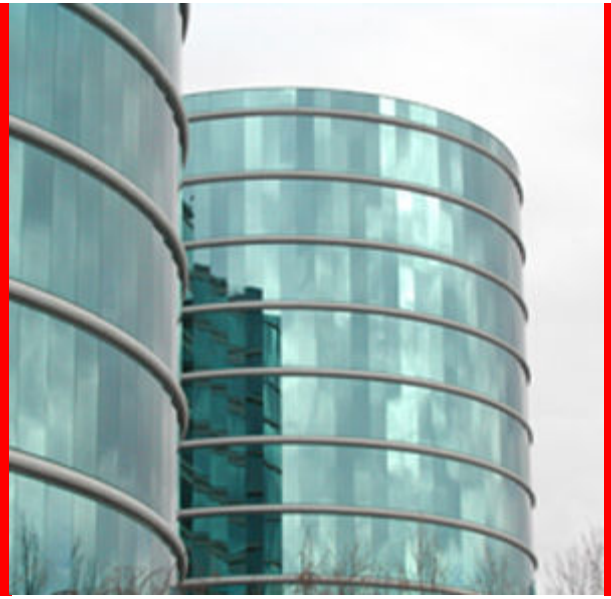


ORACLE®

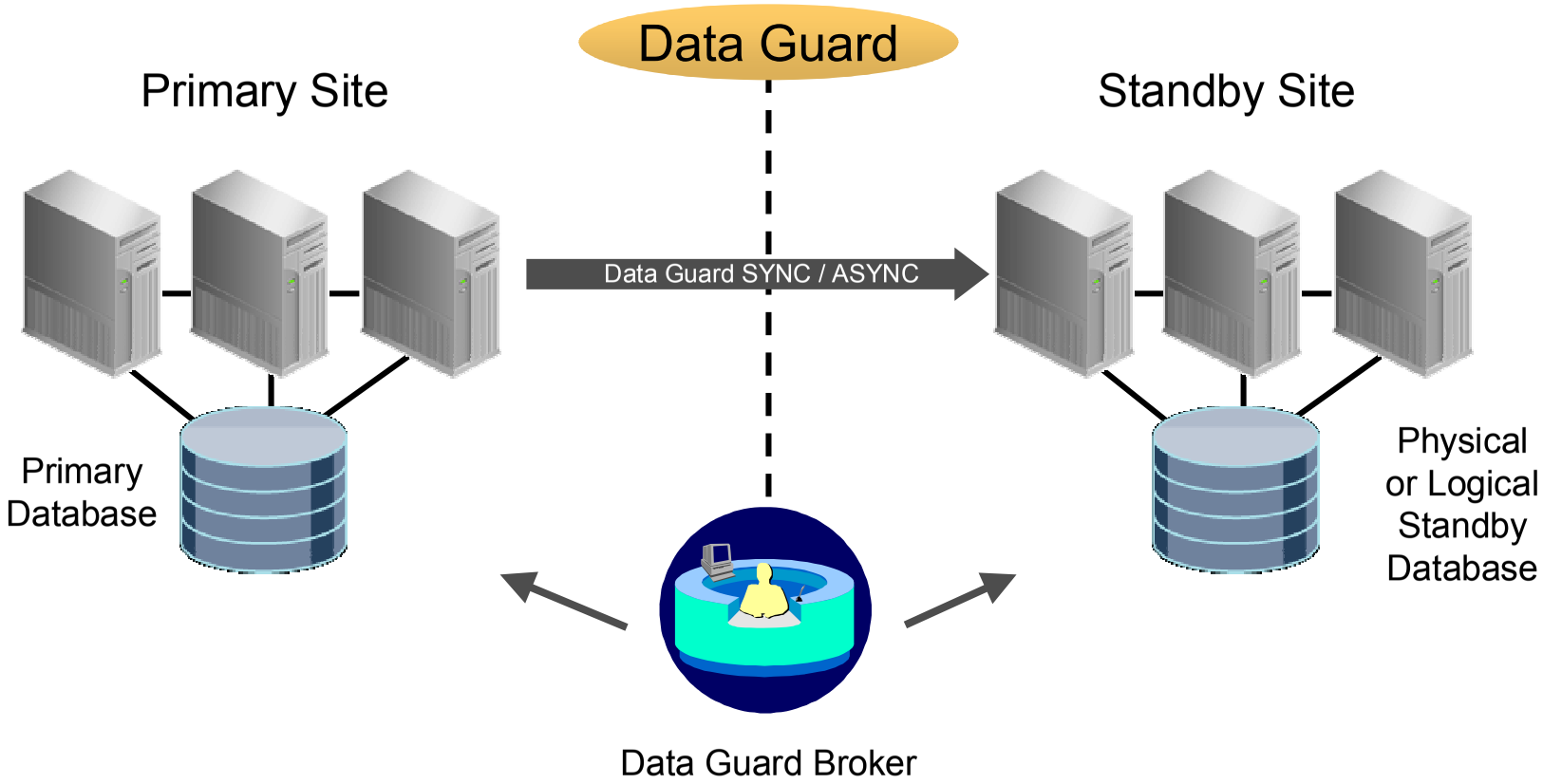
Why Oracle Data Guard?

Agenda

- **Data Guard – different from storage remote mirroring**
- Why Data Guard
  - Better return on investment
  - Less risk
  - Higher availability
  - Lower cost
- Proven

Oracle Data Guard

Feature of the Oracle Database

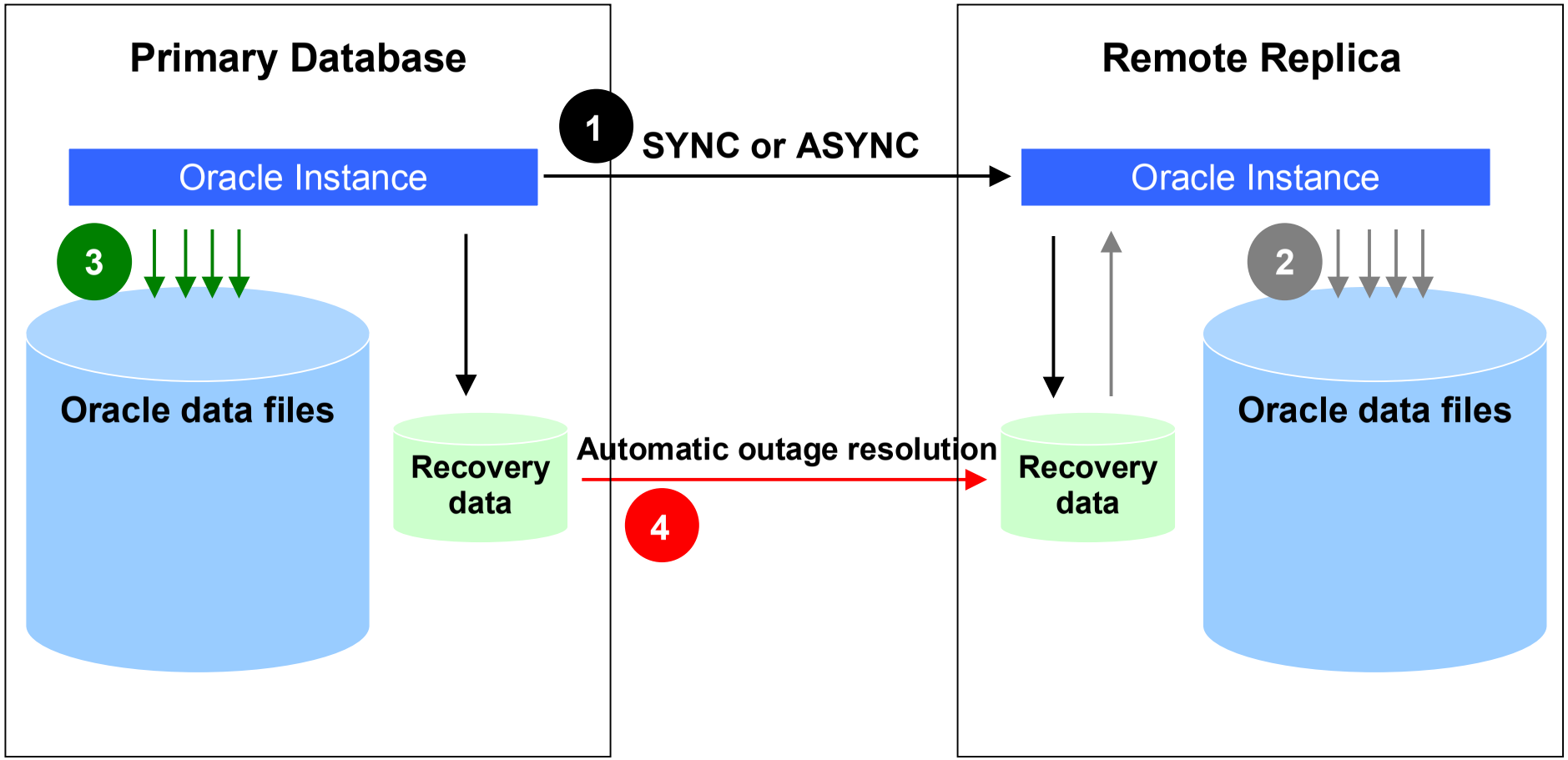


High Availability and Disaster Protection

- HA/DR for site outage due to disasters
  - Fire, earthquake, tsunami, flood, hurricane, power outages…
- HA for local outages that occur more frequently
  - Planned maintenance – database upgrades, tech refresh
  - Faulty system components – server, network, storage, software, …
  - Data corruptions
  - Backup/recovery of bad data
  - Wrong batch job
  - Bad HW/SW installations / upgrades / patching
  - Operator errors
  - Etc.

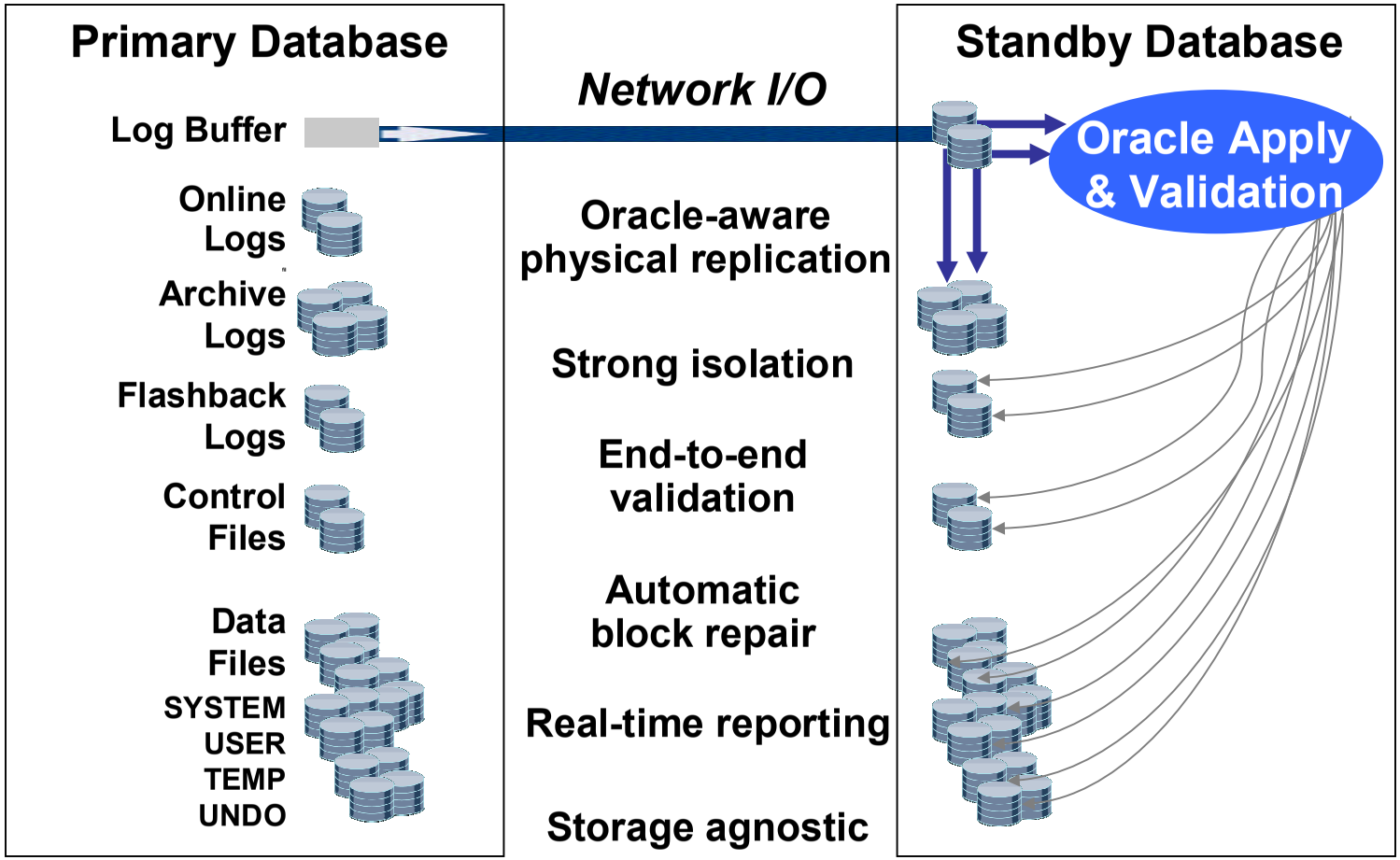
Data Guard Architecture

How it works



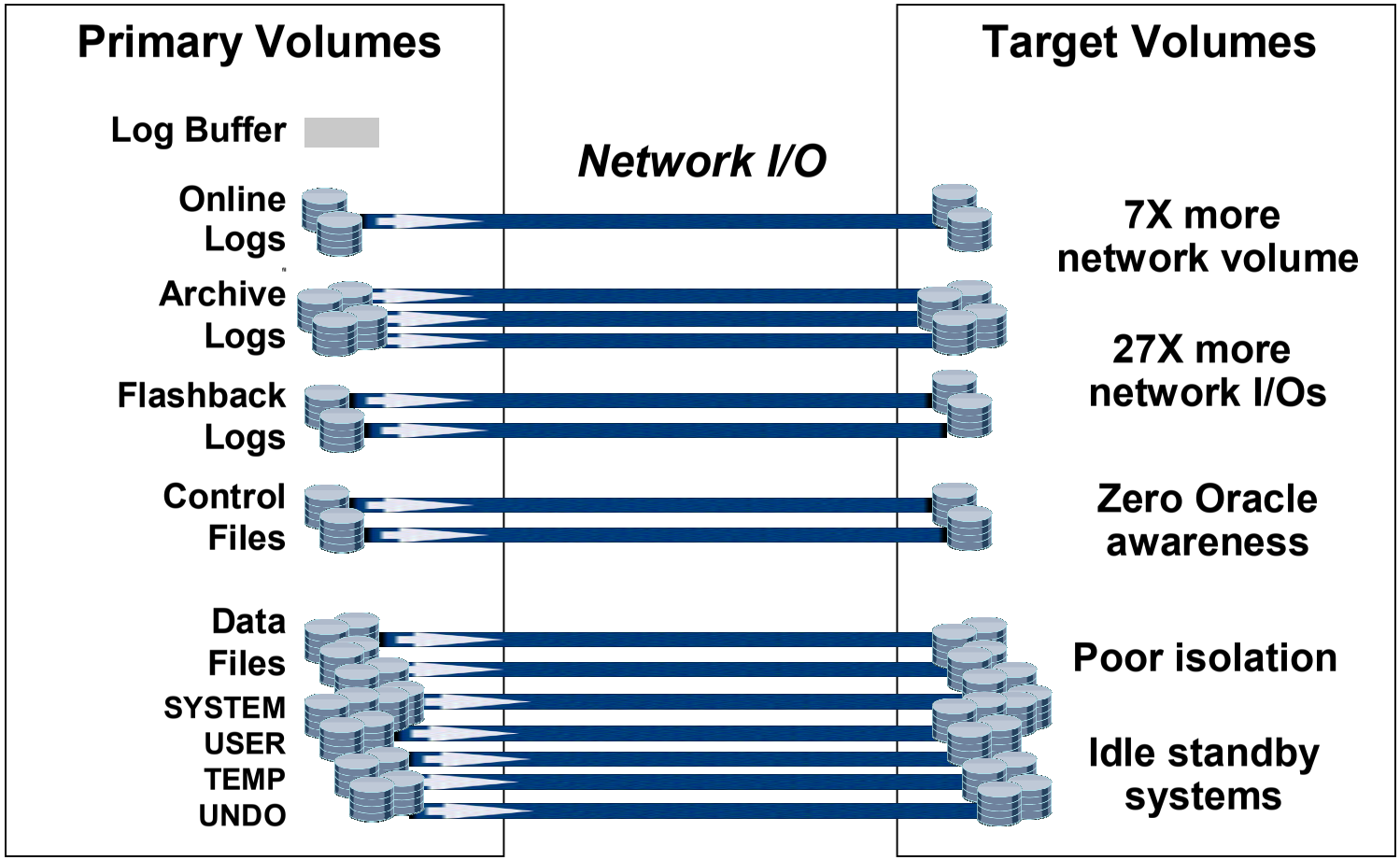
Data Guard

Database-Aware Physical Replication



Storage Remote Mirroring

Weaknesses

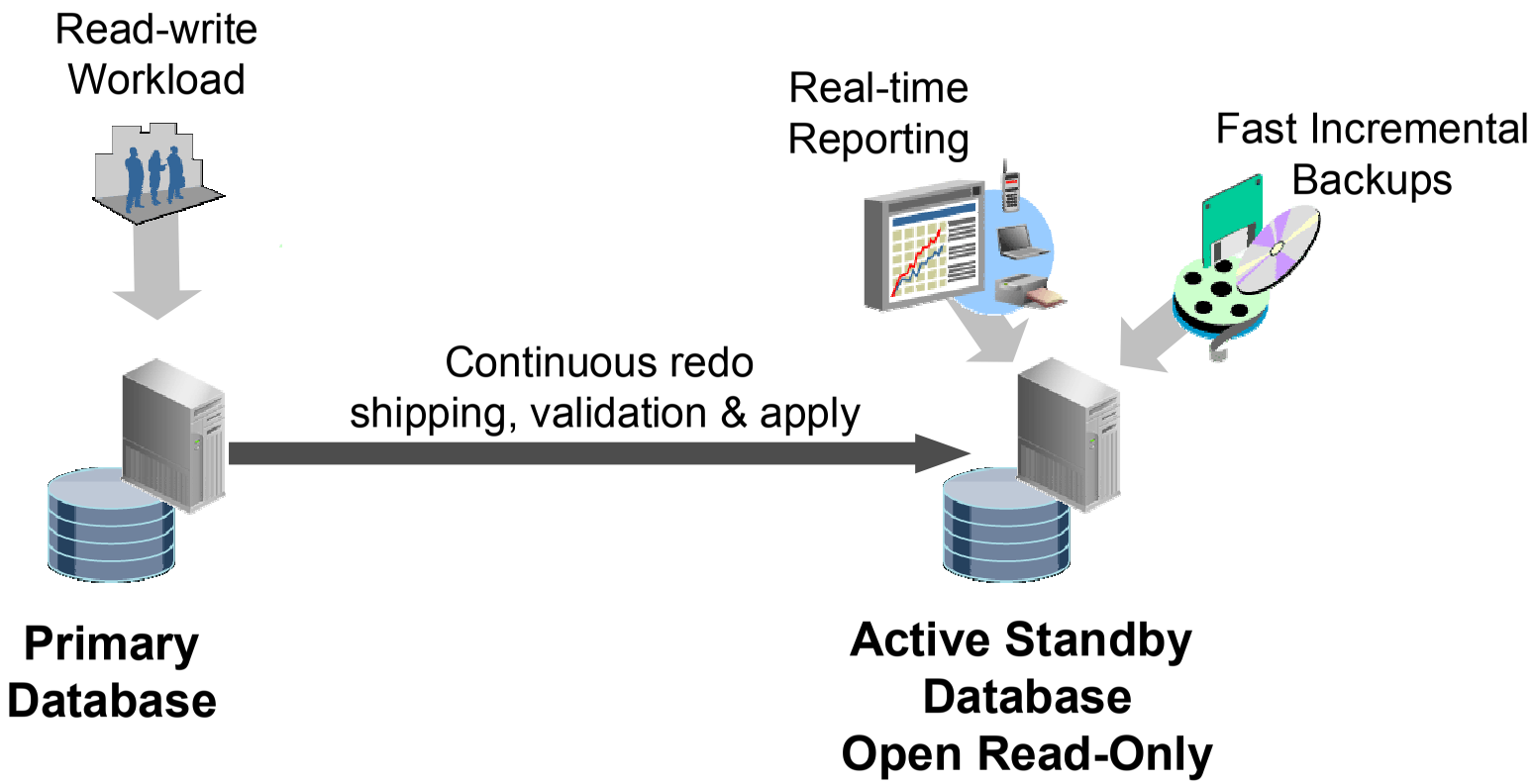


Agenda

- Data Guard – different from storage remote mirroring
- **Why Data Guard**
  - **Better return on investment**
  - **Less risk**
  - **Higher availability**
  - **Lower cost**
- Proven

ROI - Active Data Guard 11g

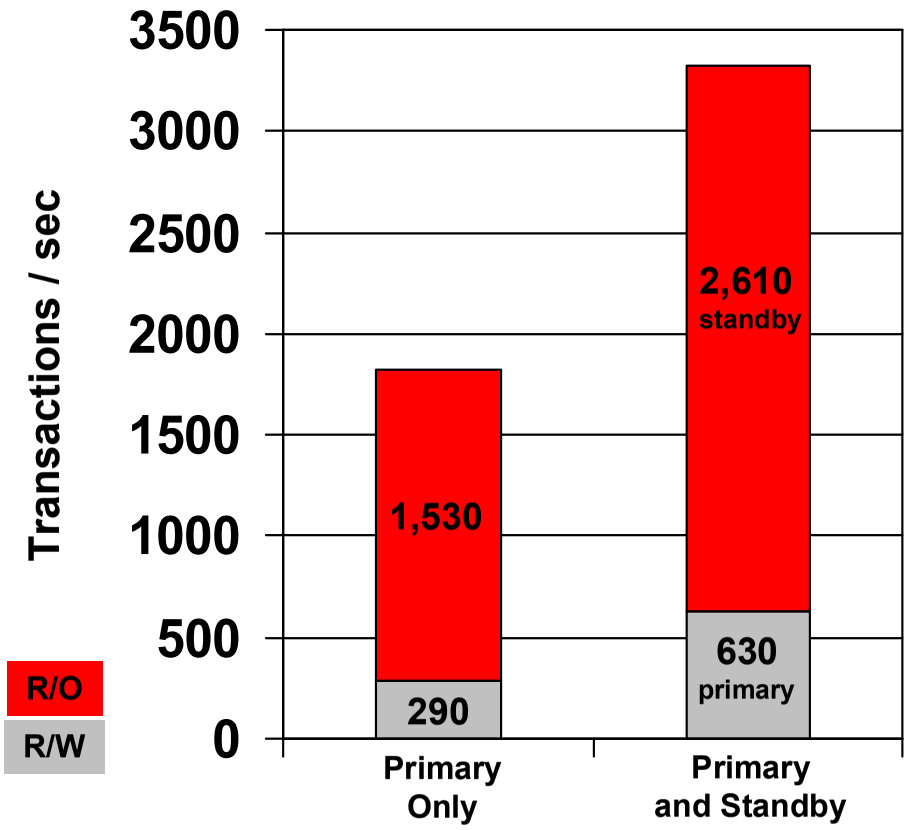
Utilize Physical Standby Database to Offload Primary



Always active – use standby for queries, reports, backups

ROI - Improve Performance

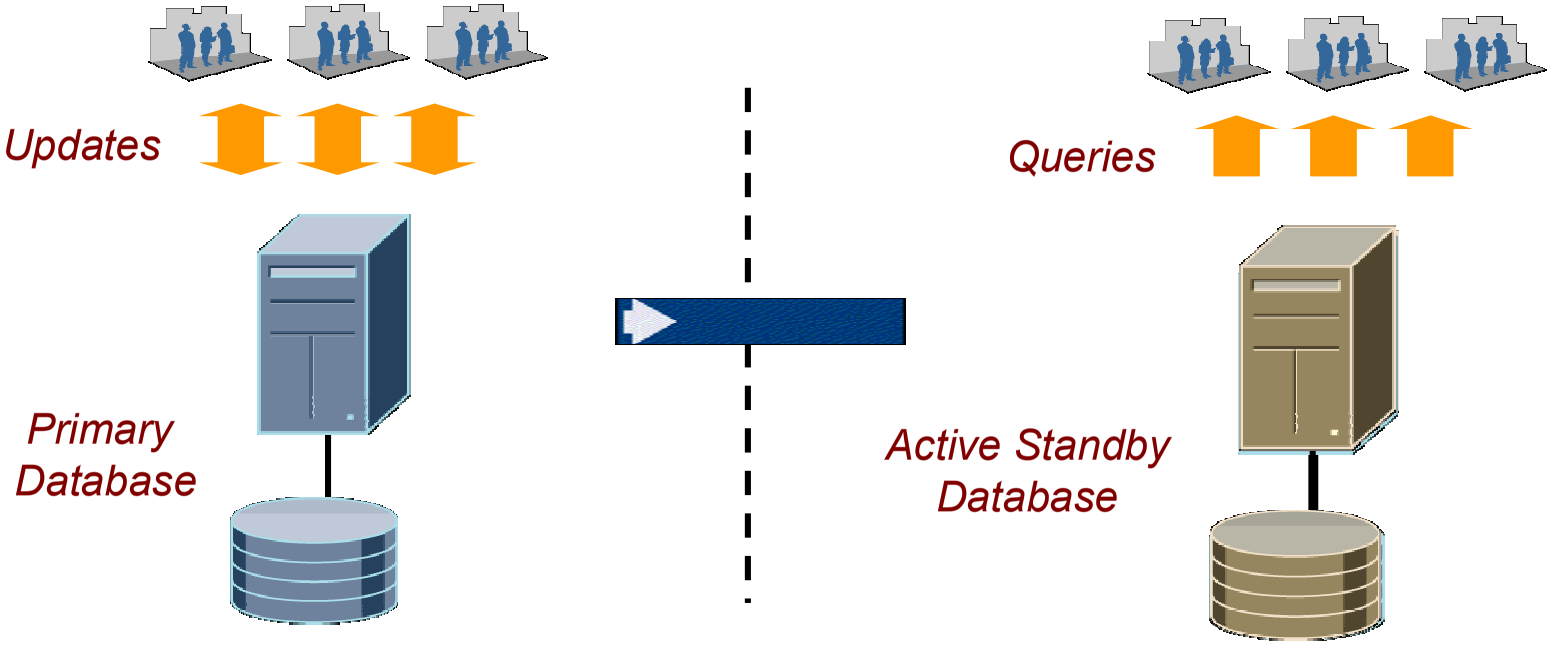
For all Workload



- Double read-write throughput
- Increase read-only throughput by 70%
- Eliminate contention between read-write and read-only workload
- Simplify performance tuning

ROI - Dual Purpose as Test System

Data Guard Snapshot Standby

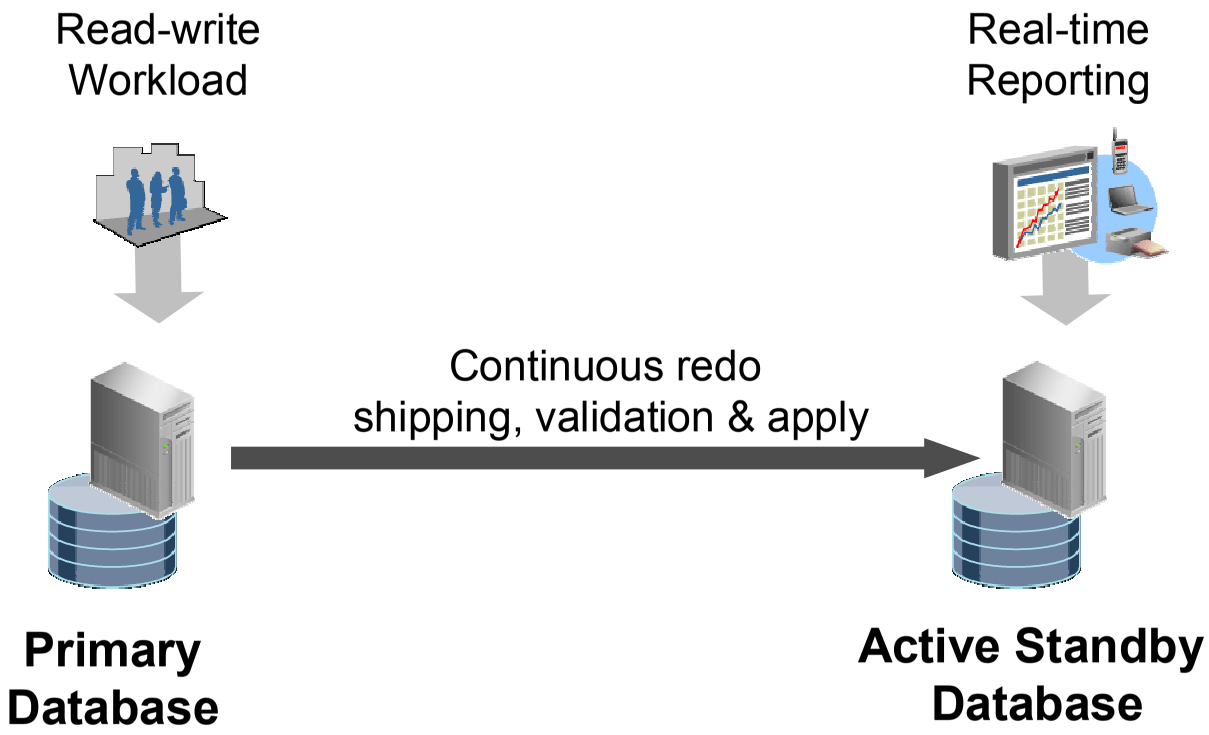


Single click conversion into snapshot standby

Single click conversion back to a physical standby

Less Risk - Always On

Standby is a Production System



- Known-state of standby database
  - Oracle is mounted and open, ready for failover if needed

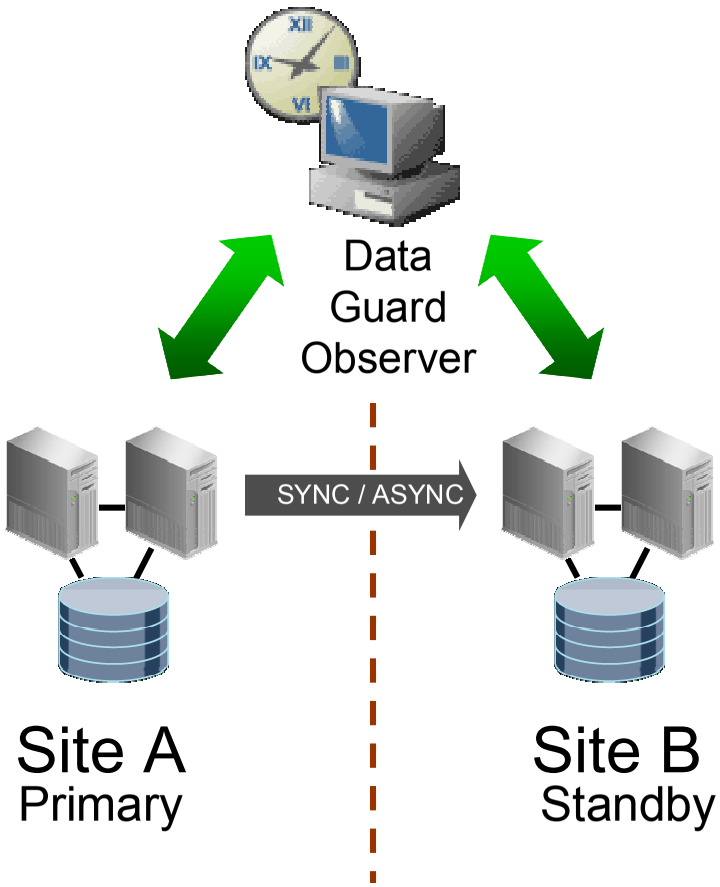
Less Risk - Isolation and Validation

Best Possible Protection for the Oracle Database

FEATURE	BENEFIT
Transmit directly from memory	Isolate I/O corruptions
Standby uses different code path	Isolate firmware/software errors
Multiple Oracle corruption checks	Data is logically and physically consistent
Detect silent corruptions	Data protection unique in the industry
Standby is always on	Known state – ready for production

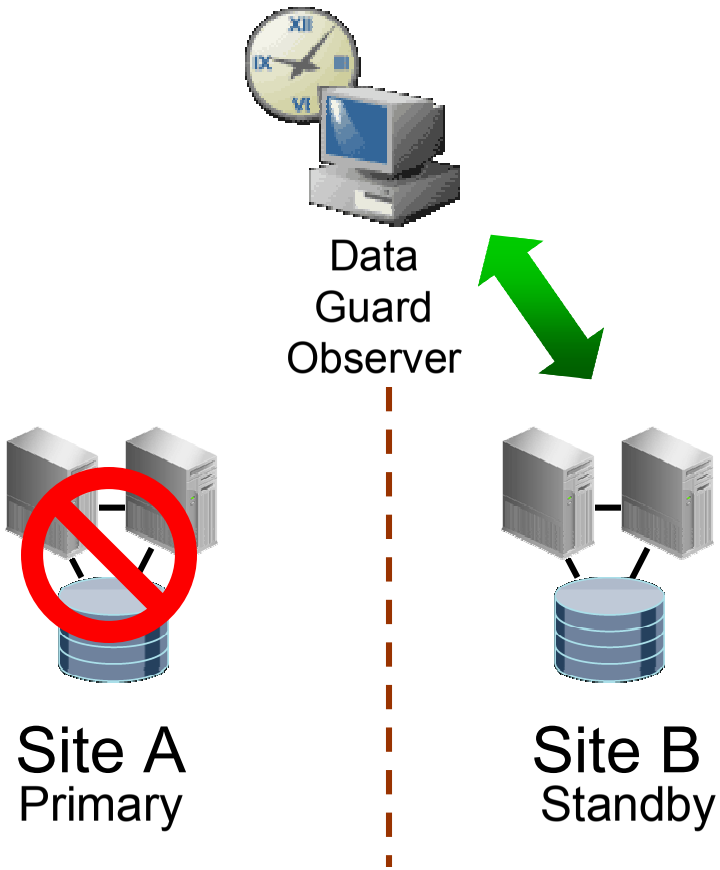
Better HA - Automatic Failover

Data Guard Fast-Start Failover



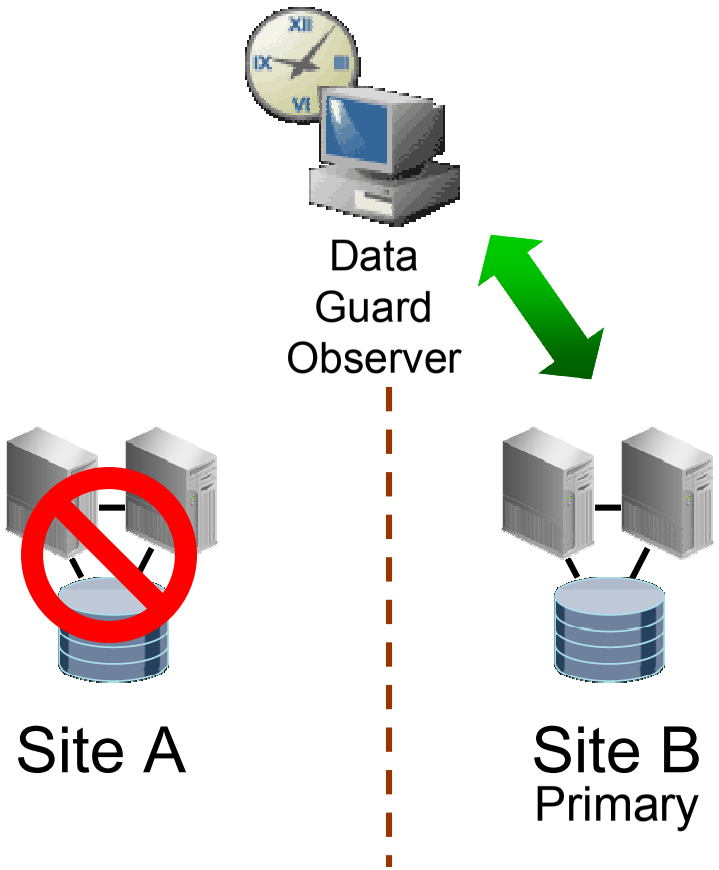
- Events that trigger an automatic database failover:
  - Database down
  - Designated health-check conditions
  - Request from application
- Automatic redirection of client connections to new primary
  - Integrated role-based services
  - Automatically start/stop services
  - Fast Application Notification (FAN)

Automatic Failure Protection



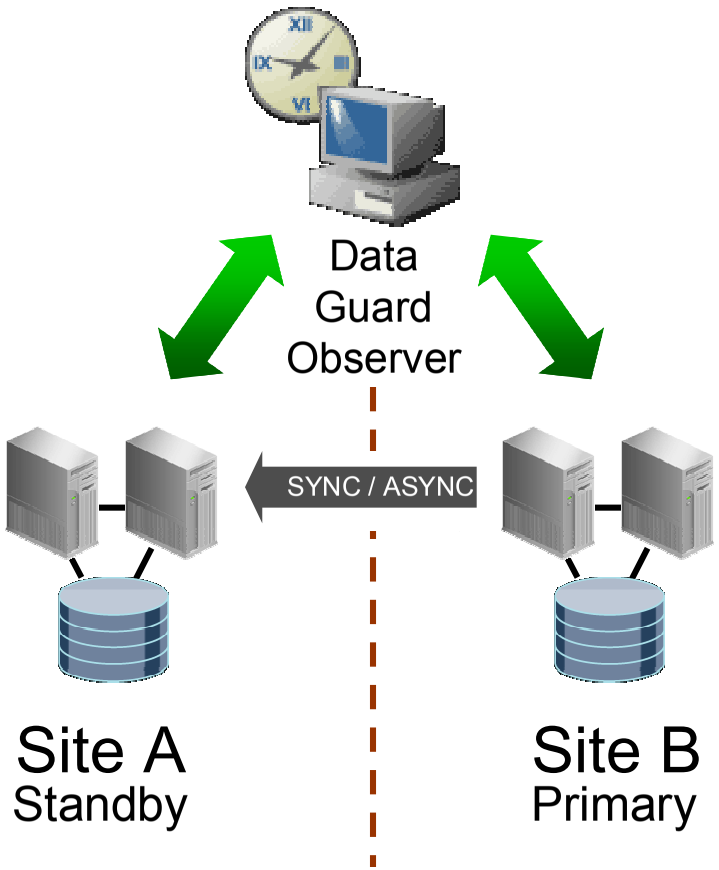
- Observer detects failure
- Failure state is confirmed with the standby database

Automatic Failover to Standby



- Observer automatically executes failover
- Standby becomes primary

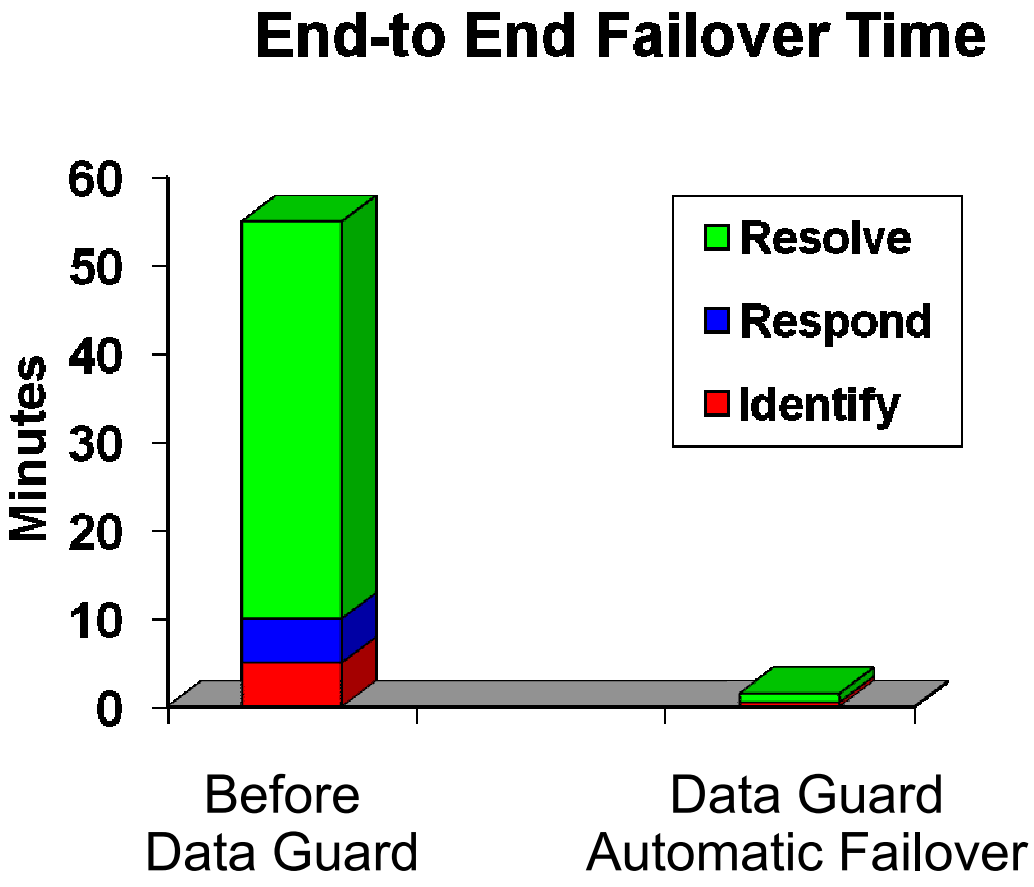
Automatic Resynchronization



- Observer automatically reinstates the failed primary as a standby database
- Built-in controls prevent any possibility of a split-brain condition

Amazon

Using Data Guard Automatic Failover since 2007

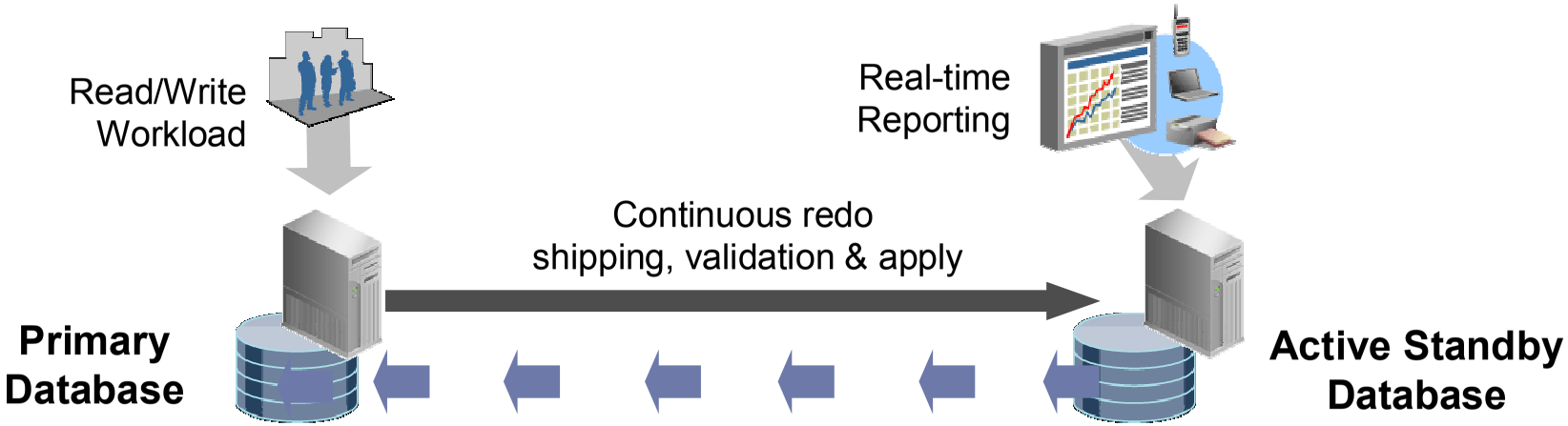


- 350 Data Guard configurations
- 150 are configured for automatic failover

Better HA - Automatic Repair

Detect and Repair Corrupt Blocks

- Automatic Block Repair
  - Automatic detection and repair of corrupt blocks
  - Transparent to the user and application



Oracle Database 11g Release 2

Better HA – Reducing Planned Downtime

Physical Standby

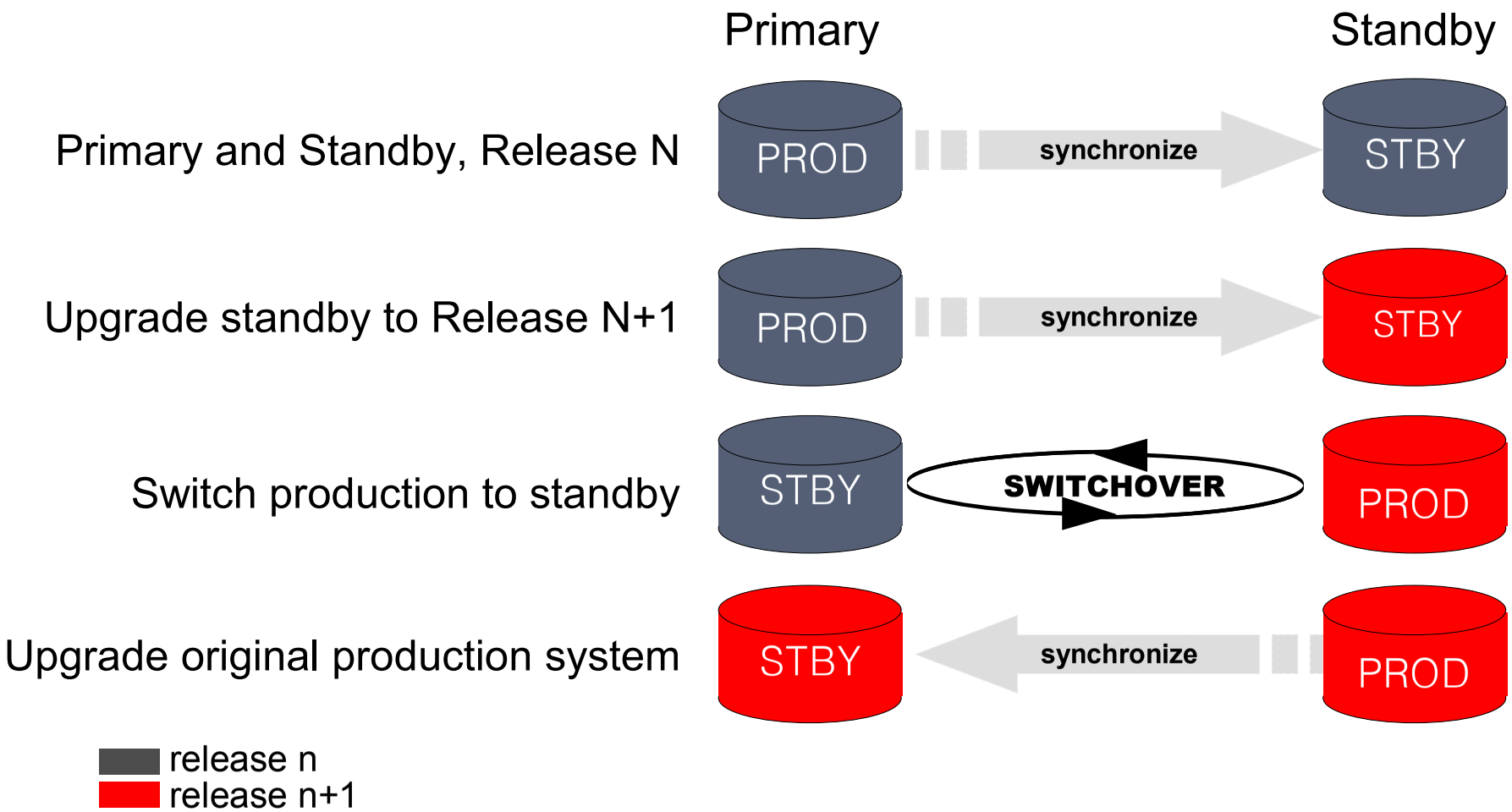
- Database rolling upgrades
- Data center moves
- Technology refresh
- 32bit to 64bit
- Windows to Linux
- AIX 64 bit to Solaris SPARC
  - Support Note 413484.1
- Single node to Oracle RAC
- Migrating to ASM
- Testing new features
- Migrating to Exadata storage
- System maintenance for single node (non-RAC) databases

Logical Standby

- Database rolling upgrades
- Various database changes
  - Example: ASSM, initrans, blocksize …
- Index and storage changes
- Implementing Advanced Compression (11.2)
- Migrating to Secure Files (11.2)
- Migrating to Exadata - when changing database extent size

Better HA - Rolling Maintenance

Database Rolling Upgrades



Lower Cost - Flexible Storage Options

- Data Guard runs on any storage
  - Different storage subsystems
  - Different vendors

Lower Cost - Integrated Management

Enterprise Manager HA Console

- Integrated view of key Data Guard and other HA metrics

High Availability Console (Boston_dglnx4.us.oracle.com - Primary Database)

Basic View | Customize | Switch To Boston_dglnx4.us.oracle.com - Primary

Current View: Boston_dglnx4.us.oracle.com

Page Refreshed May 19, 2009 6:10:14 PM UTC | Refresh | Manually

Availability Summary

Status Up
Up Since May 6, 2009 10:01:27 AM
Availability 90.67%
Host dglnx4
MAA Advisor Details

Availability Events

Message	Target	Time
The database has been started and is in mounted state.	Chicago	May 6, 2009 11:47:44 AM
The database status is MOUNTED.	Chicago	May 6, 2009 11:46:33 AM
The database has been started and is in mounted state.	ALR	May 6, 2009 10:03:32 AM
The database status is MOUNTED.	ALR	Mar 5, 2009 9:51:08 PM

Availability History

Day 100.0% (May 18, 2009 2:10 PM – May 19, 2009 2:10 PM)
Week 100.0% (May 12, 2009 2:10 PM – May 19, 2009 2:10 PM)
Month 77.52% (Apr 19, 2009 2:10 PM – May 19, 2009 2:10 PM)

Backup/Recovery Summary

Last Backup N/A
Next Backup N/A
Recovery Time 29 sec
Oldest Flashback Time May 8, 2009 5:22 PM

Flash Recovery Area Usage

Flash Recovery Area /private3/flash_recovery_area (10.0 GB)

10% 39% 50%

Unused - 5.05 GB
Used (Reclaimable) - 3.93 GB
Used (Non-reclaimable) - 1.03 GB

Used (Non-reclaimable) Flash Recovery Area (%)

100 50 0
12:19 1:00 1:30 2:00
May 19, 2009
10.27% Used

Data Guard Summary

Overall Status ✓ Normal
Protection Mode Maximum Availability
Fast-Start Failover Enabled to
Primary Database ✓ Boston_dglnx4.us.oracle.com
Primary Redo Rate 0.22 KB/sec

Standby Databases

Name	Host	Status	Role	Transport Lag	Apply Lag	Used FRA
Chicago	dglnx5	✓ Normal	Physical Standby	0.0 sec	0.0 sec	4.66%
ALR	dglnx4	✓ Normal	Physical Standby	N/A	N/A	85.02%

Primary Database Redo Rate

4.5 3.0 1.5 0.0
12:11 12:30 1:00 1:30 2:00
May 19, 2009
Rate 0.22 KB/sec

Agenda

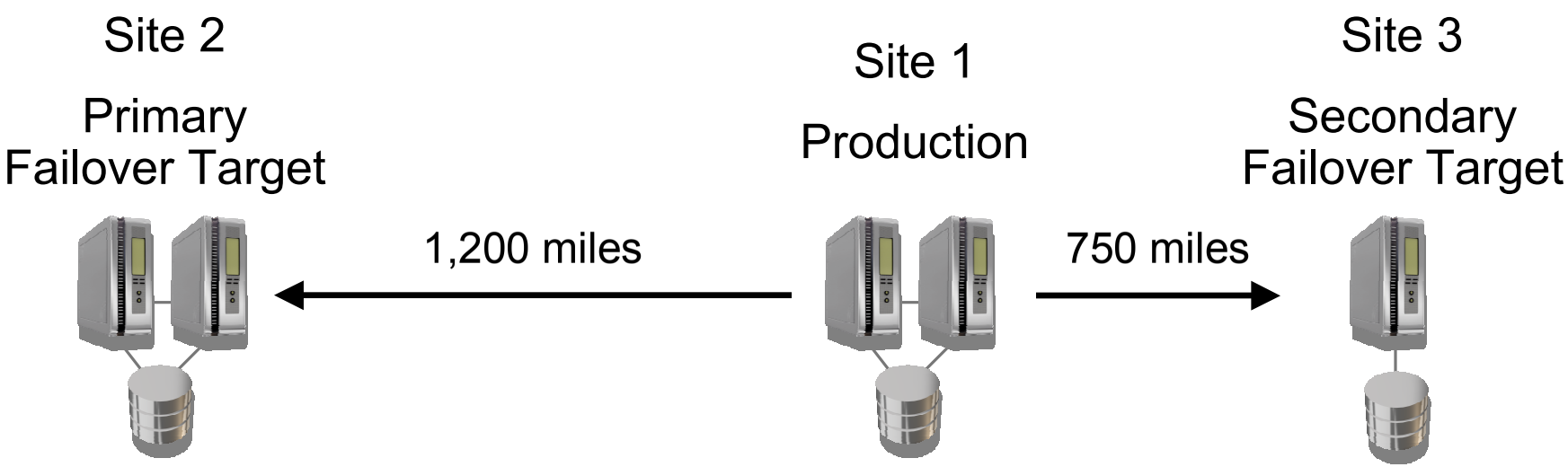
- Data Guard – different from storage remote mirroring
- Why Data Guard
  - Better return on investment
  - Less risk
  - Higher availability
  - Lower cost
- **Proven**

Proven - Mature Technology

- Used extensively by the Oracle customer base
- Continuous evolution since Oracle 7

Proven

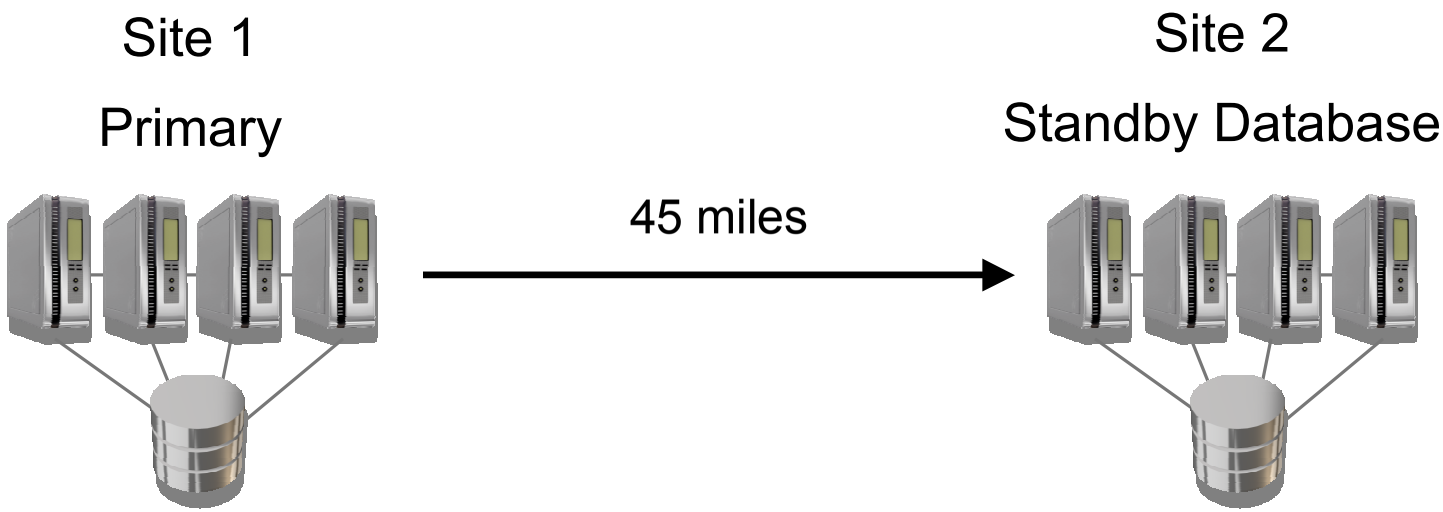
U.S. Government Financial Institution



- Trading systems for U.S. Government securities
- Multi-standby configuration
- Production since Oracle 9i

Proven

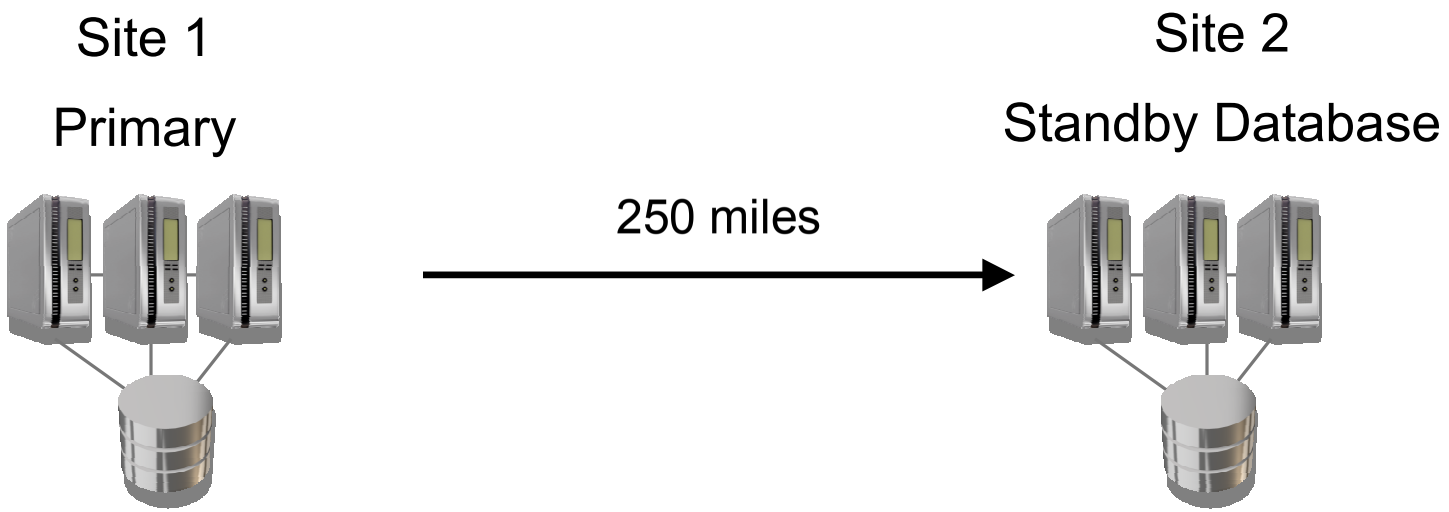
Global Brokerage Firm



- Trading system & operational data store
- Quarterly switchovers to validate production readiness
- Production since Oracle 9i

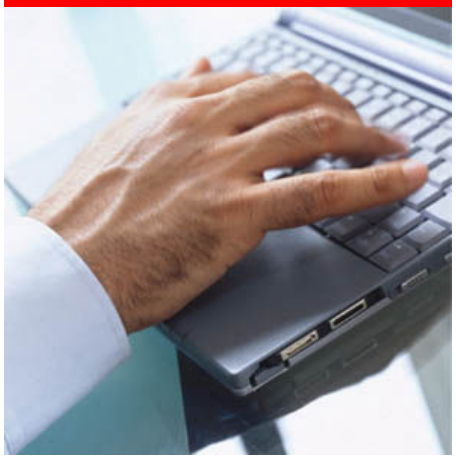
Proven

Global Investment Bank



- Data warehouse & statement repository
- 85TB Oracle Database
- Oracle 11g, Active Data Guard
  - Use standby for read-only access

Proven



Data Guard delivers:

- Better return on investment
- Less risk
- Higher availability
- Lower cost