



SCO

UnixWare® 7 NonStop Clusters® Concepts

Transparency Masters

Course Release: 1.0

For Software: UnixWare® 7 NonStop® Clusters

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NonStop Cluster Concepts

- Introduction
- Driving Forces and Clusters
- Key Cluster Concepts and NSC
- Cluster Comparisons
- Designing a Cluster

Driving Forces and Clusters

- The Need for More Computing Resources
- Faster and Less Expensive Hardware
- More Reliable Computing Environments
- The Monolithic Solutions
- The Cluster Solution

Demand for More Computing Resources

- Sophisticated user interfaces
- Improved business management features
- More Reliable Computing Environments
- Fast response times
- 24X7 Availability

Faster and Less Expensive Hardware

- Rapid Increases in CPU Speeds
- Lower Computer Equipment Costs

Downtime has a Price

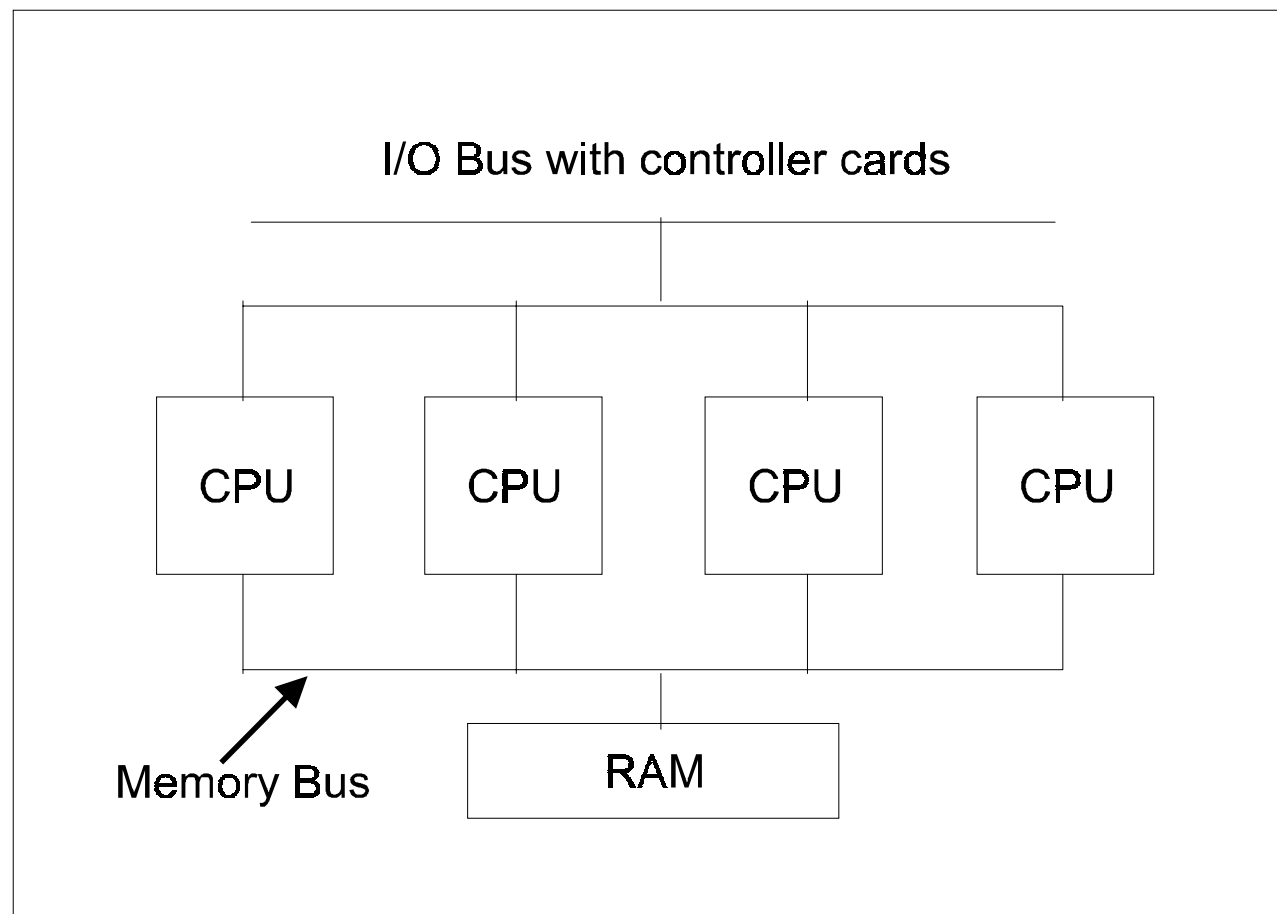
Examples of Average Cost of 1 Hour Downtime

- Financial Market - Brokerage \$6.45M
- Credit Card Sales Authorization 2.60M
- Media Pay-Per-View Server 150K
- Retail Home Catalog Sales 90K

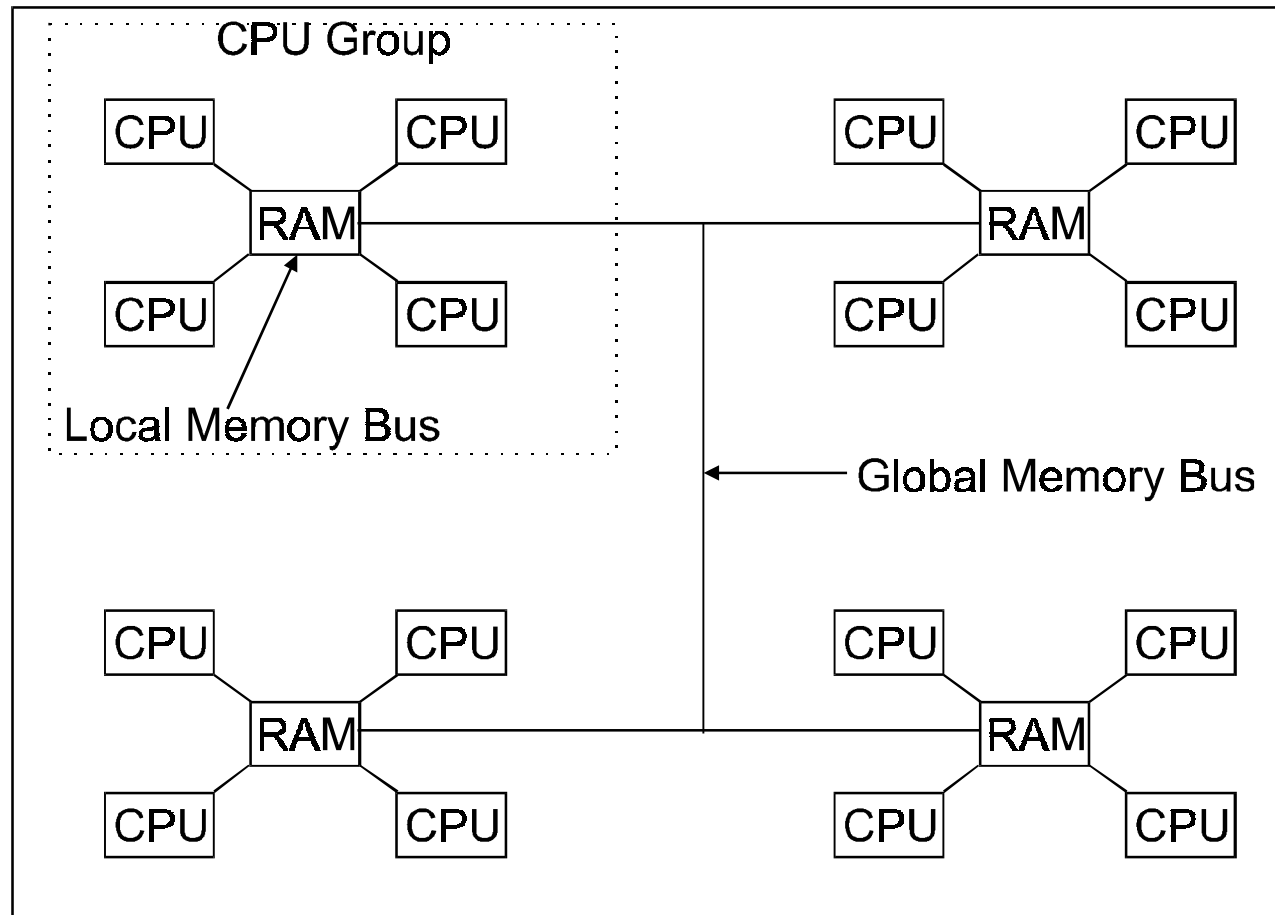
Internal SCO Research

An SMP System

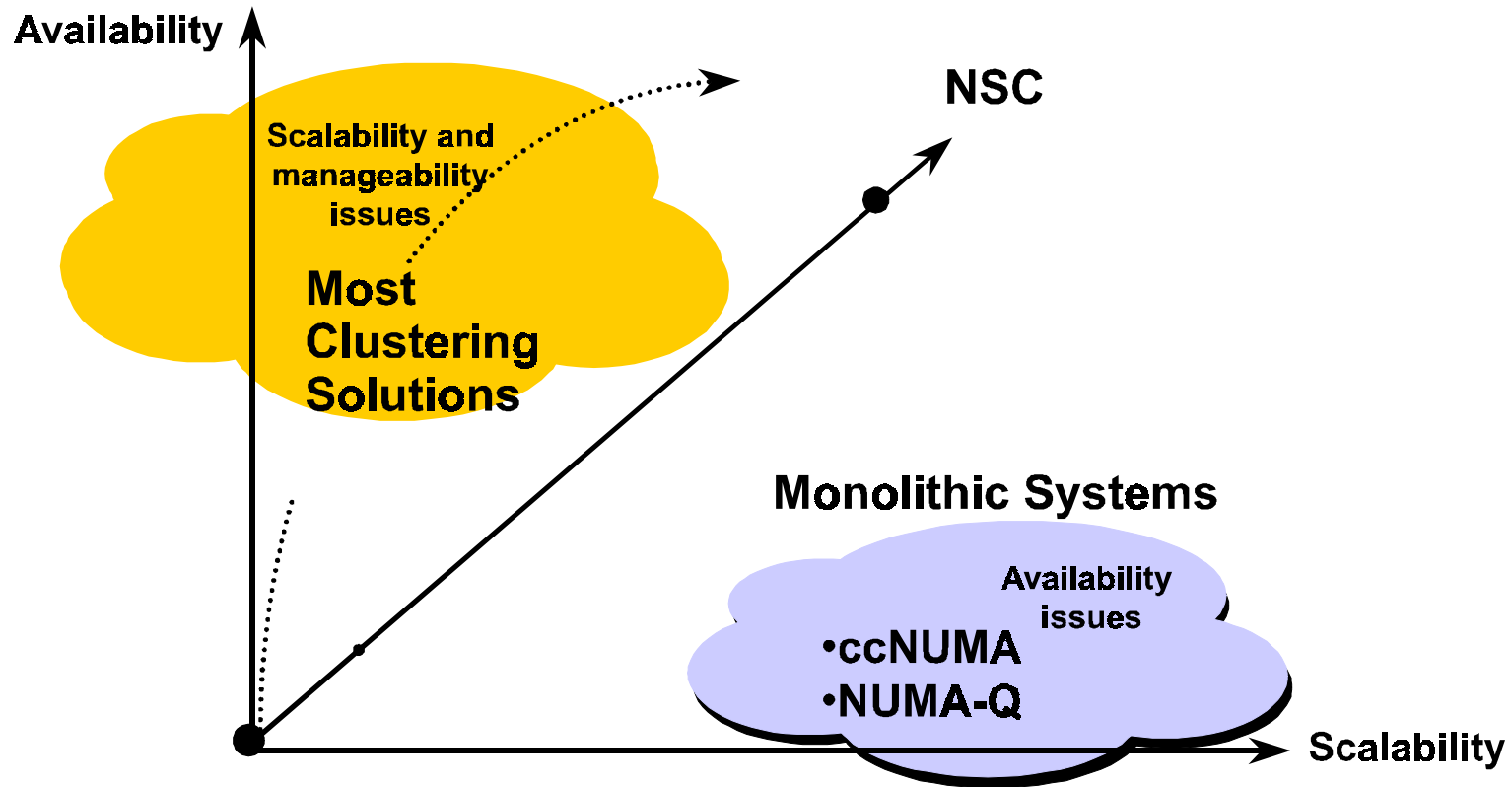
Computer



A NUMA System



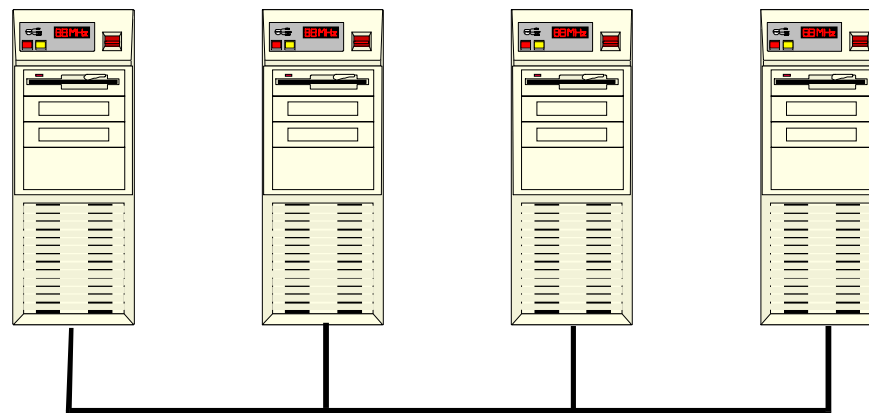
Monolithic and Other Clustering Solutions Compared



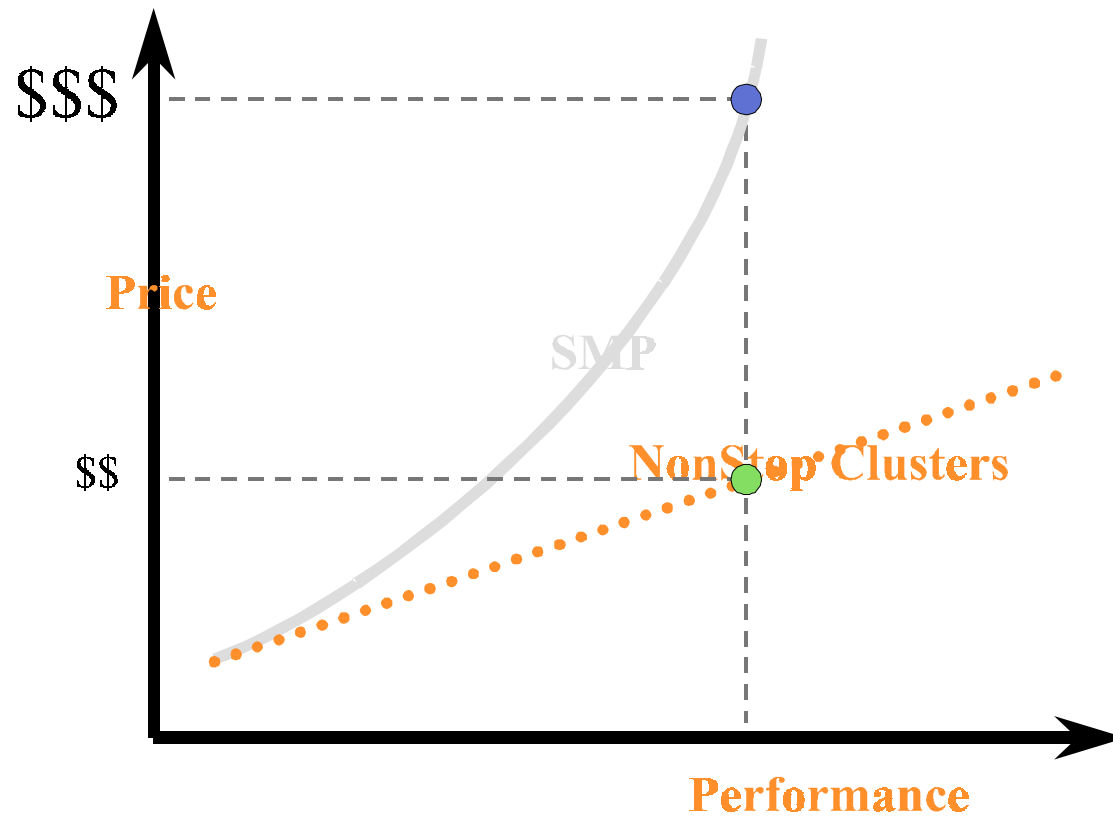
Key Cluster Concepts and NSC

- Defining Clusters
- NSC Specific Terms and Components

Interconnected Computers



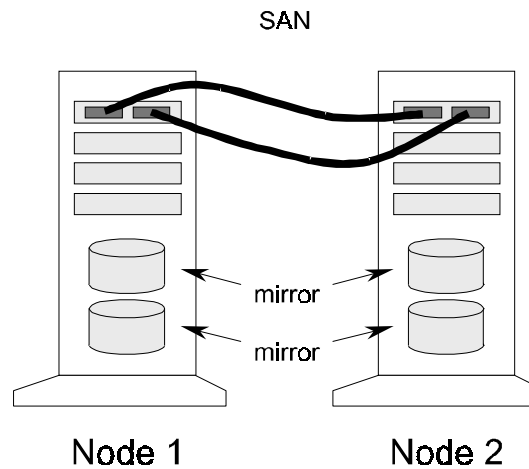
Price/Performance NSC vs SMP



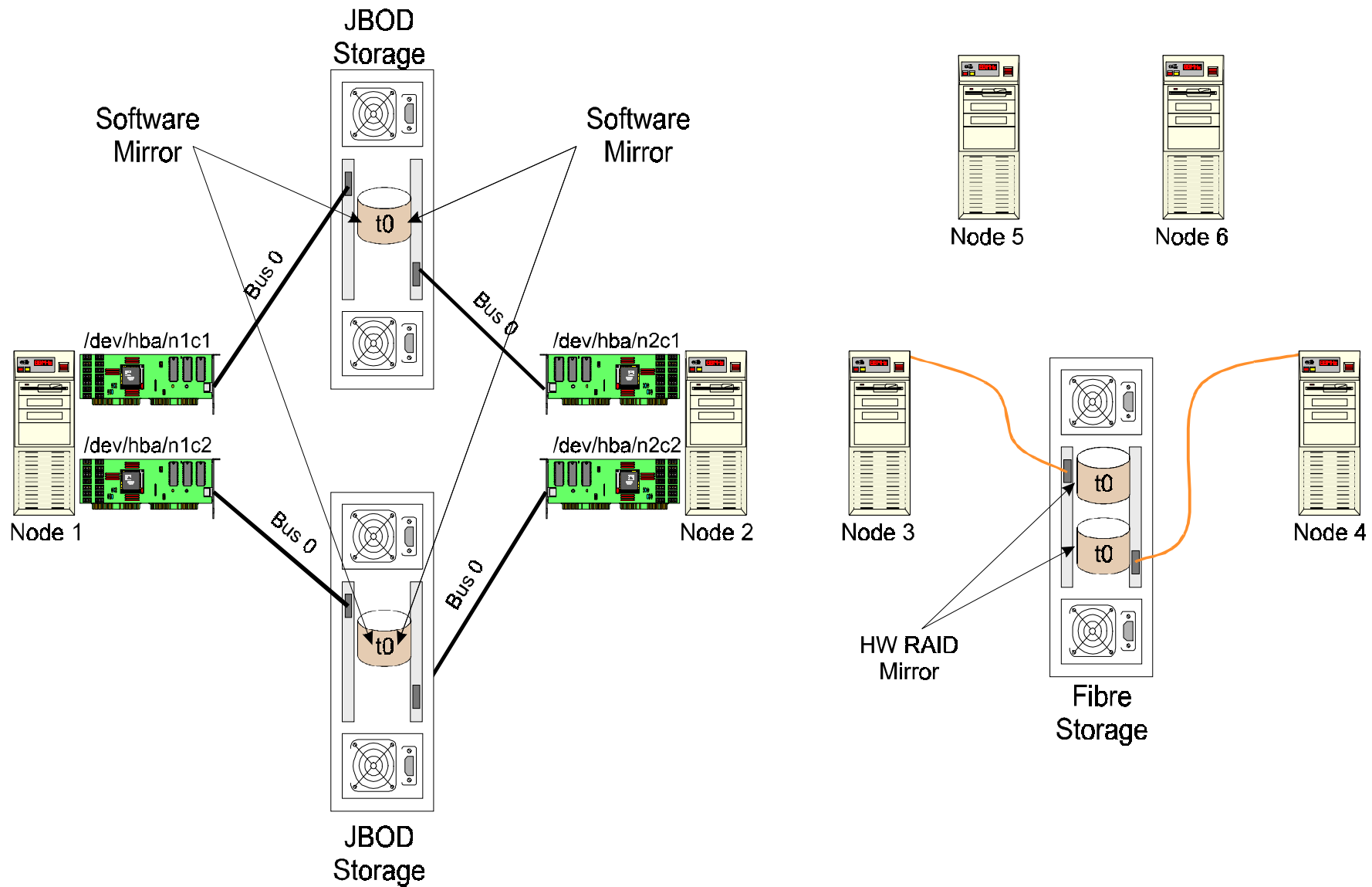
Features of Manageability

- Cluster-wide System Administration
- Transparent Cluster-wide Processes List, Migration (For Load Balancing)
- Applications, utilities, programmers, users and administrators need not be cluster aware.
- Use of standard single node tools

Internal Storage Configuration, Must Mirror Across SAN

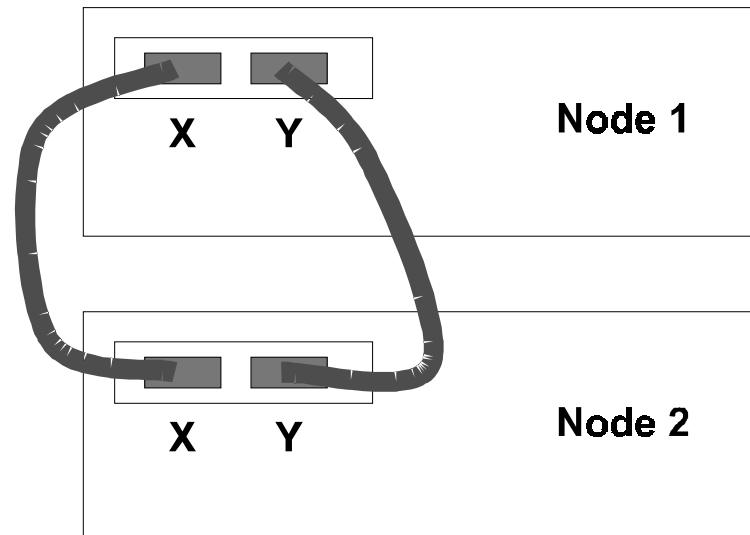


External / No-Storage Configuration

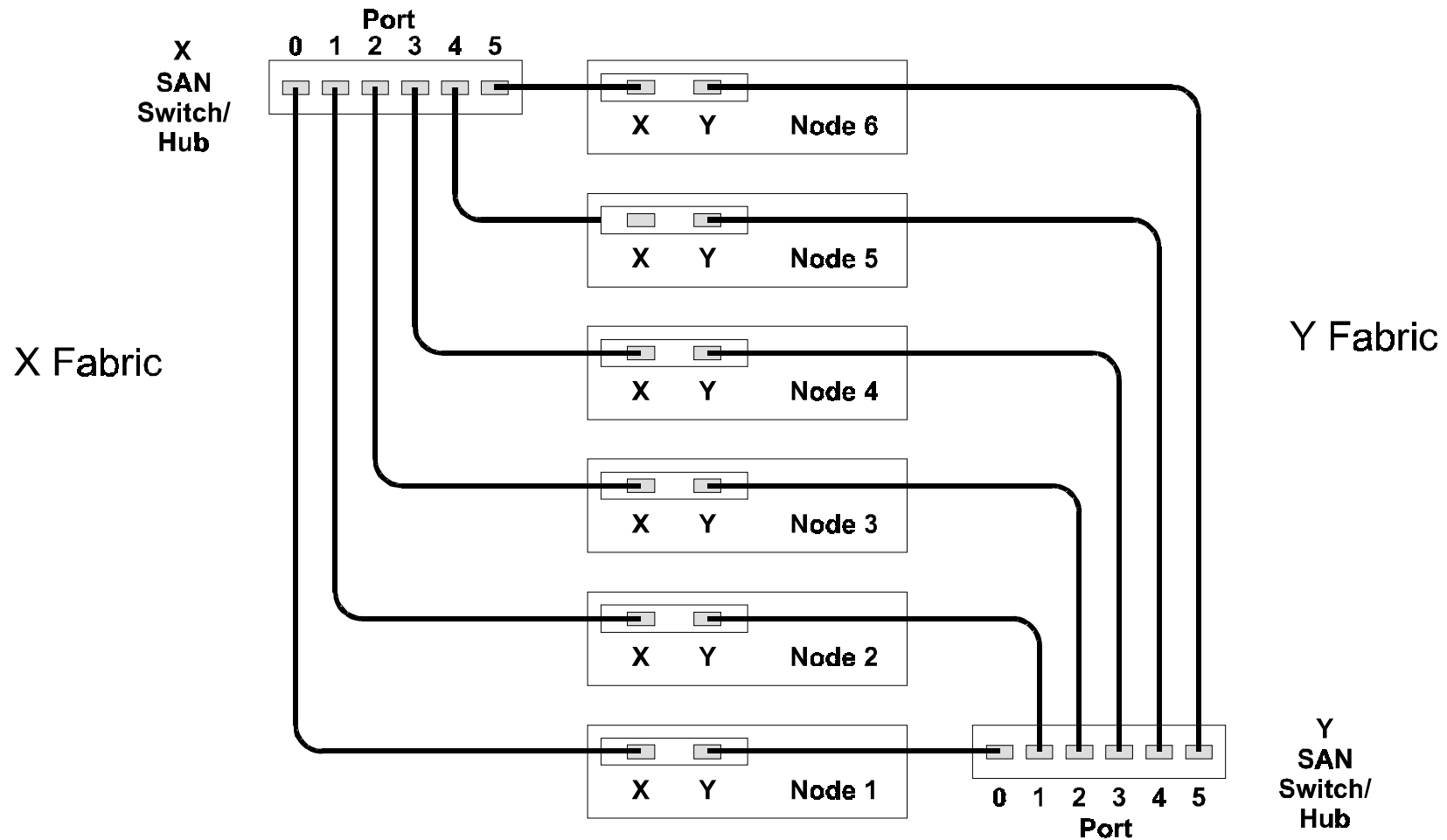


2 Node SAN Configuration

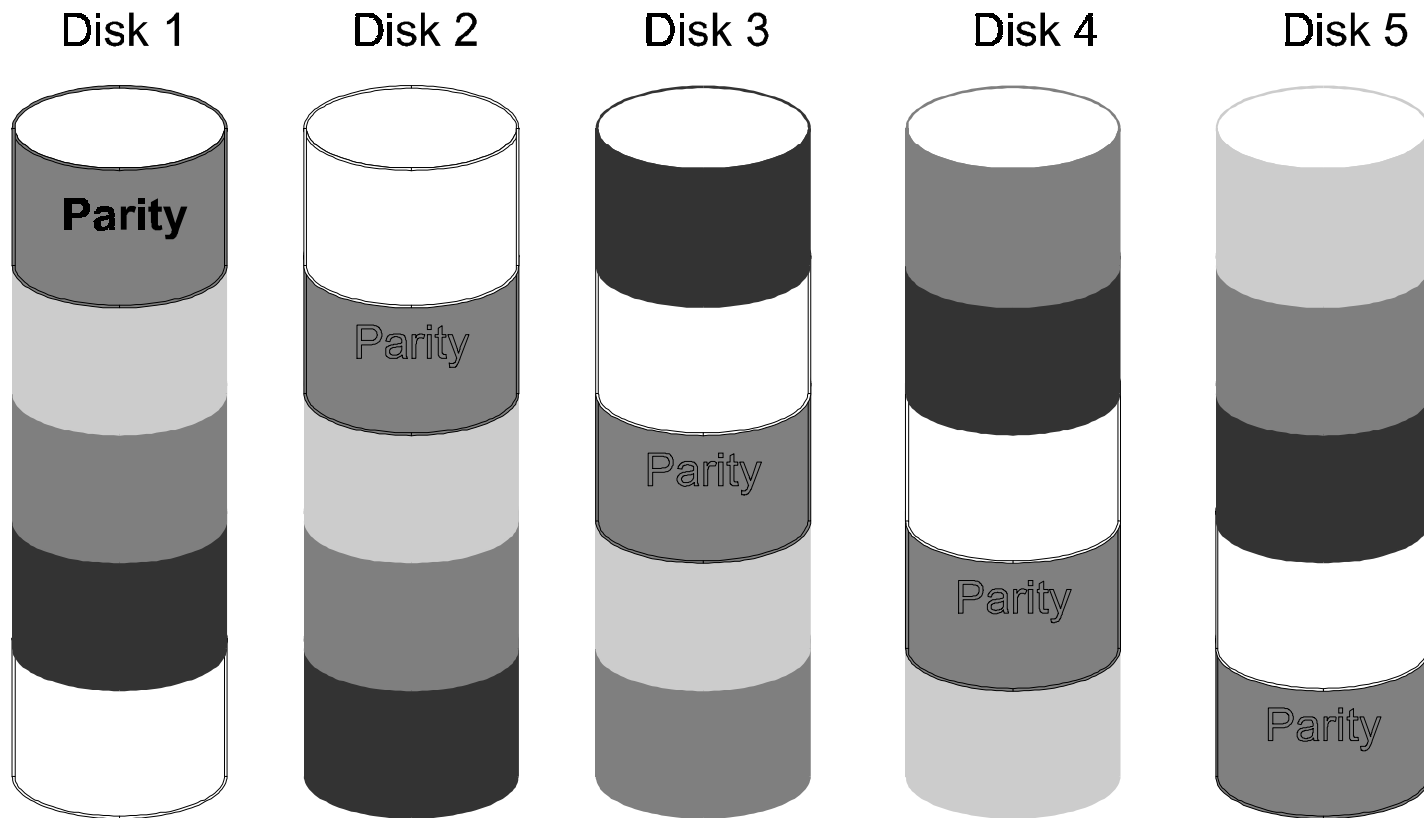
Connect
X to X
Y to Y



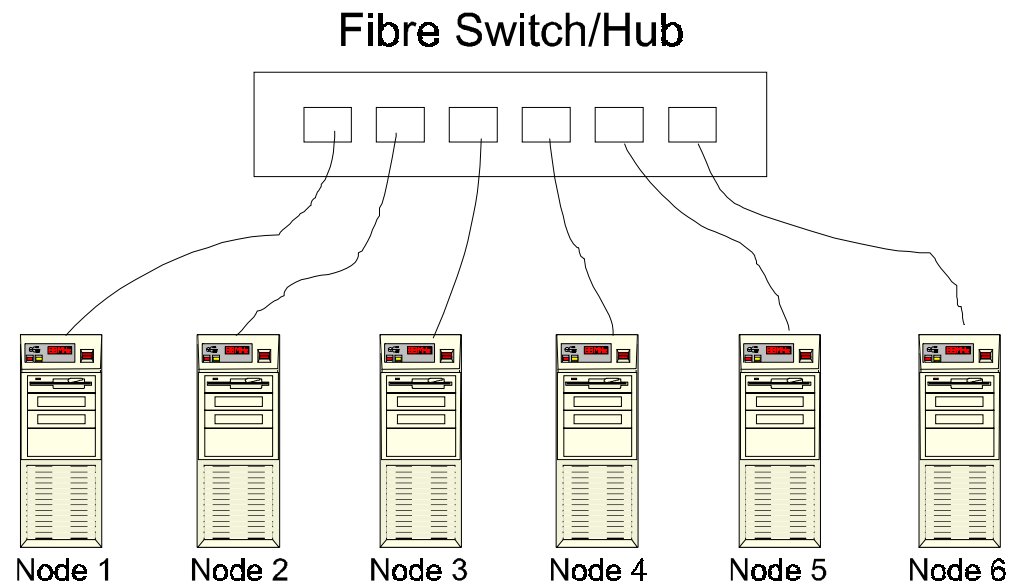
Multi-Node SAN Configuration With Switch/Hub



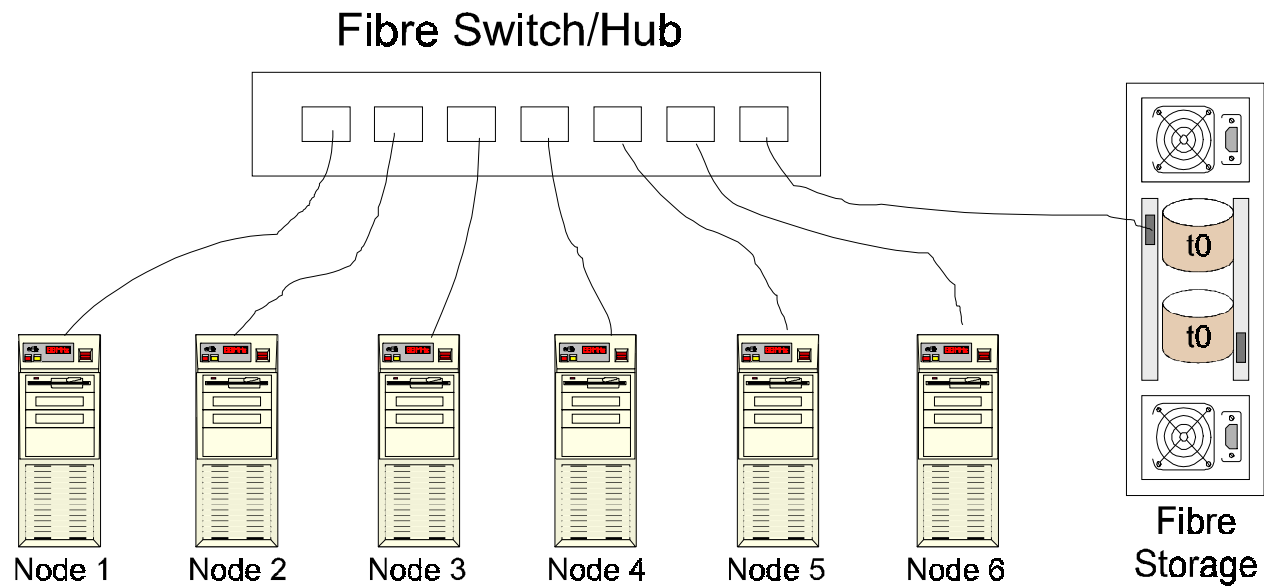
RAID 5



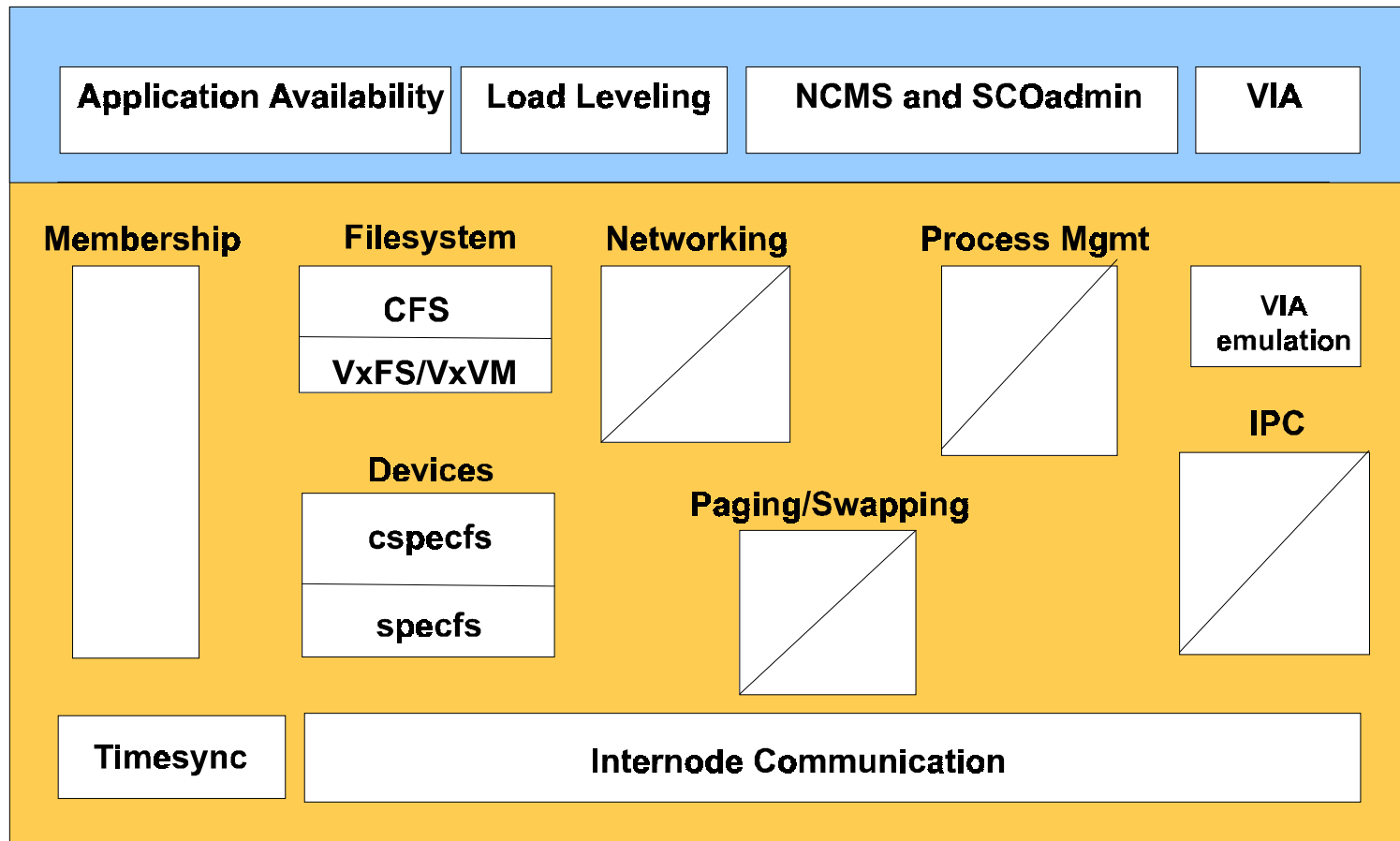
Fibre Nodes In Server Area Network (SAN)



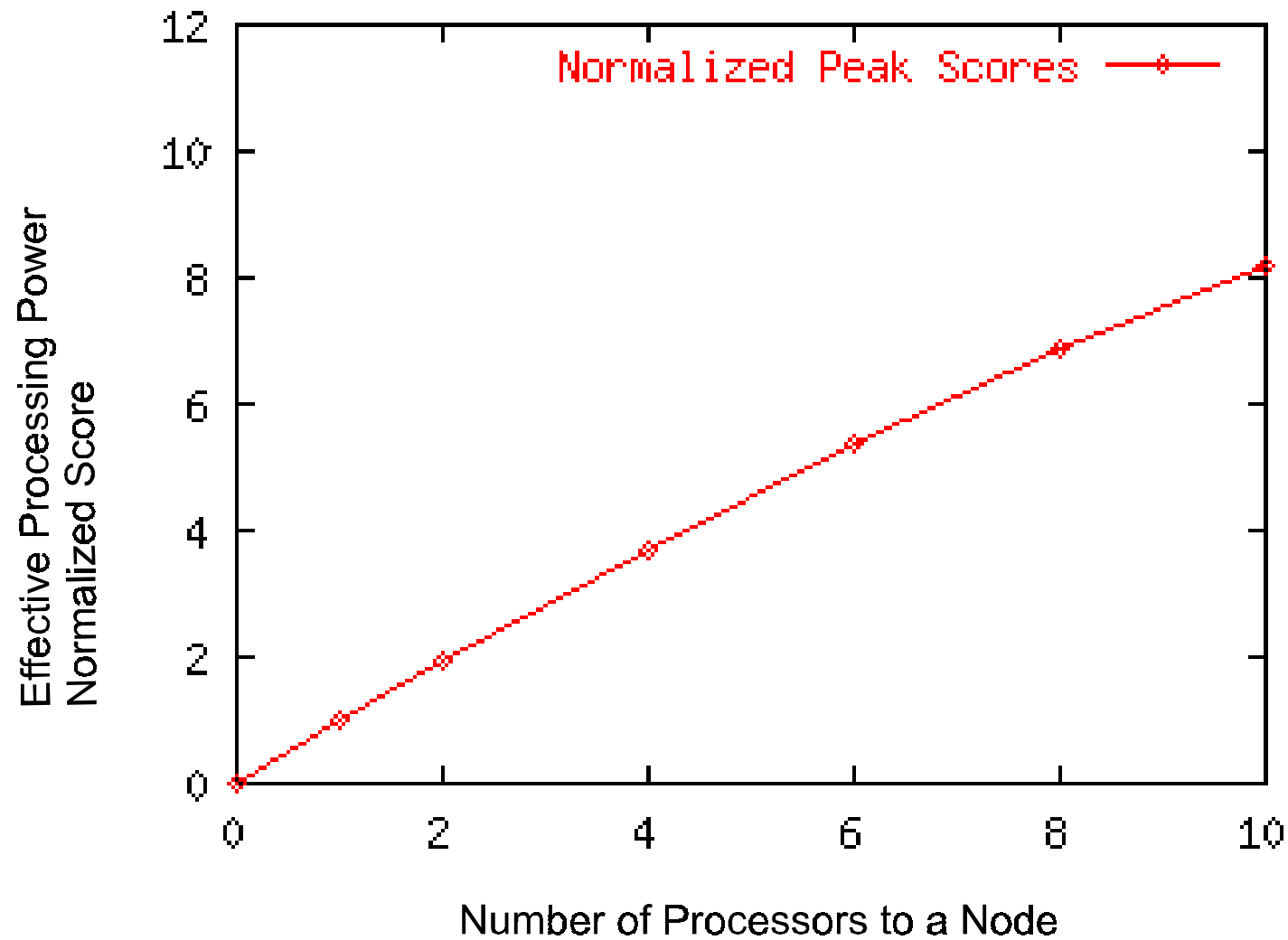
Fibre Nodes In Storage Area Network (SAN)



NSC Architecture



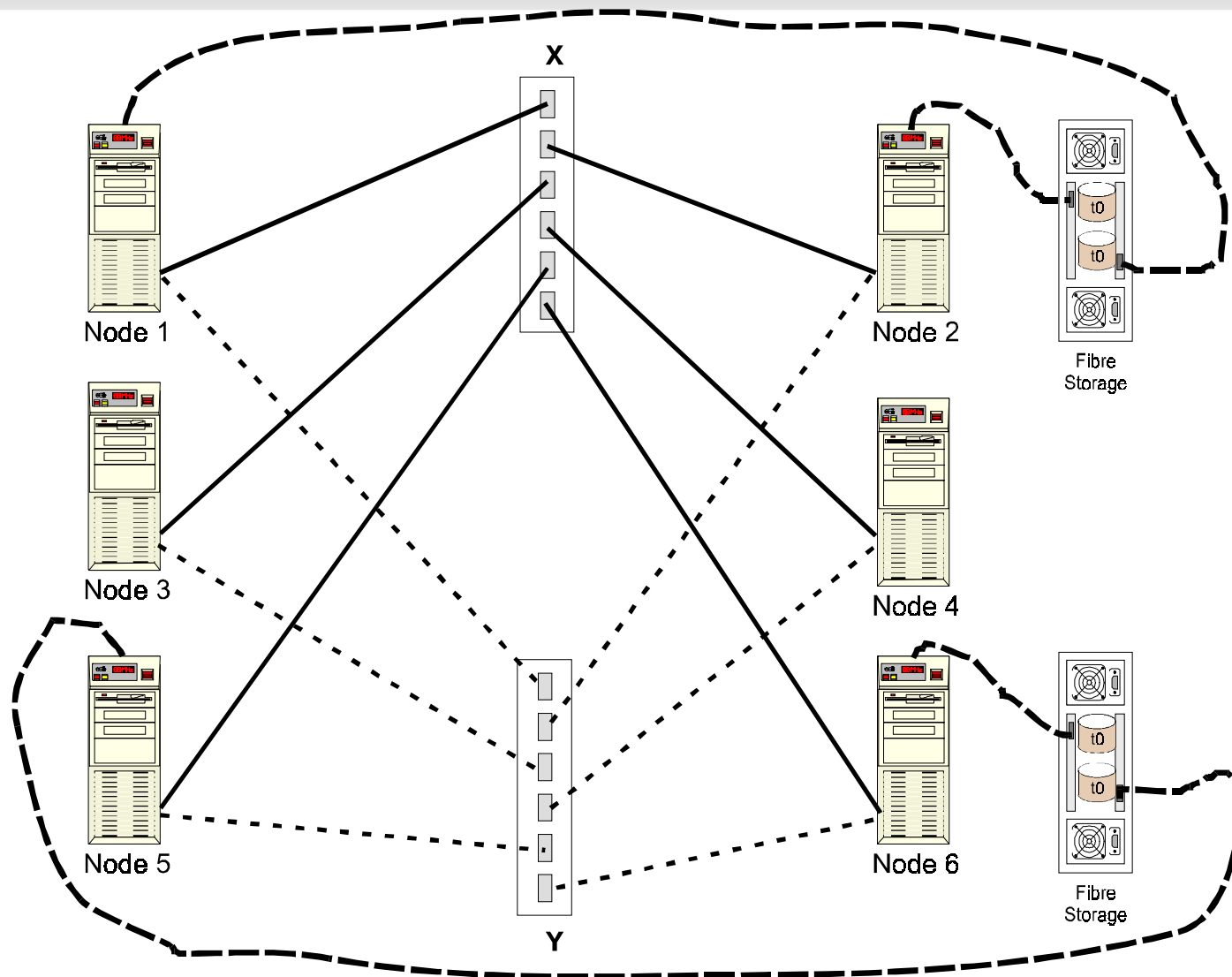
Scalability of UnixWare 7 Within a Node



Features of Manageability in NSC

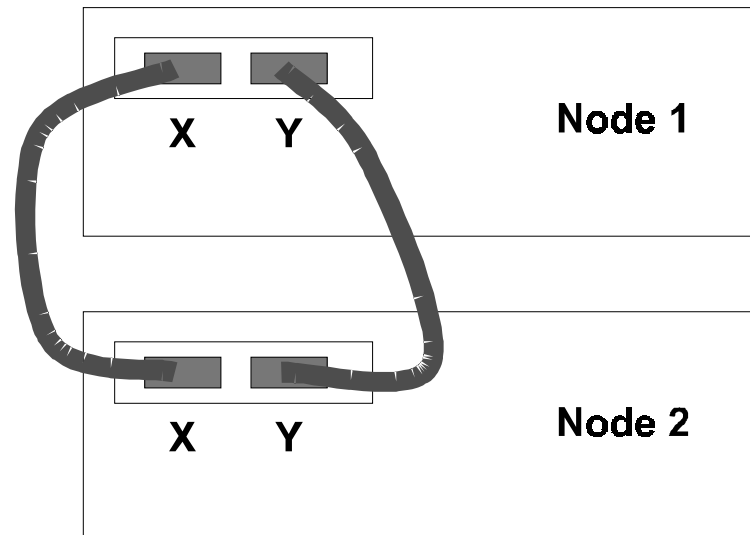
- Cluster-wide system administration
- Transparent Cluster-wide parallel TCP/IP networking
- Transparent Cluster-wide IPC
- Transparent Cluster-wide processes, migration, etc
- Automated application load balancing
- Applications, utilities, programmers, users and administrators often do not need to be cluster aware.
- Use of standard single node tools

Node Pairs



2 Node ServerNet Configuration

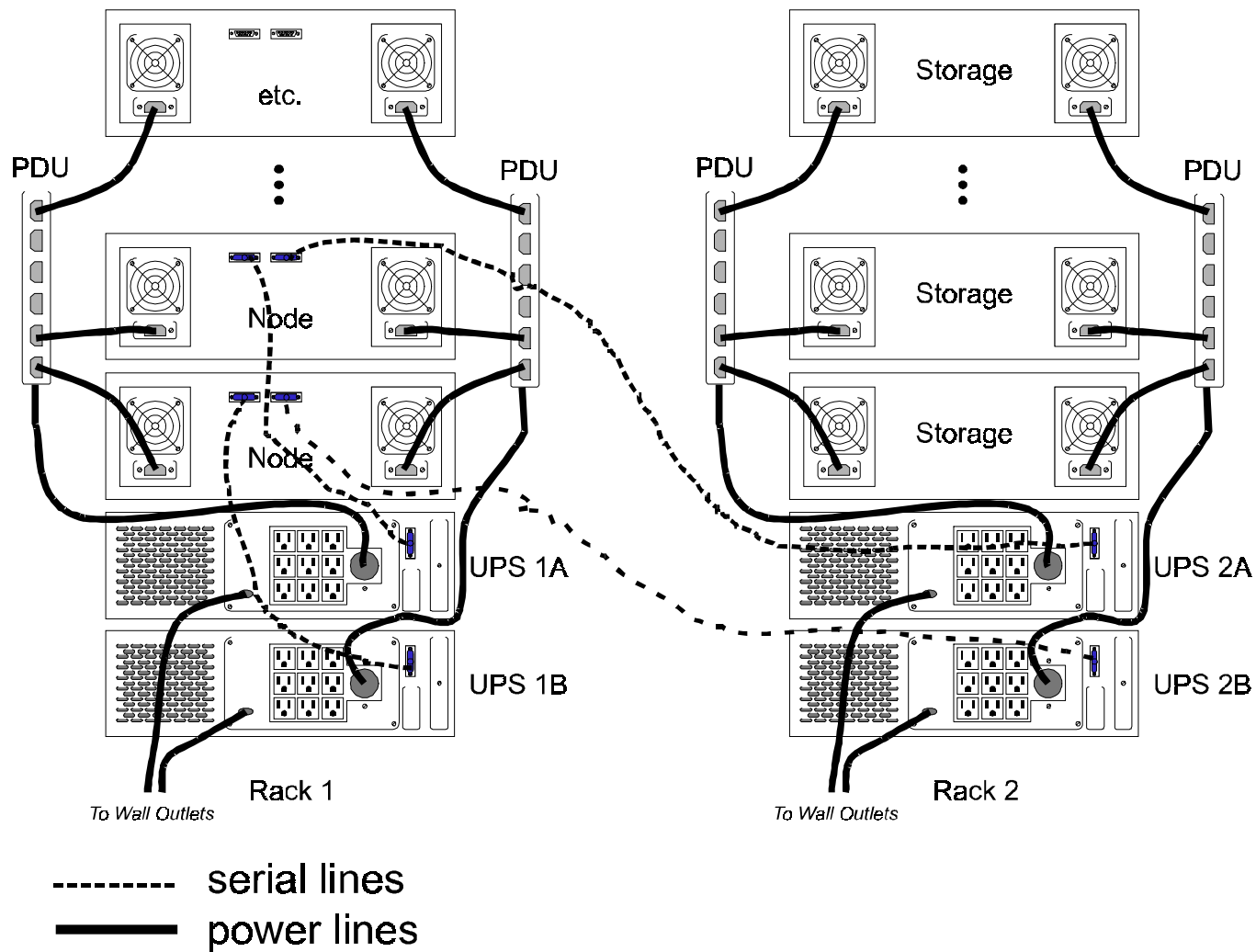
Connect
X to X
Y to Y



2 Node NIC Configuration



Virtual UPSes in a 2 Rack system



Cluster Comparison

- Distributed Computing Solutions
- IP-Spraying Solutions
- High Availability “Clustering” Solutions
- SSI Clustering Solutions
- Comparison Summary

Comparison Summary

Solution Type	Example Solution	SSI	Shared Disk	Disk Failover	Application Failover	Dynamic Load Balancing	Max Nodes	CPUs / Node
Distributed Computing	Beowulf	N	N	N	N	N	Unlimited	HW/OS Dependent
Distributed Computing	SETI @ Home	N	N	N	N	N	Unlimited	HW/OS Dependent
IP Spraying	TurboLinux Turbo Clusters	N	HTTP Docs Only	N	Y	HTTP Requests Only	Unspecified	8
High Availability	Novell Cluster Server (NCS)	N	Y	Y	Y	N	32	8
High Availability	Microsoft Cluster Server (Wolfpack)	N	Y	Y	Y	N	2	4
High Availability	Microsoft Windows 2000 Data Center Edition	N	Y	Y	Y	N	4	8
High Availability	IBM HACMP	N	Y	Y	Y	N	32	24
High Availability	HP Serviceguard	N	Y	Y	Y	N	16	Unspecified
High Availability	DEC Trueclustes	N	Y	Y	Y	N	4	14
High Availability	SCO Reliant HA	N	Y	Y	Y	N	10	32
Real	UnixWare 7 NonStop Clusters	Y	Y	Y	Y	Y	30	32

Designing An NSC Cluster

- Design Concepts
- Case Studies