NetApp NCSA-HC

Cloud Computing. What it is? Why?

Cloud Review(Security & Risk), Hybrid, Public, Private models. ITaaS(IT, Consumption, Business)

**NIST** – Branch for US department of Commerce. Responsible for developing Information security for federal assets.

AltaVault

Problems with Backup, Archive, and DR

* Too Slow
* Too Expensive
* Too Risky
* Too Complex

Benefits

* Simple
  + Provides a NAS interface with SMB, OST (Open Storage), NFS
  + Store up to 384 TB per appliance.
  + Snapshots
  + AVA400/AVA800
  + Deduplicated cache released has to be restored from the cloud
* Efficient
  + Stored on local cache
* Open
  + Integrate with the cloud (public/private)
* Secure
  + SSL 3/TLS 1
  + AES-256
  + FIPS 140-2 Level 1
  + KMS, SSO

Use Cases

* Backup Modernization
* Cold Storage Target
* Adding Cloud-Integrated Backup
* Archive Storage Target
* Disaster Recovery

**NTASP**

**Data Fabric**

* Data is becoming more distributed, dynamic, diverse.
  + Know where it is located, unstructured/structured data.
  + Digital transformation
    - Enable new points of contact with customers
    - Create innovative business opportunities
    - Optimize operations
  + Holistic Approach
    - Security
    - Efficiency – automate orchestrate
    - Future-Proof solutions
    - Data Management options
* Data Fabric – Harness (Cloud resources), Build (Next-gen DC), Modernize (data management)
  + Benefits
    - Optimizes protection
    - Simplifies Design
    - Offers a range of choice
    - Uses new technology
* NetApp Partnership
  + Trusted Data Management Advisor
  + New Business Opportunities
  + Simpler Selling Process.
* Cloud Backup Data Fabric Solution
  + AFF or FAS SnapMirror Alta Vault with SnapCenter
  + Flash to disk to Cloud

**Product Portfolio**

* Customer Challenges
  + Pressure to manage a large amount of data
  + Need to create value across the organization
  + Limited time, skills, and budget
* Bare-Metal Data Center -> Virtualized Infrastructure -> Cloud Data Services
* Deployments
  + On-Premises
  + Off-Premises
* Customer Goals
  + Modernize infrastructure without creating silos
  + Eliminate performance bottlenecks
  + Deploy emerging applications through enterprise-grade data services
  + Redically change the economics of the data center
  + Rapidly integrate new technologies
  + Freely move data to where it runs optimally
  + Use one set of tools to manage and protect data where it resides

**ONTAP 9**

* Using the Power of the Hybrid Cloud
* Simplify data management
* Accelerate and protect data across the hybrid cloud
* Eliminate planned downtime with non-disruptive data movement
* Maintain operations during system interruptions with zero data loss
* Cost-effectively protect against regional disasters
* Secure data with software-based, data-at-rest encryption on any volume and any disk.
* Receive instant, built-in backup and recovery
* Protect data against multiple disk failures
* Integrates and supports emerging applications
  + Openstack integration
  + Connector for Hadoop
  + Connector for Docker
  + Certification for MongoDB
  + Uses common infrastructure for existing and new applications
  + Provides enterprise-grade data services
* Future-proof the data infrastructure and scale environments to future needs
* Use Cases
  + Common Data Management across architectures – blocks or files on flash, disk or cloud
  + Across Deployment models – engineered storage arrays to commodity servers
  + Across applications – from enterprise to emerging applications
* Products that can be covered by ONTAP 9
  + All Flash FAS or FAS
  + Converged infrastructure/Flexpod
  + Flex Array
  + ONTAP Select on SDS
  + Near-Cloud
  + Cloud
* Deployment Modes
  + FAS
    - Increases speed
      * Up to 200% greater performance
      * NVMe Flash Cache included in all models
      * High-performance connectivity
    - Enhances availability and security
    - Reduces TCO
    - FAS9000 – business-critical workloads
    - FAS8200 – enterprise workloads
    - FAS2600 – small enterprises,
  + All FLASH FAS
    - AFF8000
    - AFF8040
    - AFF8080
    - AFF8080EX
    - AFFA200 – faster and more compact
    - AFFA300
    - AFFA700s
    - AFFA700
* Features
  + Storage Efficiencies
    - Inlined Data Reduction (compaction, compression, deduplication)
      * Expanded inline deduplication – adds inline aggregate deduplication which complements existind deduplication, compression, and compaction
      * Up to 30% more efficiency
      * Supports All Flash FAS
      * Opportunities – database copies, multiple VM across volumes
    - Thin provisioning – optimize existing storage
    - Snapshot technologies
  + FabricPool Technology
    - Tier cold data to the cloud
    - Connect to AWS or StorageGriD private cloud
    - Reduce storage costs by 40%
    - Tiers inactive data from primary snapshot copies and secondary systems
    - Supported on All Flash FAS and all -SSD FAS aggregates
  + FlexGroup
    - Scalable NAS container
    - Supports computation-intesnive workloads and massive data repositories
      * Oil and gas, high-tech, EDA
    - Delivers linear scale up to 20 PB
    - Uses one mount point with automated load and space distribution
    - Consistent low latency and high performance
    - Resiliency on FAS clusters by using ONTAP nondisruptive operation
  + QOS and Balanced Placement
    - QOS to protect the performance of business-critical workloads
      * Sets minimum resource levels
      * Enables service classes
      * Supports SAN on all Flash FAS
    - Uses balanced placement to simplify the loading of new workloads on clusters
      * Automate provisioning of LUNS
      * Balances use across clusters
* Positioning
  + FAS and ONTAP
    - Performance -drive environments
    - Application acceleration
    - Cloud-ready enterprises
    - Ready to modernize and reduce costs
    - Massive NAS demand
    - Cost-effectivy security
    - Consolidate workloads in shared environments
  + ONTAP Select
    - Leverage commodity server hardware
    - Low-risk method for testing ONTAP
  + ONTAP Cloud
    - Cloud-ready enterprise
    - Hybrid cloud environments with on-premises and hyperscale
* Qualifying questions
  + Is your current environment too complex to manage and integrate different parts of your storage solutions?
  + Can you respond quickly to business changes on-premises or in the cloud?
  + Do your enterprise applications need high performance and rish data management?
  + Do your all-flash solutions create silos?
  + Can your storage infrastructure incorporate future flash and storage technology?
  + How might your business benefit if all your workloads were always accessible?
  + Have you incorporated cloud or do you plan too?
* Benefits
  + Simplify transition to cloud-ready data center
  + Modernizes the infrastructure with flash and cloud without creating silos
  + Deploys emerging applications with enterprise-grade data services
  + Radically changes the economics of the DC
  + Freely move data to where it runs optimally, flash, disk or cloud
  + Uses current infrastructure and personnel
  + Manages and protects data with one set of tools, wherever the data resides

**ONTAP Select**

* + SDS (Software Defined Storage) on Commodity servers
  + Deploys in DC and remote offices
  + Flexible capacity-based license
  + Supports multiple configurations up to 4-node HA
  + Enterprise NAS and block services for DAS
  + 9.2 New vNAS solution and 2-node support with 90 day evaluation available

**ONTAP Cloud**

* + SDS in the cloud
  + AWS/Azure
  + PAYU
  + SSD or HDD with HA
  + Ideal for DevOps and DR
  + Enhances cloud storage with NAS, snapshot copies, clones
  + Minimizes the cloud footprint by using advanced data reduction methods
  + Enables easy data movement between on-premise and cloud locations
  + Software storage solution for AWS/Azure
  + Targets
    - DevOps
    - Cloud DR
    - Data Management in the cloud
    - Cloud strategy
  + Use Cases
    - Data Protection
      * AltaVault – disk to disk to tape onsite offsite
      * Cloud Control
    - DR
      * NPS
      * ONTAP Cloud
    - DevOps
      * ONTAP Cloud
    - Analystics
      * Cloud Sync
      * NPS

**E-Series and SANtricity**

* Market Dynamics
  + Enterprise servers hold pent-up performance
    - systems out of balance, where storage performance is the bottleneck.
    - Opportunity to drive higher CPU use, improve efficiency
  + New databases demand new levels of storage performance
    - SQL Server 2014
    - Oracle and SAP upgrades that are performance-sensitive
  + Third platform is driving faster analytics
    - Commodity servers with internal storage that can’t keep up with requirements
    - Need for consistent low-latency performance as scale increases
* E-Series Focus Areas (performance, costs and reliability, ease-of use
  + Data Protection
  + Physical and Cyber Security/Video
  + Technical Computing
  + Big Data Analytics
* Storage Systems
  + E2700 -> E2800 (All Flash array)
  + E5600 - High performance and high compacity
  + EF560 – low latency for block based applications/performance
    - All Flash – low latency, simplicity, reliability
* SANtricity OS
  + Utilized by E and EF series
  + Performance optimized data path through controller in only 38 microseconds
  + Complete set of data management features: Snapshot copies, mirroring, replication, encryption
  + Minimal impact on resources
  + Storage manager
    - Intuitive UI
  + System Manager
    - Browser-based UI
    - Streamlined interface on E2800 11.30v
  + Cloud Connector
    - Cost-effective backup and recovery to the hybrid cloud from an ESeries or EF Series
    - Integrates with NetAPP Data Fabric
    - Ideal for customers who need simple cloud backup capabilities instead of a complex backup and DR infrastructure
* Benefits
  + IT infrastructure that lowers TCO by 33%
  + Improved performance by more than 50%
  + RAS (Reliability, Availability, and Serviceability)
  + Maximum density – 600 TB in 4U
  + Fast recovery
* Customer Conversations
  + What are your IOPS per TB requirements?
  + What are your SLA’s
  + Where do you want to spend your money?
  + What does consistent latency mean to your business?
  + How rapidly is your data changing?
* Core Values
  + FAST, SIMPLE, RELIABLE

**Building a Next-Generation DC**

* Collection of resources that are agile, scalable, automated, and predictable (SDDC, Infrastructure 2.0, Cloud computing, Private cloud, Third platform)
* SolidFire
  + Doesn’t require RAID, SDS All Flash
  + Similar to AWS
  + Element X is the OS
    - Automation
    - Self-Healing
    - Guaranteed Performance
    - Global Efficiency
    - Scale-Out
* Benefits
  + Accelerate time to production
    - Simple to configuration
    - Deep integration with CloudStack, OpenStack, VMware
  + Simple scaling
    - Node by node scaling
    - Nondisruptive configuration
    - Speed/flexibility
    - Performance/capacity alignment
    - Linearity of scale
  + Reduce operational management and operational expenses
    - Uses of APIs to incorporate SolidFire into existing new workflows
  + Economic benefits of shared infrastructure
    - Guaranteed performance for every workload

**HyperConverged Infrastructure**

* Increased horsepower, improved performance of flash storage, expanded use of flash into the DC, deep integration with virtualization platform software
* Works:
  + Software that joins components together to provide resiliency
  + Virtualized servers, storage, networking
  + Granular, platform-based storage management
  + Single infrastructure stack that runs on elastic pool of x86 resources
* What is it?
  + 2-RU, 4 node building block
  + ONTAP File Services so customers can access file and block services
  + SolidFire perform the base (Integrated Data Services, Data Fabrice Services, Third-Party Services)
  + VM EXSI hypervistor
* Value Propositions – solve IT predictability problems with unique QoS limits
  + Guaranteed Performance
    - Provide granular control
    - Consolidate mixed workloads
    - Predictable performance
  + Flexibility and Scale
    - Optimize and protect
    - Eliminate the 10% to 30% HCI tax
    - Scale compute and storage independently
  + Automated Infrastructure
    - NDE (netapp deployment engine)
    - Deploy rapidly
    - Automate and streamline management
    - Simplify by using comprehensive APIs

**FlexPod Portoflio (CI)**

* IT Trends /Challenges
  + High Service levels
  + Establish cloud strategy to meet business demands
  + Legacy infrastructures were not designed to hanle the unique challenges
  + Business needs technology solutions that simplify and automate processes
* Portfolio
  + Cisco Unified Computing System
    - Unified management & programmable infrastructure
  + Cisco Nexus switches
    - Unified fabric
    - Next-generation performance with cloud scale
  + NetApp storage
    - ONTAP
    - NetApp SolidFire Tech
  + Centralized management with automation
    - Open API
    - Cisco UCS Director and orchestration support
* Products
  + FlexPod Express
    - Small business can consolidate infrastructure on an easy to manage platform
  + FlexPod DC
    - Shared virtual infrastructure/medium large/service providers
    - One storage software
  + FlexPod Select
    - Big data analytics – dedicated workloads.
  + FlexPod SF
    - Solidfire storage, predictable performance
      * All Flash storage
      * Global efficiencies
      * Cloud-like resource utilization
      * Advanced scale-out
      * Guaranteed performance
      * Automated management
      * Data Assurance
    - Cooperative support system
    - SF9608 with C220 Node UCSB series node and UCS manager. Cisco ACI
    - Devops, Line of business leaders, Cloud architects,
    - Web-native applications, scale-out databases, end-user computing
    - Service providers and telecommunications, next-generation enterprises
    - Market opportunities
      * New buyers – cloud architects
      * Infrastructure buyers
      * Build next-generation DC
      * Find new revenue sources
* Benefits
  + Cost Efficiency
    - Lower by 20%
  + Operational simplicity
    - Best-in-class preconfigured integrated solution
    - Less time configuring
  + Proven Scalability
    - Support for 60^ more virtual desktops
* Validated Designs
  + 140 – Cisco & Netapp
  + Infrastructure, storage, network
  + Single Sku & Validated Designs (Netapp)
  + Cisco – validated designs
  + Microsoft – fast track validations & technical reports
  + NetApp – verified architectures
* Cooperative Support
  + Direct Access between vendors
  + Coordinated Support – cross training
  + FlexPod Expertise – Cooperative Support LAB. Pretest labs to identify solutions
* Target Customers
  + 500 users and limited IT staff
  + Consolidate applications
  + Smaller workloads and smaller customers
  + Expanding small and midsize organizations
  + Upgrading to Microsoft application versions such as Exchange 2013
  + VDI deployments in Windows Server 2012
  + Remote branch offices

**NetApp Products for the Cloud**

* Data stimulates insights
* Data outlives generations of hardware and software
* Data is reproducible but not replaceable
* Cloud amplifies data management challenges
* Provide control and choice
* Improve efficiency
* Accelerate innovation
* Cloud Connected Services
  + AltaVault
    - Cloud based – no secondary DC, low cost protection
    - Physical – scalable 32 – 384 TB of local cache. Deployed in DC
    - Virtual – medium sized businesses/enterprises
    - Connects to any backup software or direct database dumps to the appliance and caches locally
    - Deduplicates, compresses, and encrypts
    - Benefits
      * Simple, Efficient, Open, Secure
      * 2 TB – 57 PB in the cloud
      * Migrate data from other clouds to another
      * Data at rest/Data in transit. FIPS level 1/ SSL encryption, Encryption keys managed locally.
  + NPS (Private Storage)
    - Can connect to multiple public clouds and can change at any time.
    - Data sovergnity.
    - Low latency (2ms) 10GbE
    - Dedicate storage that is installed in an Equinix cabinet connected to Equinix Cloud Exchange
    - Use Cases
      * File Services
      * DR
      * SaaS
      * Test and Development
      * Data protection
      * Hybrid analytics
* Cloud Data Services
  + Cloud Sync
  + Cloud Control
  + ONTAP Cloud

**StorageGRID Webscale**

* Object Storage – data is stored as objects in containers
* Large content repository for big, unstructured data
  + Billions of datasets
  + Dozens of PB
* Consumption of global content
  + Policy-controlled datastores at each site
* Provides intelligent data classification and access
  + Metadata-based managements
* Positioning
  + Rich content services
  + Video, images, PDFs, large throughput
  + Scalability, automated data distribution
  + Secondary that need secure archive, automated tiering.

**Strategy**

* Challenges
  + Deliver cloud services from different cloud environments
  + Predictable service levels
  + Increase speed of IT operations
  + Simplify operations and risk
* Concerns
  + CIO, CSO, VP or Director – Do we have a defined cloud strategy?
  + IT Manager, Cloud architect, or Line-of-Business Owner – What are we delivering to business units?
  + Cloud Architect or Application Developer – How does the process of transitioning to the cloud work, and how much time does the process take?
  + Storage Manager – How do we run and maintain the new environment?
* Data authority for the hybrid cloud
  + Data Fabric solution – help traditional infrastructure buyers realize business objectives
  + Help CIOs, cloud and enterprise architects
* Buyers
  + Traditional Infrastructure buyers
  + CIO, Coud and Deveops/Enterprise Architects

**Resources**

* NetApp University – learning center
* PartnerEdge – Salesorce.com + QuoteEdge
* Field Portal – learn what’s new
* Capital Solutions – NCS

**NSEP, ONTAP**

**ONTAP ABC’s**

* Delivers
  + Simplicity
  + Consolidate data management
  + Deliver performance
  + Robust & Cost-effective
* Value Proposition
  + Simplicity
    - Deploy new solutions in fewer than 10 minutes
    - Reduce the storage footprint & costs
    - Centrally manage data from a single pane of glass
    - Simple to Buy
      * Improves processes
    - Simple to Setup
      * Fast provisioning templates
    - Simple to Manage and Monitor
      * OnCommand Performance Manager
      * Mobile AutoSupport
      * Headroom
    - Simple to Extend
      * ONTAP Cloud
      * ONTAP Select
  + Agility
    - Deploy both SAN and NAS workloads on a unified storage architecture
    - Increase flexibly to cluster flash & disk nodes
    - Provision storage in seconds
  + Power
    - Increase performance up to 60%
    - Provide continuous availability to eliminate downtime
    - Protect and rapidly restore data with integrated backup and disaster recovery
    - ONTAP is the same data management software.
    - Inline data compaction
    - RAID-Tec
    - MetroCluster software
    - 15 TB drives included
* Architectures
  + Outages
  + Price Competition
  + Merger & Acquisitions
* From 7-mode from 8.3
* Questions
  + Who is your customer?
  + What is the target workload?
  + Is it the right time?
  + Who is the best contact?

**Technical Positioning of Clustered Data ONTAP 8.3**

* Hardware and Features
  + Unified Architecture
    - 64 bit data is supported in ONTAP 8.3
    - Delete 32 bit before upgrading
    - Doesn’t support FAS/V 6080, 6040, 3170, 3160, 3140, 3210 on 8.3
    - 8.2 introduced 2 node switchless cluster doesn’t require a cluster interconnect switch but requires management network.
      * Up to 12 nodes but may require a larger switch. RLM to be hosted on a different switch.
    - Can use 7-mode transition tool CLI/GUI to transition to ONTAP. Uses Snapmirror to seed cluster with flexvault volumes.
    - Protocols
      * FC
      * FCoE
      * SMB (Server Message Block)
      * NFS
      * pNFS (parallel NFS)
      * iSCSI
    - Scalability
      * Performance scaling
      * Capacity scaling
      * Operational scaling
    - Storage Efficiency
      * Deduplication
      * Compression
      * Thin provisioning
      * Cloning
    - Cost & Performance
      * Flash Cache
      * SSD
      * Flash Pools
      * SAS & SATA
    - Management & Ecosystem integration
      * Unified management
      * Secure multi-tenancy
      * Multivendor virtualization
    - Integrated Data Protection
      * Snapshot copies
      * Asynchronous mirroring
      * Disk-to-Disk and disk-to-tape backup
* Cloud ONTAP
  + OnCommand Cloud Manager is needed to provision ONTAP Cloud.
* Benefits
  + Nondisruptive Operations
    - HA
    - LIF (Logical Interface migration and failover
    - DataMotion for Volume software
    - MetroCluster – continuous availability after an outage
  + Proven Efficiency
    - FlexClone
    - Multi-tenancy
    - FlexArray
    - OnCommand – Manages the device level for clusters with single or multiple node. Branch Cache, Access, AB, Kerbos
      * Out of the box for 7mode.
      * Unified Manager – Monitors the availability, capacity, and protection of ONTAP resources to provide a single view of NetAPP storage health.
        + Combines with workflow manager & performance manager
      * Performance Manager – provides automated performance monitoring and root-cause analysis of clustered Data ONTAP
      * Workflow Automation – enables automation of simple to complex storage processes.
      * Insight – provides multivendor storage configuration, performance, and capacity management and enterprise reporting for capacity planning.
  + Seamless Scalability
    - SAN scaling
* Questions
  + Do you want to spend less time and fewer resources running your most critical workloads?
  + Do you want to achieve confidence through nondisruptive operations (NDO)?
  + Do you want seamless scalability to meet changing application needs?
  + Do you want to move data seamlessly between the cloud and the data center?