Continuous application availability for HP Integrity NonStop servers

Data sheet

Cornerstones of business continuity

Continuous application availability is no accident. Instead of taking your application down when upgrading your system hardware or software, or recovering from a disaster, you want to continue application processing without any loss of service or data.

Only HP Integrity NonStop NS-series and NonStop S-series servers are designed from the ground up for continuous availability—from their native fault-tolerant architecture to their suite of disaster-tolerant middleware. This is why The Standish Group has concluded that "HP has the most sophisticated offerings for high availability and disaster recovery solutions."

Geographically dispersed NonStop clusters— HP Metrocluster for NonStop servers and HP Continentalclusters for NonStop servers—

provide the foundation for "no downtime, no excuses" application availability.

Tightly integrated with this architecture are HP NonStop Transaction Management Facility (NonStop TMF), NonStop Remote Database Facility (NonStop RDF), NonStop AutoTMF, and NonStop AutoSYNC Software— a suite of products that provides copies of critical databases and other essential application files.

In addition, a complete spectrum of professional services—including risk management, business impact analysis, availability design and monitoring, continuity planning, implementation, and full-service outsourcing— helps enable your success.

With business continuity and availability products and services for Integrity NonStop servers, you are assured of the highest level of protection for your mission-critical data and applications.

Flexible business continuity and availability solutions for Integrity NonStop servers on your terms.

Geographically dispersed NonStop clusters

Two geographically dispersed cluster configurations for Integrity NonStop servers provide disaster tolerance for critical business applications:

- The HP Metrocluster for NonStop servers configuration supports HP ServerNet connections up to 15 kilometers (9 miles) and remote transaction log mirroring up to 100 kilometers (62 miles).

- The HP Continentalclusters for NonStop servers configuration relies on NonStop RDF and HP Expand networking software to enable Integrity NonStop servers to be geographically separated over unlimited distances.

Software product suite

NonStop Transaction Management Facility Software
Key features and benefits

- Robust two-phase commit protocol for transaction protection and database integrity

- Parallel, high-performance transaction management

- Recovery from accidental or intentional database modification or deletion

- Support for database reorganization, partition split/merge/move, and backup to disk or tape with zero application downtime

- Automated tape catalog for minimizing operator error

- Tape autoloader and silo support

NonStop TMF Software is the core of fault- and disaster-tolerant computing on Integrity NonStop servers, enabling instant and transparent takeover within a single system in the event of a hardware or software component failure.

Before updating the database, NonStop TMF Software writes every change to an integrated transaction log. Because the transaction log is written first, the data disks do not require frequent updates, thereby dramatically increasing application performance. With sufficient processor memory and disk cache, it is possible to create a virtual "in-memory" database without the risk of data loss in a failure situation.

NonStop TMF Software ensures that every business transaction is fully completed or fully backed out, without special programming, so that your company's databases are always consistent. The software facilitates industry-leading database integrity.

NonStop TMF Software works with the HP NonStop SQL Database to enable online database reorganization and backup to disk or tape with zero application downtime. The NonStop TMF transaction log also can be used to recover data that was damaged or deleted through user error or to restore a snapshot of last week's information while your application is still running.

NonStop Remote Database Facility Software
Key features and benefits

- High throughput for instantaneous replication

- Granular specification of primary and backup databases

- Support for all NonStop TMF configurations

- Zero lost transactions

- Robust manageability

- Cross-release replication

- Upgrade with no application downtime

NonStop RDF Software allows you to create a disaster-tolerant environment that can share processing in real time across multiple systems or physical sites.

NonStop RDF Software replicates database changes across systems using high-speed, low-level operating system interfaces. The key to continuity or recovery after a disaster is having all your data on another system before a failure, and nothing outperforms NonStop RDF Software's low-latency, high-performance database replication.

Any system in the NonStop RDF network can take over the work of another system in a matter of seconds. There is no need for system reboots, application restarts, or database reconfigurations. Nor do local workloads on the target system have to be jettisoned.

NonStop RDF Software handles even the largest application configurations and can support multiple live sites backing up each other, with every system running live transactions.

For maximum protection, a Metrocluster configuration can be implemented with a remote HP StorageWorks Disk Array to prevent committed transactions from being lost even in a catastrophic site failure. The storage system can be located at up to 100 kilometers from the protected Integrity NonStop server.

NonStop AutoTMF Software
Key features and benefits

Allows applications to transparently invoke NonStop TMF protection

• Improves system and application performance

• Enables the use of NonStop RDF Software

• Installs in one simple step

• Requires no recompilation or program changes

• Performs all necessary transaction activity

NonStop AutoTMF Software enables applications not currently invoking NonStop TMF protection to do so automatically. Not only do you get better transaction protection through the use of audited database files, but also your application actually performs better because NonStop TMF Software merges multiple transactions into one disk write.

NonStop AutoTMF Software also enables the use of NonStop RDF Software for disaster tolerance and data replication, without reprogramming or reloading of data. NonStop AutoTMF operations are completely automatic and can be applied to individual applications and files as required.

NonStop AutoSYNC Software
Key features and benefits

• Supports geographically dispersed application domains

• Automates multisystem software distribution

• Facilitates system migration and upgrades

• Leverages Integrity NonStop server fundamentals

• Complements database replication software

Whereas NonStop RDF Software streams database file changes to one or more systems, NonStop AutoSYNC Software uses whole file replication to automatically synchronize any kind of file across multiple systems. In a business continuity environment, this means that all the files required to support your application environment, such as program source files, object files, configuration files, static database files, and other files necessary to start and maintain applications, can now be automatically replicated and synchronized to enable immediate and complete takeover without surprises.

NonStop AutoSYNC Software also supports automated software distribution across sites and disk-to-disk backups without tape handling.

NonStop TMF Software

NonStop TMF Software is the foundation for building fault- and disaster-tolerant applications without specialized programming knowledge. It provides unparalleled database consistency, transaction integrity, and the ability to perform online database archiving and maintenance.

NonStop TMF Software provides transaction protection and database consistency for demanding adaptive enterprise, online analytical processing (OLAP), and operational data store (ODS) environments.

Using the efficient messaging system of the Integrity NonStop server, NonStop TMF Software is the fastest, most scalable transaction manager in the industry. Its fault-tolerant process-pair software architecture means that no hardware or software reconfiguration is required, memory data structures do not need to be rebuilt, and pending transactions are not lost because of any single point of hardware or software failure. And its online reconfigurability and high-speed recovery features maximize application availability.

NonStop TMF Software makes transaction management easy for programmers, because they define transaction boundaries with just two commands.

Comprehensive transaction protection

Transaction atomicity

In the NonStop TMF environment, programmers delineate transaction boundaries using only two commands: BEGINTRANSACTION and ENDTRANSACTION. NonStop TMF Software then treats as a unit all of the operations defined between those transaction boundaries.

NonStop TMF Software ensures that all of the operations of a transaction are completed successfully and are written to the transaction log before any of them permanently affect the database. In other words, either all of the changes are committed to the database or none of them are. The database always shows a consistent view of your business.

No lock manager

Unlike competing database transaction managers, NonStop TMF Software doesn't have a lock manager process that can impede transaction performance or get in the way of multiprocessor or multisystem scalability. While NonStop TMF Software manages the transaction log, individual disk access managers (DAM) handle the record locks on their own data volumes. The larger your database is, the more DAMs there are managing your record locks, allowing for near-infinite expandability. How expandable is the software? Even a multipetabyte database with thousands of transactions per second wouldn't stress NonStop TMF Software.

Support for open and distributed transactions

NonStop TMF Software maintains the consistency of the database at every disk and system in the network. A single NonStop TMF transaction can access data partitioned among all disks on a network of Integrity NonStop servers or, using middleware such as BEA WebLogic Server or Tuxedo software, distributed across heterogeneous networks (see figure 1). Distributed transactions are afforded the same thorough protection as local transactions.

Log trail = fewer cache flushes = increased performance

Before a transaction permanently alters the state of a database, before and after "images" of the affected rows are written to the transaction log. Although seemingly counter-intuitive, invoking NonStop TMF protection increases application performance by deferring data volume cache flushes without the risk of data loss in a failure situation (see figure 2). While nonaudited files are unbuffered, with frequent disk writes; files audited by NonStop TMF Software are automatically buffered into system disk cache; and while serialized log records are written immediately, data volume cache can be written later while still preserving data integrity. And the harder you push it, the better NonStop TMF Software performs (figure 3). Because I/Os occur at regular intervals, buffered I/Os to the database and "group commits" to the transaction log become more efficient.
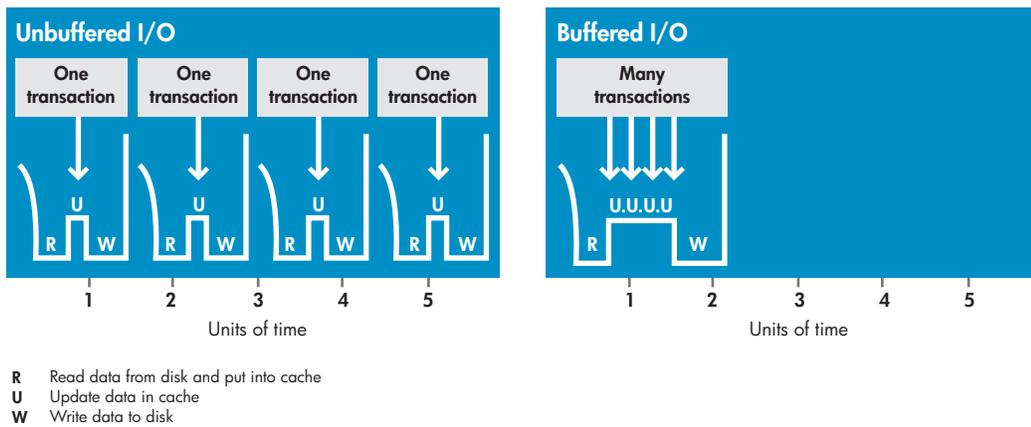
Figure 1.
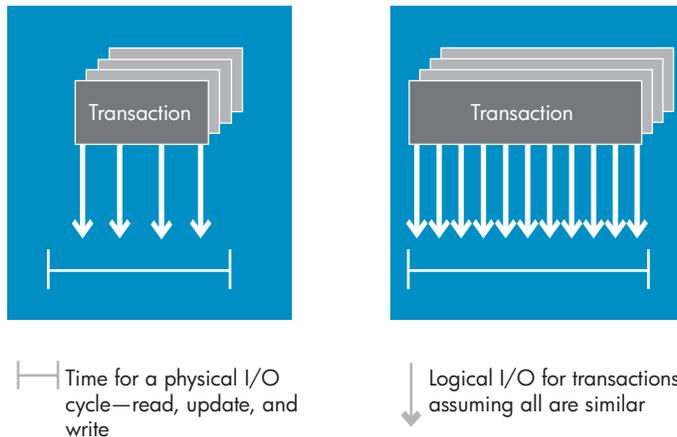A single NonStop TMF transaction can protect data distributed anywhere on a network.
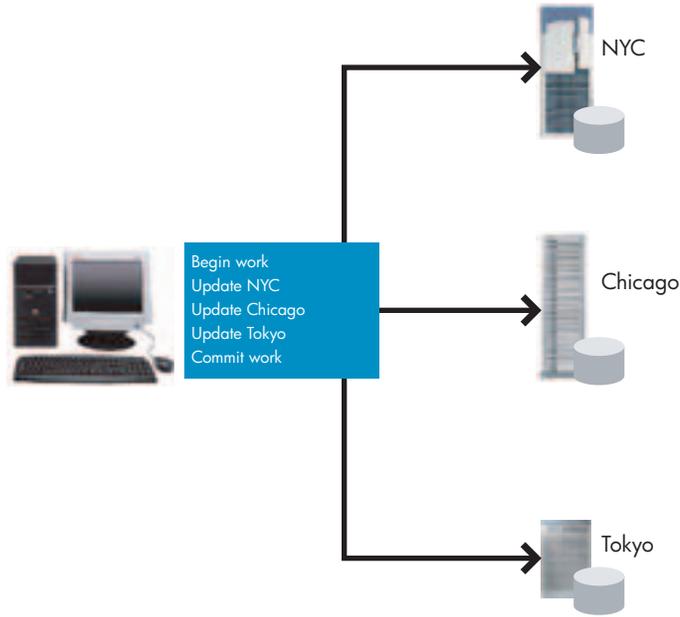
Transaction backout

NonStop TMF Software refers to its transaction log when backing out transactions or rebuilding damaged or lost files or tables. If any part of a transaction fails to update the database properly, it is aborted and the application is notified, or if there is an application failure, NonStop TMF Software automatically backs out the transaction in its entirety, returning the database to its state just prior to the start of that transaction.

Figure 2.
Unbuffered versus buffered writes.

R	Read data from disk and put into cache
U	Update data in cache
W	Write data to disk

Figure 3.
Higher transaction rates equal better performance.

| Time for a physical I/O cycle—read, update, and write | Logical I/O for transactions, assuming all are similar |

Recovery from failures

When a server is restarted—after a power outage, for example—NonStop TMF Software searches the log for incomplete transactions that were left pending as a result of the failure. After locating incomplete transactions, NonStop TMF Software automatically backs out these transactions, ensuring a consistent database. This function is sometimes called *rollback*.

Recovery from database damage

NonStop TMF Software can help protect your database from accidental or intentional damage. For example, if a file or table is purged or a column is altered, system operators can use the information archived by NonStop TMF Software to restore the database to its state either at a specific time or just prior to the incident. If you want to access yesterday's or last week's version of the database, it can be made available without affecting the version that is currently running.

Minimizes operator error

NonStop TMF Software archives transaction logs and backup copies of the database to local or remote virtual or physical tape or disk. It maintains an online catalog of information about the archived data, including its location on external media.

This catalog allows system operators to react quickly and confidently during unplanned outages, assisting them in recovering any lost data. When a portion of a database has been lost, NonStop TMF Software refers to its catalog and notifies system operators of the archive media that must be loaded. Virtual tape servers or tape silos can automatically load the proper backup volume.

Support for tape automation

NonStop TMF Software supports selected tape libraries from HP and third-party vendors, tape drives with automatic cartridge loaders, in addition to virtual tape units. This means that tape handling for archiving and recovery can be automated.

NonStop TMF Software, the foundation for fault- and disaster-tolerant applications, provides the fastest, most scalable transaction management for real-time enterprise, OLAP, and ODS environments.

Parallel, high-performance transaction management

NonStop TMF Software is the highest-performance distributed transaction manager in the industry. It leverages the efficient, message-based HP NonStop operating system, Mission Critical Operating Environment, to support distributed transaction processing environments that can scale to thousands of Integrity NonStop server processors and disks. Architectural changes made to NonStop TMF Software in recent releases of the NonStop operating system can substantially increase performance for the largest NonStop TMF environments.

Efficiency in business intelligence environments

NonStop TMF Software is also useful as a cost-effective means of backing up large decision support system (DSS) databases, which characteristically receive minor updates at regular intervals. Because NonStop TMF Software can restore a DSS database from the transaction log that it maintains, operators do not need to run static backups of the entire database each time it is updated.

High-capacity, parallel transaction log

NonStop TMF Software's consolidated transaction log consists of up to 16 active files that may be partitioned across multiple disk volumes for performance. While the active transaction log is being written to one set of disk volumes, earlier log files can be read from another set of disk volumes for recovery or archival purposes. As your application grows, the number and size of transaction log files and volumes can grow with it, without application downtime.

Data availability

Online backups

Backups are completely transparent to applications running on the server and are performed online and in parallel for maximum efficiency. Whereas other backup solutions may need to be specialized for the application, NonStop TMF Software can perform online backups of any protected database file and ensure transactional consistency when restored.

NonStop TMF Software can also ensure transaction integrity of transitory information such as temporary and queue files without requiring that they or the associated transaction logs be archived.

Online reconfigurability

System operators can dynamically alter nearly all aspects of the NonStop TMF Software configuration while servers and applications remain online. For example, system operators can add disks, rebalance HP NonStop SQL databases across disks, distribute the transaction log over additional volumes, or alter the configured value of other NonStop TMF Software parameters—without application downtime.

High-speed recovery

In the event of an unplanned outage, such as an extended power failure, failure of a nonmirrored disk drive, or catastrophic system outage, NonStop TMF Software employs high-performance, parallel operations to back out incomplete transactions and recover damaged or lost files or tables.

Because NonStop TMF Software runs operations in parallel, it can recover a one or more tables or an entire data volume quickly. For example, NonStop TMF Software can use all tape drives or virtual tape streams available to the system—concurrently and in parallel— to restore the system's database.

Used as part of a cold site recovery plan, NonStop TMF Software can restore a server's entire database to another system, typically within hours.

While NonStop RDF Software can be used to maintain an online copy of the database at a secondary site, NonStop TMF Software's online backups should still be used to protect your database from accidental or intentional modification or deletion.

Interoperability
Consolidated transaction log

NonStop TMF Software maintains a single, consolidated transaction log for all transaction monitors and resource managers, rather than a separate log for each. This log includes transactions generated by HP Pathway/iTS, NonStop Server for Java™, NonStop Tuxedo, NonStop CORBA, NonStop Servlets for JavaServer Pages, NonStop Server for Java Message Service, BEA WebLogic Server Software, and HP NonStop SQL and Enscribe databases.

NonStop TMF Software gives developers the flexibility to enhance existing applications using their choice of transaction monitors, with the assurance that transactions spanning multiple monitors and resource managers are uniformly supported by the NonStop TMF transaction log.

This single log also allows easy near-real-time replication and transformation of all database changes to heterogeneous systems without any programming using third-party software.

NonStop RDF Software

For almost two decades, major companies relying on the world's leading fault-tolerant computing platform, the NonStop server, have also turned to NonStop RDF Software to replicate critical data and enable uninterrupted service no matter the distance or communications infrastructure.

With NonStop RDF Software, one can ignore the concept of primary and backup systems or data volumes and think in terms of primary and backup databases. You can implement a wide variety of configurations, including multiple backup databases for each primary database or a single backup for multiple primary databases. And every source and target system can be running live transactions.

Using the transaction log generated by HP NonStop TMF Software, database changes are instantaneously replicated to one or more target systems, no matter how many transactions per second your application generates. If a primary database becomes inaccessible for any reason, processing can continue using the backup database with minimal service disruption or data loss.

NonStop RDF Software only protects those databases designated as critical by the customer, lowering system and communications overhead. As transactions are applied to the primary database, changes are replicated to the backup database, which can simultaneously be accessed for billing, decision support, reporting, or other activities. NonStop RDF Software does not place limits on the type or distance of the communications link.

The NonStop RDF product family consists of NonStop RDF/IMP, NonStop RDF/IMPX, and NonStop RDF/Zero Lost Transactions (NonStop RDF/ZLT) Software, a new add-on product to NonStop RDF/IMPX that provides complete transaction protection using remote enterprise storage mirroring. The product(s) that the customer chooses depends on which features are needed for particular situations. See the "No lost transactions" section, which describes NonStop RDF/ZLT functionality, and the "NonStop RDF product comparison" table, which compares the features of NonStop RDF/IMP and NonStop RDF/IMPX. Note that RDF/IMP is not available on HP Integrity NonStop NS-series servers.

Optimized throughput for instantaneous database mirroring

NonStop RDF Software minimizes the effects of a site or a regional disaster by efficiently sending transaction log information to one or more target systems, keeping your transactions safe from a system failure.

See figure 4 for the system-to-system replication path used by NonStop TMF and NonStop RDF Software.

Figure 4.
NonStop TMF and NonStop RDF Software using system-to-system replication.
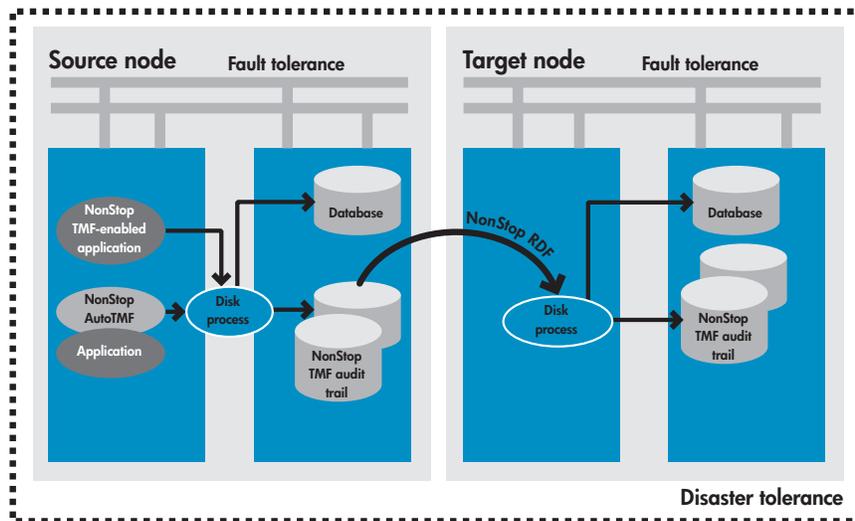

Configuration flexibility

NonStop RDF Software can replicate all or a portion of the database from one source system to one or more remote target systems (see figure 5). NonStop RDF Software can be configured to protect individual files or tables, the contents of one or more subvolumes (directories), or entire disk volumes. You can configure multiple systems to share both the database as well as the processing load. You can also configure one target to provide backup for several sources or configure two or more targets to protect one source as well as each other for "triple contingency." NonStop RDF Software is as flexible as your business needs dictate.

With NonStop RDF Software, you can create a disaster-tolerant environment that can share processing in real time across multiple systems or sites.

Figure 5.
Flexible NonStop RDF configurations.

Simplex

Multiple duplicate sites

Triple contingency

Reciprocal/ split workload

Ring

Centralized
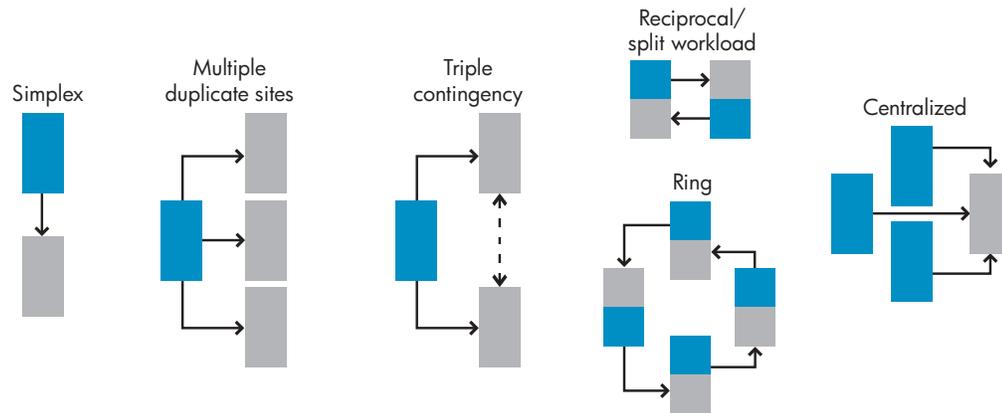
Online all the time

There is no need to be offline after a takeover while a transaction manager or database recovery tool scans logs to repair a corrupt backup database after a system or site failure. NonStop RDF takeover processing takes only seconds to complete (see figure 6). For the shortest possible takeover time, your application can be running on the target system, waiting to be activated. If the target system is processing transactions, such as in a split-workload arrangement, that processing can continue without interruption. In fact, users on the target system don't even know that NonStop RDF Software is performing takeover processing to ensure that the backup database is transactionally consistent. Users who were on the source system can be up and running on the target system within seconds. You can even initialize and load the backup database while the primary database remains online.

Instead of being at the mercy of power failures, fires, floods, earthquakes, and other disasters, you are in full control of your business-critical applications with NonStop RDF Software. As part of a business continuity plan, it can help save your company when disaster strikes. And it has more uses than protecting your applications from unplanned outages. There may be times when you want to use the backup database to keep your application accessible during a planned outage such as upgrading power or other site maintenance or to install hardware, operating system, or application software upgrades on the primary system.

Figure 6.
Backup system takeover time line.
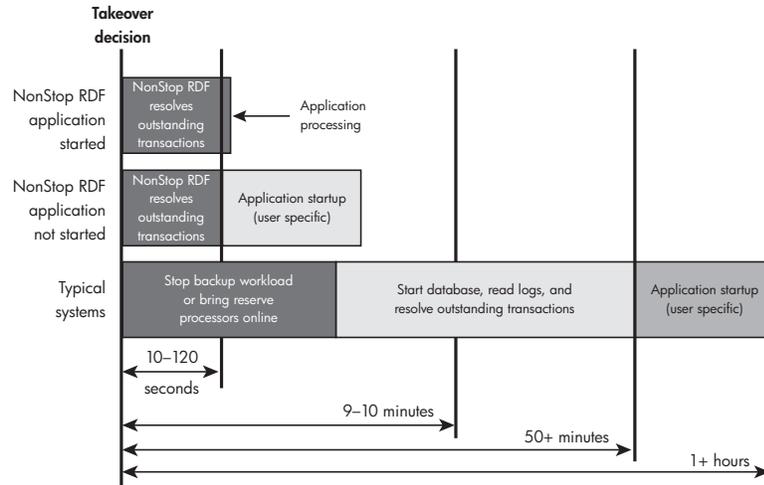
Transaction replication

Unlike hardware-based replication, which simply replicates disk track changes, NonStop RDF Software understands the state of every transaction that it is replicating, whether the transaction is wholly contained on one system or spans multiple NonStop servers. NonStop RDF Software can replicate transactions even before they have been flushed to the source system's database, further minimizing data loss, overhead, and latency. In a takeover situation, NonStop RDF Software backs out any transaction whose final state is unknown, thereby ensuring complete database consistency on one target system or across a network of target systems.

No lost transactions

Because NonStop RDF Software replicates transactions asynchronously, it is possible that a small number of transactions committed on the source system can be lost if the system fails before NonStop RDF reads the transactions from the NonStop TMF transaction log and sends them to the target system. For many applications, the loss of some transactions is not necessarily a problem. However, for other applications, the loss of even a single transaction is intolerable.

NonStop RDF/ZLT used in a Metrocluster configuration can prevent the loss of any committed transaction even in the event of a catastrophic failure though the use of a remote copy of the NonStop TMF transaction log. This copy can be located at up to 100 kilometers (62 miles) from the system by using a StorageWorks XP Disk Array.

Robust manageability

NonStop RDF Software provides administrators with a robust, flexible, and convenient system management environment. Messages are logged in the HP Event Management Service (EMS) log, and exceptional events can be logged to an operator console.

HP Availability Stats and Performance (ASAP) Software supports NonStop RDF Software, enabling it to display detailed performance information and up-to-the-minute statistics, including the status of the extractor and updater processes, relative delay times, information about the current record being processed, and sequence number of the current transaction logs and image trails.

Easy upgrades

The Independent Products NonStop RDF/IMP, NonStop RDF/IMPX, and NonStop RDF/ZLT, the optional add-on to the NonStop RDF/IMPX product, cover a full range of solutions, from entry level to full featured. The software is shipped on a CD, not as part of a site update tape (SUT). Because NonStop RDF enhancements are independent of the NonStop operating system, there is no need for the source and target systems to be running the same operating system release or even the same hardware architecture. This makes system and application upgrades much easier. By using NonStop RDF to move the active database from one system to another during upgrades, near-zero application downtime becomes a reality.

NonStop RDF product comparison

Features	NonStop RDF/IMP (SA43V1)	NonStop RDF/IMPX (SA44V1 or HSA44V1)
Audited backup database	•	•
Long-running transactions have no impact on speed	•	•
Browse access to backup database	•	•
Transaction logs supported	1	16
Takeover in seconds	•	•
Support for NonStop Storage Management Foundation (NonStop SMF) disks	•	•
Number of replicated physical volumes	255 without NonStop SMF, more than 1,000 with NonStop SMF	
Support for ASAP Software	•	•
Replication to multiple nodes	•	•
Triple contingency	•	•
Backup database initialization with no application downtime	•	•
Backup application can be running and waiting for takeover on backup system	•	•
Network transactions		•
Can support RDF/ZLT		•

NonStop AutoTMF Software

NonStop TMF Software maintains a transaction log that records the before and after images of every database update. This transaction log enables online database backup/replication and automated recovery of corrupted or lost files up to the state of the last committed transaction. But applications not explicitly coded to invoke NonStop TMF Software protection have not been able to take advantage of these features—until now.

Utilizing nonintrusive intercept technology, NonStop AutoTMF Software provides a method for automatically invoking NonStop TMF protection. This enables most applications running on an Integrity NonStop system to access audited Enscribe files without program modification or recompilation. Your application gains virtually all the benefits of programmed usage without the costs and time associated with changing all of your application programs.

Fault and disaster tolerance

With NonStop AutoTMF Software, most applications running on Integrity NonStop systems can take advantage of NonStop TMF for file and volume recovery and NonStop RDF for disaster tolerance, even if the applications weren't originally written to invoke NonStop TMF protection.

NonStop AutoTMF Software dynamically determines effective and efficient transaction boundaries and automatically consolidates multiple database updates, ensuring low overhead. There is no need to make any source code changes to programs, or even to recompile them. NonStop AutoTMF works with your existing application object files. NonStop TMF–enabled applications benefit from the performance optimization of audited operations, such as advanced file buffering, and elimination of the block-splitting overhead associated with insertions to a file.

Benchmarks of applications using NonStop AutoTMF Software show no reduction in throughput or increase in response time. In fact, in many cases, they show increases in system performance and decreases in response time.

Incremental migration to NonStop TMF Software

Normally, converting an application to invoke NonStop TMF protection requires that every program that accesses a database file be converted simultaneously before the file can be protected by TMF. However, NonStop AutoTMF Software allows incremental migration by providing transactions only when required.

Although NonStop AutoTMF automatically enables your database to use NonStop TMF, no automatic method can recognize the true boundaries of your business transactions. By rewriting your application programs to explicitly invoke NonStop TMF protection for business transactions, you can more accurately control transaction boundaries and ensure that business transactions are either completed or backed out as a unit.

Should you explicitly invoke NonStop TMF protection in one or more programs or enable TMF protection for additional files within an application, NonStop AutoTMF Software can be configured to provide separate, parallel transactions for the newly audited files or to allow the program to manage the transactions itself.

Implementation of NonStop AutoTMF Software is fast and simple. No program alteration, recompilation, or access to source code is required. Object files are enabled for TMF-protected file access using a simple and reversible operation that can be automatically applied to large numbers of object files (see figure 7) as part of the change control process.

NonStop AutoTMF Software automatically enables your database to use NonStop TMF Software and can be implemented quickly and easily.

Figure 7.
NonStop AutoTMF runtime
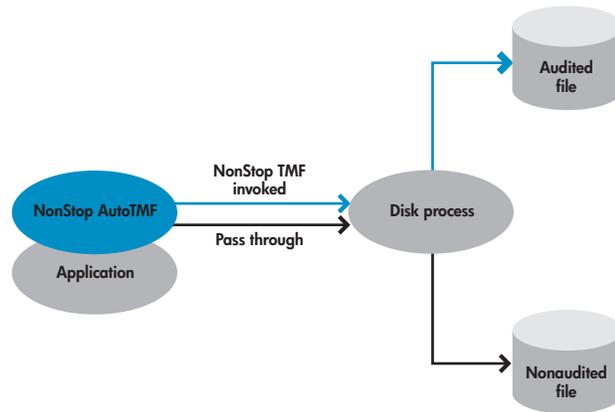
Improved application performance, data integrity, and online operation

By enabling your applications to invoke NonStop TMF protection, you can recover from accidental or intentional database modification or deletion. Your application also automatically gains better uptime performance, because audited files can be backed up to disk or tape with zero downtime, and the automated tape catalog minimizes operator error.

Though seemingly a paradox, many applications show higher performance when using NonStop TMF audited files. This is because random file writes are highly buffered, and database block-splitting overhead is completely eliminated. The NonStop TMF transaction log ensures that there is no risk of data loss in the event of a component failure, and NonStop RDF Software extends this protection to loss of an entire system due to a site failure.

NonStop AutoSYNC Software

Replicates and synchronizes application environments automatically

Complex application environments depend on the precise coordination of all application and system software elements. NonStop AutoSYNC Software is designed and built to reduce the effort and minimize the human and system errors associated with management of multiple system environments, including upgrades and migrations.

Real-time replication of databases for geographic dispersal of your applications isn't enough to ensure uninterrupted operations. For seamless, reliable operations, the entire current application environment must be replicated across your Integrity NonStop servers.

NonStop AutoSYNC Software monitors customer-selected files on a source server. When an updated version becomes available, NonStop AutoSYNC uses whole file replication to enable synchronization with one or more target servers. Virtually all file types are supported.

Specifically, file types include NonStop SQL tables, audited and nonaudited structured files, and unstructured files such as edit files, Open System Services (OSS) files and directories, and partitioned files. Hence, in an Integrity NonStop environment, Pathway control and configuration files, batch files, object/source files, binary large objects (BLOBs), TACL macros, obey files, and other files necessary to start and maintain applications can all be replicated and synchronized.

After initial configuration, the software requires no operator intervention, which makes it easy to use and manage. NonStop AutoSYNC Software is completely self-tending and automatically leverages the fault tolerance and parallel processing performance of the NonStop platform.

By itself, NonStop AutoSYNC Software supports "lights-out operations" through automatic software distribution and maintenance. When used in concert with NonStop RDF Software, NonStop AutoSYNC enables entire application environments to be replicated for comprehensive wide-area disaster protection.

Multisite business continuity

NonStop AutoSYNC Software is an important enabler of multinode application environments, as well as multisite business continuity implementations used to protect critical applications against regional disasters. NonStop AutoSYNC rounds out either solution by working in concert with NonStop RDF Software (see figure 8).

Takeover operations can be derailed if crucial files are not up to date and synchronized across all systems. NonStop AutoSYNC Software's automated operations ensure that application environment files are up to date and in the right place on the right systems so that backup applications can begin operations immediately. Files can be replicated within a system, to a single target site or to numerous targets, depending on the overall application topology.

NonStop AutoSYNC Software helps users coordinate all application and system software elements.
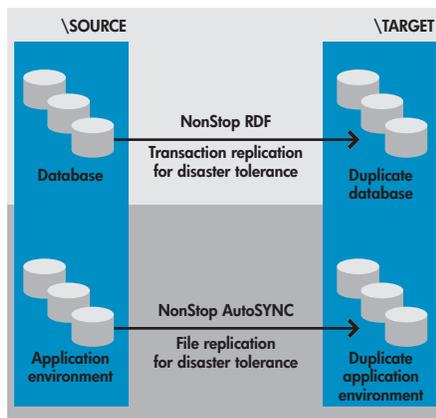
And have you thought about a disaster affecting your development system? The loss of even a day's work can be catastrophic to tight development schedules and programmer productivity. NonStop AutoSYNC can be used to protect the version control environment running on your NonStop system. Consult with your software vendor for its recommended configuration for NonStop AutoSYNC replication.
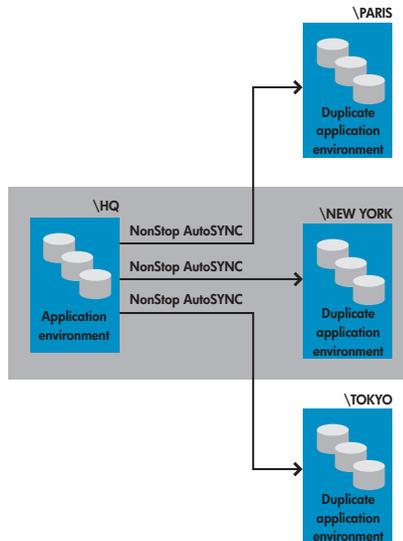
Multisystem software distribution

As part of your change control program, NonStop AutoSYNC Software can provide a set-it-and-forget-it environment to reduce staff effort and the chance of human error.

Whenever a file changes in a source file set, NonStop AutoSYNC can be configured to automatically replicate the updated file to designated destinations across any number of target systems for ongoing synchronization (see figure 9). The software also supports automated staged distribution, manual on-the-fly distribution, and disk-to-disk backups without tape handling. Full compliance with system security ensures that no users have the ability to access or replicate files other than those authorized to them.

Figure 8.
NonStop AutoSYNC Software works in concert with NonStop RDF Software to replicate the entire application environment.

\SOURCE   \TARGET

NonStop RDF
Transaction replication for disaster tolerance
Database   Duplicate database

NonStop AutoSYNC
File replication for disaster tolerance
Application environment   Duplicate application environment

System migrations and upgrades

NonStop AutoSYNC Software can be used for the initial transfer of an existing system environment to a new system without tape, even while the existing system is running. It can capture an initial snapshot of your databases plus all of the associated application and environment files needed for system startup. During the new system burn-in period, NonStop AutoSYNC can continue to replicate your static files, while NonStop RDF ensures that the database files are ready for cutover to the new system.

In addition to HP Expand networking software, NonStop AutoSYNC supports TCP/IP communications between systems, enabling exact replacement of entire systems for seamless system migrations.

Also useful for system migrations and upgrades is the NonStop AutoSYNC system synchronization reporting function. The report lists detailed statistics in any combination, showing all files that are in sync, all files that require synchronization, or files that have been excluded from synchronization by NonStop AutoSYNC at the user's direction. Verifying the synchronization status between systems is now a simple, one-step process.

Operational flexibility

NonStop AutoSYNC Software is easy to install and manage and is extremely flexible in its operations. Automatic file replication can be flexibly scheduled, or replication can be invoked manually for ad hoc transfers. Flexible options also exist for controlling file purging and archiving replaced files, and for managing file access security for multiple users.

NonStop AutoSYNC provides very powerful trigger functionality that can be invoked whenever a file is replaced. Triggers can initiate any function or program available from a command line, for example, executing an edit script, compiling an SQL program, or starting a program such as a batch job when a file is replaced.

Scalability and reliability

NonStop AutoSYNC Software leverages the scalability, performance, and availability of the Integrity NonStop platform. Replication processes run in parallel for scalable performance, and the software takes full advantage of the NonStop architecture to continue replication operations in the event of processor failure or software process faults.

NonStop AutoSYNC Software also makes maximum use of available bandwidth between source and remote target systems through the use of data streaming and data compression.

Services and support

From installing and configuring our suite of disaster-tolerant products, to ensuring that your environment is as fault tolerant as your NonStop server, to getting your business continuity planning program up and running quickly, HP Services provides a full suite of implementation services worldwide.

HP Services can help your company create an integrated disaster protection and recovery solution for all your mission-critical systems:

- Risk assessment, business impact analysis, and availability services assist clients in defining the specific requirements for their operations.

- Continuity planning helps customers develop and maintain plans for protecting market share and financial security in the event of a disaster.

- Implementation services help organizations install, implement, and manage disaster recovery plans.

In addition, HP outsourcing services can duplicate the workplace environment and provide all the facilities to run business operations at a remote location without the investment in a complete system.

We pioneered continuous availability

Today's Integrity NonStop servers are the culmination of more than 30 years of continuous availability expertise. No other platform provides such a comprehensive and powerful continuous processing architecture as the Integrity NonStop server, the best choice for enterprises that cannot risk data loss or downtime.

Technical specifications

NonStop TMF Software system requirements

Hardware	Integrity NonStop NS-series or NonStop S-series server (some features may not be available on certain systems)
Software	NonStop operating system NonStop SQL/MP and/or NonStop SQL/MX and/or Enscribe database

NonStop RDF Software system requirements

Hardware	Integrity NonStop NS-series or NonStop S-series server (some features may not be available on certain systems) Communications controller for system-to-system connection StorageWorks XP Disk Array for NonStop RDF/ZLT
Software	NonStop operating system Release Version Update (RVU) G06.03 or later (some features may require minimum RVUs) NonStop TMF Software HP Expand and/or Expand for HP ServerNet NonStop SQL/MP and/or NonStop SQL/MX and/or Enscribe database

NonStop AutoTMF Software system requirements

Hardware	Integrity NonStop NS-series or NonStop S-series server (some features may not be available on certain systems) Communications controller for system-to-system connection
Software	NonStop operating system RVU G06.03 or later (some features may require minimum RVUs) HP Expand and/or Expand for HP ServerNet

NonStop AutoSYNC Software system requirements

Hardware	Integrity NonStop NS-series of NonStop S-series server (some features may not be available on certain systems) Communications controller for system-to-system connection
Software	NonStop operating system RVU G06.03 or later (some features may require minimum RVUs) HP Expand and/or Expand for HP ServerNet

Ordering information

NonStop TMF Software	As the foundation for database consistency and continuous application availability, NonStop TMF Software is included with the operating system and does not need to be ordered separately.

NonStop RDF Software

Part number	Product name
SA43V1	NonStop RDF/IMP for NonStop S-series servers
HSA44V1	NonStop RDF/IMPX extended version for Integrity NonStop NS-series servers
SA44V1	NonStop RDF/IMPX extended version for NonStop S-series servers; see the NonStop RDF product comparison table
HSA88V1	NonStop RDF/ZLT add-on to HSA44V1 for Integrity NonStop NS-series servers
SA88V1	NonStop RDF/ZLT add-on to SA44V1 for NonStop S-series servers

NonStop AutoTMF Software

Part number	Product name
HSA45V1	NonStop AutoTMF Software for Integrity NonStop NS-series servers
SA45V1	NonStop AutoTMF Software for NonStop S-series servers

NonStop AutoSYNC Software

Part number	Product name
HSA46V1	NonStop AutoSYNC Software for Integrity NonStop NS-series servers
SA46V1	NonStop AutoSYNC Software for NonStop S-series servers

For more information

For more information about continuous application availability on HP NonStop Integrity servers, visit **www.hp.com/go/nonstopcontinuity**.

HP Financial Services provides innovative financing and financial asset management programs to help you cost-effectively acquire and manage your HP solutions. For more information on these services, contact your HP sales representative or visit **www.hp.com/go/hpfinancialservices**.

HP Technology Services provides a broad spectrum of services to commercial and enterprise customers. In addition to HP hardware and software support packages, HP Technology Services also offers performance and availability services, proactive mission-critical services, and services ranging from deployment to support management of the entire IT infrastructure, including HP and multivendor environments. For more information on these services, contact your HP sales representative or visit **www.hp.com/hps/support**.

For more information, visit www.hp.com/go/nonstopcontinuity.

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