7 Kasım 2012 - Çırağan Palace Kempinski

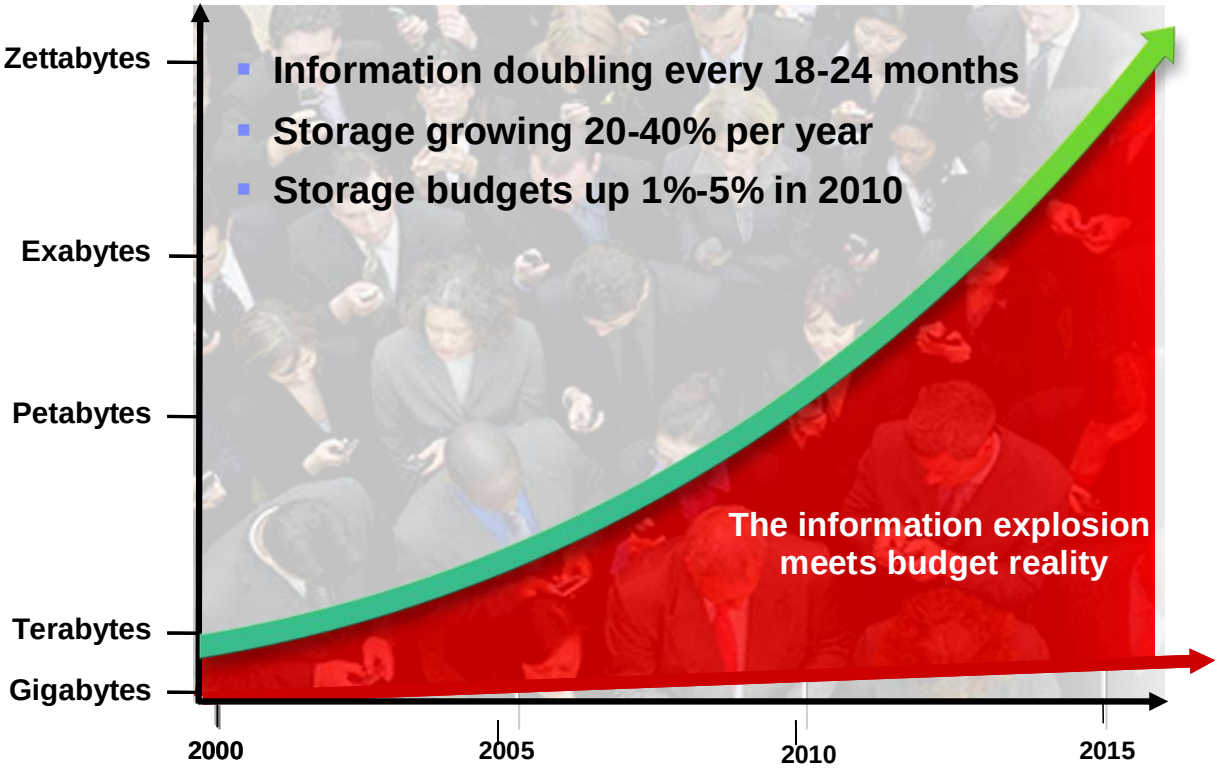
IBM Connected 2012 Istanbul

Learn. Collaborate. Innovate.

Presentation Title Here

Name, Surname
Title, Company

You have faced the problem…



…and heard the "Cloud" buzz

- "…major economies of scale and greater control of growing data volumes."

What does Cloud mean to your storage users?

Self-Service ability to manage their own IT environment in their own way

Pay per use pay only for what is consumed

Quick Access getting the right data to the right people at the right time

Elasticity capacity growth without constraints, release resources when not needed

Cloud Storage is an attractive means of delivering storage services while saving both time and cost

For end users

Value delivered	From traditional	To cloud
Storage Provisioning	Weeks	Minutes
Continuous Access to data	Centralized	Localized, any time any where
Storage Capacity	Fixed	Dynamic (Elastic)

For IT

Reduced storage admin costs		Up to 50% savings
Reduced energy costs		Up to 36%
Increased storage utilization	From 50%	Up to 90%

Cloud is changing how we think about Private IT

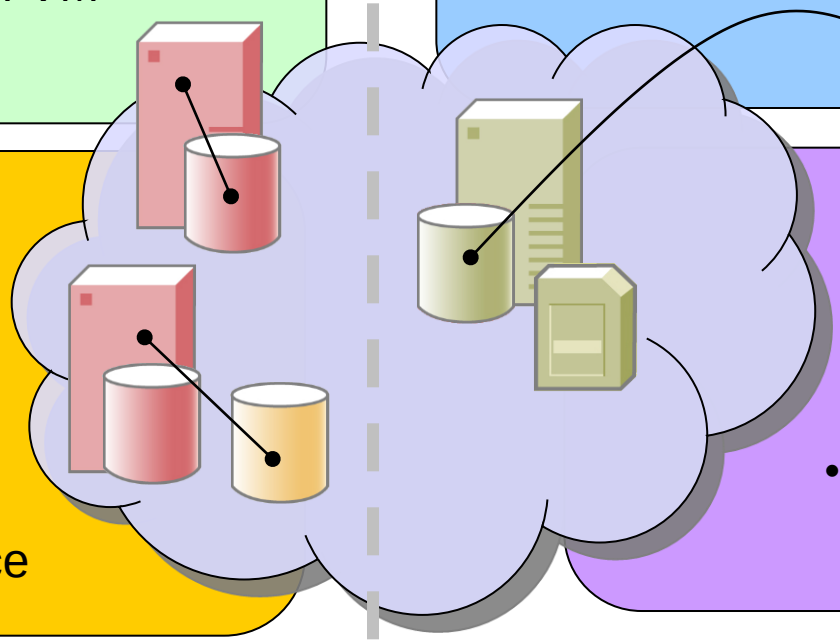
- Clients want to use Cloud concepts to improve Private IT
  "Cloud Enable" their environment (Private Storage Cloud)

- What distinguishes a Private Storage Cloud from Traditional IT?
  1. **Storage resources are virtualized** from multiple arrays, vendors, and datacenters – pooled together and accessed anywhere.
     (as opposed to physical array-boundary limitations)
  2. **Storage services are standardized** – selected from a storage service catalog.
     (as opposed to customized configuration)
  3. **Storage provisioning is self-service** – administrators use automation to allocate capacity from the catalog.
     (as opposed to manual component-level provisioning)
  4. **Storage usage is paid per use** – end users are aware of the impact of their consumption and service level choices.
     (as opposed to paid from a central IT budget)

Cloud Storage Taxonomy

Ephemeral Storage
- Typically boot volumes, page files and temporary data
- Goes away when VM is shutdown

Hosted Storage
- File Storage
- Backup/Disaster Recovery
- Web API objects



Persistent Storage
- Persists across VM reboots
- Can be shared between VMs
- Transactional
- High Performance

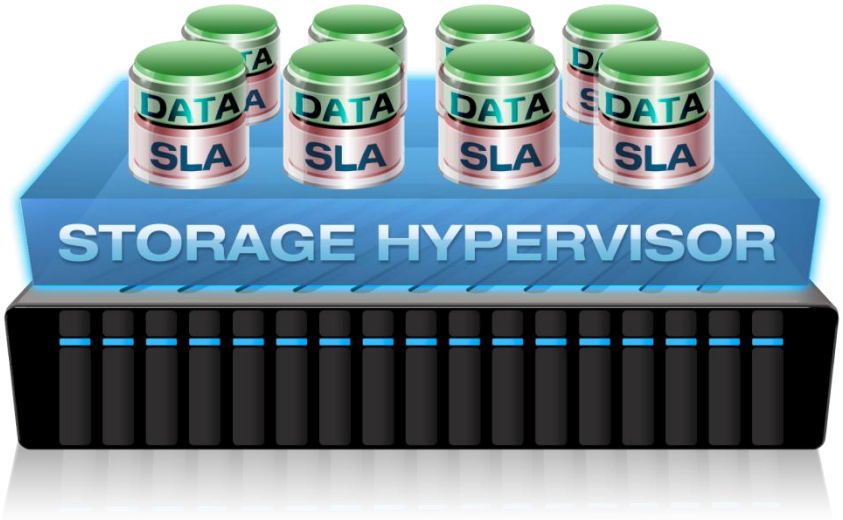
Reference Storage
- Archives
- Images/Video
- NENR / Compliance

Storage for the Cloud

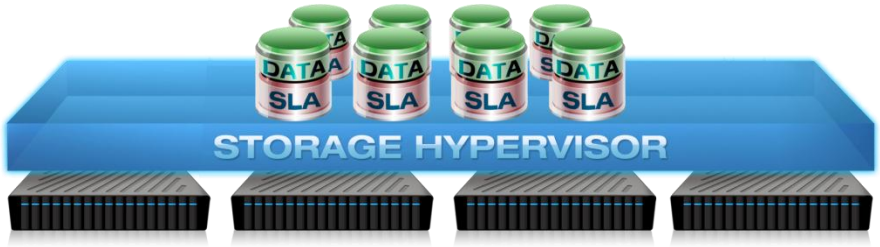
Storage as the Cloud

Pooled Physical Resources

- Dramatically improve utilization **of your physical storage assets**
- How? Pooled physical resources **from virtually any disk array vendor or tier**

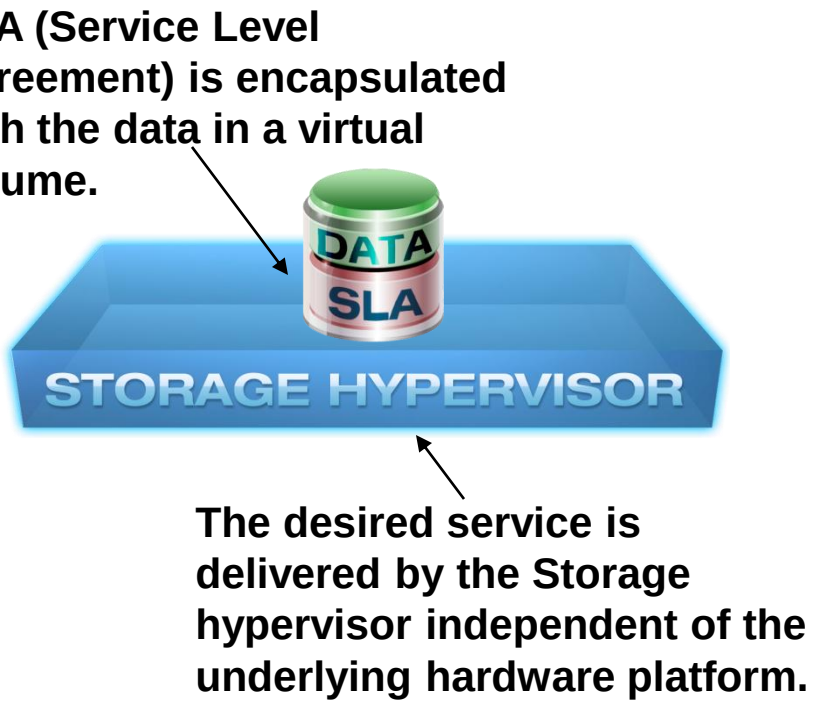


DELL HITACHI IBM NetApp EMC² Sun hp
NEC BULL FUJITSU pillar DATA SYSTEMS tms NEXSAN xio



Common Capabilities

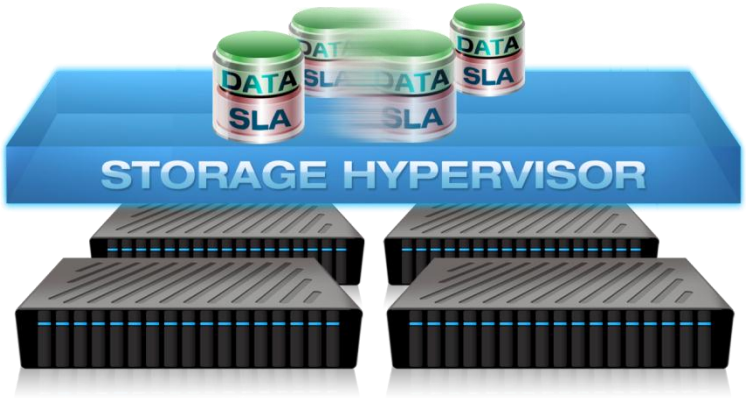
- Deliver tier-1 service **regardless of hardware choice**
- How? Common capabilities **delivered by the storage hypervisor**
  - I/O caching, thin provisioning, automated tiering, application-integrated snapshot and mirroring, mobility-driven disruption avoidance

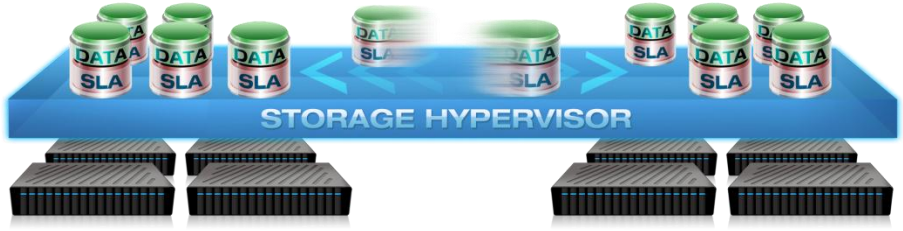


Mobility

- Balance workload, manage lease termination, improve datacenter performance

- How? Mobility **of virtual volumes between any physical disk arrays**
  - Move on the fly, snapshot or mirror between arrays…
  - …In a single physical datacenter or across two physical datacenters up to 300km apart





Centralized Management

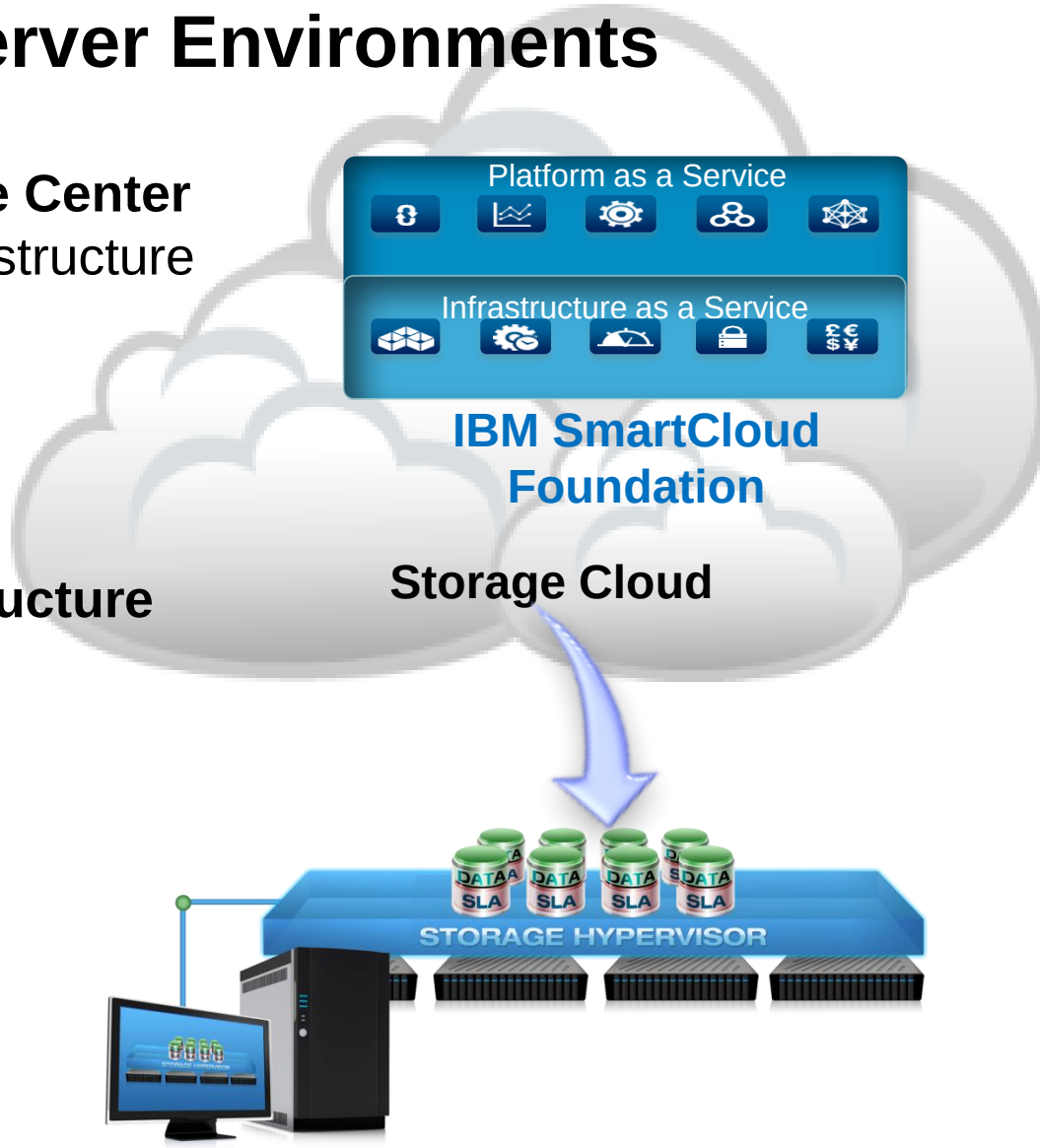
- Optimize your people **for the challenges of day-to-day operations**

- How? Centralized management
  - Visualization, health, capacity, performance
  - Storage services catalog, automated provisioning, pay-per-use

The Optimal Storage Infrastructure for Cloud and Virtual Server Environments

- **IBM SmartCloud Virtual Storage Center** provides the optimal storage infrastructure for **Cloud and virtual server environments**

- **How? Optimize storage infrastructure with cloud enablement:**
  - Storage service catalog
  - Automated storage provisioning
  - Pay-per-use



Cloud Enable Traditional IT

Summary for block storage

What IBM products enable this Private Storage Cloud?

1. **Storage resources are virtualized**
2. **Storage services are standardized**
3. **Storage provisioning is self-service**

IBM SmartCloud Virtual Storage Center

- **System Storage SAN Volume Controller**
- **Tivoli Storage Productivity Center**
- **Tivoli Storage FlashCopy Manager**

4. **Storage usage is paid per use** → **Tivoli Usage and Accounting Manager**

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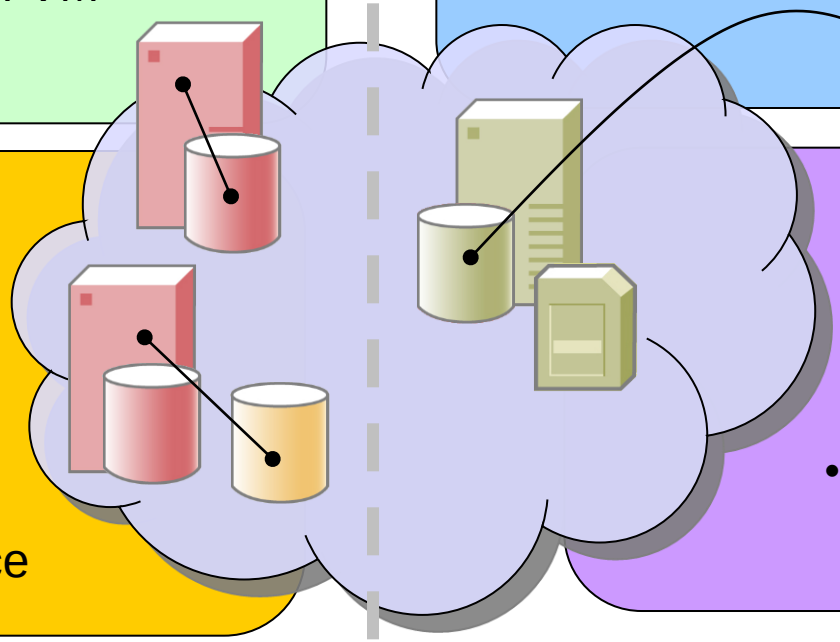

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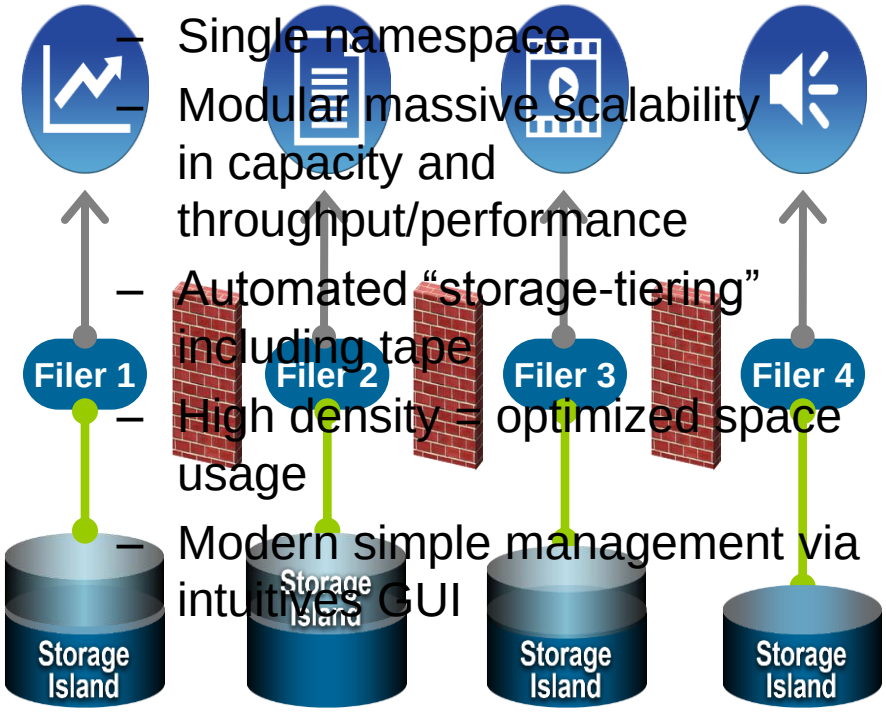
Storage for the Cloud

Storage as the Cloud

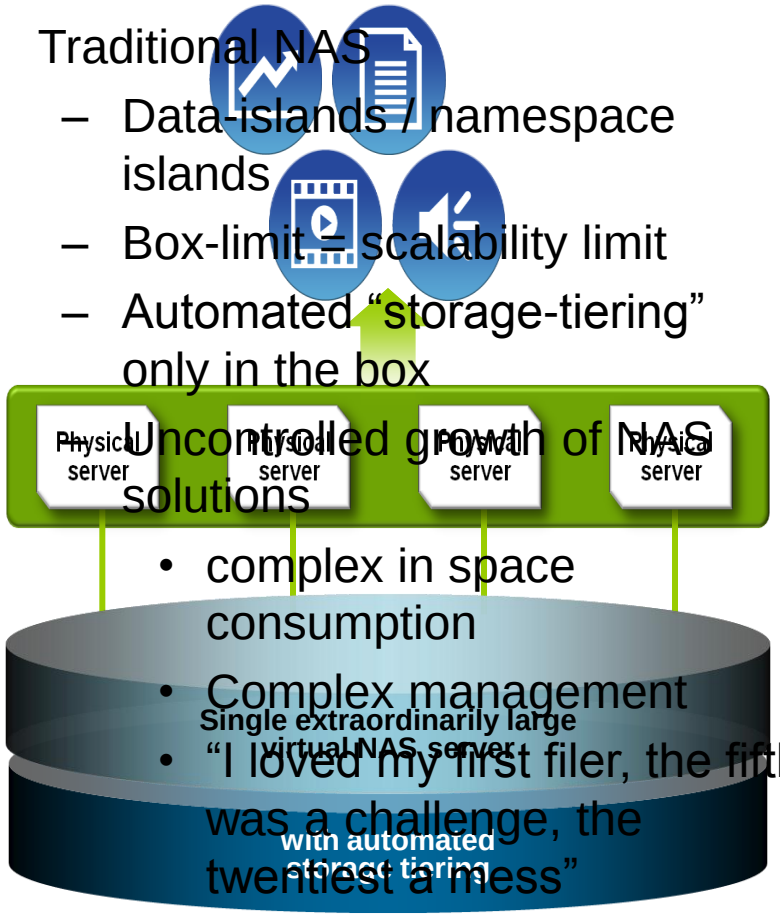
IBM SONAS: optimized and central use of resources

- IBM Scale Out NAS (SONAS)
  - Single namespace
  - Modular massive scalability in capacity and throughput/performance
  - Automated “storage-tiering” including tape
  - High density = optimized space usage
  - Modern simple management via intuitives GUI



Traditional NAS

- Traditional NAS
  - Data-islands / namespace islands
  - Box-limit = scalability limit
  - Automated “storage-tiering” only in the box
  - Uncontrolled growth of NAS solutions
    - complex in space consumption
    - Complex management
    - “I loved my first filer, the fifth was a challenge, the twentiest a mess”
  - Inconsistent management

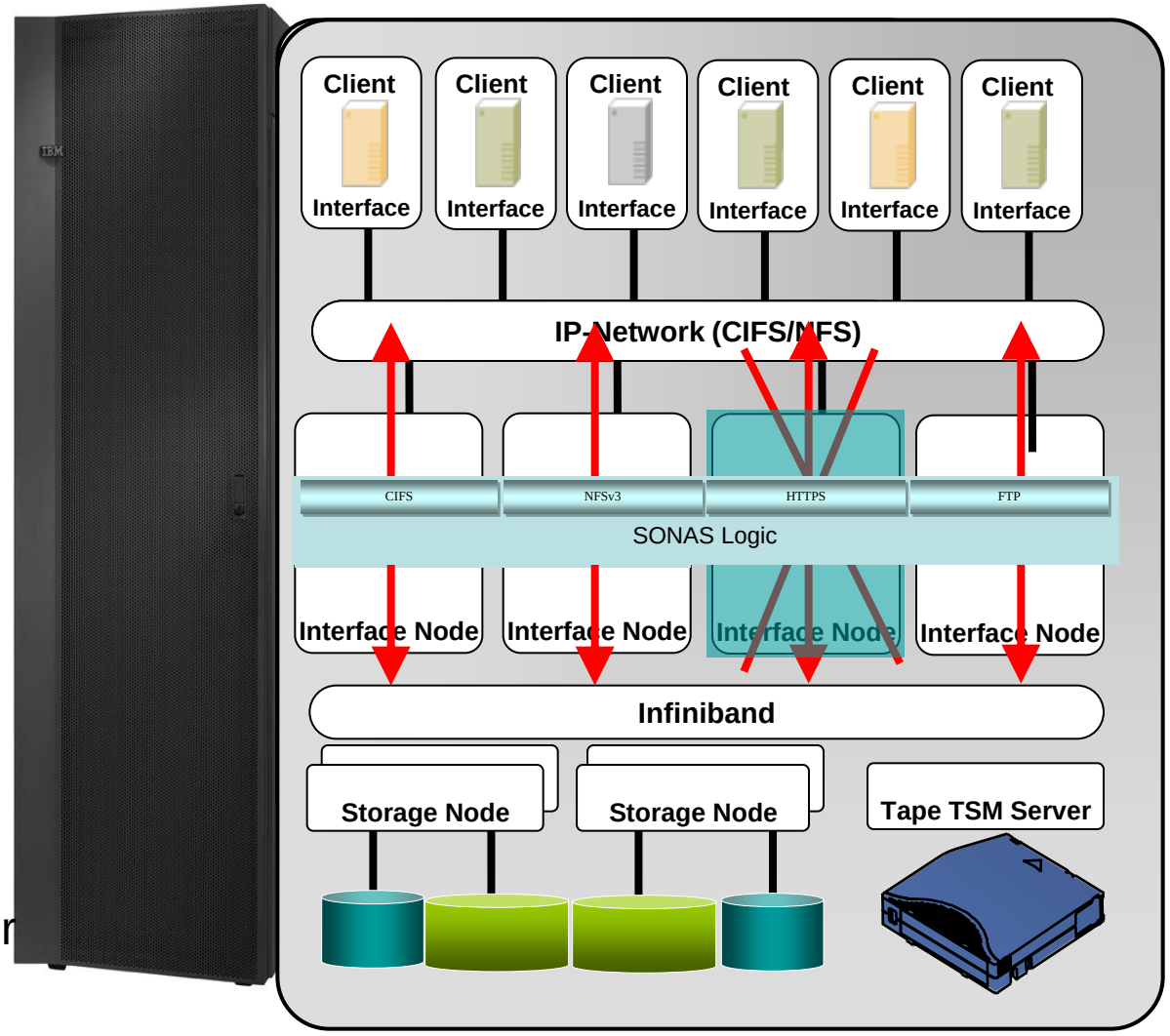


IBM Scale Out NAS (SONAS)

SONAS Appliance – architecture advantage

Parallel grid architecture

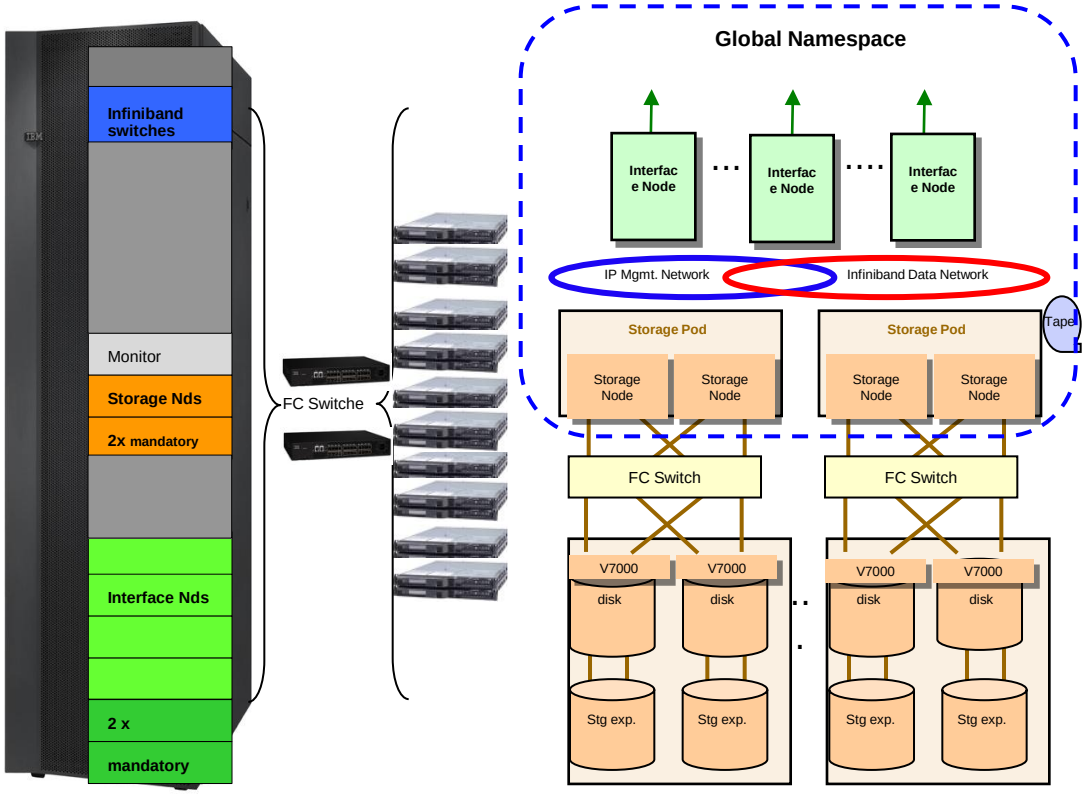
- Independent scalability
  - Nbr. clients (millions of users)
  - Throughput (> 100 GB/sec)
  - Capacity (36 TB* up to 21 PB)
  - extended capacity via integrated tape support
- Fault tolerance
  - Redundant layout of components
  - SONAS logic on all nodes
  - Simple redistribution of work in case of desaster



* SONAS Appliance, with SONAS GW smaller starting capacity possible

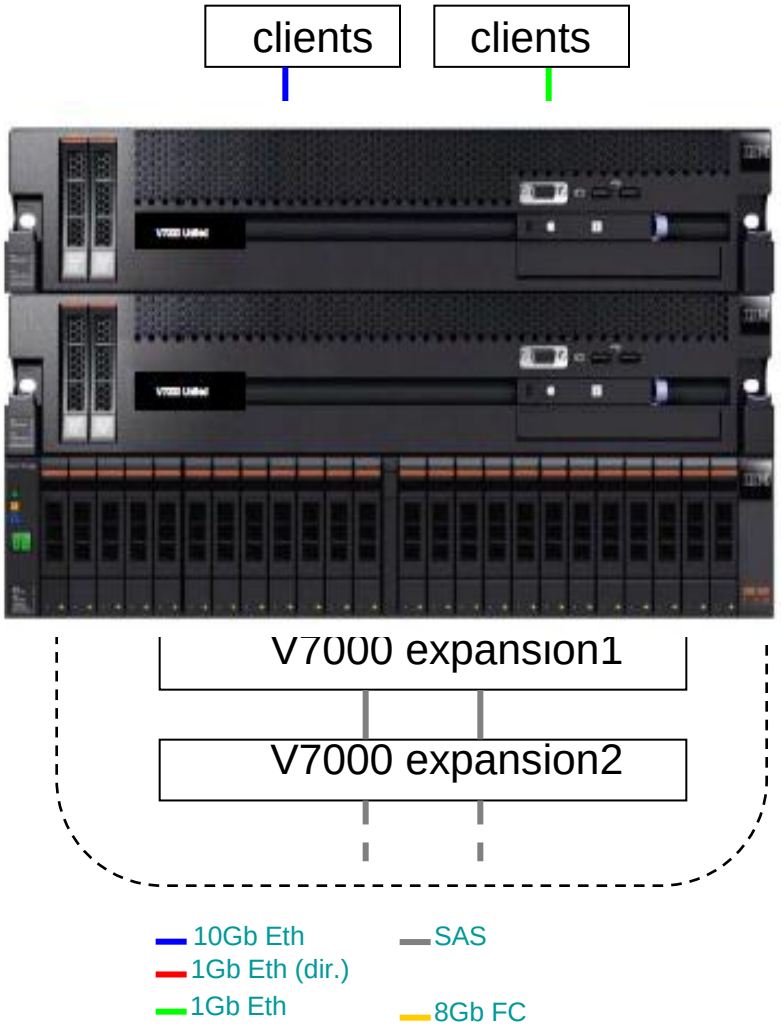
SONAS Gateway

- SONAS gateway-combinations
  - XIV
  - V7000
  - SVC (based on iRPQ, NFS)
- Advantage
  - Small capacity starting point
  - SSD technology
  - NAS / SAN intermix

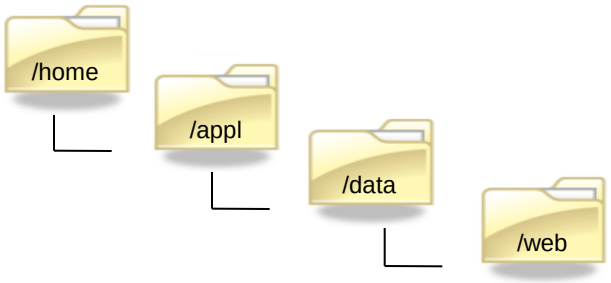


Small brother V7000 Unified

- V7000 Unified
  - 2 x IBM Storwize V7000 file module hardware (2073-700) units
  - 1 x V7000 storage enclosure (2 nodes)
    - Storage: SSD, SAS, NL-SAS
  - SONAS software stack
    - same base functions
  - + SAN functionality of V7000



Create and write files



/home/appl/data/web/**important_big_spreadsheet.xls**

/home/appl/data/web/**big_architecture_drawing.ppt**

/home/appl/data/web/**unstructured_big_video.mpg**

Logical

Note: all three files, in same directory, but each allocated to *different* physical storage pool

IBM Scale Out NAS

Workload auto-balanced across all interface nodes

Global Namespace

Policy Engine

Interface nodes ... Interface nodes ... Interface nodes ...> scale out

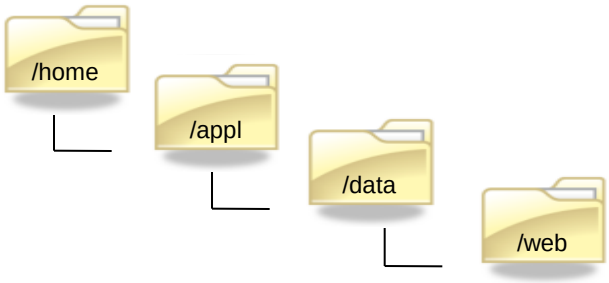
Storage nodes ..... Storage nodes ..... Storage nodes ...> scale out

Data striped across all disks in storage pool. High performance, auto-tuning, auto-load balancing

Physical

Tier 1: SAS drives 15krpm **Tier 2: SAS drives 10krpm** **Tier 3: NL-SAS 7,2krpm**

Read files – multiple users – in parallel



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/home/appl/data/web/**big_architecture_design.ppt**

/home/appl/data/web/**unstructured_big_video.mpg**

Logical

IBM Scale Out NAS

Parallel streaming reads of multiple files to multiple users

Global Namespace

Policy Engine

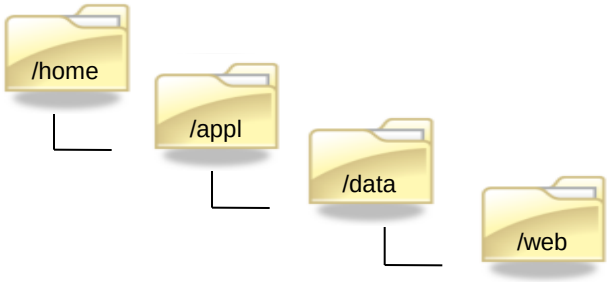
Interface nodes ... Interface nodes ... Interface nodes ...> scale out

Storage nodes ..... Storage nodes ..... Storage nodes ...> scale out

Tier 1 **Tier 2** **Tier 3**

Physical

Scan engine



- *Scan Engine* reads internal SONAS file system metadata
- Does not need to read the file or directory tree
- All nodes can participate in scan of file system

Metadata scan

Scan > 10 million files/minute per node

Some or all nodes (both storage and interface) can participate in *parallel scan engine*

1. Start scan

IBM Scale Out NAS

Global Namespace

Scan/Policy Engine

2. Read policies

3. Parallel Scan

Interface node

Interface nodes

4. Return results of scan

Interface node

Interface node

Storage nodes

Storage nodes

Storage nodes

Storage nodes

Storage nodes

Storage nodes

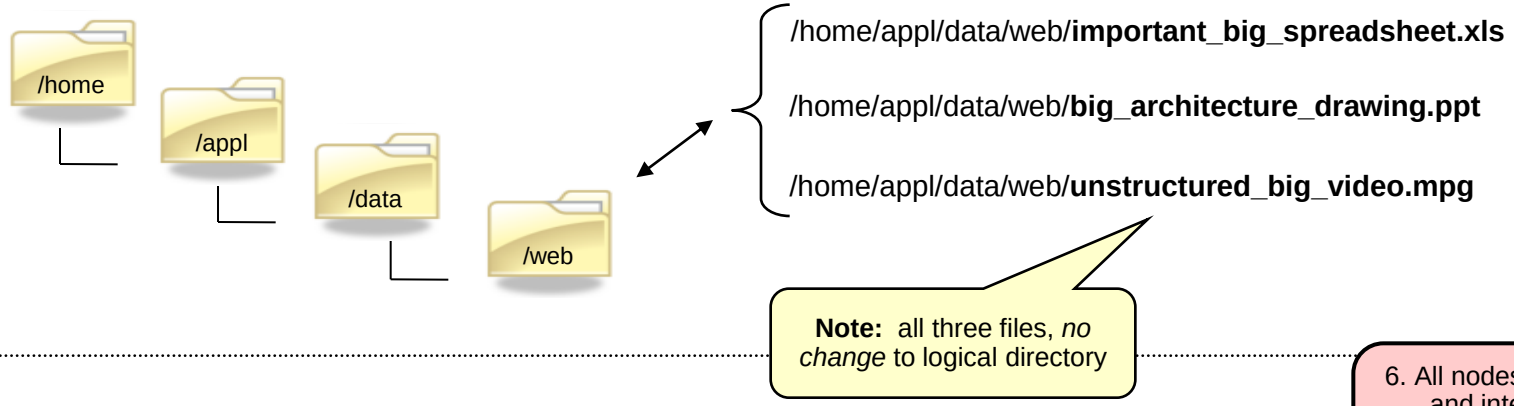
Tier 1

Tier 2

Tier 3

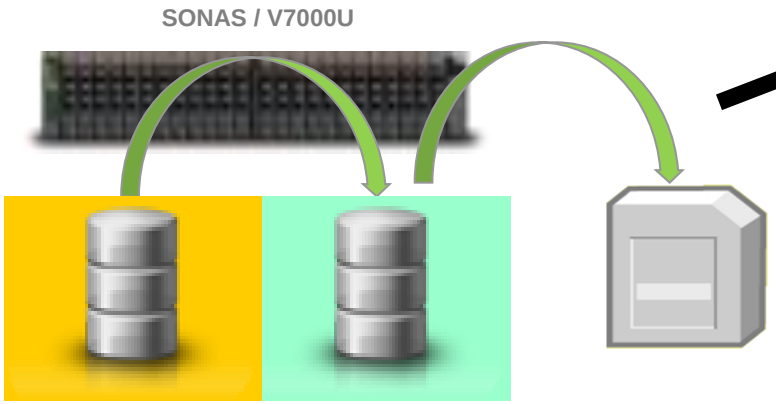
Scale Out

Data movement -> ILM / HSM



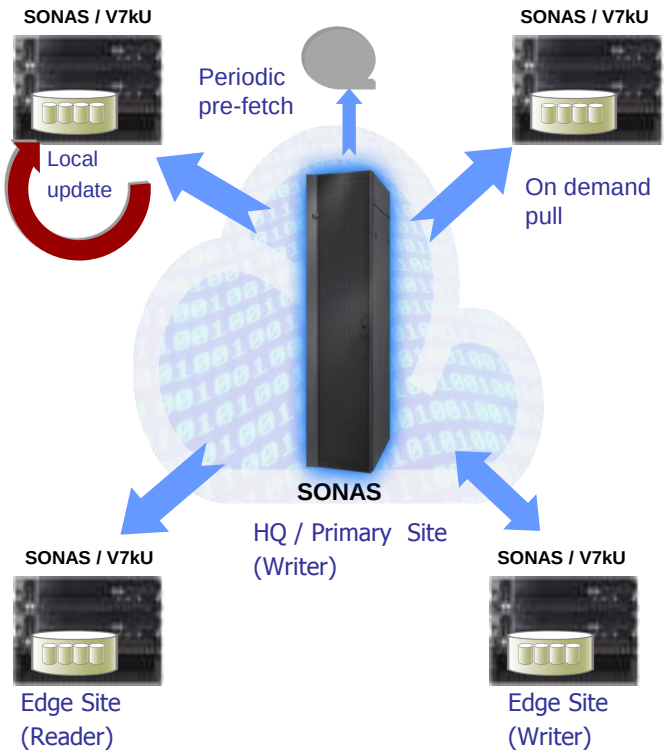
Active Cloud Engine (ACE) – local

- Place data on correct storage, based on value of data to your customer
- Transparently move data over time
- Optimizes hardware, software, energy and facilities cost



- Fast identification of changed data
- Fast backup at Data Center Site
- Fast Replication to remote site

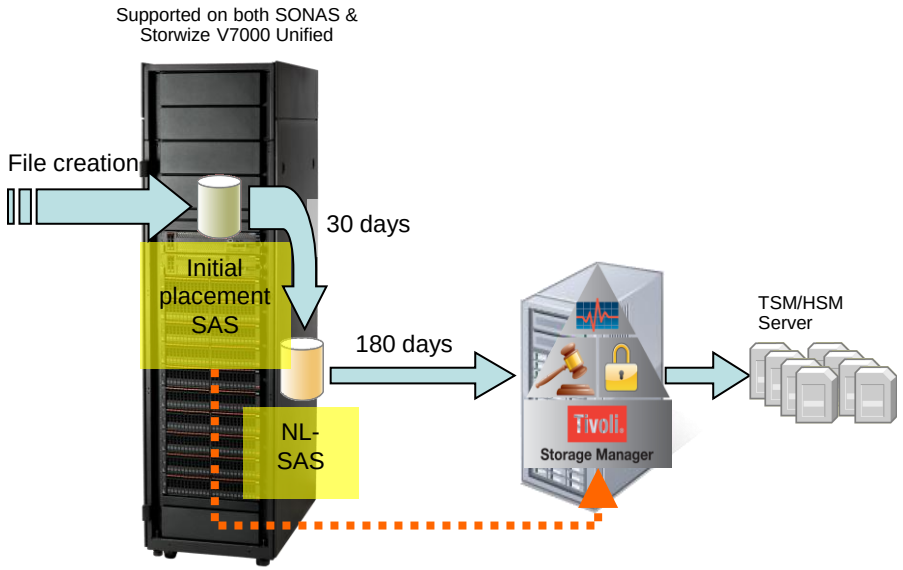
SONAS Use case ACE Global



- Central office - branch office cache
  - Automotive customer with branch offices
    - construction offices
    - supplier
  - NAS subset of data in each branch office
    - on demand pull or pre-fetch

    Advantage
    - need to know
    - fast access
    - Self-sustaining against network-problems
  - data transfer back to headquarter
    - Local writer
  - for test / development office with need for autarkic data
    - Local update

SONAS usecase ACE local



- Long term repository / archive
  - long term data archive
    - life science (raw data are stored for years awaiting new analysis methods)
    - utility provider (measured data of f.e. wind engines)
    - libraries
  - policy-driven storing of data
    - automated on-demand
    - Including tape as cost-efficient medium
    - User can access data anytime, without „recall“ or „restore“
    - data remain online

Getting Started with IBM for Cloud Storage

Review my infrastructure and recommend options

- Applications Strategy and Assessment
- Infrastructure Strategy & Design services
- Security assessments and readiness

Help me orient my infrastructure for cloud

- Infrastructure implementation and migration
- Deployed infrastructure services

Help me build, test and deploy to a private cloud

- Design
- Development
- Migration
- Testing