HEWLETT PACKARD

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SharePlex/iX

Introduction

In organizations that rely on computer processing to support their business, the need for greater system uptime and data availability is steadily increasing. The HP 3000 is Hewlett-Packard's premier computer platform for worry-free, business-critical computing, and delivers the most effective solution for environments that require high system and data availability .

One of the features that makes the HP 3000 the preferred platform by commercial customers is the ability to configure systems in a loosely coupled or clustered manner. This is achieved through a product offering called HP SharePlex/iX.

This paper will explain what SharePlex/iX is and how it benefits HP 3000 customers.

What is a cluster?

SharePlex/iX is a clustering solution for the HP 3000. But what is a cluster? In the computer industry, there are a range of solutions that try to pass as a "cluster" that vary dramatically in functionality. The least functional would be a configuration of 2 to 3 systems with switchover capability, for warm standby in the event of a system failure. The other end of the spectrum, where SharePlex/iX resides, is a multi-node computer system which has:
- a single-system view from the perspective of its users, programmers, operators and administrators
- provisions for enhanced availability
- cluster-wide operations and management features
- shared, cluster-wide facilities for print queues, batch queues, file systems, and peripherals
- a graceful incremental growth capability
- a flexible configuration through interconnect and topology options

Benefits of clusters

The benefits of clusters vary from providing high data and application availability to protecting customer investment in existing systems. The following details some of those benefits and explains how SharePlex/iX delivers them.

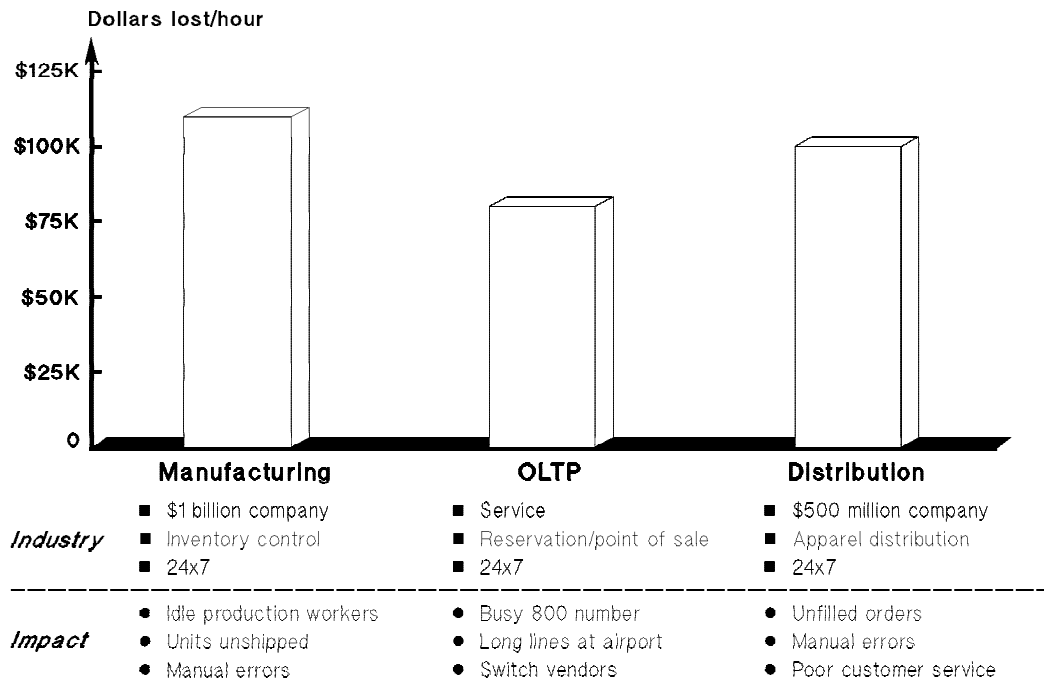**Figure 1. SharePlex/iX: Local and wide area cluster**
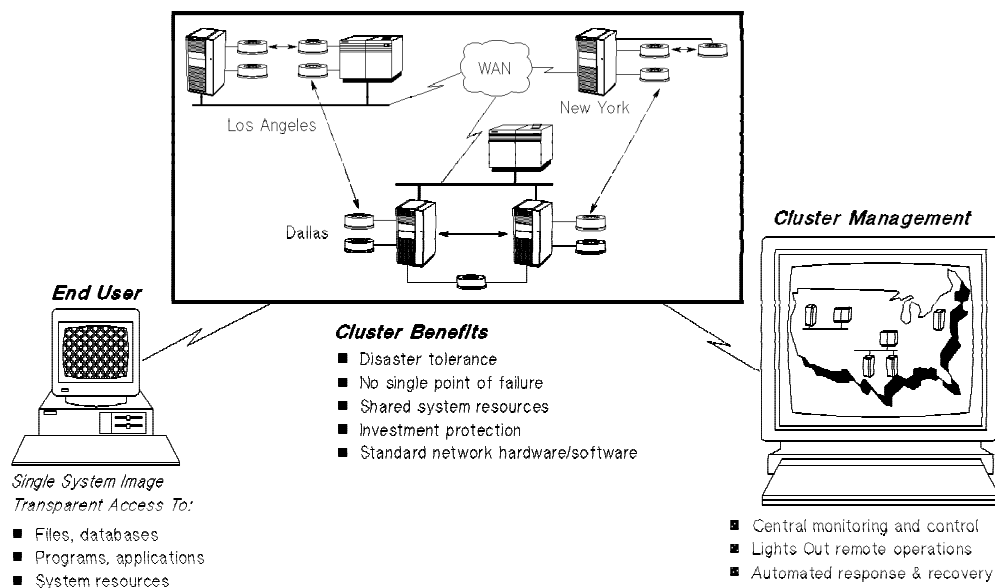
Higher application and system availability

By providing features to protect data in the event of a system or disk failure, clusters have traditionally provided the benefit of increasing application and system availability.

However this doesn't go far enough. The need still remains to be able to recover from unexpected disasters that make data unavailable. These can include a local datacenter disaster, such as an outbreak of vandalism, a regional disaster, such as a power outage in a section of New York, or a widespread disaster, such as an earthquake that impacts a very large geographic area. Businesses are increasingly aware of the need for a Disaster Recovery Plan (DRP) that enables them to resume access to their data and other computing resources. Sales losses from downtime can run as high as $70,000 a minute and a long outage can cripple or even destroy a company's ability to do business after the event. Though often overlooked, DRPs are especially critical to companies that are dependent on the availability of their systems and data in order to do business.

Figure 2.

Dollars lost/hour

Industry	Manufacturing	OLTP	Distribution
	$1 billion company	Service	$500 million company
	Inventory control	Reservation/point of sale	Apparel distribution
	24x7	24x7	24x7

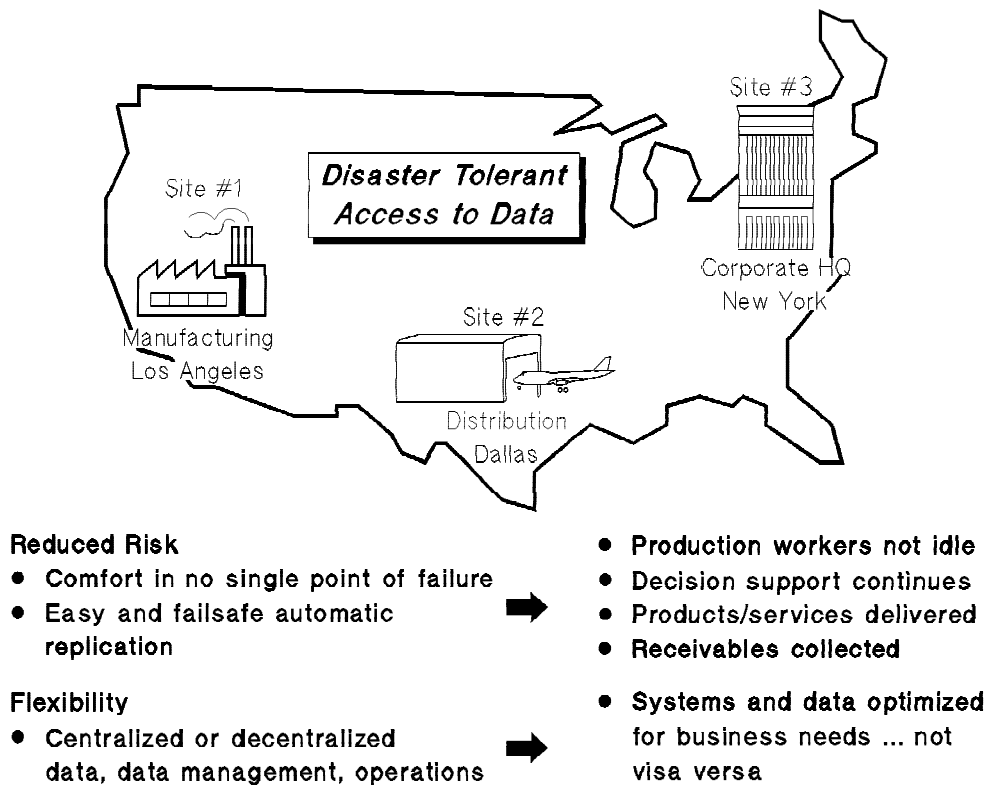| Impact			
	Idle production workers	Busy 800 number	Unfilled orders
	Units unshipped	Long lines at airport	Manual errors
	Manual errors	Switch vendors	Poor customer service

While some people rely on Fault Tolerant systems for this protection on a single site, SharePlex/iX configurations protect data even in the event of a natural disaster that completely destroys an entire node. SharePlex/iX incorporates data and application shadowing features than replicate the data in another distant location. In the event of a disaster, the data is preserved and is still accessible by other parts of the company that need it. And SharePlex/iX can be configured without geographic limitations, anywhere in the world.

In addition to the obvious high availability benefits of disaster recovery, SharePlex/iX has more subtle ways to increase data and application availability. Customers can switch application processing from one system to another during particularly heavy periods of processing. For example, in order to improve application performance and response time, a company might choose to do its year-end number crunching on a larger, more powerful system than its finance department usually uses.

This level of flexibility enables customers to tailor their information systems to their business needs, rather than making the business adhere to the computer system limitations.

Figure 3. SharePlex/iX: Corporate wide cluster

Reduced Risk
- Comfort in no single point of failure
- Easy and failsafe automatic replication

Flexibility
- Centralized or decentralized data, data management, operations

- Production workers not idle
- Decision support continues
- Products/services delivered
- Receivables collected

- Systems and data optimized for business needs ... not visa versa

Another example involves the ability to send print jobs to any printer on the network. Aside from the obvious benefit of sharing system printers, this feature is capable of keeping a copy of the print job on a local system until it receives confirmation that the job has successfully completed on the remote system. If the remote printer fails, the job can be automatically resent, or routed to another printer.

SharePlex/iX is completely compatible with other HP 3000 high availability features that provide automatic system restart in the event of a system software failure, system switchover in the event of an SPU failure, and disk mirroring. All of these features increase application and data availability even further for SharePlex/iX cluster users.

Investment protection and growth-increment flexibility

SharePlex/iX is the only highly functional cluster solution offered by a major computer vendor that is supportable across both CISC and RISC platforms. This enables HP 3000 customers who have a mix of MPE V and MPE/iX systems to take advantage of clustering benefits across their entire enterprise. Customers need not discard older HP 3000 models in order to get the functionality of a cluster (this is an issue for DEC VAX Clusters, which are only fully supported on the older CISC platforms).

SharePlex/iX protects customer investment by enabling an overloaded CPU to move an application or an application module to another system, improving performance on the first system. No applications changes are necessary. So if a system in Houston were near its processing limits, an under-utilized system in Chicago could offload it. The Houston users would never know the difference. And the customer would be getting a better return from his investment in the Chicago machine.

Clustering capability provides processor growth flexibility in the same manner: customers only needing a small incremental amount of processing power for a particular application have more choices. They can add a small system to the cluster, or perhaps just take advantage of some excess processing power on another system in the cluster.

In the above examples, SharePlex/iX is most appropriate when the configuration consists of multiple applications or databases that need to occasionally share data. If the configuration consists of one large application or group of applications that heavily access the same database, upgrading the processor, rather than spreading the workload, would be more efficient.

SharePlex/iX enables workload balancing by integrating several key technologies, most notably a product called NetBase and a product called HP OpenView System Manager.

NetBase consists of a set of modules that provide data shadowing, file access, spooling, and process management features. These features facilitate the kinds of workload balancing in the examples above. Since applications need not be rewritten or adjusted to take advantage of NetBase, it is an easy and cost effective technology to implement.

Figure 4. NETBASE: Primary SharePlex/iX enabling technology

Application Environment Replication (Shadowing)

- Databases, programs, flat files, etc. automatically replicated over local and wide area networks

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- Fast recovery and access to business critical data upon system or data center outage

Common File System (Network File Access)

- Files, databases, etc. distributed in the cluster are accessed through central directory

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- Shared data without special user or application awareness

Master Print/Spooling Management (NB Spool)

- Central printing environment and spooler management

→

- Simple and practical cluster-wide shared printing/spooling

Shared Program Execution (AutoRPM)

- Automatic/simple remote process management interface

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- Programs reside anywhere in the cluster, appearing local to the user

Operational ease-of-use

SharePlex/iX clusters include software that makes the cluster look like one system to the end user and applications, so no retraining or application adjustments are necessary. SharePlex/iX configurations are managed with HP OpenView System Manager, which is easy to use even for operators with very little training. Many functions that would normally require human intervention are automated, and operators are alerted to events that require their attention via simple icons that light up and change colors. Even clusters with nodes that are dispersed worldwide can be easily and centrally managed this way.

Figure 5. HP OpenView System Manager for SharePlex/iX

Central Cluster Management

- Easy to use HP Openview Windows Graphical User Interface $\longrightarrow$
- Reduced requirements on operation's size and expertise

- Centralized monitoring with task based filtering and management by exception $\longrightarrow$
- Quick detection of any critical application, system or cluster-wide event, without overloading operation's staff

- Centralized system console functions with full console capabilities and automated responses $\longrightarrow$
- Quick response to events with remote and "lights out" operation's capabilities

NetBase software has been enhanced to integrate with HP OpenView System Manager so the centralized console is alerted if any event occurs involving any of the NetBase modules. This greatly simplifies cluster management.

Figure 6. Monitoring distributed HP 3000s
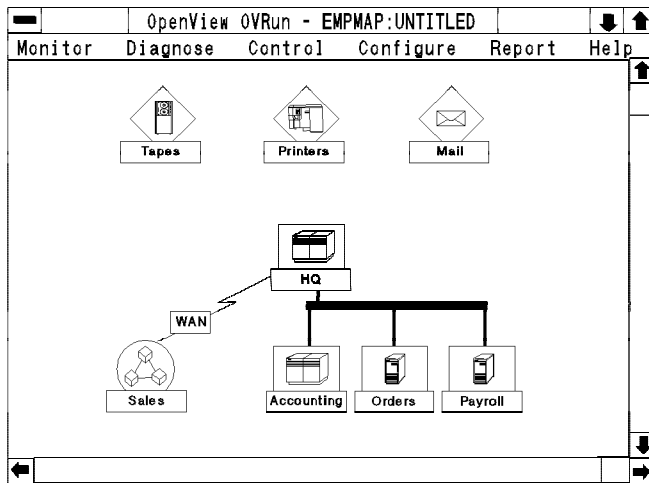
Monitors...
- *system status*
- *operating system and subsystems*
- *job streams*
- *applications*

- Exception-based notification
- Online event review and trouble tracking
- Task-based filter of events
- Event archival and reporting

Comparing SharePlex/iX to other vendors' clustering solutions

The Aberdeen Group, in their report, Clustering: An Alternative Growth and Operations Path, compares the HP 3000 SharePlex/iX solution to other vendors' clustering solutions. Digital Equipment Company did a lot to make clusters a viable computing solution in the 1980's, and it scored highly in the Aberdeen report from the perspective of the old CISC-based VMS platform. DEC's new RISC platform does not support the clustering capabilities of the old VAX VMS platform. Thus the benefits of having a fully functioning cluster with RISC-based hardware are not available to DEC customers. In addition, VAX Clusters require expensive specialized networking to overcome geographic limitations. SharePlex/iX does not have any geographic limitations, which is an important feature for true disaster recovery, and it utilizes less expensive standard networking to keep costs down.

The HP 3000 was rated higher than all the other cluster solutions evaluated, including IBM's Sysplex (MVS), the RS/6000 solution, and several other UNIX* solutions. The HP 3000 is the clear leader in cluster solutions on a RISC platform, without geographic limitations. SharePlex/iX offers flexible configurations that increase the availability of customer's data and applications, which is just one reason people choose the HP 3000 for worry-free, business-critical computing.

For more information:

- SharePlex/iX Clustering for the HP 3000 — 5091-7037E
- Clustering: An Alternative Growth and Operations Path (Aberdeen Group reprint) — 5091-7103E
- HP 3000 High Availability White Paper — 5091-6982E