NAS: New Frontiers Beyond The Filer

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NAS Strategy and Planning

Data Management Group

Sun Microsystems, Inc.

NAS

NAS Evolution

NAS (naz, nas)

1. Optimized server for file serving/sharing, including integrated storage, attaching to IP LAN.
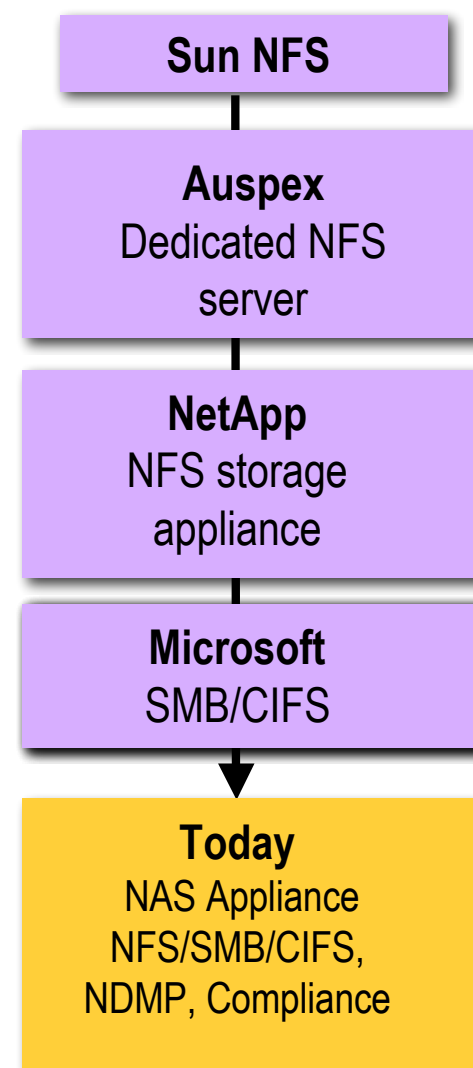2. Intelligent device for single, well-defined function (appliance).
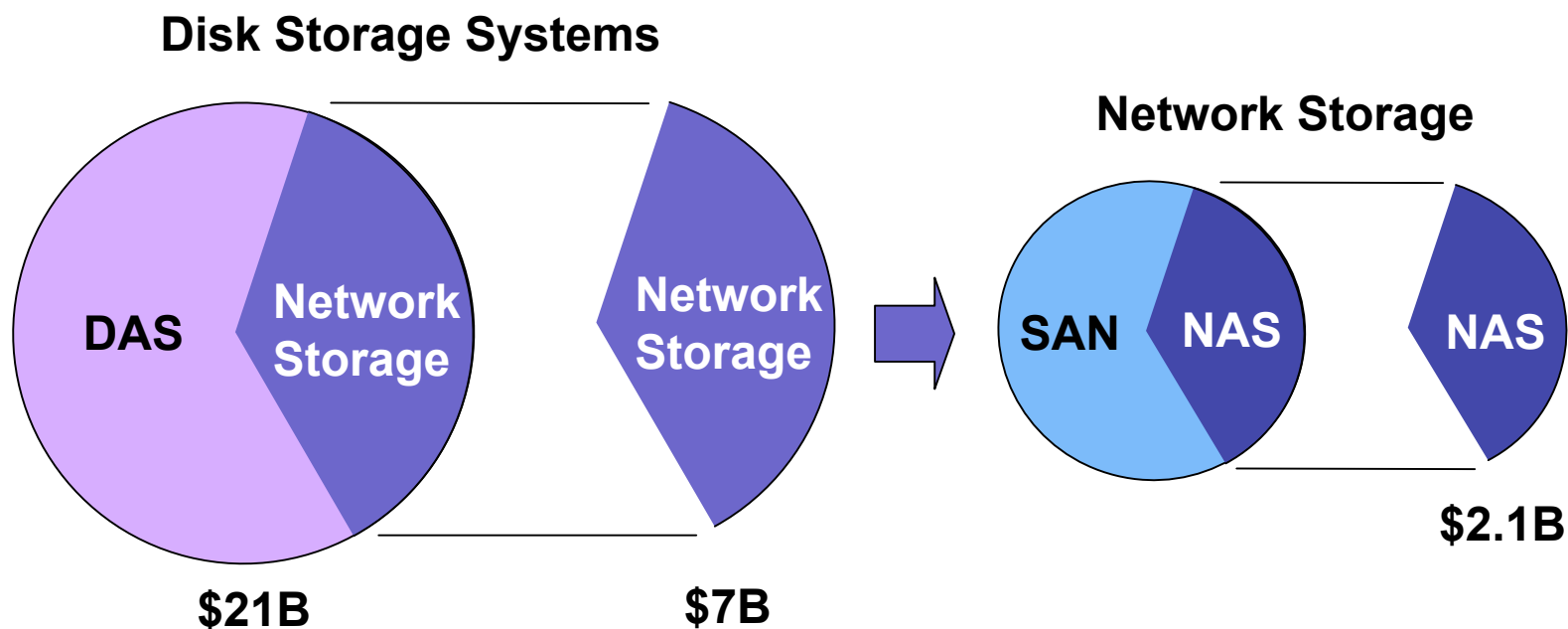
NAS = file access
Good for sharing data

SAN = block access
Good for sharing resources

Sun NFS

Auspex
Dedicated NFS server

NetApp
NFS storage appliance

Microsoft
SMB/CIFS

Today
NAS Appliance
NFS/SMB/CIFS,
NDMP, Compliance

Consolidation is the Primary NAS Opportunity

Disk Storage Systems

DAS

Network Storage

Network Storage

$21B

$7B

Network Storage

SAN

NAS

NAS

$2.1B

Many NAS Benefits

Reduce management

Simplify admin, protection
Reduce repetitive tasks

Reduce capacity needs

Eliminate DAS redundancies
Share/eliminate duplicate files

Increase reliability

Monitored platform and alerts
RAID protection
Clustering

Improve performance

Dedicated, optimized server

Improve Disaster Recovery

Backup from single source
Eliminate redundant file backup
Snapshot/replicate transparently

Improve scalability

Simplify configuration changes
Reduce time/effort to add storage

Improve security
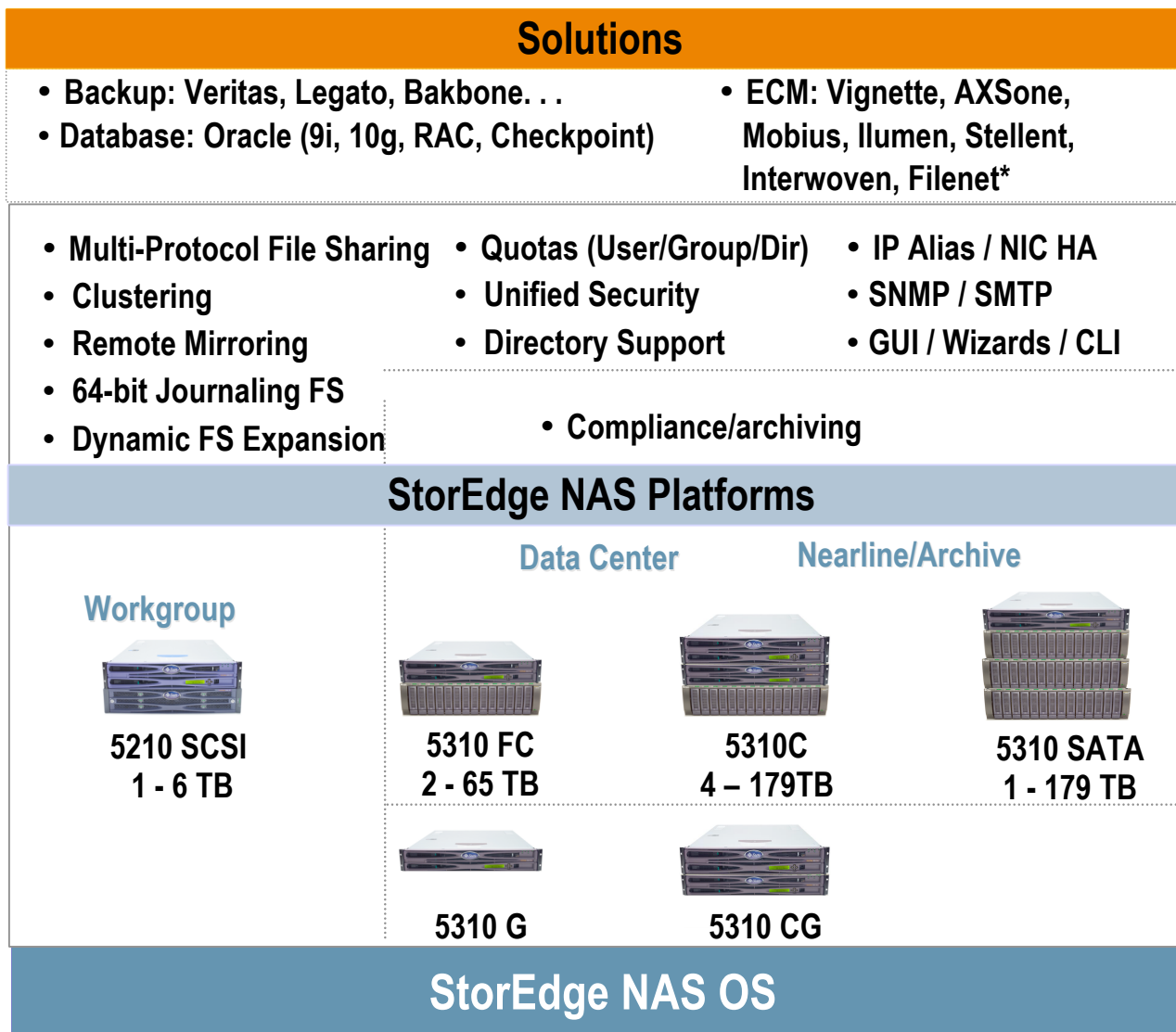
Set policies for file access
Set policies for groups/users
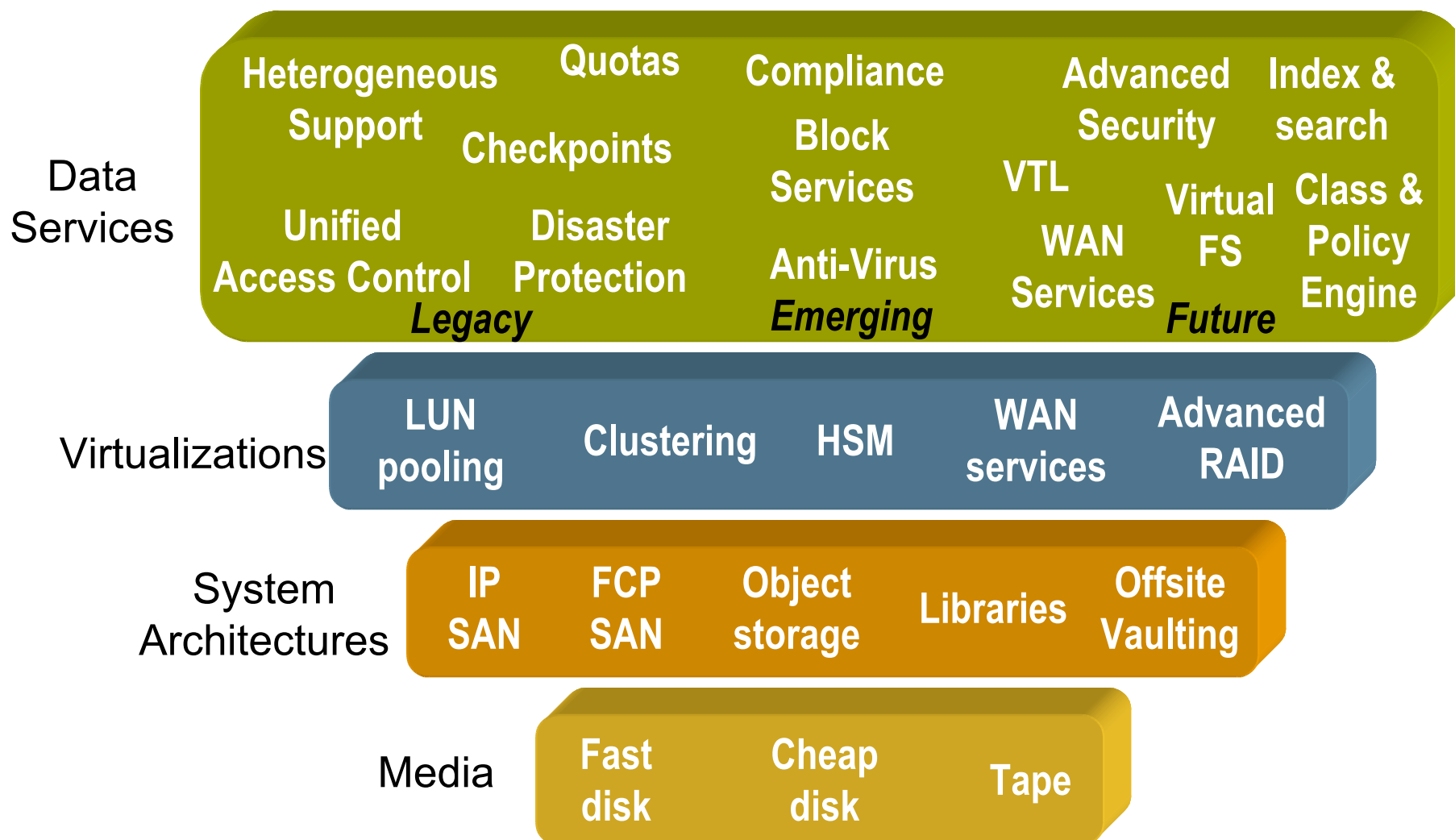
Workgroup to Datacenter Solutions

3rd-party solutions

Solutions for file sharing, data protection, security and management
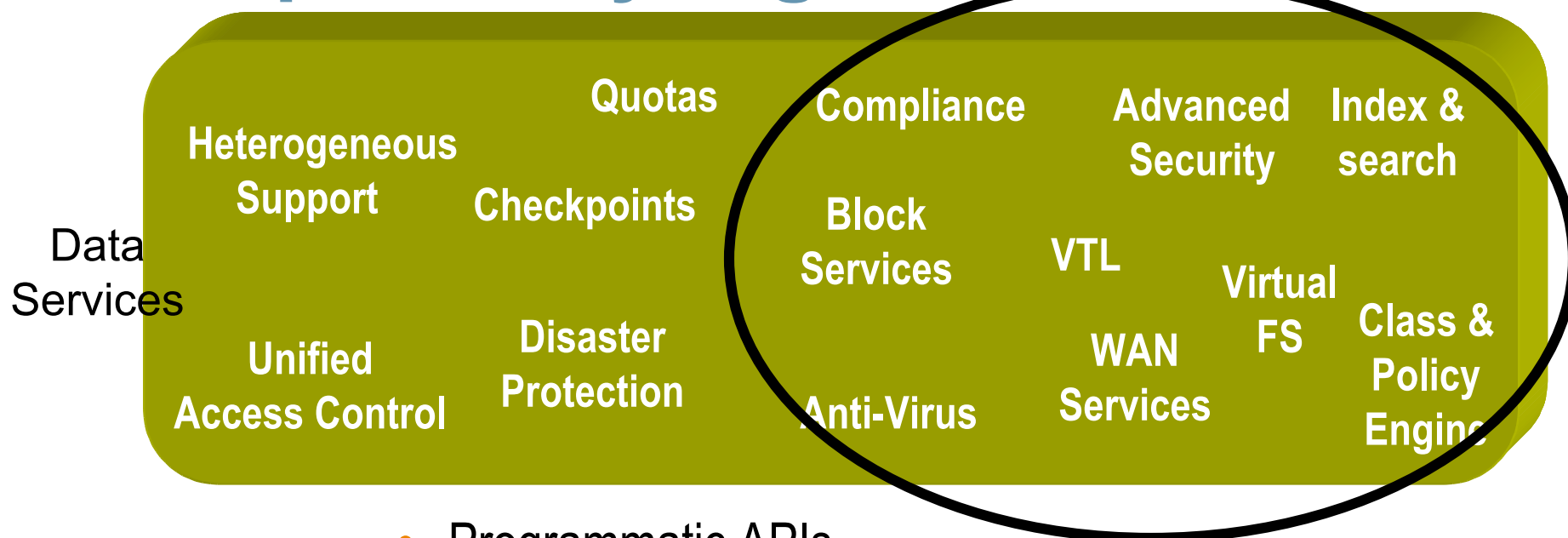
Industry-standard hardware platforms

Storage appliance OS

Solutions

- Backup: Veritas, Legato, Bakbone. . .
- Database: Oracle (9i, 10g, RAC, Checkpoint)
- ECM: Vignette, AXSone, Mobius, Ilumen, Stellent, Interwoven, Filenet*

- Multi-Protocol File Sharing
- Clustering
- Remote Mirroring
- 64-bit Journaling FS
- Dynamic FS Expansion

- Quotas (User/Group/Dir)
- Unified Security
- Directory Support

- IP Alias / NIC HA
- SNMP / SMTP
- GUI / Wizards / CLI

- Compliance/archiving

StorEdge NAS Platforms

Data Center   **Nearline/Archive**

Workgroup

5210 SCSI
1 - 6 TB

5310 FC
2 - 65 TB

5310C
4 – 179TB

5310 SATA
1 - 179 TB

5310 G

5310 CG

StorEdge NAS OS

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NAS is Not A Clear Definition

Data Services

Heterogeneous Support Quotas Compliance Advanced Security Index & search

Checkpoints Block Services VTL Virtual FS Class & Policy Engine

Unified Access Control Disaster Protection Anti-Virus WAN Services

Legacy *Emerging* *Future*

Virtualizations

LUN pooling Clustering HSM WAN services Advanced RAID

System Architectures

IP SAN FCP SAN Object storage Libraries Offsite Vaulting

Media

Fast disk Cheap disk Tape

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Increased Intelligence = Worsening Interoperability Nightmare?

Data Services

Heterogeneous Support

Quotas

Checkpoints

Compliance

Advanced Security

Index & search

Block Services

VTL

Virtual FS

Unified Access Control

Disaster Protection

WAN Services

Class & Policy Engine

Anti-Virus

- Programmatic APIs
- Pseudo-APIs (eg CHMOD 444 for WORM)
- NFS Extensions
- Administrative: SMIS, CLI, GUI
- Custom agents and shims (ISV role in 'standards')

What Problems Are We Solving?

SAN	NAS
Fast	Slow(ish)
Low Overhead	High Overhead
Device Specific	Device Independent
Geometry Specific	N/A
Transport Specific	Transport Independent
Limited Distance	Any Distance
Limited Data Sharing	Excellent Data Sharing
Limited Hetero	Completely Hetero
"Blocks"	"Files"

This Is Not the End Point

SAN (Block)
FC Network

FCP Protocol

NAS (File)
Gig-E Network

IP Protocol

This is a filer and a disk controller in the same box Sun is doing this. This is good, but it's not the end of the road

Is There Room For an Object Interface?

I want to write 26,763 bytes to you
Handle = Get_Rich_Quick
QoS = High
Metadata = 10/19/05 NASConf
Retention = 100 years
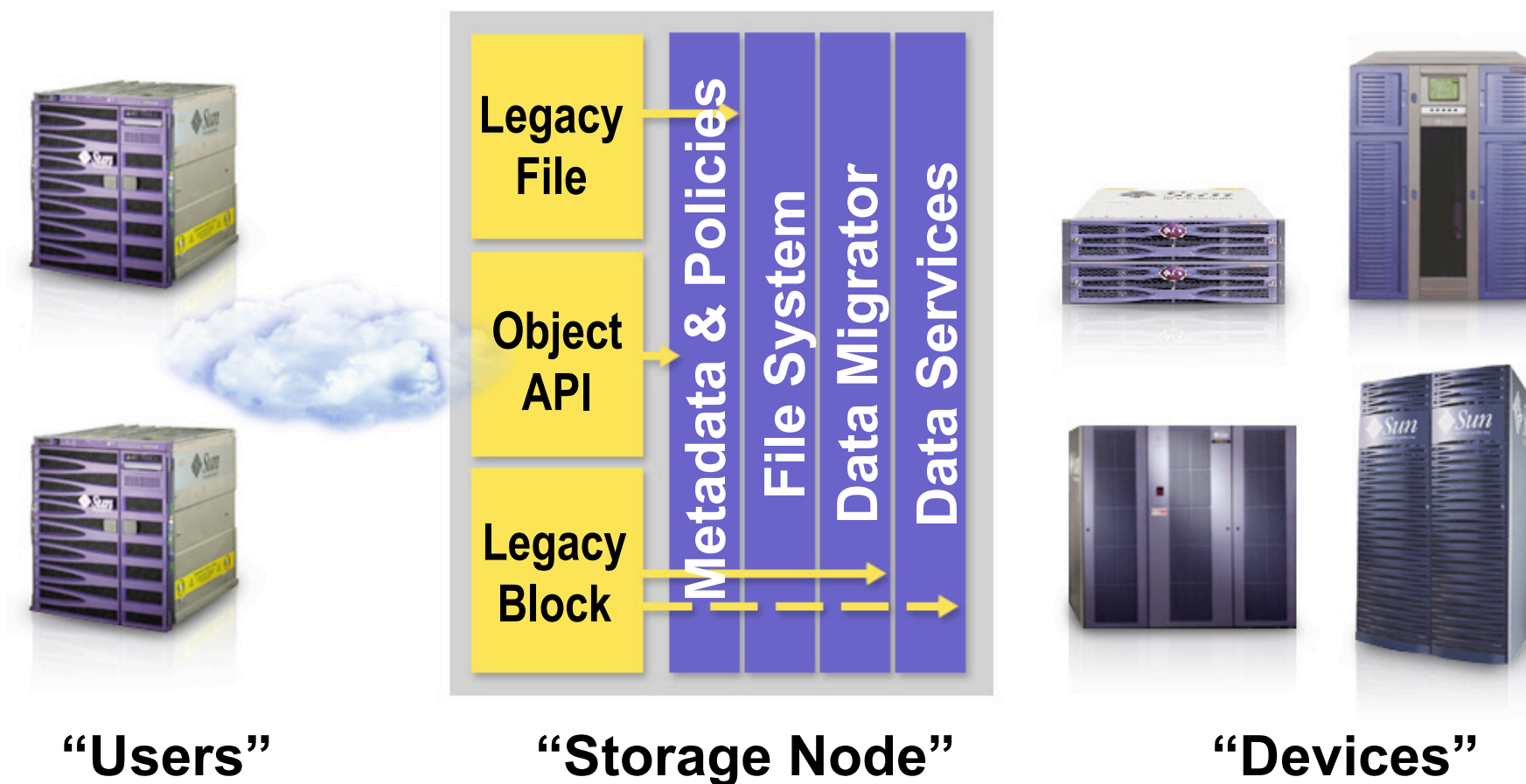Access Key = *&^%#
Data Payload…

Storage Node

"Devices"

Big Message:

Applications (and humans) are not concerned with where the data is located, only that it is there & secure

Storage Node Functions

- Outboard Space Management
- Security/Access Control
- QoS Implementation
- Cache, Backup, RAID
- Policy Migration, Retention

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Modernizing the Access Semantic

A New "Layer" to Talk To

"Users"

Legacy File

Object API

Legacy Block

Metadata & Policies

File System

Data Migrator

Data Services

"Storage Node"

"Devices"

Problem: Data Outlives Infrastructure!

- Magnetic media life = ~5 years, Papyrus = ~3000 years

- Retention requirement = 1 day to "Forever"
  - > Life Insurance Policy & Claim data: 99 years after actuarial death of the insured
  - > Financial Data: 5-7 years and increasing
  - > Healthcare: 7 years, 20+ years, some "forever"
  - > Deeds and real property maps: Forever

- Solutions:
  - > Transparent technology refresh (media, CPUs, vendors?)
  - > Multi-generational support
  - > Policy-based de-commissioning

Problems: Assured Delete

- A looming post-retention problem

- How do I delete data when:
  - > I may not know where it is?
  - > It might be on off-line tape?
  - > How many copies are there? Where are they?
  - > Forensic disk recovery can retrieve "erased" data

- Ask the right question: Delete or "make unavailable"?
  - > Encrypted data and robust key management
    http://research.sun.com/spotlight/2005-03-01_Ephemerizer.html

Problem: We are Losing Value

- In large-scale applications, file systems have lost meaning to customers
    - > Finding the needle requires a rich application schema
    - > Query is the everyday use model
    - > FS limitations: scaling, insuring uniqueness, static view
- Rich metadata = content awareness
- Content awareness adds the value back
    - > Query
    - > Virtual dynamic hierarchical file systems
    - > Smarter policy engines
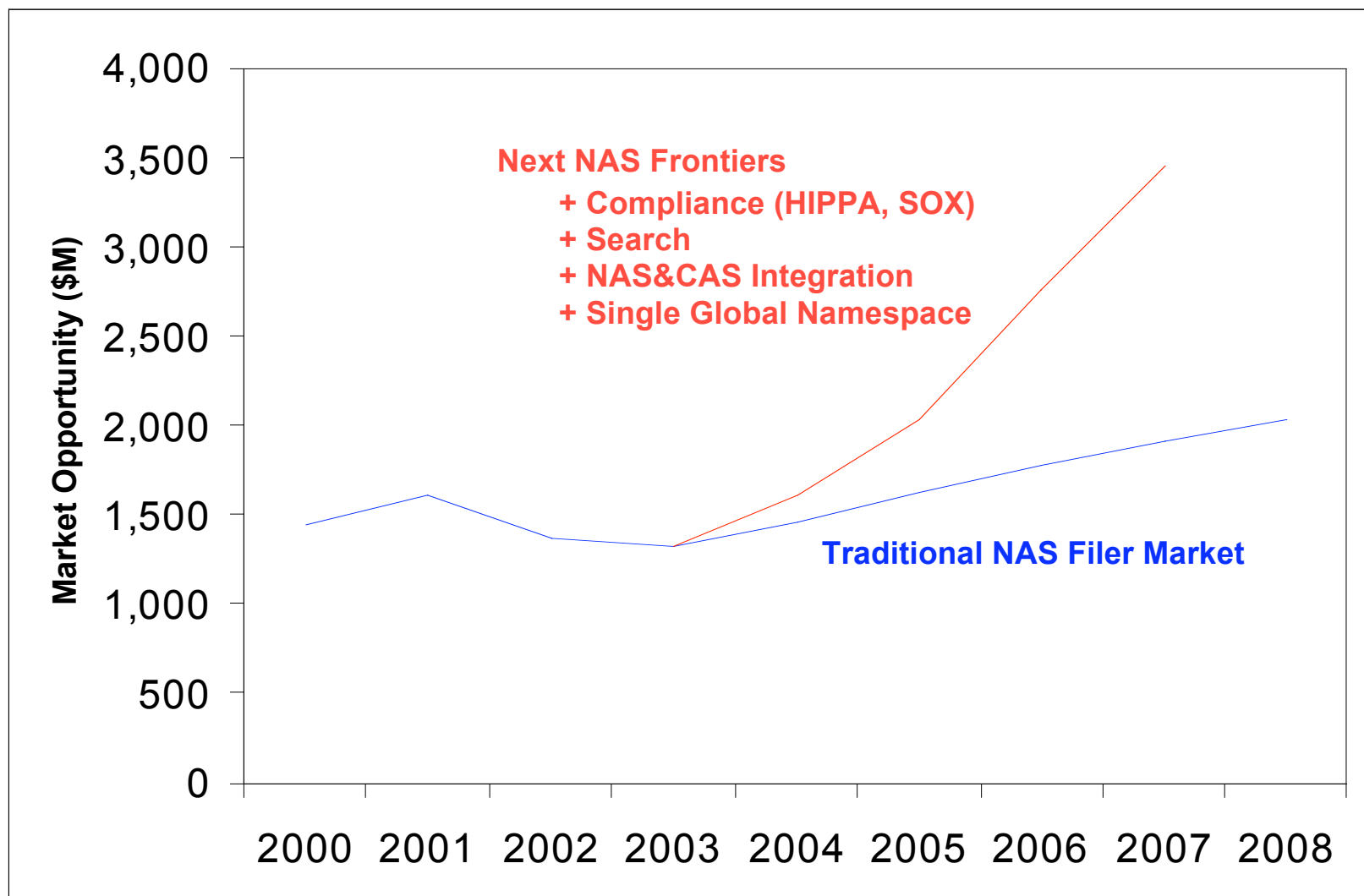
Technologies Influencing Trends

- NFS v4
  - NT style ACLs
  - File delegations
  - Statefull connection
  - WAN improvements (TCP, compound, security, locks)
  - Migration & replication (although limited)
- PNFS extensions - horizontally scaleable performance
- 10G Ethernet transition
- iSCSI - Consolidating block and file services

Where Can NFS Help Further?

- Open Standards support for new data services, to reduce business risk to partner community
  - > Capturing extended attributes
  - > Executing a query
  - > Invoking compliance functionality
- Heterogeneous interoperability
- Integration with identity management
- Namespace scaling
- Stronger WAN capabilities

We Can Grow the Market

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