HP NonStop business continuity products and services update

Sept 7th 2006
Bob Loftis, Product Manager
robert.loftis@hp.com

© 2006 Hewlett-Packard Development Company, L.P.
The information contained herein is subject to change without notice.
Agenda

• Overview
  – HP Business Continuity and Availability approach
  – HP NonStop products, services, partners

• Safe, fast replication
  – RDF focused on disaster tolerance; futures

• Complementing TMF and RDF
  – AutoTMF and AutoSYNC

• Best Practices
Guest Speakers

• Alan Pendleton
  – RDF development team

• Harry Scott
  – Co-founder Carr Scott Software
  – AutoTMF, AutoSYNC

• Megan Fotter
  – RDF support analyst, GMCSC
The pressure to mitigate business & IT risk seems to be increasing

- External threats seem more visible, frequent
- Requirements grow for business compliance
- New security risks emerge each month
- Users and customers are demanding better level of IT service (potential differentiation)
- More applications & processes are becoming business-critical
- 24 x 7 global operations shrink the window for back-up & downtime
Questions get tougher..

2002

Do we really need a disaster recovery plan?

CEO

Am I sure that my business can keep going in a crisis or emergency?

2006

Do we have service level agreements with our users?

CIO

Are we building operational excellence into our IT service?

2002

If the system fails, how quickly can it recover?

IT Manager

How can we get the right levels of security & availability in our new system from day one?

2006

September 7, 2006
HP has a complete portfolio of solutions to meet business continuity, availability & security needs

HP promise:
• Best in class solutions across the board
• Enhanced customer benefit by taking a holistic approach
• A solution to match your unique needs

Am I sure that my business can keep going in a crisis or emergency?

Are we building operational excellence into our IT service?

How can we get the right levels of security & availability in our new system from day one?
# HP’s Business Continuity & Availability Solution

## Increasing protection

**Standard - Protected - Continuous**

### Business Continuity Management

- Continuity preparation
- Business operations continuity
- IT Service continuity

### IT Service Management

- Applications
  - High Availability Solutions for Exchange, Citrix, SAP
  - OpenView
- IT Service Mgmt tools
- IT Service Mgmt. Processes
- IT Security
  - Security Governance, Identity Mgmt & Proactive Security Mgmt

### Infrastructure Availability and Security

- Servers
  - Virtualization --- Clustering --- Continuous Computing
- Storage
  - Near-line --- SAN --- Disaster Tolerant Solutions
- Data
  - Tape --- Electronic Vaulting --- Mirroring --- Data Replication
- Services
  - Assessments --- Proactive Services --- Mission Critical Services

---

September 7, 2006

Business continuity solutions for the HP NonStop platform
HP Services capabilities

• More than 5,000 disasters successfully handled since 1984
• More than 12,000 customers worldwide
• One of only two global business continuity service vendors in the industry
• 50 recovery facilities located across 40 countries; includes data center recovery, work area recovery, and satellite facilities
• Wide range of multivendor recovery systems
  - HP NonStop servers
  - UNIX® system servers (PA-RISC)
  - HP AlphaServer and VAX
  - Intel® processor-based servers (mainframe)
  - Sun servers
  - IBM iSeries/AS400
  - IBM pSeries/RS6000
  - IBM enterprise servers (MVS)
• Expertise in
  - Business Continuity Consulting
  - Disaster Tolerant design and implementation
Integrated NonStop Server products

• **NonStop Transaction Management Facility (TMF)**
  – The foundation for transaction integrity and data protection

• **NonStop AutoTMF**
  – Automatically invokes NonStop TMF protection for non audited databases

• **NonStop AutoSYNC**
  – Synchronizes non database files

• **NonStop Remote Database Facility (RDF)**
  – High-performance database replication
NonStop TMF

Transaction Management Facility

- Bedrock of transaction integrity, data protection
- All database modifications captured in audit trail
- If any part of transaction fails, db backed out
- Low level integration – high speed
- Enhances performance with automatic buffering
Single, consolidated audit log

- Web clients
- Applications
- Traditional clients

Industry-standard APIs

- NonStop Tuxedo
- NonStop CORBA
- BEA WebLogic Server
- NonStop SQL or Enscribe
- Pathway
- NonStop TMF
- NonStop Kernel
NonStop AutoTMF software

- Brings NonStop TMF protection for nonaudited databases
- Quick, easy, low-risk implementation
- No change to application or system
  - No privileged code or SYSGEN required
NonStop AutoSYNC software

• Whole file replication of non database files needed for application
• Synchronizes file sets between NonStop servers via HP Expand networking software or native TCP/IP
• Completely automatic: “set it and forget it”
• Fault tolerant and highly reliable
NonStop Remote Database Facility

- High-speed, low-latency database replication software
- Peer-to-peer for NonStop servers only
- Focused on disaster tolerance
- Uses low-level system interfaces
- Tuned for network and long running transactions
NonStop TMF and NonStop RDF software: Powerful NonStop system-to-system replication

**Source node**  **Fault tolerance**

- Nonstop TMF–enabled application
- NonStop AutoTMF
- Application
- Disk process
- NonStop TMF audit trail

**Target node**  **Fault tolerance**

- Database
- NonStop TMF audit trail
- Disk process
- NonStop RDF

**Disaster tolerance**
Customer Overview

- Over 250 current customers
  - Banking, finance
  - Telecomm
  - Retail
  - Healthcare
  - Government
- Since Jan 2004
  - 140+ customers purchased RDF, primarily IMPX
  - High end S-Series servers
  - Integrity sales are strong
Our database replication partners

GoldenGate Software (GoldenGate)
Gravic (Shadowbase)
Network Technologies Intl. (DRNet)

<table>
<thead>
<tr>
<th>Feature</th>
<th>NonStop RDF</th>
<th>GoldenGate</th>
<th>Shadowbase</th>
<th>DRNet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audited database files</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Nonaudited database files</td>
<td>With NonStop AutoTMF</td>
<td>Yes</td>
<td>With NonStop AutoTMF</td>
<td>Yes</td>
</tr>
<tr>
<td>Cross platform</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>DRNet/MPS</td>
</tr>
<tr>
<td>Integrated into OS</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Data manipulation</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sold and supported by HP</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Questions?

www.hp.com/go/nonstopcontinuity
Agenda

- **Overview**
  - HP Business Continuity and Availability approach
  - HP NonStop products, services, partners

- **Safe, fast replication**
  - RDF focused on disaster tolerance; futures

- **Complementing TMF and RDF**
  - AutoTMF and AutoSYNC

- **Best Practices**
Guest Speakers

• Alan Pendleton,
  - RDF development team

• Harry Scott
  - Co-founder Carr Scott Software
  - AutoTMF, AutoSYNC

• Megan Fotter
  - RDF support analyst, GMCSC
RDF Overview

Primary Node

Application

Data vols

TMF Audit Trail

Extractor

Backup Node

RDF Image Trail

Updater

Purger

Data vols
RDF Key Features

- Network transactions
- Large transactions
- High throughput and performance
- Robust architecture
- Process lockstep
- Auxiliary audit trail management
- Syskeys, cluster keys handling
- Split reciprocal – collision avoidance
- ASAP, EMS monitoring
- Low level integration
- Excellent, dedicated support thru GMCSC
Some NonStop RDF topologies

Centralized

Simplex

Multiple duplicate sites

Reciprocal/split workload

Ring

Triple contingency
Some NonStop RDF topologies

Simplex

A-Z → A-Z

Reciprocal/split workload

A-L → M-Z

M-Z → A-L

Triple contingency

A-Z → A-Z → A-Z
Network transaction replication streams

Primary

Backup
NonStop RDF/ZLT Option

• All asynchronous replication products can lose “in-flight” transactions
  – Transactions can commit on source system but not yet be replicated when a disruption occurs

• NonStop RDF/Zero Lost Transactions can guarantee no loss of committed data in an unplanned outage—with-outhout any application changes

• Controlled availability
RDF without Zero Lost Transactions

System A (source)

NonStop RDF traffic - async

System B (NonStop RDF target)
RDF/ZLT moves audit mirror to remote location between sites

**System A** (source)  
- Data
- Audit-P

**NonStop RDF traffic**

**Distance limited by latency**

**System B** (NonStop RDF target and standby)  
- Audit-M
- Data

Mirror can also be at backup site

Requires HP StorageWorks XP
RDF Release 1.7 Review 1 of 2

October 2005 on S-series, December 2005 on Integrity NonStop

- Management of RDF by any Supergroup Userid, regardless of what Userid started it
- Management of RDF by any user (non SUPER group)
- Run with one-way remote passwords (primary to backup)
- Faster file comparison tool: MD5Chek
- Single RDFCOM command to drain and apply all audit up to the time the command was issued
RDF Release 1.7 Review 2 of 2

October 2005 on S-series, December 2005 on Integrity NonStop

- New REVERSE option for the STOP RDF command
- Configure triggers that are automatically executed after critical operations (e.g. Takeover and Stop RDF, reverse commands)
- New event issued when all updaters have stopped and replication shut down
- With "!" option force takeover even if Expand network line is up
- "NOW" option with INITTIME in INITIALIZE RDF command
Direction for RDF

Potential enhancements for mid-2007 or later

- Nativize select objects (overall performance)
- Support for large blocks and large rows
- Stop update to consistent network transactional state
- SQL/MX ANSI names in event messages
- Flexibility in sub volume naming
- G and H series interoperability, but targeting Hxx only

Future product plans, dates, and functionality are subject to change without notice
Questions?
Agenda

• Overview
  – HP Business Continuity and Availability approach
  – HP NonStop products, services, partners
• Safe, fast replication
  – RDF focused on disaster tolerance; futures
• Complementing TMF and RDF
  – AutoTMF and AutoSYNC
• Best Practices
Guest Speakers

• Alan Pendleton
  – RDF development team

• Harry Scott
  – Co-founder Carr Scott Software
  – AutoTMF, AutoSYNC

• Megan Fotter
  – RDF support analyst, GMCSC
NonStop AutoTMF and AutoSYNC

• Growing customer base +300 installations
  – NonStop AutoTMF and AutoSYNC Customer base
    • Worldwide over 200 customers using NS AutoTMF/AutoSYNC
    • +100 Banks, brokerages & financial firms world-wide
    • Used with many, many different applications, including
      – 3rd Party software packages: ACI’s Base24, ADP/SIS, . . .
      – Many in-house developed solutions
Guaranteed Data Integrity

- TMF provides only guaranteed log of all database changes
- TMF Audit-trails used to recover from accidental data loss

Basis for Guaranteed Disaster Recovery

- Fully integrated with NonStop Kernel operating system
- Replay guaranteed database changes to multiple systems

Online BACKUPs

- TMF protected databases can be BACKUP protected without fear of data loss / corruption

Improves Performance

- Eliminates block-split overhead
- Automatic buffering
NonStop AutoTMF runtime

- Intercepts file system and NonStop TMF calls
- Operations on nonaudited files are passed through
- Automatic transactions are triggered by operations that require a transaction
- Designed for performance and real-world applications
  - Many updates per transaction
  - Automatically robust
  - Configurable for ‘unusual’ situations
  - Makes every step better
Why NonStop AutoTMF software?

Automatic TMF benefits without changing programs:
• Improved application performance
• Ability to do online backups
• Recoverability from human error
• Only guaranteed foundation for database replication
• Distributed and supported world-wide by HP
NonStop AutoSYNC features

- Whole file replication of files as complement to RDF, for system migrations and for multi-system application environments
- Synchronizes file sets between NonStop servers via HP Expand networking software or native TCP/IP
- Easy to install and manage
- Completely automatic: “set it and forget it”
- Fault tolerant and highly reliable
- Optional Triggers take action with updated file (i.e., Automatic SQL compilation, change system names in config files, initiate batch job, etc...)
NonStop AutoSYNC non-database file replication

- **Transactions**: Online Users
- **Database**: 
  - New Programs
  - Config Updates
- **Application Environment**: Operators, Developers, Production Control
  - NonStop AutoSYNC
  - File Replication for Disaster Recovery

**Remote**
- Duplicate Database
- RDF
  - Transaction Replication for Disaster Recovery
  - Duplicate Application Environment
NonStop AutoSYNC
System Migrations & Upgrades

Because naming can remain the same, fewer issues, easier migrations, more upgrades!

Replicate all files. Even databases and SQL catalogues without tapes or additional products, retaining system "name."
NS AutoSYNC Recent Features

• Replication of OSS files / directories*

• Replication of partitioned files (audited and non-audited)*

• Triggers
  – Execute a user-specified program or macro when a file is updated
  – Guardian or OSS triggers
  – Examples of functions that Triggers can perform:
    • Execute EDIT scripts to adjust system / volume names
    • SQLCOMP programs
    • Run batch jobs or other user-defined processes

• TCP/IP support (in addition to Expand)*

• System synchronization reporting*

* - features especially important for system upgrades & migrations
NonStop AutoSYNC 7 new

- New OPENUPDATE
  - Opened files replicated (updated) as needed
  - Verifies opened file not updated during synchronization
  - Broadens class of file candidates for automatic replication (files always opened, infrequently updated)
  - Doesn’t apply to files opened for exclusive access, audited files, or SQL tables
  - Replication of OSS files > 2 GB, w/o special config!

- PURGE option supported for OSS files and directories: deletion of destination files/directories not in source set

- REPORT command shows candidate files for deletion
Agenda

• **Overview**
  - HP Business Continuity and Availability approach
  - HP NonStop products, services, partners

• **Safe, fast replication**
  - RDF focused on disaster tolerance; futures

• **Complementing TMF and RDF**
  - AutoTMF and AutoSYNC

• **Best Practices**
Guest Speakers

• Alan Pendleton
  – RDF development team

• Harry Scott
  – Co-founder Carr Scott Software
  – AutoTMF, AutoSYNC

• Megan Fotter
  – RDF support analyst, GMCSC
Best Use of New Features (1 of 5)

• Use RDF 1.6 or later on G06.24 and later RVUs
  – Only 1.6 and later certified for G06.24 and later RVUs
  – TMF can generate audit trail records on G06.24 and later RVUs that cannot be read by earlier versions than 1.6 RDF
  – Note: earlier RDF versions may work if SQL/MX not installed and TMF Format 2 audit not used

• SET PRIMARYSWAP and BACKUPSWAP no longer supported (as of 1.6)
  – Remove these (optional) commands from RDF configuration files before upgrades to T0346A06 or later
  – RDF ignored file backed swap directives in its configuration files since KMSF was introduced (D42.00)
Best Use of New Features (2 of 5)

• Highpin process support (RDF 1.6)
  – Control RDF process high/lowpin usage - alleviate pin pressure
  – RDF processes will run highpin when you start RDF subsystem from a highpin RDFCOM session

• Native SQL/MX table replication (RDF 1.6)
  – See dedicated chapter in RDF System Management Manual
  – Replication based on Guardian object names
  – Synchronize per Backup Restore 2 and select-insert based methods
  – Catalogs residing on primary and backup nodes should have different names
Best Use of New Features (3 of 5)

• Replication between S Series and NS Series
  – Requires that compatible but *different* versions of RDF be installed on the S and NS series nodes
  – Chart of compatible versions available via the Knowledge Base for NonStop support, KBNS: https://onepoint.nonstop.compaq.com/
  – S Series node should be primary system
Best Use of New Features (4 of 5)

• Use TAKEOVER trigger to automate user tasks during TAKEOVER and speed processing (RDF 1.7)
  – Trigger executes user script following successful completion
  – Use script to prepare environment for TAKEOVER app processing

• Use STOP RDF, REVERSE trigger for planned switchover (RDF 1.7)
  – Stops RDF subsystem, drains replication stream and executes user scripts to reverse replication
  – User must create required scripts for reverse RDF initialization and configuration
  – Improperly developed scripts or incorrect use of a reverse trigger could have adverse impact on database
Best Use of New Features (5 of 5)

• **STOP RDF, DRAIN (RDF 1.7)**
  - Drains replication stream prior to stopping RDF subsystem
  - Alternative for sites that currently use STOP TMF to stop RDF on earlier releases
  - Effective way to stop RDF when replication stream needs to be drained for non-shared access DDL operations
  - If application is not stopped, STOP RDF with the DRAIN option will not leave backup database in consistent state; for consistency use STOP UPDATE to a TIMESTAMP

• **ALTER PURGETIME (RDF 1.7)**
  - Setting PURGETIME will force purge pass and reset interval
  - Works if PURGETIME set to current configuration value
  - Use this method for image trail cleanup rather than manual methods employed on earlier RDF releases
Maximum Uptime Revisited (1 of 3)

• Sessions at ITUG 2004 available in archive: MEA-14-HP and MEA-10-HP (TMF)

• A few to keep in mind:
  – Optimal RDF performance requires healthy TMF configuration
  – Can change TMF FILESPERVOLUME parameter on fly for all RVUs
    • Note - FILESPERVOLUME 2 can cause TMF problem unless multiple ActiveVols
  – As of G06.24, can change audit trail FILESIZE while TMF is running
  – As of G06.26, can add TMF auxiliary audit trails while TMF started
    • Must stop/delete DataVols to move from one audit trail to another
Maximum Uptime Revisited (2 of 3)

- Initializing RDF to a point in time
- Getting correct value for INITTIME
- Managing RDF image trail files
- Correcting full image volume problem
- Using flexible online database synch
- RDF after TAKEOVER details
- Easier monitoring of RDF subsystem
Maximum Uptime Revisited (3 of 3)

• Myths Busted at ITUG 2004
  – “I don’t use RDF because it replicates database corruption”
  – “I don’t need RDF because I can recover from a system disaster with TMF tapes”
  – “I can perform a TMF File Recovery operation on my RDF backup node”
  – “RDF will synchronize my database magically”
  – “I can’t use SMF in my RDF environment”
  – “The AUDITTRAILBUFFER will improve RDF’s performance”
NonStop Business Continuity Strategy Summary

Provide high performance, reliable, NonStop to NonStop database replication products that:

- Allow smooth migration and upgrade
- Support no lost business in disaster events
- Provide zero lost transactions where required

Provide access to our partners who offer heterogeneous data transformation, and options for active-active and other features.
Thanks for attending

NonStop - we’re watching your back

www.hp.com/go/nonstopcontinuity

robert.loftis@hp.com