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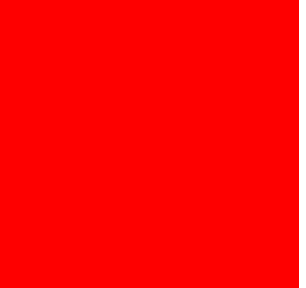


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**Oracle BI Publisher 10g
Best Practices -- Session # 8633**

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The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions.

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BI Publisher 10g Best Practices

Agenda

- Oracle BI Publisher Enterprise Overview
- System Configuration Guidelines
- BI Publisher Server Configuration Options
- Report Design Best Practices
 - Data Modeling Guidelines
 - Template Design Guidelines
- Q & A



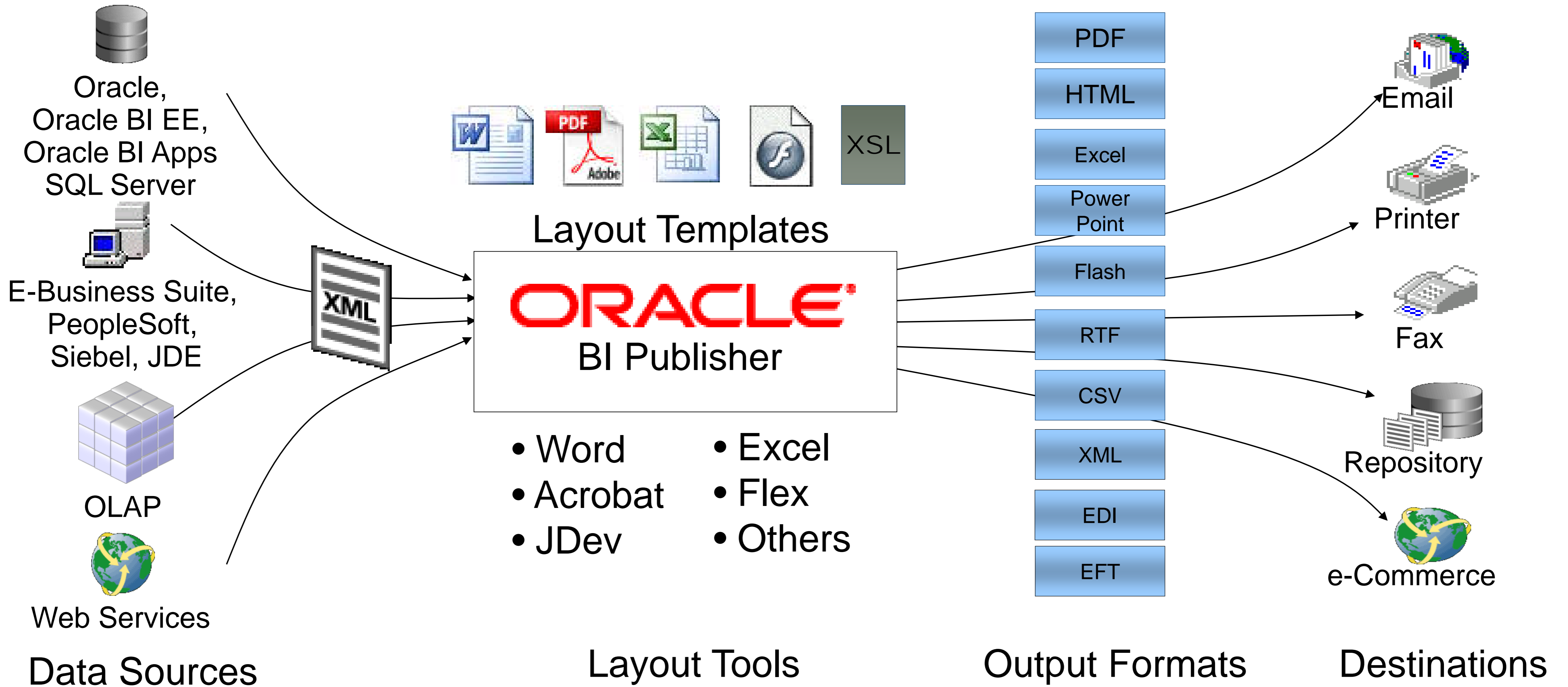
Oracle BI Publisher Enterprise One Solution

- One Environment
 - Author
 - Generate
 - Deliver
- Benefits
 - Eliminate complexity
 - Simplify report development & maintenance
 - Reduce costs

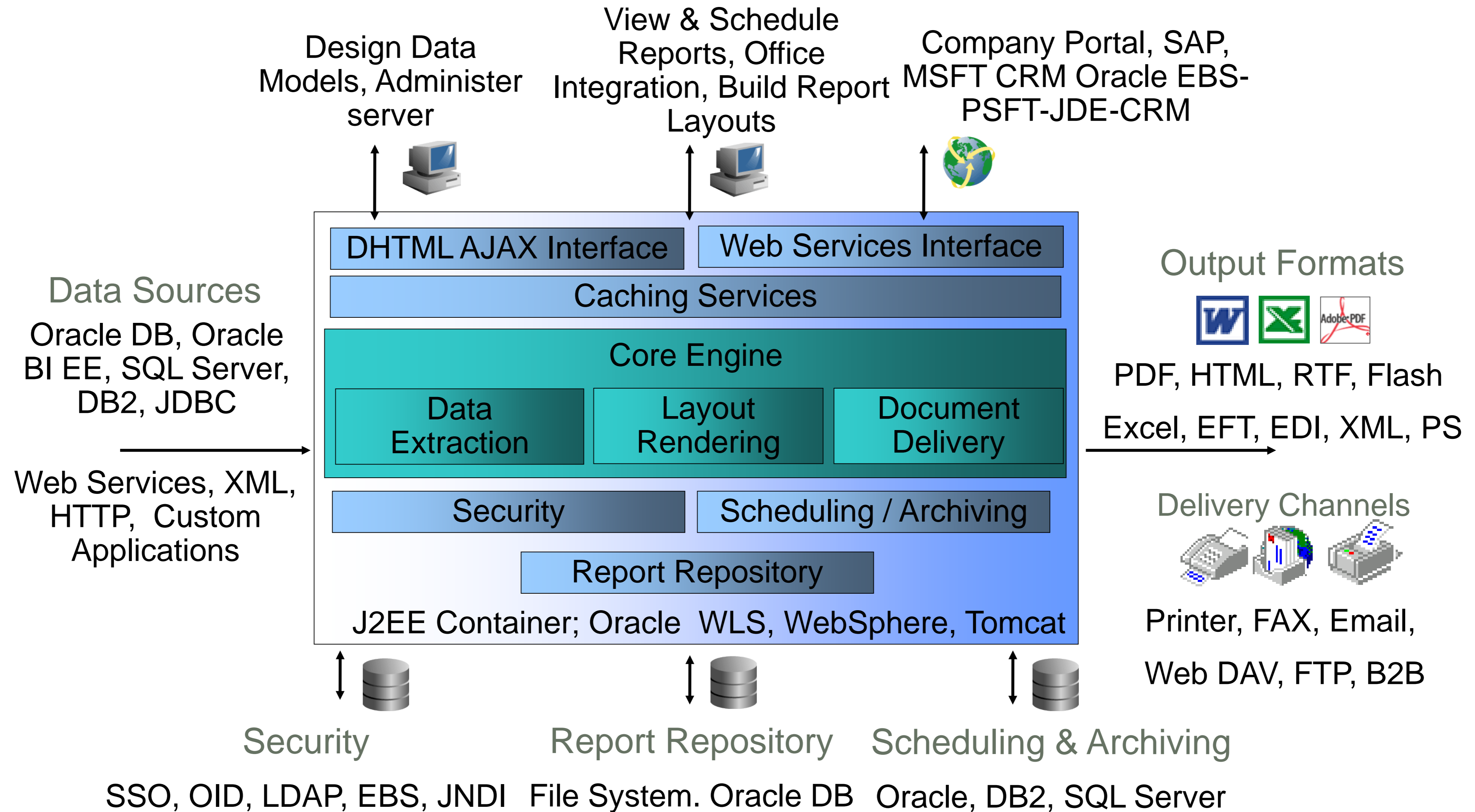


Oracle BI Publisher Enterprise

From Data to Document to Delivery



Architecture



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Hardware & Software Requirements

Java, Memory & Storage

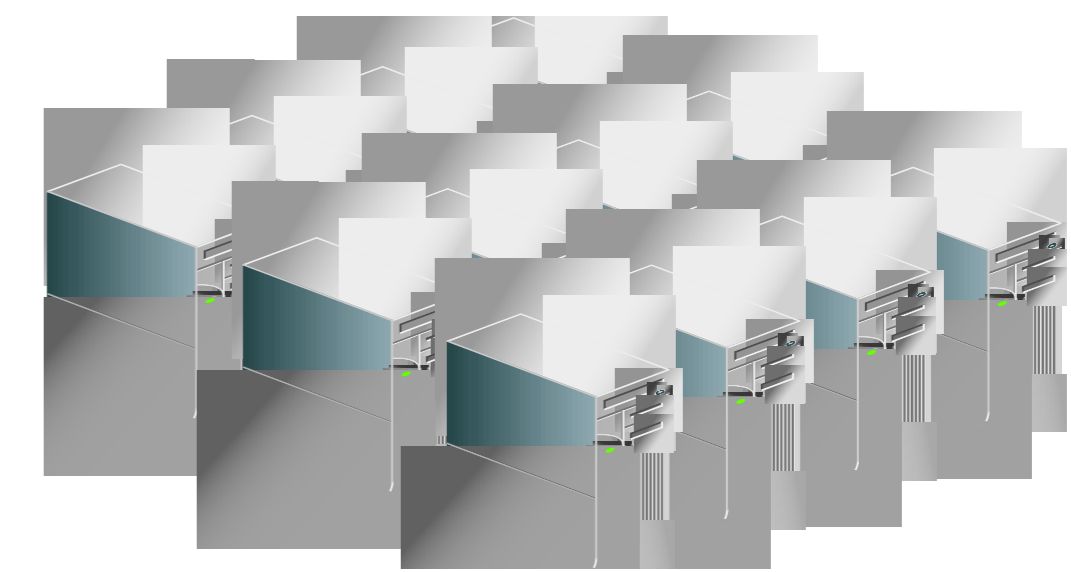
- JVM settings & JDK version
 - 64 bit JVM (on a 64 bit OS)
 - JDK version 1.6 (update 2) or higher
- Memory (RAM)
 - 8 GB on 64 bit OS is recommended for large, high volume use
 - 2 GB on 32 bit OS suitable for small to mid volume use
- Storage
 - 30 GB Hard disk space (repository) could be shared for cluster
 - 20 GB Temp space (document processing) not shared

Please refer to our certification matrix for supported OS platforms and J2EE Web servers.

The link is available in the Appendix.

Sizing Guidelines – How Many Servers?

- Usage type
 - Online/concurrent report viewing
 - Bursting
- Total number & size of reports
 - Online/concurrent scenario (Small, Medium, Large)
 - Bursting (total # of reports, time window)
- Number of CPU/server & CPU rating



Sizing Example

Metalink Note 948841.1

Concurrent Usage	
Sizing Data Input	
# user with small reports (~ 10 Pages)	20
# user with medium report (~ 50 pages)	20
# user with Large report (>100 Pages)	10
# user with extremely large report (> 100,000 rows)*	1

* Recommend offhour or dedicated server

Production Machine	
Total Number of CPUs/Server	2
Spec2006 Ratings Info	
CPU CINT2006 Rates Base Score	47.10
# of CPUs used for benchmarking	2

Results	
Recommended Number of Servers	1
Server(s) utilization	68%

Bursting Usage	
Sizing Data Input	
Total Number of Reports	10000
Time to Generate Reports	60 Minutes

Reports Distribution (Optional)	
Small reports (~ 10 pages)	80%
Medium reports (~ 50 pages)	10%
Large reports (> 100 pages)	10%

Production Machine	
Total Number of CPUs/Server	2
Spec2006 Ratings Info	
CPU CINT2006 Rates Base Score	24.10
# of CPUs used for benchmarking	1

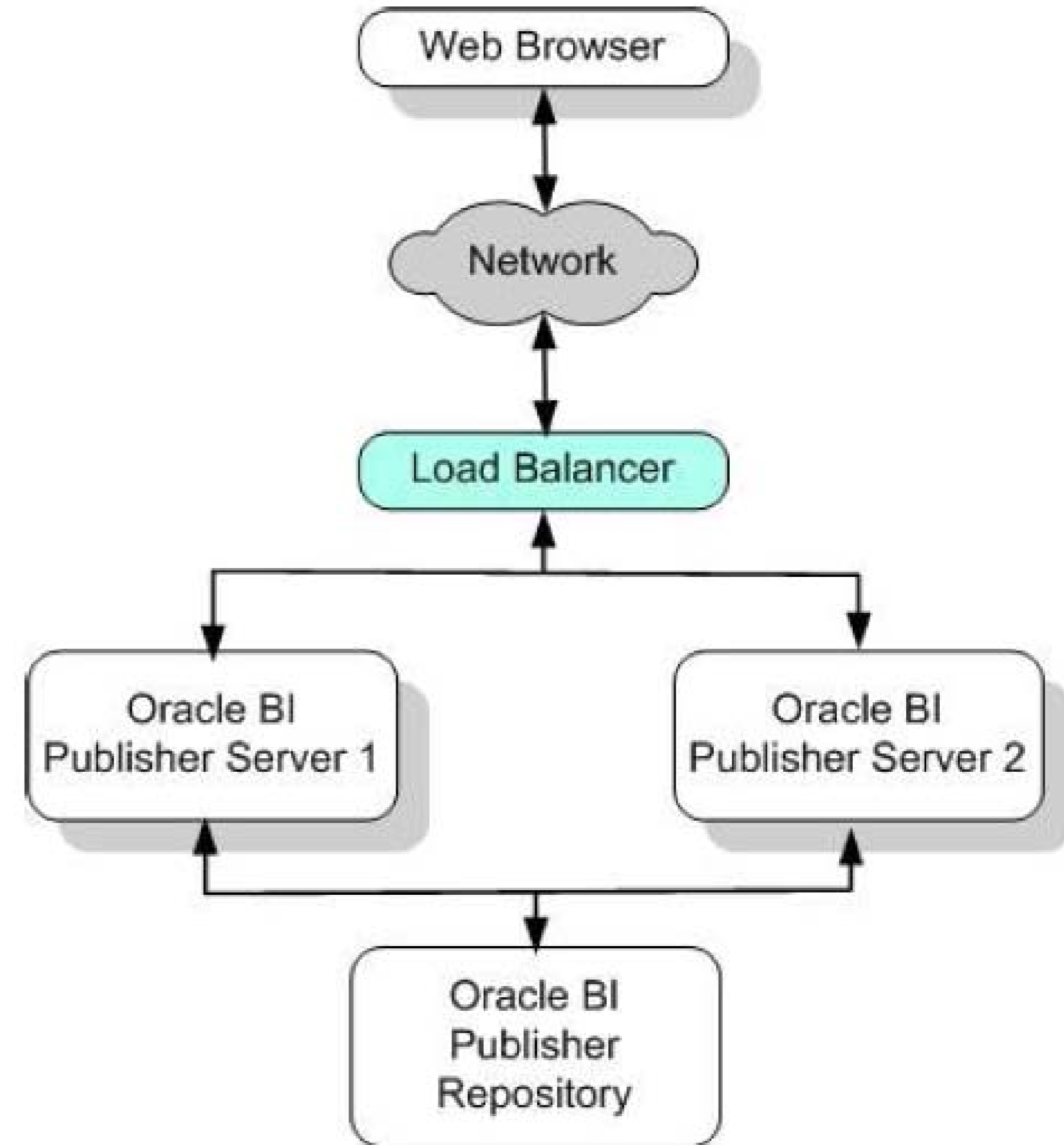
Results	
Recommended Number of Servers	1
Server(s) utilization	13%

Deployment Options – Cluster Deployment

- High availability
 - Improve availability of the system
- Load balancing
 - Increase throughput

For more details on clustering, please refer to our White Paper on High Availability.

The link is available in the Appendix.



Deployment Options – Scheduler Configuration

- Enable clustering

Admin > Scheduler Configuration

System Maintenance

Report Repository | Server Configuration | Scheduler Configuration

TIP Any changes will only take effect after the application is restarted.

Database Connection

Database Connection Type: jdbc

Database Type: Oracle 10g

Connection String: jdbc:oracle:thin:@localhost:1521:orcl

Username: BIPSCHDLR

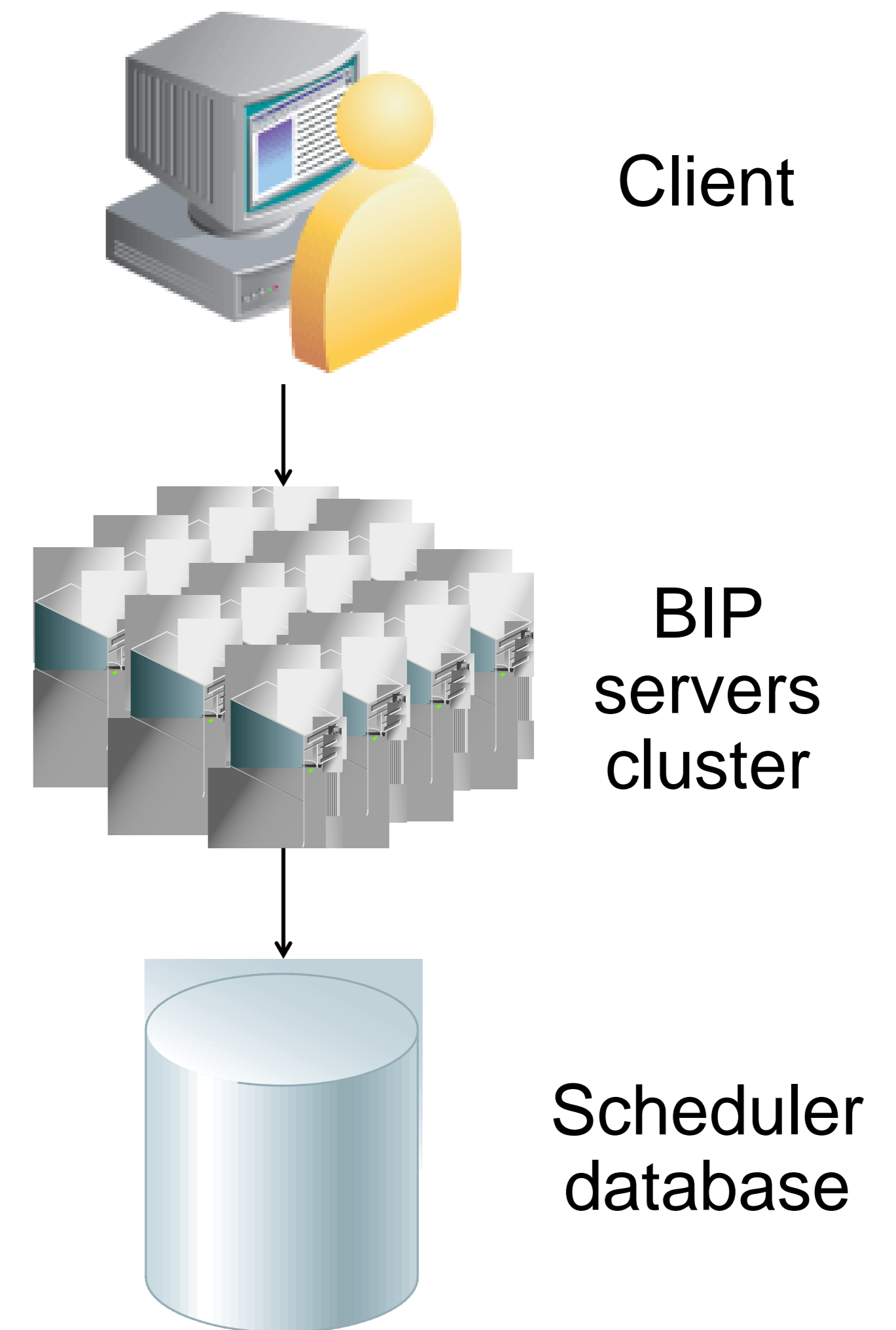
Password: ●●●●●●

Database Driver Class: oracle.jdbc.OracleDriver

Test Connection | Install Schema

Scheduler Properties

Enable Clustering



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Server Configuration Options

- Debug level*
- Scalable threshold (in bytes)*
- Cache expiration (in min)
- Cache size limit (# of datasets)
- Maximum cached reports

System Maintenance

Report Repository Server Configuration Scheduler Configuration

✓ TIP Any changes will only take effect after the application is restarted.

General Properties

System Temporary Directory C:\MyTemp\Publisher

Debug Level	Exception
Report Viewer Height	600
Report Scalable Threshold	10,000,000

Output Formats

- PDF
- HTML
- RTF
- Excel
- Excel2000
- PowerPoint
- MHTML
- CSV
- Data

Caching

Cache Expiration (minutes)	30
Cache Size Limit	1000
Maximum Cached Reports	50

Default values

Server Configuration Options – Runtime Configuration Settings

- Bursting
 - Enable multithreading – *Default: False**
 - Thread count – *Default: 2**
- FO processing
 - Enable scalable feature of XSLT processor – *Default: False**
 - Enable multithreading – *Default: False**
 - FO Parsing Buffer Size – *Default: 1000000**
 - Use BI Publisher's XSLT processor – *Default: True*
 - Enable XSLT runtime optimization – *Default: True*
 - Pages cached during processing – *Default: 50*

Report-level Properties – Runtime Properties

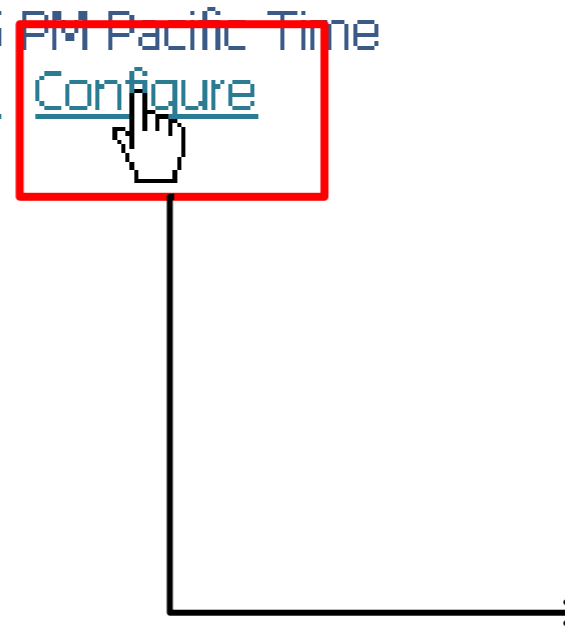


Warehouse Inventory Report

This report comes with two different layouts. The first provide the product inventory listed for each product second layout show the inventory for each warehouse data source is the jdbc data source "demo" based on OE schema.

Date Modified 12/11/06 3:25 PM Pacific Time

[View](#) [Schedule](#) [History](#) [Edit](#) [Configure](#)



Runtime Configuration		
Properties		
	Report Value	Server Value
[-] Properties		
[-] Bursting		
Enable multithreading	<input type="checkbox"/>	False
Thread count	<input type="text" value="2"/>	2
[-] FO Processing		
Use BI Publisher's XSLT processor	<input type="checkbox"/>	True
Enable scalable feature of XSLT processor	<input type="checkbox"/>	True
Enable XSLT runtime optimization	<input type="checkbox"/>	True
Pages cached during processing	<input type="text" value="50"/>	50
Bidi language digit substitution type	<input type="checkbox"/>	National
Disable variable header support	<input type="checkbox"/>	False
Add prefix to IDs when merging FO	<input type="checkbox"/>	False
Enable multithreading	<input type="checkbox"/>	False
Disable external references	<input type="checkbox"/>	True
FO Parsing Buffer Size	<input type="text" value="1000000"/>	1000000
[-] RTF Template		
Extract attribute sets	<input type="checkbox"/>	Auto
Enable XPath rewriting	<input type="checkbox"/>	True
Characters used for checkbox	<input type="text" value="Albany WT J;97"/>	Albany WT J;97

Report-level Properties – Data Model

- Set scalable mode property to “on” in Data Template

```
<properties>
```

```
  <property name="scalable_mode" value="on" />
```

```
</properties>
```

- Cache Result
 - Saves XML data for reuse up to the Cache Expiration threshold
 - Improved performance with different template/output format
 - Not recommended for real-time data

Data Set

General Settings

Name: Q1

Type: SQL Query

Details

Data Source: Default Data Source demo [Refresh Data Source List](#)

Cache Result

Caching

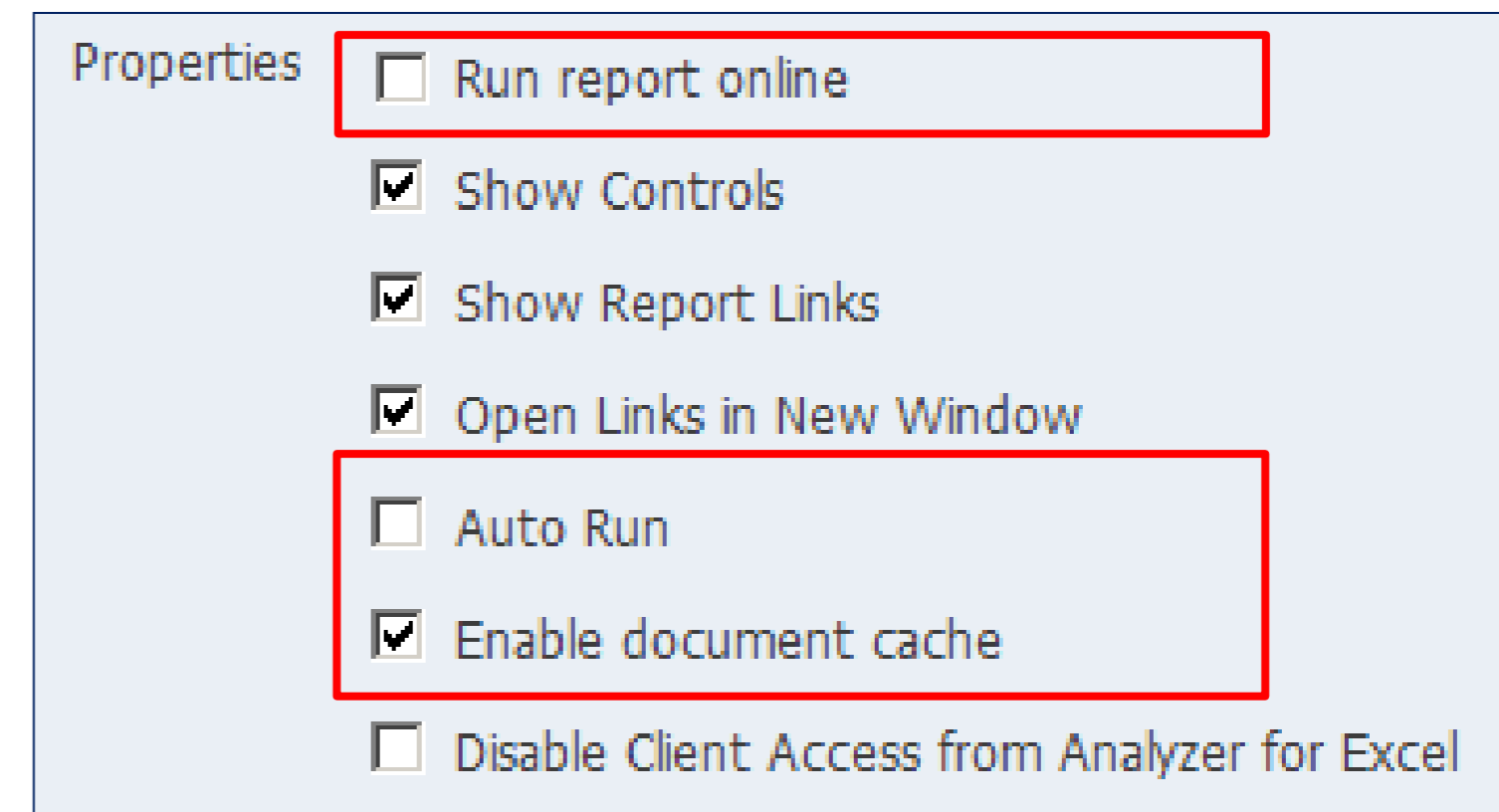
Cache Expiration (minutes): 30

Cache Size Limit: 1000

Maximum Cached Reports: 50

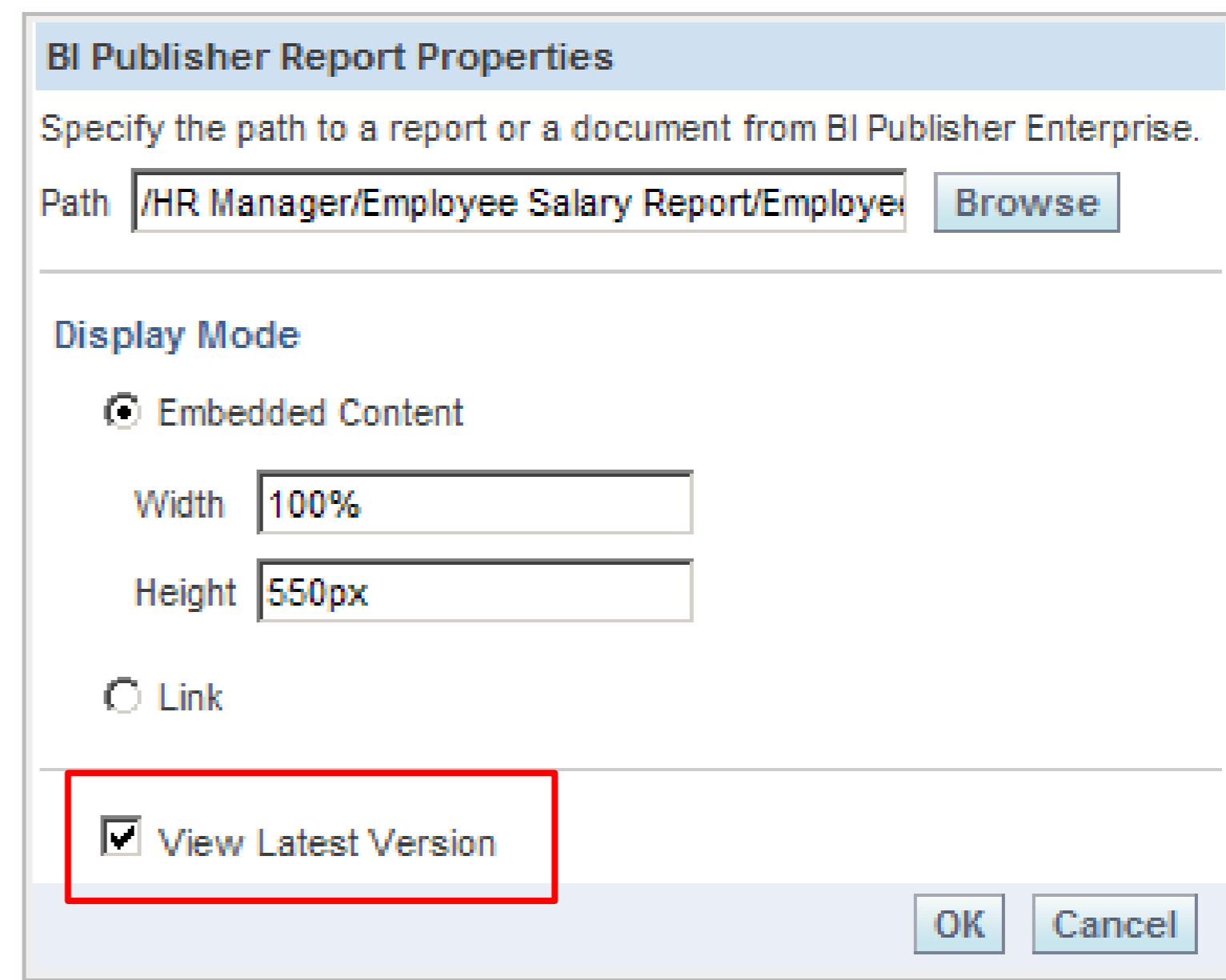
Report-level Properties – Viewing Reports Online

- For long running reports
 - Select **Enable document cache**
 - Disable **Auto Run**
 - Take advantage of scheduling and disable **Run report online**.
 - **Tip:** If you are using OBIEE, publish the report to a Dashboard and select **View Latest Version**.



Properties

- Run report online
- Show Controls
- Show Report Links
- Open Links in New Window
- Auto Run
- Enable document cache
- Disable Client Access from Analyzer for Excel



BI Publisher Report Properties

Specify the path to a report or a document from BI Publisher Enterprise.

Path

Display Mode

Embedded Content

Width

Height

Link

View Latest Version

BI Publisher 10g Best Practices

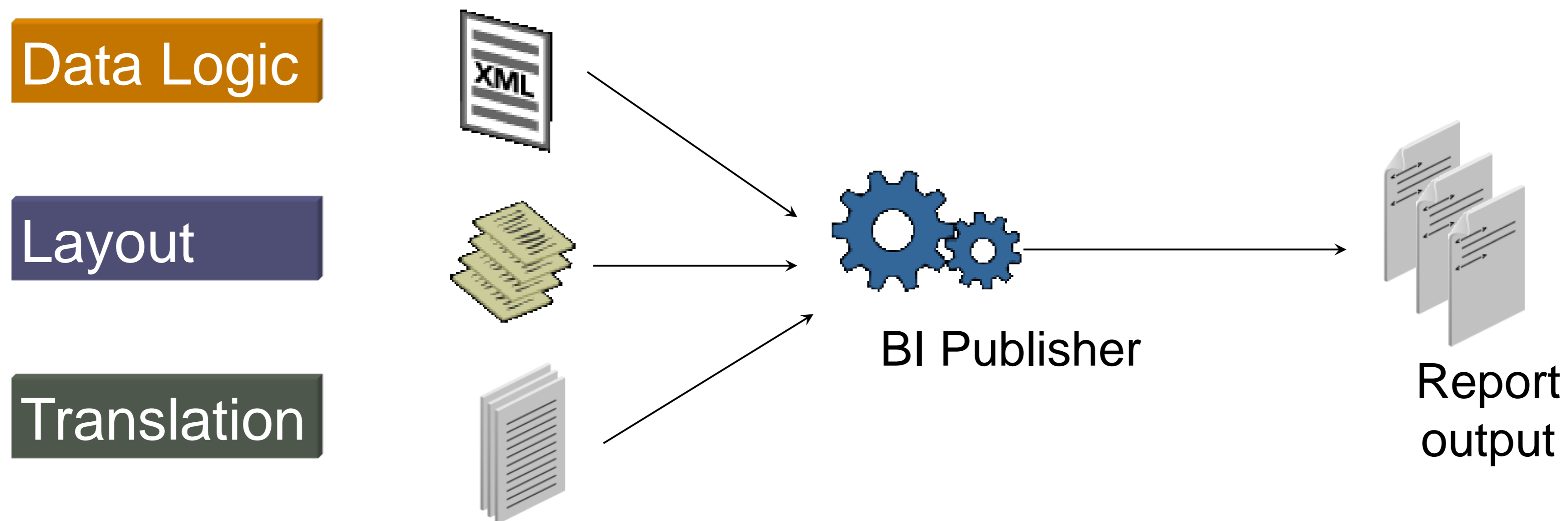
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Oracle BI Publisher Enterprise – Report Architecture

- Separate data logic, layout & translation benefits
 - greater flexibility and reuse
 - fewer reports and better report maintenance
 - optimize data extraction and document generation process



Best Practices for XML Data

Data Extraction & Processing – Data Sources

- Data Source Types

- File (XML)
- Data Template
- SQL Query
- MDX Query
- Web Service
- Oracle BI Answers
- Oracle BI Discoverer
- HTTP (XML Feed)

- Connection Types

- JDBC
- JNDI (Recommended, can take advantage of connection pooling)

The screenshot shows the 'Data Set' configuration window in Oracle BI. The 'General Settings' tab is selected, displaying the 'Name' field with the value 'Q1' and the 'Type' dropdown menu set to 'SQL Query'. The dropdown menu is open, showing a list of data source types: 'SQL Query', 'HTTP (XML Feed)', 'Web Service', 'Data Template', 'Oracle BI Answers', 'Oracle BI Discoverer', 'File', and 'MDX query'. The 'Details' tab is also visible, showing the 'Data Source' field and a 'fresh' button.

Best Practices for XML Data

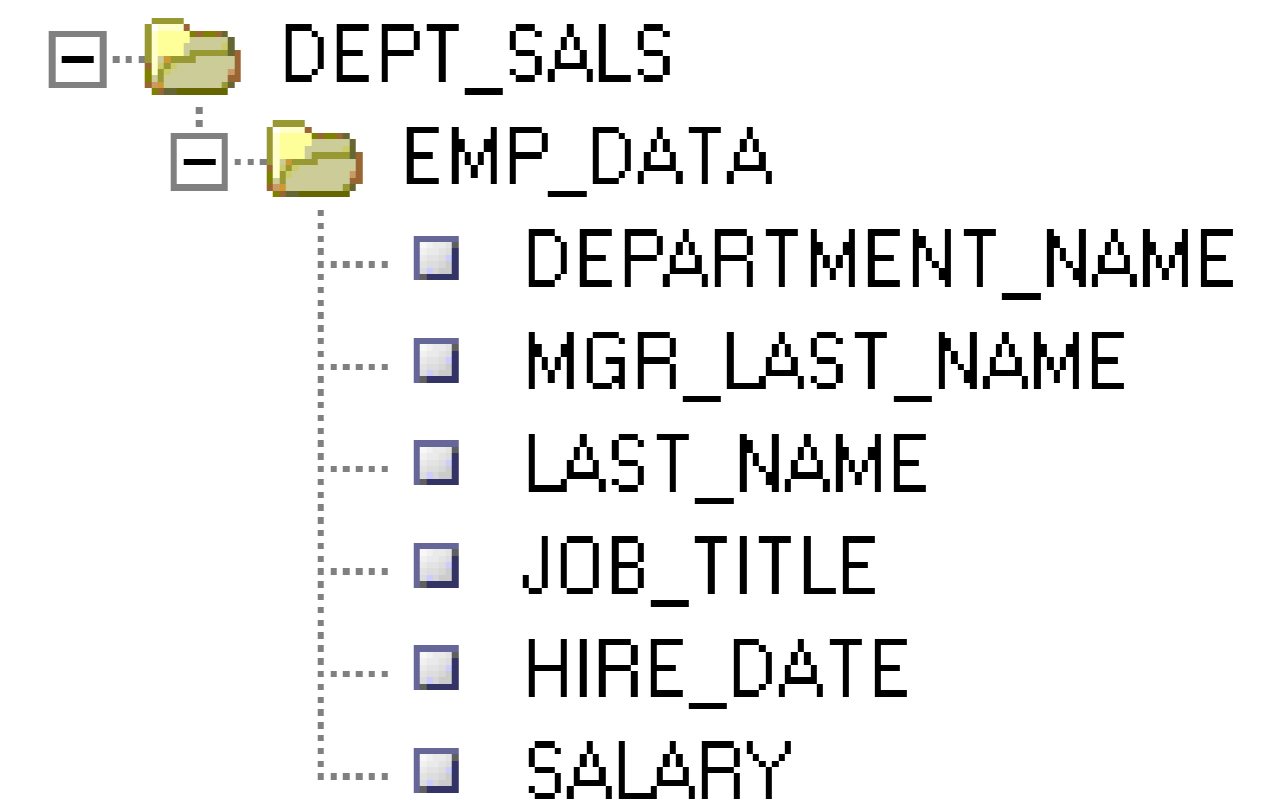
Data Extraction & Processing – Data Template

- Join & structure data from different sources
- For large data sets
 - Push expensive joins to the database
 - Generate XML data optimized for document generation
 - Sort data (preferably at the source)
 - Structure data
 - Pre-calculate group-level and report-level aggregate functions
 - Take advantage of before report triggers

Best Practices for XML Data

Data Extraction & Processing – Flat XML

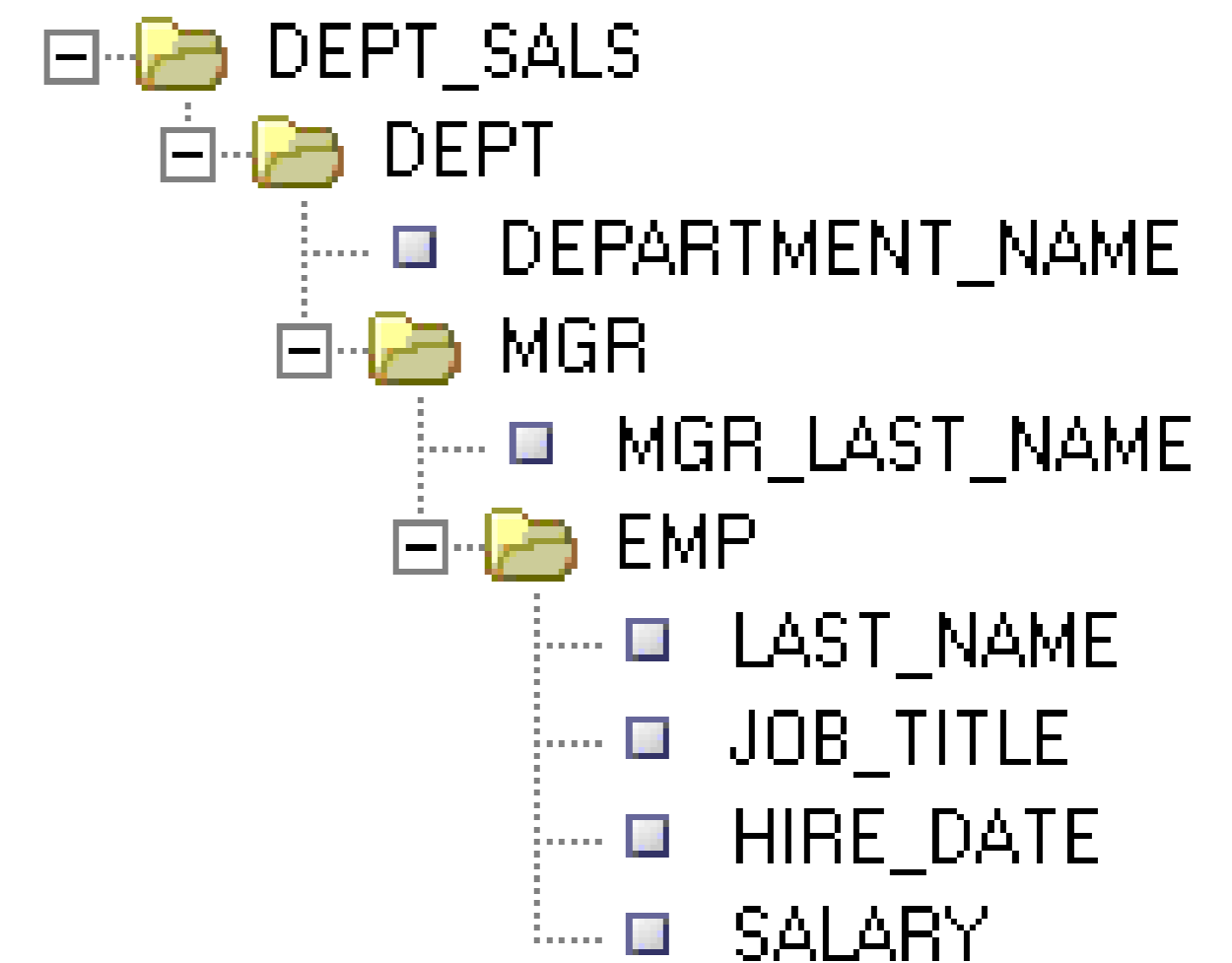
```
- <DEPT_SALS>
  - <EMP_DATA>
    <DEPARTMENT_NAME>Accounting</DEPARTMENT_NAME>
    <MGR_LAST_NAME>Kochhar</MGR_LAST_NAME>
    <LAST_NAME>Higgins</LAST_NAME>
    <JOB_TITLE>Accounting Manager</JOB_TITLE>
    <HIRE_DATE>1994-06-07T00:00:00.000-07:00</HIRE_DATE>
    <SALARY>12000</SALARY>
  </EMP_DATA>
  - <EMP_DATA>
    <DEPARTMENT_NAME>Accounting</DEPARTMENT_NAME>
    <MGR_LAST_NAME>Higgins</MGR_LAST_NAME>
    <LAST_NAME>Gietz</LAST_NAME>
    <JOB_TITLE>Public Accountant</JOB_TITLE>
    <HIRE_DATE>1994-06-07T00:00:00.000-07:00</HIRE_DATE>
    <SALARY>8300</SALARY>
  </EMP_DATA>
```



Best Practices for XML Data

Data Extraction & Processing – Hierarchical XML

```
- <DEPT_SALS>
- <DEPT>
  <DEPARTMENT_NAME>Accounting</DEPARTMENT_NAME>
- <MGR>
  <MGR_LAST_NAME>Higgins</MGR_LAST_NAME>
- <EMP>
  <LAST_NAME>Gietz</LAST_NAME>
  <JOB_TITLE>Public Accountant</JOB_TITLE>
  <HIRE_DATE>1994-06-07T00:00:00.000-07:00</HIRE_DATE>
  <SALARY>8300</SALARY>
</EMP>
</MGR>
- <MGR>
  <MGR_LAST_NAME>Kochhar</MGR_LAST_NAME>
- <EMP>
  <LAST_NAME>Higgins</LAST_NAME>
  <JOB_TITLE>Accounting Manager</JOB_TITLE>
  <HIRE_DATE>1994-06-07T00:00:00.000-07:00</HIRE_DATE>
  <SALARY>12000</SALARY>
</EMP>
</MGR>
</DEPT>
- <DEPT>
```



Best Practices for XML Data

Data Extraction & Processing – Element Naming

- Avoid re-using the same name for element names. Sometimes this make sense – for example, `CITY` under `SHIPPING_ADDRESS` and `BILLING_ADDRESS`. But in many cases you are better off using different names e.g. `S_CITY` and `B_CITY`
- Use short element names to reduce XML file size

Best Practices for XML Data

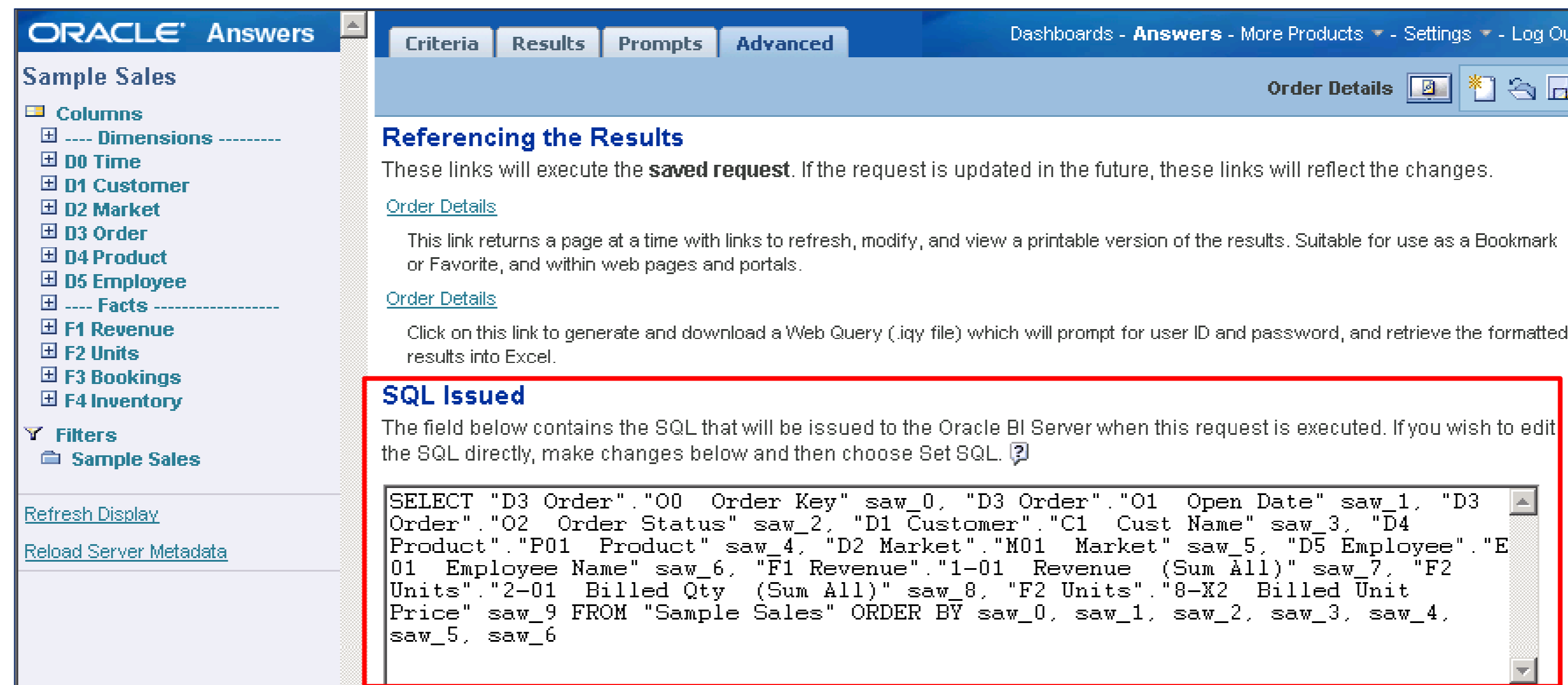
NULL Elements & XML Attributes

- Avoid generating empty tags in the XML
 - Missing fields **do not** cause an issue with XSL – for example a print statement will just return an empty string
 - Aggregation over fields that contain empty tags **will fail** with a “not a number” exception
- Avoid using XML attributes, they are supported but are more complicated to use in the Template Builder for Word

Data Extraction & Processing

OBIEE Data Source

- If possible use SQL/ JDBC against BI Server instead of using an Answers Request as a data source
 - **Tip:** Copy the SQL in an Answers Request and paste into the Query Builder text area



The screenshot shows the Oracle Answers Query Builder interface. The left sidebar contains a tree view for 'Sample Sales' with columns and filters. The main area is titled 'Referencing the Results' and contains several links. A red box highlights the 'SQL Issued' section, which contains a text area with the following SQL query:

```
SELECT "D3 Order"."00 Order Key" saw_0, "D3 Order"."01 Open Date" saw_1, "D3 Order"."02 Order Status" saw_2, "D1 Customer"."C1 Cust Name" saw_3, "D4 Product"."P01 Product" saw_4, "D2 Market"."M01 Market" saw_5, "D5 Employee"."E01 Employee Name" saw_6, "F1 Revenue"."1-01 Revenue (Sum All)" saw_7, "F2 Units"."2-01 Billed Qty (Sum All)" saw_8, "F2 Units"."8-X2 Billed Unit Price" saw_9 FROM "Sample Sales" ORDER BY saw_0, saw_1, saw_2, saw_3, saw_4, saw_5, saw_6
```

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Document Formatting and Layout – What Template Type should I use? (1 of 2)

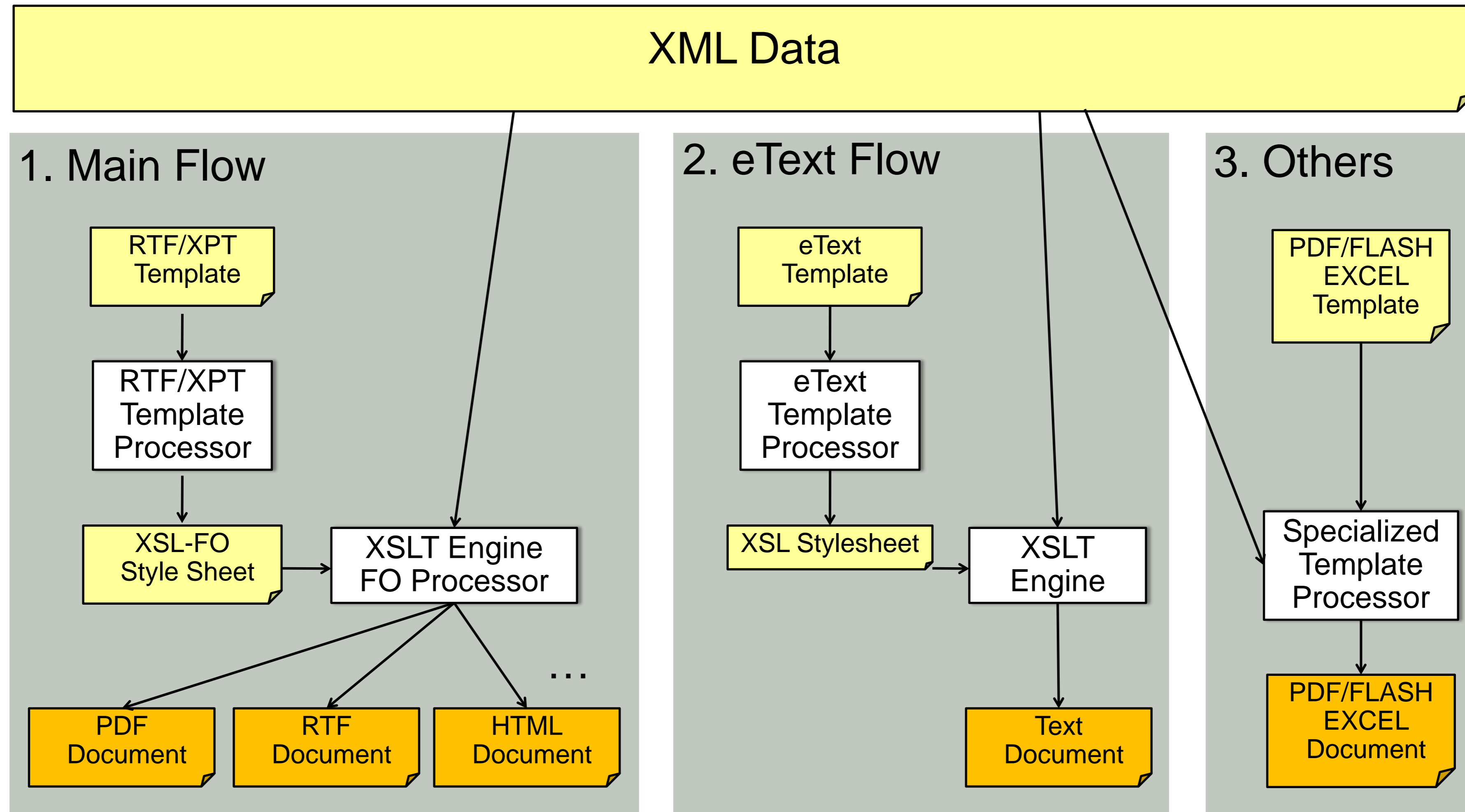
RTF Templates	<ul style="list-style-type: none">• RTF marked up with XSL code or BI Publisher simplified XSL• Widest range of output (PDF, HTML, Excel, PPT, RTF, MHTML)• Greatest flexibility and functionality• Easy to create w/ BI Publisher Template Builder Add-in to Word
PDF Forms	<ul style="list-style-type: none">• PDF forms with XML elements mapped to form fields.• Great to use with government forms• PDF output only• Create in Acrobat Professional
e-Text Templates	<ul style="list-style-type: none">• RTF with table of statements to place fields and separators• Great for character delimited or fixed position docs (EFT & EDI)• Text output only• Create in any RTF editor (e.g. Word, OpenOffice)

Document Formatting and Layout

What Template Type should I use? (2 of 2)

Excel Templates	<ul style="list-style-type: none">• Excel w/ data mapped to named cells & Excel and XSL formatting• Great for formatted, true Excel output and burst over sheets• Excel XLS output only• Create directly in Excel, good flexibility
Excel Analyzer Templates	<ul style="list-style-type: none">• Auto generated EXCEL puts data in tabular format in sheet• Great to get data into Excel & Able to refresh data w/ params• Excel output only
Flash Templates	<ul style="list-style-type: none">• SWF files embeded with BI Publisher data fields• Great for self contained, nearly unlimited interactive output• Create in Adobe Flex Builder
XSL Style Sheets	<ul style="list-style-type: none">• Allows for third party tools and legacy solutions

Oracle BI Publisher Enterprise – Document Formatting Process



RTF Template Best Practices – Use Word Tables

- Use tables to control precisely where field data will be placed in the report

Grp:Supplier

Supplier	Supplier 1				
Address	1 Long Avenue				
Invoice Number	Invoice Date	Currency	GL Date	Entered Amount	Accounted Amount
Grp:Invoice1134922	01-Jan-2007	USD	01-Jan-2007	\$100.00	\$100.00End Invoice
Total for Supplier: Supplier 1				\$100.00	\$100.00

End Supplier

Invoice Tax Summary

Tax Code	Entered Amt	Accounted Amt
Grp:TaxVAT 17.5%	\$100.00	\$100.00End Tax
Report Total	\$100.00	\$100.00

RTF Template Best Practices – Why Use Form Fields

- Keep the template clean
- Supported by the Template Builder *Field Browser*
- Can be **colored** or **hidden** to help understand the structure
- Caveat: Word header & footer don't allow form fields

Invoice Number	Date
<?for-each:G_INVOICES?> TRX_NUMBER	TRANSACTION_DATE

Invoice Number	Date
F TRX_NUMBER	TRANSACTION_DATE

Please confirm the above information.

The screenshot shows the Oracle Template Builder Field Browser dialog box. It has a 'Find' field and a 'Find Next' button. Below is a table with two columns: 'Text' and 'Code'. The table lists various fields and their corresponding RTF codes. The row for '<?for-each:G_INVOICES?>' is highlighted in blue. Below the table is an 'Edit' field containing '<?for-each:G_INVOICES?>'. At the bottom are buttons for 'Update', 'Refresh', 'Show All', 'Close', and 'Help'.

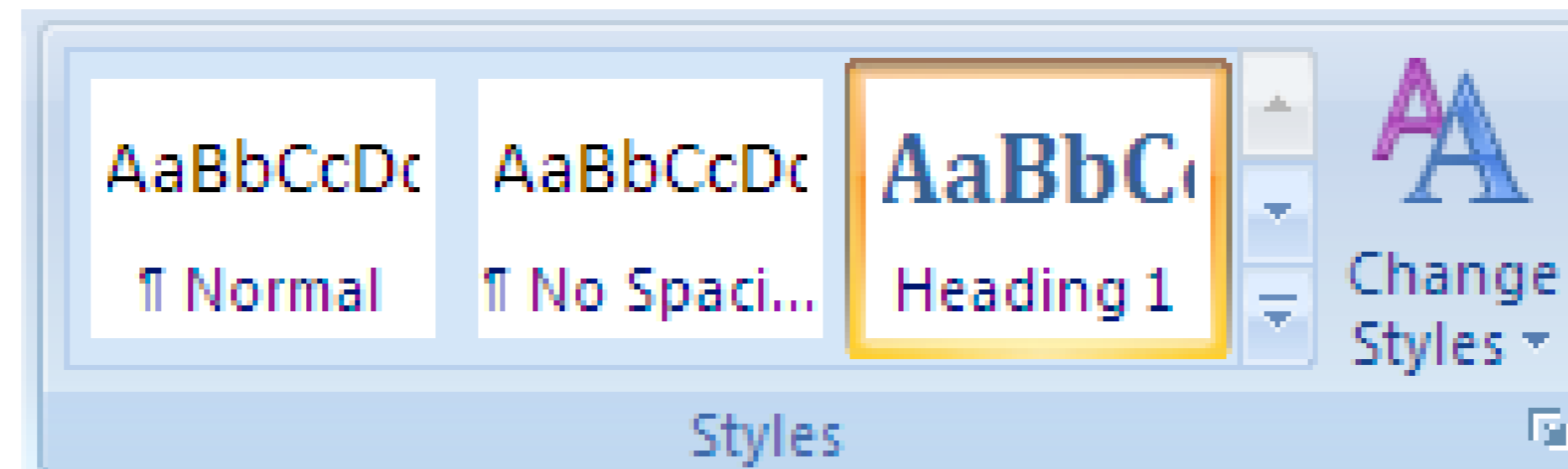
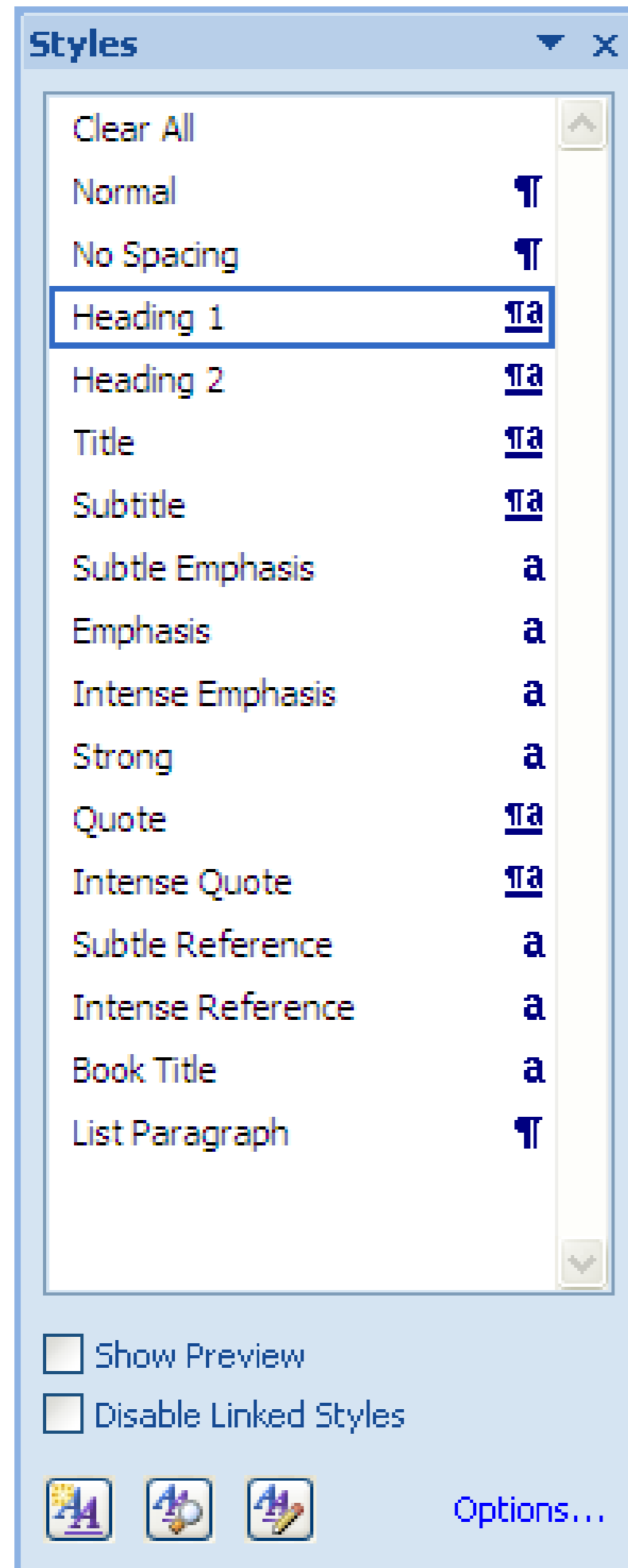
Text	Code
COUNTRY	<?COUNTRY?>
AS_OF_DATE	<?AS_OF_DATE?>
TRX_CURRENCY_CODE	<?TRX_CURRENCY_CODE?>
CF_INV_BAL_DISPLAY	<?CF_INV_BAL_DISPLAY?>
F <?for-each:G_INVOICES?>	<?for-each:G_INVOICES?>
TRX_NUMBER	<?TRX_NUMBER?>
TRANSACTION_DATE	<?TRANSACTION_DATE?>
1,000.00	<?TRANS_AMOUNT?>
500.00	<?TRANS_AMOUNT_REMAINING?>
E	<?end for-each?>

Edit
<?for-each:G_INVOICES?>

Update Refresh Show All Close Help

RTF Template Best Practices – Use Word Styles

- Achieve consistency in the template and between templates
- In 11g use Style Templates to control the template styles



RTF Template Best Practices – Don't overcomplicate your template

- Keep it easy to understand, debug and maintain
- In general better to have different business documents in different templates
- Try to limit the logic in templates to simple if or loop statements
- Use sub templates to simplify documents if necessary
- Many calculations are better performed in the data template

Document Formatting and Layout

Sub Templates: Introduction

- What is a sub template?
 - A document that contains layout and or code that can be defined once and used multiple times
 - Multiple functions (called “templates” in XSL) or text segments can be defined in a single sub template
- Sub template types
 - XSL sub templates for code re-use or separation
 - RTF sub templates for layout re-use
 - Caveat: Use of RTF sub templates makes it hard to understand the template structure

Document Formatting and Layout

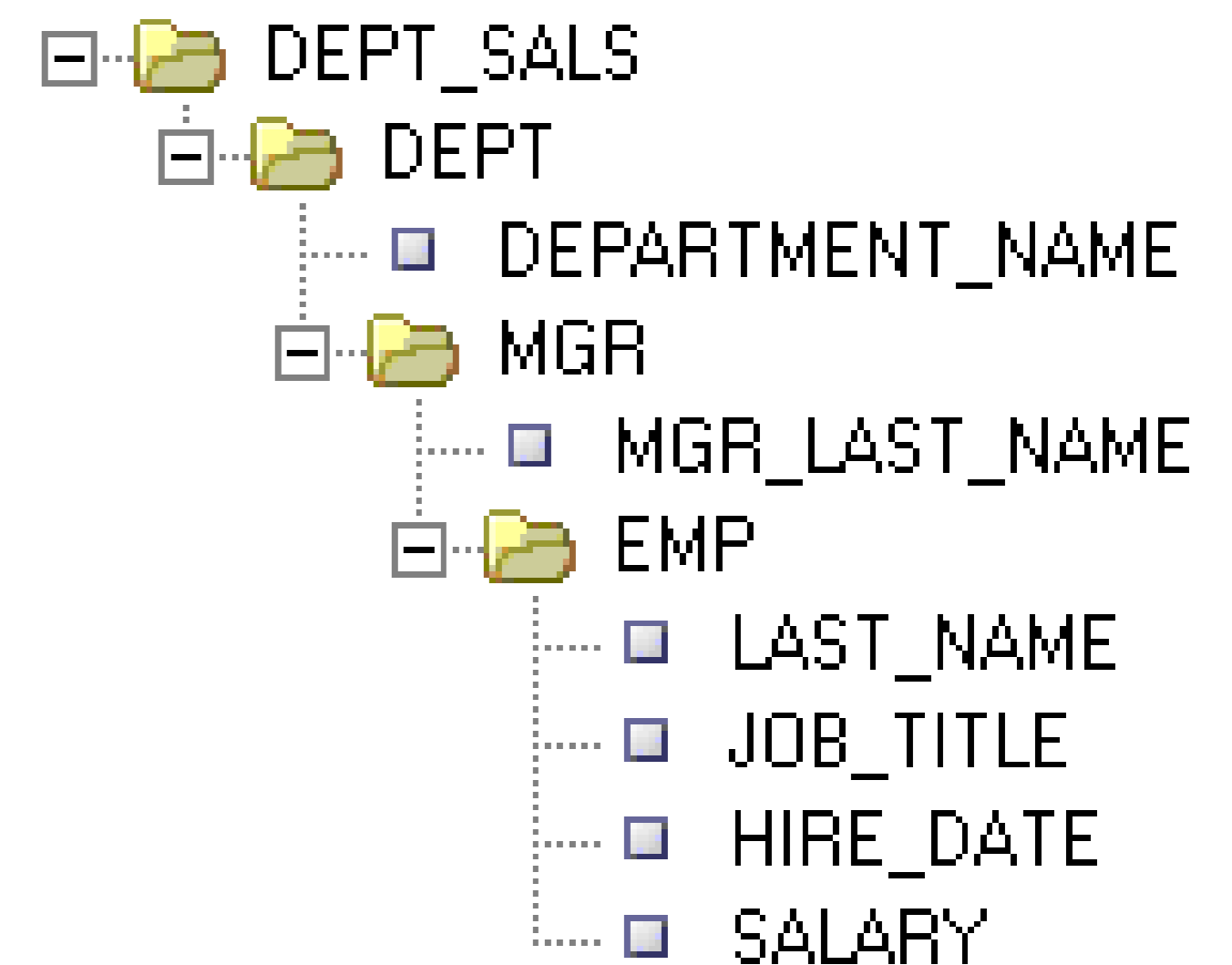
Sub Templates: Use Cases

- RTF sub templates
 - Re-use common layouts such as header/footer
 - Internationalized address block
- XSL sub templates
 - Transformations for complex chart requirements
 - Dynamically apply formatting to a portion of data (e.g. sub scripting / super scripting / chemical formula)
 - Print formatted XHTML data – convert to FO using sub template (as used in Oracle Contracts)

RTF Template Best Practices

Performance Considerations: XPATH Concepts

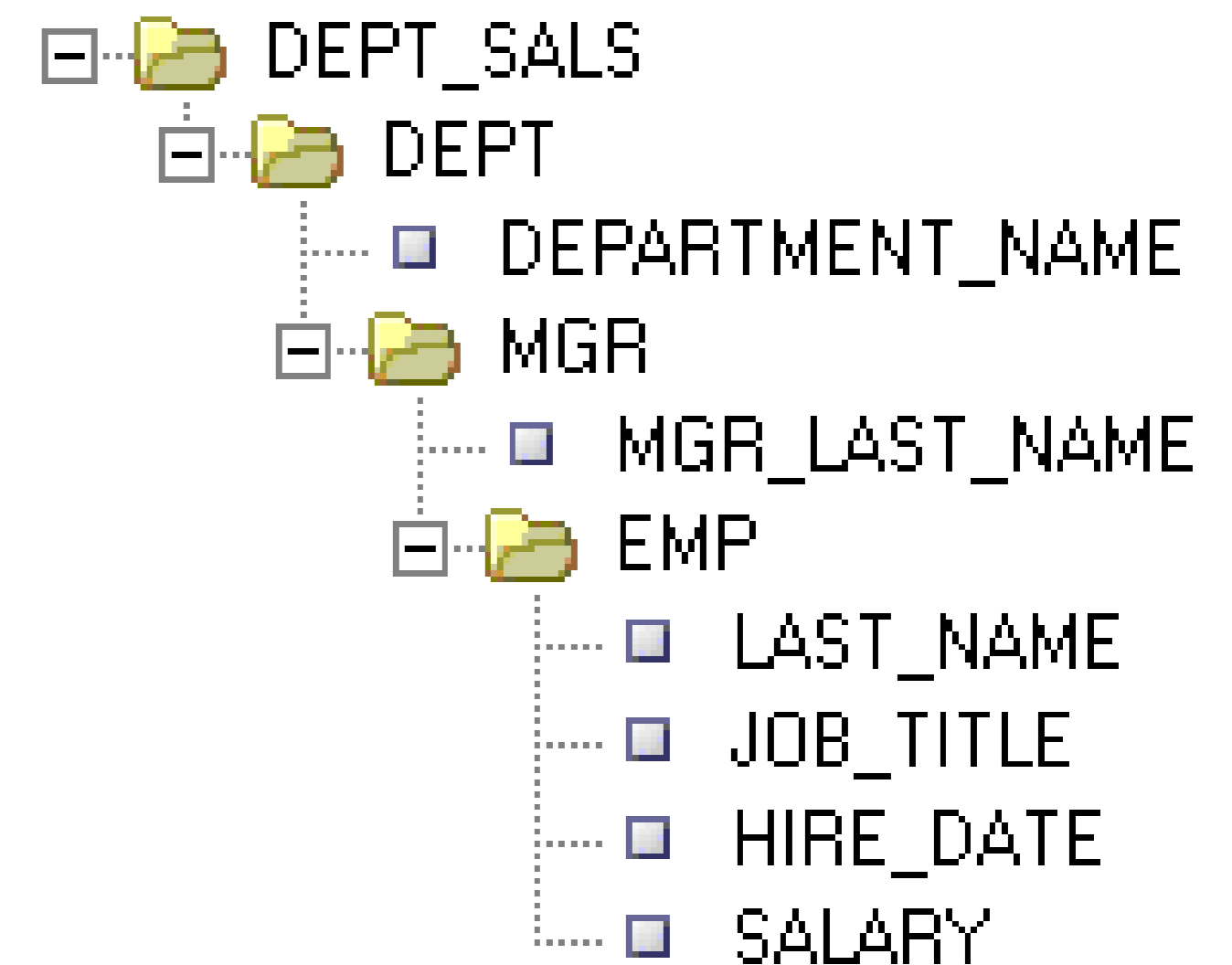
- BI Publisher uses XPATH to access data elements
- DEPARTMENT_NAME is inserted as `<?DEPARTMENT_NAME?>`
- `<?DEPARTMENT_NAME?>` is translated to the XPATH `./ /DEPARTMENT_NAME`
- `./ /DEPARTMENT_NAME` searches for DEPARTMENT_NAME in the complete sub-tree starting from current context



RTF Template Best Practices

Performance Considerations: XPATH Tuning

- For small documents the search time is negligible
- Large documents may not fit into memory and the search may require disk access
- For large datasets use the full relative path
- Instead of `<?for-each: DEPT?>`
use `<?for-each: /DEPT_SALS/DEPT?>`
- Instead of `<?DEPARTMENT_NAME?>`
use `<? ./DEPARTMENT_NAME?>`



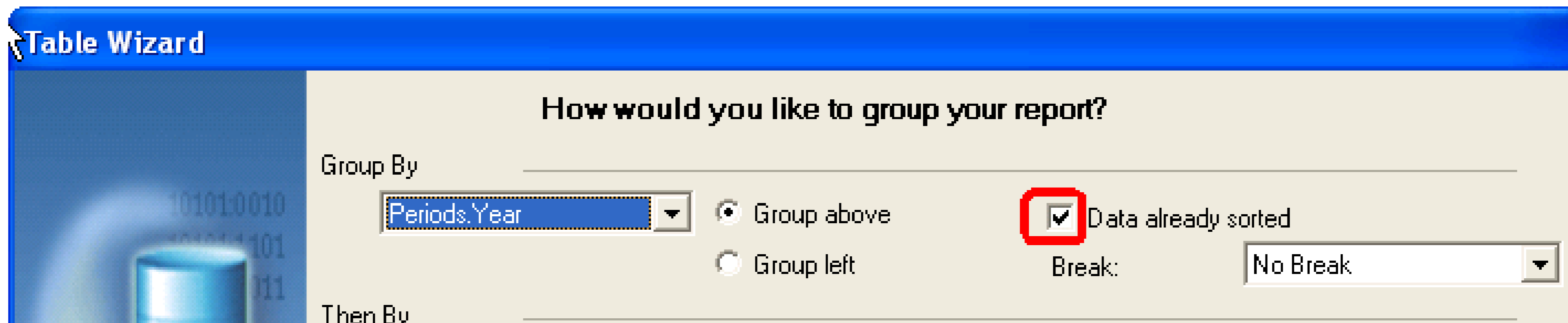
RTF Template Best Practices

Performance Considerations: Tuning

- XPATH Tuning
 - Start with the outer loops and outer most data access
 - Reducing full tree searches will provide bigger improvements than optimizing access in a small subset of the data
 - Fixing the XPATH in a single for-each loop may be all the performance tuning you need to do
- Tables
 - Large tables that span hundreds of pages consume considerable server resources. If possible group the data and create a table inside each grouping

RTF Template Best Practices – Performance Considerations: Grouping

- Better to Sort data in the data model
- Group By `<?for-each-group?>`
will force the XSL engine to sort data
- Checking “Data already sorted” option in the Table Wizard will not re-sort data (good thing)



RTF Template Best Practices

Summary

- Use tables to place data fields precisely
- Use form fields
- Use word styles
- Don't overcomplicate your templates
- Use sub templates for re-use and complex code
- Performance optimization
 - Optimize the XPATH
 - Focus optimization on outer loops
 - Sort in the data base and use “group-adjacent” in the template

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Resources

- Certification matrix http://download.oracle.com/docs/cd/E12844_01/doc/bip.1013/e12692/toc.htm
- High availability white paper www.oracle.com/technology/products/xml-publisher/docs/BIP_HA.pdf
- Sizing Spreadsheet for BI Publisher Enterprise 10g
Metalink Note - 948841.1
- Sub-templates white paper <http://www.oracle.com/technology/products/xml-publisher/docs/BIP-SubTemplate.pdf>
- QUARTZ Scheduling (clustering) wiki page
<http://wiki.opensymphony.com/display/QRZ1/ConfigJDBCJobStoreClustering>
- CPU Ratings
http://www.spec.org/cpu2006/results/cpu2006.html#SPECint_rate

For More Information

search.oracle.com



or

<http://www.oracle.com/technology/products/xml-publisher/index.html>

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