



HITACHI
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Hitachi Strategic File and Content Services

High performance NAS

Scalable Performance & Virtualisation in a unified platform

May 2010

Andy Williams

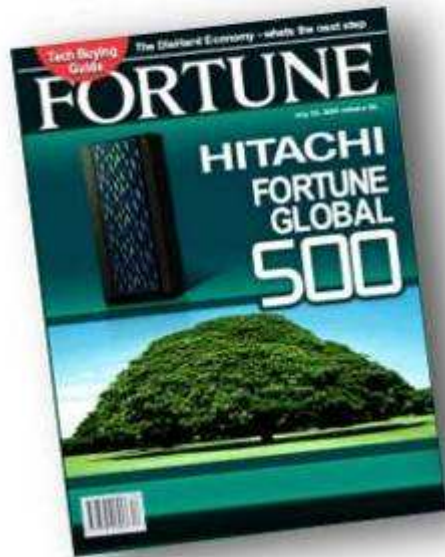
NAS Business Manager EMEA

EMEA File Services Team

Solutions Marketing & Business Development

- Hitachi & Hitachi Data Systems - Introduction
- HDS File Services Approach
- HNAS Technology and Features
- HNAS Use Case
- Summary & Questions

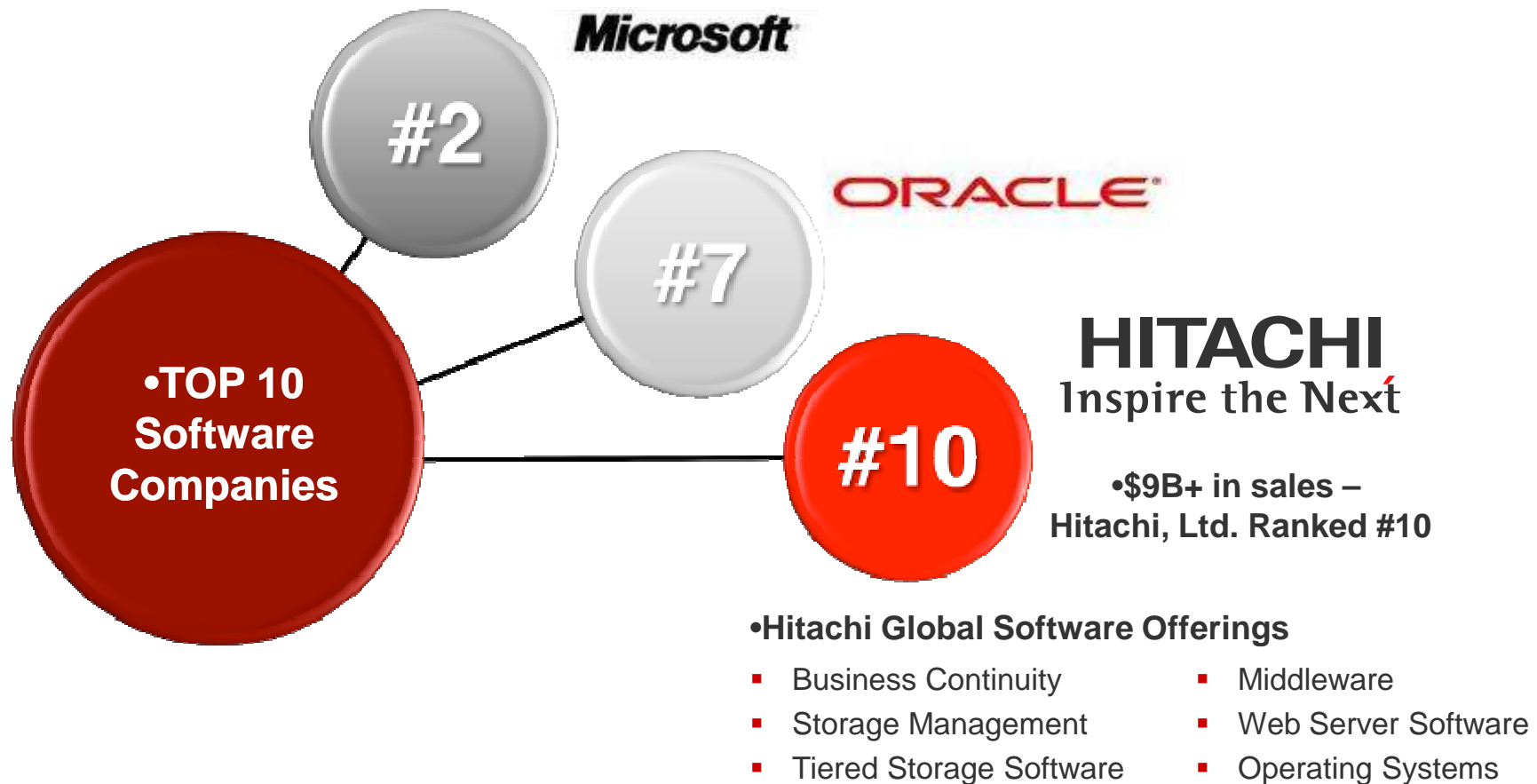
One of the **world's largest** integrated electronics companies



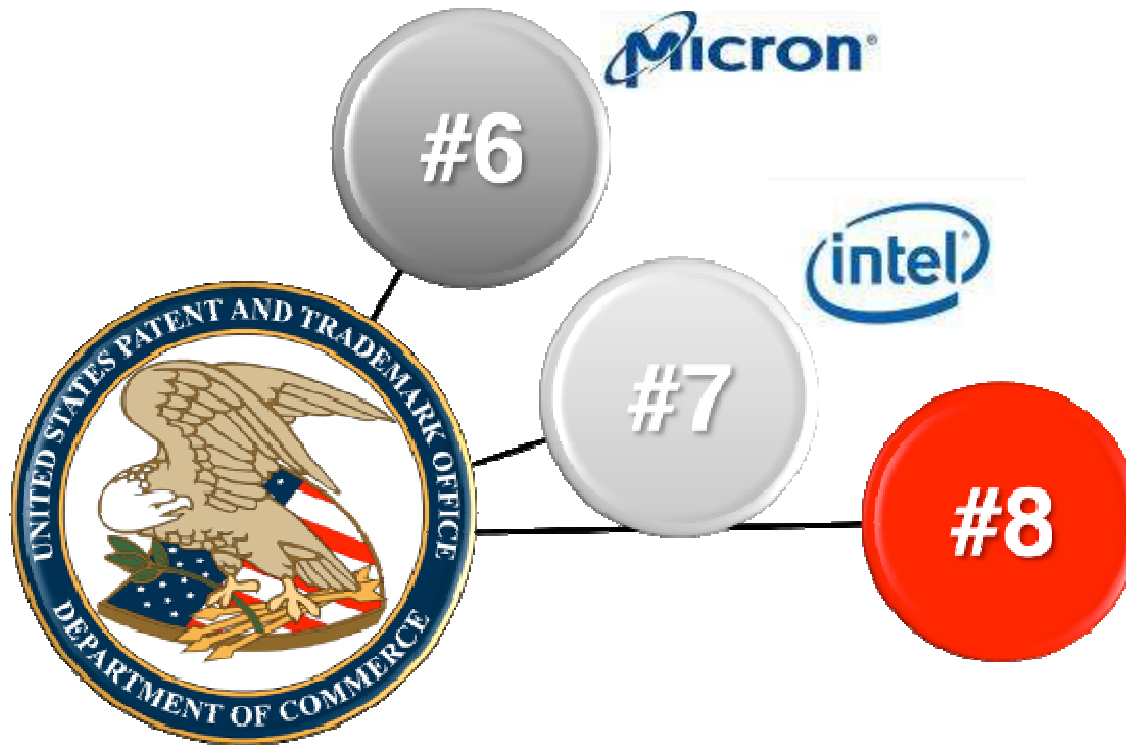
- Founded in 1910
- 943 subsidiaries
- 400,000 employees
- Over 700 PhDs
- Total FY08 sales of \$102B
- FY08 R&D Investment: \$4.2B
- Approx. 40% in IT
- Approx. \$8.2B in cash

No. 52 on the 2009 FORTUNE Global 500®

Hitachi, Ltd.: One of World's Top 10 Software Companies



•Source: Software Magazine



**U.S Patent and
Trademark Office**

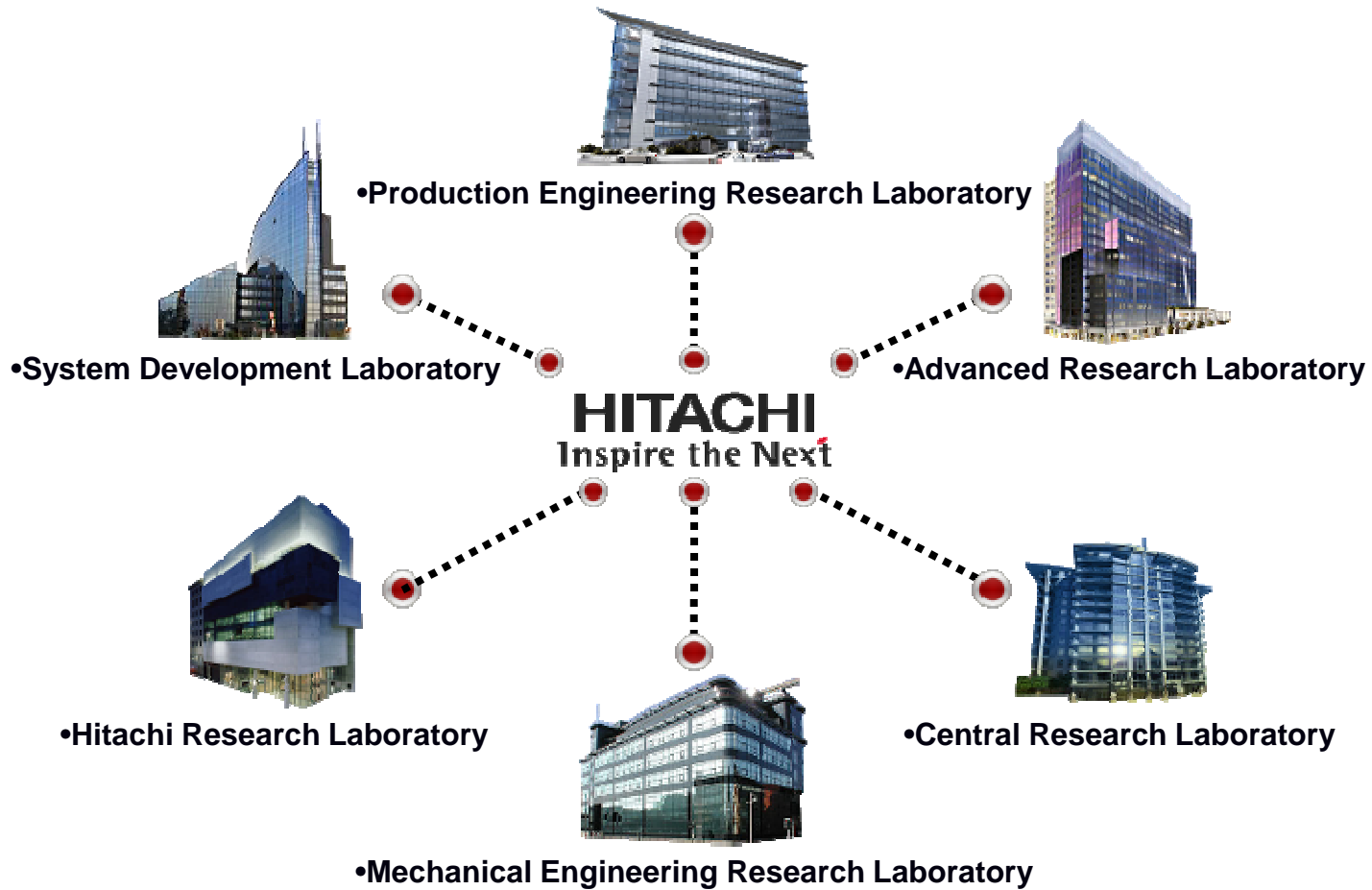
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- Hitachi, Ltd. Ranked #8
- Hitachi Global Patent Expanding:

- Storage System Technologies
- RFID Solutions
- Biotechnology
- Nanotechnology
- Networking
- Thermo-Nuclear Fusion
- Electron Microscopy

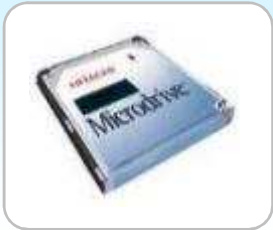
Hitachi, Ltd. Global Research and Development: Corporate Research Laboratories

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Hitachi, Ltd. is the World's Only Vertically Integrated Storage Company

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•Two Powerful Storage Businesses: \$9.0B In Sales:

- Storage Systems and Solutions Business / Hitachi Storage Solutions Group: \$3.4B
- Hard Disk Drive Business/Hitachi Global Storage Technologies: \$5.6B



•Leveraging Storage Technology Leadership:

- Enterprise Storage Platforms, Midrange Storage Systems, Storage Management Software, Consulting Services, Hard Disk Drives



•Expanding and Investing in Emerging Markets:

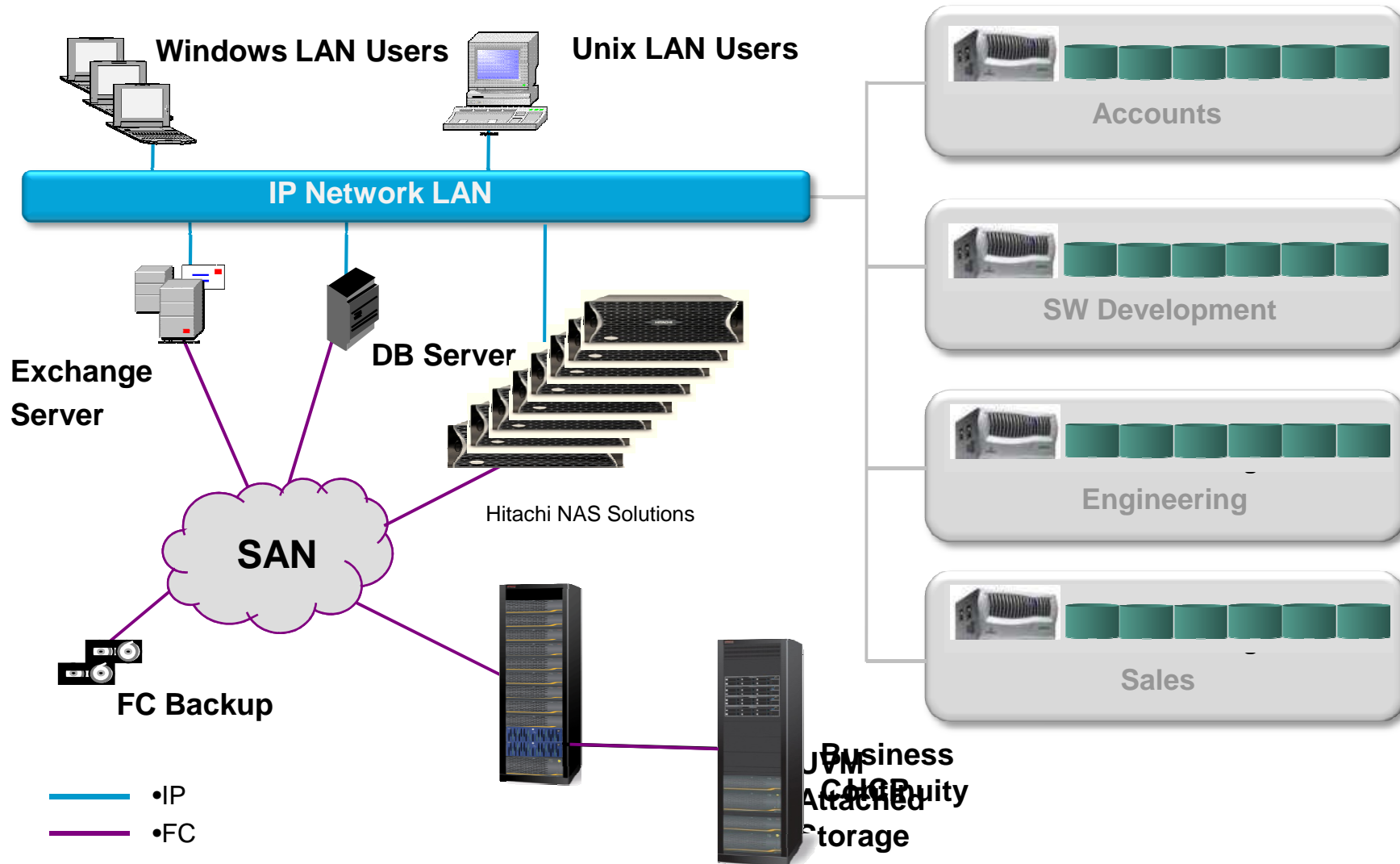
- Intelligent Virtual Storage Controllers, Midrange Systems, Rich Media, Mobile Music, Game Players, enabling the "Terabyte Home"



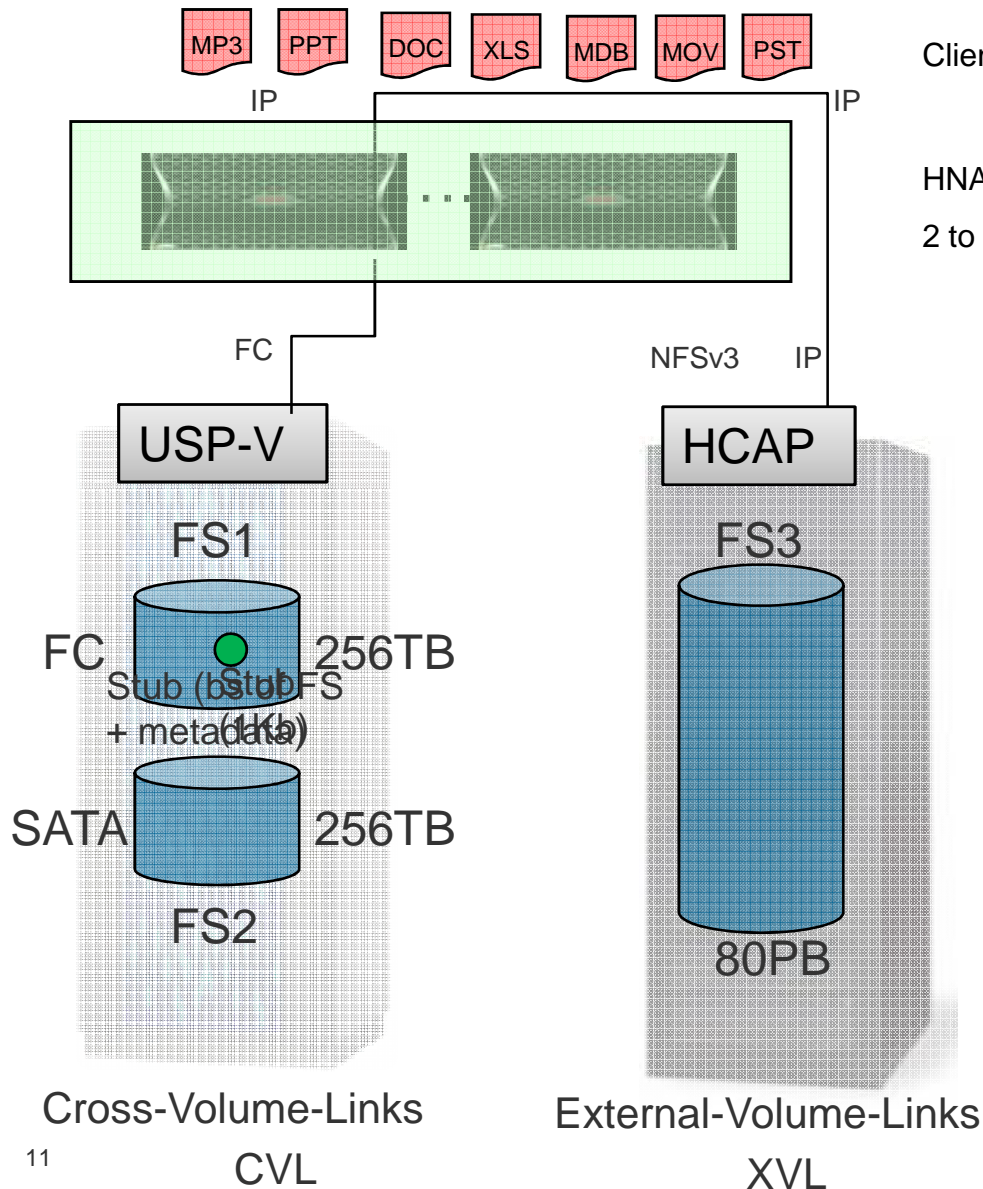
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- Strengthens Hitachi Data Systems market leadership as the ***Infrastructure of Choice*** for storage
- Enhances our File/Object-based storage portfolio to **compliment our best-in-class block-based storage**
- Makes Hitachi Storage Command Suite® File/Object aware and enables customers to manage all platforms seamlessly with **integrated management interface**
- Enables customers to **take control** of unstructured data with integrated platforms

Strategic Approach For Better Efficiency, Manageability, Performance and TCO



NAS Data Migrator CVL vs XVL



Consolidate

Tiering

Protect

Client files

HNAS cluster
2 to 8 nodes

Example policies:

- 1) Regardless of file type if bigger than 20MB move to Tier-2
- 2) If file 6 months old move to HCAP

Advantages:

CVL: Allows tiering between on FC attached file systems e.g. FC to SATA on same array or between multiple arrays

XVL: Allows tiering between internal disks and external NFSv3 mounted file systems. In the case of HCAP a single file system of 80PB which is single file instanced and compressed can be the target.

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Hitachi NAS Platform

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- **Enterprise Performance & Scalability at a Midrange price**
- **Up to 4-way Cluster Scale-out with Single Name Space**
- **Intelligent File Tiering**
- **Integrated with Hitachi Storage Arrays and Storage Command Suite**
- **Feature Rich**
- **Easy to use**
- **Field proven**

Performance & scalability Features 3090 single node

IOPS per server (SPECsfs profile)	100,000
Max NFS simultaneous connections	60,000
Max CIFS simultaneous connections	15,000 per node
Max. cluster addressable space	2PB
Filesystem size	256 TB
Number of Filesystems per server	128
Max. number of files or subdirectories per directory	16 million
Max \$ NFS/CIFS shares	10,000
Max. number of snapshots per filesystem	1,024

Model Comparison

Scaled performance

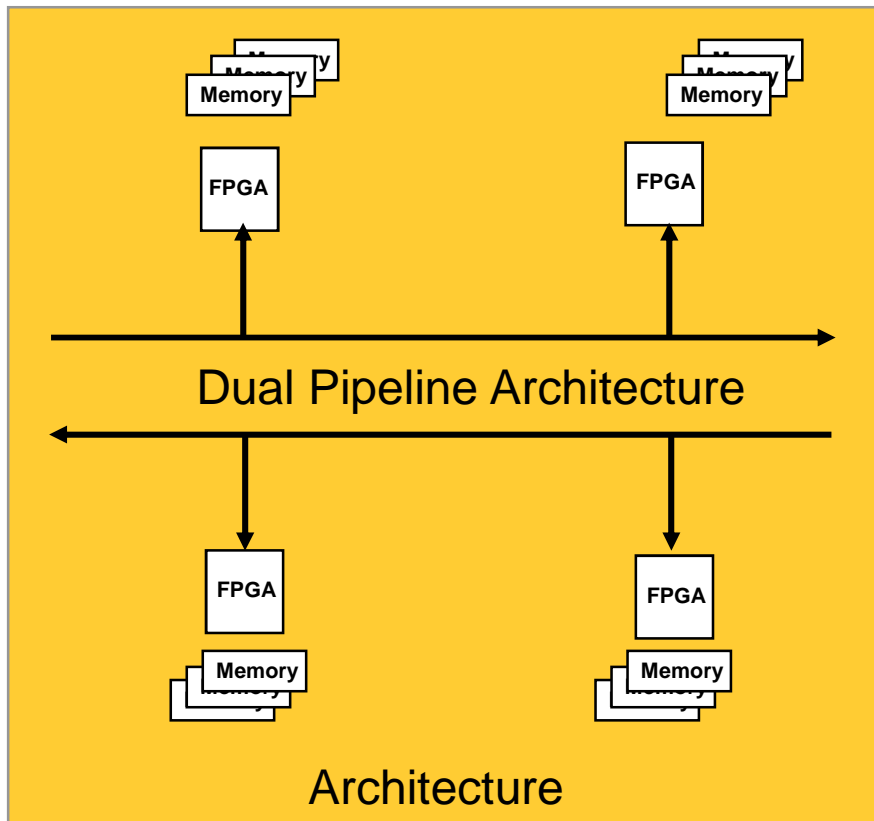


	Hitachi NAS 3080	Hitachi NAS 3090	HNAS 3100 (FSX)	HNAS 3200 (FSX)
File System Object	16 Million per Directory	16 Million per Directory	16 Million per Directory	16 Million per Directory
SpecSFS IOPs	60,000	100,000	100,000	193,000
Throughput	Up to 700 MB/Sec	Up to 1,100 MB/Sec	Up to 850MB/sec	Up to 1600 MB/Sec
Scalability	1 Petabyte	2 Petabytes	2 Petabytes	4 Petabytes
File System Size	128 Terabytes	256 Terabytes	128 Terabytes	256 Terabytes
Ethernet Ports	6 x 1 Gigabits and 2x 10Gb	6 x 1 Gigabits and 2x 10Gb	6 x 1 Gigabits or 2x 10Gb	6 x 1 Gigabits or 2x 10Gb
Fire Channel Ports	4x 4/2/1 Gigabits Ports	4x 4/2/1 Gigabits Ports	4x 4/2/1 Gigabits Ports	8x 4/2/1 Gigabits Ports
# Nodes / Cluster	Up to 2 Nodes	Up to 4 Nodes	Up to 8 Nodes	Up to 8 Nodes

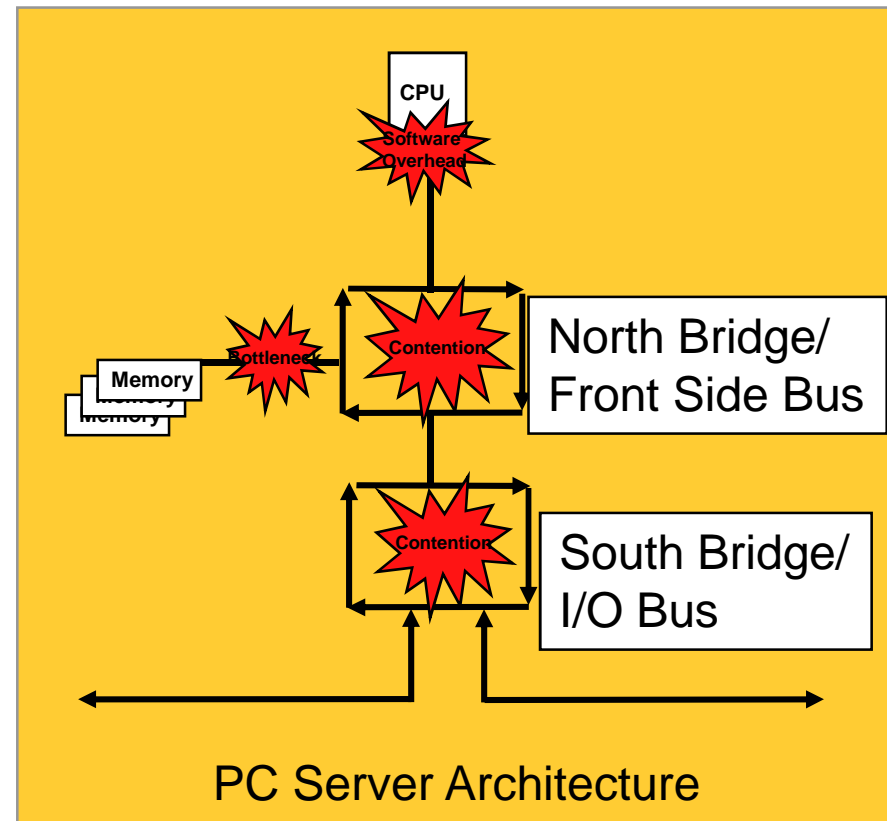


Gold – HNAS 3200
Bronze – AMS 2000

Architecture Comparison



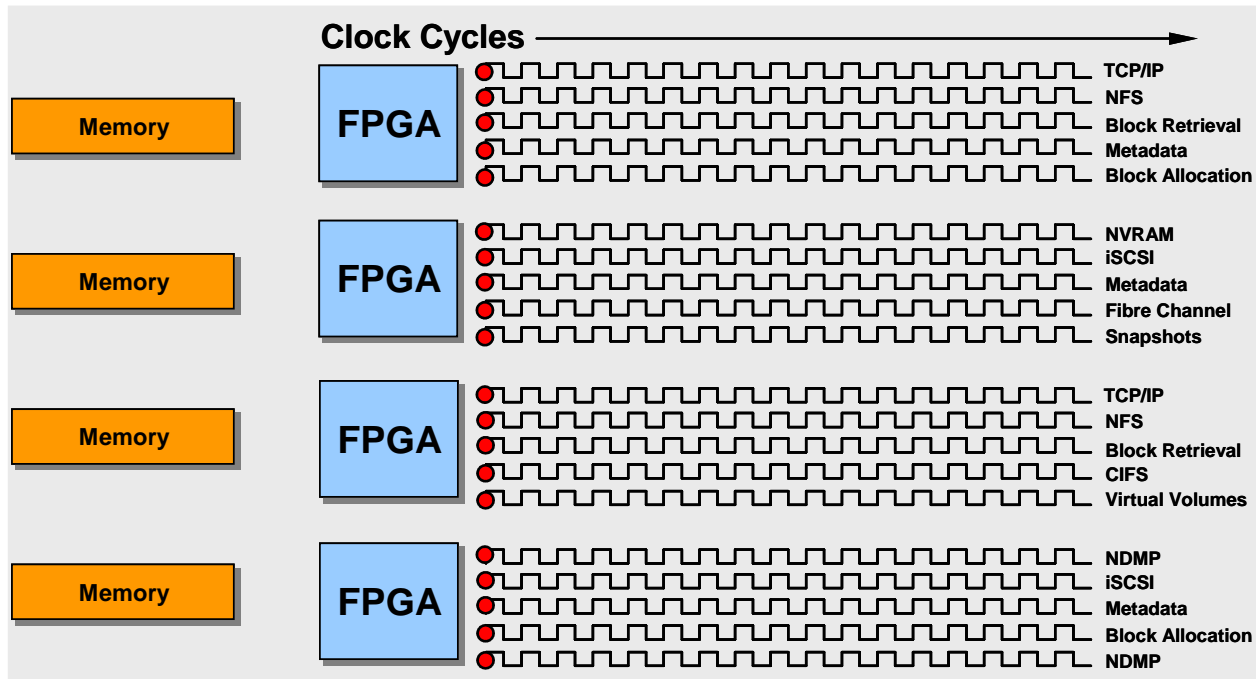
- Highly parallel
- Optimized for data movement
- Similar to network switches or routers



- Highly serial
- Optimized for general purpose computing
- Similar to a laptop or pc

FPGA vs. CPU based Architectures

Parallelized vs. Serialized Processing



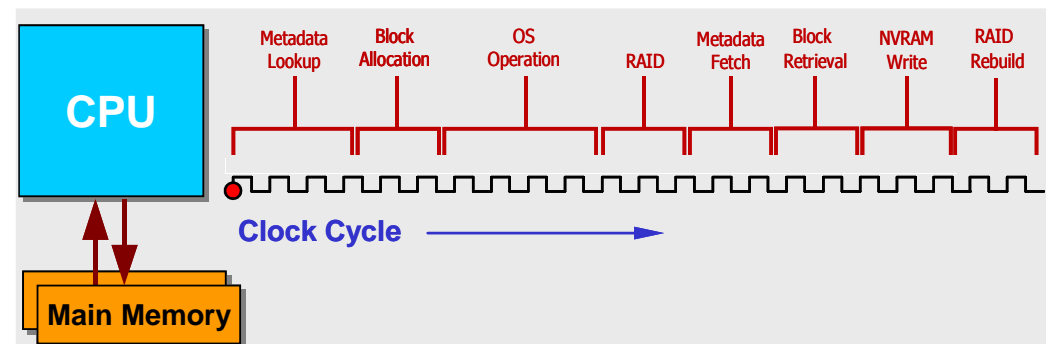
Parallelized Processing

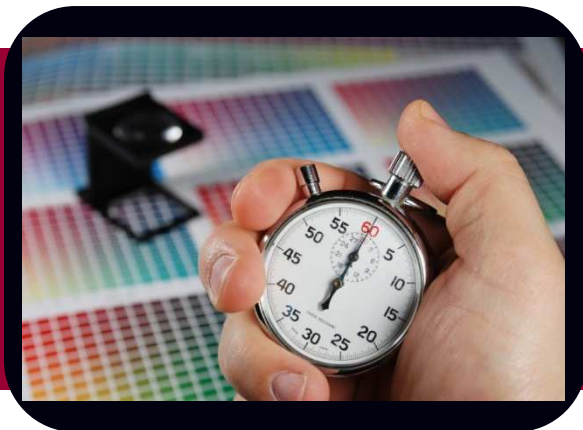
- Distributed processing for specific tasks
- Multiple Tasks per clock cycle
- Distributed memory
- No shared buses



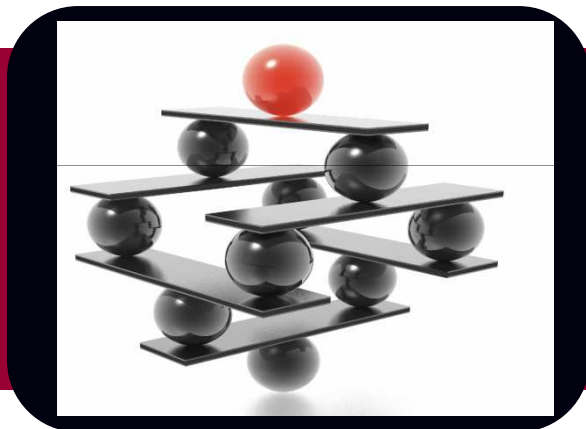
Serialized Processing

- Shared processor
- Shared memory
- Single tasks per clock cycle
- Shared buses





- Stable H/W accelerated WFS-2 File System
- Cluster up to 8-nodes
- Cluster Read Caching
- Dynamic Read/Write balancing
- Wire-speed like operation with linearity of scale
- > 10GB/s in NFS v3 environments
- IOP/MB/s per KW advantage
- Offloaded Hitachi RAID protection



- Virtualization with NAS and SAN
 - Virtual Storage Pool
 - Cluster Name Space
 - Horizontal & vertical scalability

- Intelligent Tiered Storage (HSM)
 - Policy Based Data Migration Across Tiers
 - Transparent data movement helps maintain Tier1 performance

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Business Needs

- High performance requirements for Oil & Geological Modelling Applications
- Huge customer interest in HNAS overall because they use an application (OMEGA 2-D/3-D seismic processing software Western Geophysical)
- Huge customer HNAS interest to connect/interface at the High Performance Computer (IBM HPC)

What was the solution?

- 2200 HNAS Cluster + 10GB NIM3 + 3 x AMS1000 (Total 500TB (200TB NAS))

Why Did They Buy?

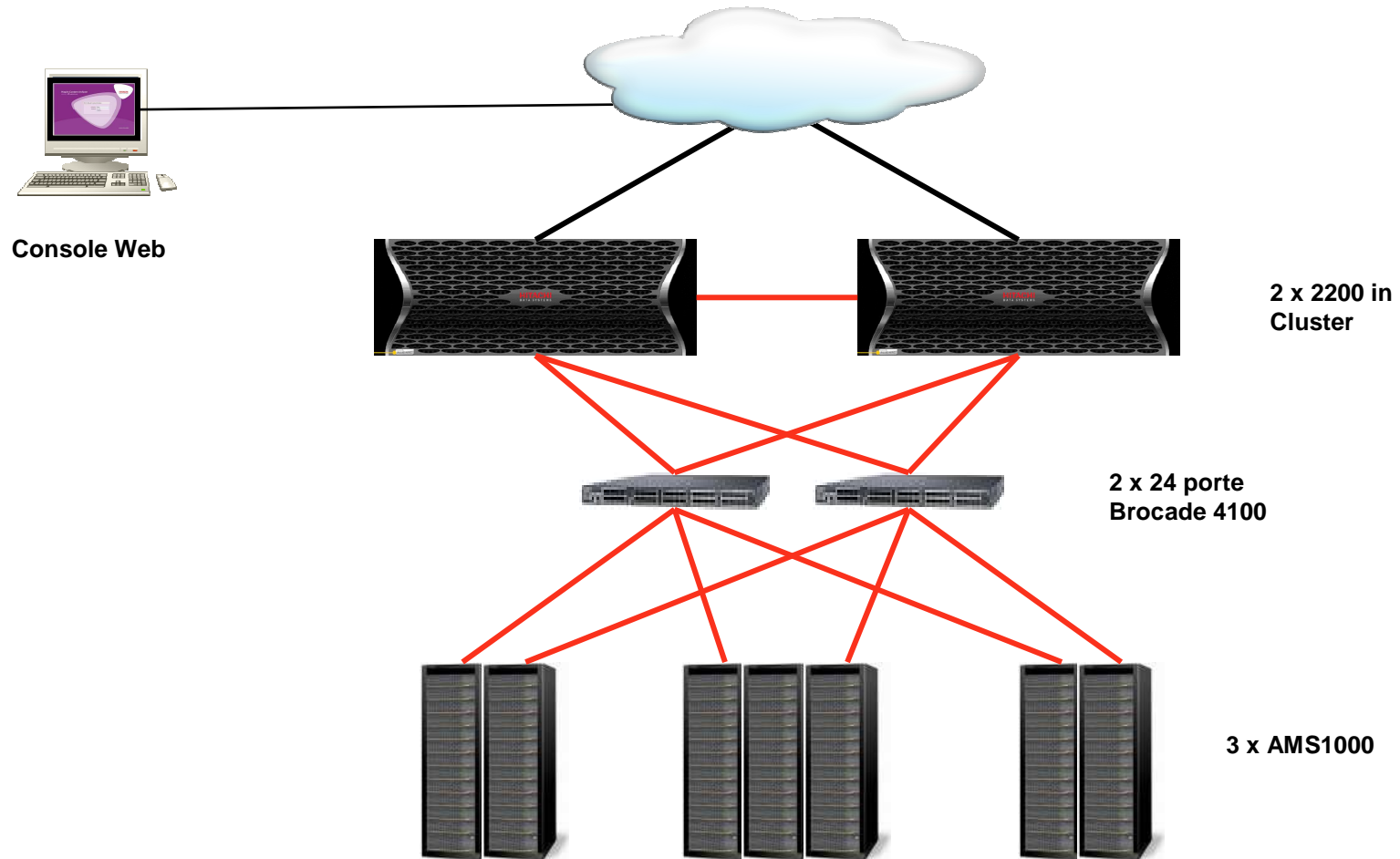
- HNAS had the best “profile” and solution set available – (One Stop Shop)
- Certified in the "compatibility" list of software vendor
- Performance & Scalability of HNAS platform to cater for application & users
- HNAS Architecture (Differentiator)
- Excellent HDS brand & perception in Italy
- Best performance and scalability Vs existing NAS vendor
- HNAS is considered best platform to interface at the HPC customer environment (IBM)

APPLICATION(S)

- OMEGA 2-D/3-D seismic processing software Western Geophysical Application

HNAS Solution

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Business Needs

Cost effective & simple to setup & use high performing NAS platform capable of supporting multiple compute nodes

What was the solution?

HNAS 3080 Entry x 3. AMS 2100 x 3 with 35TB (1TB SATA 7.2K) in each system
NFS & CIFS licenses

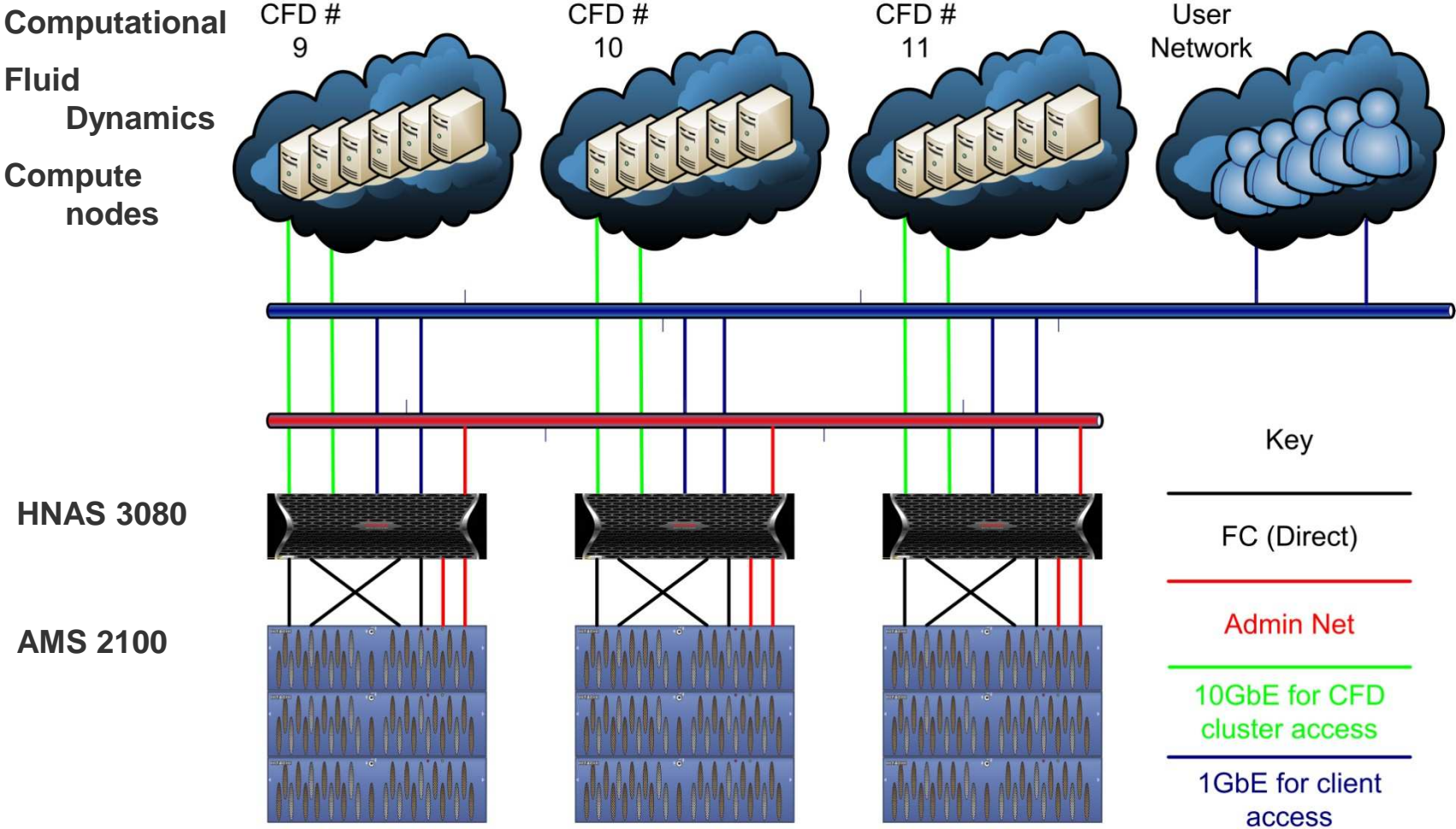
Why Did They Buy?

Budget cap spend for all motorsport teams in the series had to be within certain low limits. The HNAS solution was less complex than the competitors, delivered great performance & was at a good price point (that fitted well with the regulations)

APPLICATION(S)

SUSE Linux & Windows HPC servers. Used FLUENT/NASTRAN/Dassault applications during the POC phase to gauge HNAS performance level
The 3 systems will be used in 3 separate solutions related to fluid dynamics (wind tunnel testing)

HNAS Reference Architecture



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HNAS Capabilities for Vertical Markets

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**Internet
Services**



**Media &
Entertainment**



**Finance, Banking
& Government**

Solution Capabilities:

- Industry leading performance in CIFS and NFS to accelerate information sharing
- Granular & easy to scale-up & scale-out
- Transparent file tiering for file and content management



Healthcare

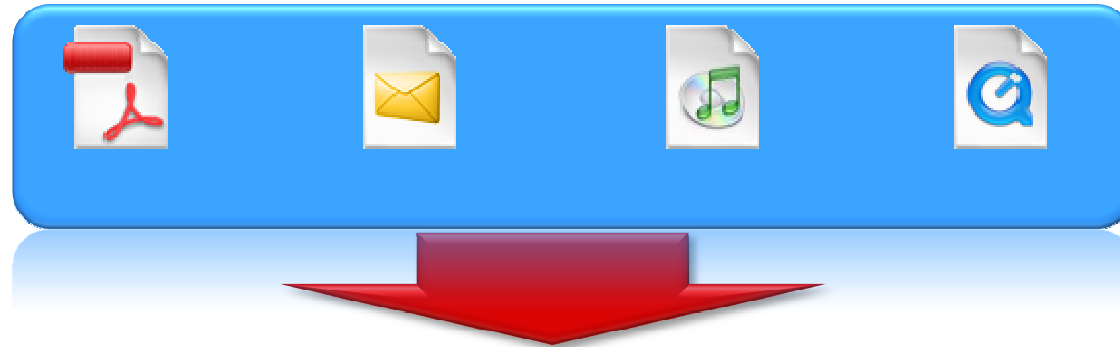


**Life
Sciences**



**Energy
Development**

In HPC environments – HNAS delivers:



EASIER to manage clustering
DYNAMIC load balancing & data distribution
MORE performance linearity
LESS footprint, power and cooling costs

Reduce Complexity

Simple Management

File Tiering

Hardware RAID

Hitachi Strategic File and Content Services

Single Platform, Single Management, Single Vendor



Thank You.