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THE INFORMATION COMPANY
OracleBI Discoverer 10g R2 (10.1.2)
Best Practices for Performance, Scalability, and Troubleshooting
Oracle BI Discoverer 10g (10.1.2) – Best Practices

• Architecture
• Performance
• Scalability
• Troubleshooting
Architecture

• Architectural differences from 9.0.4
  • Supports OLAP data sources
  • Viewer uses UIX instead of XSL
  • Completely Removed Visibroker
Architecture - Discoverer (OLAP)
OracleBI Discoverer 10g (10.1.2) – Best Practices

- Architecture
- Performance
- Scalability
- Troubleshooting
Performance

• Database
• Business Areas
• Worksheet design
• Scheduling
• Discoverer configuration
• Application Server configuration
Performance – Database

- Star Schema/DW or Analytic Workspace over OLTP/3NF

- Indices

- Materialized Views
  - Discoverer Automated Summary Management
  - Database Server Summary Advisor
Performance - Business Areas

- Folders are SQL statements that generate result sets:
  - Simple, Complex, and Custom
- SQL Optimization in Discoverer 10g
  - Join and Item Trimming; SQL Flattening
- Custom Folders are useful for:
  - UNION, CONNECT BY, MINUS, INTERSECT
  - Optimizer Hints
- Recommend: Simple & Complex first, then Custom
Performance - Business Areas

• Avoid complex aggregation in folders -- try to defer to Worksheet if possible
• Use mandatory conditions in folders to enforce security and restrict result set sizes
• Create optional conditions in folders to encourage their use
Performance - Business Areas

- Tabular reports without page items execute faster than crosstab reports or tabular reports with page items
- Use “Default position” to encourage users to place items on top or side axis. Preferred order:
  - Top
  - Side or Top
  - Side
  - Page
Performance

- Database
- Business Areas
- **Worksheet design**
- Scheduling
- Discoverer configuration
- Application Server configuration
Performance – Worksheet Design

- Table over Crosstab (if appropriate)
- Smart use of parameters and page items
  - parameters reduce data fetched
- Create worksheets that are “human-sized”
  - avoid wide crosstabs
- Remove extraneous worksheets from workbooks
  - reduce time to open
  - reduce time to export
- Use Query Statistics Workbook to identify Worksheets that need tuning
### Performance – Table over Crosstab

<table>
<thead>
<tr>
<th>Region</th>
<th>Country Name</th>
<th>Sales Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>Argentina</td>
<td>$5,235</td>
</tr>
<tr>
<td></td>
<td>Brazil</td>
<td>$12,391</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>$578,820</td>
</tr>
<tr>
<td></td>
<td>United States of America</td>
<td>$12,872,172</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal For Americas</strong></td>
<td><strong>$13,468,419</strong></td>
</tr>
<tr>
<td>Asia</td>
<td>India</td>
<td>$1,268</td>
</tr>
<tr>
<td></td>
<td>Japan</td>
<td>$1,703,635</td>
</tr>
<tr>
<td></td>
<td>Singapore</td>
<td>$763,603</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal For Asia</strong></td>
<td><strong>$2,468,507</strong></td>
</tr>
<tr>
<td>Europe</td>
<td>Denmark</td>
<td>$497,040</td>
</tr>
<tr>
<td></td>
<td>France</td>
<td>$1,005,834</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td>$2,204,699</td>
</tr>
<tr>
<td></td>
<td>Poland</td>
<td>$81</td>
</tr>
<tr>
<td></td>
<td>Spain</td>
<td>$488,179</td>
</tr>
<tr>
<td></td>
<td>The Netherlands</td>
<td>$1,241,484</td>
</tr>
<tr>
<td></td>
<td>Turkey</td>
<td>$6,522</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>$1,658,678</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal For Europe</strong></td>
<td><strong>$7,102,517</strong></td>
</tr>
<tr>
<td>Oceania</td>
<td>Australia</td>
<td>$1,044,202</td>
</tr>
<tr>
<td></td>
<td>New Zealand</td>
<td>$271</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal For Oceania</strong></td>
<td><strong>$1,044,472</strong></td>
</tr>
</tbody>
</table>

**Grand Total for the Year:** **$24,083,915**
Performance – Parameters and Page Items

- Page Items provide very responsive, interactive manipulation of data
- At a cost:
  - Forces retrieval of all Detail values
  - Incremental increases of memory as indices are built
- Parameters reduce result set, improve performance
- Use Page Items only when needed – 2 to 3 with < 12 values each
Performance – Parameters and Page Items - example

- Loc(3), Dept(10), ProdType(50), Prod(1,000), Date(365)
- 547,500,000 potential rows/combinations (3*10*50*1000*365)
- Use parameters for Loc, Dept, ProdType, and 90 day date range
- 90,000 potential rows/combinations (1000*90)
- Reduce data retrieved by ~ 6000 X
- Improve performance by several orders of magnitude
• Application Server configuration
• Discoverer configuration
• Scheduling
• Worksheet design
• Business Areas
• Database

Performance
Performance - Scheduling

The image shows a graphical interface for scheduling workbooks. The interface includes a wizard with multiple tabs:

1. **Step 1 of 3: General**
   - What do you want to name this scheduled workbook? (Enter: Channel Analysis)

2. **Step 2 of 3: Schedule**
   - When do you want to schedule this workbook?
     - Immediately
     - Time: Tuesday, September 5, 2005, 12:01 AM
     - Time zone: Pacific Daylight Time

3. **Step 3 of 3: Schedule**
   - How often do you want to repeat this schedule?
     - Never
     - Repeat every 1 Day(s)
   - Scheduled workbooks save versions of results?
     - Yes, keep all results:
     - No, just keep the latest set
   - How long do you want to keep the results?
     - Delete results after 5 days.

The interface includes options for managing scheduled tasks and specifying their execution parameters.
Performance

- Database
- Business Areas
- Worksheet design
- Scheduling

Discoverer configuration
Application Server configuration
Performance - Discoverer configuration

- Viewer
  - WebCache & Delay Times
- Portlet Provider
  - Session Pool
- Set RowsPerFetch appropriately
  - in prefs.txt overall
  - in Plus and Viewer Options per user
Performance – Viewer configuration

Discoverer Viewer Configuration
Discoverer Viewer is a read-only publishing tool that allows users to open workbooks created with Discoverer Plus or Discoverer Desktop. Users can view, drill down, drill out, pivot, sort, and change the layout of data.

Viewer Delay Times
Specify the amount of delay time.
* Indicates a required field

- Query Progress Page (seconds) [3]
  Time to wait before returning the initial query progress page.

- Request (seconds) [6]
  Frequency to check for request completion. This should typically be just less than the browser's timeout specification.

- Query Request Timeout (seconds) [6]
  The time to wait before displaying query progress page.

- Long Request Timeout (seconds) [6]
  The time to wait before displaying the long progress page.
Performance – Portlet Provider configuration

**Discoverer Session**

The Discoverer Portlet Provider uses Discoverer sessions to update cached data for Discoverer Portlets. These Sessions can be pooled for reuse by different Discoverer Portlets, saving CPU and memory.

Specify the maximum number of Discoverer sessions to pool.

* Indicates a required field

- **Maximum Sessions**: 20

**TIP** A small number of maximum sessions in the pool saves memory but causes requests to be queued for a short time if all sessions are in use.

- **Maximum Session Inactivity (minutes)**: 10

**TIP** The maximum number of minutes a session is allowed to be inactive in the pool before being removed.

- **Maximum Session Age (hours)**: 2

**TIP** The maximum number of hours a session is allowed to be in the pool even if it is active.

- **Maximum Wait Time (minutes)**: 120

**TIP** The maximum number of minutes to wait for a session to become available before cancelling a portlet refresh.
Performance – RowsPerFetch

- Default is 250. Set to 1000 if expecting to typically fetch thousands of rows
- Set for all users in prefs.txt – applypreferences
- Set for individual users with dis51pr command line or in “Retrieve data incrementally in groups of” in …
  - Plus (Tools | Options | Query Governor)
  - Viewer (Preferences)
Performance

- Database
- Business Areas
- Worksheet design
- Scheduling
- Discoverer configuration
- Application Server configuration
Performance – Application Server configuration

- OC4J number of JVMs
  - machine resources permitting, 1 per 2 CPUs
- OC4J JVM memory settings
Performance – Application Server configuration

- **General**
  - **Name**: OC4J_BI_Forms
  - **Server Root**: C:\1012_BIAS_050808_1601j2ee\OC4J_BIFormsModule\config

- **Command Line Options**
  - **Java Executable**: 
  - **OC4J Options**: -properties -userThreads
  - **Java Options**: 
    - config\java2\policy -Djava.awt.headless=true -Xmx512M -Xms128M

- **Environment Variables**
  - **DISPLAY**: localhost:0
  - **LD_LIBRARY_PATH**: C:\1012_BIAS_050808_1601\lib32\C:\1012_BIAS_050808_1601\lib32\C:\1012_BIAS_050808_1601\lib32
Oracle BI Discoverer 10g (10.1.2) – Best Practices

- Architecture
- Performance
- **Scalability**
- Troubleshooting
Scalability

- Sharing Scheduled Results
- Session timeout
- Load Balancing
- Deployment Considerations
- Balancing Portlet Providers
Scalability – Sharing Scheduled Results
Scalability – Session Timeout

• To reduce memory consumption on mid-tier reduce session timeout values to clean up inactive sessions
  • Plus – timeout (default 1800 = 30 minutes) in pref.txt
  • Viewer -- session-timeout tag (default 10 minutes) in web.xml
Scalability – Load Balancing

- Install Oracle AS Discoverer on multiple machines
  - Oracle AS WebCache
  - Commercial HTTP/IP Router load balancers
- Try to distribute Portlet refreshes as evenly as possible
Scalability – Deployment Considerations

• Consider user population, uses and right mix
  • Portlet Provider
  • Viewer
  • Plus
• Typical mix is 70/30 report consumers to report authors
• Active users are typically 10% of total population
• Follow Capacity Planning Guidelines on OTN
Scalability – Balancing Portlet Providers

- Synchronize machine times
- Identical Portlet Provider Session Pool Settings
- Identical peekSleepIntervalSec in opmn.xml file
- If adjustments are needed
  - Maximum Sessions
  - peekSleepIntervalSec
Oracle BI Discoverer 10g (10.1.2) – Best Practices

- Architecture
- Performance
- Scalability
- Troubleshooting
Troubleshooting

- checkdiscoverer script
- Plus OLAP Diagnose
- Monitor Performance
- Enable Logging
- Java Console
- SQL Trace
- EUL Status Workbooks
Troubleshooting - checkdiscoverer

- Use when nothing works
- Checks
  - Discoverer Activation processes
  - Discoverer Session
  - Discoverer Preferences
  - NICs
- collectlogs script
Troubleshooting – Plus OLAP Diagnose

To analyze the connection error, run a Quick Diagnosis or Extensive Diagnosis to create a Diagnostic Report. Use the Save As button to save the report to a file which you can send to Oracle support.

Diagnostic Report:

26/37) Measure Margin 12 Mo MOV Avg ...... = Successful
S=CS OLAP, C=SHAPSALES, M=MARGIN_12MMA

27/37) Measure Margin 6 Mo MOV Avg ...... = Successful
S=CS OLAP, C=SHAPSALES, M=MARGIN_6MMA

28/37) Measure Margin 1st Best Fit ...... = Successful
S=CS OLAP, C=SHAPSALES, M=MARGIN_FCST_SF

29/37) Measure Margin % Growth Prior Period = Successful
S=CS OLAP, C=SHAPSALES, M=MARGIN_FCST_CHANGE_PF

30/37) Measure Margin % Growth ...... = Successful
S=CS OLAP, C=SHAPSALES, M=MARGIN_FCST_CHANGE_PF_12MMA

31/37) Measure Margin % .................. = Successful
S=CS OLAP, C=SHAPSALES, M=MARGIN_PERCENT

32/37) Measure Quantity .................. = Successful
S=CS OLAP, C=SHAPSALES, M=QUANTITY_SOLD

33/37) Dimension Time ...................... = Successful
S=CS OLAP, D=SHAV_TIME

34/37) Dimension Promotion ................. = Successful
S=CS OLAP, D=SHAPROMOTIONS

35/37) Dimension Product ................... = Successful
S=CS OLAP, D=SHAPPRODUCTS

36/37) Dimension Geography ................ = Successful
S=CS OLAP, D=SHAPGEOGRAPHIES

37/37) Dimension Channel .................. = Successful
S=CS OLAP, D=SHAPCHANNELS

ORACLE
Troubleshooting – Monitor Performance

- Use Application Server Control
  - Discoverer Services
  - Discoverer Components
    - Plus
    - Viewer
    - Portlet Provider
Troubleshooting – Monitor Performance

Discoverer Plus

Discoverer Plus Sessions

The session information is for Discoverer Plus only. Discoverer Plus OLAP connects directly to the database using JDBC and does not create sessions in the middle-tier.

Sessions 2

<table>
<thead>
<tr>
<th>Session ID</th>
<th>OS Process ID</th>
<th>Total CPU Usage (%)</th>
<th>Total Memory Usage (MB)</th>
<th>DBUser@DB - EUL</th>
<th>SSO User</th>
<th>View Log</th>
</tr>
</thead>
<tbody>
<tr>
<td>200509061954452880-2688</td>
<td>0.0</td>
<td>2.06</td>
<td></td>
<td>VIDEO4@DESCRIPTION=(ADDRESS=(PROTOCOL=TCP) (HOST=dssqa21.us.oracle.com)(PORT=1521)) (CONNECT_DATA=(SERVER=DEDICATED) (SERVICE_NAME=dssqa.us.oracle.com)))</td>
<td>ORCLADMIN</td>
<td></td>
</tr>
<tr>
<td>200509061972328800-2680</td>
<td>0.29</td>
<td>25.14</td>
<td></td>
<td>VIDEO1012@dssqa92</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Troubleshooting – Enable Logging

- Use Application Server Control
  - Discoverer Services
  - Discoverer Components
    - Plus
    - Viewer
    - Portlet Provider
Troubleshooting – Enable Logging
Troubleshooting – Java Console

Java(TM) Plug-in Control Panel

Show console
Hide console
Do not start console

Show Java in System Tray
Show Exception Dialog Box

Java Console

Installed custom security manager
Could not set permission PermissionChecker.SYSTEM for IE
This can cause a "Warning: Applet Window" to be displayed when running with IE
Logs:

atempt 1: adding Protocol[protocol] -> rmi
atempt 1: adding default Protocol[timeouts] -> 40
atempt 1: adding RMI[Protocol transport] -> (rmi
atempt 1: adding RMI[Protocol[server]] -> discovererplus
atempt 1: adding RMI[Protocol[server] sessionid -> 1
atempt 1: adding RMI[Protocol[sessionid] -> sessionid=0a8f9b5e9e86a4753a556463f327d5f1d14e1f

New LOGUIP
Lookup Requested
Performing lookup RMI: lookup: http://bidemo.us.oracle.com:7779/discovererplus
Reading bytes from input stream
Unmarshalling response
Session ID: 20093100005563932
REMOVE DEBUG OPTION
Bl Beans Debugger[3.2.1.0.13]
Bl Beans Debugger[3.2.1.0.13]

Clear Copy Close
Troubleshooting – SQL Trace

- Set SQLTrace preference
  - Collect trace files from DB Server
- Manual
  - Extract the SQL
    - Plus – Show SQL
    - Plus – post_save_document EUL trigger
  - Start trace and run in SQL Plus
Troubleshooting – EUL Status Workbooks

- Reports on the EUL itself (joins, folders, conditions, hierarchies etc.)
- Report on Discoverer usage by users
  - Which worksheets run by which users and the frequency
  - Number of rows returned
  - Useful in diagnosing worksheets which can be improved with additional parameters
- Standard business area and workbook which ships with the product. Simply import and run.
Best Practices References

- Oracle Business Intelligence Discoverer 10g Release 2 (10.1.2.1) Documentation - http://www.oracle.com/technology/documentation/discoverer.html
  - Oracle Business Intelligence Discoverer Configuration Guide
  - Oracle Discoverer Administrator Administration Guide
- Oracle Application Server 10g Release 2 Documentation http://www.oracle.com/technology/documentation/appserver1012.html
  - Oracle Application Server Performance Guide
- Oracle Database 10g Release 2 Documentation http://www.oracle.com/technology/documentation/database10gr2.html
  - Data Warehousing Guide
  - Performance Tuning Guide
- To be released:
  - Diagnostics for Discoverer 10g (10.1.2)
  - Capacity Planning Guide for Discoverer 10g (10.1.2)