

COMPAQ

Inspiration Technology

Compaq NonStop™ Business Continuity Solutions

March 2002

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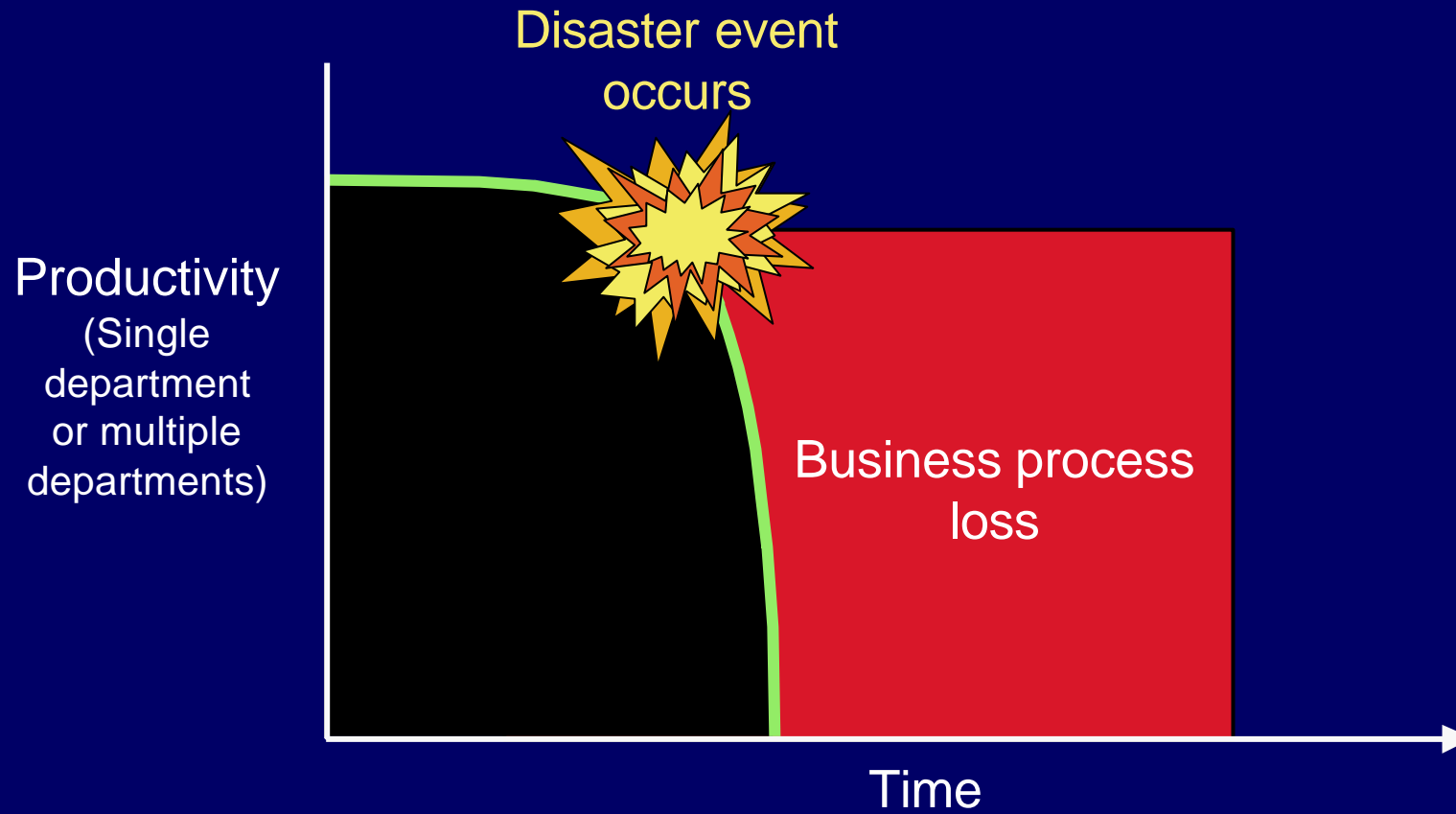
Agenda

- Business continuity vs. disaster recovery
- Compaq *NonStop*[™] Transaction Management Facility (*NonStop* TMF) software
 - Data protection and improved performance
- Compaq *NonStop* AutoTMF software
 - Protection for non *NonStop* TMF applications
- Compaq Remote Database Facility (RDF) software
 - World-class database disaster recovery
- Compaq *NonStop* AutoSYNC software
 - Synchronization of nondatabase files **Now FCS**

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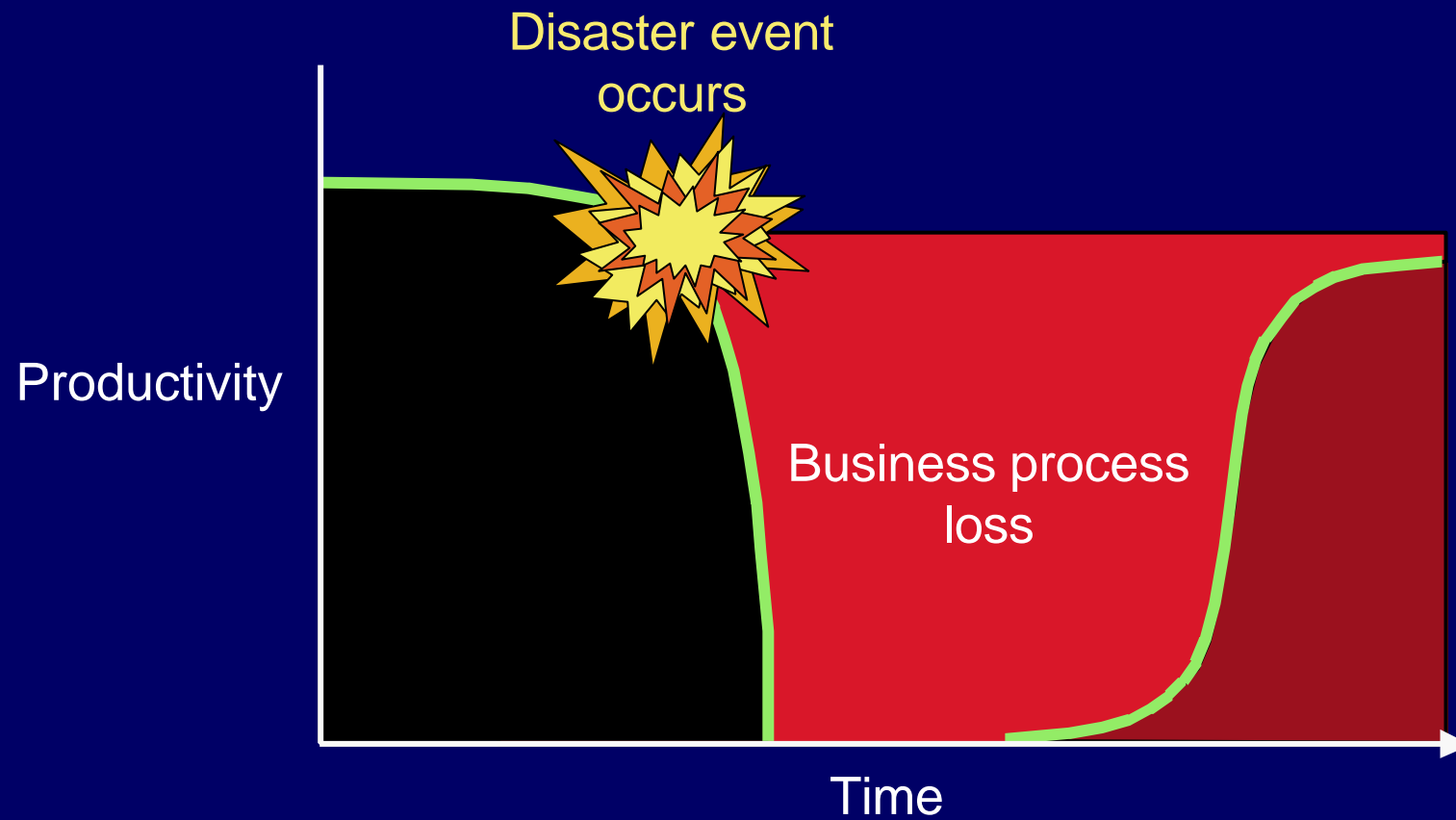


Something happens



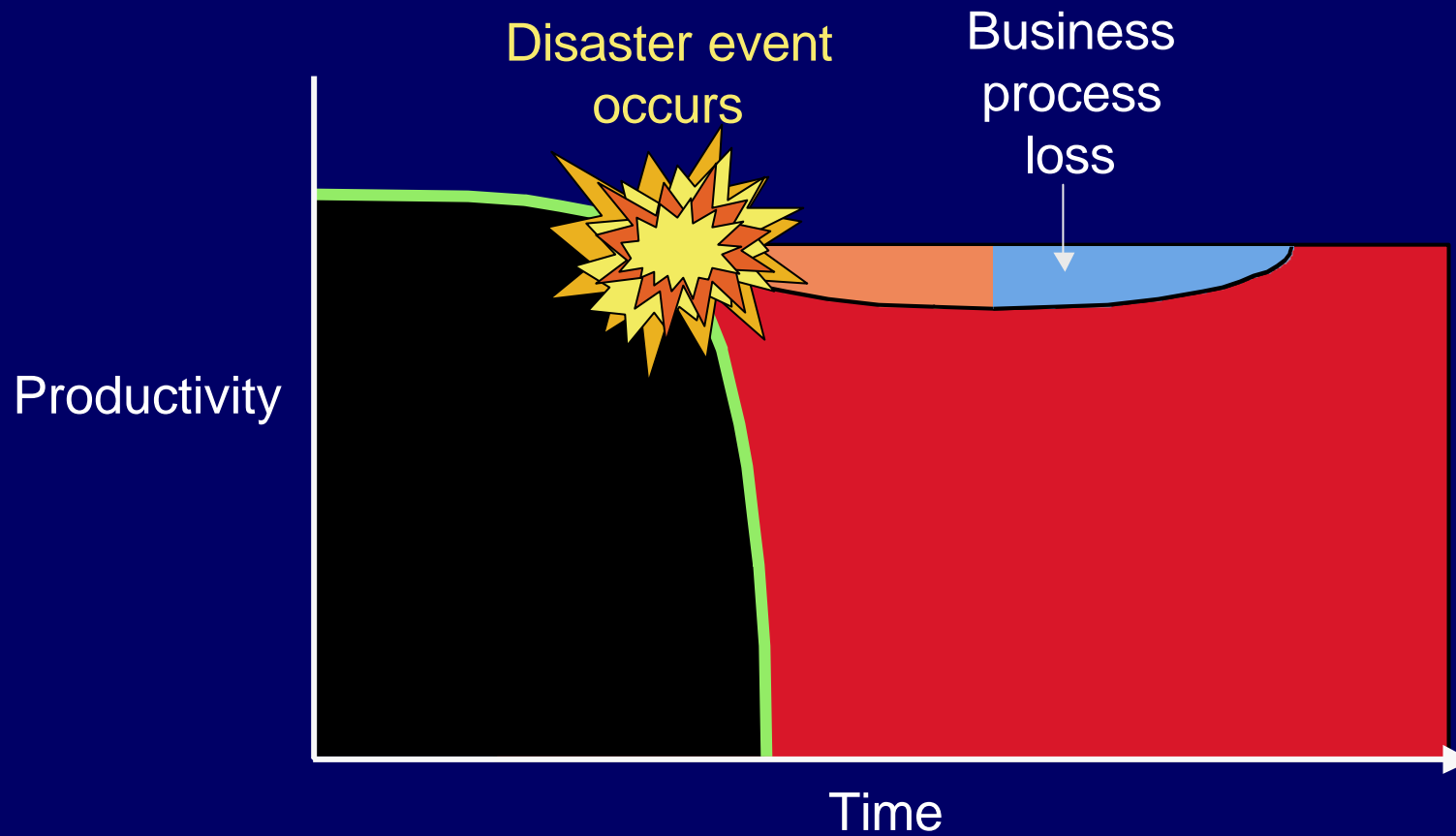
Source: DRII

Disaster recovery



Source: DRII

Business continuity



Source: DRII

Is this YOUR COMPANY?

Our Disaster Recovery Plan
Goes Something Like This...



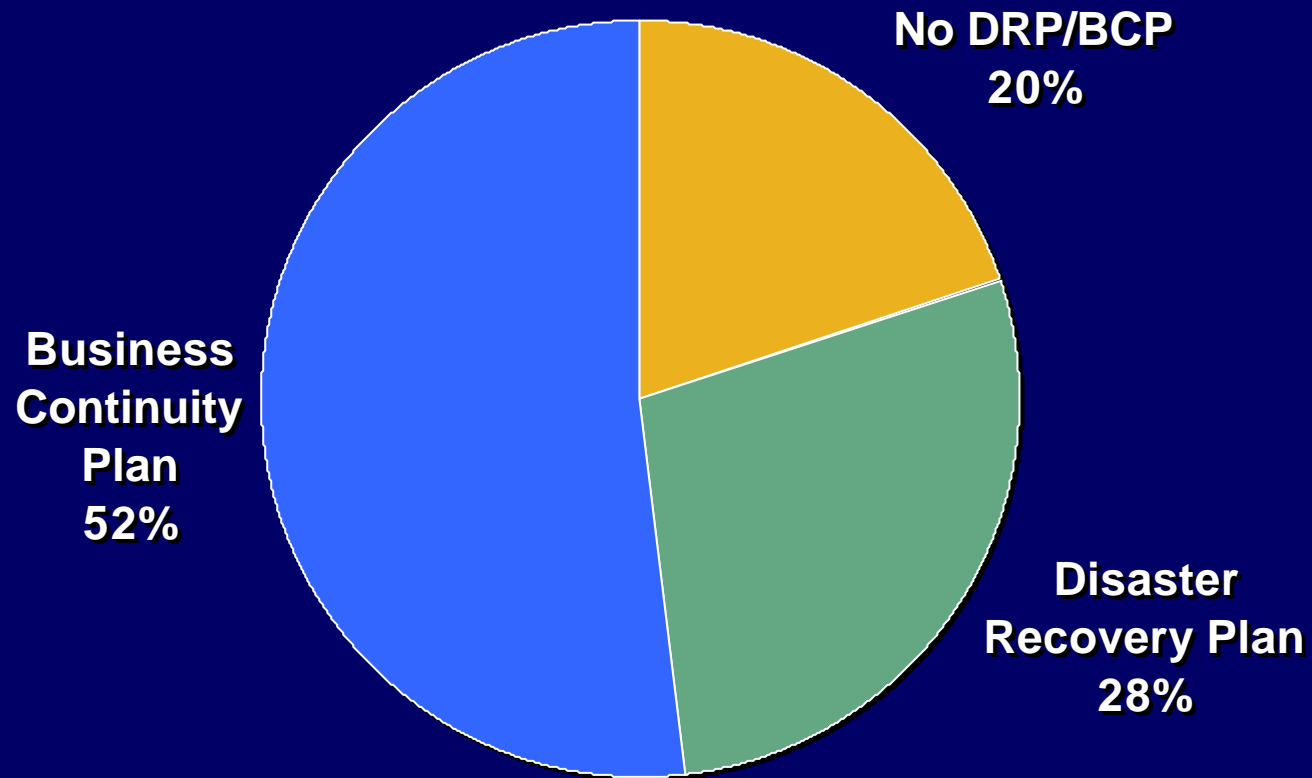
Courtesy of
DILBERT by Scott Adams

IT spending on business continuity



Source: Gartner 2001

Company Preparedness



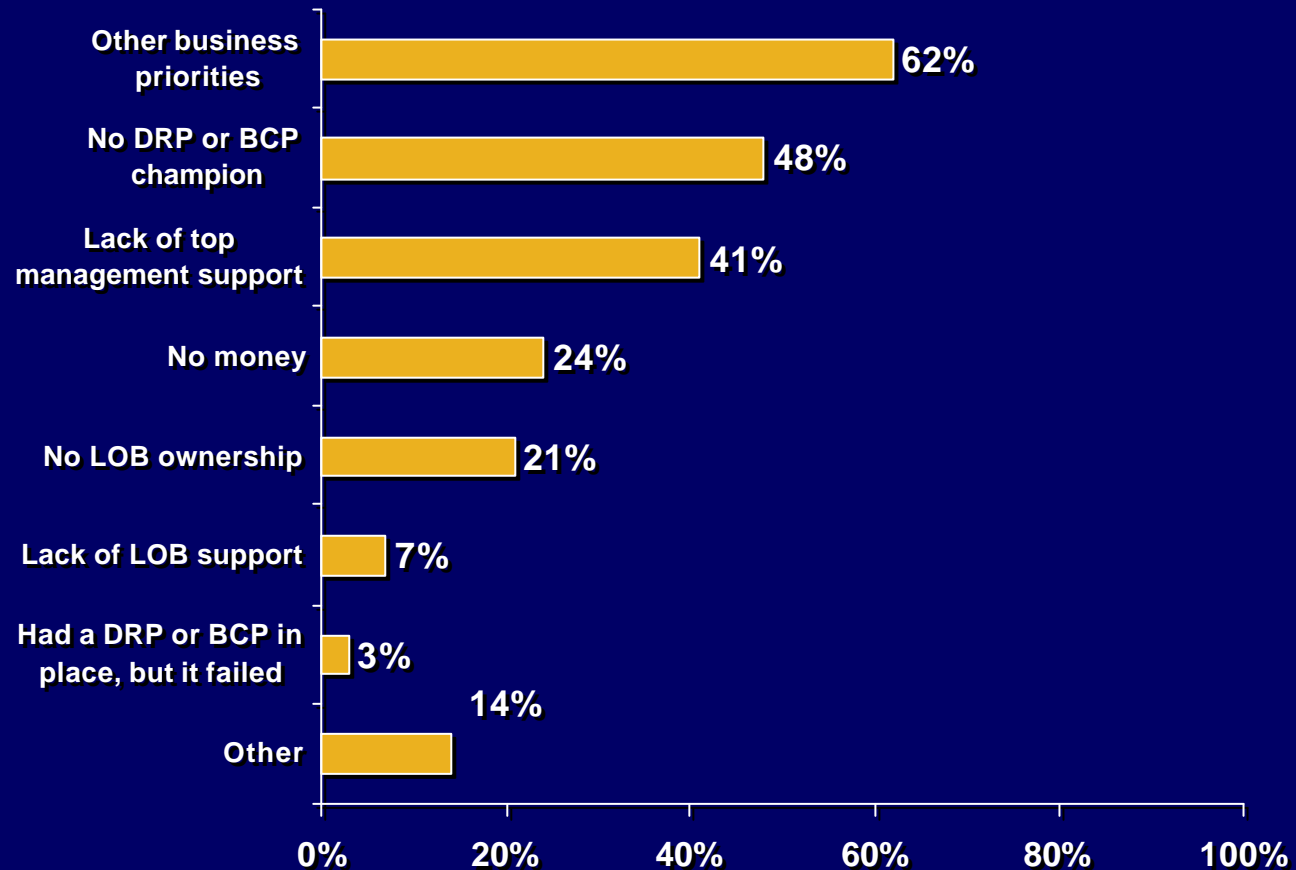
Source: Meta Group 2001

Canadian Survey – December 2001

- 80 CEO/CIO of 1000 largest companies
- Results:
 - 26% have no business continuity plan
 - 25% have no computer disaster recovery plan
 - 41% have no overall crisis management plan
- 36% believe recovery time **EXCEEDS** business critical needs

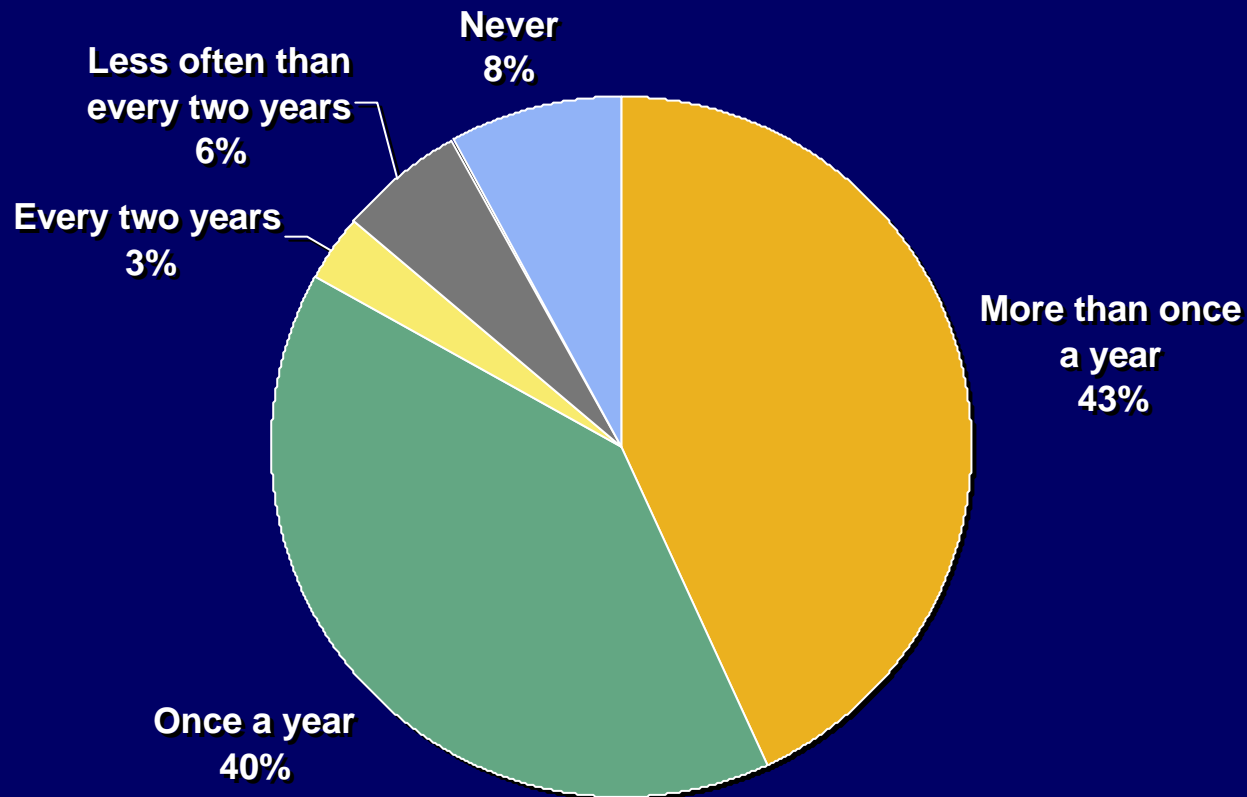
Source: Ernst & Young LLP 2001

Why Companies do not have Plans



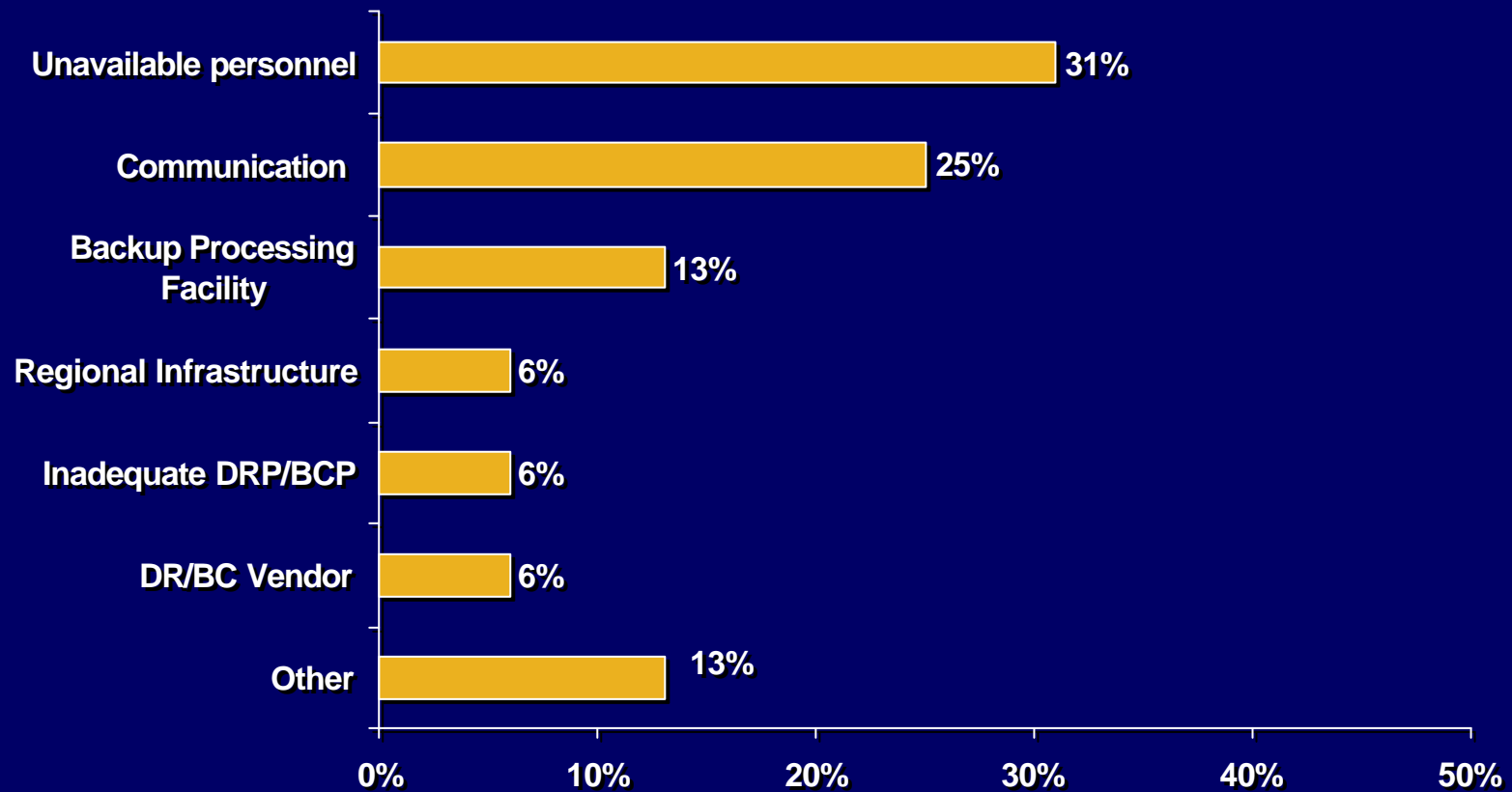
Source: META Group 2001

Frequency of Plan Updates



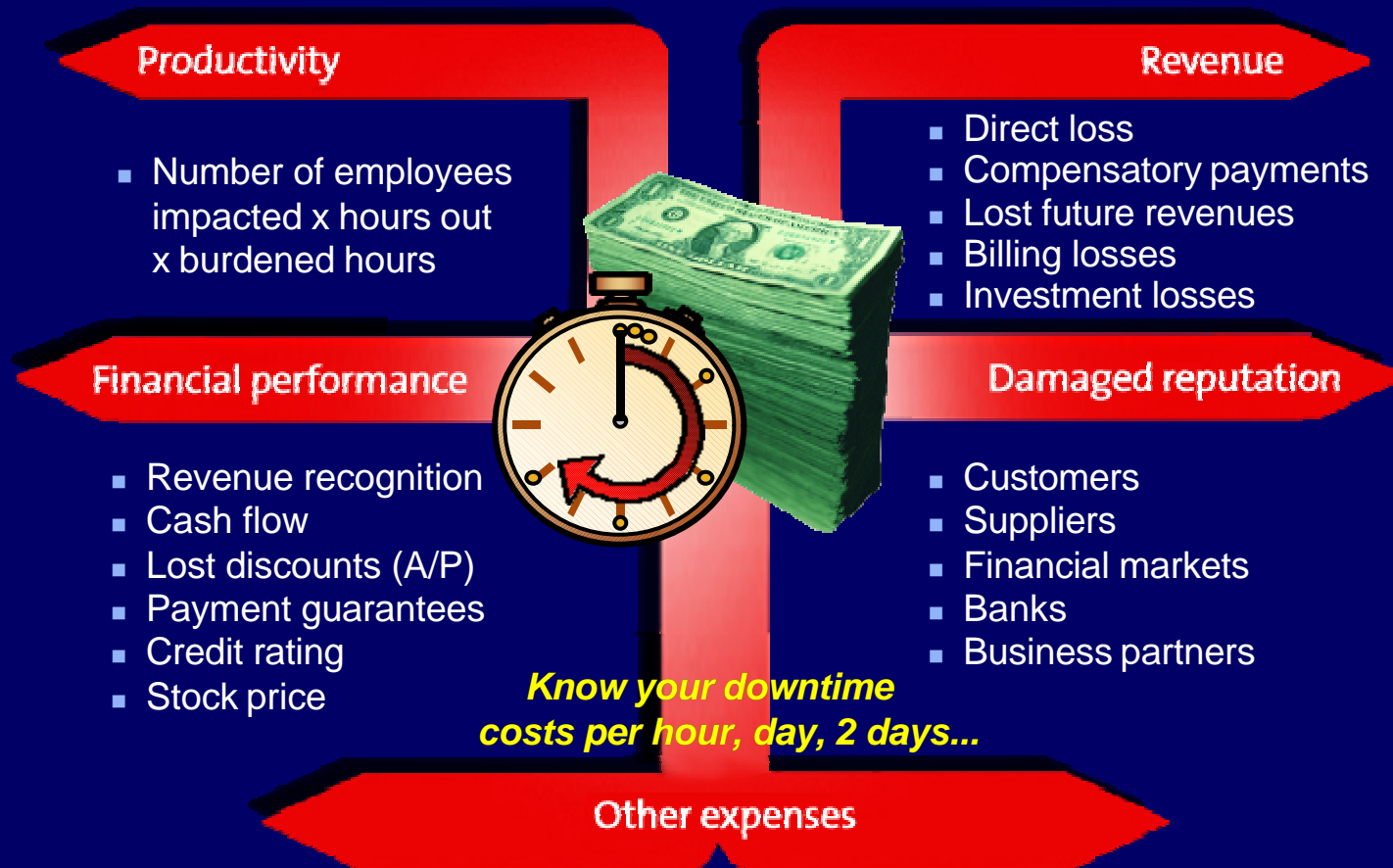
Source: META Group 2001

Obstacles to Recovery



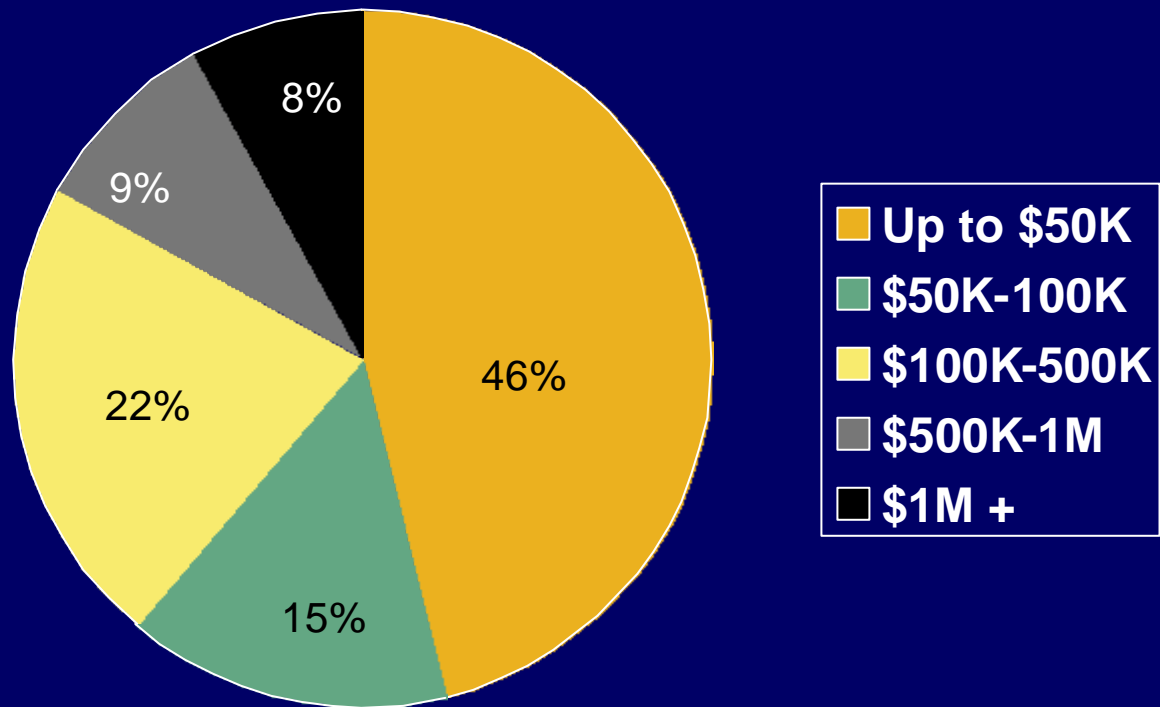
Source: META Group 2001

What is your cost of downtime?



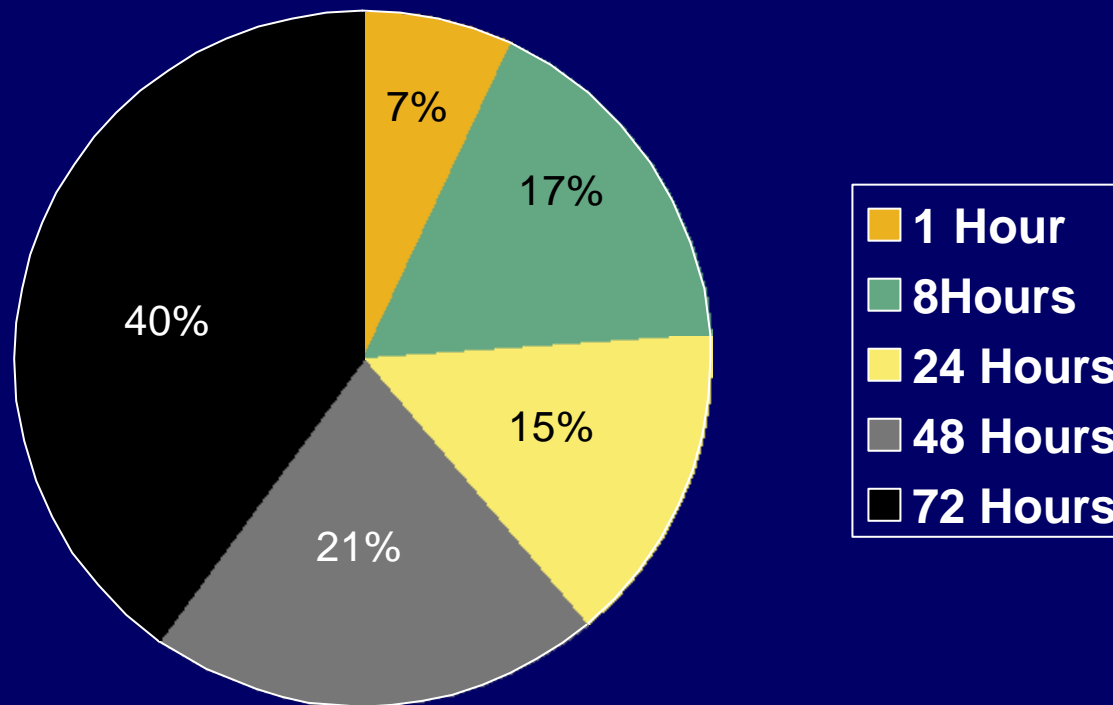
Temporary employees, equipment rental, overtime costs, extra shipping costs, travel expenses, etc.

Hourly Cost of Downtime



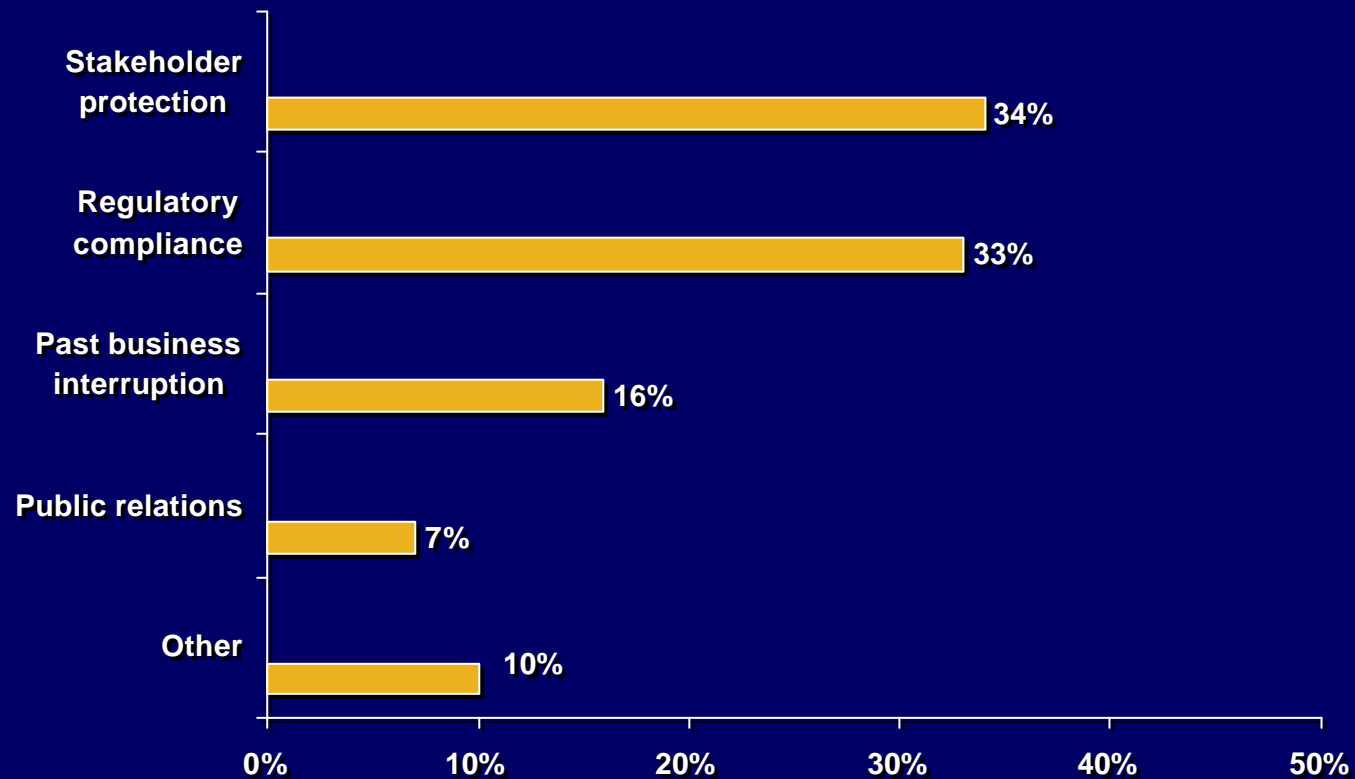
Source: Eagle Rock Alliance 2001

Company Survival Risk



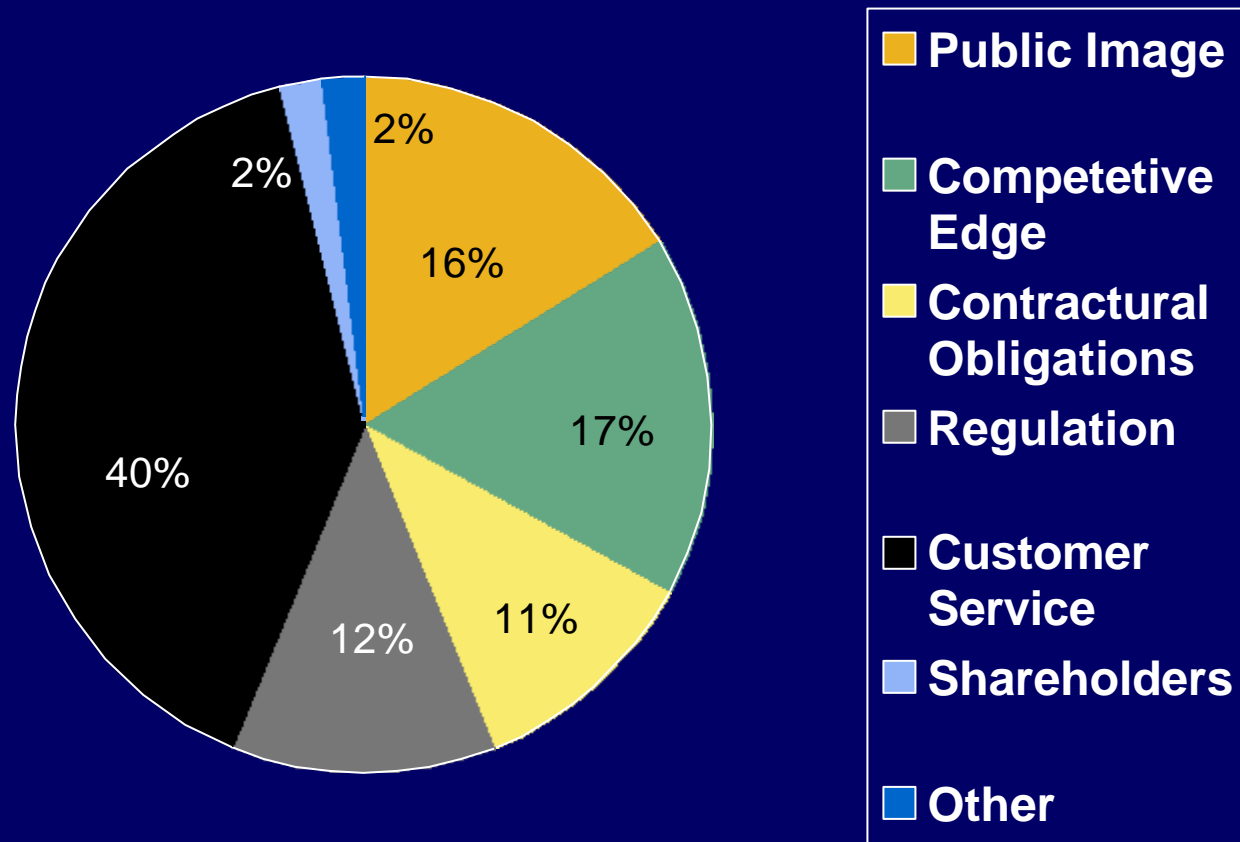
Source: Eagle Rock Alliance 2001

Why Companies have Business Continuity Plans



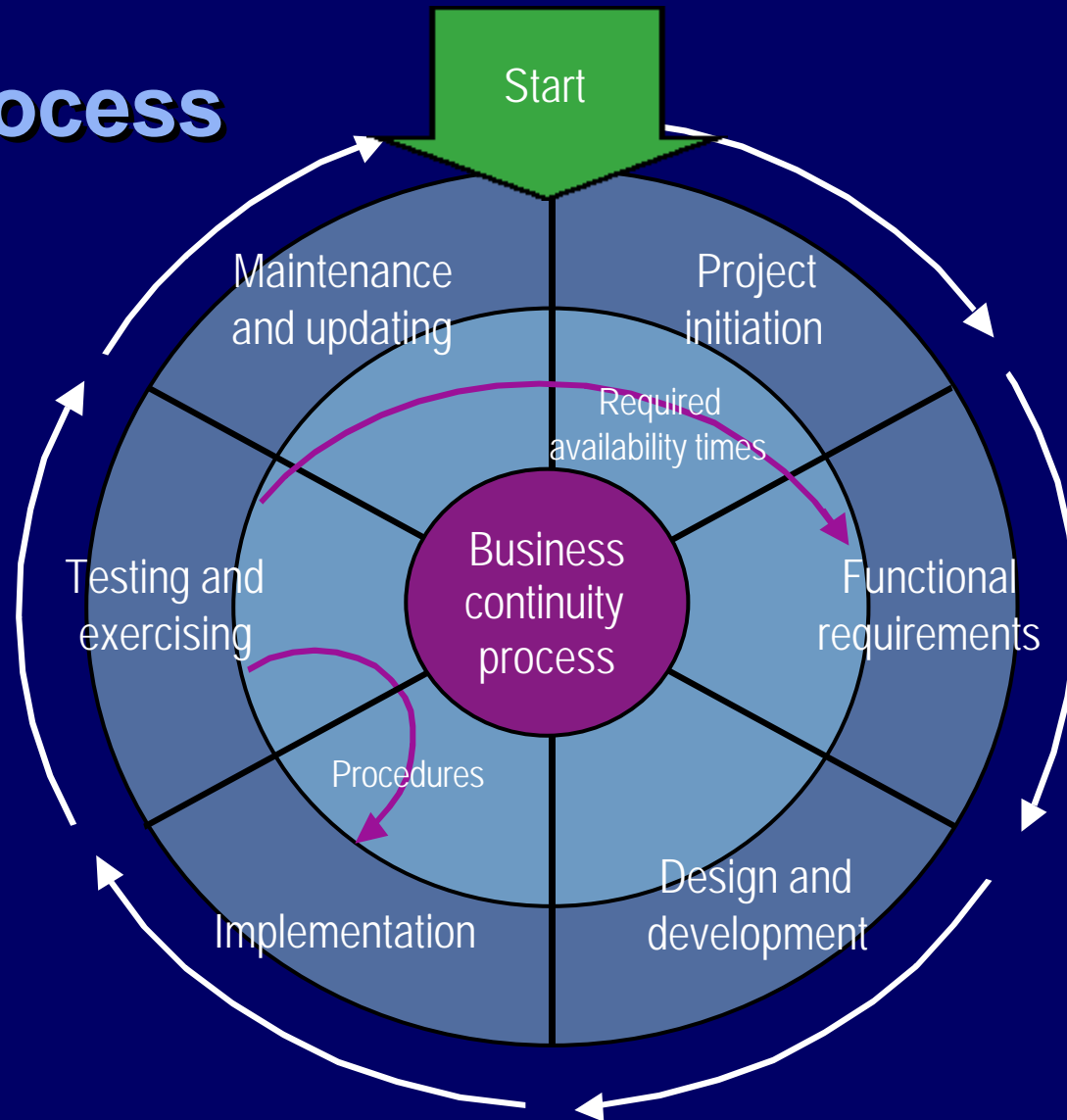
Source: META Group 2001

Company Survival Factors

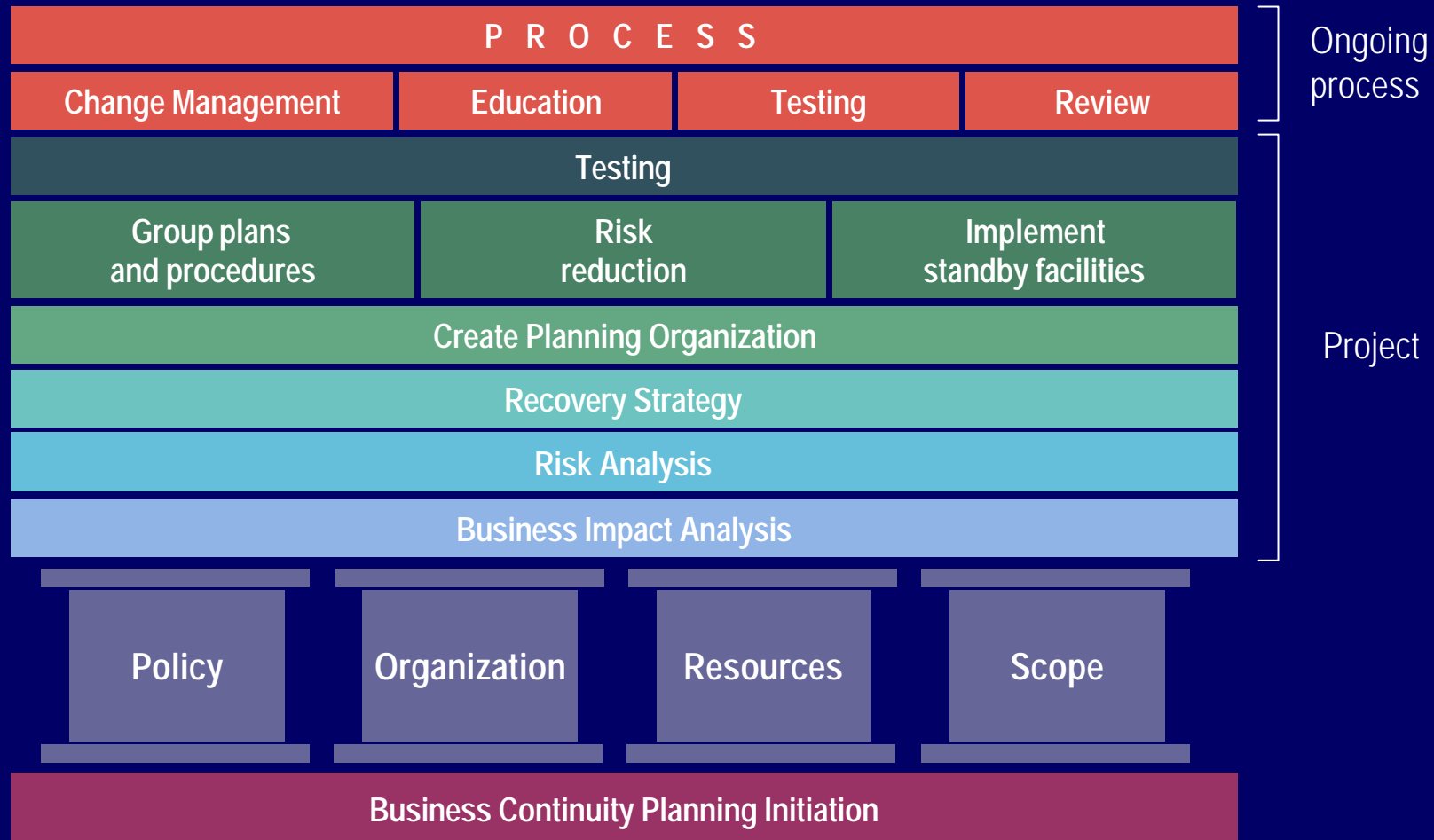


Source: Eagle Rock Alliance 2001

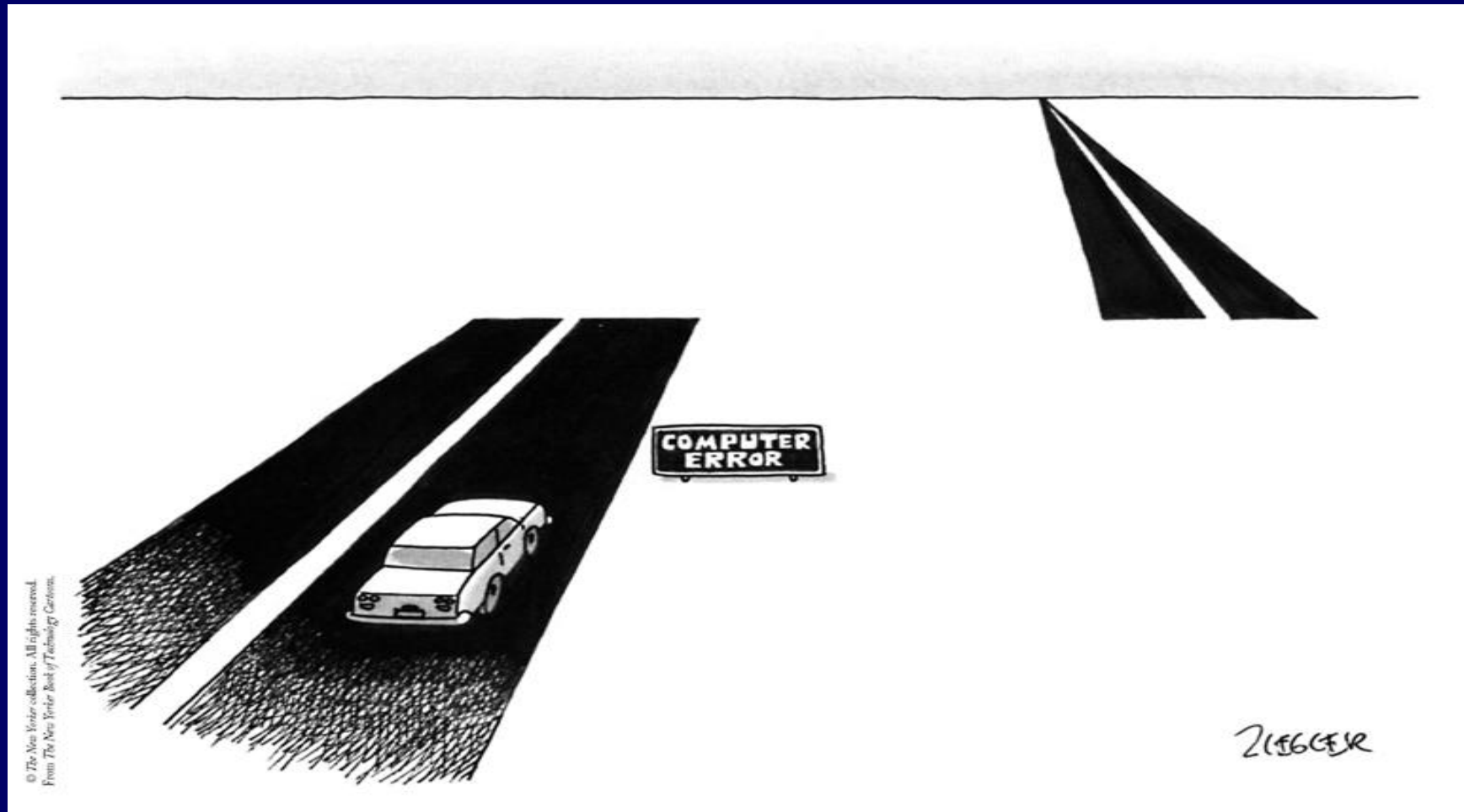
It's a process



Creating Business Continuity Plans



Business (dis) Continuity...



Integrated disaster tolerance and recovery products for the Compaq NonStop Himalaya™ server

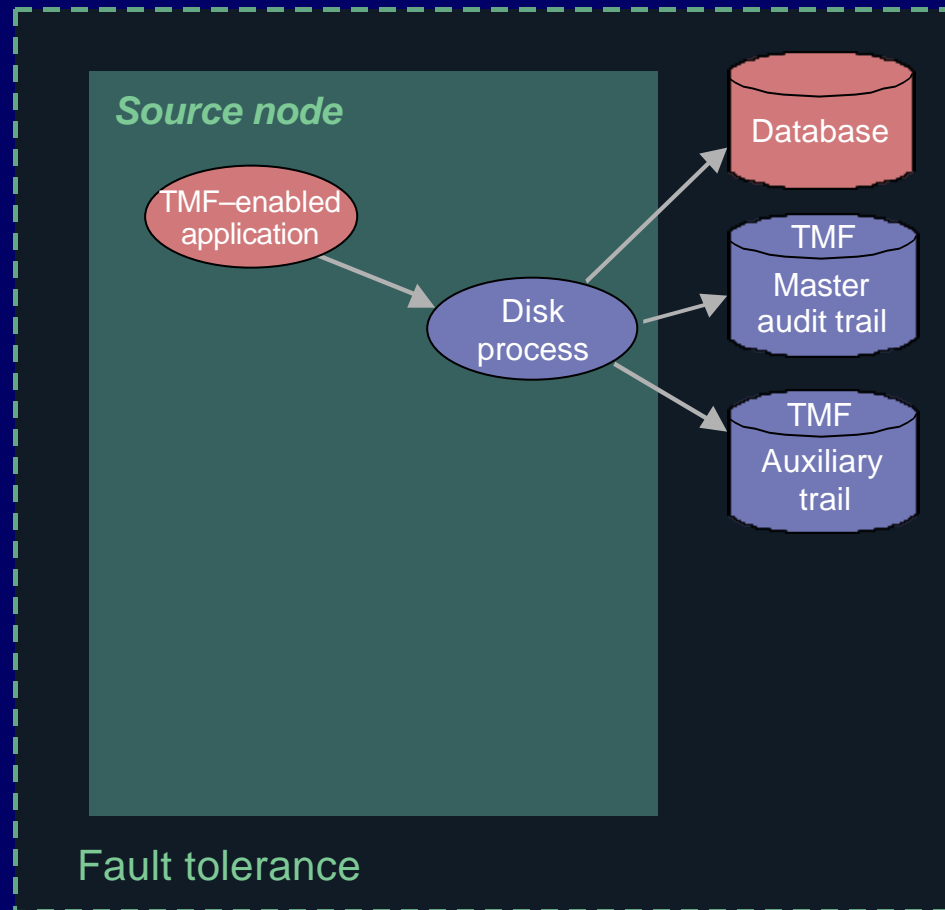
- *NonStop*™ TMF software
 - The foundation for transaction integrity and data protection
- *NonStop* AutoTMF software
 - Enables TMF for non *NonStop* TMF applications
- RDF software
 - High-performance database replication
- *NonStop* AutoSYNC software—new (FCS March 2002)
 - Synchronizes nondatabase files

Compaq NonStop™ Transaction Management Facility

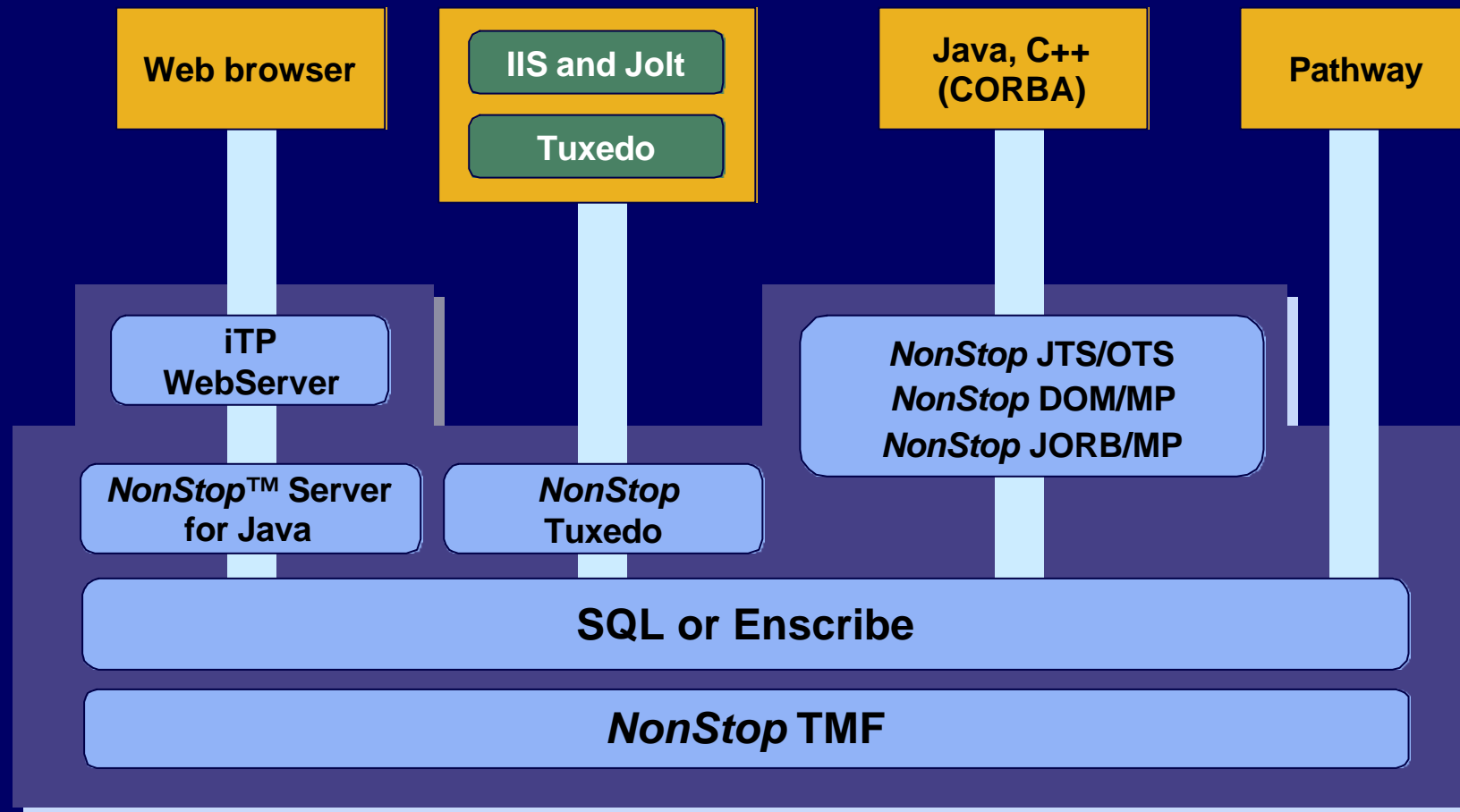
What is NonStop TMF software?

- *NonStop*TM TMF is a fault-tolerant disk and transaction manager that guarantees transaction atomicity and database integrity
 - All database modifications are captured in the *NonStop* TMF audit trail
 - Before and after images efficiently captured
 - Guaranteed log of database changes
 - Audit trail can be used to replicate and rebuild the database
 - If any part of the transaction fails, the entire transaction fails

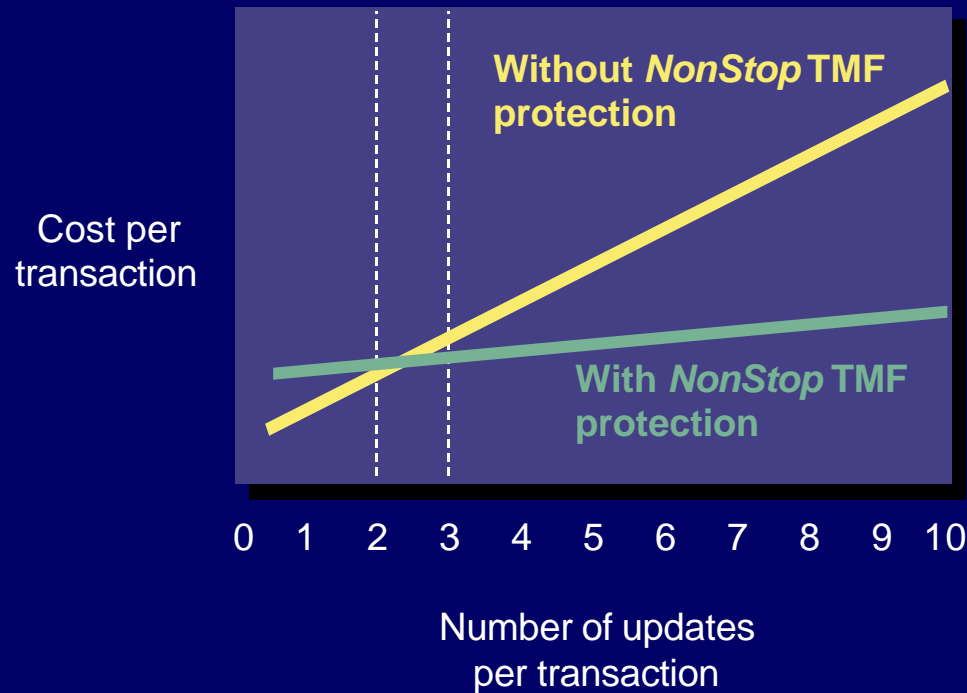
NonStop TMF



Single, consolidated audit log



Performance with NonStop Tmf protection



Apparent paradox:
 Why do you get better performance with *NonStopTM* Tmf than without?

Answer:
 More advanced buffering, fewer and more optimized DB disk writes, and serialized AT writes.

What can NonStop TMF do for an application?

- *NonStop*TM TMF software is the foundation for any 24 x 7 IT operation
 - Database reorganization, partition split/merge/move, and backup to disk or tape with zero application downtime
 - Near real-time replication to a backup system
- Online database backup
 - One block split can ruin your whole day
 - Do you run tape retrieval and restore tests?
- Recovery from accidental or intentional database modification
 - Part or all of the database can be recovered to a point in time, including to just before that “drop table” command
 - Using third-party tools, accidentally deleted records can be reinserted

Compaq NonStop™ AutoTMF

The problem: Protection for non NonStop TMF applications

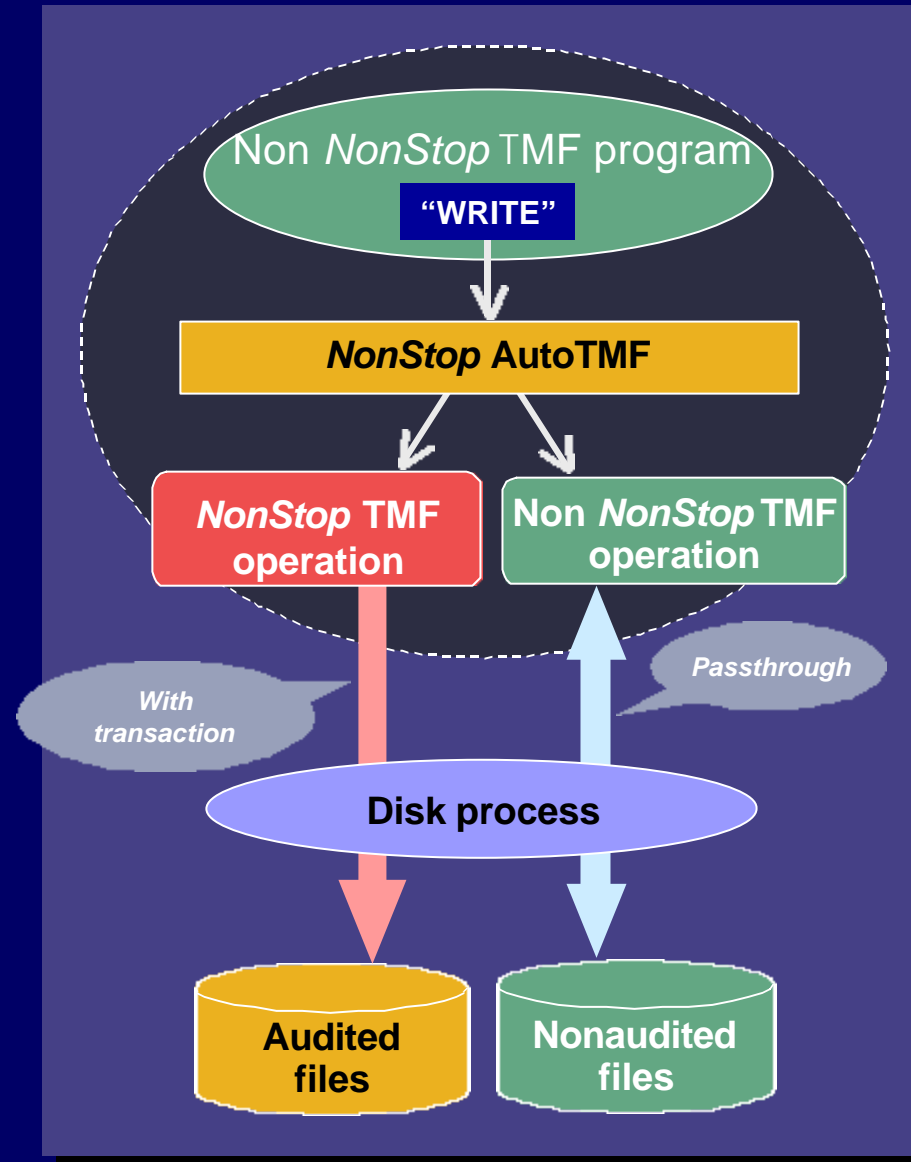
- *NonStop*[™] TMF has great advantages
 - Online backups for 24 x 7 availability
 - Data recovery
 - Improved application performance
- Nearly half of the existing applications on *NonStop Himalaya*[™] systems are not coded to use *NonStop* TMF
- Even most *NonStop* TMF–enabled applications do not protect all files
 - Leaves a hole for replication and disaster protection
- Reprogramming an application is daunting and risky
- Development dollars better used for new features
- RDF requires *NonStop* TMF to provide guaranteed replication

The solution: NonStop AutoTMF

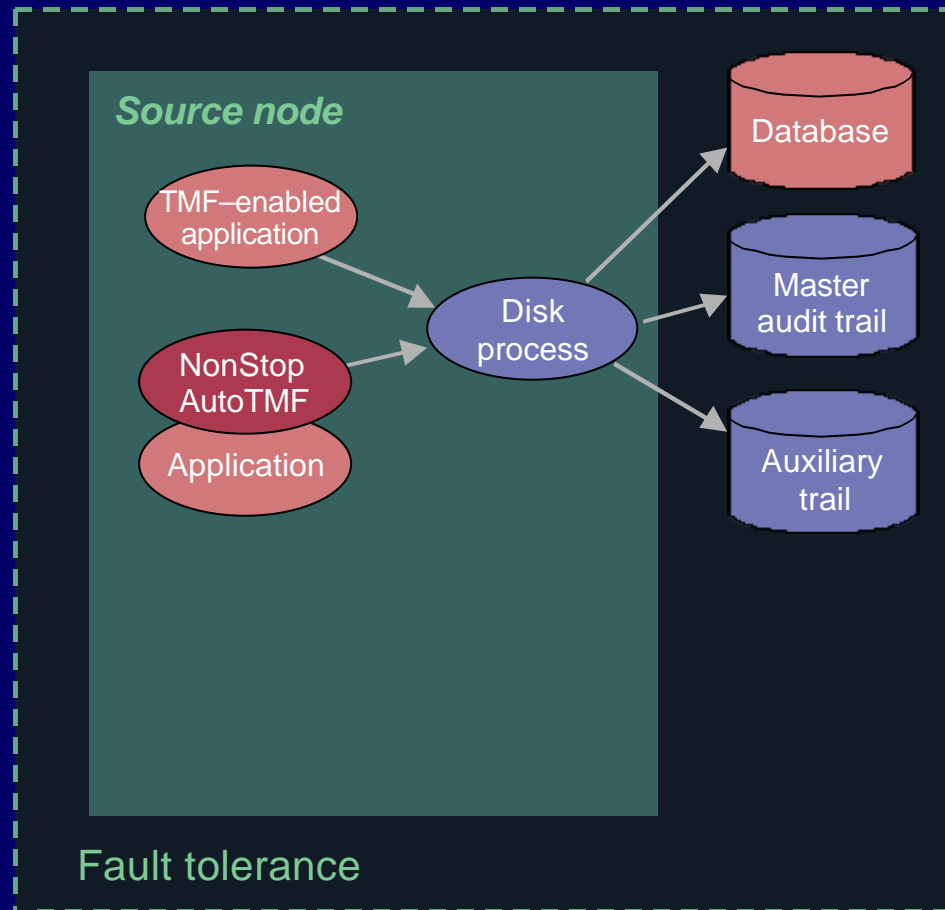
- Enables *NonStop*[™] TMF and RDF protection for non *NonStop* TMF–enabled applications
- Quick, easy, low-risk implementation
 - Simple preparation of object files
 - Provides automatic *NonStop* TMF transactions for audited files
- No change to application, RDF, *NonStop* TMF, or DP2
- No privileged code, no SYSGEN required
- Data consistency same or better than pre-AutoTMF application
- Developed by Carr Scott Software

NonStop AutoTMF runtime

- Intercepts file system and *NonStop*TM TMF calls
 - Implemented as a user library
- Operations on nonaudited files are passed through
- Automatic transactions are triggered by operations that require a transaction
- Designed for performance
 - Files are buffered
 - Efficient block splits
 - Many updates per transaction



NonStop AutoTMF runtime



NonStop TMF and NonStop AutoTMF performance

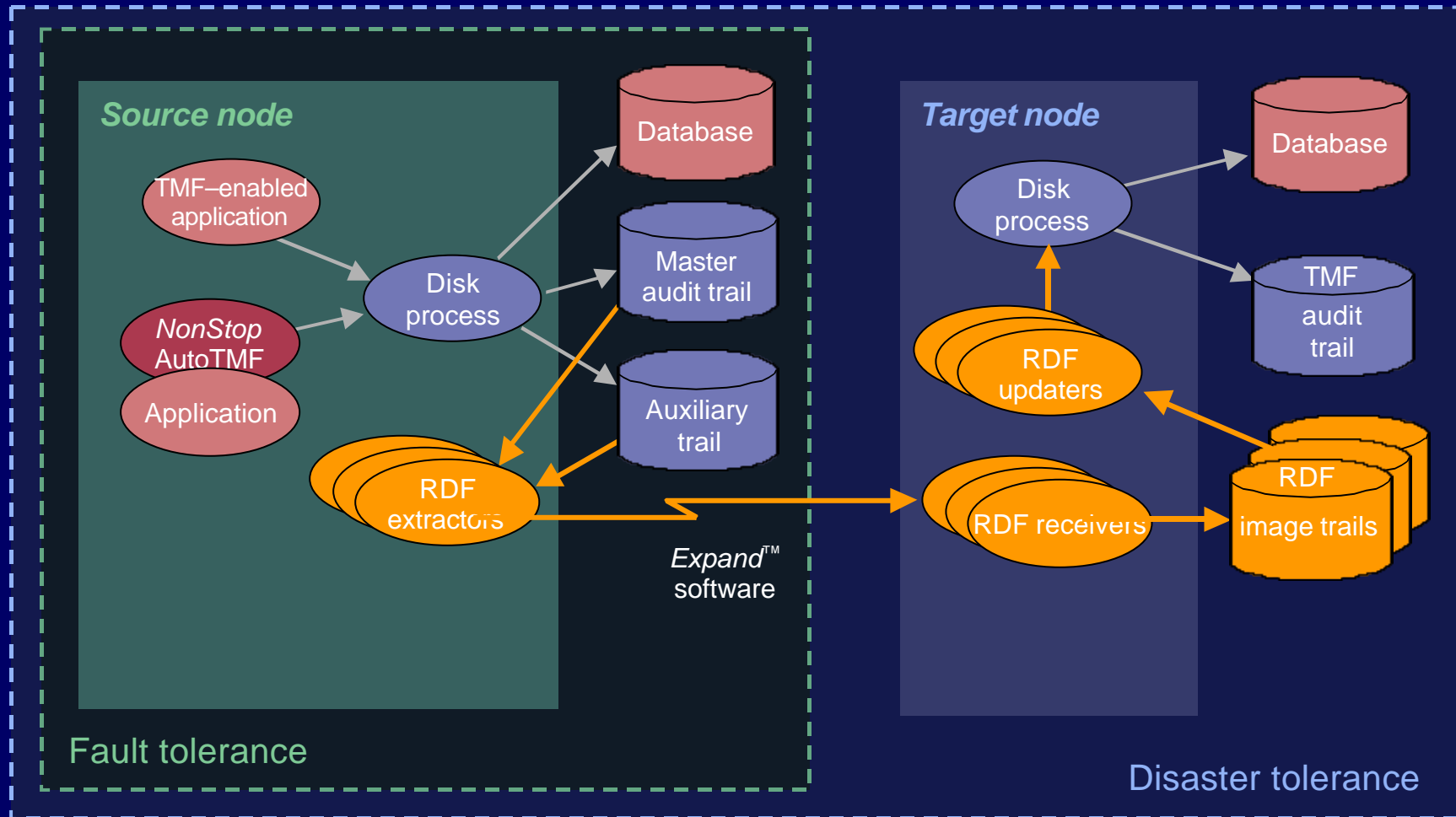
- *NonStop™* AutoTMF is optimized
 - Low overhead and minimal operations requirements
 - Data consistency same or better than pre-AutoTMF application
- *NonStop* AutoTMF performance is TMF performance
- *NonStop* TMF activity is optimized
 - Minimizes number of transactions—several inserts/updates per transaction
 - Parallelism when multiple (separate) transactions are configured
 - No-wait transactions
 - User configurable

Compaq Remote Database Facility

What is RDF software?

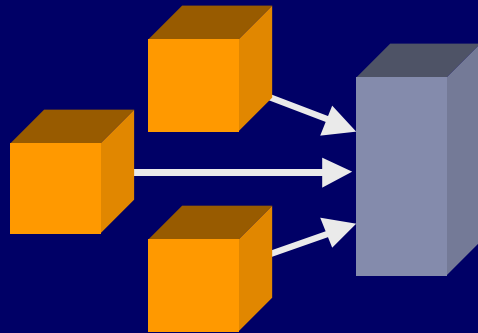
- High-speed, low-latency database replication software
- Peer-to-peer for Compaq *NonStop*[™] *Himalaya*[™] servers only
- Focused on disaster protection capability
- An integral element of the Indestructible Scalable Computing initiative

NonStop TMF and RDF software: Unbeatable for NonStop Himalaya™ system-to-system replication

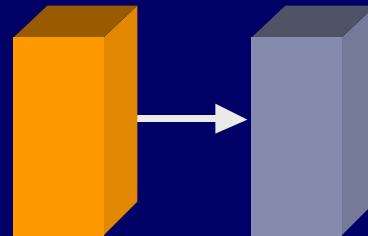


Some RDF topologies

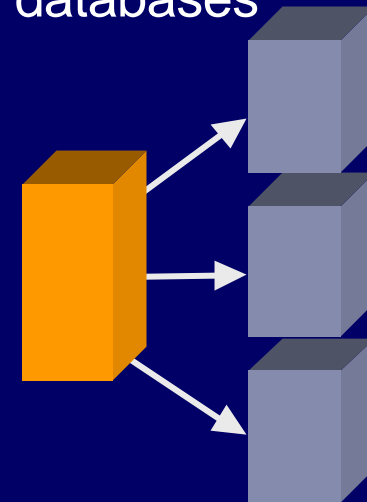
Centralized



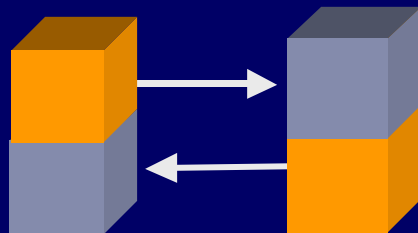
Simplex



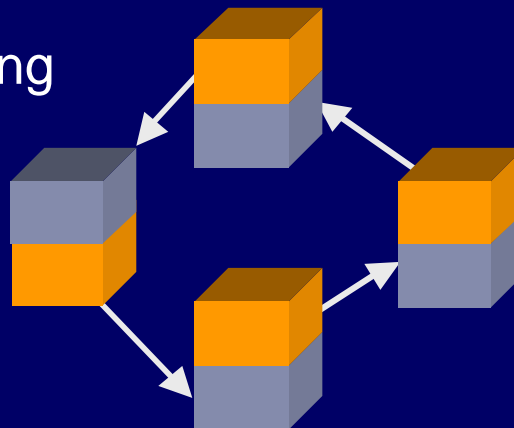
Multiple duplicate databases



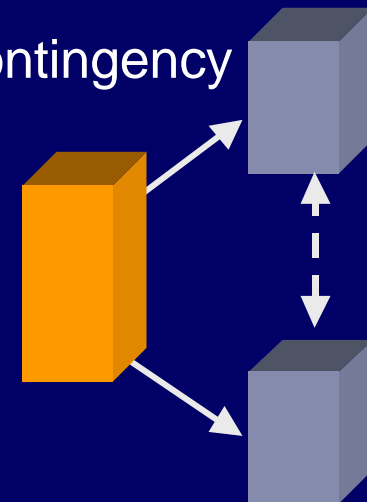
Reciprocal



Ring



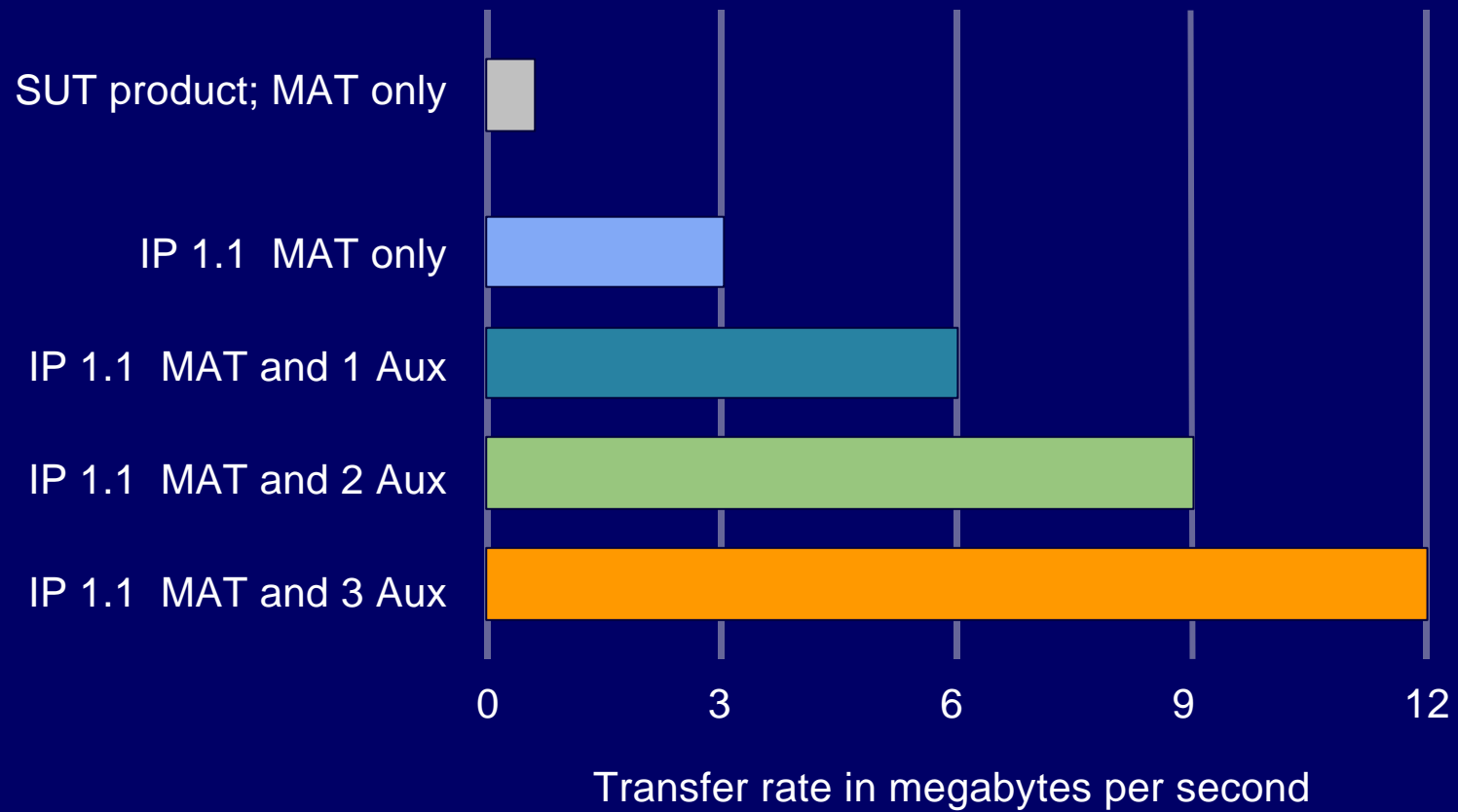
Triple contingency



RDF Independent Product (IP)

- Third generation released on CD, not tied to operating system releases
- IP Version 1.2 released June 2001
 - Network transactions (RDF/IMPX only)
 - Accelerated objects
- IP Version 1.3 released September 2001
 - Process lockstep (RDF/IMPX only) – **Application change required**
 - Compaq ASAP Release 2 software
 - SQL Format 2 (big) files
 - Enscribe Queue files

RDF performance

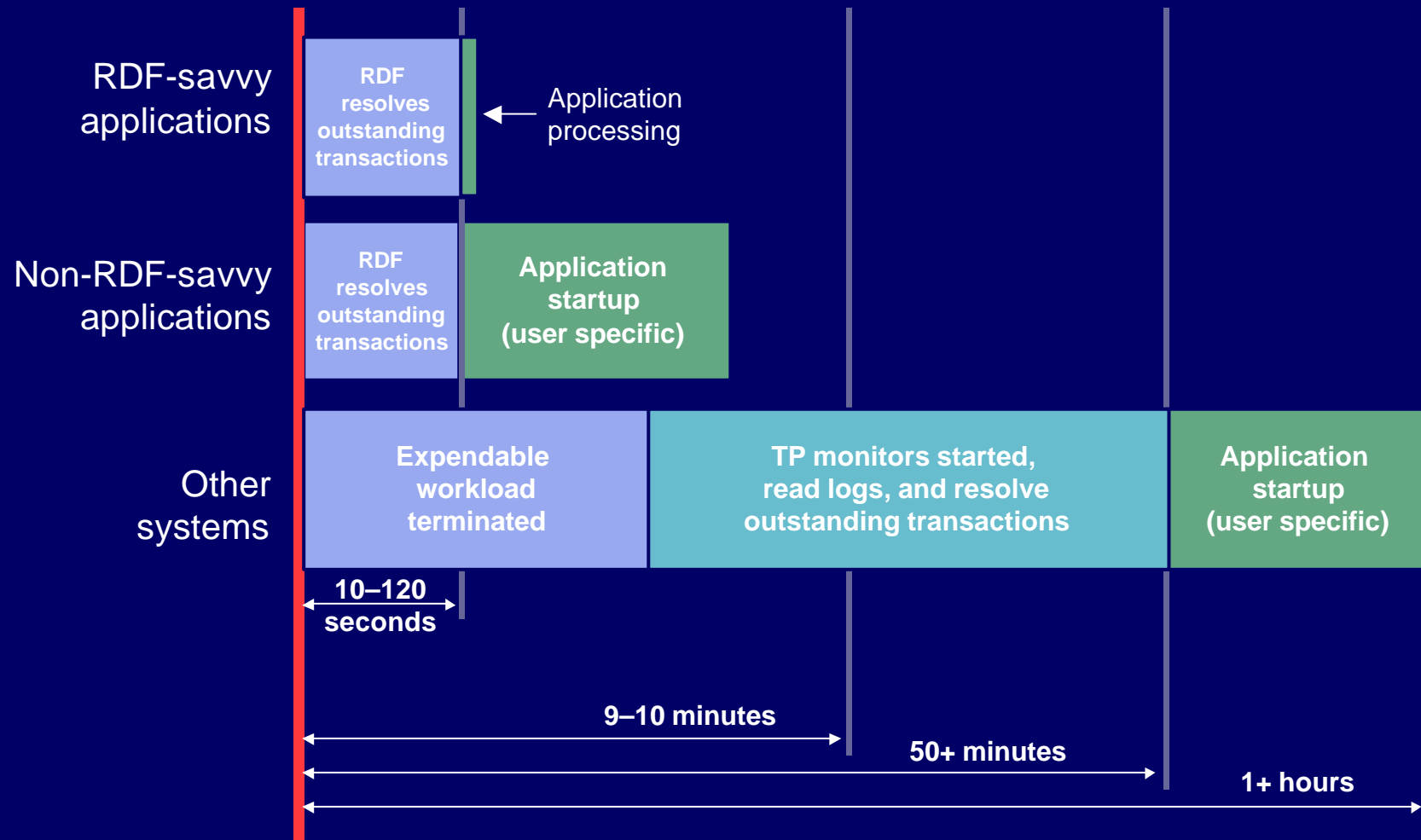


RDF Independent Product

- IP version 1.4 – Planned for FY'02
- **Projected** feature set – No promises!
 - > 255 volumes (SA44V1 only)
 - SMF support – Virtual volumes spanning multiple physical volumes
 - Superfast takeover documented – **Application change required**
 - SQL shared access support in Aux trails
 - Online partition split/merge/move
 - Fast file comparison

Backup system takeover timeline

Primary site fails

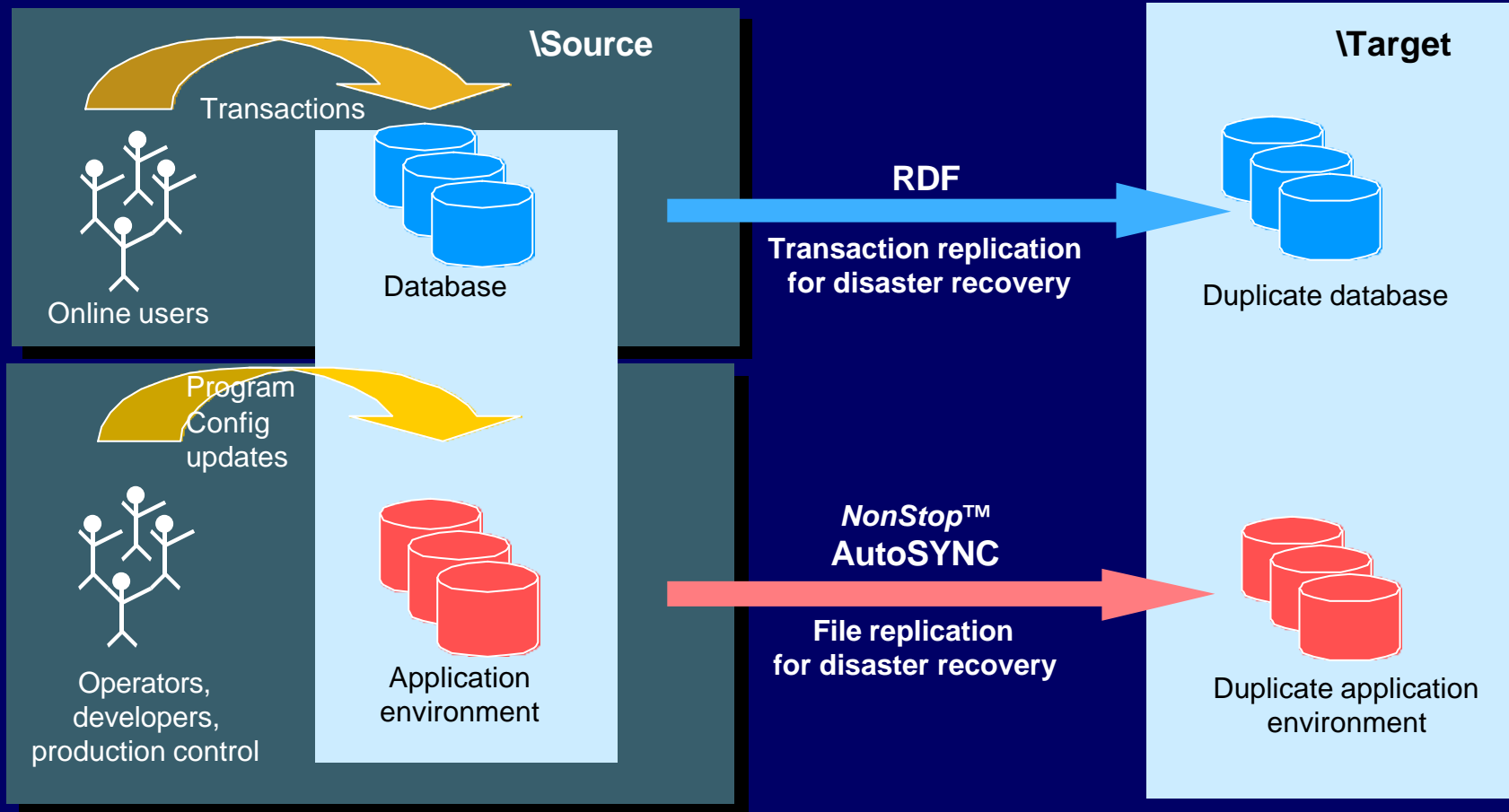


Compaq NonStop™ AutoSYNC

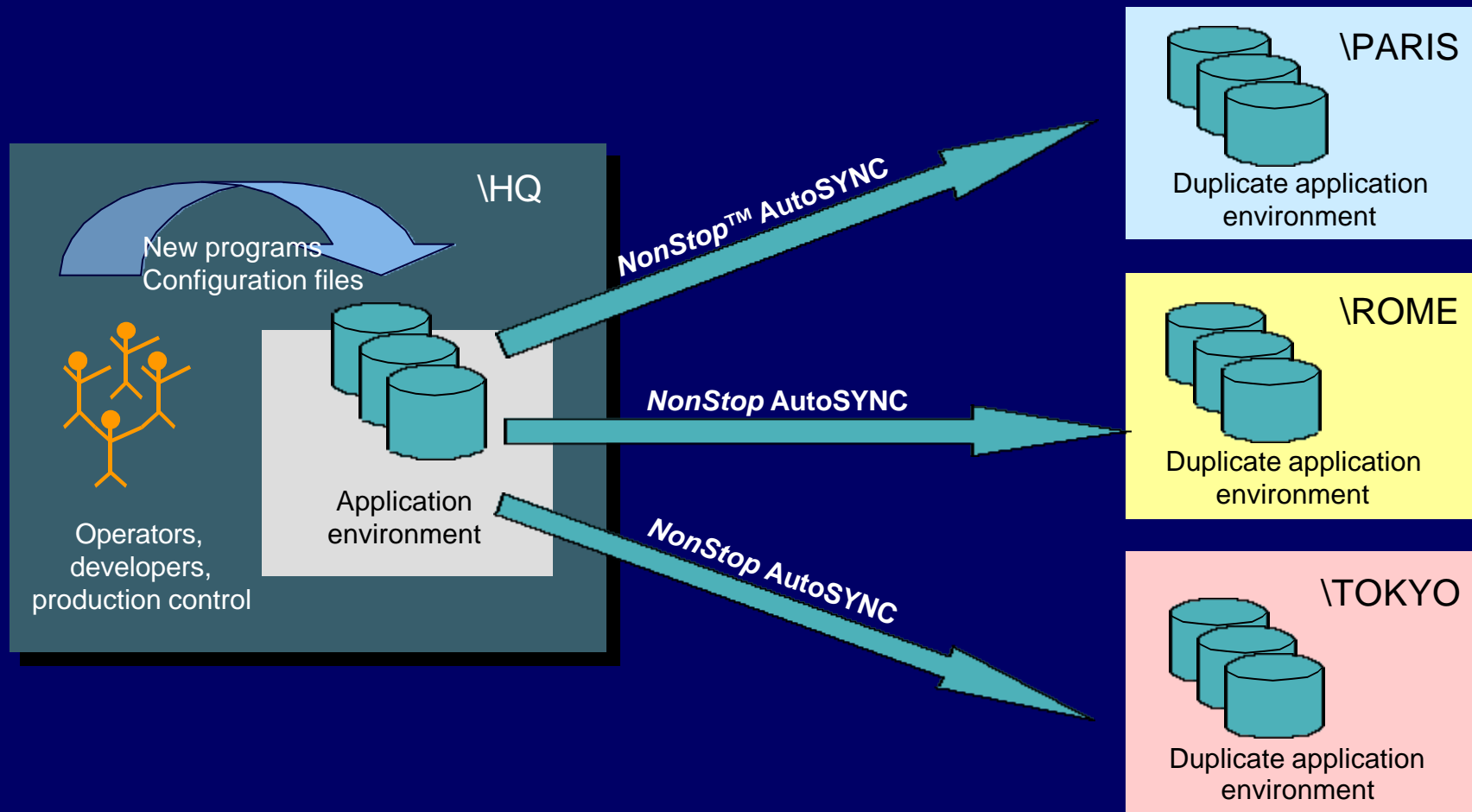
NonStop AutoSYNC software

- Nondatabase file replication
 - Auditing often impractical or impossible
- Synchronizes file sets between Compaq *NonStop™ Himalaya™* servers
- Replication of entire files, not record changes
- Complements RDF and other replication products
- Easy to install and manage
 - Completely automatic: “set it and forget it”
 - Fault tolerant and highly reliable
- Primary uses
 - Completes disaster protection environment
 - Automated operations support
- Developed by Carr Scott Software

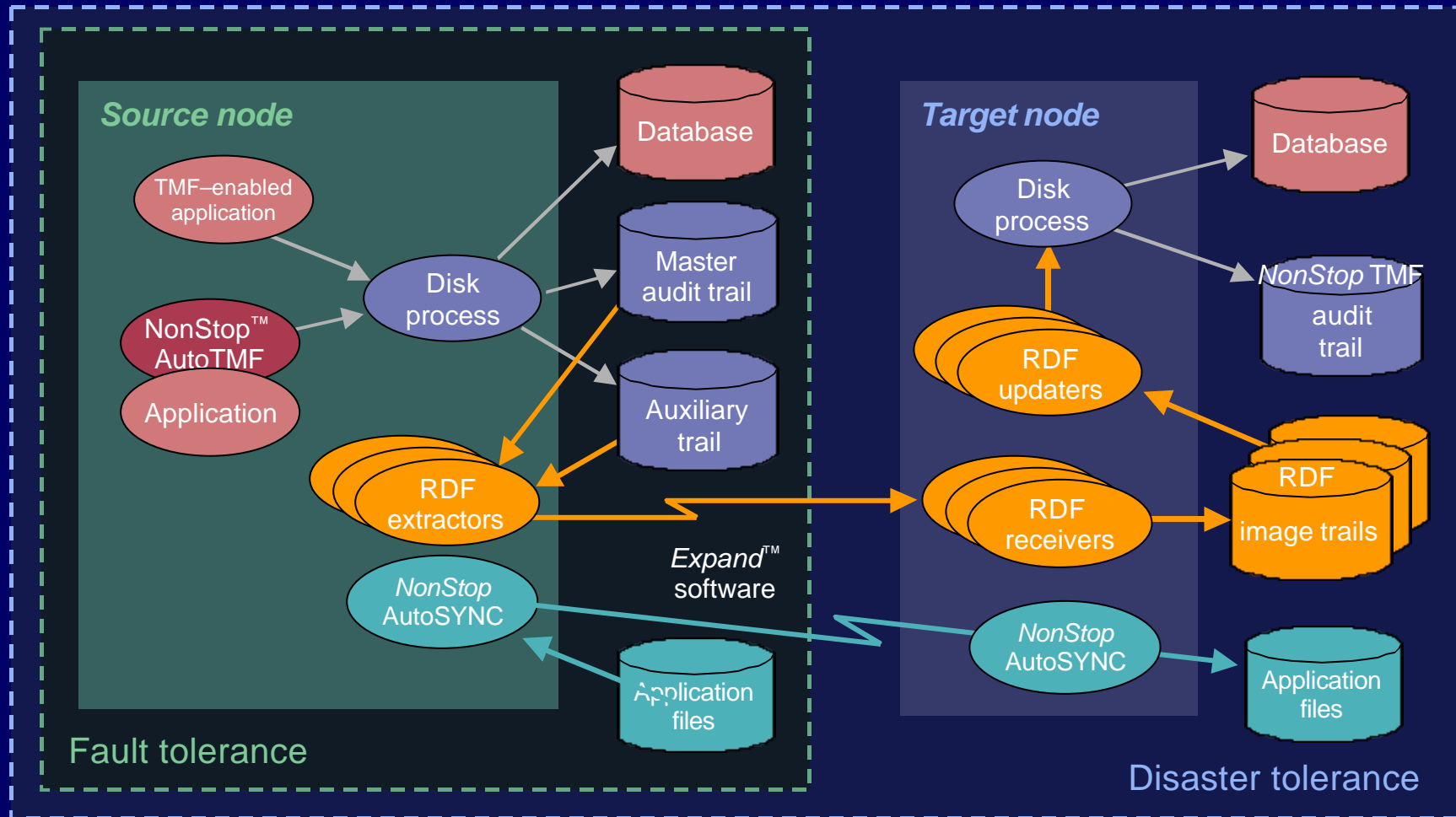
NonStop AutoSYNC for nondatabase file replication



NonStop AutoSYNC for software distribution



How it all fits together



Database Replication Partners

- Golden Gate Software (Extractor/Replicator)
 - Distributed by Insession Technologies
- ITI (Shadowbase3)
 - Direct in NA, multiple distributors WW
- Network Technology (DRNet)
 - Direct in NA, multiple distributors WW

	<u>RDF</u>	<u>E/R</u>	<u>S/B3</u>	<u>DRNet</u>
TMF Apps	Yes	Yes	Yes	Limited
Non-TMF Apps	W/Auto TMF	Yes	W/Auto TMF	Orig
X- plat rep	No	Yes	Yes	No

Summary

- Continuity planning and disaster protection is increasingly important
- It has become central to Compaq *NonStop*[™] *Himalaya*[™] server focus
- Compaq products and services provide powerful business recovery tools
- Continuing investment and enhancements
- **The best is yet to come!**

For more information...

- Useful URLs

- External: <http://nonstop.compaq.com/continuity>
- Internal:
http://himalaya.inet.cpqcorp.net/view.asp?PAGE=RDF_SW

- Contacts

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- Harry Scott, +1 (781) 924 0989
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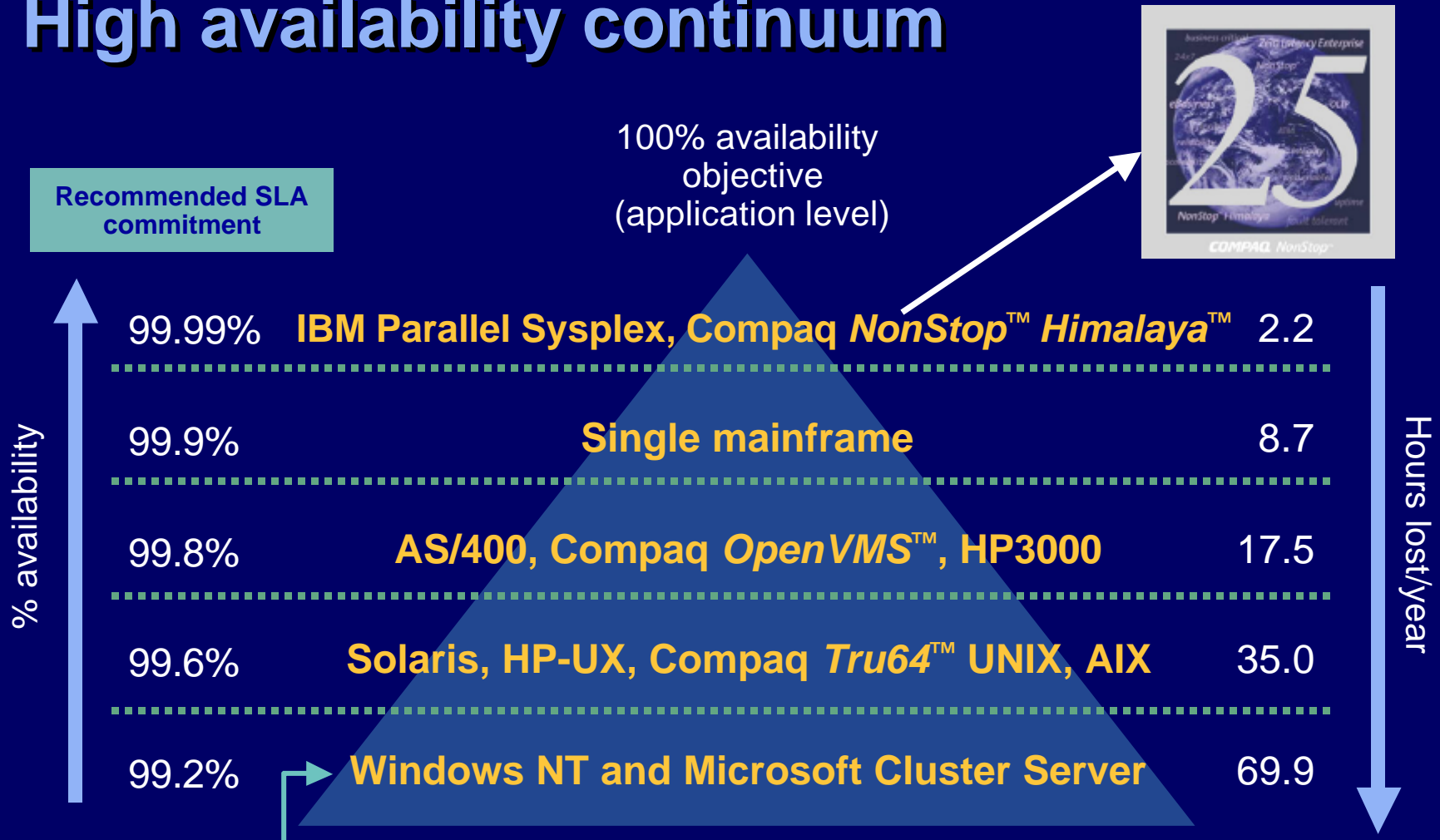
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Backup slides

Continuous availability: The bottom line

- It's the user's point of view that counts
 - Is the application available to me?
 - Is its response time acceptable?
 - Is my data correct and consistent?
- Customer responsibilities
 - Implement operational best practices
 - Develop business continuity plans
- How Compaq can help
 - Compaq *NonStop™ Himalaya™* systems and software
 - Global Services (Compaq and partners)

High availability continuum



Recommended SLA commitment

100% availability objective (application level)

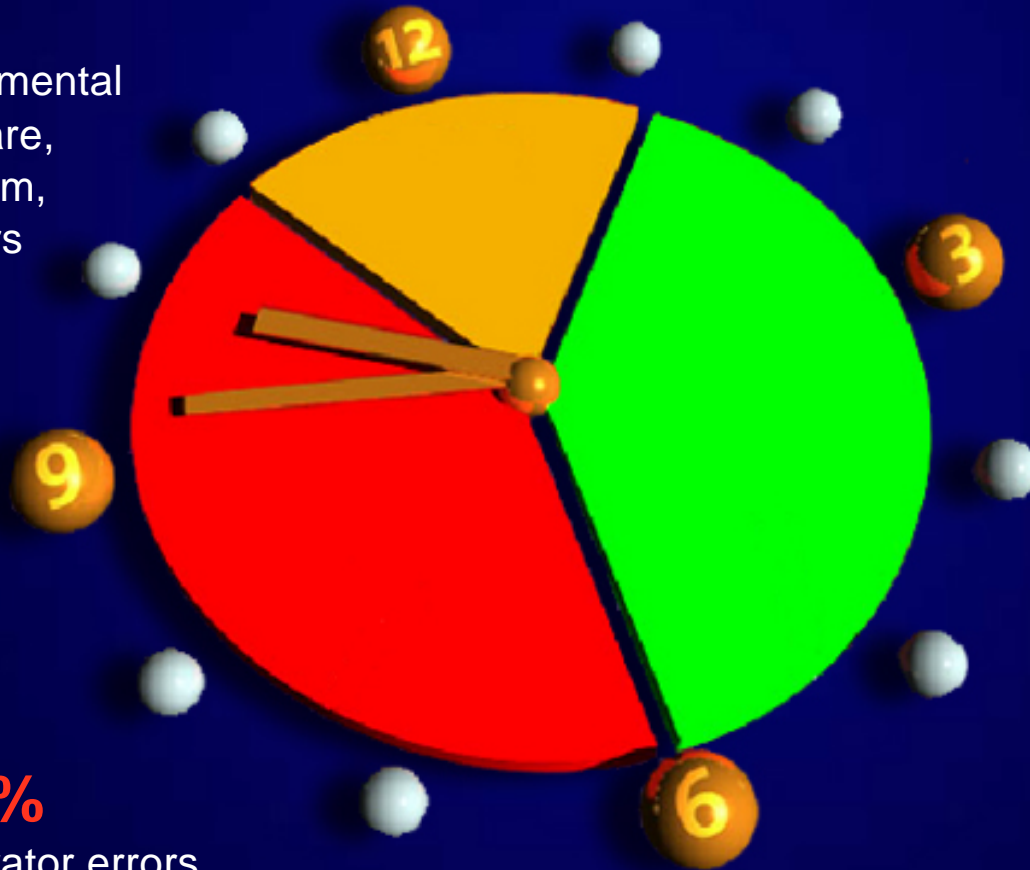


Windows 2000 will improve this rapidly in 2001, 99.5% for AS, even better for DCS

Source: Gartner 2001

Where do failures happen?

20% environmental factors, hardware, operating system, power, disasters



40% application failure

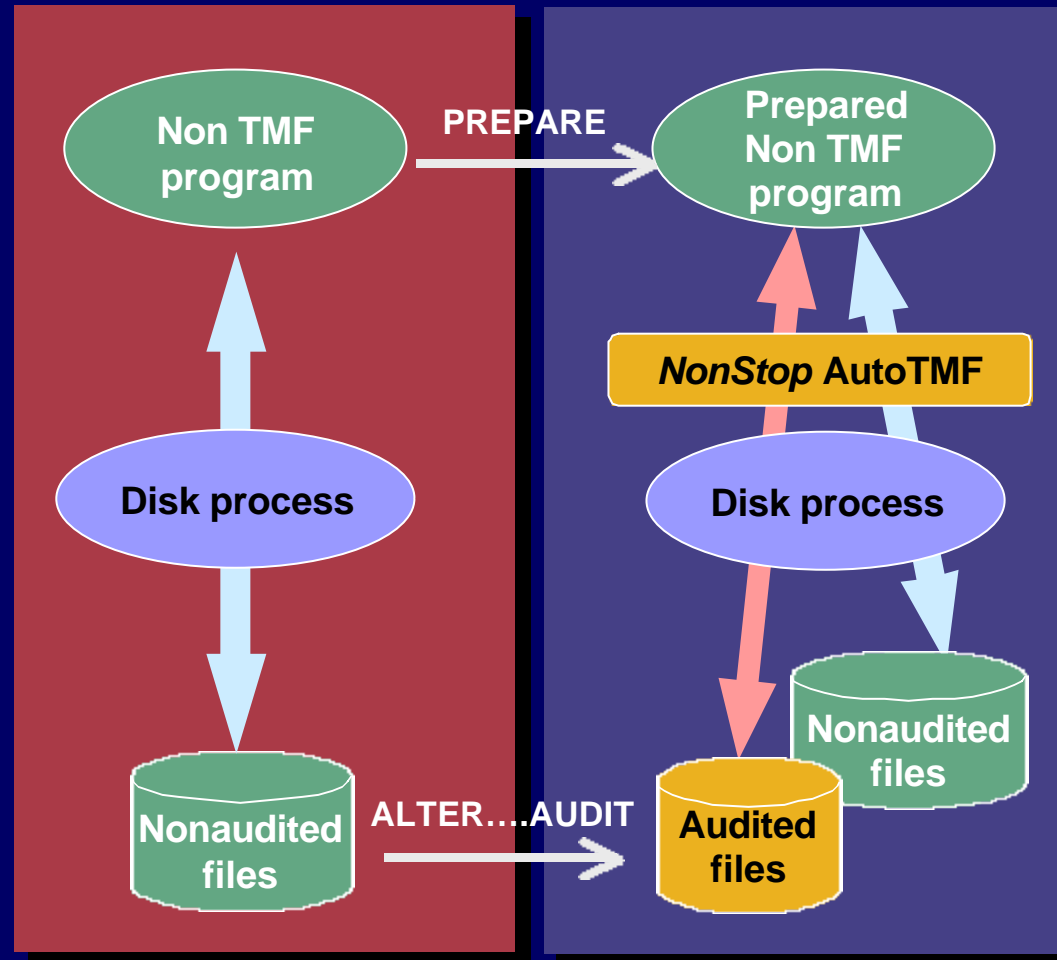
40% operator errors

NonStop AutoTMF

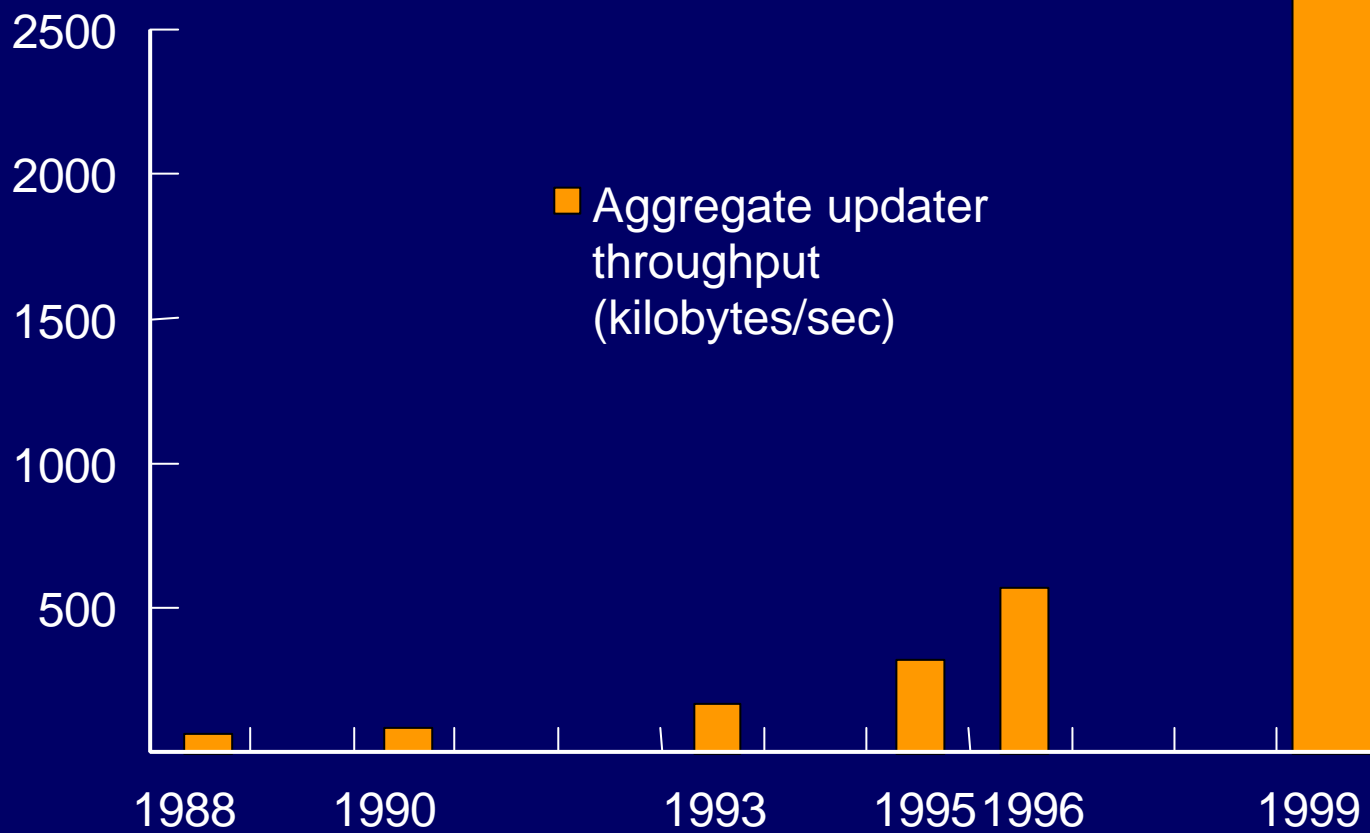
- *NonStop*[™] AutoTMF quickly enables applications for *NonStop* TMF
 - A few minutes to install
 - A few minutes to prepare object files
 - Requires no programming, recompiling, or binding
 - A few minutes to audit desired files
- Low overhead and minimal operations requirements
- Data consistency same or better than before using NonStop AutoTMF
 - Automatic transaction boundaries are not “business transactions”
 - Incremental business transaction consistency is possible
 - Recovery is always better than pre *NonStop* TMF environment
 - In *NonStop* TMF enabled applications, ability to configure separate “parallel” transactions that will never abort or back out

Migration process

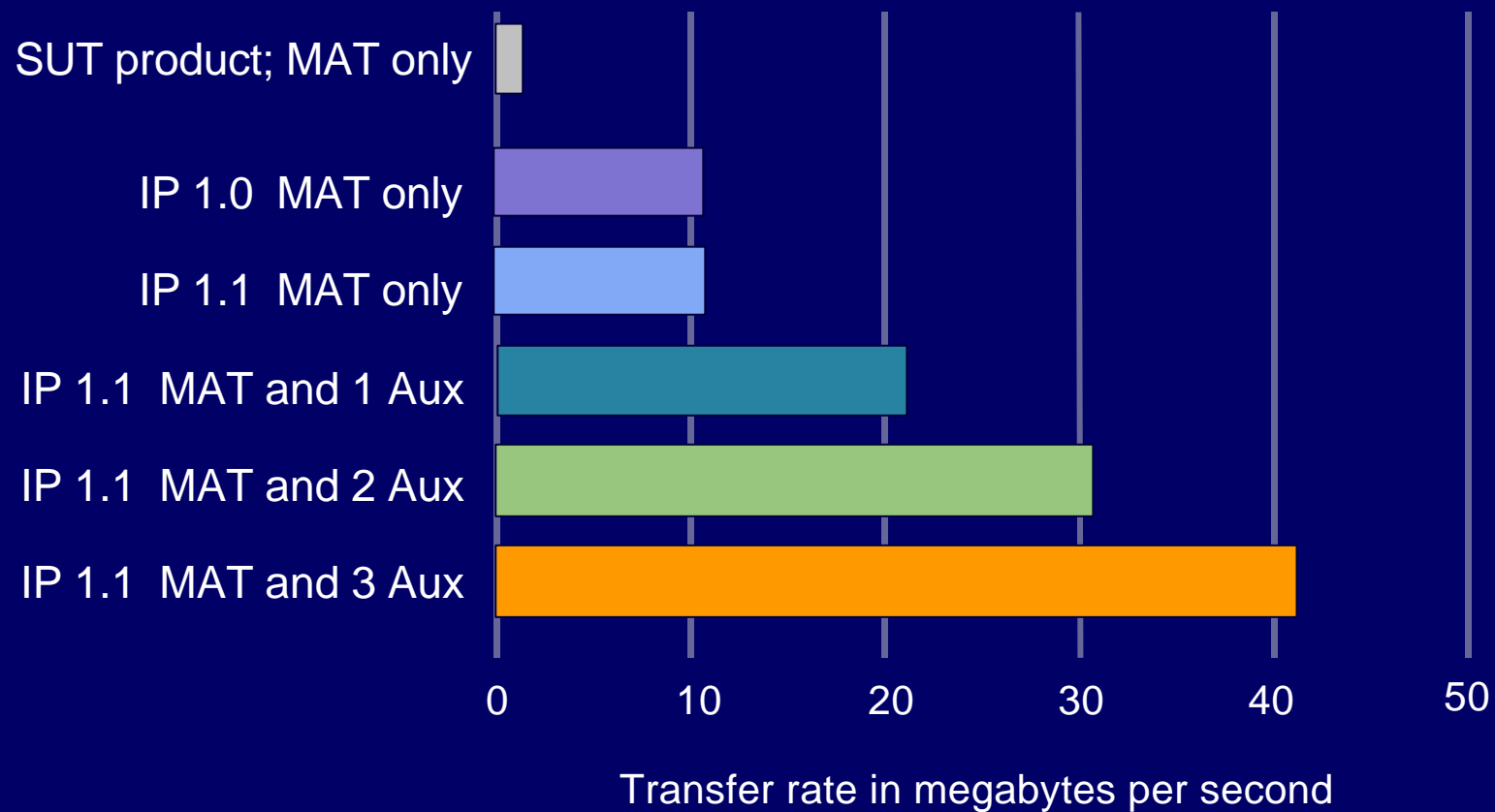
- Programs
 - Simple process— one command
 - Operates on object file
 - No changes to source or logic
 - No need to recompile, SQL compile, bind or accelerate
- Database
 - Turn on audit
 - Incrementally migrate files



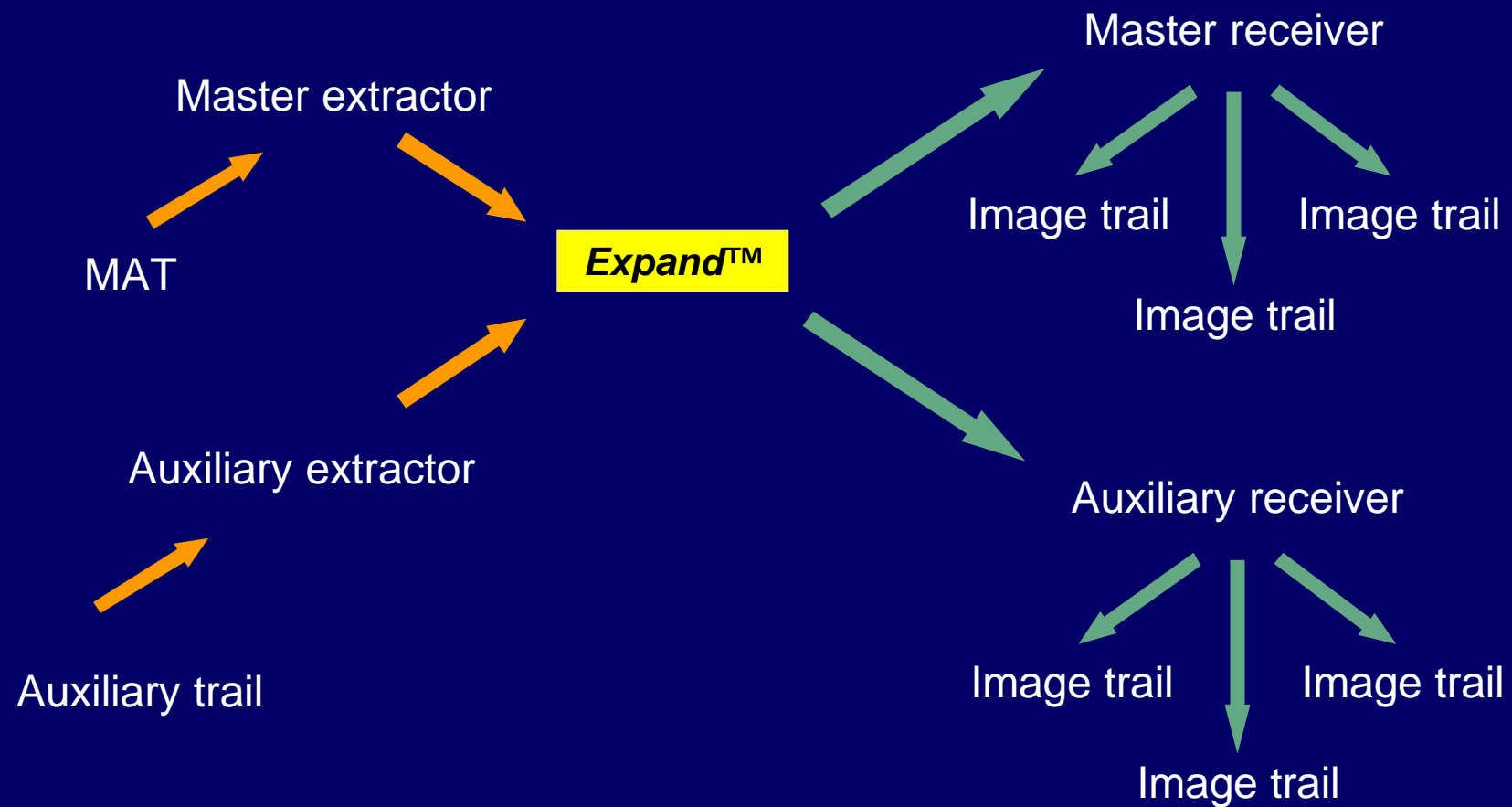
RDF performance history



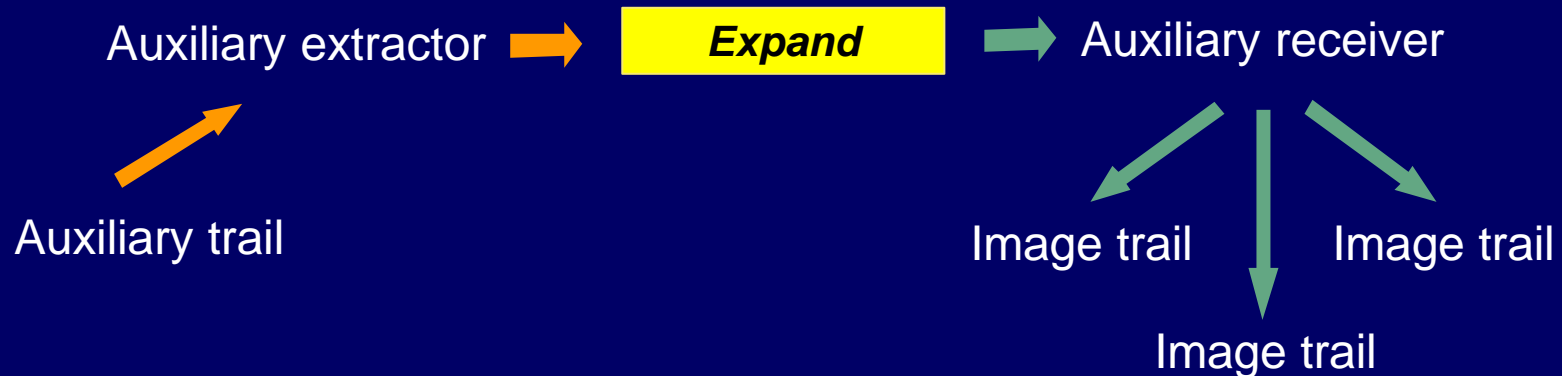
Extractor-receiver catchup: Idle transaction activity



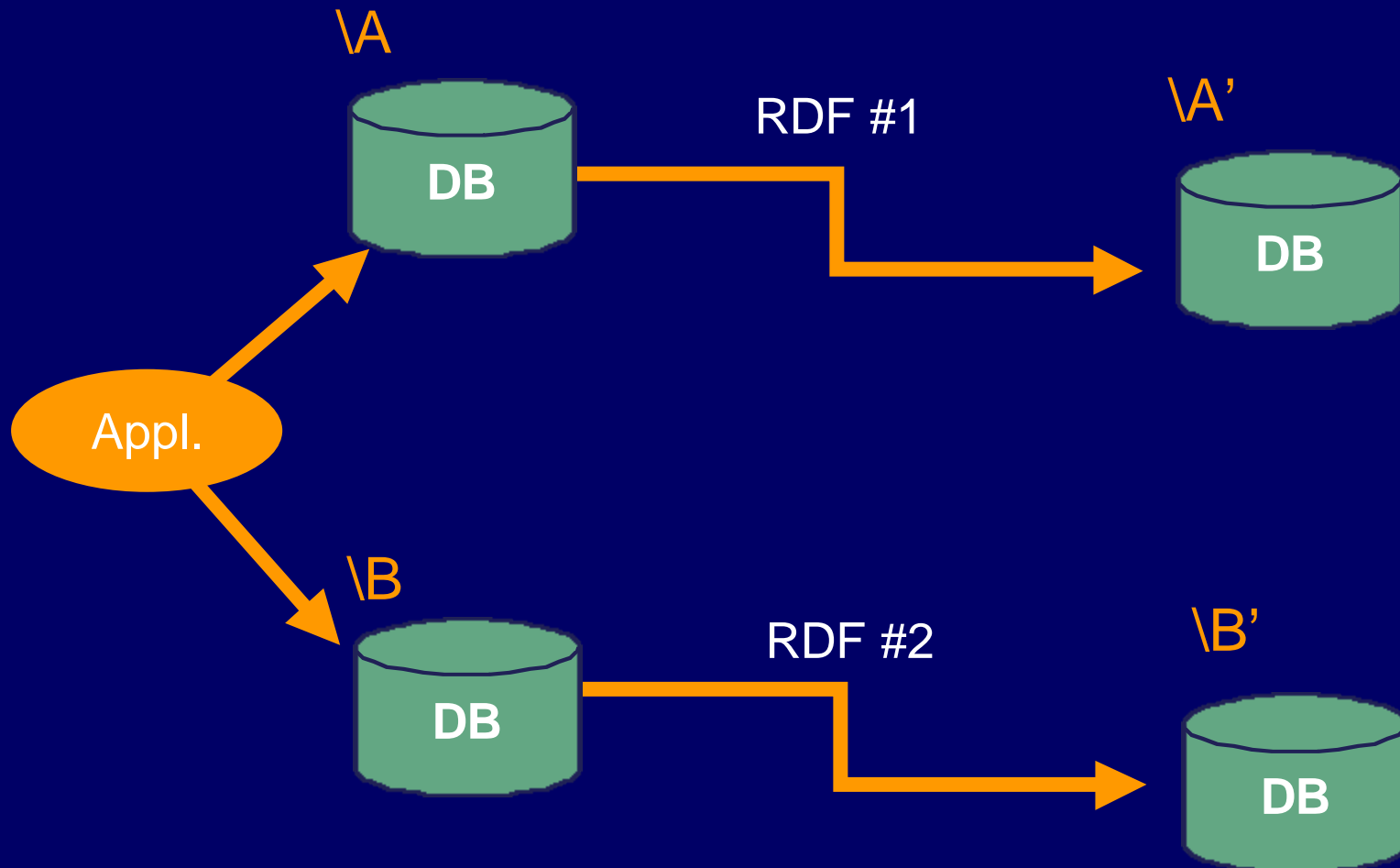
Auxiliary audit: Single path



Auxiliary audit: Super paths



Network transactions



NonStop™ AutoSYNC

- Nondatabase file replication
 - TACL macros and edit files
 - Configuration files (Pathway, batch, spooler, and so on)
 - Object/source files
 - Report files, BLOBs, and so on
- Auditing of such files is impractical or impossible

NonStop™ AutoSYNC rollout plan

- Developed by Carr Scott Software
- Already in production at Carr Scott customers
- Worldwide sales and support from Compaq
 - Target FCS 1Q 2002