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Maximize Availability with Oracle Database 11g Release 2

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Agenda

- Oracle Maximum Availability Architecture (MAA) - Overview
- New Capabilities of Oracle Database 11g
- Oracle Maximum Availability Architecture

Traditional High Availability

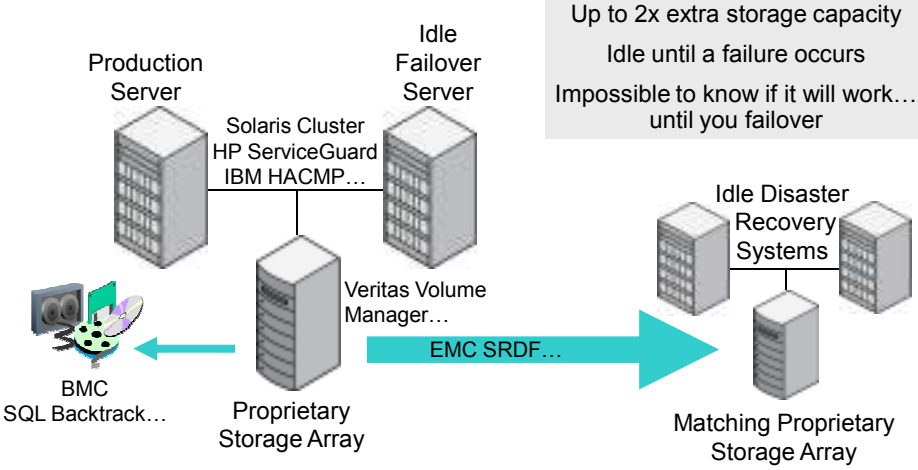
Expensive, Idle Redundancy

Up to 4x extra systems capacity

Up to 2x extra storage capacity

Idle until a failure occurs

Impossible to know if it will work… until you failover



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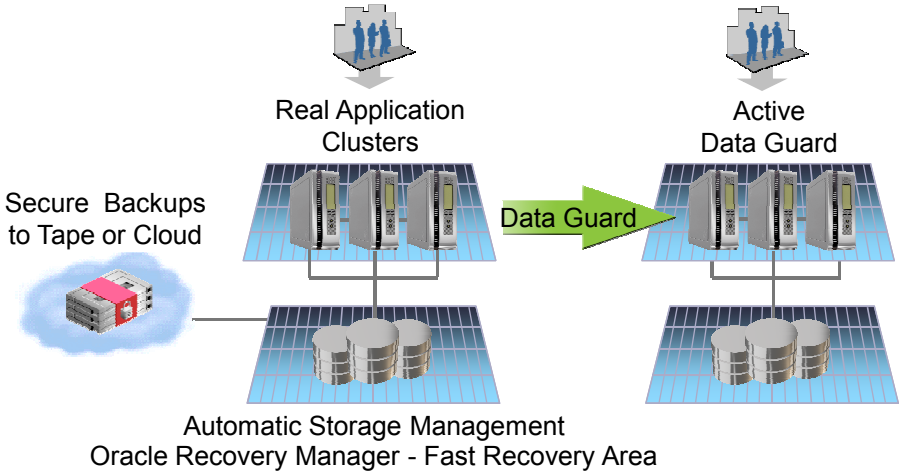
Oracle Maximum Availability Architecture

Low Cost, Active-Active, High ROI



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- Oracle Maximum Availability Architecture (MAA) - Overview
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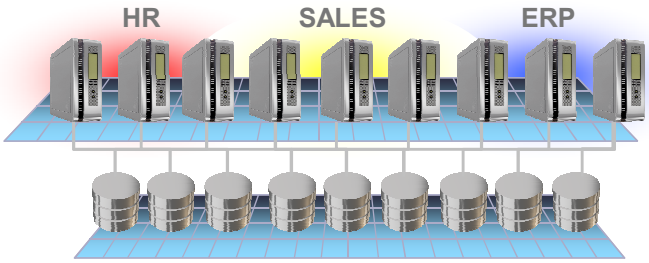
Real Application Clusters

Virtualizes Server Resources



- Runs all Oracle database applications
- Active-Active: highly available and scalable
- Adapts to changes in workloads

Oracle RAC 11g Release 2

Dynamic Cluster Partitioning via Server Pools

- Server pools
  - Dynamically assigns the server resources required to run specific workloads
  - Shared infrastructure, but behaves as if deployed in a single-system environment
- Application and database pools
- Policy managed
  - Min and Max Servers
  - Relative Importance
- Unassigned servers go to free pool

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Oracle RAC One Node

Better Virtualization for Single-Instance Databases

- RAC One Node: All the benefits of HA and server virtualization for single-instance databases
  - Host many databases on a single cluster
  - More efficient than traditional virtualization
  - Instance caging – prevents runaway consumption of resources
  - Automatic instance & server failover
  - True live migration, no quiesce required
  - Rolling database patches & O.S. upgrades
  - Supports all platforms supported by Oracle RAC

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Eugene Park
Senior Director of Platform Services
PG&E

"We've been able to save over $5 million dollars a year by re-platforming from our mainframe to Oracle Real Application Clusters."

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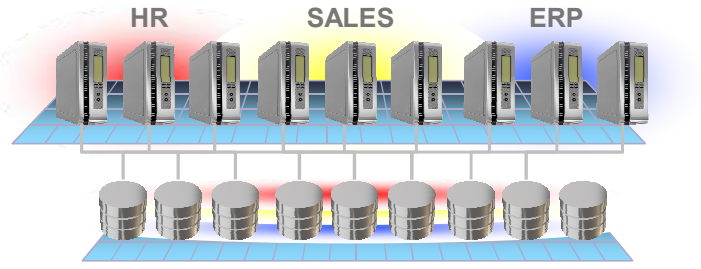
Automatic Storage Management

Lowers the Cost of Storage Management



- Virtualize and share storage resources
- Advanced data striping for maximum I/O performance
- Online addition and migration of storage
- Built-in mirroring with auto-repair of corrupt blocks

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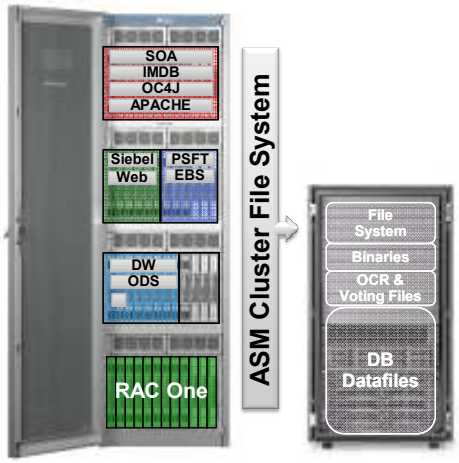
Oracle Database 11g Release 2

ASM Supports All File Types



- General purpose clustered or local file system
- ASM supports all file types
  - Database files
  - Clusterware files (OCR/Vote Disk)
  - File system files
    - ASM Cluster File System (ACFS)
    - 3rd-party file systems
- ASM manageability benefits
  - Optimized disk layout
  - Online disk add/drop/rebalance
  - Integrated mirroring
- Read-Only Snapshots
  - up to 64 point-in-time space efficient copies of file system

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Burlington Coat Factory

Michael Prince
Chief Technology Officer
Burlington Coat Factory

"ASM is a revolution in the way we manage storage, it has dramatically simplified storage management."

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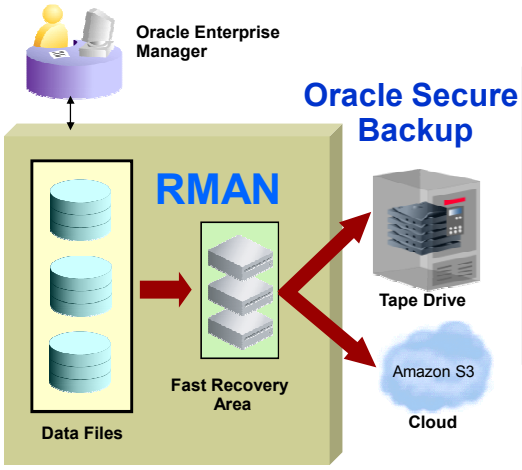
Oracle Backup & Recovery

Integrated Disk, Tape & Cloud Backup



- Recovery Manager (RMAN): Integrated Backup & Recovery
- Intrinsic knowledge of database file formats and recovery procedures
  - Block validation
  - Online block-level recovery
  - Unused block compression
  - Online, multi-streamed backup
  - Native encryption
- Integrated disk, tape & cloud backup leveraging Fast Recovery Area and Oracle Secure Backup

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CSX How tomorrow moves

Charles Pack
Data Management IT Architect
CSX Technology

"We saved $500,000 in licensing and maintenance fees by implementing RMAN instead of continuing with a third party software product, not to mention backup failures were reduced by over 90%. RMAN is a big win!"

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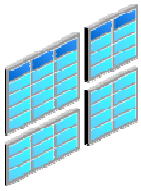
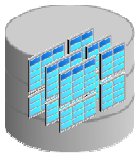
Oracle Flashback Technologies

Fast Recovery From Human Error

Flashback Query



Flashback Table



Flashback Transaction

Flashback

Flashback Database

Correction Time = Error Time + ~~f(DB_SIZE)~~

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reserve america

Joshua Ort
Database Administrator
ReserveAmerica

"In our QA environment, Flashback Database is a huge time-saver by giving us the ability of quickly rolling back changes to a test point, in preparation for re-tests."

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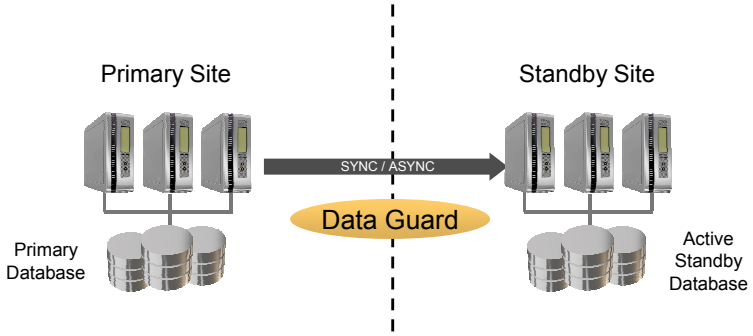
Oracle Data Guard

Data Availability and Protection



- Best corruption protection for Oracle Database
- Automatic database failover
- Full systems utilization – reduces the effect cost of DR

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Oracle Data Guard

Best Possible Protection for the Oracle Database

- Primary changes transmitted directly from memory
  - Isolates standby from I/O corruptions
- Software code path on standby different than primary
  - Isolates standby from firmware and software errors
- Multiple Oracle corruption detection checks
  - Data applied to the standby is logically and physically consistent
- Standby detects silent corruptions that occur at primary
  - Caused by hardware errors and data transfer faults that occur after Oracle receives acknowledgment of write-complete
- Known-state of standby database
  - Oracle is open, ready for failover if needed

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BARNES&NOBLE
www.bn.com

David Willen
CTO
BarnesandNoble.com

"We utilize SAN arrays and we've got bandwidth, so we've got the ability to use solutions such as remote-mirroring, but for this critical database system, we went with Data Guard. Data consistency and data integrity were the main drivers."

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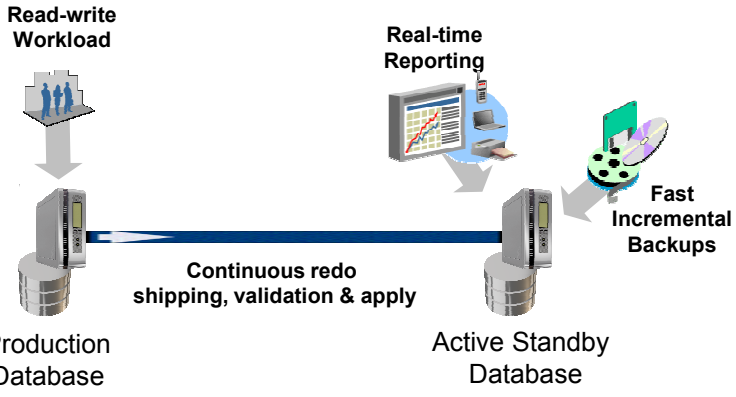
Active Data Guard 11g

Offload Processing – Improve Primary Performance



- Offload read-only queries to an up-to-date physical standby
- Use fast incremental backups on a physical standby – up to 20x faster

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Sue Merrigan
Director, Information Management
Intermap Technologies

"Oracle Active Data Guard was a quick win. We easily dual-purposed our ten terabyte standby database for both disaster protection and for secure read-only access to our public-facing eCommerce applications."

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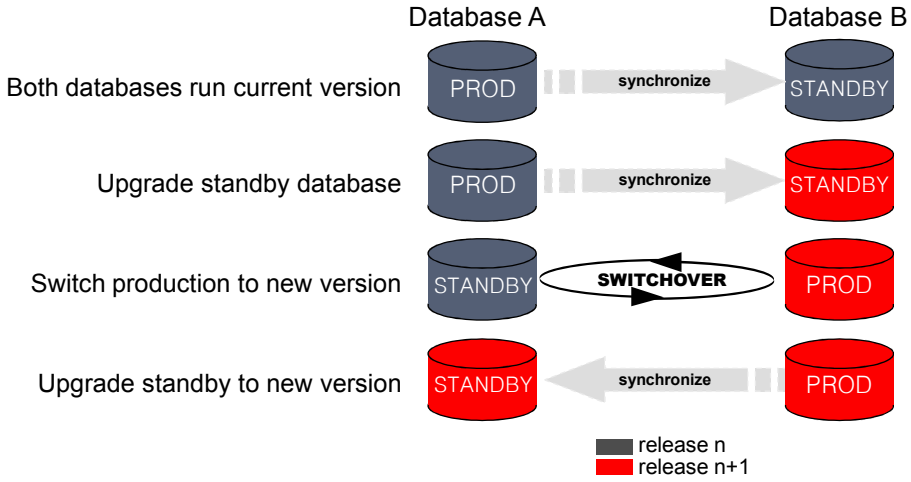
Database Rolling Upgrades

Using Data Guard Standby Databases



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Zero Downtime Application Upgrades

Edition-based Redefinition

- Large, mission critical applications are often unavailable for tens of hours while an application patch or an upgrade is installed
- Oracle Database 11g Release 2 introduces revolutionary new capabilities that allow online application upgrade with uninterrupted availability of the application
- The pre-upgrade application and the post-upgrade application can be used concurrently

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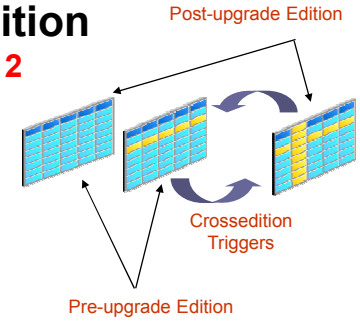
Edition-based Redefinition

Oracle Database 11g Release 2



- New features:
  - edition
  - editioning view
  - crossedition trigger
- Code changes are installed in the privacy of a new edition
- Data changes are made safely by writing only to new columns or new tables not seen by the old edition
  - An editioning view exposes a different projection of a table into each edition to allow each to see just its own columns
  - A crossedition trigger propagates data changes made by the old edition into the new edition's columns, or (in hot-rollover) vice-versa

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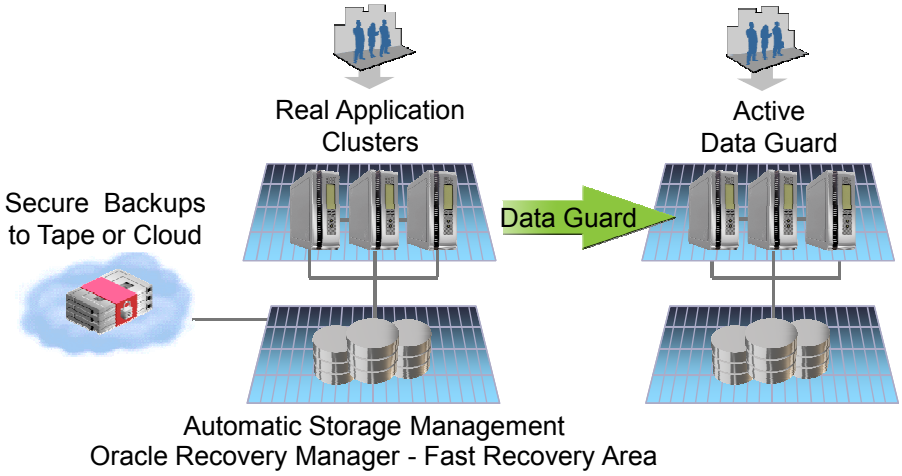
Oracle Maximum Availability Architecture

HA Best Practices Blueprint



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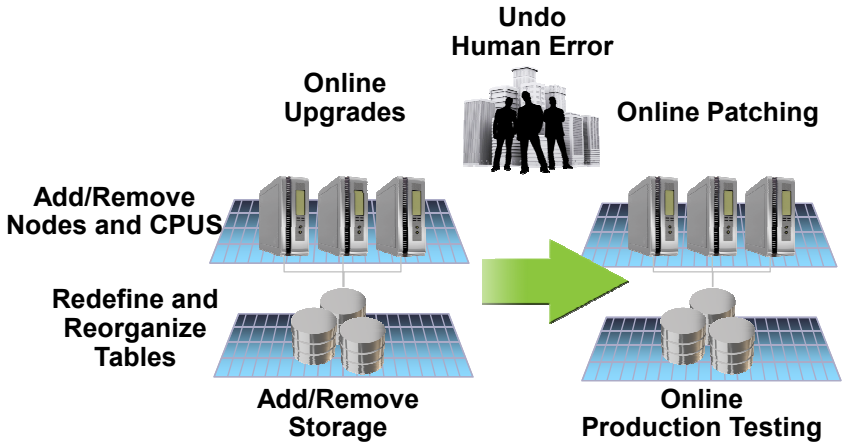
Oracle Maximum Availability Architecture

Eliminate the cost of planned downtime



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Database Integrated HA Technology

Protection from Unplanned Outages

Outage	Oracle Solution (s)	Downtime
Server failure	Oracle RAC, Clusterware	Zero
Storage failure	Automatic Storage Management (ASM)	Zero
Database and site failure	Oracle Data Guard	< 60 seconds
Data corruptions	Oracle Data Guard	Zero to < 60 seconds
Human Errors	Oracle Flashback Technologies	80x faster than restore

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Database Integrated HA Technology

Minimizing Planned Downtime

Planned Event	Oracle Solution(s)	Downtime
Operating system and hardware maintenance, add/remove cluster nodes or storage	Oracle RAC, Clusterware, ASM	Zero
Oracle one-off patches, critical patch updates, file system and clusterware upgrades	Oracle RAC, Clusterware, ASM	Zero
Site maintenance, cluster-wide maintenance	Oracle Data Guard	Zero or minimal
Oracle patch-set and full Oracle release upgrades	Oracle Data Guard	Zero or minimal
Platform Migrations	Oracle Data Guard	Zero or minimal
Application upgrades	Edition-based redefinition	Zero

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Jon Waldron
Executive Architect
Commonwealth Bank of Australia

"High availability is absolutely essential for us…we now use Oracle RAC for instance failover, Data Guard for site failover, ASM to manage our storage, and Oracle Clusterware to hang the whole thing together."

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Why Oracle Database 11g?

Maximum Availability at Lowest Cost

From:	To:
Expensive, poorly utilized, SMP Servers	Low cost, efficiently utilized, clustered servers
Expensive storage silos	Low cost storage
Idle redundancy	Fully utilized redundancy
Vulnerable to data corruption and data loss	Best protection for the Oracle Database
Long recovery times and extended outages for planned maintenance	Zero or near zero downtime

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