NFS INDUSTRY CONFERENCE

Deploying Scalable Switched NAS Infrastructures in the NFS Environment

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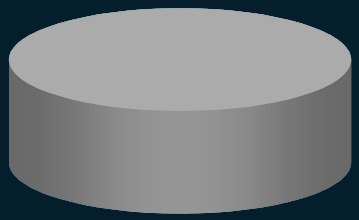
October 22-23, 2002

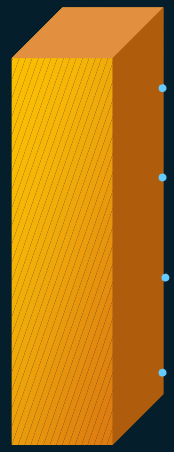
RAID Aggregates Block-Level Storage

Single Large Expensive Disk



SCSI Disks

RAID ARRAY



RAID Controller

+

SCSI Disks

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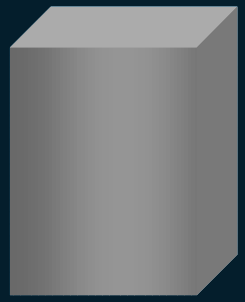
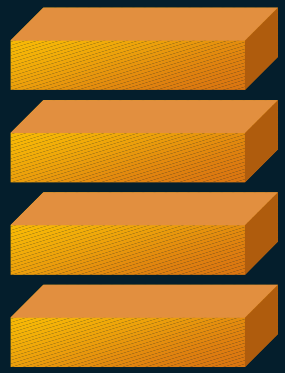
File Switch Aggregates File-Level Storage

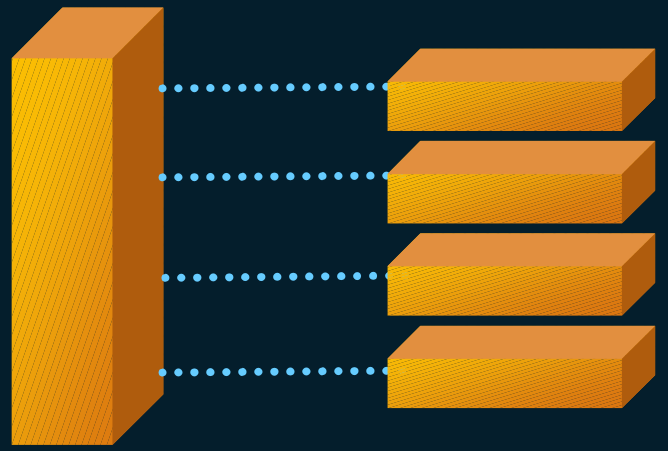
Large Clustered File Servers





Inexpensive NAS Servers

NAS ARRAY



File Switch + *Inexpensive NAS Servers*

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Today NAS is limited to a point solution

- Cannot scale non-disruptively for growth
- No scalability = manageability problems
- Stranded islands of storage
- Underutilized NAS file serving capability
- Multiple forklift upgrades over time
- High-availability solutions are complex & expensive

NAS Must Move to Become a Scalable Infrastructure

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Key Company Facts

- Founded in late 1999
- Offices in Laguna Hills and Santa Clara, CA
- Key technology patent granted by USPTO
- 12 more patents pending
- First “venture” round of $16M
- Key Investors:
  - Allegis Capital
  - Alloy Ventures
  - Quantum Technology Ventures
  - Rock Creek Capital

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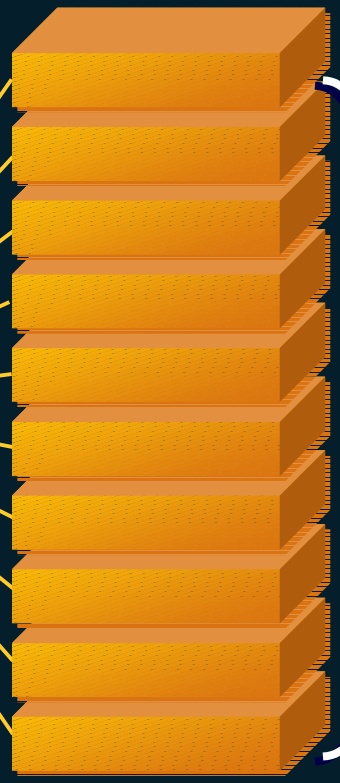
Z-force Enables the NAS Array

High-Performance
Scalable NAS Array

Z-force
File Switch



NAS Devices

Striping + mirroring
File aggregation
Load balancing

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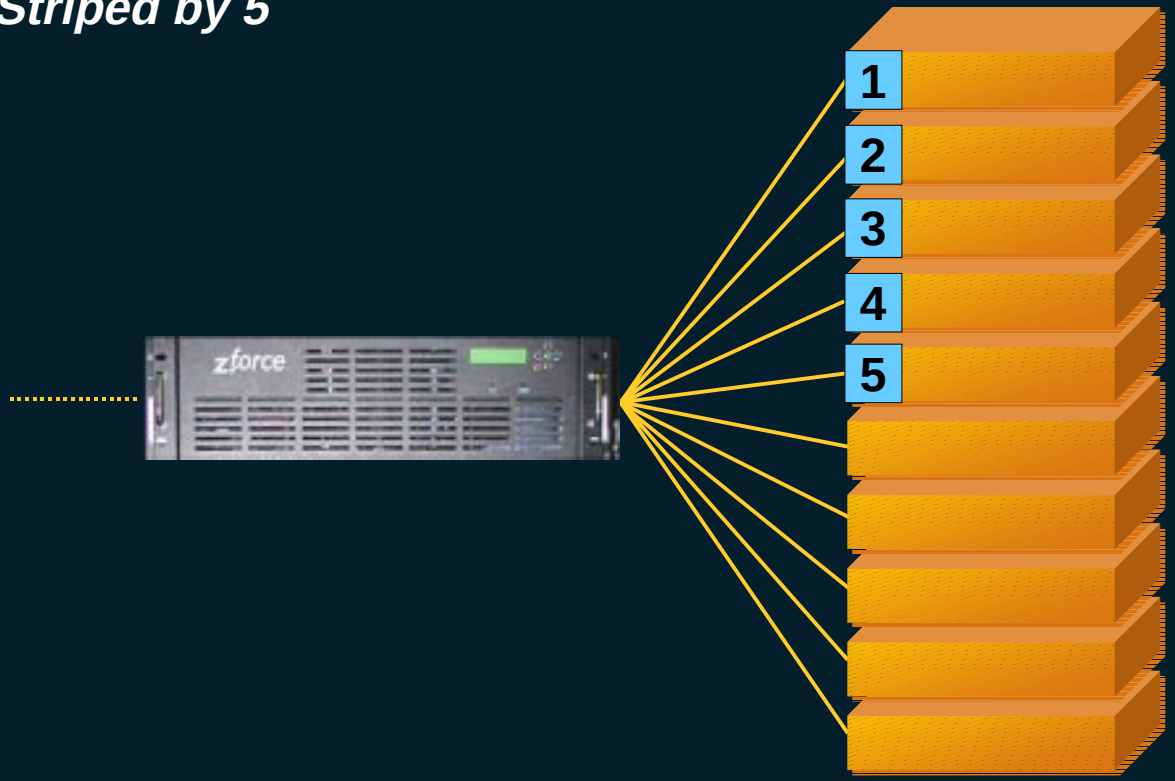
File-Aware, Rules-Based Storage Management

A Simplified Example of User Programmable Rules

All .jpg Files are Striped by 5



Automated Load Balancing
Provides Optimal Storage Utilization

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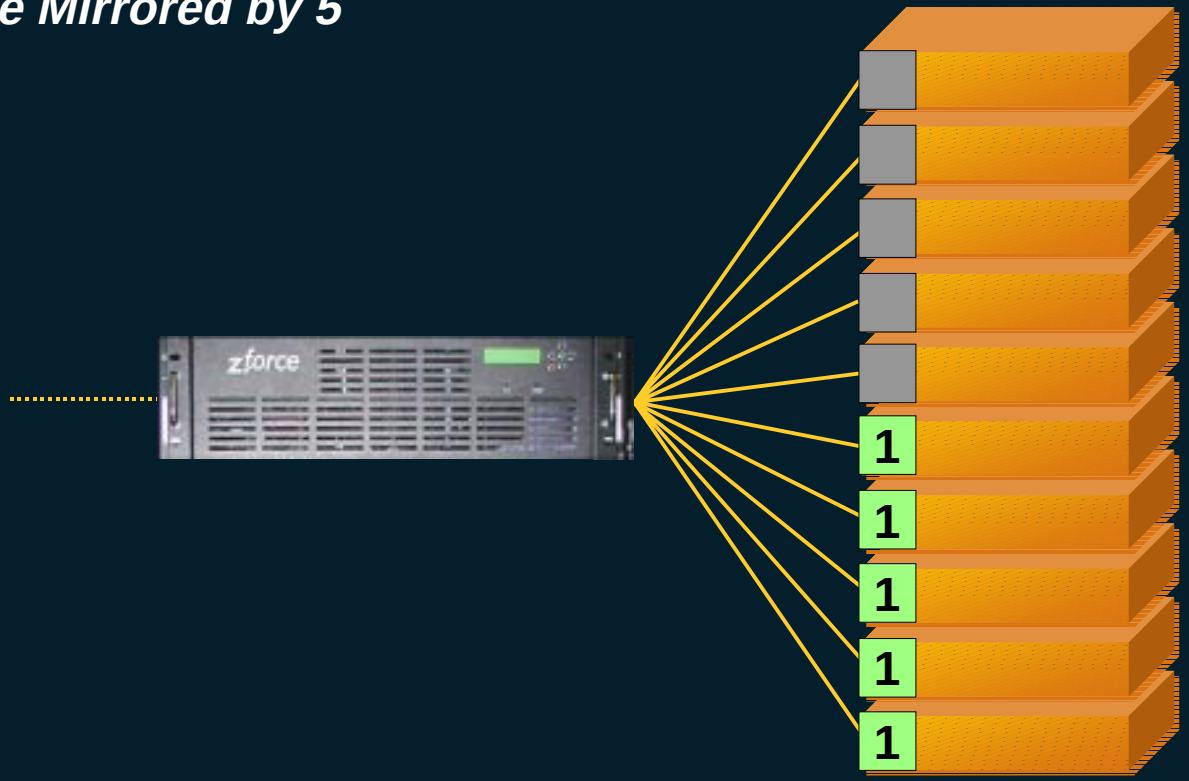
File-Aware, Rules-Based Storage Management

A Simplified Example of User Programmable Rules

All .html Files are Mirrored by 5



Multiple Active Mirrors
Accelerates Read Performance

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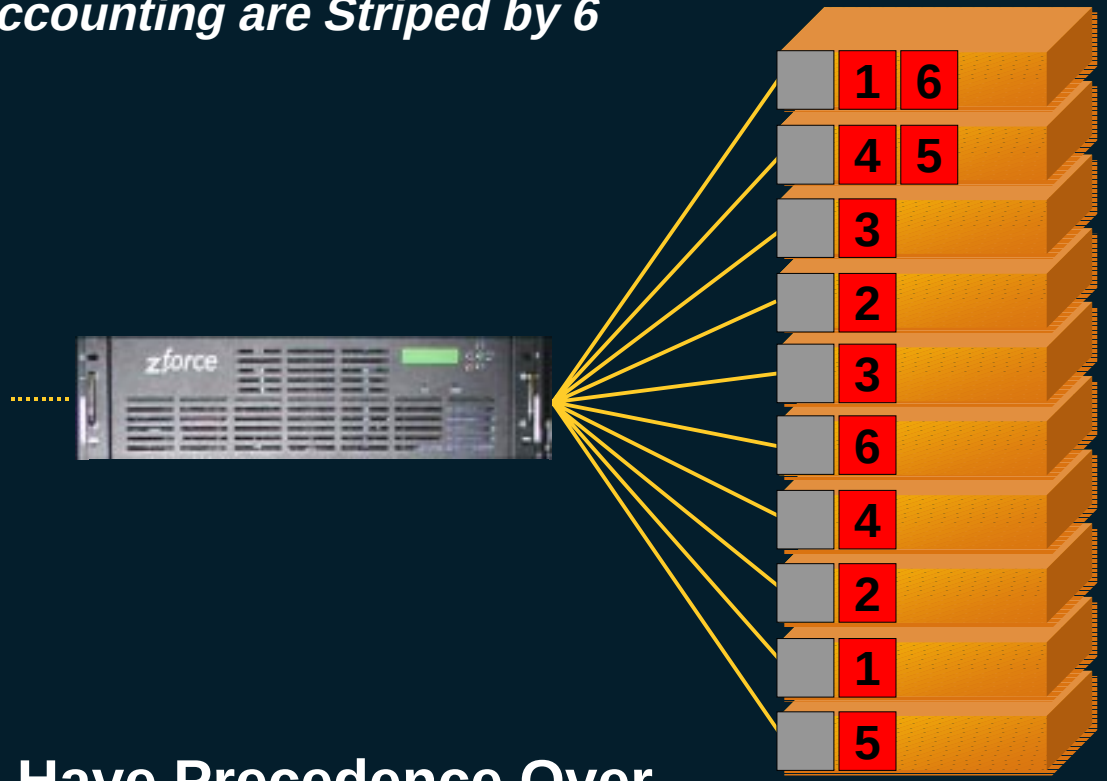
File-Aware, Rules-Based Storage Management

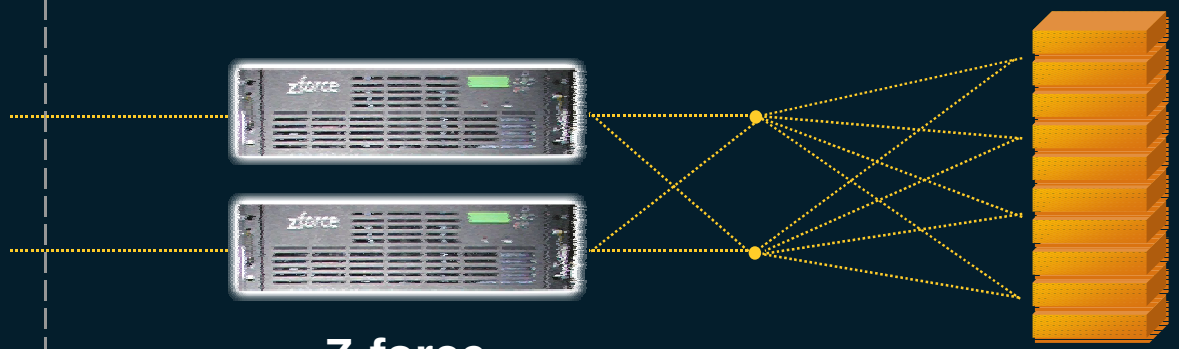
A Simplified Example of User Programmable Rules

All .jpg Files from Accounting are Striped by 6 and Mirrored by 2



Custom Rules Have Precedence Over Generic Rules Offering File-Aware Management

Simple-to-Deploy Entry Level NAS Array



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File Switches

Local
NAS
Array

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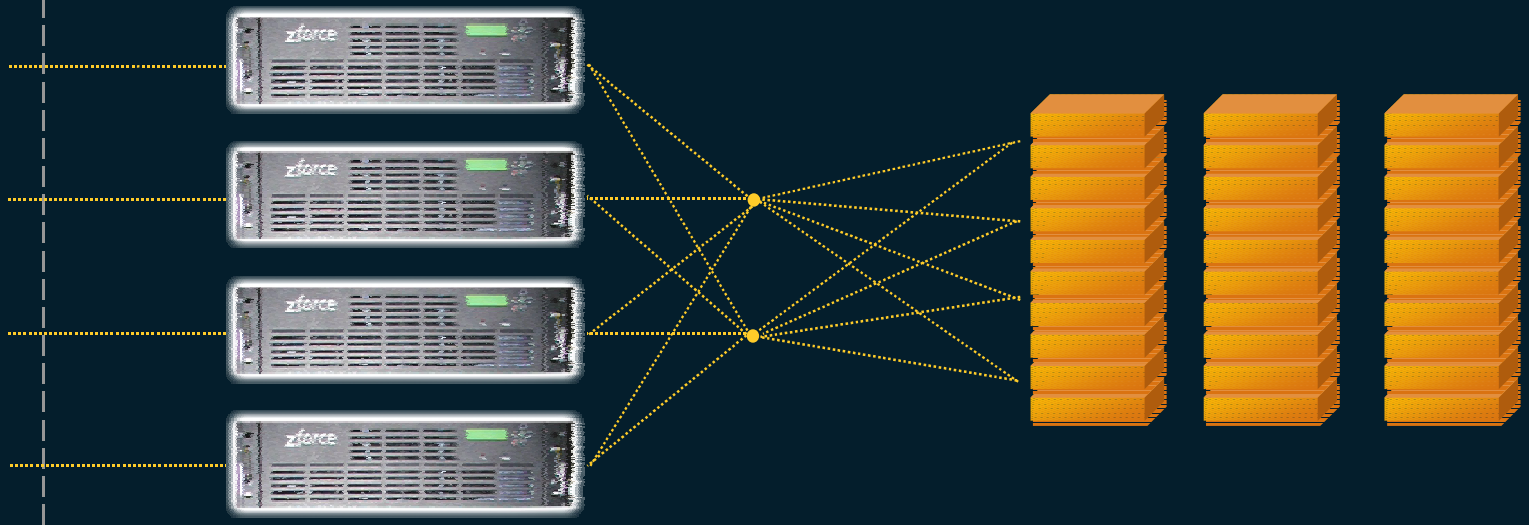
Incremental Scalability Possible for the First Time



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Legacy Devices Share One Common Namespace

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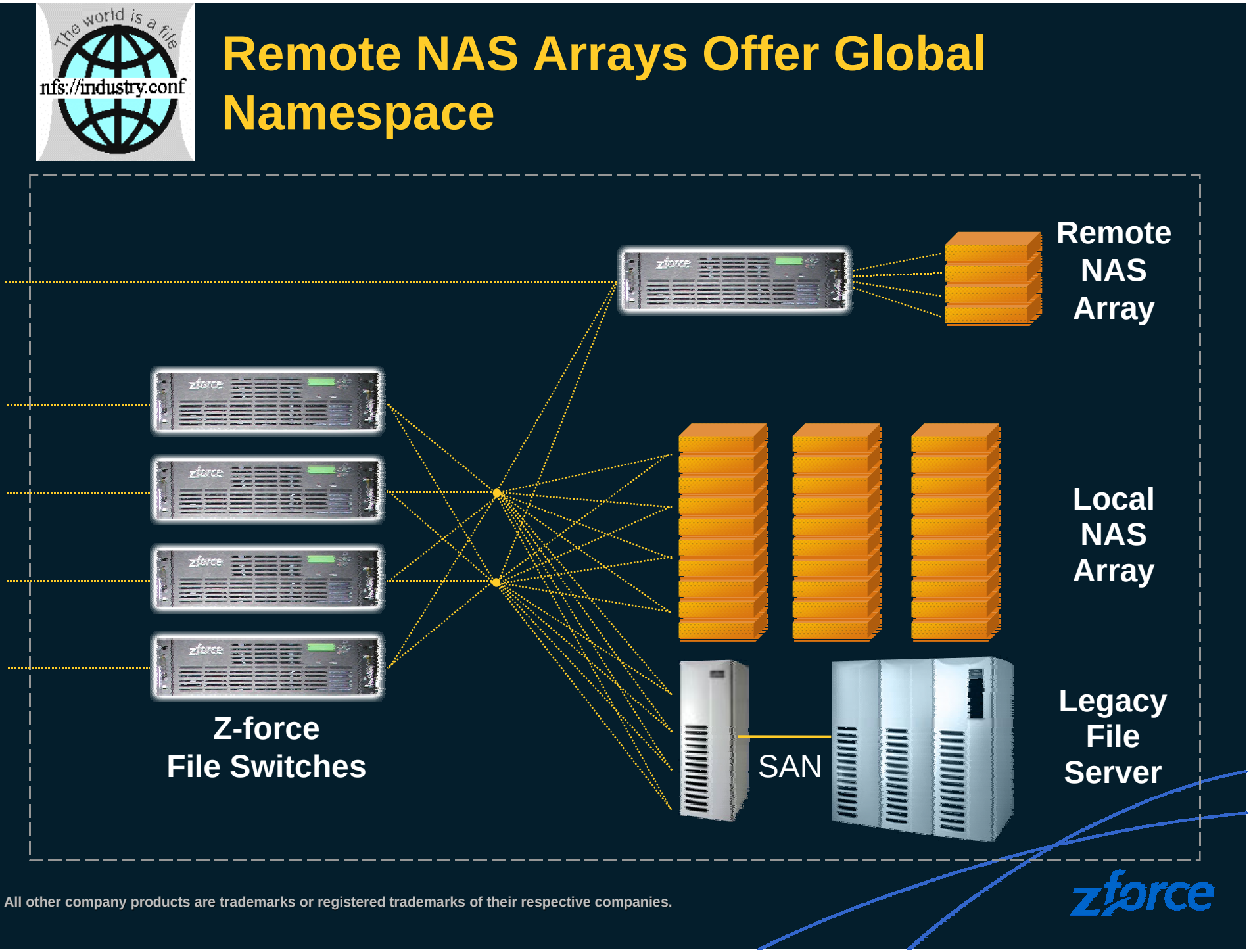

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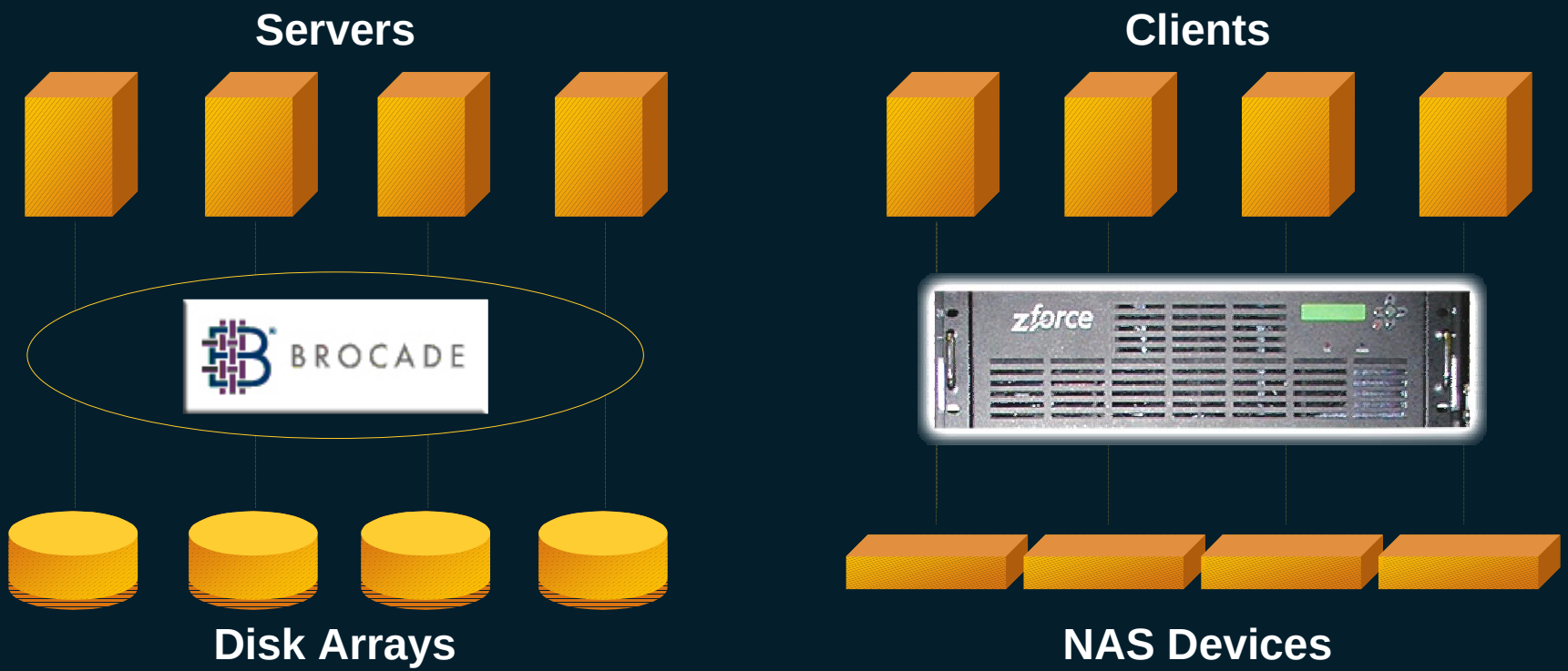
Enabling Truly Scalable Storage Architectures



SAN Enables Truly Scalable Block Storage Architectures

Z-force Enables Truly Scalable NAS Storage Architectures

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“Commodity Supercomputing”

CPU
scales

Interconnect
scales

Shared Memory
bottleneck!

Commodity
Linux
boxes

Commodity
Gigabit
Ethernet

SAN

NAS
Heads

Fibre Channel
Disk Arrays

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“Commodity Supercomputing”

CPU scales

Interconnect scales

Shared Memory scales

Commodity Linux boxes

Commodity Gigabit Ethernet

Z-force File Switches

NAS boxes

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Conclusions

- Z-force invented the file switch
- File switch enables NAS arrays
- NAS Arrays = scalable NAS infrastructure

Z-force enables scalable NAS infrastructure

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