



NEC Corporation of America Intro to High Availability / Fault Tolerant Solutions



EXPRESSCLUSTER®

The Ultimate Application And Data Recovery Solution

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NEC Corporation

Technology solutions leader for 100+ years

- Established 1899, headquartered in Tokyo
- First Japanese joint venture with U.S. capital
- **130,000+ employees**
- 100+ manufacturing facilities in 22 countries

Total revenue: \$40 billion

- 13th largest software & services supplier in the world
- Solutions revenue: \$17 billion
- **84th in Fortune Global 100**

Global solutions innovator

- World's fastest supercomputer
- 10 R&D facilities in U.S., Japan and Germany
- 40,000 patents worldwide
- **Top 4 for U.S. patents for the last 5 years**

Focused on Internet solutions

- NEC provides 80% of the world's wireless Internet connections
- NEC is the 2nd largest ISP(**BIGLOBE**) with 19 million users



NEC SUPER TOWER
JAPAN



Earth Simulator

Topics

Definition of Terms

Introduction to Fault Tolerance

NEC Fault Tolerant Servers F&B Review

Disaster Recovery/ExpressCluster

Roundtable

RA Events /NEC Resources

Conclusions – Q&A



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Definition of Terms

High Availability (HA)

At least 99.99% Uptime in a PRODUCTION environment. Directly relates to the local (or hosted) application server.

Fault Tolerant

An electromechanical device that will continue normal operation despite the presence of hardware failures...no single point of failure exists in the system.

Disaster Recovery (DR)

REMOTE replication of a production environment designed to come online should the local production environment become unavailable due to natural or man-made disasters

What is Fault Tolerance?

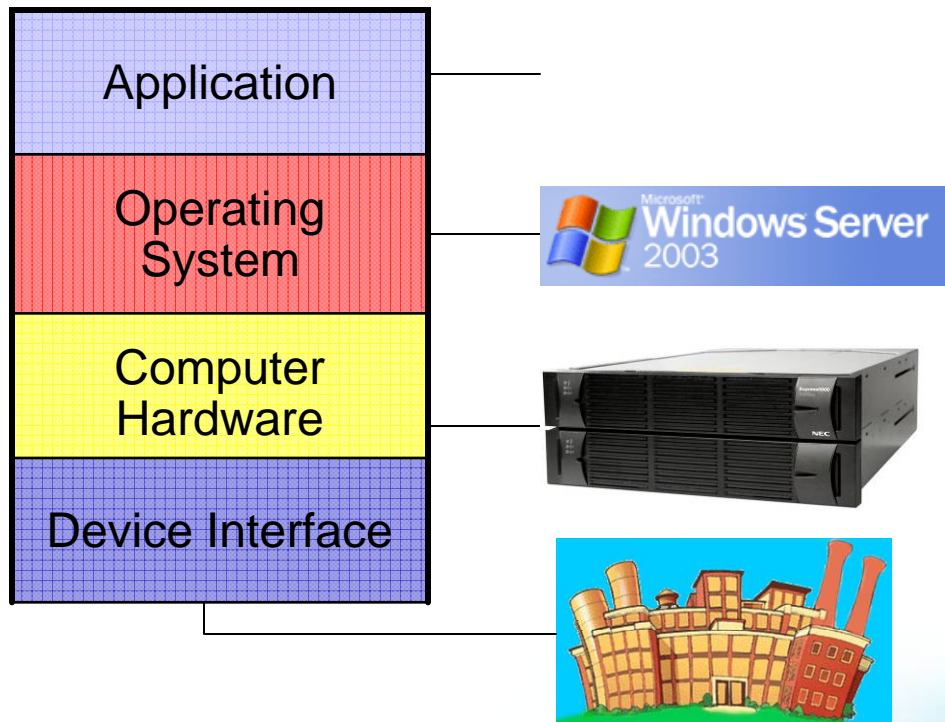
Source: IDC	Availability	Average Annual Downtime	User Tolerance to Downtime
Fault Tolerant Continuous Availability (CA)	99.999%	5 Minutes	None
Cluster High Availability (HA)	99.9%	8 Hours 45 Minutes	Business Interruption Lost Transaction
Stand Alone GP or Blade Server w/RAID	99.5%	43 Hours 23 Minutes	Tomorrow is O.K.

72% of mission critical applications experience nine hours of outage per year.

- Standish Group Research

Overview - Solution Stack

It helps to think of a computer Solution as layers in a stack.



Each layer has its availability issues.

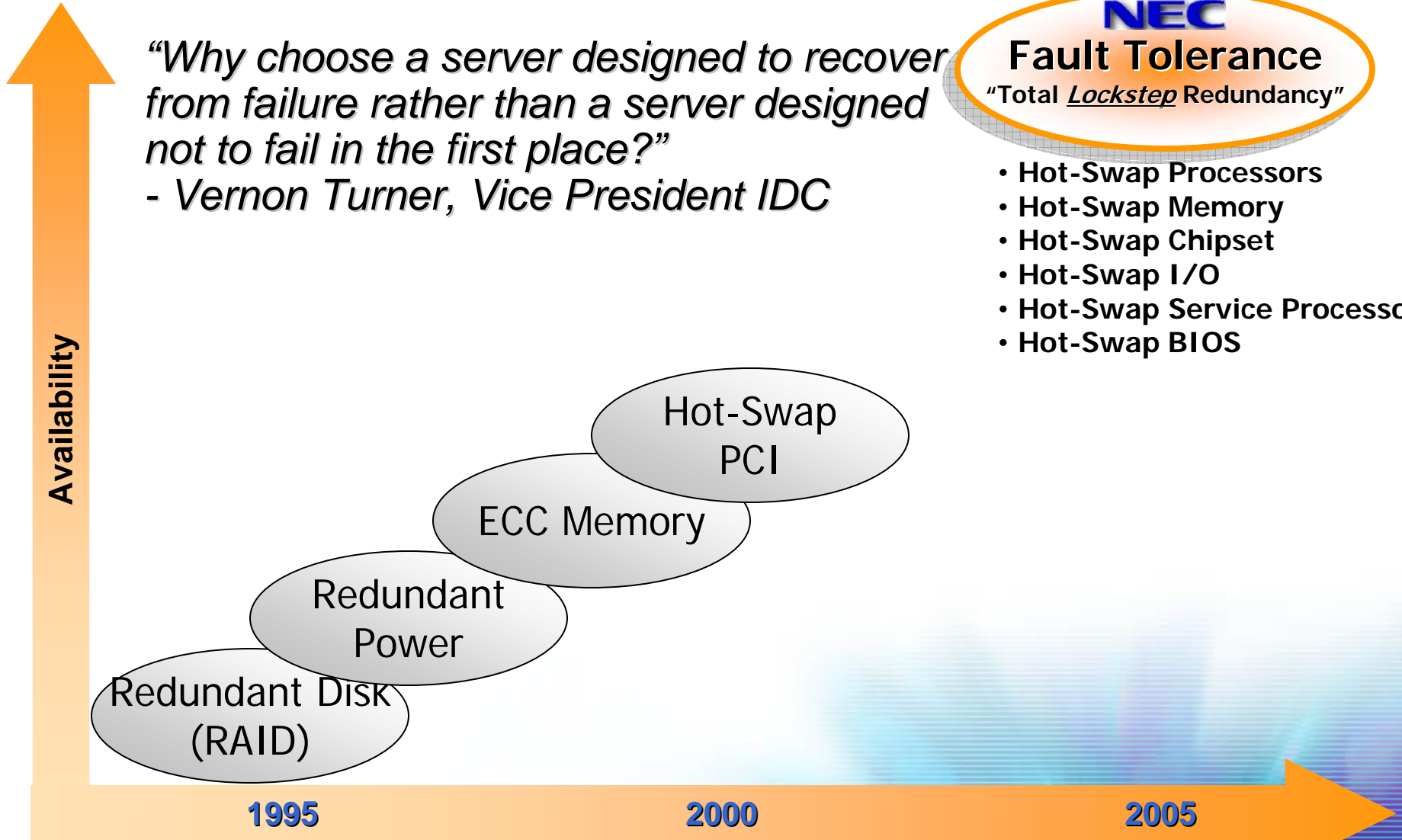
Intel Server Availability Feature Evolution

“Why choose a server designed to recover from failure rather than a server designed not to fail in the first place?”

- Vernon Turner, Vice President IDC

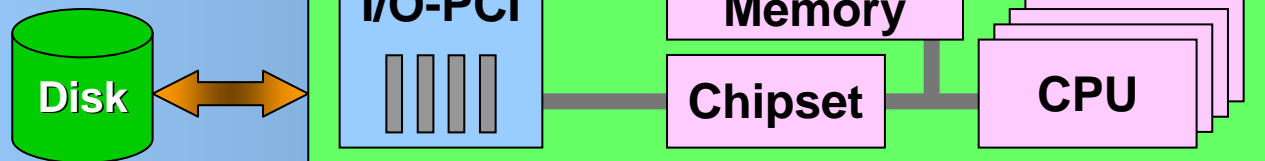
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Fault Tolerance
“Total Lockstep Redundancy”

- Hot-Swap Processors
- Hot-Swap Memory
- Hot-Swap Chipset
- Hot-Swap I/O
- Hot-Swap Service Processors
- Hot-Swap BIOS

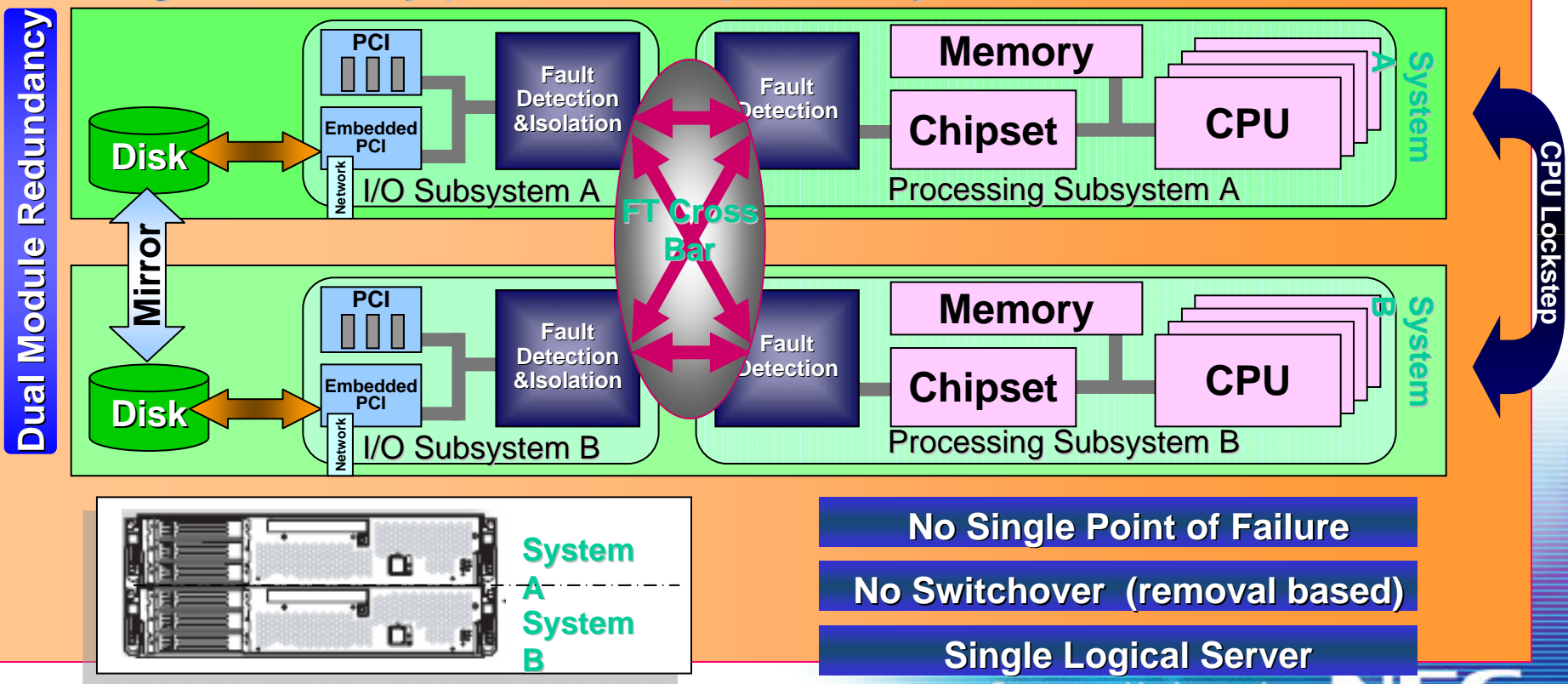


About Ft's; In-the-Box Redundancy

Conventional Server System



NEC High Availability (Fault Tolerant) Server System

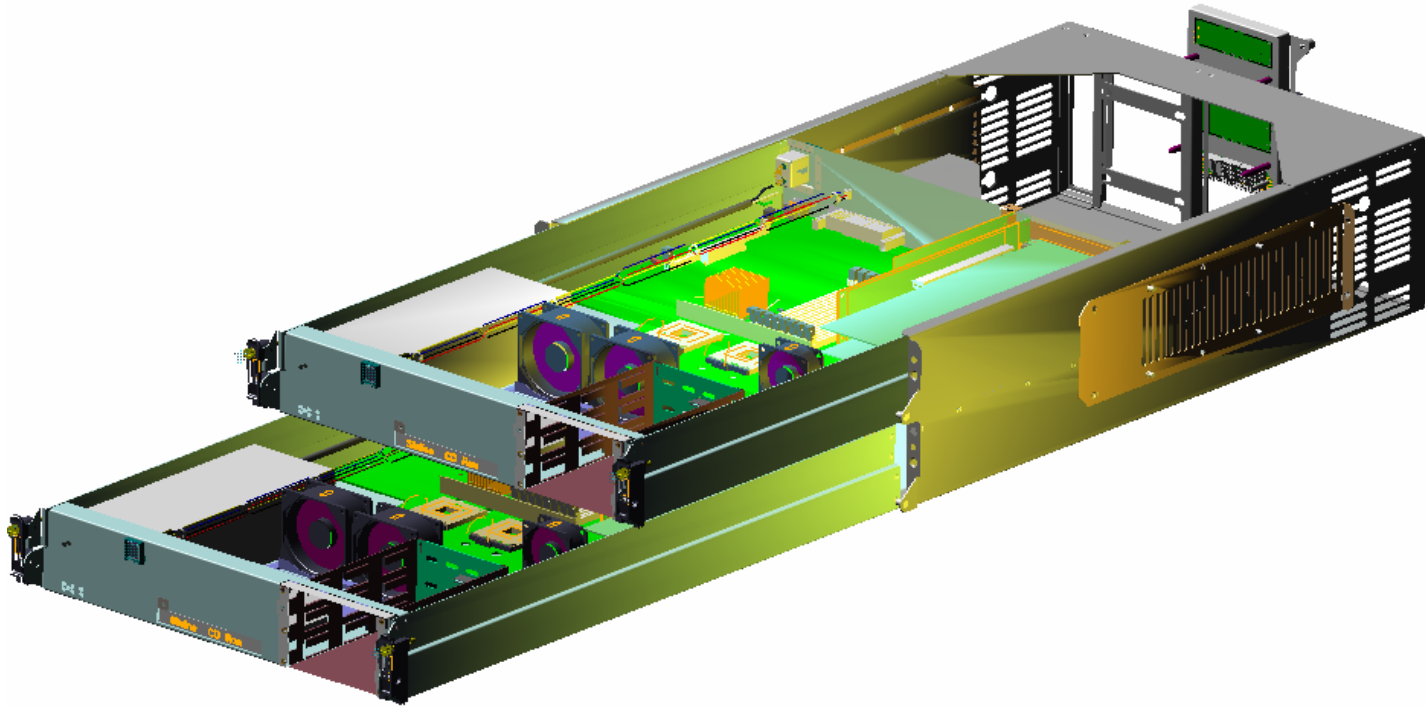


- No Single Point of Failure
- No Switchover (removal based)
- Single Logical Server

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About Ft's: - Ease of Maintenance



Designed for Simplified Service (Customer Replaceable Units (CRU))

Only 2 Replaceable Components – CRU and HDD

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About Ft's: Standard Software

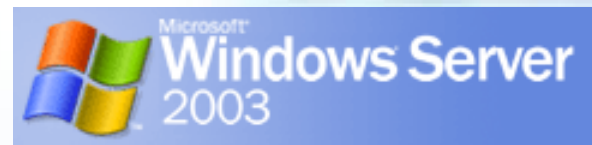
NEC FT can provide fault tolerant availability to any “straight out of the box” application!

FT uses standard operating systems:

- Windows Server 2003 Enterprise Edition
- Red Hat Enterprise Linux

Requires only one copy of any application

Applications need not be “cluster aware” or Enterprise version



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Integrated Remote Management

Virtual Technician Module (VTM)

- ✓ Constant On – separate 5V DC
- ✓ Execute Rom PILOT BIOS extensions
- ✓ Accessible by LAN and Serial I/O
- ✓ Provides true remote management
- ✓ Redundant since integrated into CRU

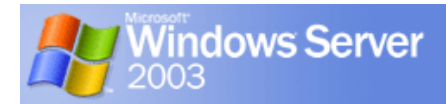


New For 2007 – *ACTIVE UPGRADE*

An advanced method of performing software maintenance by using the system architecture of the FT Series Servers.

Provides the ability to perform software maintenance without requiring a reboot of the operating system:

- ➔ **Windows Hot-fixes & Security Patches**
- ➔ **Service Packs**
- ➔ **System Software upgrades from NEC**
- ➔ **Applications (dependant upon characteristics)**



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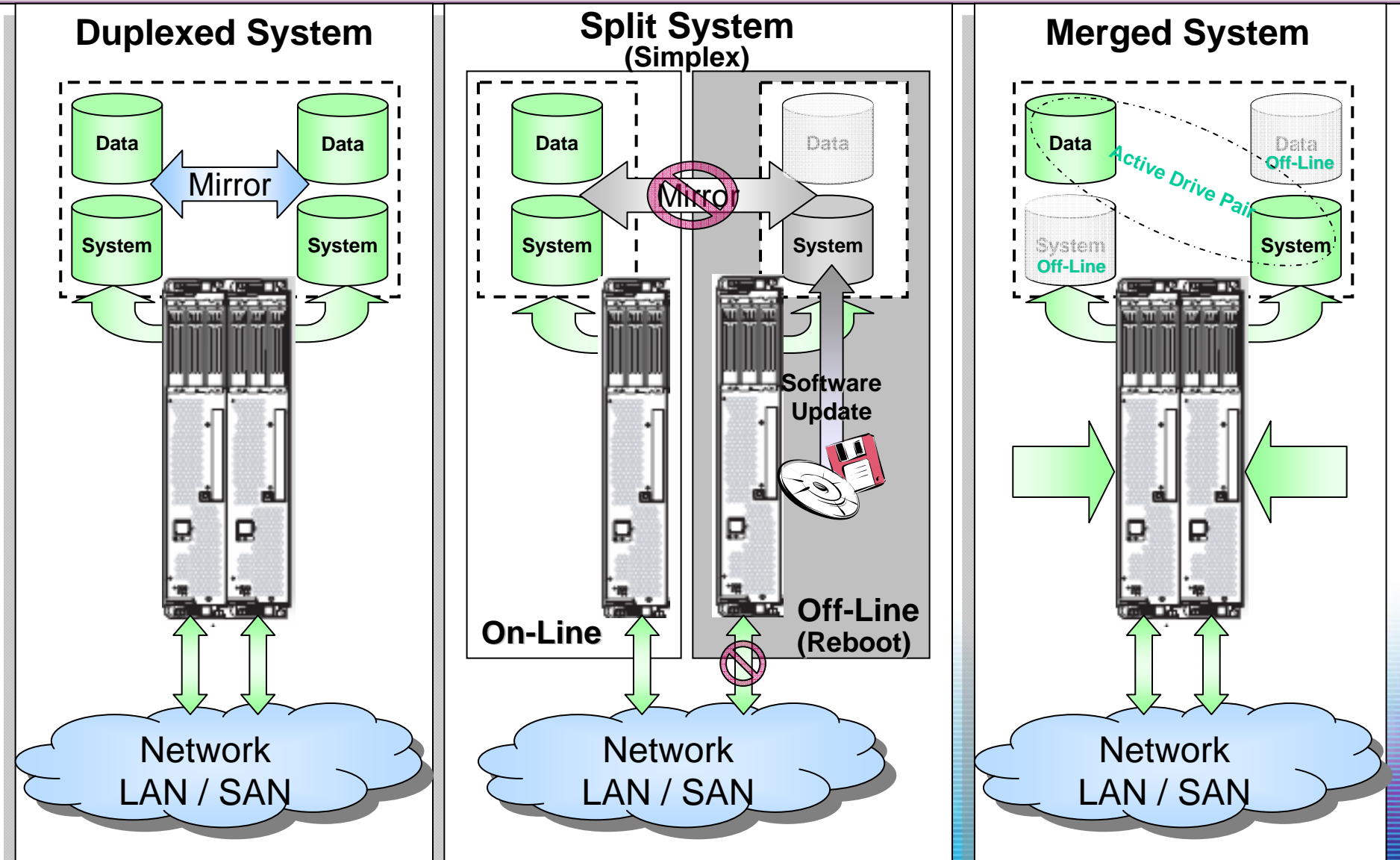
New For 2007 – *ACTIVE UPGRADE*

Introducing Active Upgrade™ Using FT Technology to address Planned Maintenance

*“The combination of Active Upgrade with NEC’s fault-tolerant servers pose an exciting technological advancement by **enabling online software upgrades and patches without having to take the server or application offline.** This blended offering further maximizes server reliability at the application layer, which is an essential requirement for maintaining and protecting the critical infrastructure of a manufacturing organization.”*

*- Don Richardson, Director, Manufacturing Solutions,
Microsoft Corp.*

Active Upgrade Process




NEC Express5800/320Ma Server Family



- ✓ **320Ma DC – Dual Core CPUs 2.8GHz – *Data Center Platform***
Supports up to 16GB memory
- ✓ **320Ma 3.2GHz – 2 x 3.2GHz CPUs – *Application Platform***
Supports up to 8GB memory
- ✓ **320Ma “Single Socket” 3.2GHz – *Entry Level Platform***
Supports up to 8GB memory
Value Priced Entry Level Ma that still offers 99.999% Uptime

FT vs. Cluster Comparison

	FT series 	Cluster solution
Availability	99.999% 5 min. average/year	99.9% >8 hrs. average/year
Recovery time	Zero switchover	Minutes of failover
Performance	No impact	Potentially serious impact
Data loss	None (memory & disk)	Disk protection Only
System integrity	Complete	None
Implementation	No work required	Script development &testing
Application modification	None required	Recommended
OS & Application	Single license	Multi-licenses Required
IT support	Lights out	Extensive

The NEC Guarantee

FT Money-Back Guarantee Program

➔ Program Summary

- **99.999% hardware availability guarantee for 12 months**
- **Refund up to \$50,000* of the purchase price of the hardware**

**99.999% Availability
GUARANTEED
on NEC FT Servers**
For details on our
**100% Money-Back
Guarantee**

CLICK HERE!



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***Subject to terms and conditions, see your Team 1 representative**

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Disaster Tolerance

Since 9/11 disaster tolerance has become a critical requirement for IT Directors

The challenge:

- Protect mission critical data in the event of the destruction of local computing resources
- Allow surviving resources to continue working with access to the latest data
- Don't break the IT budget to do it.

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The Ultimate Application And Data Recovery Solution

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ExpressCluster

Integrated Application And Data Availability Solution

Near-Instant Recovery of Business Critical Applications and Data without Loss over LAN and WAN

Over 8,000 Licenses Worldwide

Volume Platform Support

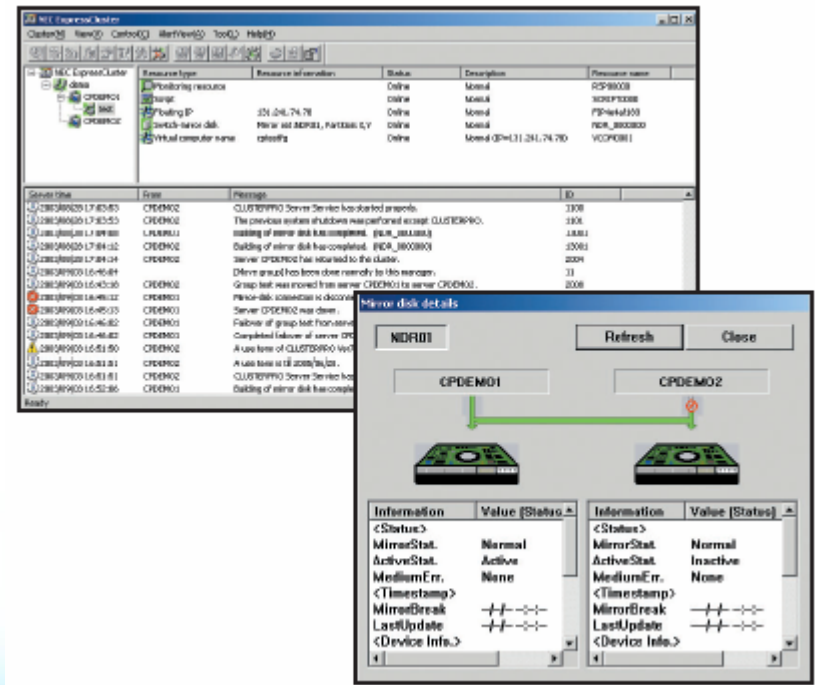
32-bit (IA32)

64-bit (EM64T & Itanium)*

Windows, Linux, VMWare

Award Winning Technology

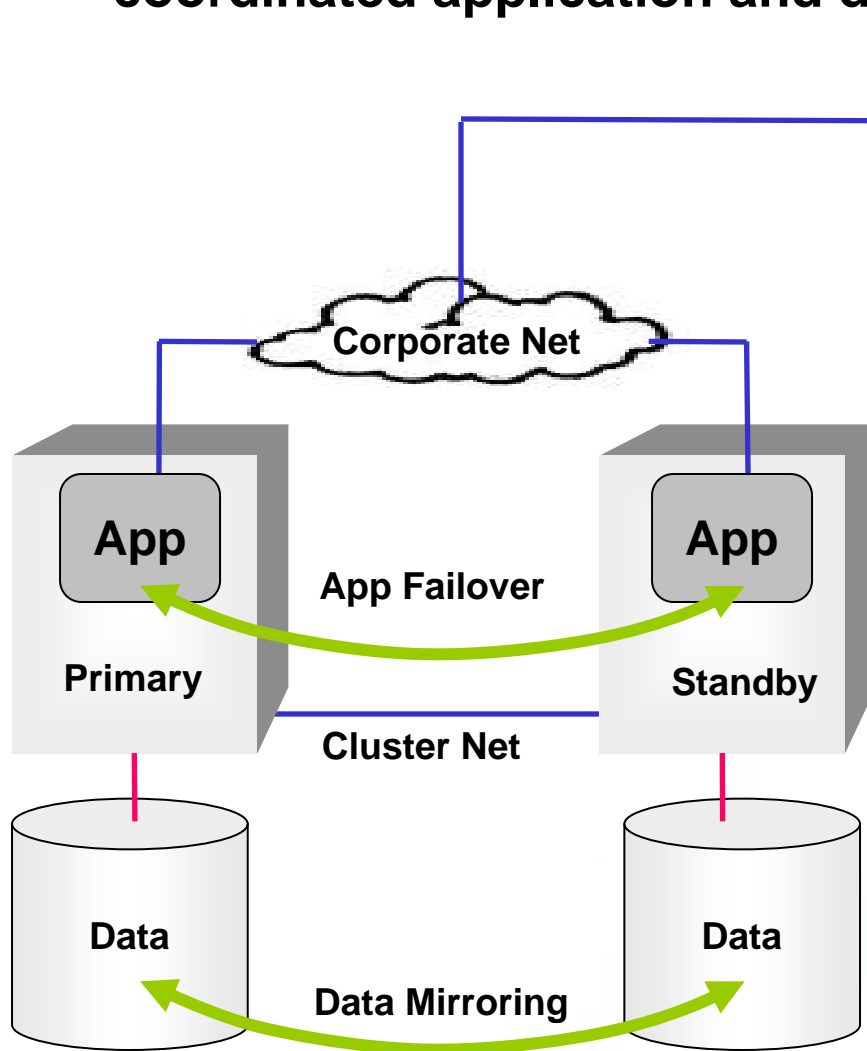
*Best of CeBIT America Award
for Disaster Recovery Fault
Tolerant Solution*



*Limited Release

Integrated Application and Data Recovery

No need for custom integration of separate products to enable coordinated application and data recovery means lower TCO



The Cluster Manager software interface is shown in two screenshots. The top screenshot displays a list of resources with the following table:

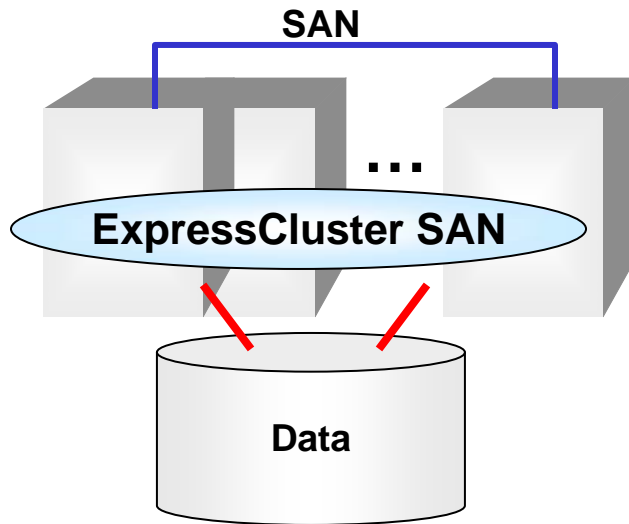
Resource Name	Resource Type	Resource Information	Status	Description	Processor Name
data	Disk		Online	Mount	CPDEMO1
server	Cluster		Online	Mount	CPDEMO1
CPDEMO1	Node	201.241.74.71	Online	Mount	CPDEMO1
CPDEMO2	Node	201.241.74.72	Online	Mount	CPDEMO1

The bottom screenshot shows 'Mirror disk details' for a mirrored disk set (NDP01) with two disks (CPDEMO1 and CPDEMO2). The status is 'Ready'. Below the disk icons are two tables of information:

Information	Value (Status)	Information	Value (Status)
<Status>		<Status>	
MirrorStat	Normal	MirrorStat	Normal
ActiveStat	Active	ActiveStat	Inactive
MediumErr	None	MediumErr	None
<Timestamp>		<Timestamp>	
MirrorBreak	++----	MirrorBreak	++----
LastUpdate	++----	LastUpdate	++----
<Device Info>		<Device Info>	

ExpressCluster Product Line

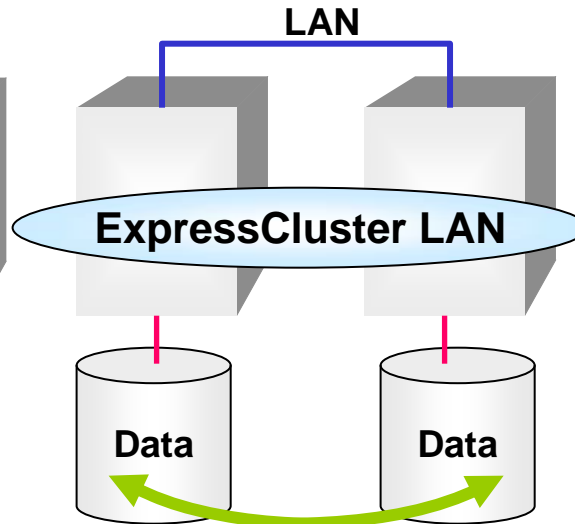
ExpressCluster SAN



SAN

- Data on shared storage
- JBOD/SAN/NAS
- Large cluster support

ExpressCluster LAN

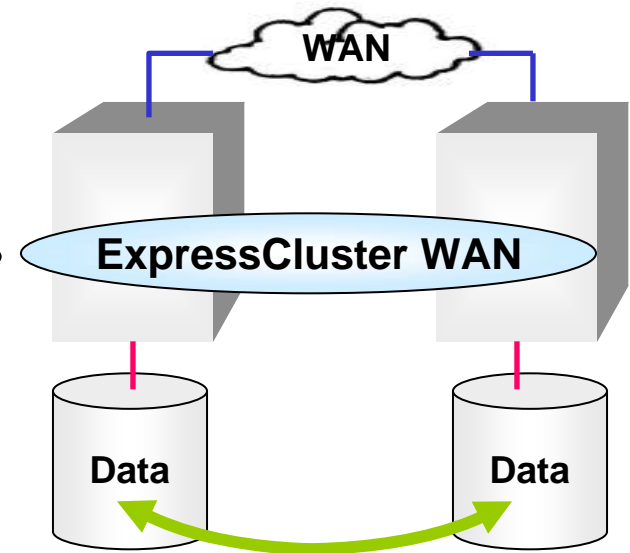


LAN

- No shared disk data
- RAID1 via LAN
- Low cost

ExpressCluster WAN

Version X **NEW**



WAN

- Disaster Recovery
- *Supports Synchronous and Asynchronous Mirroring*
- Low bandwidth and long distance WAN support

ExpressCluster X WAN Edition

Next Generation ExpressCluster Technology

ExpressCluster X WAN Edition for Windows is the first new product based on the new ExpressCluster X product platform

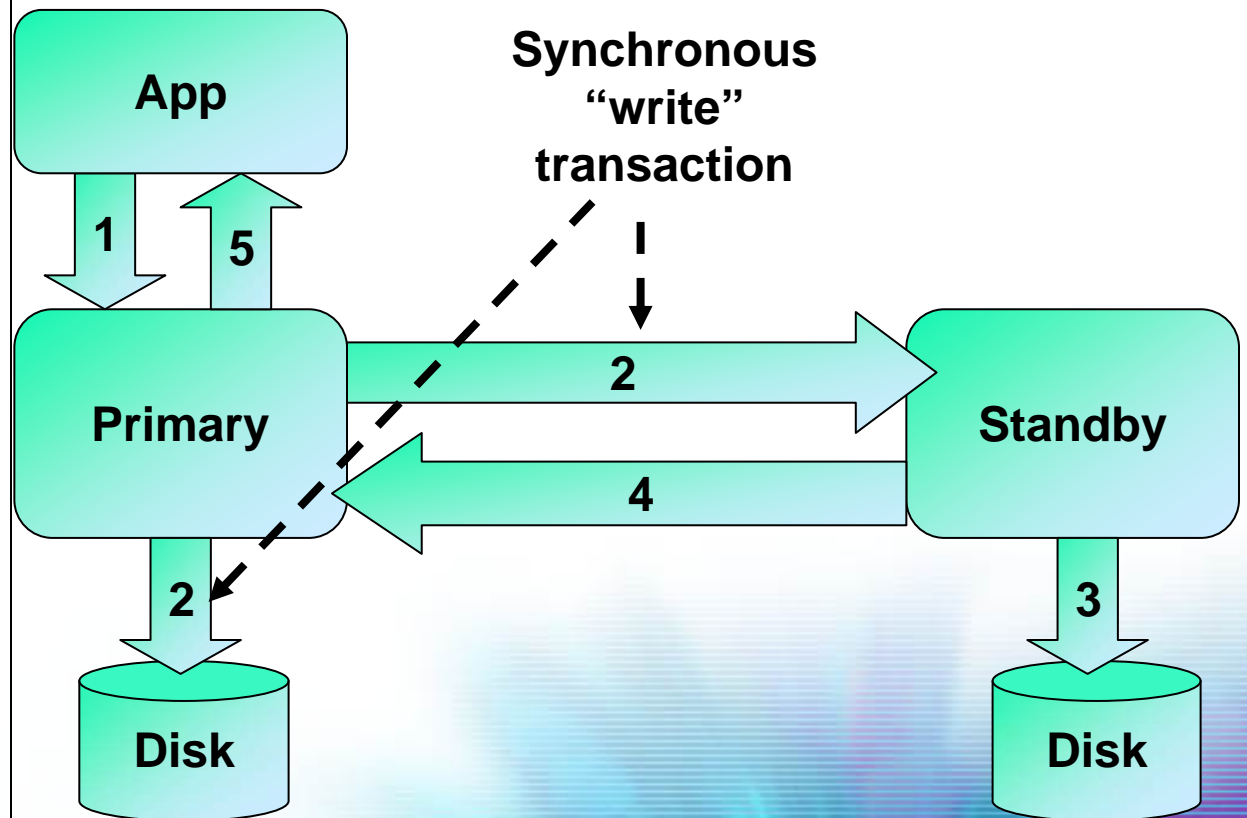
ExpressCluster X WAN Edition for Windows Features/Benefits

- **Synchronous/asynchronous data** mirroring support allows ease choose between full data protection and minimum network complexity
- **Pure web based** management console further simplifies management
- Fine grained disk mirroring configuration support further reduces disk requirements
- **IP based mirroring protocol** adds more flexible network infrastructure support (e.g. Internet)
- New resource level controls further reduces potential downtime for maintenance and configuration
- Various performance and scalability enhancements

Synchronous Mirroring for Guaranteed Data Replication

Data mirroring over LAN or WAN spanning hundreds of miles* with transactional integrity to ensure data can be recovered with no loss

1. **Primary** receives "write" request from **App**
2. **Primary** writes data to disk and forward it to **Standby**.
3. **Backup** writes data to its own disk.
4. **Backup** sends the result to **Primary**.
5. **Primary** receives the result from **Backup** and return the result of the "write" back **App**.



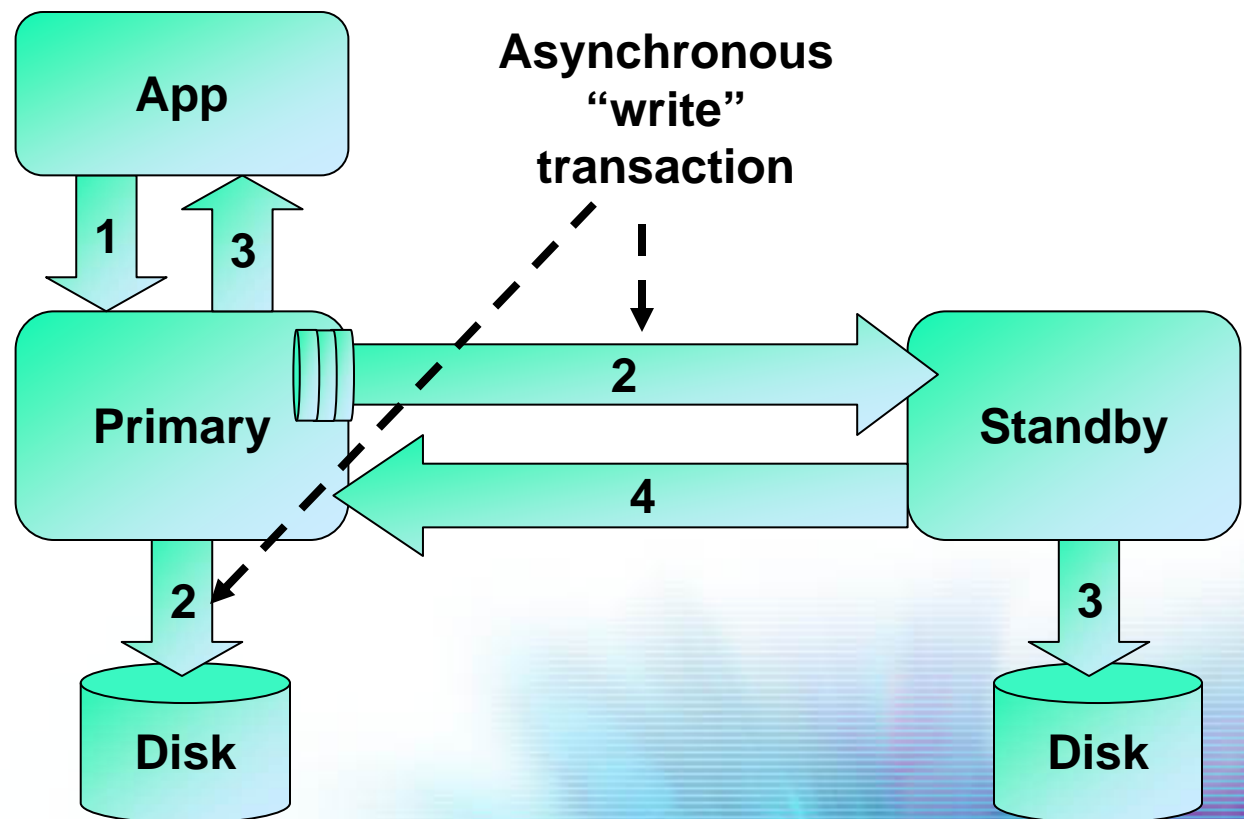
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* Depends on WAN link. Up to 200 miles over typical T1 link

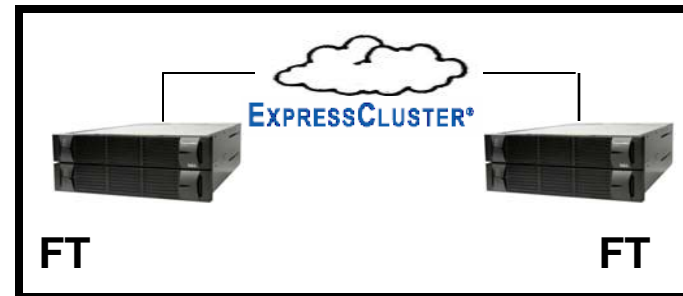
Asynchronous Data Mirroring for Minimizing Network Requirements and Maximum Application Performance

1. **Primary** receives "write" request from **App**
2. **Primary** writes data to its disk and forward it to **Standby**.
3. **Primary** receives the result from its disk and returns result and control back **App** while **Standby** continues to write data to its disk
4. **Standby** sends the result to **Primary**



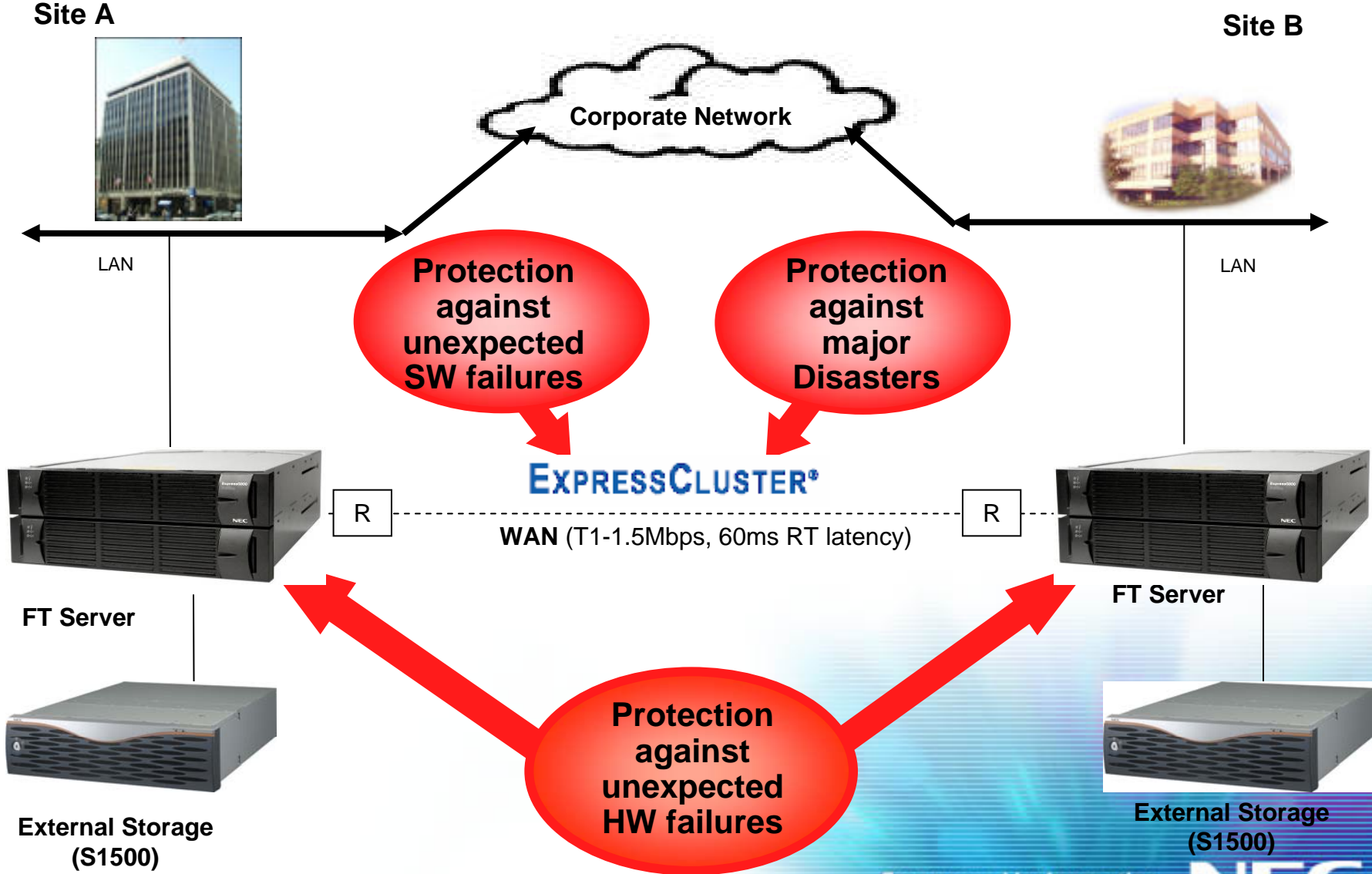
Ft + ExpressCluster = Flexible Deployment Options

Only DR solution compatible with NEC FT servers to provide up to 99.999% availability for most critical applications and data



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FT Disaster Tolerant Solution



Roundtable

IS Ft Right for You?

Questions to ask:

Do you have 24x7 requirements?

What would be the impact if these applications were unavailable?

Have you had unexpected downtime recently?

Would you be interested in a solution that can give you less than 5 minutes of downtime a year?

If you discuss...

"Application X is very important to us"

"Our admins are on call 24 x 7 to support ..."

"Application clustering is so expensive"

"Our company runs on SQL Server"

"I was here all weekend installing updates..."

"Outages are very expensive."

Q&A

NEC's FT looks expensive

What is your downtime worth? What would the impact to your business be if this mission-critical application wasn't available?

My IT staff doesn't have the specialized skills for this or seems complicated

No special skills are needed. An entire FT unit can be swapped-out by a non-technical person and runs like a GP server

I don't want to buy specialized software

The FT runs completely standard off-the-shelf operating systems and software and only needs 1 license (non-cluster aware versions)

What is the switch over time if a part fails? Will I lose data?

The FT server is a continuously running server. No switch over time is necessary, and no data is lost. All parts are redundant, and back each other up in the event of a part failure

NEC Resources



www.necam.com/channel

Log In: ept@necam.com

Password: ept

Summary Benefits

5 Customer Benefits of the FT Server:

- 99.999% Uptime
- Easy Maintenance
- Single copy of Standard Software
- Great Remote Management Tools
- FT TCO Beats Software Clusters



Disaster Recovery Solution:

- No Data Loss
- Less than 4 minutes from Disaster to Recovery
- No reprogramming of users or devices
- Affordable to Small/Medium Businesses

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