



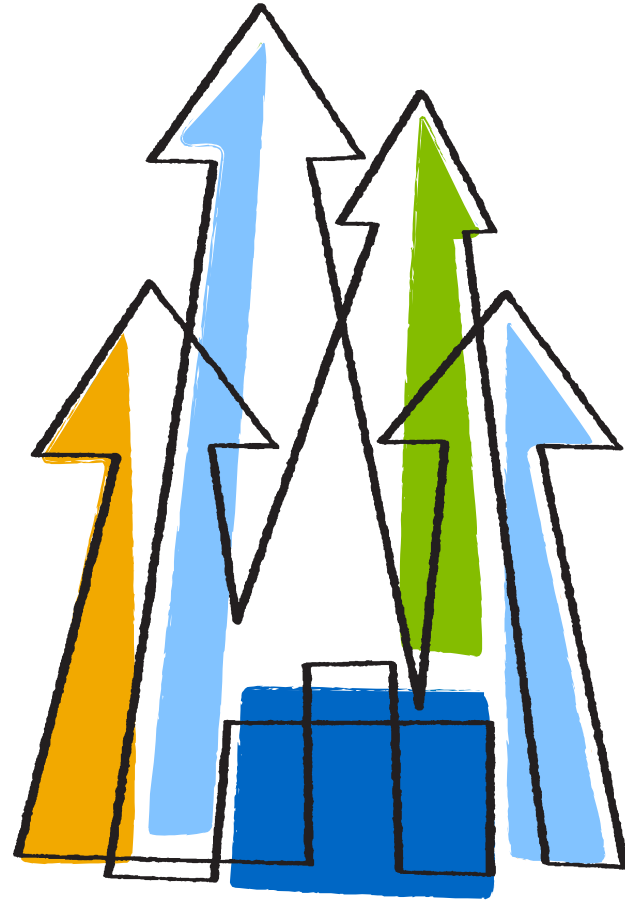
NetApp®

Storage Service Automation for Cloud

Jitender Arora

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Don't be like Dilbert





Agenda

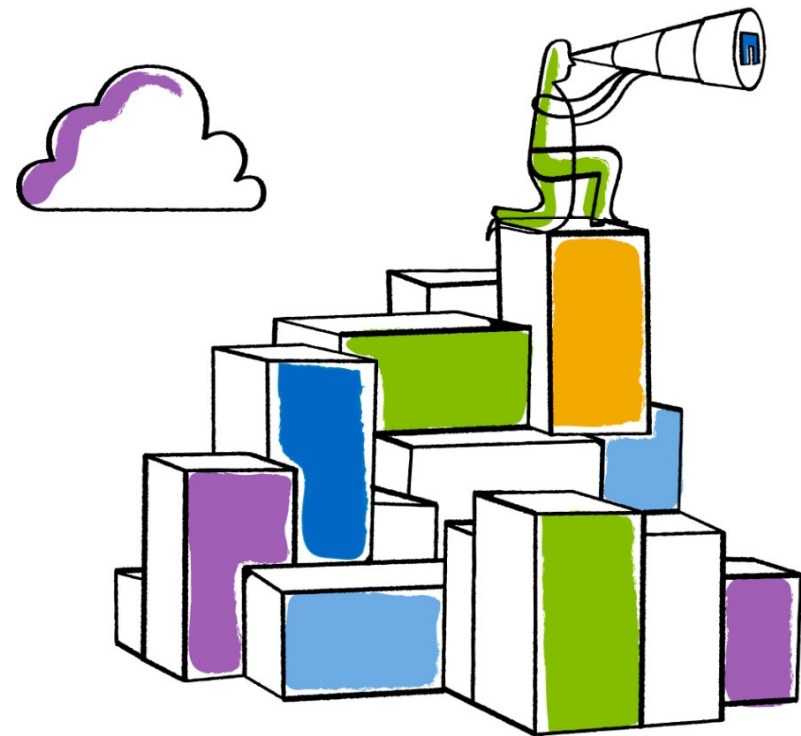
- Introducing NetApp
- Services Oriented Architecture
- NetApp enabling Technologies
- Enabling Storage Service Automation
- Introducing SDK
- References
- Next Steps



Go further, faster®



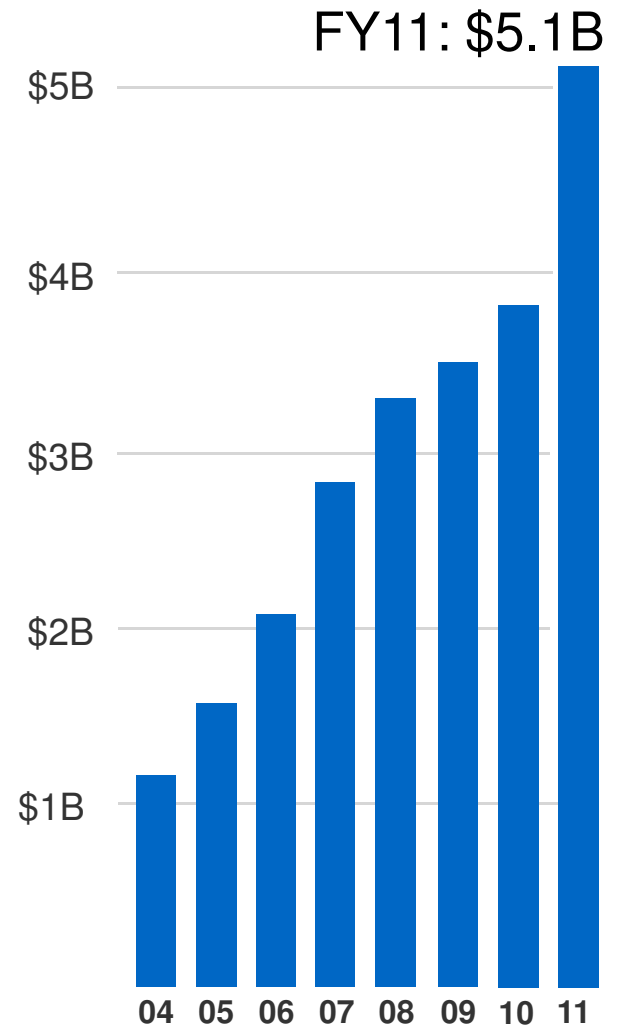
Helping Customers Go Further, Faster





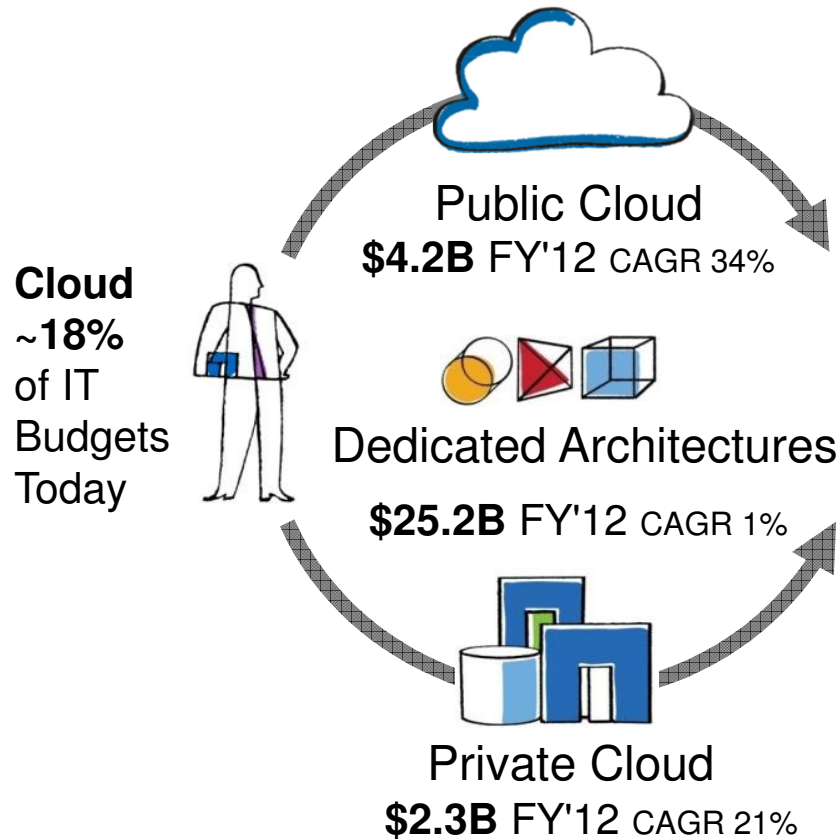
Customer Success Fuels Our Growth

- Broad solutions portfolio
- Industry-leading partners
- 11,000+ employees
- Comprehensive professional services
- Global support
- 150+ offices around the world
- 20% 5-year CAGR





IT Leaders Are Exploring Alternatives



Embrace Service Providers?
Delivering new levels of cost efficiency and responsiveness

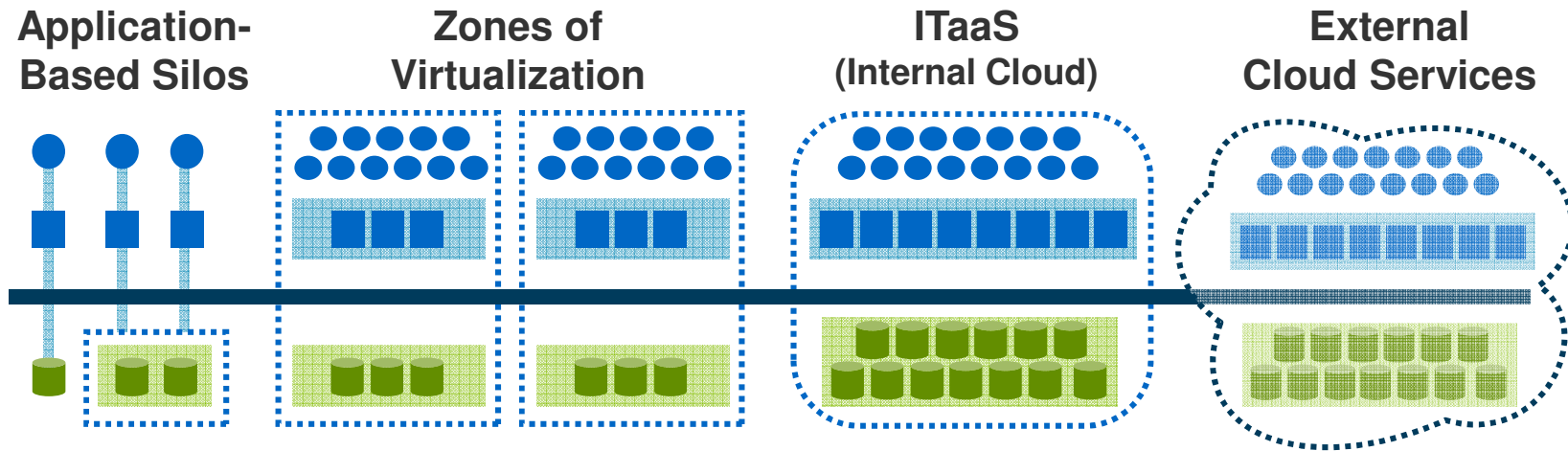
Build a Private Cloud?
Compete on cost and deliver business enablement

NetApp Can Help Them Do Both

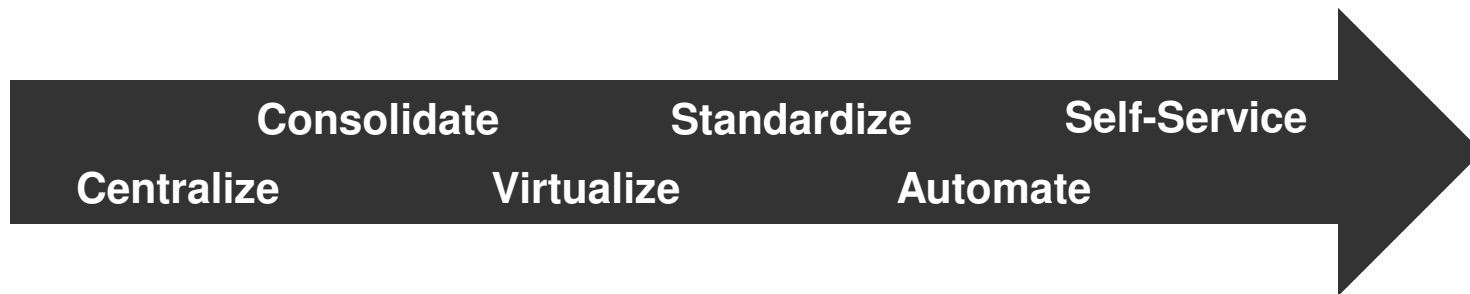
Sources: IDC, IT Hardware for Cloud Forecast 2010, DRAFT April 2011 • 2010 IDG Enterprise Cloud-based Computing Research, November 2010



One Shared Vision and Journey

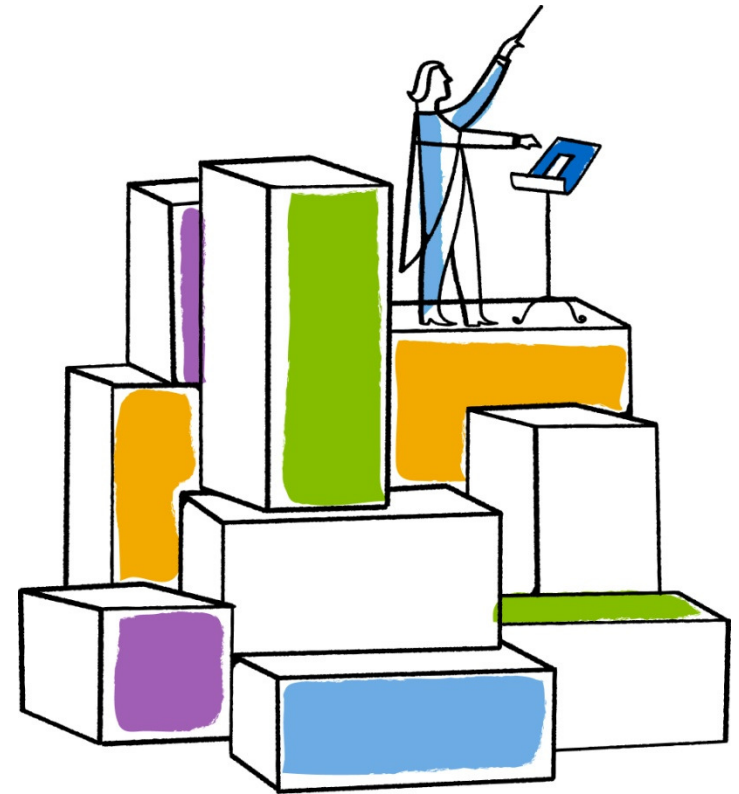


- Cisco and NetApp deliver the proven journey.
- Where are you on this journey?





Service Oriented Architecture





Enabling the Path to Private Cloud

Service Requirements

- Define your services
- Optimize your service delivery
- Rapidly deploy your services
- Empower IT and your end users





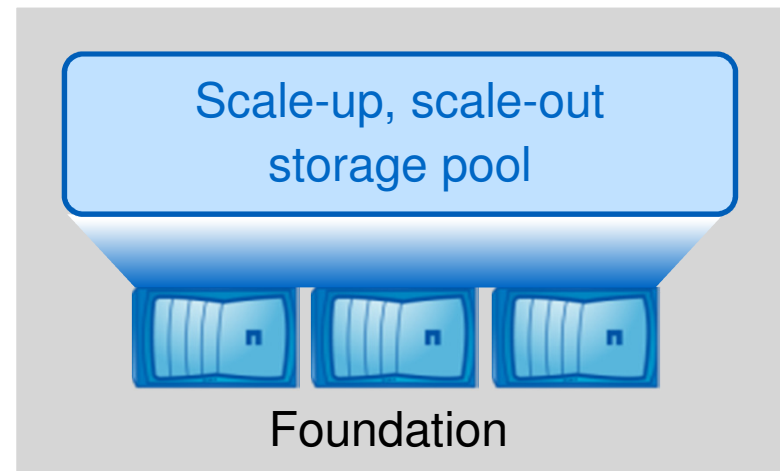
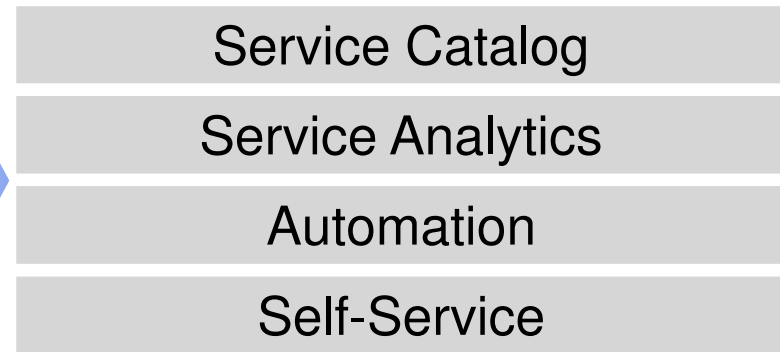
Enabling the Path to the Private Cloud

Service Requirements

- Define your services
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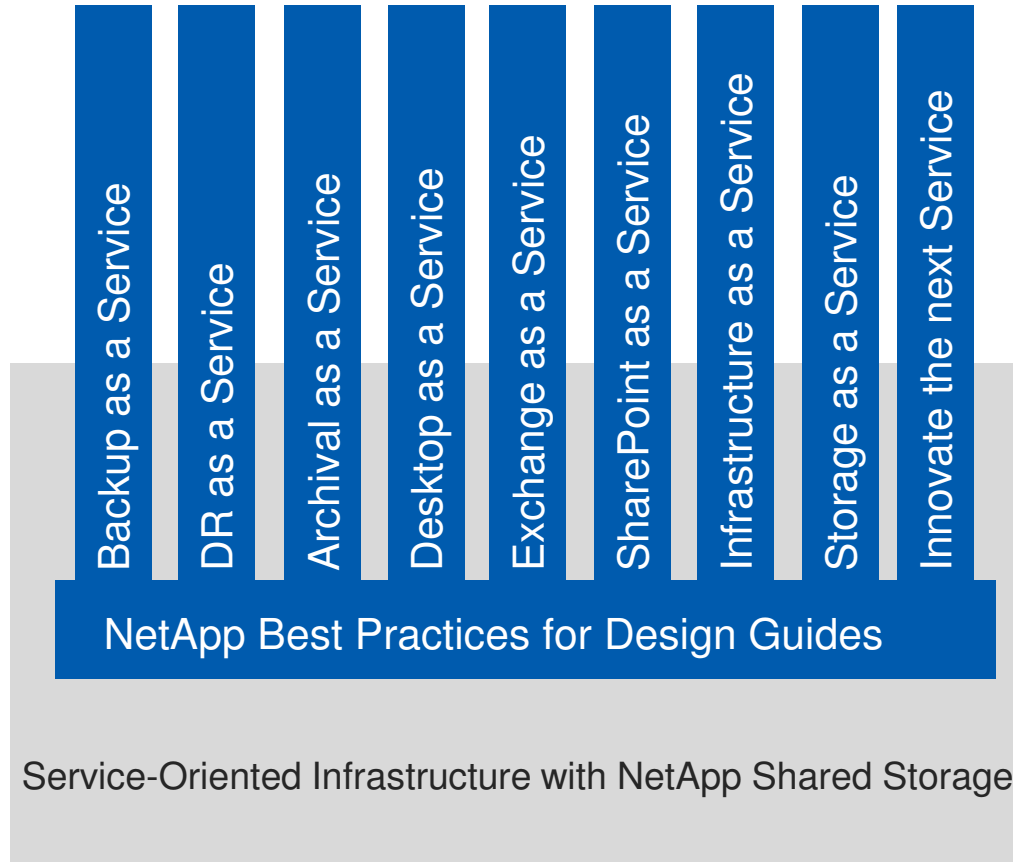


Fundamental Elements





NetApp Experience Accelerates Design

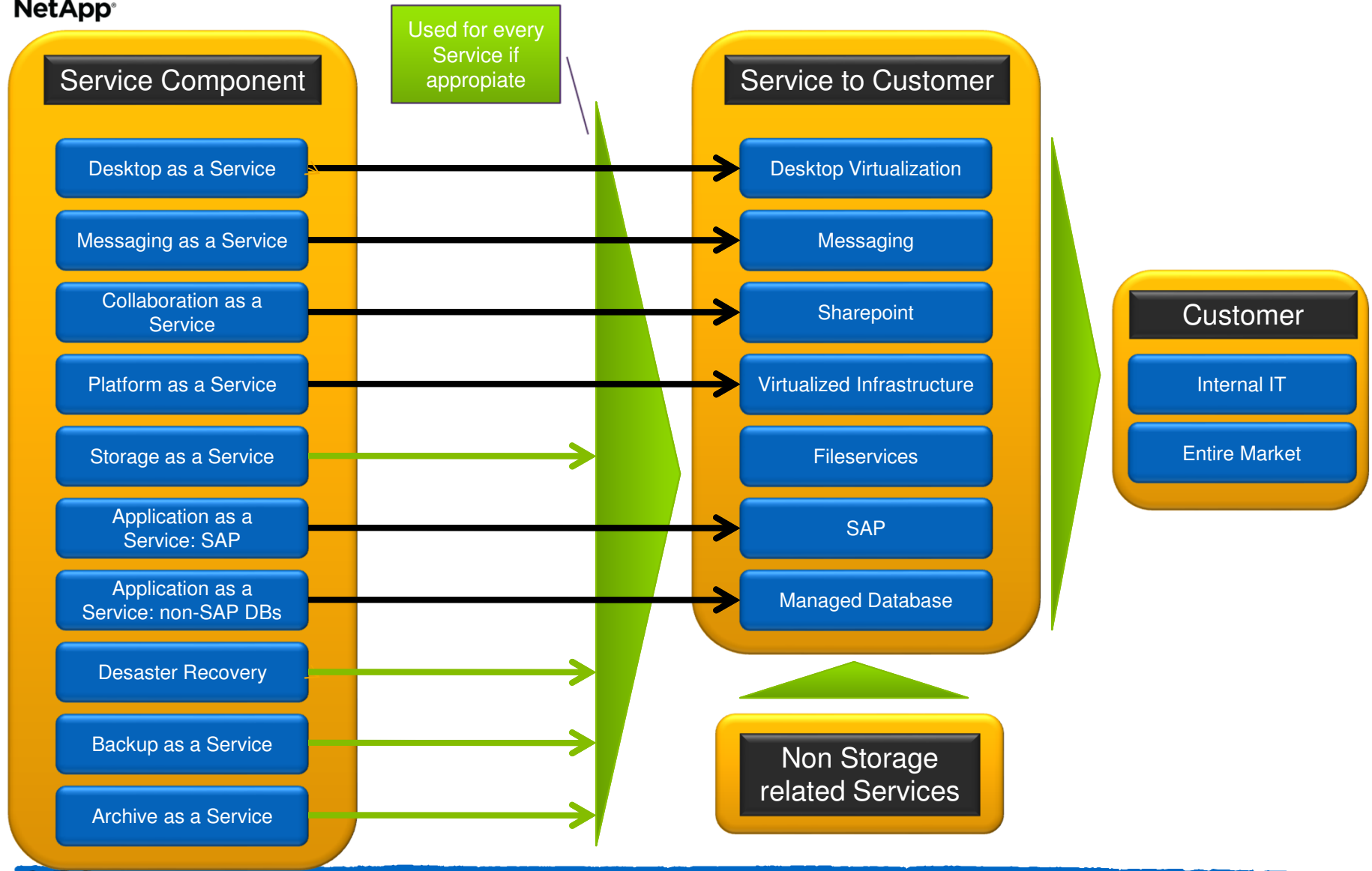


XaaS

- Storage aaS
- Data Protection aaS
- Backup aaS
- Desktop aaS
- Exchange aaS
- Infrastructure aaS

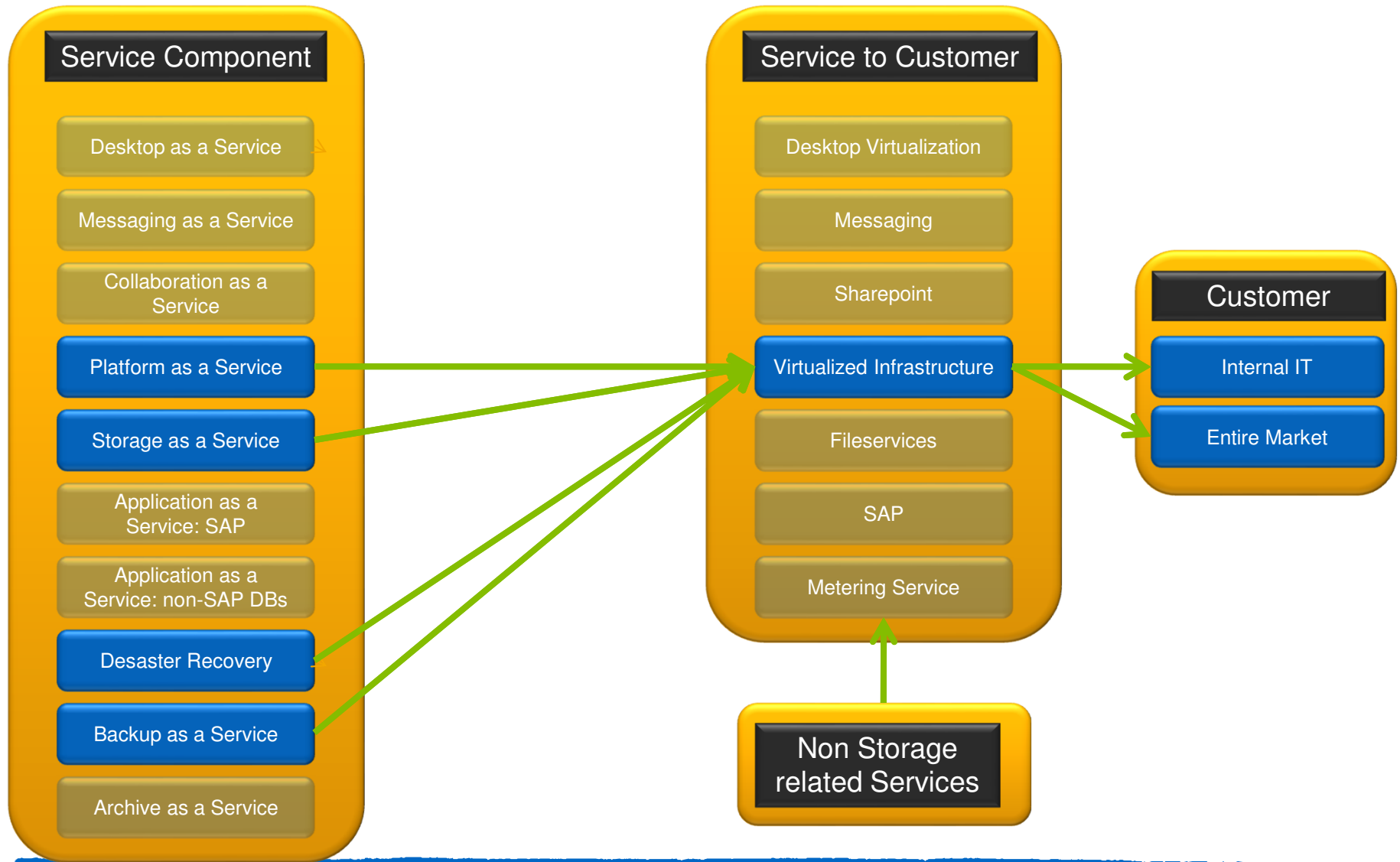


How Services are related



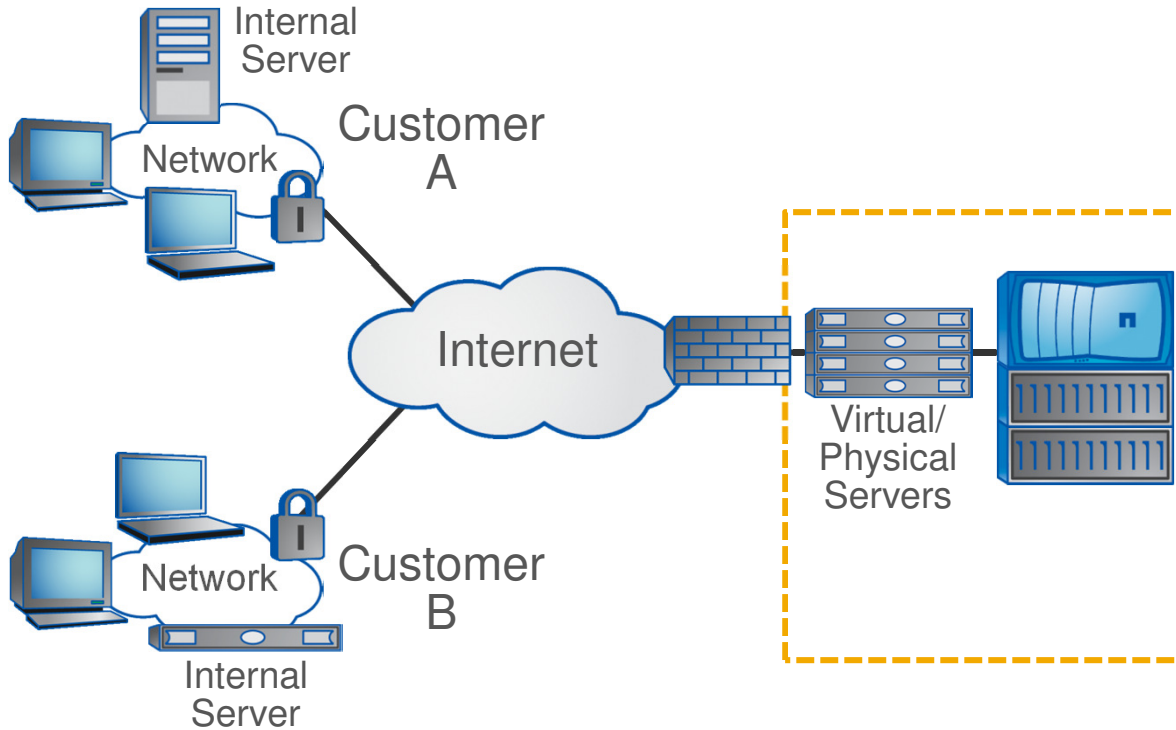


Example : Virtualized Infrastructure





Storage as a Service



What Is It?

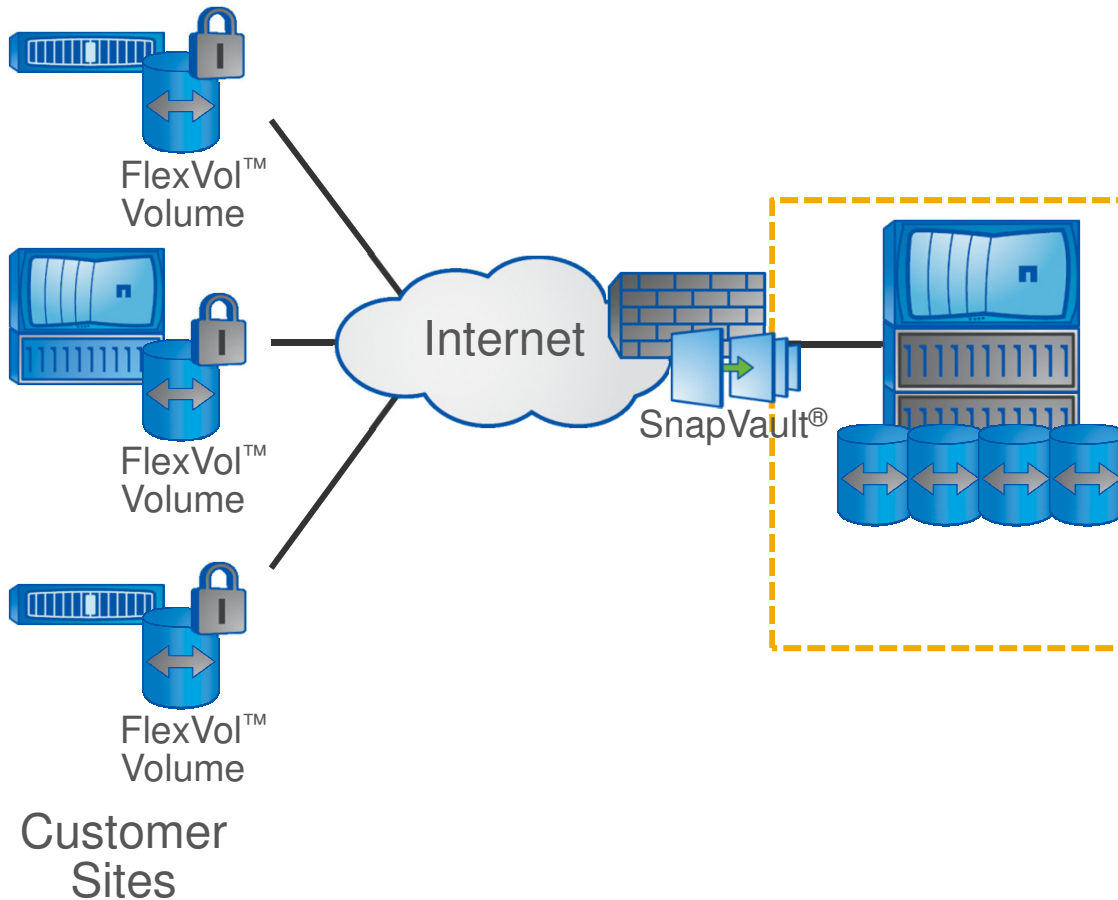
Provision and scale storage and network resources on demand

Key Technologies

- MultiStore®
- Thin Provisioning
- FlexClone®
- VMware Integration



Data Protection as a Service



What Is It?

Back up, archive, and perform disaster recovery either to or within a service provider

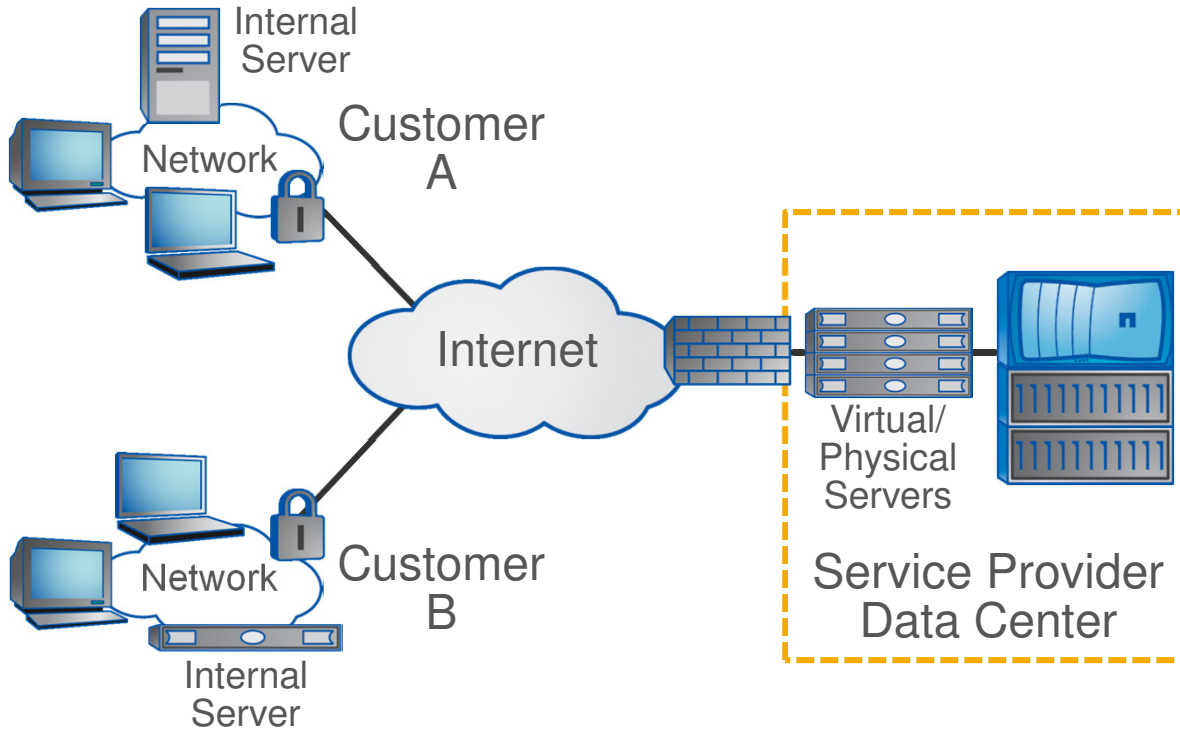
Key Technologies

- SnapVault®
- SnapMirror®
- Heterogeneous backup partners

* Imminent



Infrastructure as a Service



What Is It?

Provision and scale storage, compute, and network resources on demand

Key Technologies

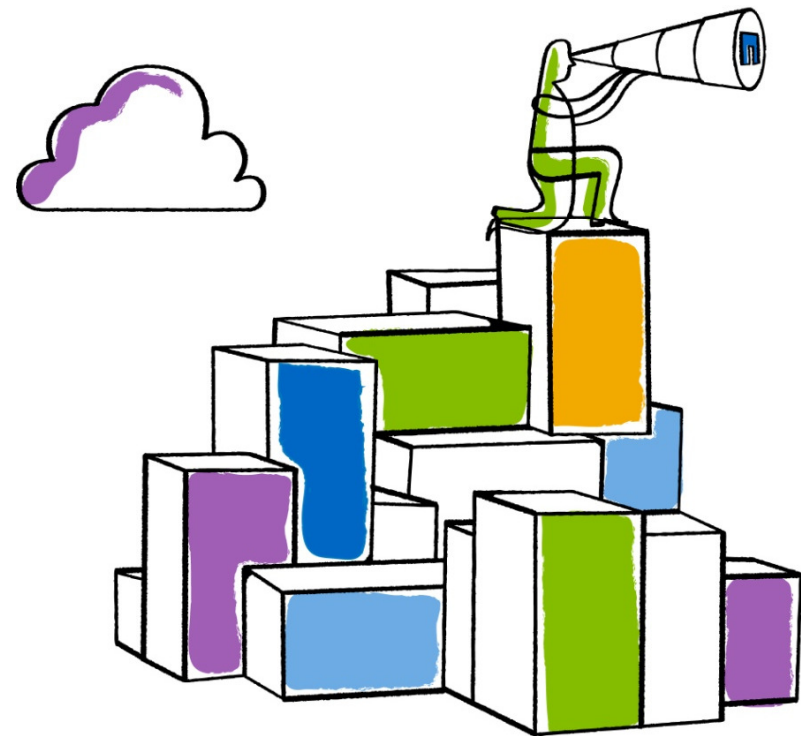
- MultiStore®
- FlexClone®
- VMware Integration



Go further, faster®



NetApp enabling Technologies





Efficient Platform for Storage as a Service

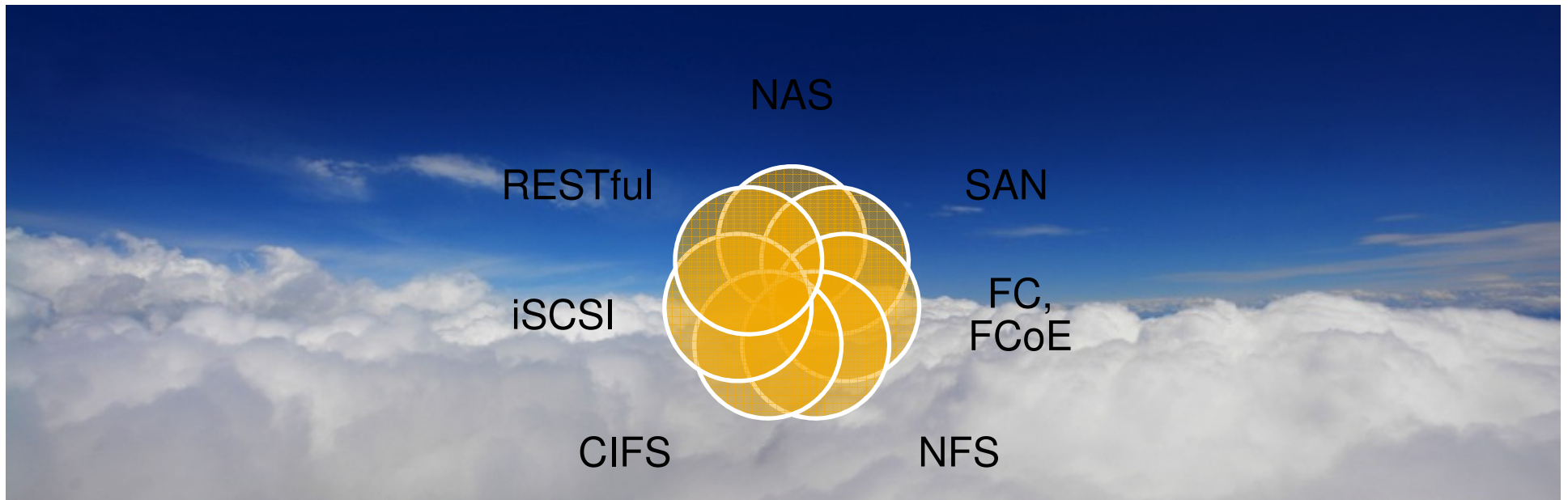


- Designed for lower cost and complexity
 - Single unified platform and management interface
 - Management integration with APIs enables interface with your management structure
 - Multiprotocol support including RESTful interface
- Lower overhead and higher profits
- Process efficiencies



Multiprotocol Support

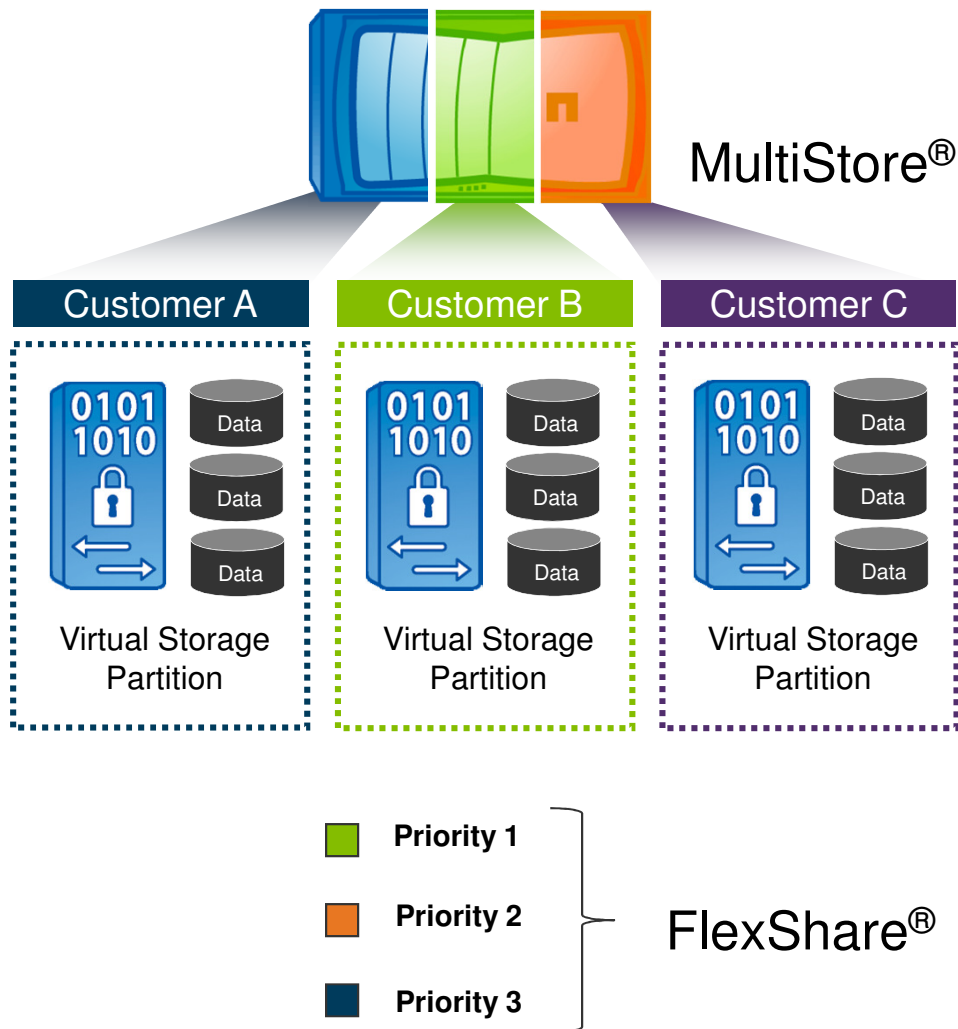
- Fulfill your customers' diverse requirements
- Multiprotocol access to a single pool of storage
- Maximum efficiency and flexibility for your service offerings
- Unified storage supports NAS, SAN, FC, FCoE NFS, CIFS, iSCSI, and HTTP-based REST protocols.





Secure Multi-Tenancy: NetApp

Partitioning Clients and Workloads



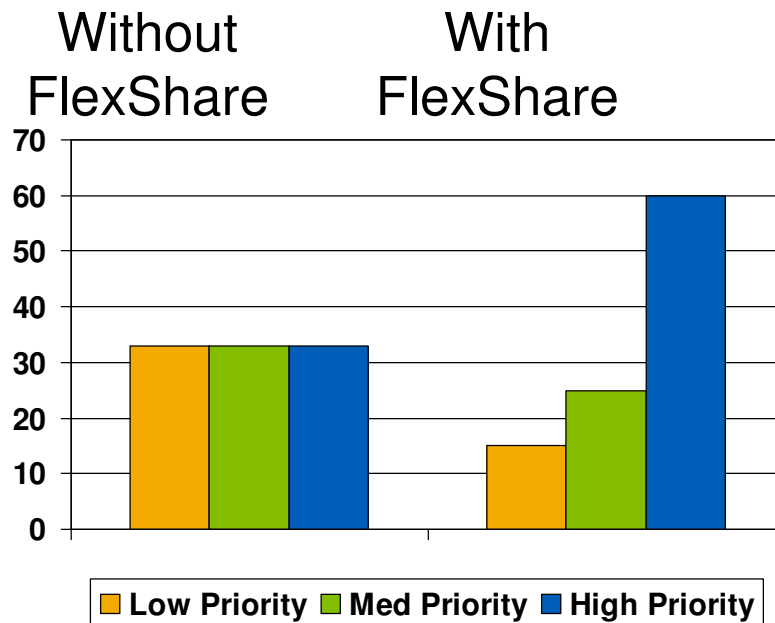
- Create secure virtual partitions within the same physical controller
- Increase storage utilization and efficiency in shared infrastructure
- MultiStore® is a proven technology with NetApp
 - Over 16,000 licenses sold



FlexShare

Gives Priority Service to Your Most Important Workloads

Performance by Workload



- Workload prioritization provides “class of service”
- Control of system and client workloads
- Disparate workloads can share a single system



Integrated Data Protection

Comprehensive Data Protection

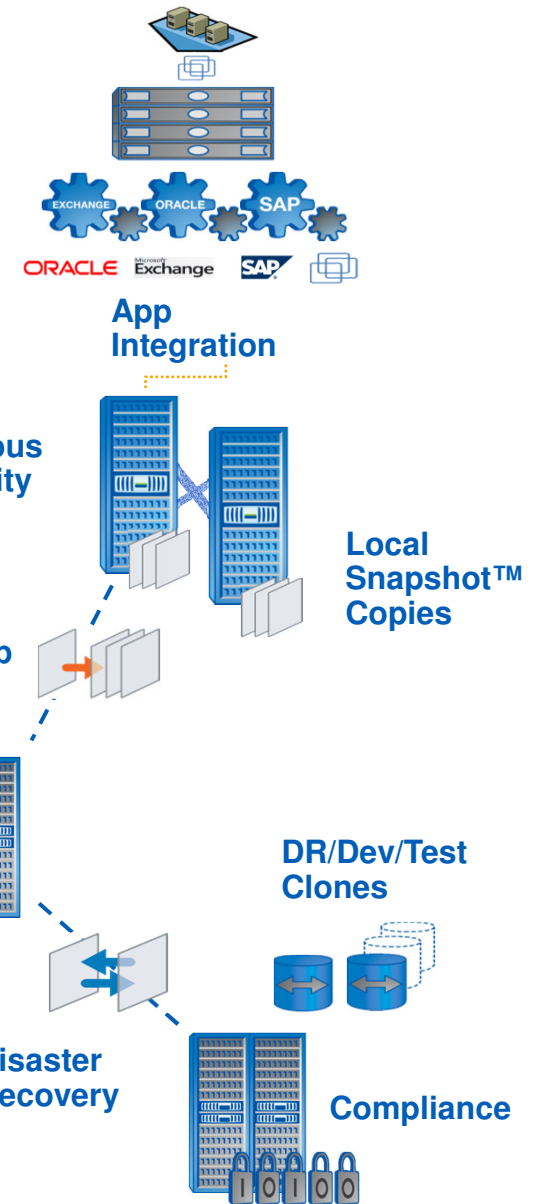
- Policy-based data management
- Application-specific data protection
- Full coverage for NetApp® and third-party data

Broad SLA Support

- 24x7 continuous data availability
- Extend to compliance (Sec 17a-4 and others)
- Adjustable RPO for backup and DR

Efficiency

- Up to 75% capex and opex savings
- Up to 95% smaller footprint and less network traffic
- Shrink backup from hours or days to minutes

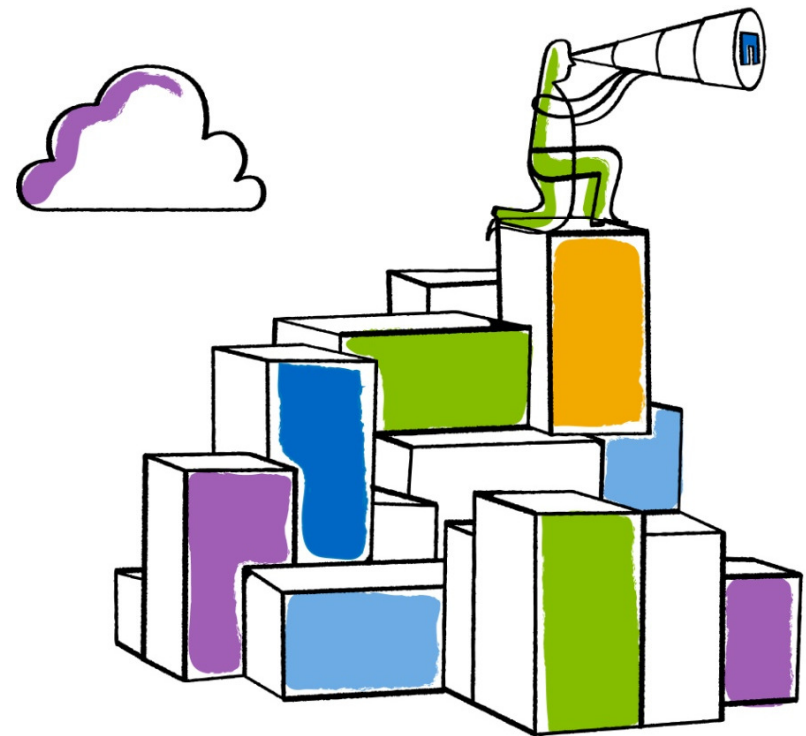




Go further, faster®



Enabling Storage Service Automation





Storage Service “Language”

Box-level Management

LUN Size	<input type="text" value="200"/> GB
Storage System	prod_stor_40
Aggregate	aggr4
Volume	fv_ora_21
Space Guarantee	none
Fractional Reserve	<input type="text" value="0"/>
Autogrow	<input checked="" type="checkbox"/>
Deduplicate	<input checked="" type="checkbox"/>
Local Backup Schedule	Hourly <input type="text" value="12@8-18"/> Nightly <input type="text" value="5@22"/> Weekly <input type="text" value="3@Sat"/>
Remote Backups	
Storage System	archive03
Aggregate	aggr1
Volume	archive_03
Remote Backup Schedule	Nightly <input type="text" value="24@22"/> Weekly <input type="text" value="50@Sat"/>
Disaster Protection	
Storage System	dr_stor_01
Aggregate	aggr8
Volume	fv_ora_dr_21
... and so on ...	

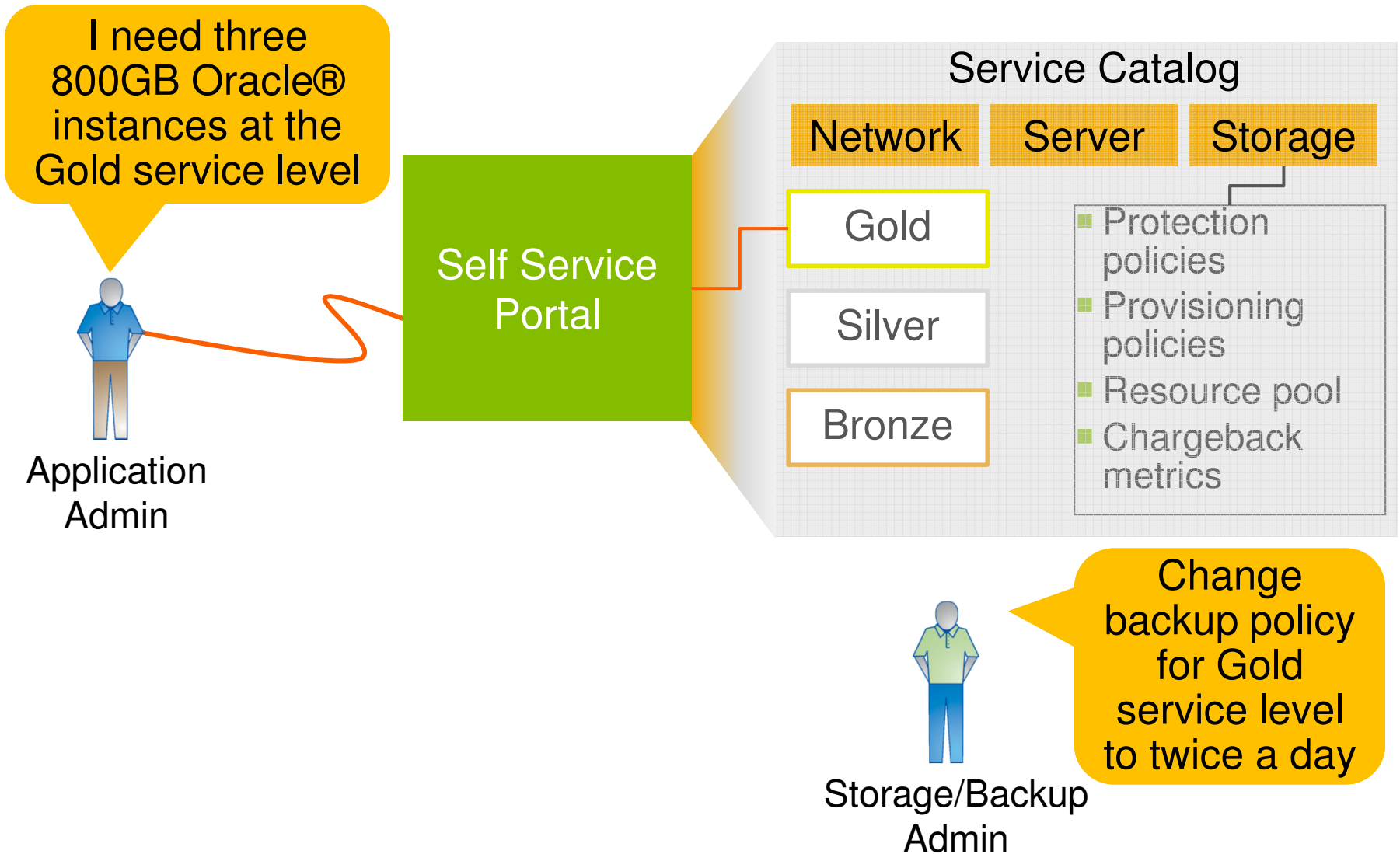


Service Level Management

LUN Size	<input type="text" value="200"/> GB
Service Level	<input type="radio"/> Gold <input checked="" type="radio"/> Silver <input type="radio"/> Bronze
What are the service levels?	



Service Automation – Storage





NetApp®

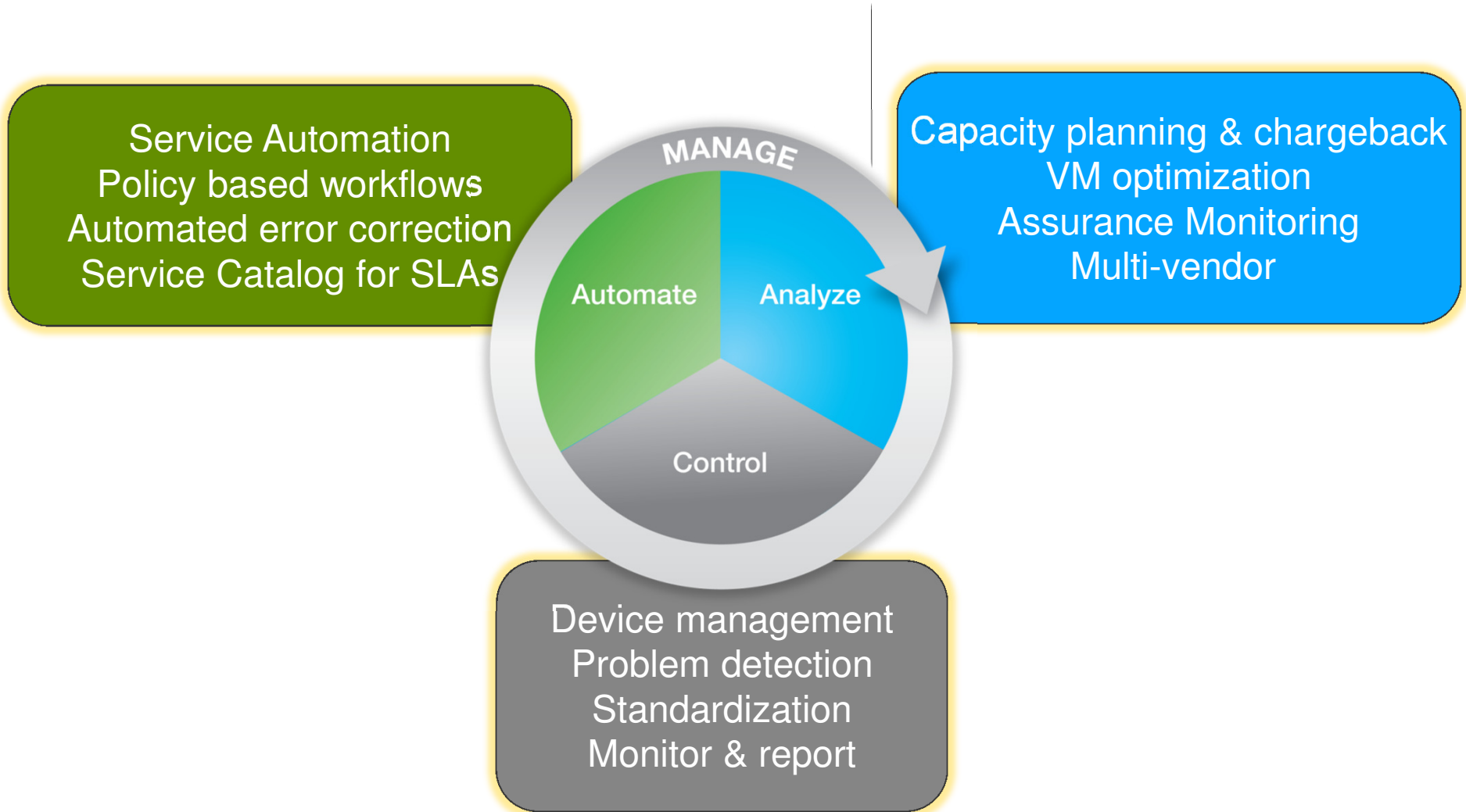
Sample Storage Service Level Agreements

Service Level	Definition
Gold	"5 9s" availability
	DR Replication: Synchronous or Async with 10 minute RPO
	Fully provisioned (guaranteed)
Silver	"5 9s" availability
	DR Replication: Asynchronous with 1 hour RPO
	50% oversubscription of capacity (thin provisioning, dedupe)
Bronze	99.995% availability
	Disk based backup with 24 hour RPO
	100% oversubscription of capacity (thin provisioning, dedupe)



What Is Effective Management?

Optimize Storage & Service Efficiency



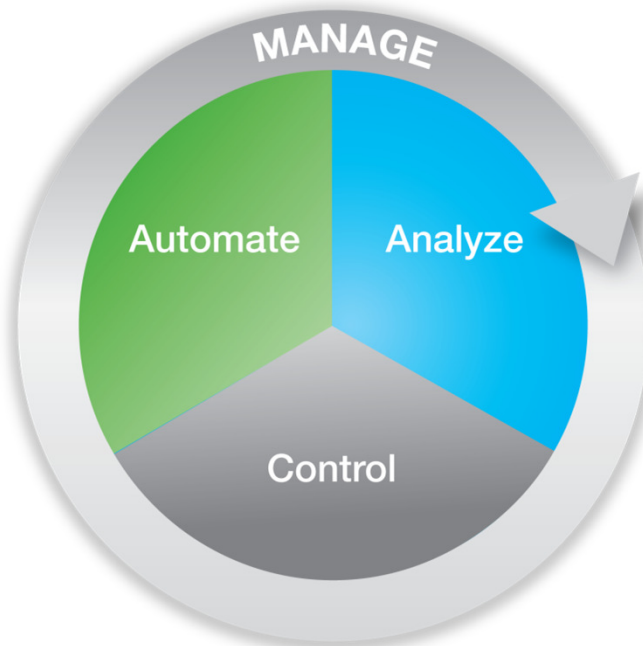


OnCommand Ecosystem Integration

APIs, SDK Provide Flexibility to Choose the Right Solution

Microsoft
vmware
CITRIX

Virtualization
Management



Custom
Management

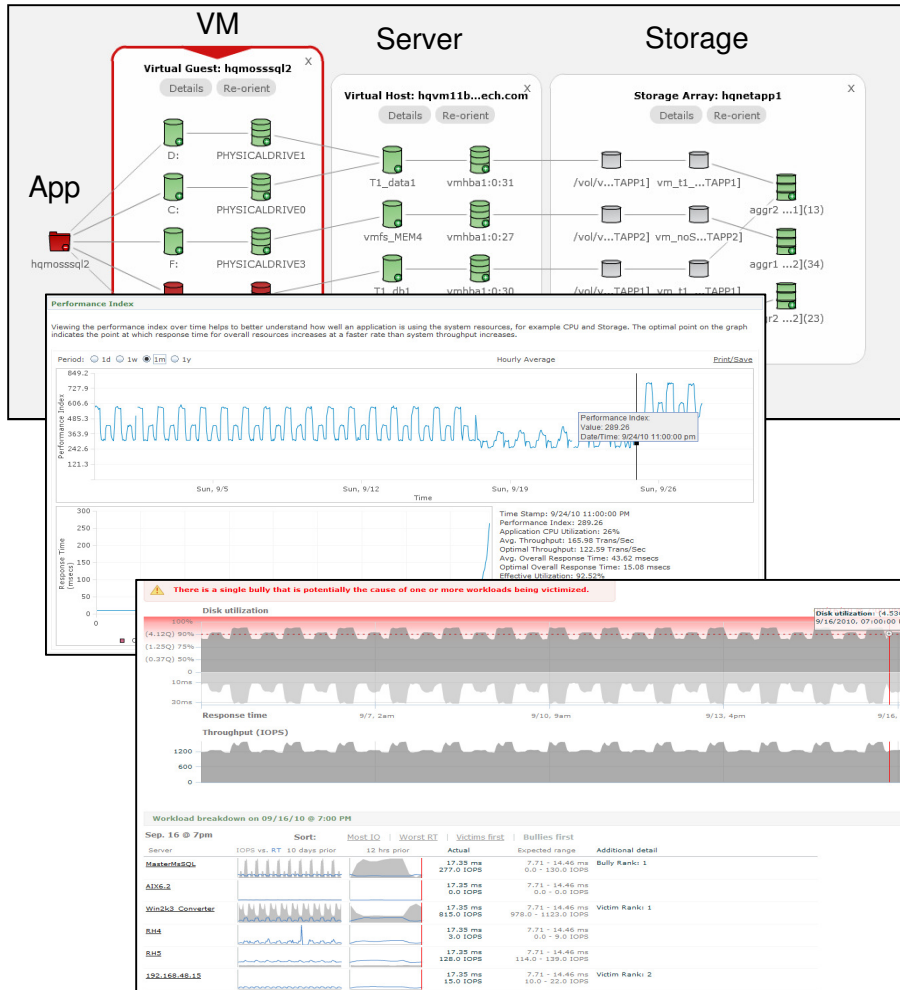
**In-House
Management
Tools**

Enterprise
Management





OnCommand Insight Balance (Formerly Akorri)



Know the Health of Your Infrastructure

- Map service health
- Optimize workloads
- Predict and resolve problems
- Get analytics that provide intelligence, not just a bunch of data



OnCommand – Unified Manager

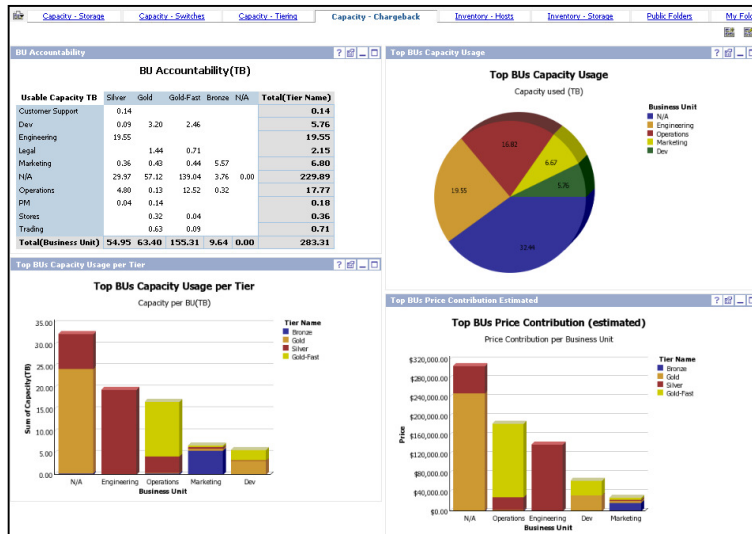


Deliver services efficiently

- Service catalog
- Automated provisioning and protection
- Unified and extensible policy infrastructure
- Uniform management across workloads
- Single configuration repository for reporting, event, & audit logs
- Integration with VMware® and Microsoft® Hyper-V™

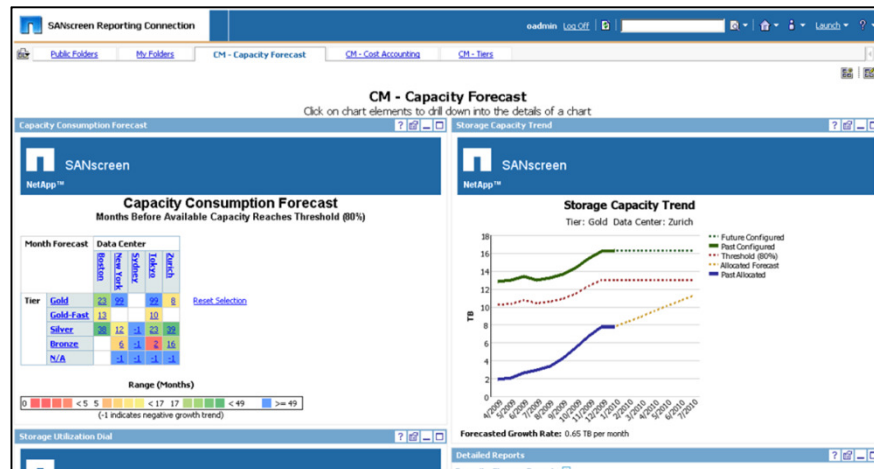


OnCommand Insight Assure, Plan, Perform (Formerly SANscreen)



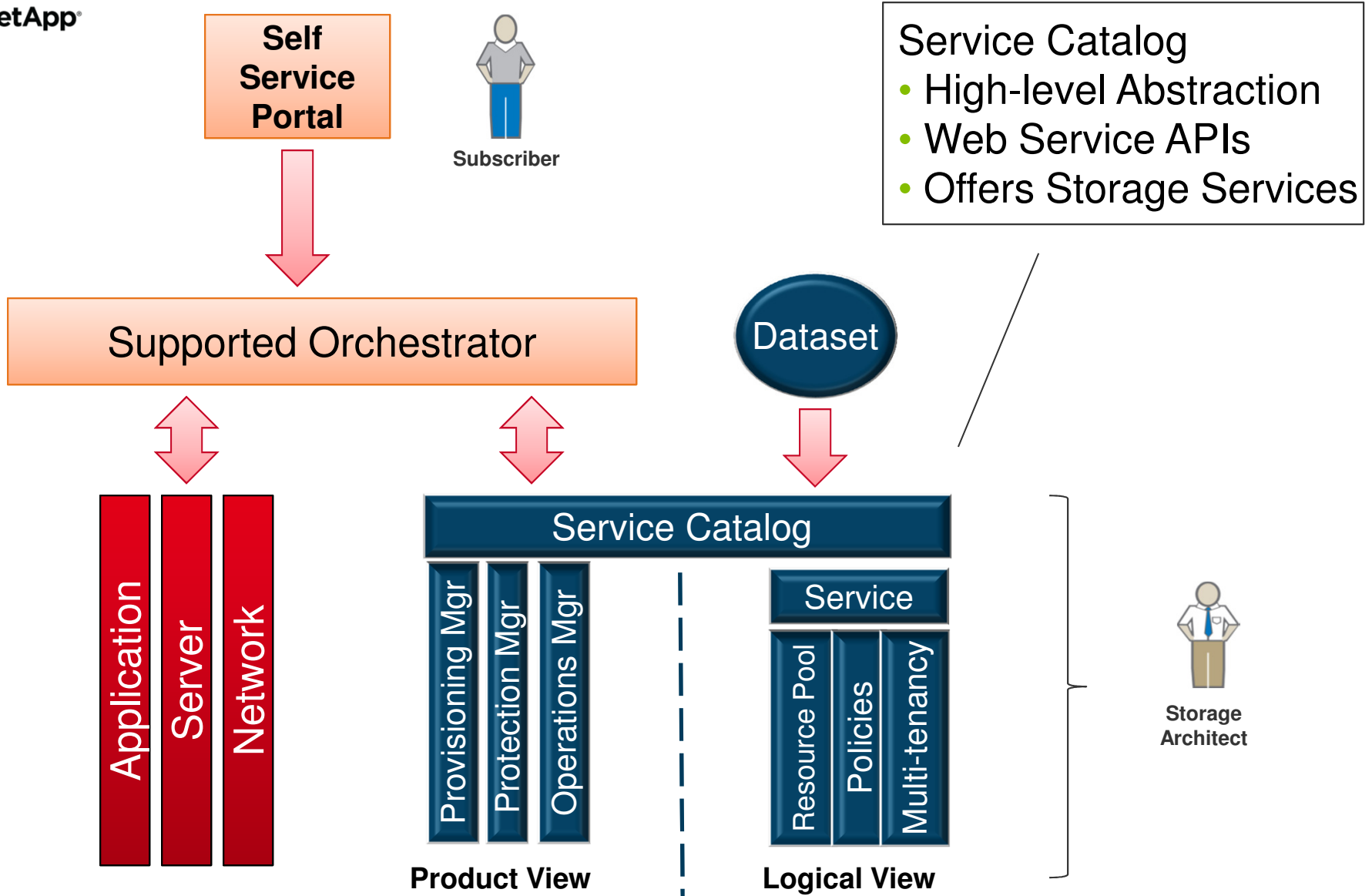
Optimize and Plan Your Services

- **Assure**
 - End-to-end visibility
 - Set policies and best practices
 - Plan and validate changes
- **Perform**
 - Correlate resources to applications
 - Manage, optimize resources
- **Plan**
 - Manage and plan capacity
 - Trend, forecast, report
 - Enable chargeback



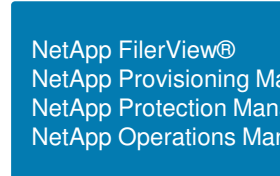
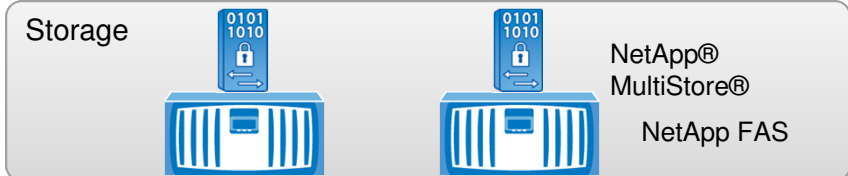
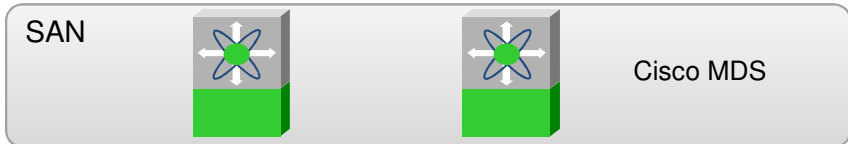
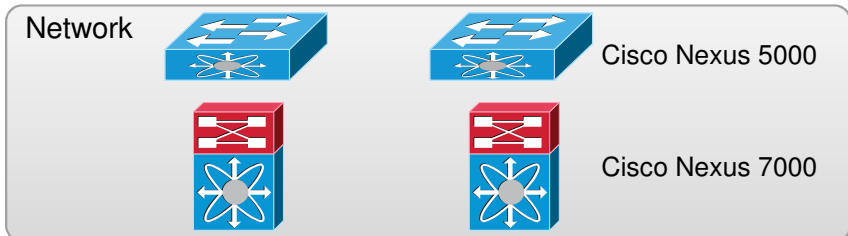
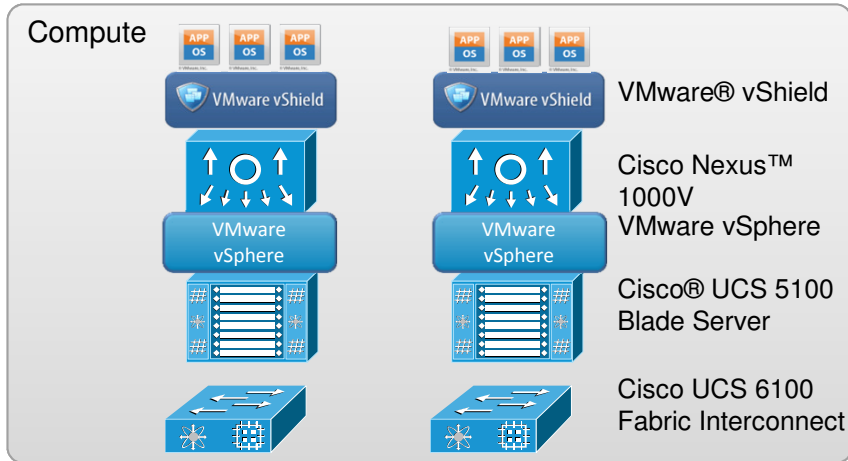


Data Center Automation





Secure Multi-Tenancy: Cisco, NetApp, VMware Components



Compute

- VMware vShield
- VMware vSphere
- Cisco Unified Computing System

Network

- Cisco Nexus 1000V
- Cisco Nexus 5000
- Cisco Nexus 7000
- Cisco MDS

Storage

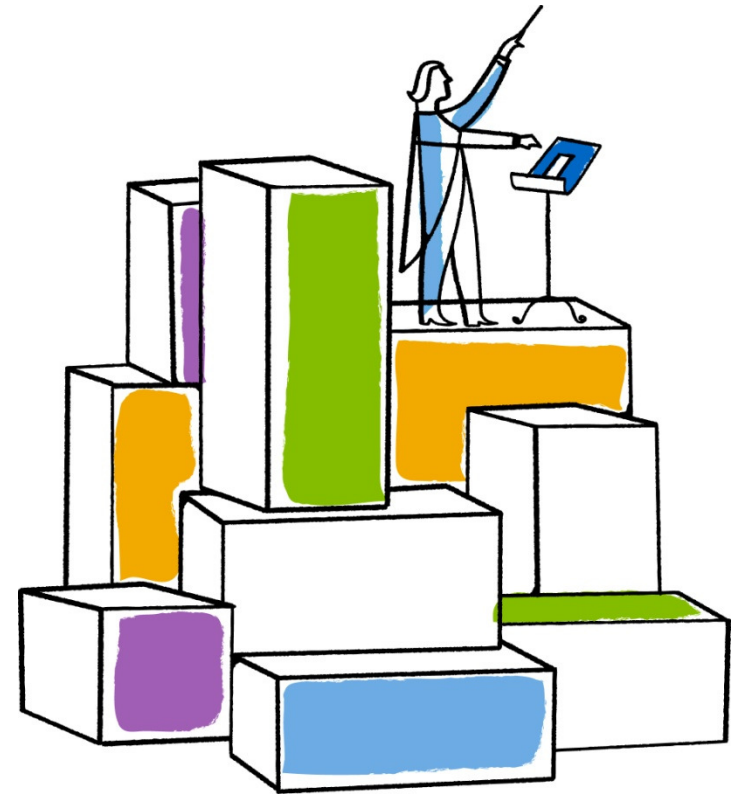
- NetApp FAS
- NetApp MultiStore

Management

- VMware vShield Manager
- VMware vCenter
- Cisco UCS Manager
- Cisco DC Network Manager
- NetApp Operations Manager
- NetApp Provisioning Manager
- NetApp SANSscreen® and SnapManager®

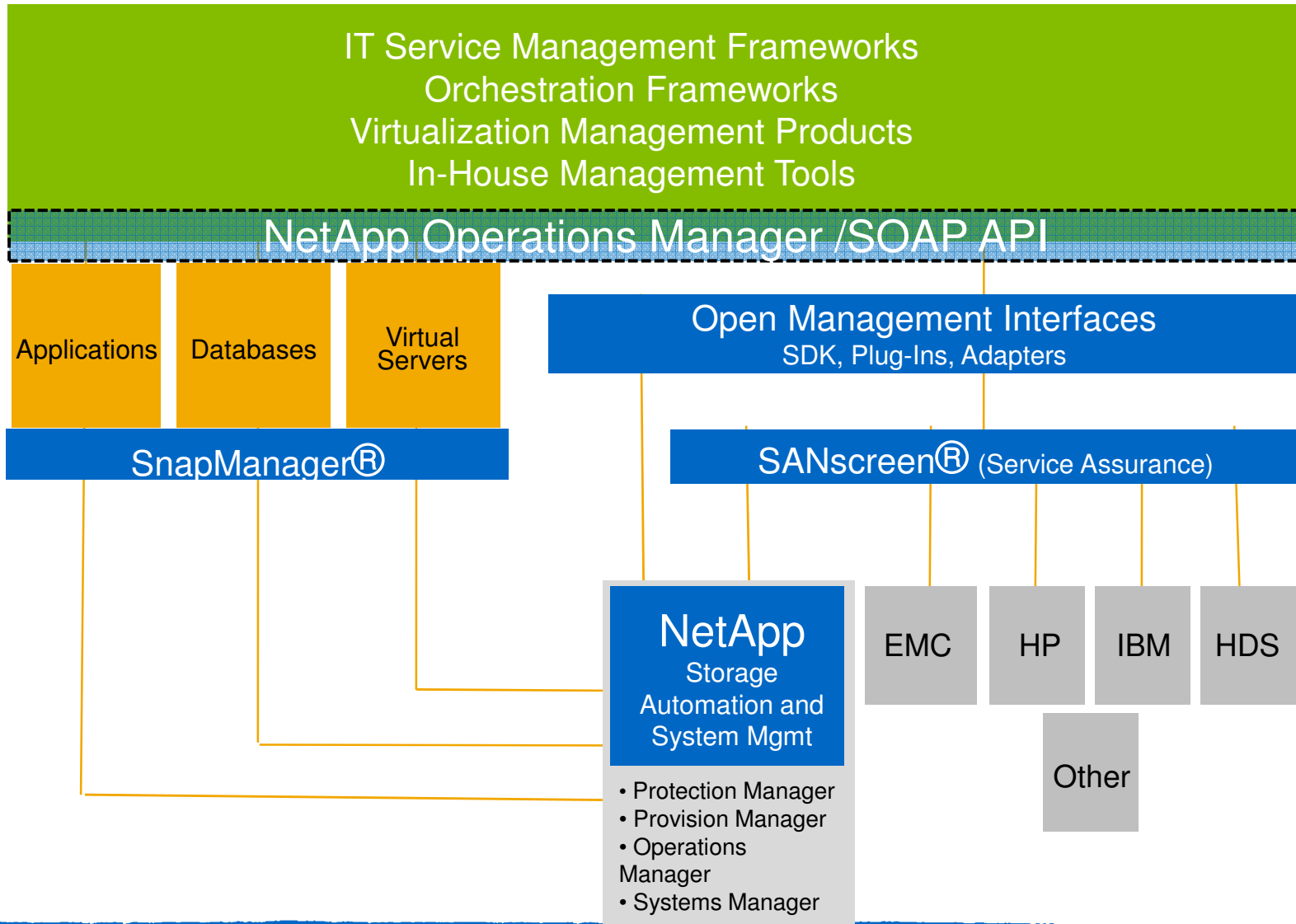


Introducing NetApp SDK



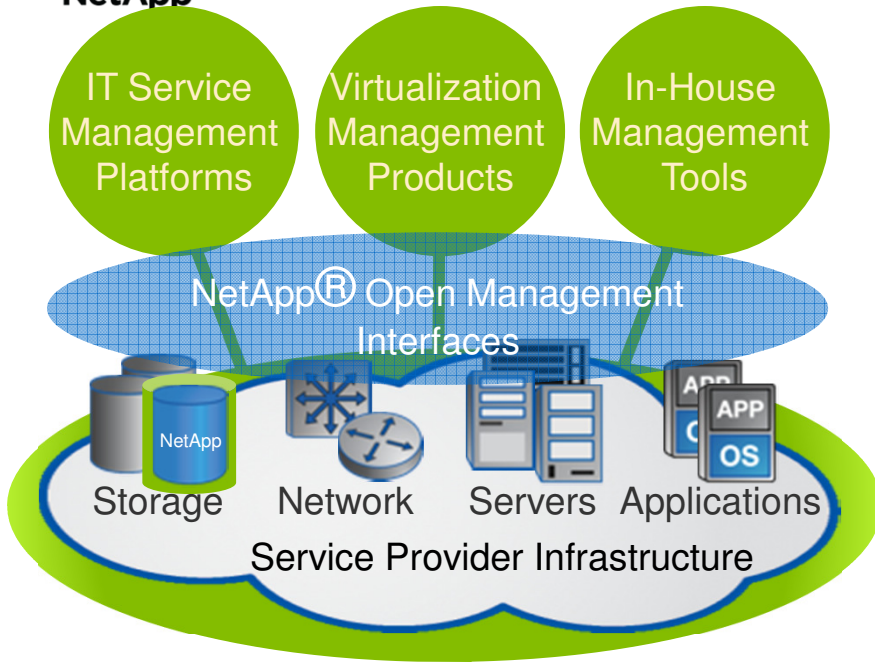


NetApp Open Management





NetApp Open Management Interfaces



- Enables IT service management and orchestration platforms to manage NetApp storage
- Adapters and plug-ins enable management of NetApp storage from overarching virtualization management products
- Enhanced management of NetApp storage using in-house management tools

NetApp Manageability SDK Available FREE Through NetApp Communities

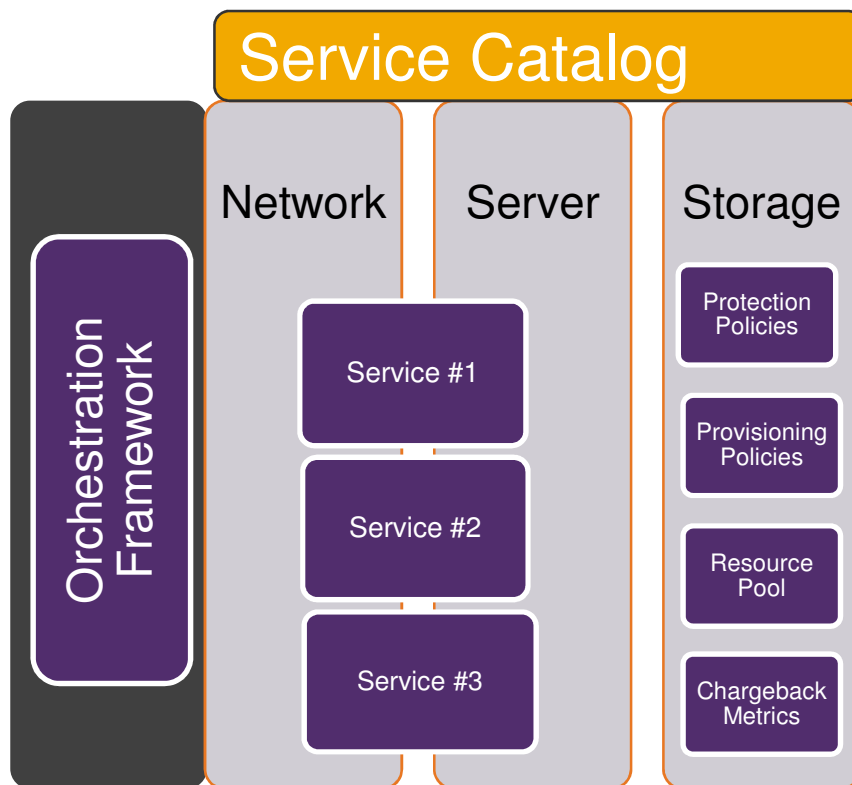


NetApp Manageability SDK Key Features

- Complete set of open interfaces and necessary tools to integrate with manageability software (Operations Manager, Provisioning Manager, and Protection Manager)
- SDK API library bindings in C, Java™, Perl, and .Net
- Support for all industry-leading operating systems
 - Windows®, Linux®, AIX, HP-UX, Solaris™, VMware® ESX
- Sample code and developer tools
- Solution guide: Storage Provisioning Automation
- Download and support via the NetApp Communities Web site
- Fully supported by NetApp Global Services



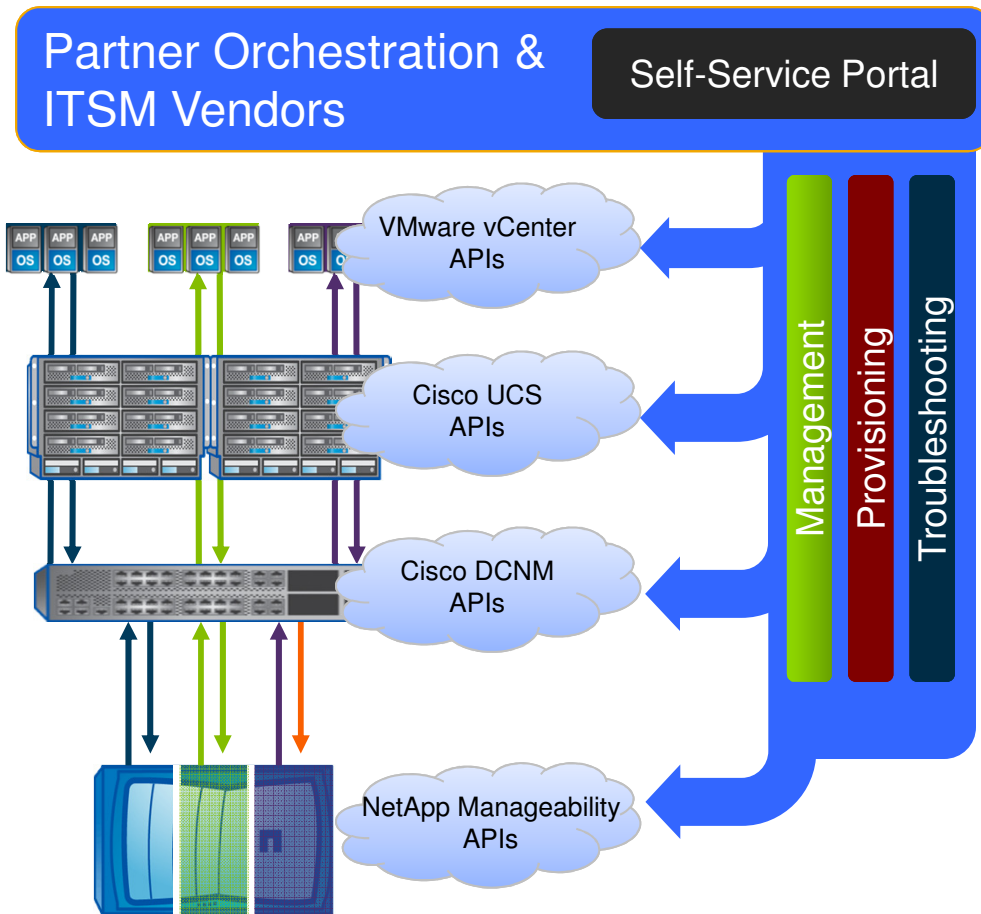
Automation, Service Assurance and Chargeback Metrics for Storage



- Automate provisioning and protection policies
- Monitoring, alerting, reporting, capacity and performance management for NetApp storage
- Access source data for metering and chargeback of storage resources
- Distribute storage costs for shared business services across customers



Secure Multi-Tenancy Open Management for ITSM and Automation



- Open Management strategy through open APIs
- Detailed tenant and infrastructure procedures
- Enabling ITSM and automation vendors to provide:
 - Self-service portals
 - Enabling end-to-end provisioning, management, monitoring, and troubleshooting
- Enable rapid integration for ITSM/DCA vendors



Where do I start?





How to Get Access to SDK?

- NetApp Manageability SDK is available to all TSPs via our community site at:
 - http://communities.netapp.com/community/interfaces_and_tools/interfaces
- For all developers, after registration at
 - <http://developer.netapp.com>
- SDK Access request form and SDK training materials are on this site
- Design guides on how to use SDK for various key use-cases are also on this site



What resources do we have for TSP's?

- 3x VM running the simulators – to simulate SM/SV primary and secondary with different storage efficiency features enabled
- 1x VM running the OnCommand management softwares, i.e. the Opr/Prot/Prov Mgr, SystemManager2.0, Management Console 3.0 and the Java/Perl script.
- A comprehensive set of powerpoint and docs describing how the OnCommand, Manageability software and the API/SDK works
- 10 exercises with detailed step by step notes



Communities Page


NetApp Community: Space: Developer Community - Windows Internet Explorer
http://communities.netapp.com/community/interfaces_and_tools/developer

NetApp Community: Space: Developer Commun...

NetApp Community > Developer Network > Developer Community

Overview | All Content (7) | Discussions (0) | Documents (3) | Blog | Videos | Set as default tab

ANNOUNCEMENT: NetApp Manageability SDK 4.1 Public Beta available now [Show Details](#)



NetApp DevCon 2011 - US Edition in Chicago on Oct 5-7

NetApp DevCon 2011 - Japan Edition on Sep 28-30

NetApp Developer Contest Coming Soon.

Getting Started


Tutorials

- How to download and install NMSDK and identify the support system [Introduction to NetApp Manageability SDK](#)
- Understand the SDK Core API types and Data ONTAP API fundamentals
[Core SDK and Data ONTAP APIs in NMSDK](#)
- Understand in detail the different API categories [DataFabric Manager Server APIs in NMSDK](#)

Recent Discussions

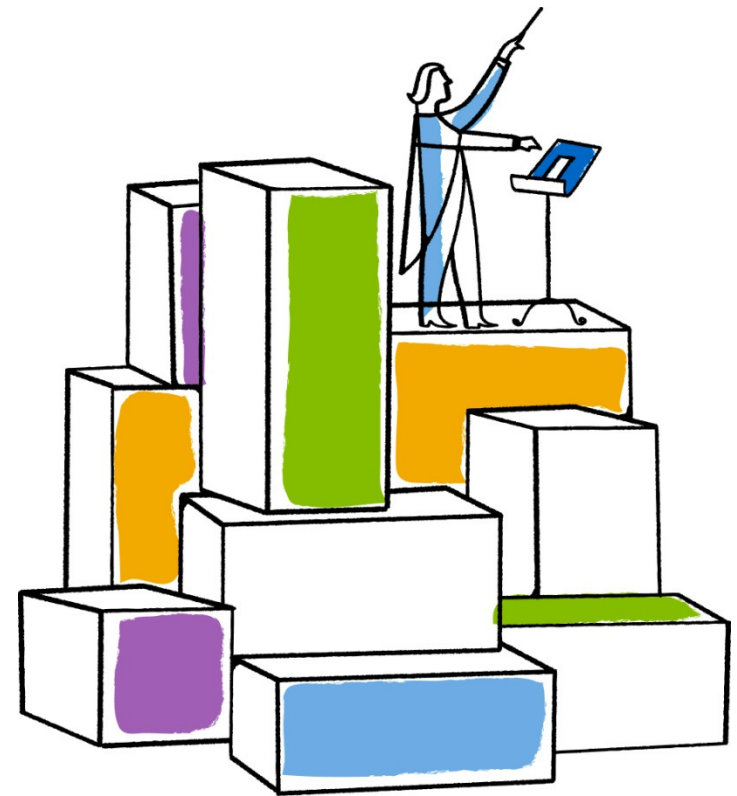
- SNMP problem: [snmp.agent.resp.failed:warning]: Could not send response to host: <IP of the host> : reason : Failure could be due to either DNS/gateway misconfiguration or takeover/giveback in progress
- Volume Shadow copy Service with SnapDrive hardware provider
- Volume invalid
- Firefox and filerview error -

Tweets

-  marboen R
Registrator
Chicago Oc
4 days ago · re
-  NetAppDev
your game:
DevCon201
3 days ago · re
-  NetAppDev
DevCon201
#NetApp



Questions?



Thank you

