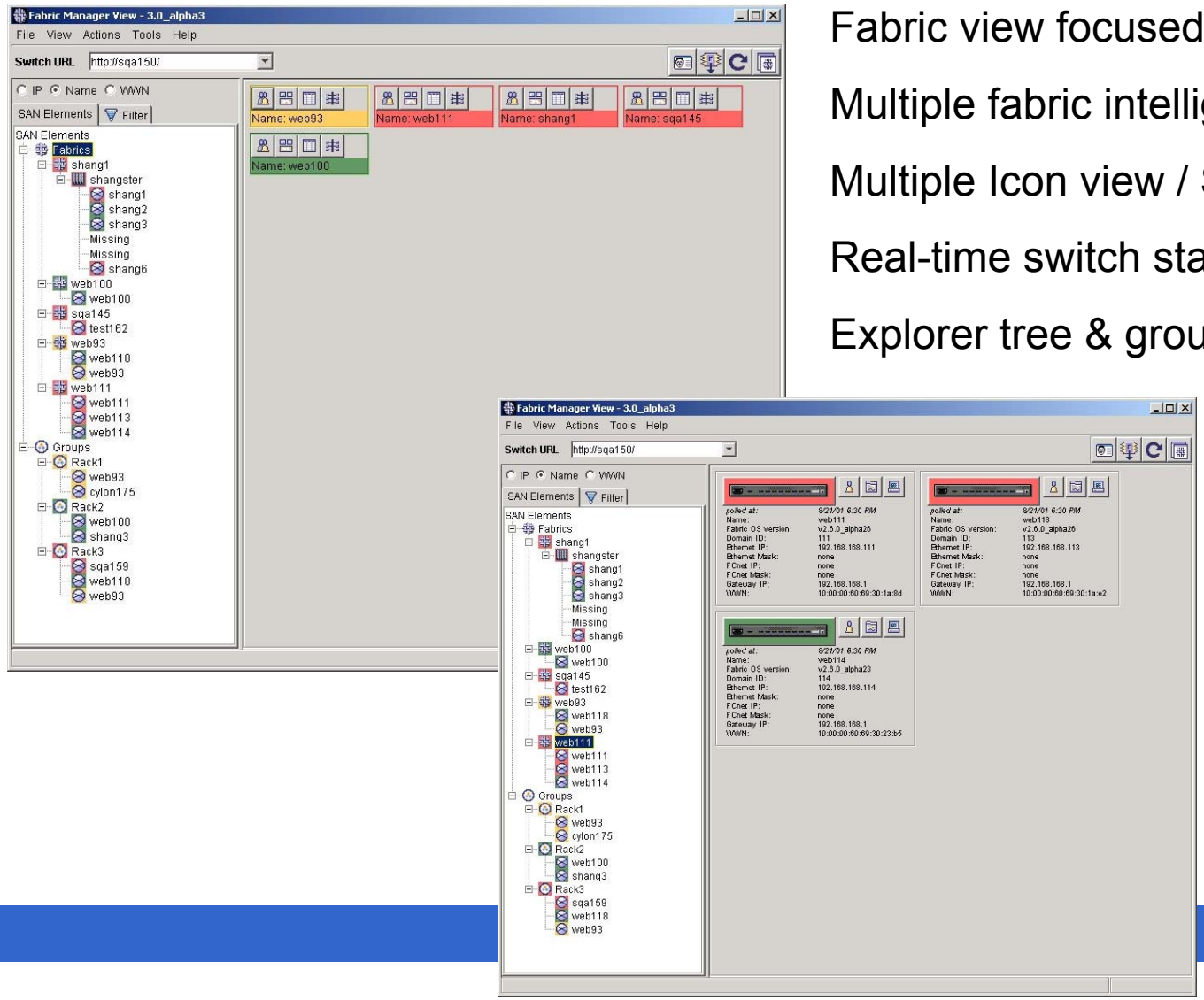
Brocade Fabric Manager

- **Manage multiple Brocade switches, multiple fabrics and large fabrics**
- **Monitoring the SAN Through a Single Console**
  - **Collects fabric events from multiple fabrics**
  - **Rapid detailed drill down**
- **Rapid SAN provisioning**
  - **Clone and Deploy switch profiles**
  - **Intelligent group functions (devices and fabrics)**
- **Simplifies Core Management Tasks**
  - **FabricOS™ license management**
  - **Zone and Fabric merge**
  - **Flexible Control of firmware download**
  - **Backup and Restore fabric switch configs**
- ***Uses Brocade Fabric Access API***



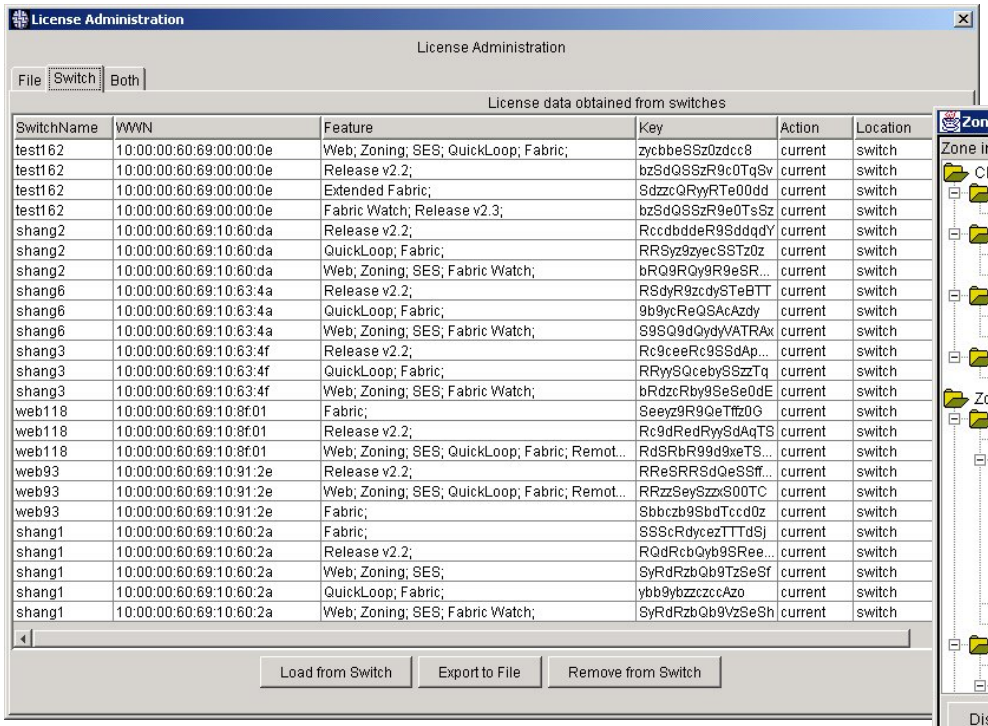
Lower the Total Cost of Ownership

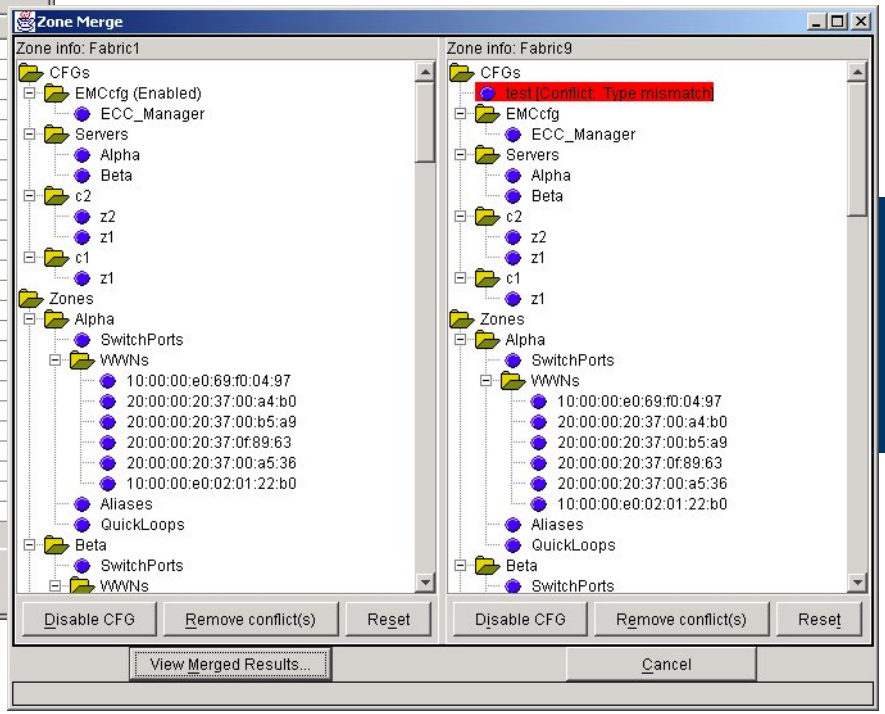
Fabric Manager – Status and Health Monitoring



- Fabric view focused
- Multiple fabric intelligence
- Multiple Icon view / Switch Status view
- Real-time switch status indicators
- Explorer tree & groups linked to statues

Fabric Manager – License and Zone Merge Management





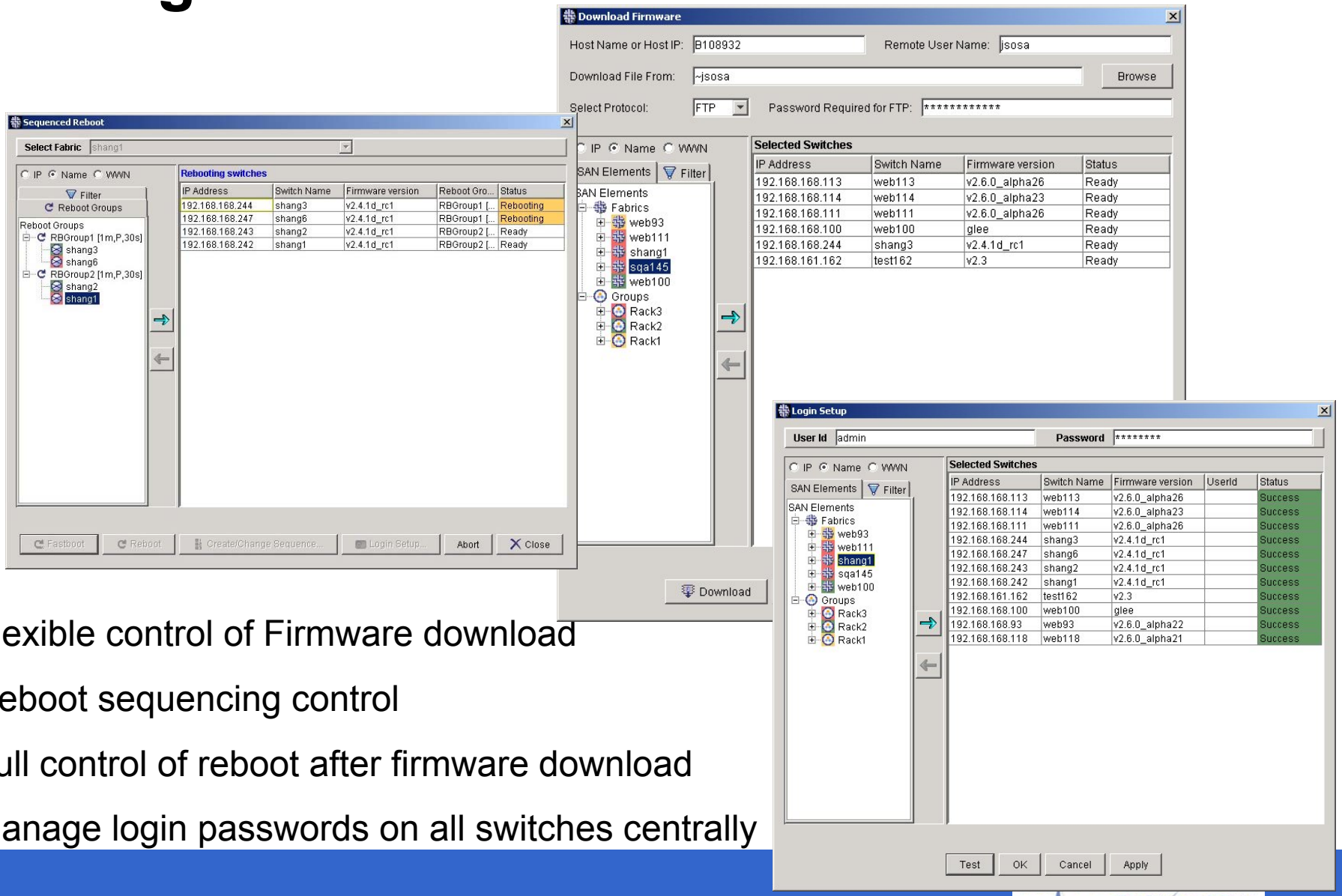
Audit and manage FabricOS™ licenses

Manage complex Merge operations

Zone and Fabric merge

Intelligent pre-merge checking

Fabric Manager – Firmware & Reboot Management



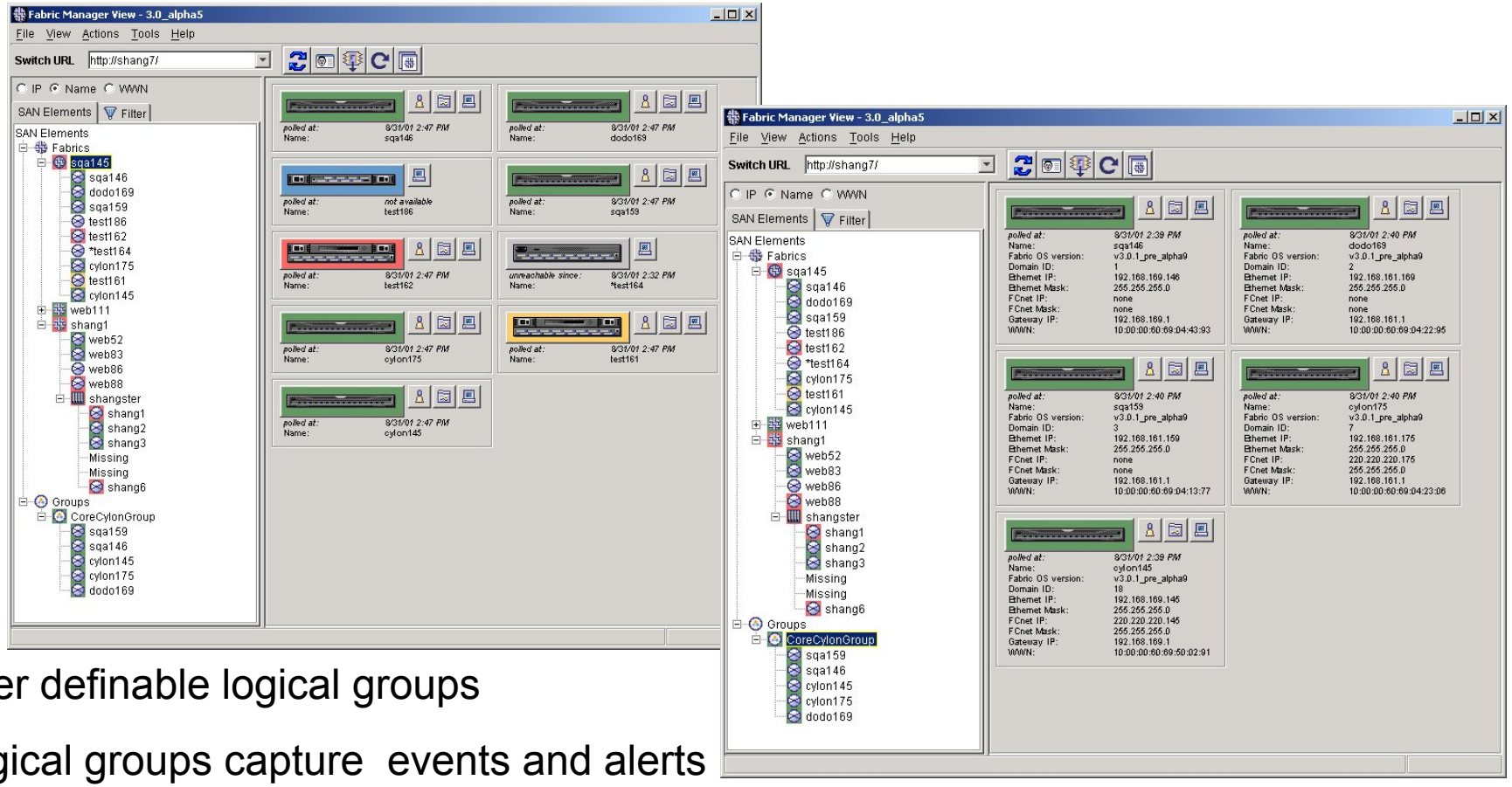
Flexible control of Firmware download

Reboot sequencing control

Full control of reboot after firmware download

Manage login passwords on all switches centrally

Fabric Manager – Powerful Grouping Control

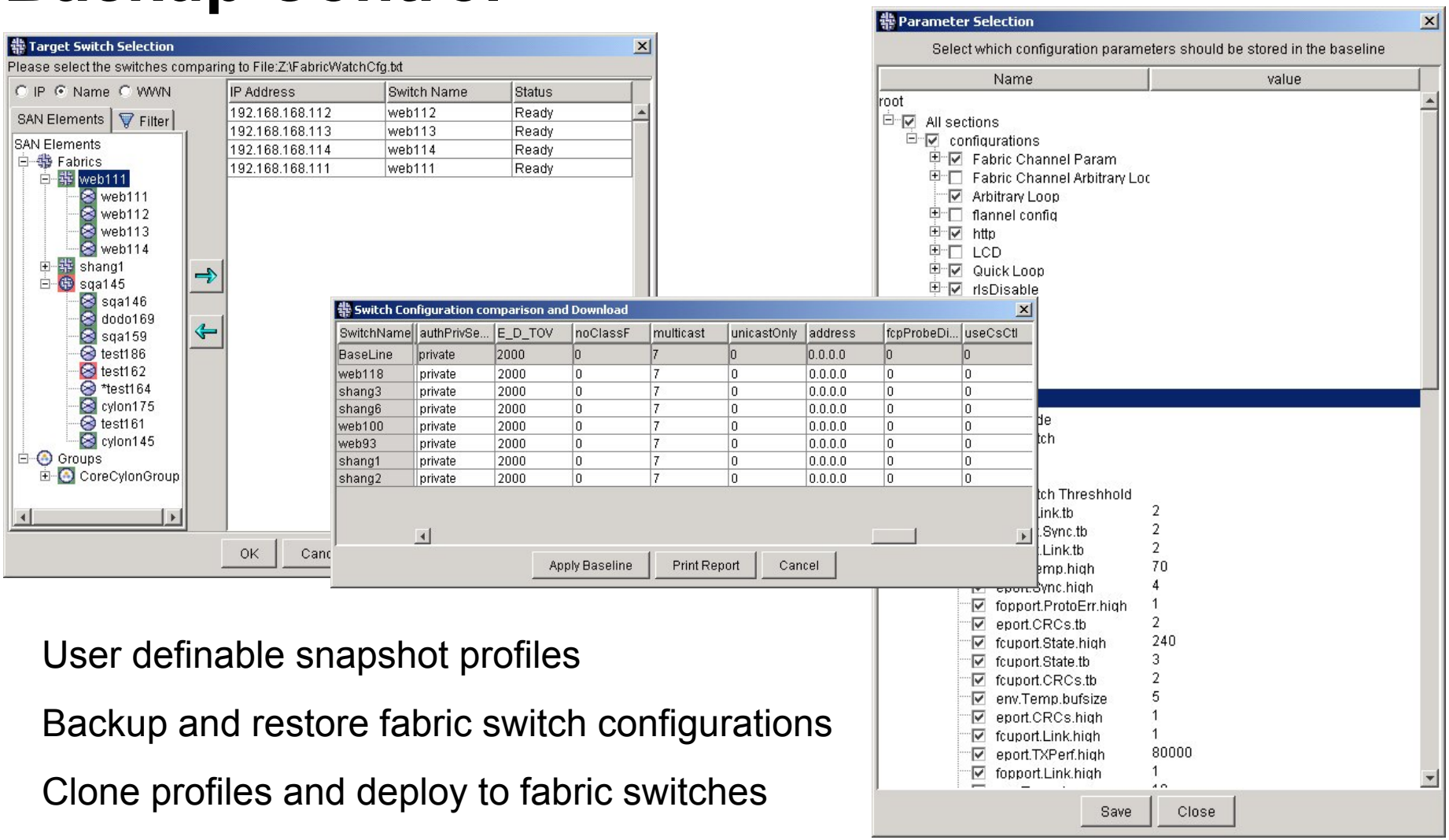


User definable logical groups

Logical groups capture events and alerts

Groups can be used for Active management control (firmware, reboots, cloning etc)

Fabric Manager – Cloning and Fabric Backup Control



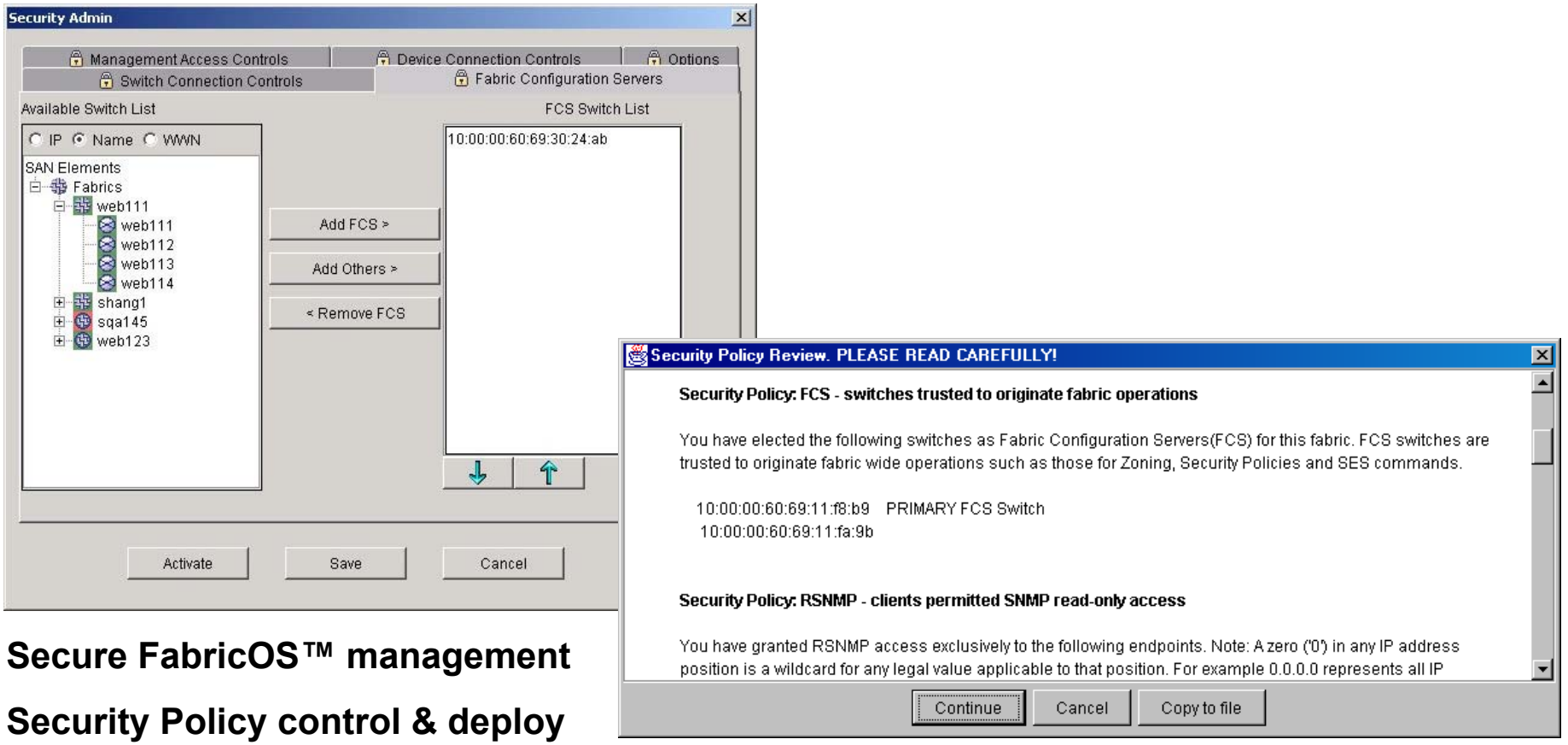
User definable snapshot profiles

Backup and restore fabric switch configurations

Clone profiles and deploy to fabric switches

Compare and audit config profiles

Secure Fabric OS™ Management



Secure FabricOS™ management

Security Policy control & deploy

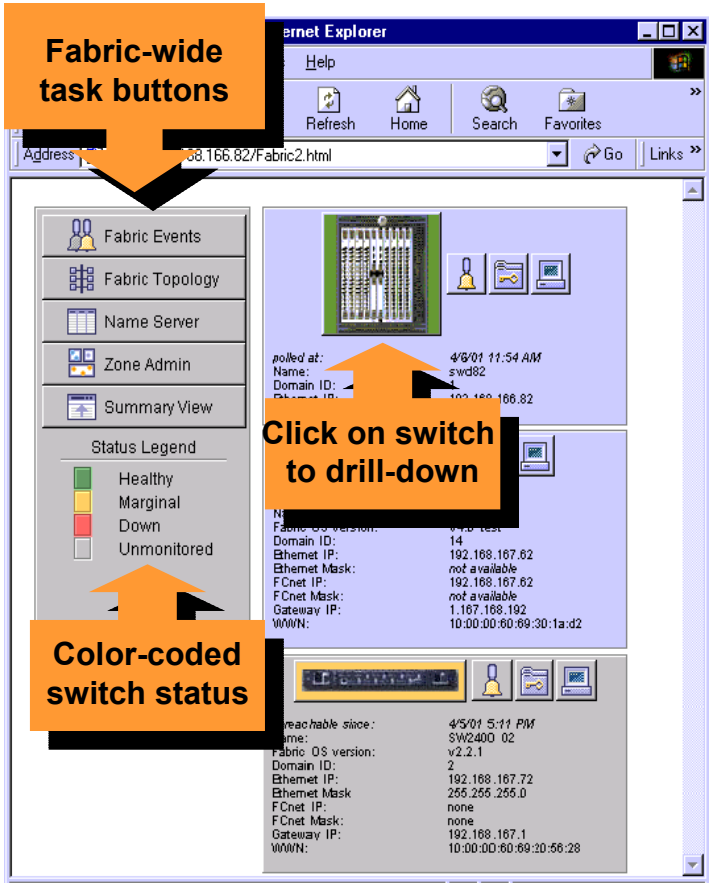
Security audit & reporting

Multi personality (manage secure & non-secure FabricOS SANs from a single console)

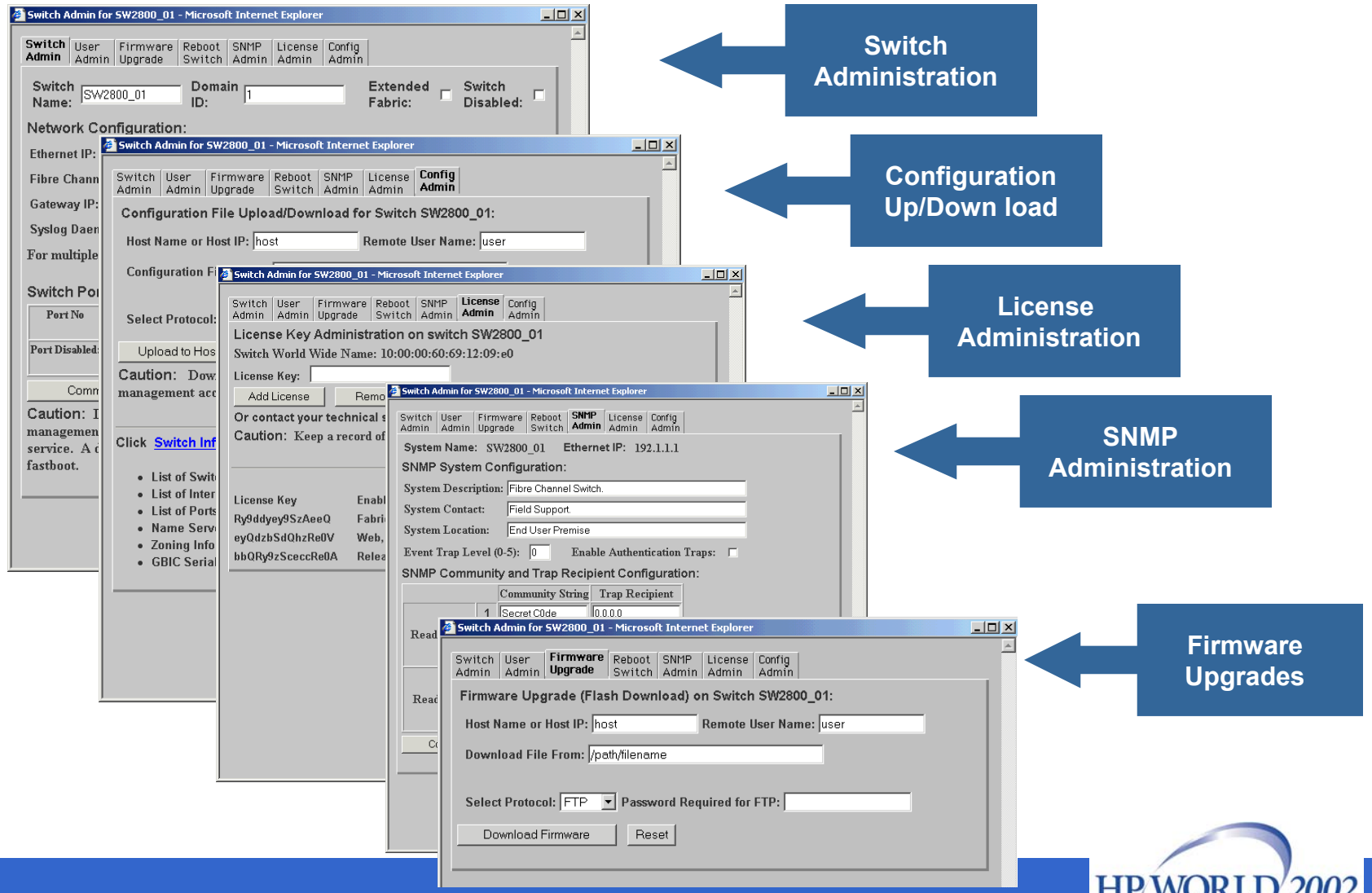
Brocade Web Tools ™

Simplified Fabric Administration

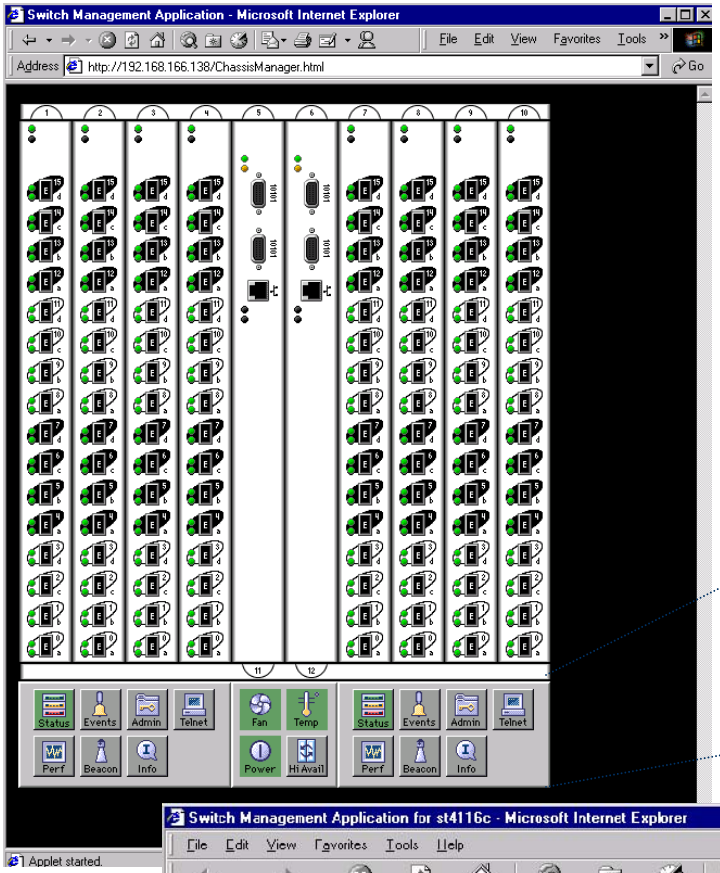
- Easy-to-use Web-based tool
- Lives in switch, self delivered
- Configuration and administration of single switch or small fabrics
- Enables management of any switch in the fabric from a single access point
  - Drill down to single switch and port-level details
- Fabric-wide tasks such as zoning, events and name services
- Telnet direct launch-point
- Fabric Watch™ launch-point
- Integrated with Fabric Manager



Brocade WebTools – Administration View



Brocade WebTools – Switch View



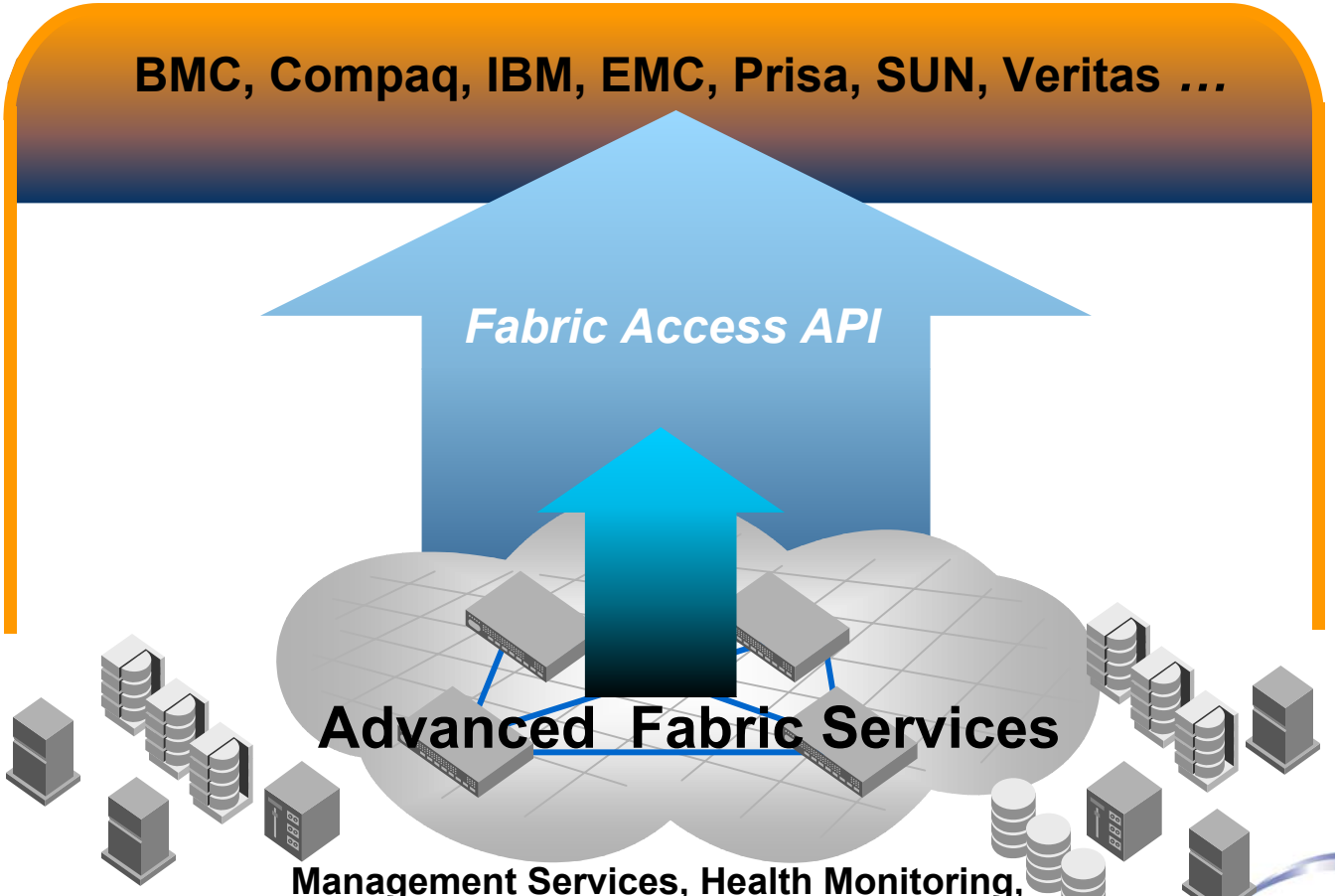
Real-time web browser display of switch status

Easy button access to most common tasks such as admin, Performance & events

Environmental Status

Enabling SAN Management: Fabric Access API

End to End Storage/SAN Administration: Integrate Brocade SAN management with higher-level management applications



Fabric Access 2.0 *New*

Available Now

Physical Discovery - Provides information about Fabric components (Fabrics, switches, HBAs, storage).

Zoning Discovery and Control - Full interface to discover and control zone information.

Performance - Access to port performance and error statistics.

Logical Discovery - Allows applications to discovery path information. Can be easily combined with port information for route analysis.

Switch and Port Control - Control of ports and switch functions.

Events - Provides reliable information about any change in the SAN

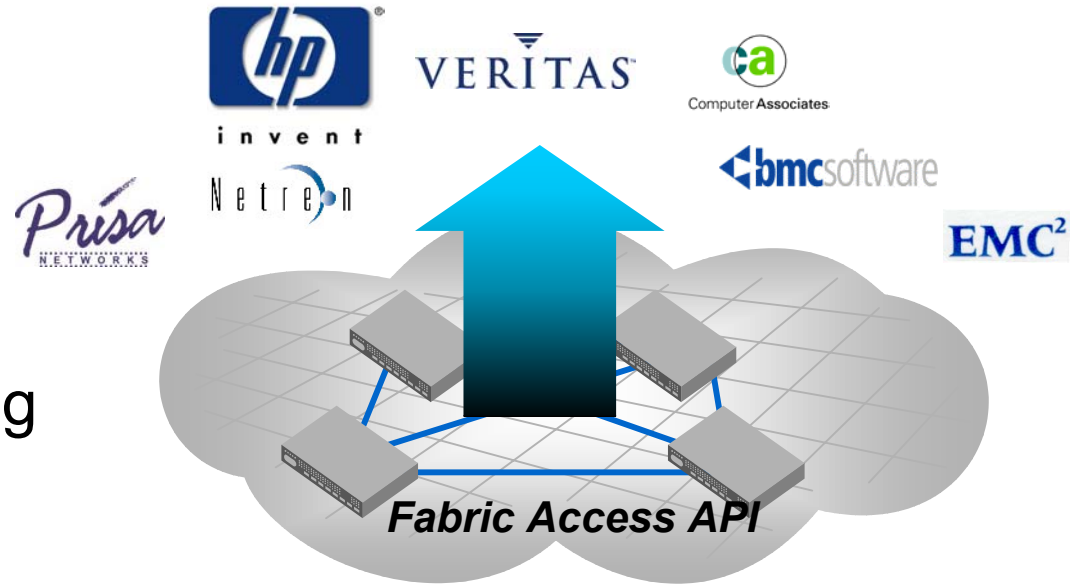
Fabric Watch™ Thresholding Control - Allows the application to distribute tasks to the switch

Security - Enables applications to manage Secure Fabric OS policies

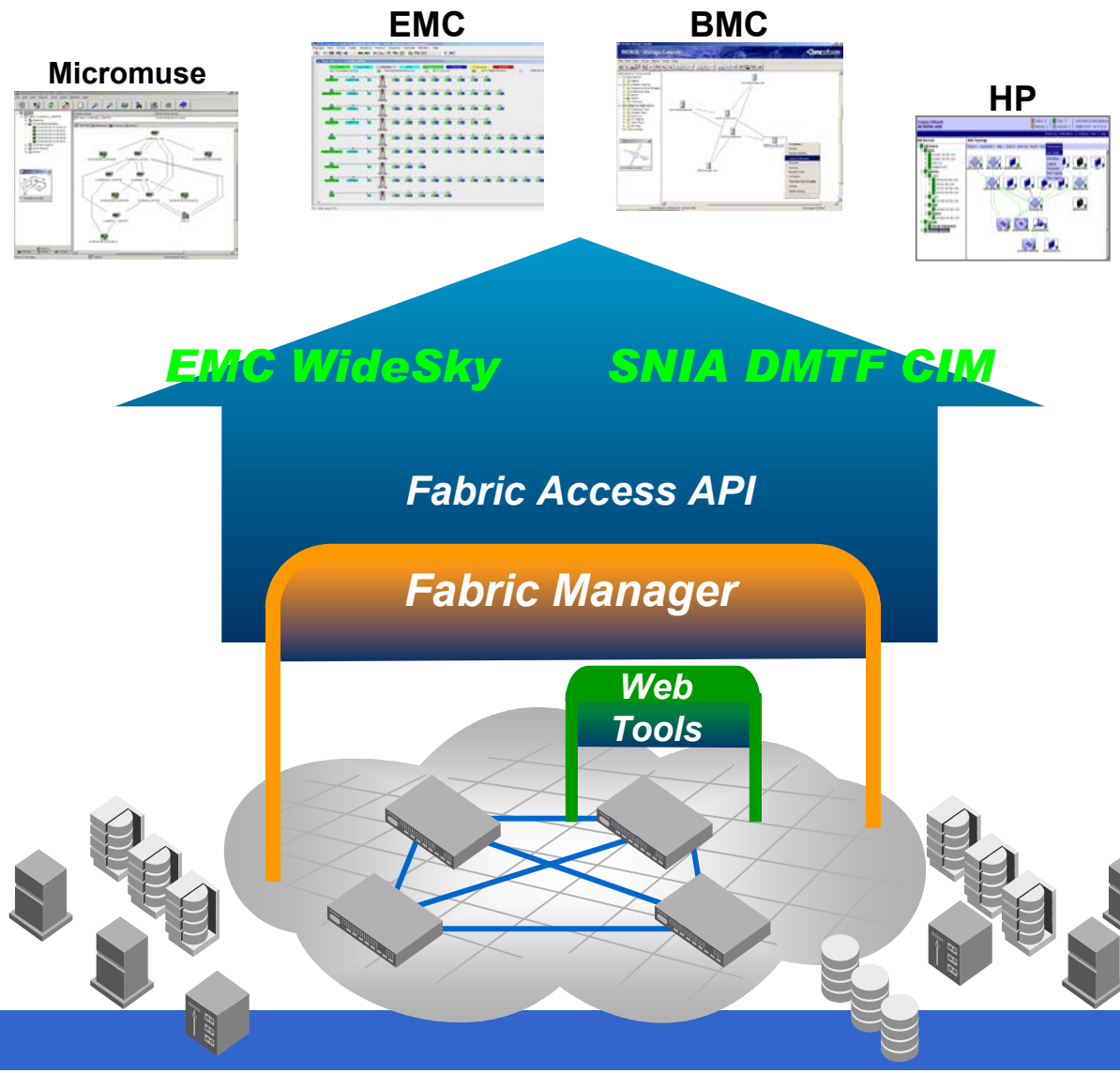
Switch Configuration and Firmware Download - Full access to switch configuration facilities

Fabric Access API Partners: Delivering Solutions

- Applications are being developed to the Fabric Access API that span the management needs of customers, including:
  - Visualization
  - SAN Design
  - Event Management
  - Automatic Provisioning
  - SAN Configuration
  - Security
  - Performance Management
  - Capacity Planning



Setting the Standard for Open APIs

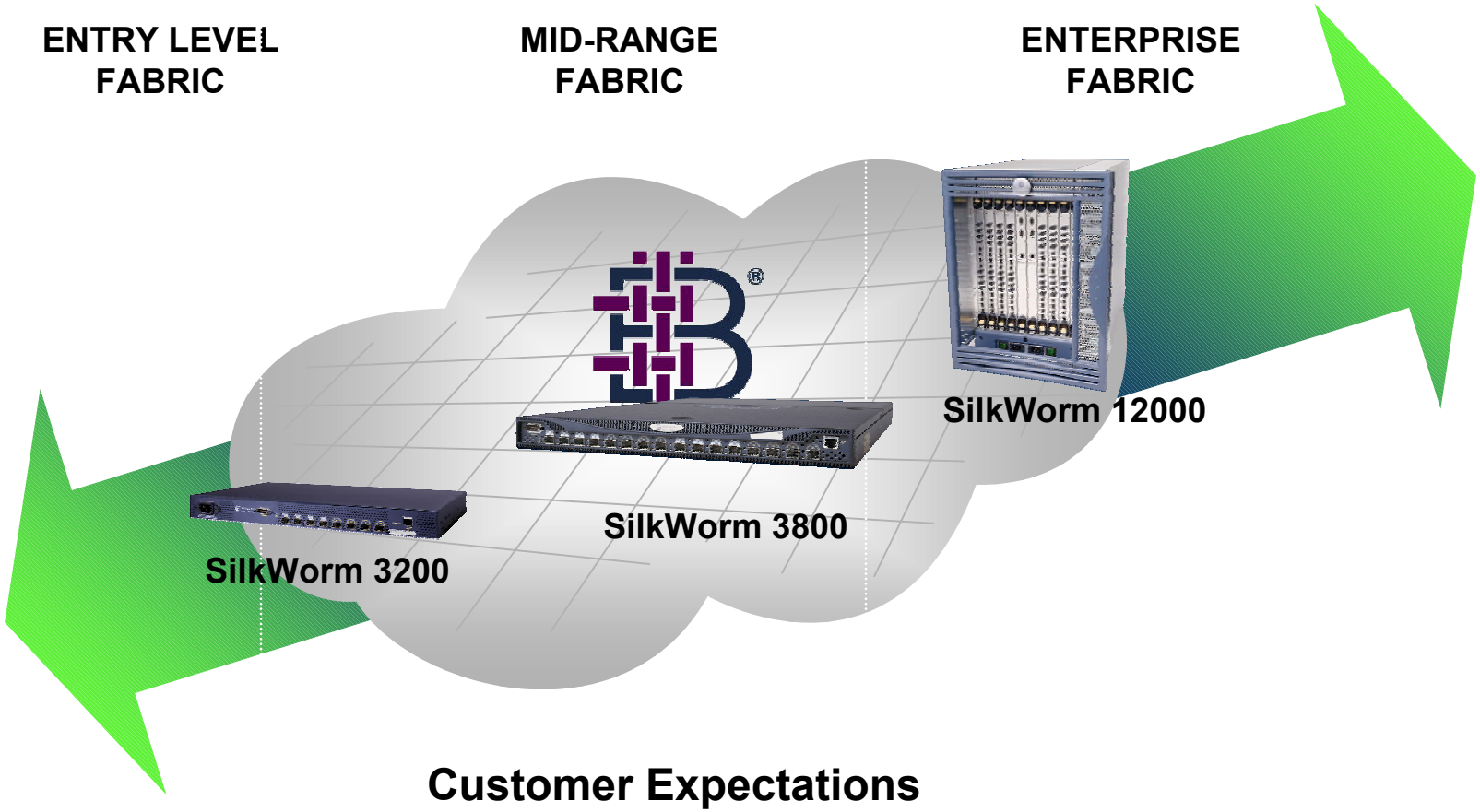


- API Extension
  - Persistent Objects
  - Event filtering
  - Object Query
  - Access HBA info
- Accelerate partner application design
- Enable policy-based management
- Compatible with emerging industry standards

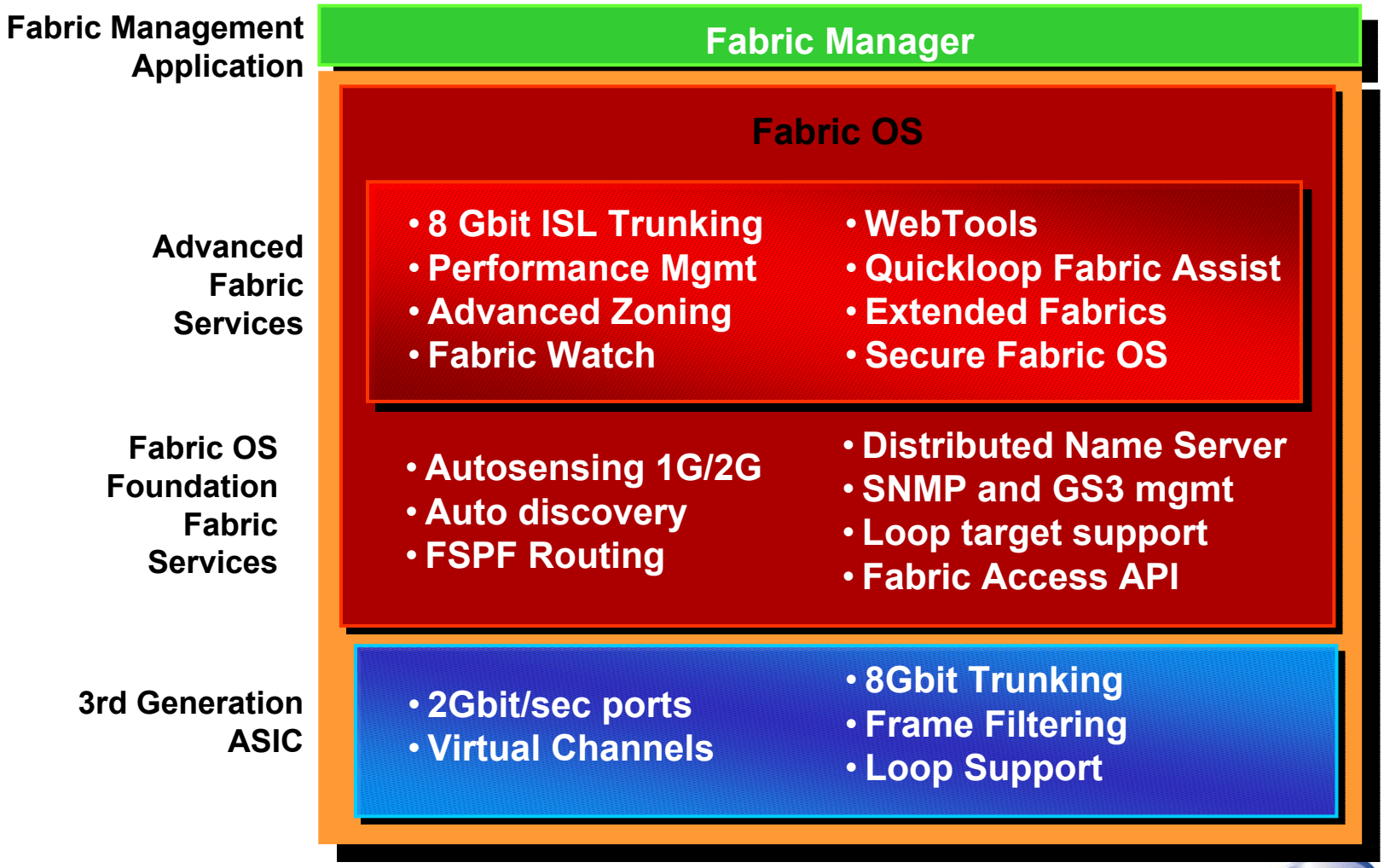
Summary

An Intelligent Platform for the Entry Level to Enterprise

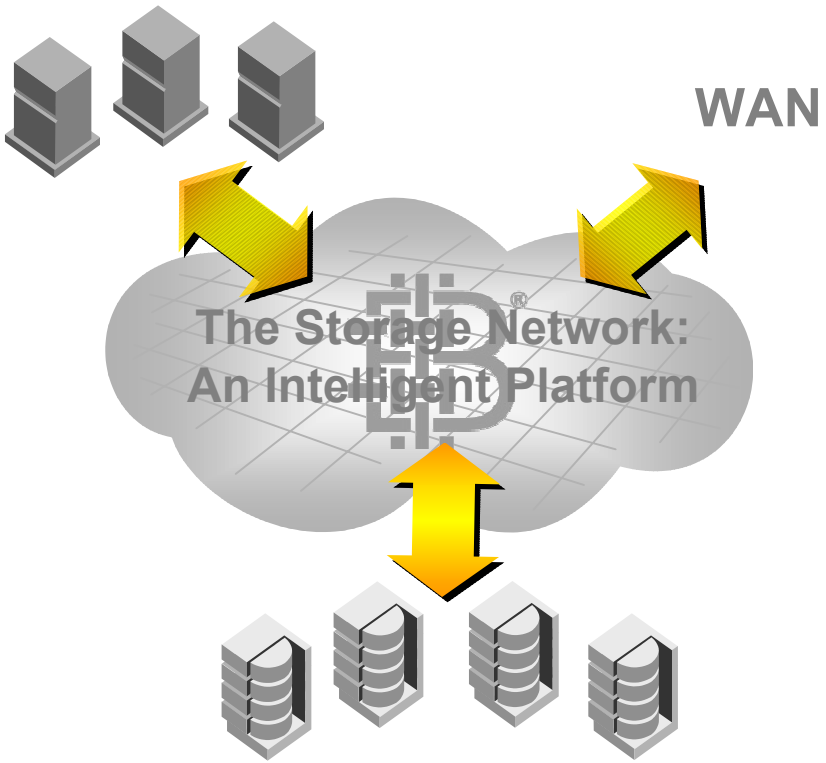
A Family of Solutions for all SAN Needs



Foundations of Intelligence



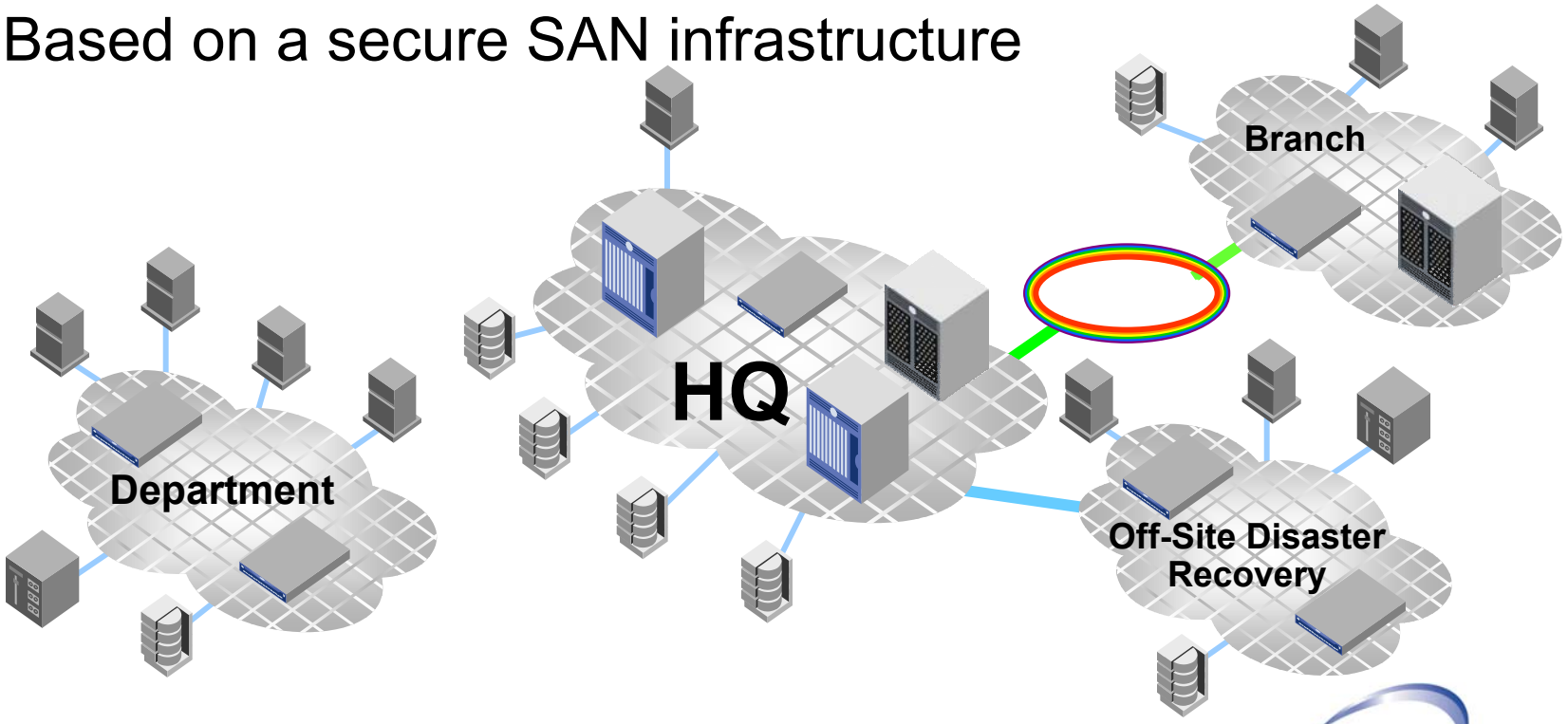
Extending the Intelligent Platform for Networking Storage



- Storage Virtualization
- SAN Subnets
- Intelligent QoS
- Next-generation SAN security
- Expanded Open API
- Extensible Switching Platforms

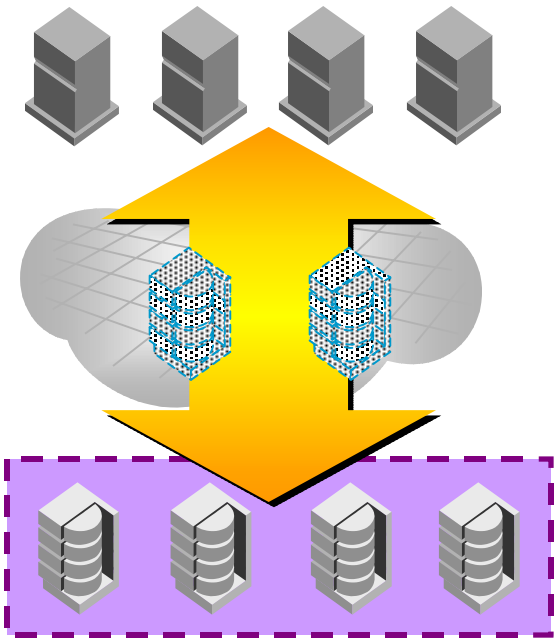
Brocade: The Intelligent Platform for Networking Storage

- Highest availability through a networking model
- A platform for business continuance and storage applications
- Simplifies administration and management
- Based on a secure SAN infrastructure



Future Direction

Advanced Fabric Services *Directions*: Switch Based Storage Virtualization



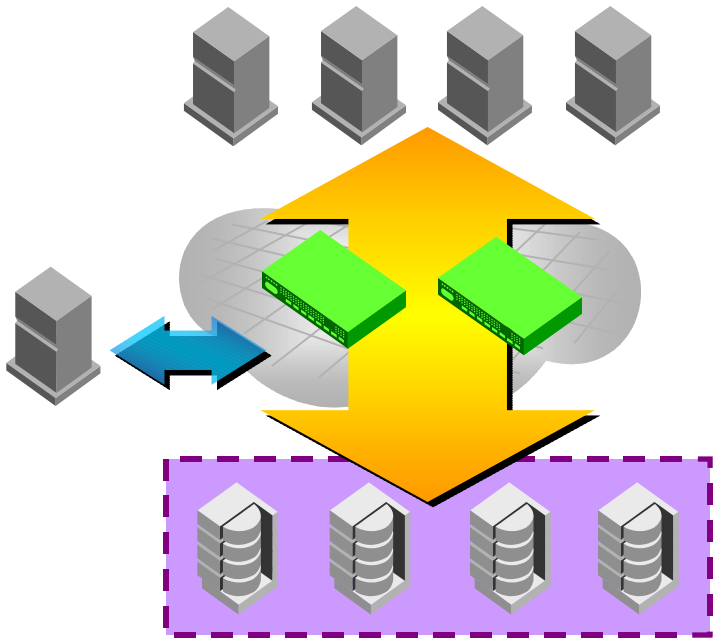
Storage Virtualization creates logical pools from physical storage

- Allows applications to see “virtual” disk volumes
- Translates “virtual” volume access to physical volume access
- Liberates applications from physical storage configuration limits

Benefits:

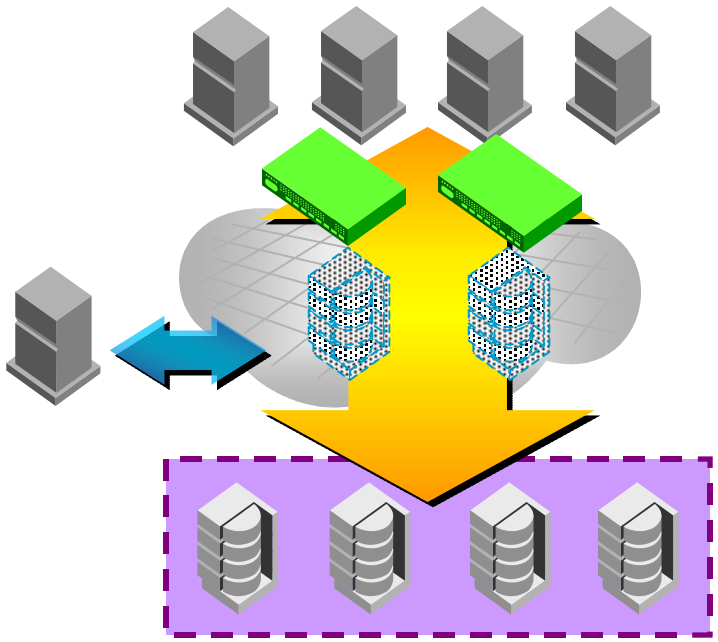
- Seamless expansion of application data across storage arrays
- Optimal use of storage resources
- Instant allocation of new storage
- Online migration of data

Switch-based Virtualization Platform



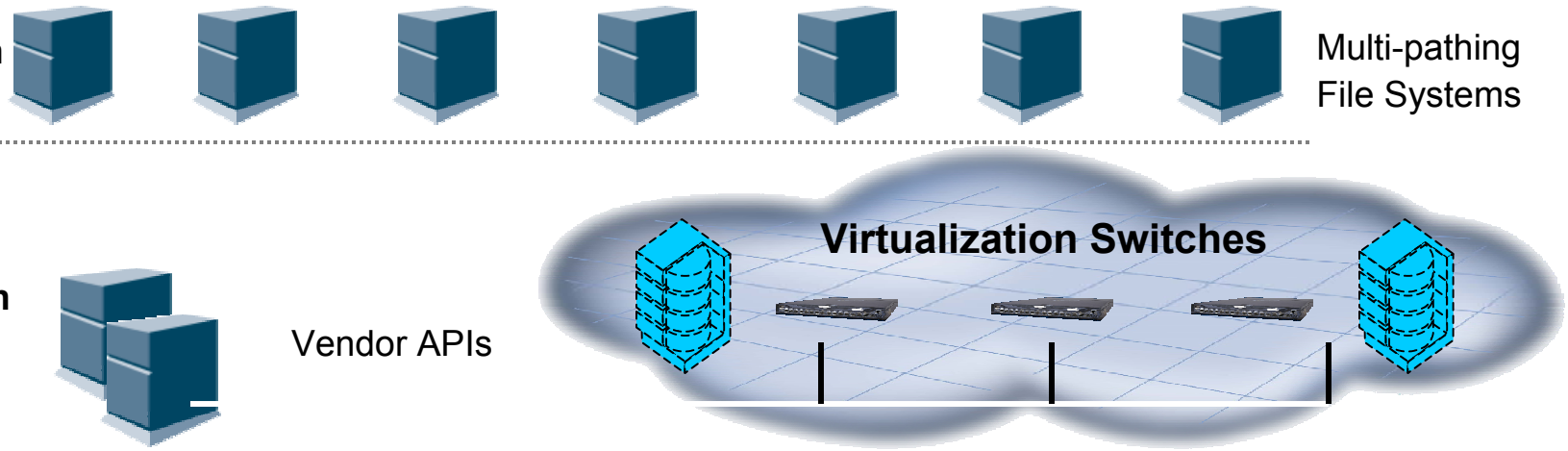
- Switch-based virtualization provides distributed, high-performance virtual-physical translation
- Centralized management and security reduces effort and complexity
- Complements host or array-based virtualization
- Enables reduced server and O/S administrative complexity
- Scalable foundation not limited by host or storage device, but rather the networkability of the switch fabric

Brocade Switches Optimized for Distributed Storage Virtualization



- **Brocade switches will enable high-performance, highly scalable fabric-based virtualization**
- **Integrated, wire-speed virtualization in a fabric switch**
- **Enabler for OEM and third-party virtualization applications**
  - Centralized management, security
  - Distributed data path
- **Compatible with multiple virtualization applications**
- **Highly scalable**
- **Integrated with Brocade Advanced Fabric Services**
- **Compatible with installed base of 1.5 million SAN ports**

Fabric-based Virtualization Functions

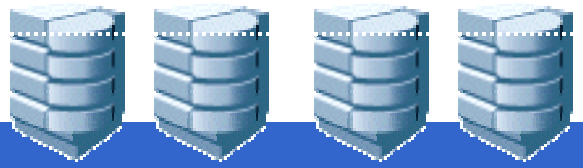


✓ Centralized Virtualization management:
- Centralized discovery, allocation and control of storage
- No changes to application servers

✓ Compatible with multiple virtualization applications

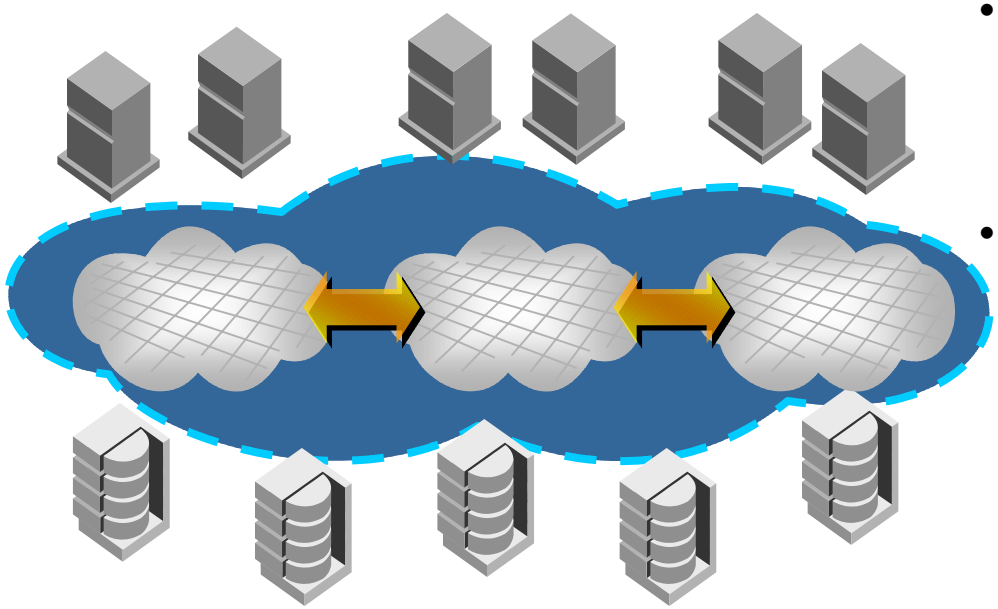
✓ Scalable, distributed I/O redirection functions
- Re-map I/O at wire speed
- Multiple I/O redirectors for speed, availability

✓ Integrated with SAN security features



Advanced Fabric Services *Directions*: Inter-Fabric Switching

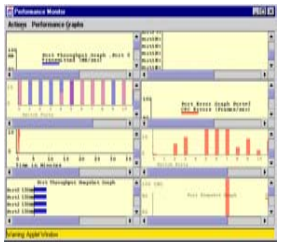
SAN Subnetting



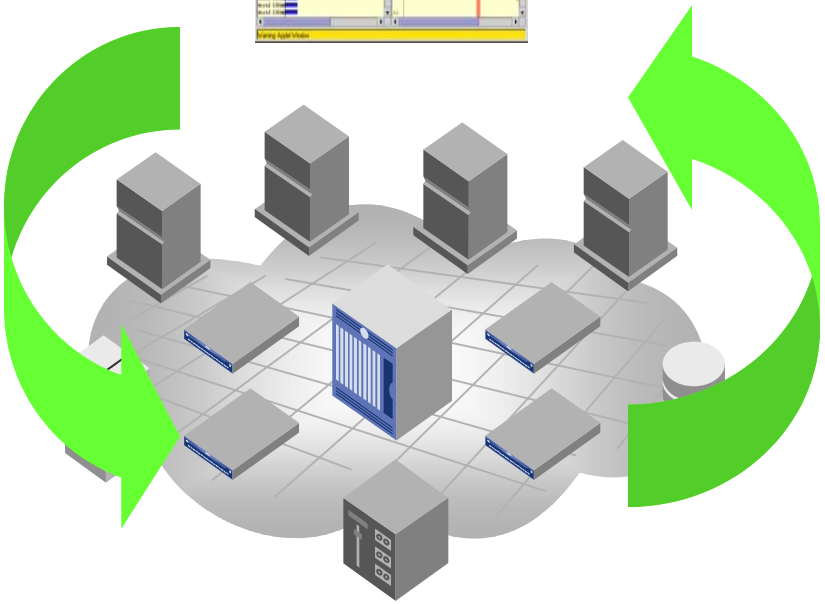
Accelerating Corporate SAN Growth

- SANs start as small networks
  - Project specific
  - Different storage vendors
- Barriers to merging project SANS
  - Organizational
  - Vendor support
- Inter-Fabric Switching
  - Allows selective connectivity between separate SAN islands
  - Shares resources at wire speed
  - Maintains separate management and support domains
- Servers see single “Virtual” Fabric
- Ensure seamless growth while protecting existing investments

Advanced Fabric Services *Directions*: Intelligent Network Quality of Service (QoS)



Partner application controls network usage based on policy



Performance monitoring provides real-time and historical usage trends

- ***Optimize application performance***
- ***Optimize network asset utilization***
- ***Meet service level agreements***

Thank You

Brocade Communications Systems, Inc.