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http://www.oracle.com/rdb

Oracle Rdb Business and Engineering Update

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Agenda

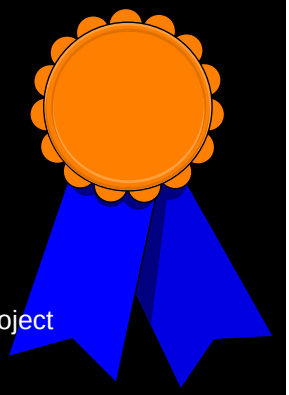
- Strategy
- Integration with other Oracle products
- Rdb 7.1
- Update on new features
- Future directions and roadmap

Have you ever . . .

- Traded commodities, equities or futures in the US, UK, Australia, Austria, Sweden, Spain, France, Greece, Italy, Switzerland, or Germany
- Made mobile phone call in US, Italy, Japan, Korea, Hong Kong, UK, South Africa, Peru, Germany, Austria, Czech Republic, Denmark, France, Greece, Portugal, or Switzerland
- Run a PC with Intel inside
- Purchased a lottery ticket in Europe, Canada, Australia, South America or the US
- Watched the US Space Shuttle lift off
- Driven a Volvo, Nissan, or Fiat
- Purchased a newspaper in the UK
- Captured a Kodak moment
- Been sacked in Ireland
- Used electronic banking in Europe
- Rented a car at Thrifty or Dollar
- Watched Satellite TV
- Paid a highway toll without stopping at the toll booth

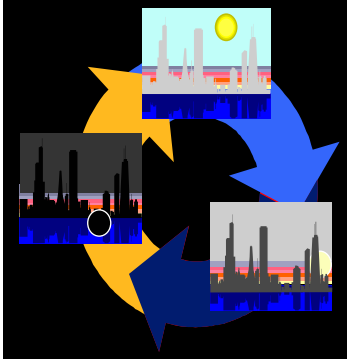
Great Customer Commitment . . .

- New Stock Futures Exchanges
  - BrokerTec
  - Jiway
  - International Securities Exchange
- Verizon Wireless Communications
  - Rdb system chosen for retail systems
- Deutsche Bank, New York
  - Replacement of new DB2 trading system project



Product Development Strategy

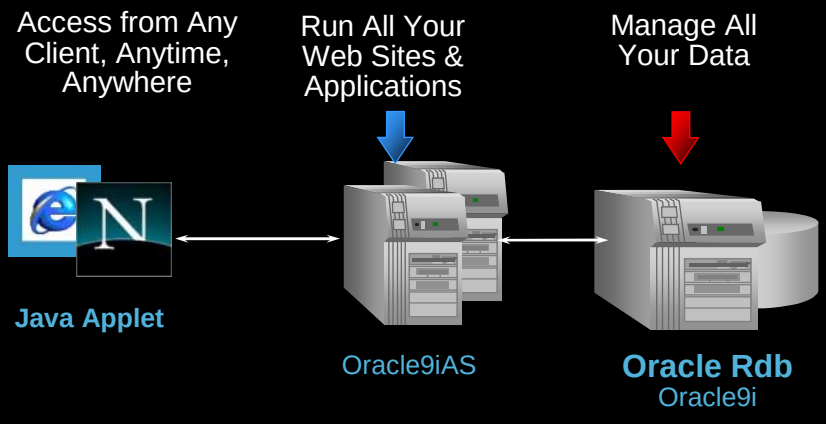
A 24x7 Database Optimized for Compaq OpenVMS



- Rdb's Unique Capabilities
  - High-end OLTP systems
  - Robust on-line management
  - Extensive tuning capabilities
  - Unique scalability on OpenVMS
- Integrated with Oracle environment

Oracle's Vision

Integrate Infrastructure to Develop & Deploy Web Sites

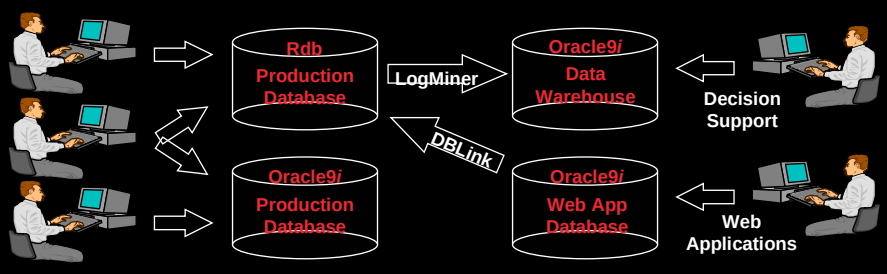


The Great Myth

- Myth:
  - Oracle & Rdb will merge into a single product
- Reality:
  - This will ***NEVER*** happen
  - SQL*Net provides “bridge” to other Oracle products, to Oracle database server
  - Many features unique to Rdb are being developed for the Oracle database server
  - Many features being developed in parallel
  - Product synergy & interoperability gives you a choice

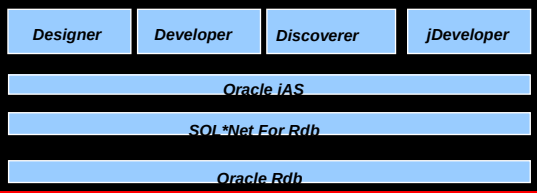
Rdb & Oracle Servers: Coexistence

- Coexistence
  - Common application development w/ SQL*Net
    - Single applications possible today
  - Data sharing directly through DBLinks
  - Near-line data sharing using LogMiner



SQL*Net for Rdb — The Key Enabler

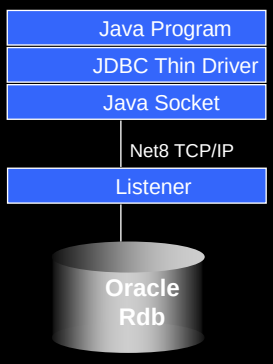
- SLQ*Net release 7.1.5 for Rdb
  - Technology for iAS connectivity to Rdb
  - Works with Rdb 7.0 and 7.1
  - Thin JDBC
  - Supports Net8 capabilities
- Native support for Oracle tools
- Most third party tools support OCI
- Database Links for data sharing with Oracle



Integrated with Oracle 9iAS

Thin JDBC Support

- Environment Applet
- Access Rdb through SQL*Net
- Features
  - No client needs to be installed
  - Can take a while to download thin driver (about 300kb)
  - Net8 TCP/IP protocol



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Rdb Marketing Focus

- Focus on installed base, meeting our customers' needs
- Activities
  - Rdb Web page, Rdb Web Journal, MetaLink, OTN
    - www.oracle.com/rdb
  - Rdb Management personal customer visits
    - Well over 100 customer visits per year
    - Hundreds more via e-mail and telephone
  - World-wide Rdb Technical Forums
    - 6 in 2002
  - Rdb Customer Advisory Council — 3-6 per year
  - Events
    - CETS / QUORUM
    - Oracle Users' Group
    - Oracle Open World

Rdb 7.1

- Released August 2001
- EV68 certified
- OpenVMS Alpha V7.2 minimum
- Alpha only
- Multi-version only
- New Features
- Performance Enhancements
- Rdb V7.1.0.1 production release December 2001
- Rdb V7.1.0.2 arriving

Rdb 7.1 Key Features

- OpenVMS Galaxy
- Bit Map Index optimizations
- Parallel Index creation
- Sequences
- Thin JDBC
- Table, Index partition management
- SQL*Net for Rdb improvements
- Oracle Style User/Role Security
- VLM for Global Buffers
- Parallel RMU/BACKUP to disk

Bitmapped Scan Using Ranked Indexes

- Ranked index optimization
  - Boolean AND operation
- Uses existing Ranked Index
  - DBKEY Compressed bitmap
- Extension of dynamic optimizer

```
SQL> SELECT COUNT(*) FROM CAR
     WHERE   MAKE = 'HOLDEN' AND
             CYEAR <> 1978 AND
             COLOUR = 'RED' AND
             LPLATE = 'AAA000';
```


Parallel index creation

- Relief for very large partitioned tables/indexes
- First describe “shape” of index
- Then build index partitions in parallel
  - multiple processes
  - one or more nodes
- Finally “join” partitions to enable index
- Up to ‘N’ times faster (where N is number of partitions)

Sequences

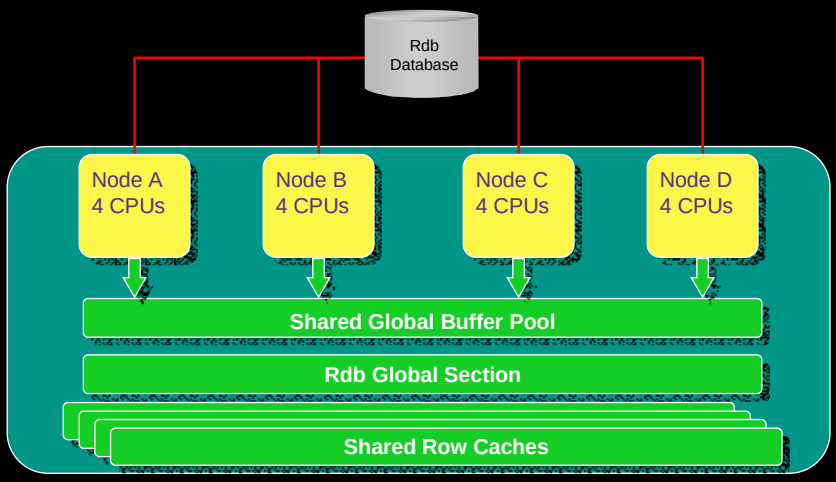
- Database managed sequence value
  - unscaled values to 64 bits
  - controls on caching, and cluster synchronization
  - change committed immediately - not tied to application transaction

```
SQL> CREATE SEQUENCE EMPID INCREMENT 15;
     ...
SQL> INSERT INTO EMPLOYEES VALUES (
   EMPID.NEXTVAL) RETURNING EMPLOYEE_ID;
EMPLOYEE_ID
155
```

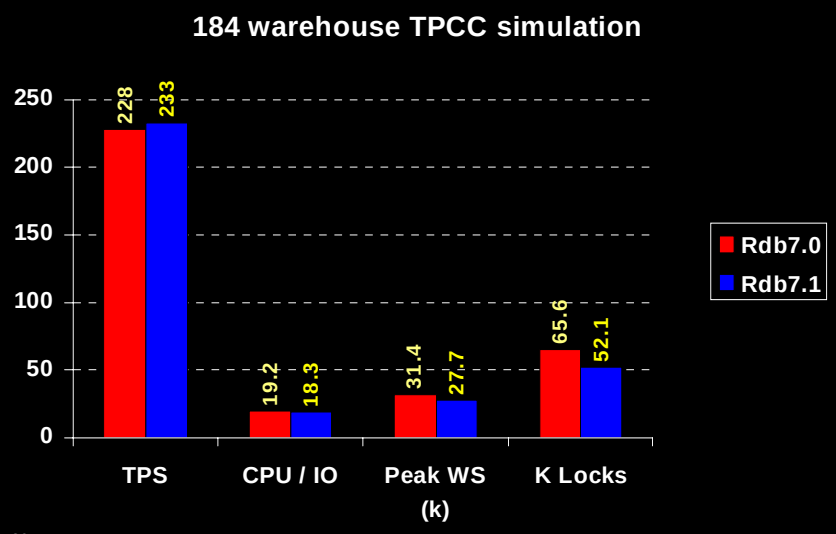

Rdb 7.1 & Galaxy

- Extension of Rdb's existing cluster support
- "Cluster-in-a-box" model
- Global buffers
  - Galaxy-wide
- Row Cache
  - Galaxy-wide
  - Runs in cluster
- Root Objects
  - Shared between Galaxy members
  - Transaction start/stop performance
- Database open/close on each node

VMS Galaxy & Oracle Rdb



V7.1 Performance Indicator



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And Also In Rdb 7.1 ...

- Disabling journaling
- Areas created and populated using asynchronous I/O
- Better handling of 'long KODA verb'
- New COUNT optimization with Sorted Ranked index
- Horizontal partitions can be reserved or locked to allow concurrent partitioned operation on a single table
- 'ALTER INDEX' supports partition operations
- Vertical and horizontal partition can be named
- Allow dumping portions of the AIJ with FIRST and LAST qualifier for record, block, tid, time
- Information tables can be used to retrieve database internal attributes and be displayed as a relational table
- Change a unique index to allow duplicates
- RMU/EXTRACT support all new SQL syntax
- SQL defaults for columns, domains and routine parameters
- Sql BEFORE and AFTER COLUMN to reorder the column display
- Sql Automatic Columns
- Sql Synonyms
- Sql 'Lock Table' to locks tables within a transaction
- SQL : REPEAT ... UNTIL ... END REPEAT
- SQL : ITERATE statement
- SQL : Counted FOR loop
- SQL : Module level Global variables
- SQL : Routine IN parameter can have a DEFAULT
- SQL : Trailing IN parameters can be omitted from CALL
- SQL : SIGNAL now supports optional text to return to client
- SQL : New Built-in Functions
- SQL : DBKEY literals
- OPTIMIZE USING supported for compound statement (usage of qurey outline)
- Constraint and triggers can be enable and disable online
- ...

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And Also In Rdb 7.1 ...

And much more...

7.1 New feature manual .pdf is +4600 Ko

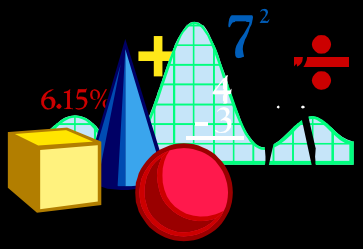
7.1 Release notes ASCII is +1000 Ko

Rdb 7.0.6.3

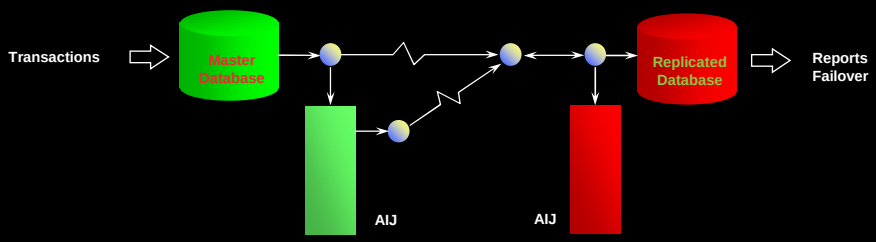
- Production release since January 2002
- LogMiner enhancements
  - Performance
  - Output formats
- Bug fixes
- Full kit (does not need prior Rdb kit installed)

Rdb V7.0 Key Features Review

- Major features for
  - Integration into Oracle product family
  - 64-bit very large memory support
  - Enhanced memory cache
  - Disaster tolerance
  - Enhanced Partitioning
  - Client/Server performance
  - Parallel backup & load
  - And much more



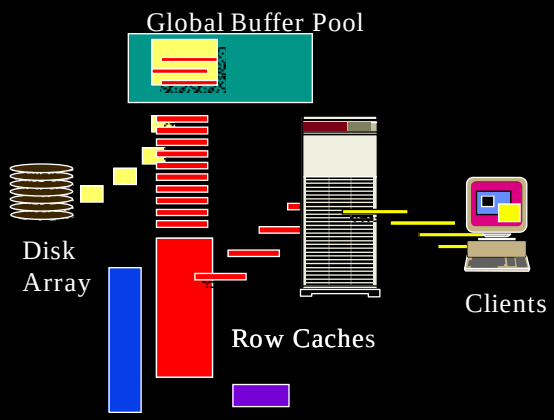
Hot Standby Option



- An exact copy of the primary database
- Transactionally consistent
- Geographically separate systems
- Application transparent
  - No application change
  - Database unchanged (AIJ Fast Commit required)
- Negligible performance impact
- Stand-by database available for Read-Only access
- No longer extra-cost license!

Row Cache

- Dramatically improves read and write performance by servicing requests in memory
- Further improves write performance by eliminating Page Lock conflicts



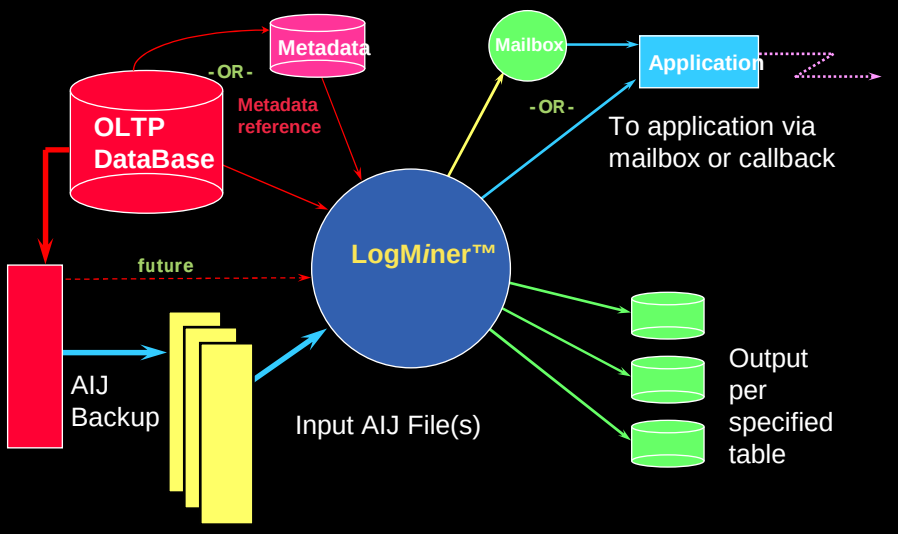
LogMiner™ for Rdb

- Allows extraction of database changes as logged to After-Image Journal
- Filter by Table, Date/Time, etc.
- Application transparent
- Blazingly fast!
  - 100,000 changes to each of 10 tables — 1,000,000 records — extracted in 30 seconds.
- Output to file, mailbox, pipe or user written routine
- No performance impact on production system
- Introduced with Rdb 7.0.4

LogMiner™

- Enables Journal Based Replication
- Most information already in journal
  - Additional information stored - ignored by recovery
  - System relations used to retrieve metadata
- Minimal or zero impact to production database
  - Single quick database retrieval or saved metadata file
  - Data retrieved from backed up AIJ (future: online)
  - AIJ size may be slightly increased (though significantly reduced from table based replication)
  - No application changes
- Addresses data *extraction*; not loading

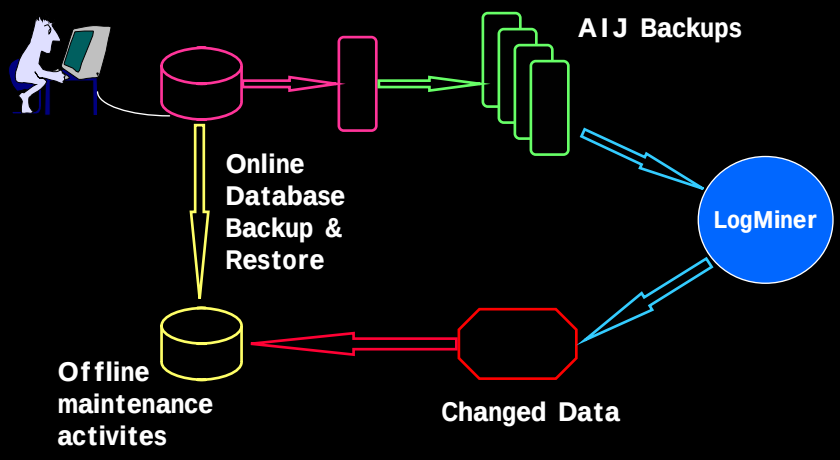
Extracting Data From AIJ



Example: Database Maintenance with Minimal Downtime

- Reduce hours of maintenance to seconds of down-time
  - Online production backup then restore new database
  - Perform maintenance on new database
  - Online AIJ backup / LogMiner unload since backup
  - Populate new database with changes
  - Shutdown application
  - Offline AIJ backup / LogMiner unload changes
  - Populate new database with changes
  - Start online backup of new database
  - Restart application on new database

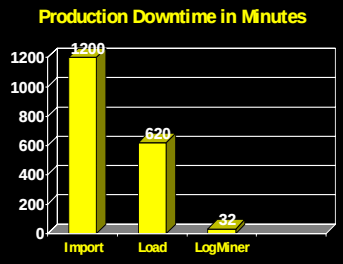
Minimal Downtime...



…One Customer's Experience

- 50GB database
  - 175 tables
  - Largest > 60 million rows; multiple 20+ million row
- Dual-processor ES40, 5GB, FW SCSI, SW-Raid
- Parallel unload/load streams
- Using JCC's LogMiner-Loader Technology
  - www.jcc.com

Method	Downtime
Traditional Export/Import	20 hours
UNLOAD/LOAD via Mailboxes	10.5 hours
LogMiner Approach	32 Minutes



"Continuous" LogMiner™

- In Beta testing
- LogMiner Phase II
- Runs online to extract changes from the AIJ "as they happen"
- Output to VMS Mailbox or user-supplied callback routine
- "Relatively Real Time" reporting database feed

Rdb 6.1

- Rdb 7.1 released
- Rdb 6.1 starts desupport ramp-down, 18 months
- Rdb 6.1 desupported Q1 CY 2003

OpenVMS Alpha Platform Support

- Future OpenVMS releases
- Galaxy enhancements
- Systems
- Processors

Rdb on Itanium : The Announcement

Oracle and Compaq have a long and successful history of delivering enterprise solutions to our OpenVMS customers. In July, Oracle released Rdb 7.1 for OpenVMS. In September, Oracle9i for OpenVMS was released. Given Compaq's recent announcement to consolidate its 64-bit servers on the Itanium Processor Family (tm), Oracle's current plan is to team with Compaq and work toward a delivery of Oracle Rdb and Oracle 9i for OpenVMS on IPF based upon Compaq's current engineering roadmap.

Juan C. Jones
Vice President
System Platforms Division
Oracle Corporation
October 10, 2001

Rdb Has a Successful Porting History

- Ported Rdb from VAX to Alpha
  - Delivered Rdb V5.1
- Ported Rdb to Digital Unix on Alpha
  - Delivered Rdb V6.1
- Ported Rdb to Windows NT (Alpha and Intel)
  - Delivered Rdb V8.0
  - Available for download from Oracle ITN

Rdb on Itanium : Current Plans

- **1-** Create a build environment that uses the intermediate cross compilers on Alpha but generating Itanium object code and executables
- **2-** Require OpenVMS and hardware
  - execution of new Rdb images
  - Port regression and stress-load testing environments to Itanium (could use remote Rdb)
- **3-** Build Rdb using native compilers, librarian and linker
  - Enter external beta testing
- **4-** Release production version on OpenVMS
  - Plan to allow mixed cluster support
  - Features should be the same on both platforms

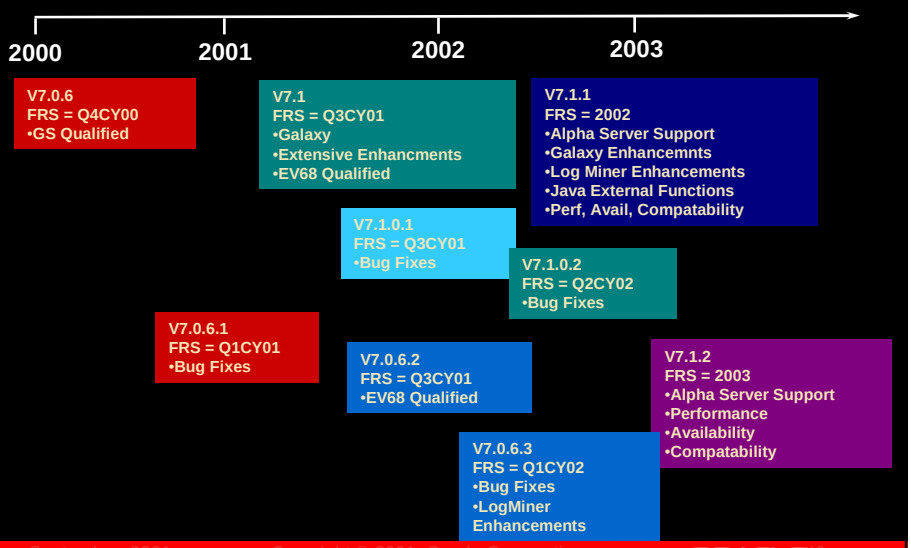
Rdb on Itanium : Products

- Rdb including
  - SQL, SQLPRE, SQLMOD, etc
  - RMU
  - RDO, RDML and RDBPRE
  - Replication Option for Rdb
  - SQL*net for Rdb
  - SQL/Services
- CODASYL DBMS
- CDD/Repository
- Oracle TRACE

Areas of Focus for Rdb 7.Future

- Performance
- Platform Support
- Compatibility with other Oracle Technologies
- Areas of Enhancement
  - Log Miner - Phase III
  - Galaxy - Phase II
  - Row Cache - Phase II
  - VLM Enhancements
  - Online Index Creation
  - Parallel Unload
- SQL*Net for Rdb
- SQL Services
- Tools Integration
- Web access to Rdb data

Oracle Rdb Roadmap



Rdb Technical Forum

- In ‘Europe’ in 2002
  - 17, 18 June 2002 in Zurich, Switzeland
  - 20, 21 June 2002 in Reading, UK
  - 27, 28 June 2002 in Copenhagen
- Best place to :
  - Learn about Rdb
  - Meet the engineers
  - Meet the management

Questions ? Comment ?

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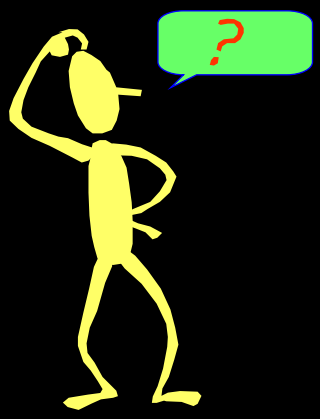

- For more :

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