

Practical Applications of Oracle XML DB

Joshua Feinstein
September 21, 2010

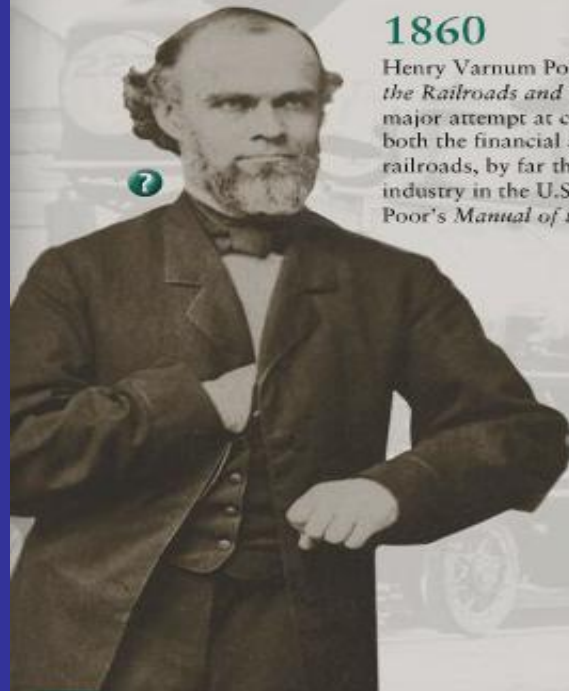
Use Case Outline & Agenda

- S&P Equity Research Services
- Data Management Overview
- ERS Global Data Architecture & Oracle XML DB
- Configuring Oracle XML DB Repository
- Querying, Inserting and Updating data
- Performance and Indexing Oracle XML DB

Standard and Poor's

1830-1870s

The rise of private capital markets in the U.S. is fostered largely by rapid development and construction in the railroad industry through public and private financing. Transparency and availability of corporate records, company financial dealings and independent third-party analysis are very limited.



1860

Henry Varnum Poor (1812-1905) publishes *History of the Railroads and Canals of the United States*, the first major attempt at compiling a comprehensive account of both the financial and operational details of U.S. railroads, by far the largest and most capital-intensive industry in the U.S. This publication is the predecessor of *Poor's Manual of the Railroads of the United States*.



1868

After forming H.V. and H.W. Poor Co. with his son, Henry William Poor (1844-1915), the Poor's publish the *Manual of the Railroads of the United States*. Within a few months, they sell all 2,500 copies of the first issue. Each copy, at 442 pages, is priced at \$5 and contains essential information for investors in the U.S. railroad industry. The *Manual* is updated annually, keeping investors current and allowing them to chart a company's progress over the years.



The history of Standard & Poor's closely parallels the history of modern financial markets.

(On the below table, the right column gears toward S&P Equity Research.)

1860	Henry Varnum Poor (1812 – 1905) publishes <i>History of the Railroads and Canals of the United States</i> , the first major attempt at compiling a comprehensive account of both the financial and operational details of the U.S. railroads.	1986	Equity Research launched its Stock Appreciation Ranking System (STARS®) on stocks in the U.S. The STARS ranking ultimately will cover more than 1,500 U.S. stocks and nearly 500 in Europe and Asia Pacific.
1906	Luther Lee Blake (1874 – 1953) like H.V. Poor, recognizes the need for an accurate, centralized source of financial information for investors and forms the Standard Statistics Bureau .	1991	Introduces the S&P MidCap 400 Index® , an index designed to cover the U.S. mid-cap market.
1922	Poor's Publishing (a successor company to H.V. & H.W. Poor) and Standard Statistics begin rating corporate bonds and municipal securities.	1996	Introduces new industry groups covering more than 8,700 securities in the Stock Guide Database, dividing the stock universe into 10 economic sectors, which are divided into 122 industry groups.
1941	Standard Statistics merges with Poor's Publishing, forming Standard & Poor's Corp , which publishes the new <i>Bond Guide</i> carrying a list of about 7,000 municipal bond ratings.	1998	Launches S&P Personal-Wealth , trailblazing financial industry website with dynamically generated content covering multi-asset classes and S&P analyst insight.
1957	The S&P 500® Stock Index is introduced.	2000	S&P Investment Services (Equity Research) launches Web-Solutions - an evolution of S&P Personal Wealth product
1964	Standard & Poor's Compustat® is launched, delivering high-quality, standardized fundamental and market data to investment professionals around the world.	2004	Acquires Capital IQ® , a leading provider of high-impact information solutions to the global investment and financial services communities.
1969	S&P Publishes the Committee for Uniform Security Identification Procedures (CUSIP®), becoming the standard identifier for all securities. Standard & Poor's begins rating commercial paper and begins charging issuers for municipal ratings.	2008	S&P Equity Research launches MarketScope® Advisor, and ETF Reports that features proprietary holdings based methodology .
1984	Standard & Poor's becomes the first major credit rating agency to open an office in London to serve European Markets. Begins to rate money market mutual funds and bond funds.	2009	S&P ERS Launches unique holdings based methodology for US based Mutual Fund Reports and Analysis.

Multi-Asset Class Research & Analysis

Equities

- Qualitative & Quantitative
- Global Scope

Mutual Funds

- Qualitative Ratings (Europe, Middle East and Australia)
- Quantitative Rankings (US)

ETFs

- Proprietary holdings-based analysis of over 800 ETFs

Bonds

- Research, tools and insight into thousands of issuers and issues.

Variable Annuities

- Extensive information on thousands of VA sub accounts and contracts.

Options

- Robust options reports, screeners, alerts, news and tools

Global Multi-Asset Class Coverage

- High standards of integrity, objectivity and rigor to their work.
- Wide range of asset classes
- Qualitative Research: S&P Analyst expresses an opinion on an investment
- Quantitative Research: Performed using a mathematical models.
- In some instances, these two disciplines, Quant & Qual are combined.

Equities	Over 1,700 stocks covered qualitatively and 7,900 stocks covered quantitatively across the US, Europe, Middle East, Australia and Asia;
Mutual Funds	1,900 funds in the US, Europe, Middle East, Australia and Asia with a mutual fund analyst's qualitative rating; 21,200 funds in the US with a quantitative ranking.
ETFs	ETF holdings-based analysis reports on over 800 ETFs (U.S.) with an overweight, market weight or underweight recommendation.
Bonds	S&P's bond portal includes research, tools and a bond ladder builder covering over 200,000 issues from more than 40,000 issuers.
Annuities	S&P provides coverage and screener for approximately 70,000 subaccounts and 1600 policies
Options	Based on stock coverage of approximately 1,200 U.S. stocks and ADRs, S&P publishes covered call and calendar spread strategies on 3, 4, and 5 STARs stocks, PowerPicks and Top 10.

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Featured Content

STAR Rating
15 OF JULY 26, 2007

Global Rating
Updated 26 Jul 2006
BBB+ Stable A-2

S&P Headlines

When	Symbol	Results	Source
12/13/2007	BT.A	BT GROUP-Buys 68.6% of NET28	S&P European MarketScope
12/12/2007	BT.A	Update to BT Group plc's Equity Buyback in the amount of 1,000,000 ord..._Capital IQ key Developments	Capital IQ key Developments
12/11/2007	BT.A	Update to BT Group plc's Equity Buyback in the amount of 1,475,000 ord..._Capital IQ key Developments	Capital IQ key Developments
12/13/2007	BT.A	BT GROUP-BRITISH TELECOM - Prices are correcting since the resistance...	S&P European MarketScope
12/19/2007	BT.A	Update to BT Group plc's Equity Buyback in the amount of 1,400,000 ord..._Capital IQ key Developments	Capital IQ key Developments
12/06/2007	VPHED	BT Group plc Wins Contract to Manage Virgin's Fixed-Line Network	Capital IQ key Developments

S&P Headlines

Prev 1-11 Next Updated 16:15 Refresh

12/13/2007 BT GROUP-Buys 68.6% of NET28

12/13/2007 BT GROUP-Buys 68.6% of NET28 Co. has agreed to acquire a 68.6% stake in Net28 from four controlling founding shareholders at EUR 5.27 per share. Notes the deal values the entire outstanding Net28 issued share capital at approximately EUR 69.5m.

12/12/2007 Update to BT Group plc's Equity Buyback in the amount of 1,000,000 ordinary shares on December 12, 2007

On December 12, 2007, BT Group plc announced that it has repurchased through JP Morgan Cazenove Limited 1,000,000 ordinary shares at a price of 260.54 pence per share. The purchased shares will all be held as treasury shares. BT Group plc's capital consists of 9,640,054,882 ordinary shares with voting rights. Following the above purchase, BT Group plc holds 629,770,591 ordinary shares as treasury.

12/11/2007 Update to BT Group plc's Equity Buyback in the amount of 1,475,000 ordinary shares on December 11, 2007

On December 11, 2007, BT Group plc announced that it has repurchased through JP Morgan Cazenove Limited 1,475,000 ordinary shares at a price of 289.17 pence per share. The purchased shares will all be held as treasury shares. BT Group plc's capital consists of 9,640,054,882 ordinary shares with voting rights. Following the above purchase, BT Group plc holds 627,770,591 ordinary shares as treasury.

12/10/2007 BT GROUP-BRITISH TELECOM - Prices are correcting since the resistance.

MD-TERM CONTACT Prices have fallen but they are now oversold, close to important supports. Our mid term opinion is bullish, SHORT-TERM FORECAST in our last short term analysis (08/12/2007), we were negative. Prices are correcting since the resistance. We remain then bearish for the coming days. Our targets unchanged: it remains set at 06P2 72. This view

12/06/2007 Update to BT Group plc's Equity Buyback in the amount of 1,400,000 ordinary shares on December 10, 2007

Equity S&P

Search [GO] Options

WIRE	TIME	
1)	EMS 11:01	United Kingdom: KELDA: FY results tomorrow
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3)	EMS 10:57	United Kingdom: BOOTS: Posts FY numbers tomorrow
4)	EMS 10:56	United Kingdom: SMITH AND NEPHEW: Raising more loans?
5)	EMS 10:54	Italy: PERMASTEELISA: Banca Akros cuts target to EUR 15.7
6)	EMS 10:51	United Kingdom: PUNCH TAVERNS: Deutsche Bank adds to UK
7)	EMS 10:48	United Kingdom: VODAFONE: Deutsche Bank adds to UK
8)	EMS 10:43	United Kingdom: KINGFISHER: Citigroup raises target
9)	EMS 10:42	Italy: AEM TORINO: Cap. increase price attractive
10)	EMS 10:42	Netherlands: CORUS: Financing talks going well
11)	EMS 10:39	United Kingdom: DIXONS GROUP: Impact of KGF results
12)	EMS 10:37	Switzerland: RICHEMONT: FY02/03 figures due tomorrow
13)	EMS 10:37	United Kingdom: KINGFISHER: Take profits says DrKW
14)	EMS 10:34	United Kingdom: FKI: Citigroup cuts target price
15)	EMS 10:28	United Kingdom: BARCLAYS: Morgan Stanley ups rating
16)	EMS 10:28	Italy: ENI: Kashagan project signed
17)	EMS 10:26	Nordic: ASSA ABLDY: CSFB downgrades target
18)	EMS 10:25	United Kingdom: AB FOODS: Goldman cuts to underperform
19)	EMS 10:22	Germany: DAIMLERCHRYSLER: BNP cuts to underperform
20)	EMS 10:22	Italy: SAIPEM: Approving the Kashagan plan

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The screenshots illustrate the following features:

- Market Movers:** A dashboard showing market movements, research notes, and S&P investment strategy. A prominent headline reads: "GAP INC. [GAP] AUG. COMPS DOWN" with a sub-headline "09/03/2009-01:29 PM ET OPS posts 3% lower Aug. same-store total sales. Wedbush Morgan reiterates outperform... READ MORE".
- Research Notes:** A section for detailed analyst reports. A headline states: "S&P MAINTAINS BUY RECOMMENDATION ON SHARES OF LINCOLN NATIONAL [LNC]" with a sub-headline "09/03/2009-01:25 PM ET We are cutting our '10 operating EPS estimate for LNC to \$3.40 from \$4.00 to reflect the recent sale of its U.K. operations and Delaware Asset Management. In addition, we expect lower sales of... READ MORE".
- Sectors:** An analysis of market sectors. A headline reads: "STAVALL ON SECTORS" with a sub-headline "09/03/2009-SETTING UP FOR A SEPTEMBER SET-BACK? The S&P 500's price advance continues to confound many investors, as it rose 4.2% month to date through August 28 and 52.1% since the March 9 bear-market bottom, while suffering through only a 7% price decline from mid-June through mid-July. While this kind of performance is atypical in August during average years... since 1929, the S&P 500's price change in August ranked in the bottom half of all months... it has been relatively common following bear market bottoms. What's more, nine of 10 sectors and 112 (84%) of the sub-industries in the S&P 500 rose in August - 31 of them gained more than 10% during the month... pointing to the encouraging breadth of this advance. Finally, even though the S&P 500 typically posted its worst performance in the third quarter, the S&P 500 rose 11.9% quarter to date on strong performances in both July and August. With one more month to go, however, many investors are wondering if September will live up to its reputation as the month in which the S&P posts its worst... READ MORE".
- Focus Stock of the Week:** A section highlighting a specific stock. The headline is "WILLIS GROUP HOLDINGS LTD. [WSH]" with a sub-headline "08/31/2009-08:35 AM ET".
- Trends & Ideas:** A section for market trends and ideas. The headline is "S&P FORECASTS AUGUST SAME-STORE SALES COMPS" with a sub-headline "08/31/2009-03:15 PM ET While retailers begin to show early fall assortments, Standard & Poor's Equity Research thinks warm weather drove shoppers to clearance racks for deals on wear-now apparel, including trans-seasonal categories such as t-shirts, polos, dresses, and jeans. After a slow start in July, we think back-to-school (BTS) gained momentum in August as retailers ramped up marketing and promotions. A total of 13 states also held sales tax holidays during the month. Still, we suspect that many parents and teens are postponing apparel purchases until September, after school starts, in order to take advantage of Labor Day sales events. With many retailers offering similar styles, we believe many teens and parents have been seeking out the best deals for their money, even if that has meant trading down stores or brands."

Investment Advice & Strategy: S&P Investment Advisory Service LLC

- A wholly owned subsidiary of The McGraw-Hill Companies, Inc., Standard & Poor's Investment Advisory Services LLC ("SPIAS") provides non-discretionary investment advice to major financial institutions which in turn provide the investment solution to their end retail clients
- S&P's Investment Advisory Services group leverages its intellectual capital to create customized investment solutions and strategies for leading asset management, mutual fund and insurance firms – among others.
- Working with our clients' requirements, we perform independent analysis and create custom-tailored recommendations. Our advice and research can be employed in a variety of investment vehicles and programs including:

• **MUTUAL FUNDS**

• **FUND OF FUNDS**

• **UNIT INVESTMENT TRUSTS**

• **EXCHANGE TRADED FUNDS (ETFs)**

• **VARIABLE ANNUITIES**

• **MANAGED ACCOUNT PROGRAMS**

• **WRAP PROGRAMS**

Global Clients

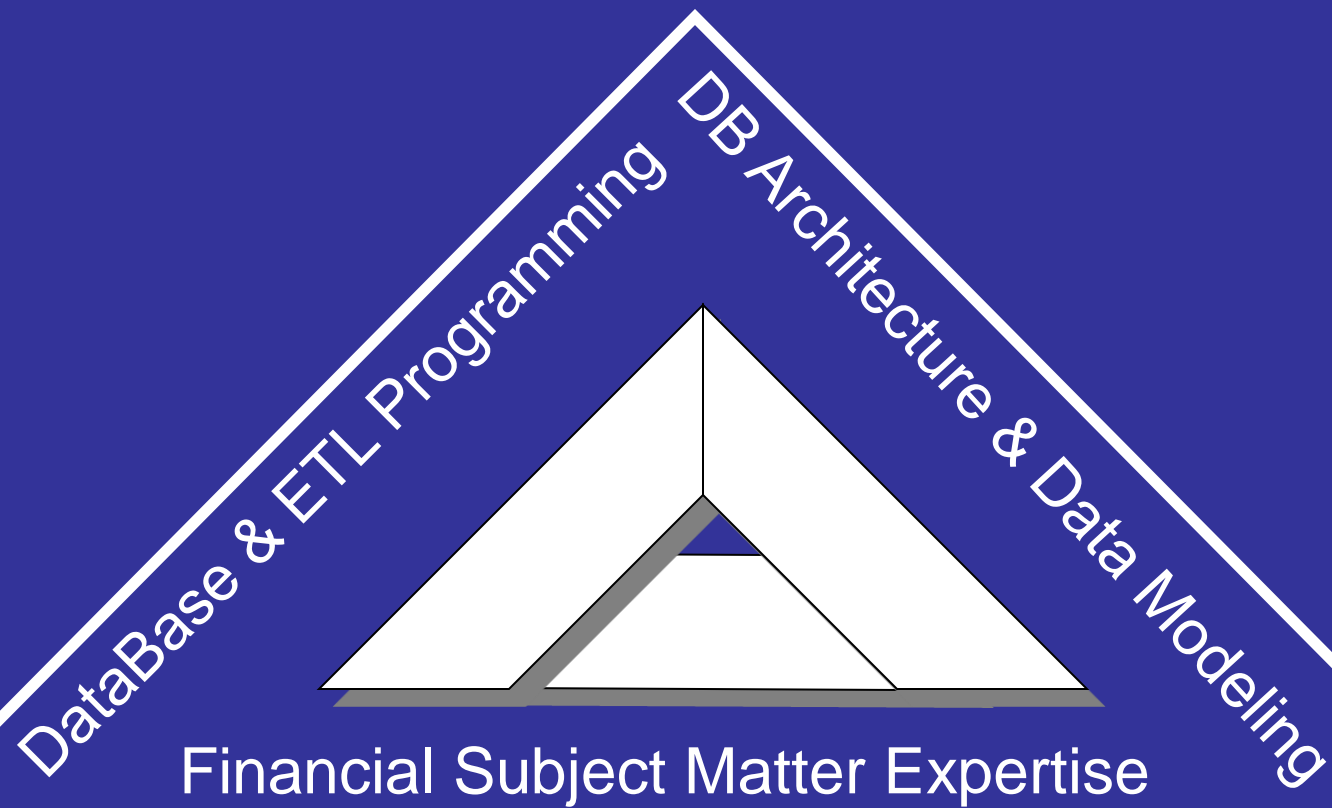
A wide range of services which contribute intelligence, insight and utility to every segment of the capital markets.

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MASS AFFLUENT	MONEY MANAGERS	GLOBAL BANKS	MUTUAL FUNDS
HIGH NET WORTH	FINANCIAL PLANNERS	REGIONAL BANKS	ETFs
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FAMILIES	FAMILY OFFICES	BROKER DEALERS	
ENDOWMENTS	CONSULTANTS	CLEARING FIRMS	<u>OTHERS</u>
FOUNDATIONS		CUSTODY FIRMS	STOCK ISSUERS
INSTITUTIONS		GLOBAL EXCHANGES	DEBT ISSUERS

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S&P Equity Research Services Data Management (ERS-DAMA)



S&P Equity Research Services Data Management (ERS-DAMA)

Basic Terminology

FINANCIAL ENTITY : An entity which releases financial statements which are of interest to the financial community (e.g. Corporations, municipalities, not-for-profit institutions, mutual funds, sovereign nations, etc.)

INSTRUMENT: An investment vehicle issued by a Financial Entity. Some examples include stock or equity, bonds or fixed income, mutual funds, warrants, options, etc.

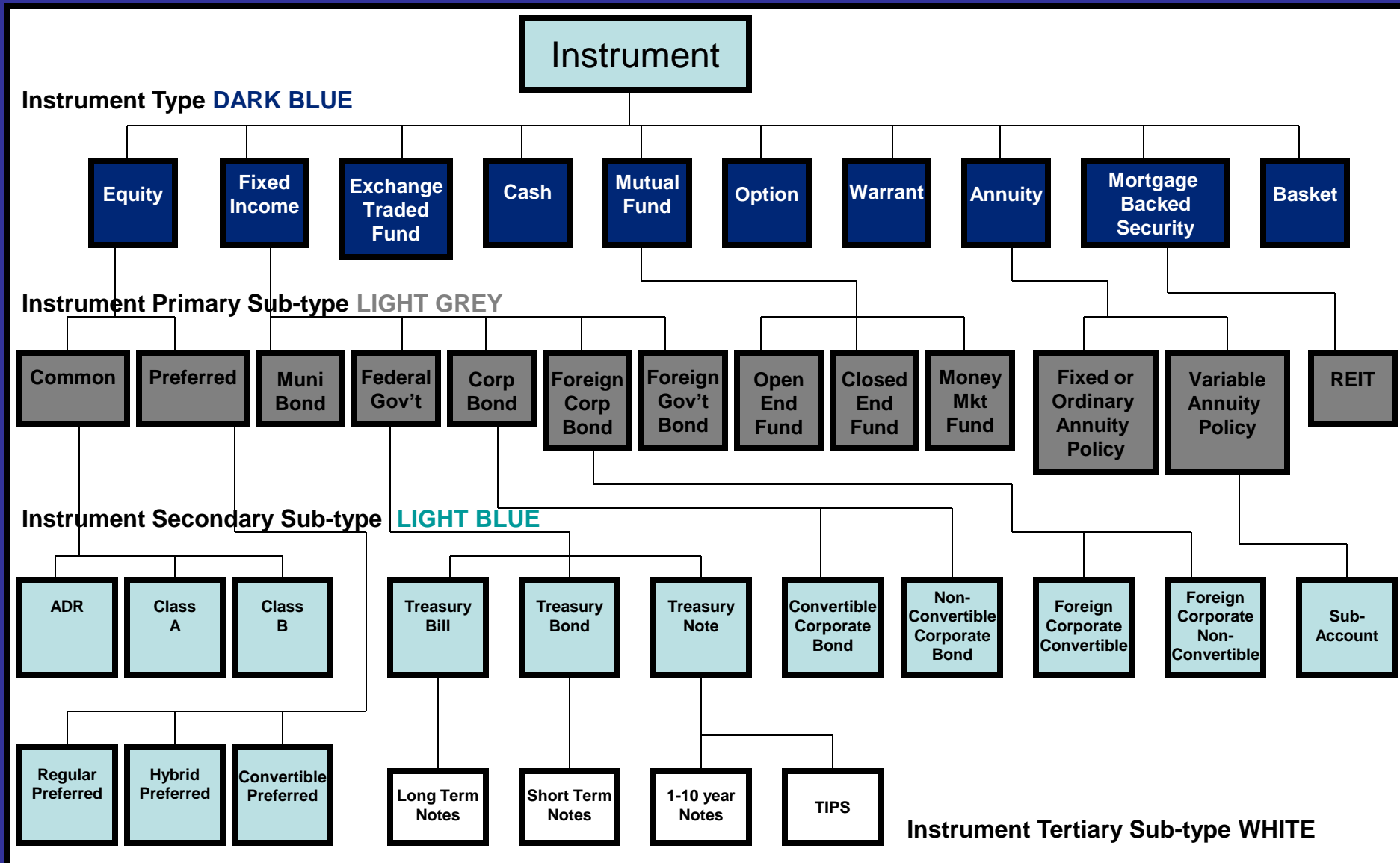
S&P Equity Research Services Data Management (ERS-DAMA)

Instrument Based vs. Product Based Architecture

- RDBMS : Instrument Data
- XML Data-Stores : Product Content

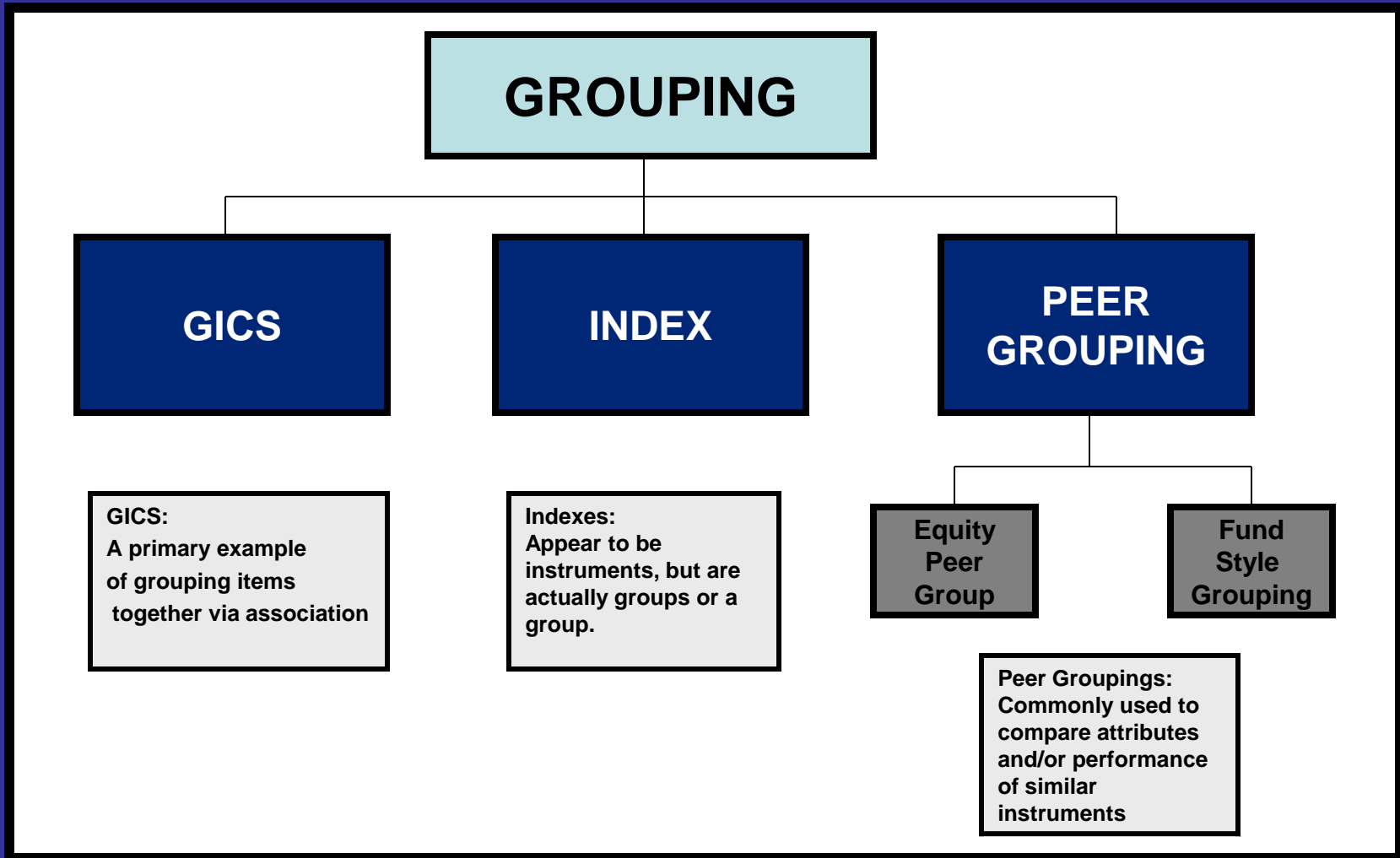
ERS-DAMA

Instrument Master Hierarchy



ERS-DAMA

Instrument Master Groupings



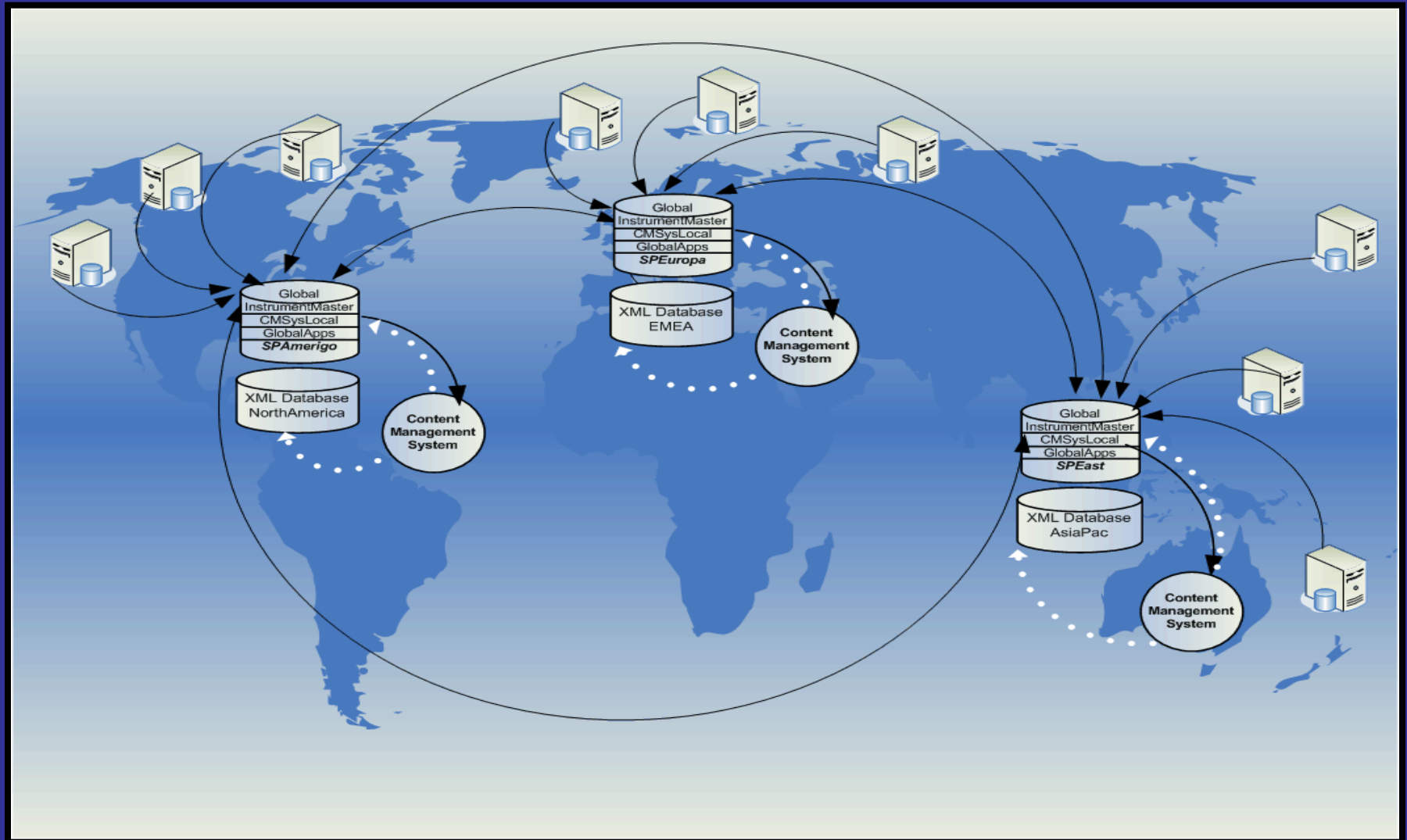
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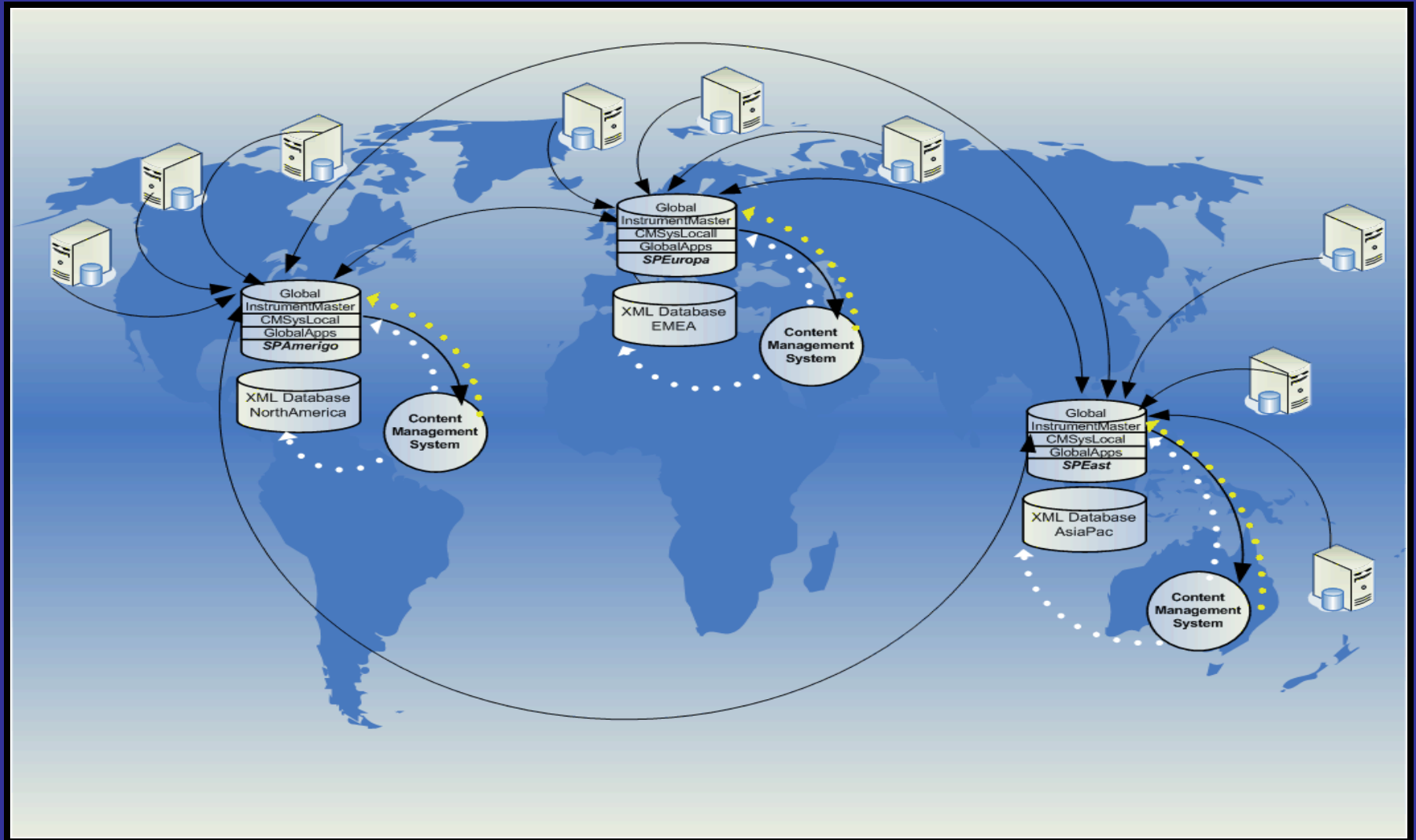
GCC Data Initiative: Overall Project Goals

- Corporate Goals:
 - To consolidate and normalize global information about financial entities and their instruments into one system – a single finished goods repository that will house all consumer ready data.
 - To reduce the number of siloed systems holding financial entity and instrument information - domestically and around the world – all of which maybe currently individually supported.

Global Data Systems Architecture Design Evolution Phase I

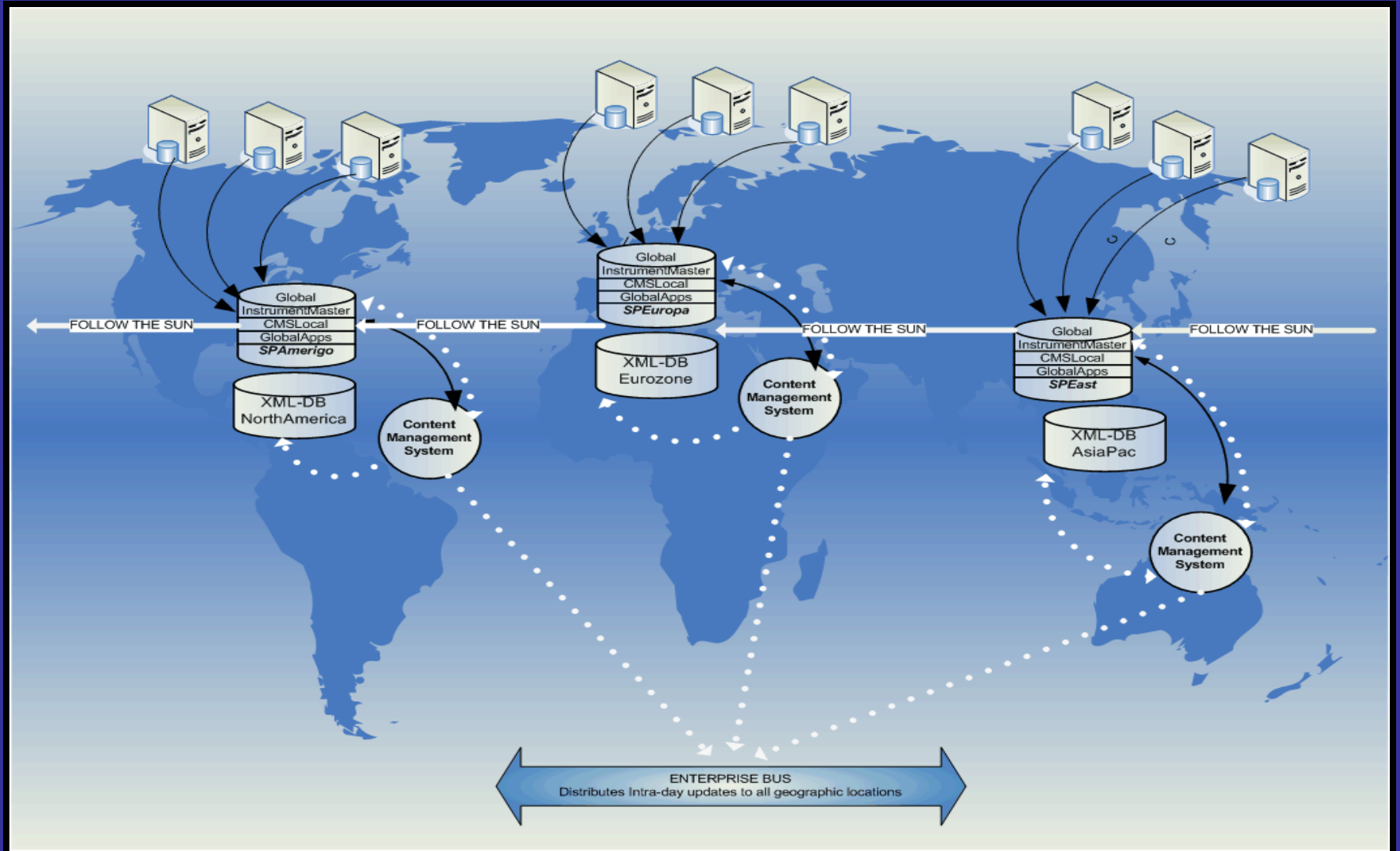


Global Data Systems Architecture Design Evolution Phase II



Global Data Systems Architecture

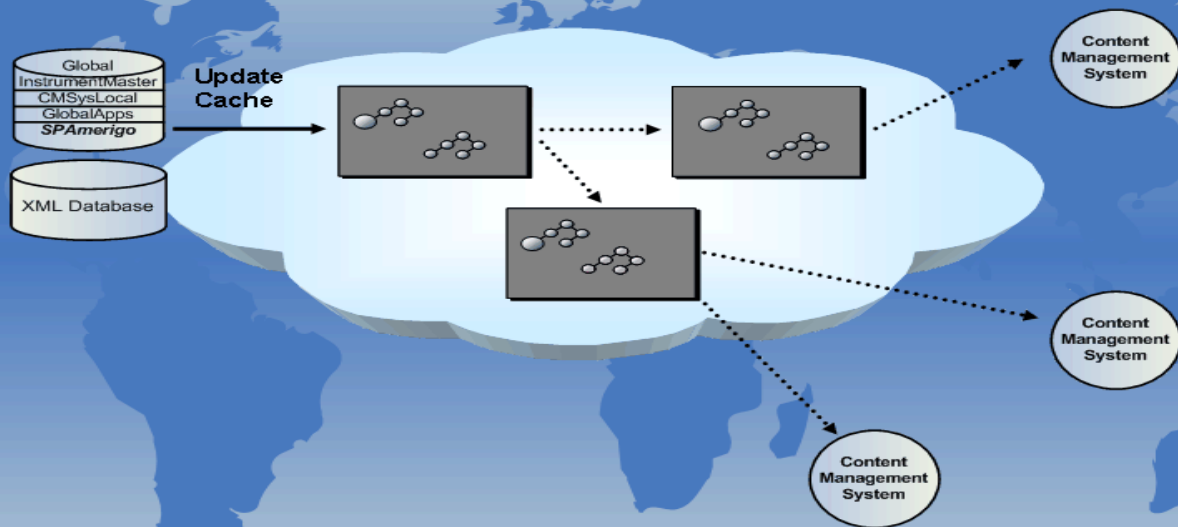
Phase III: Pass by Book



Global Data Systems Architecture

Phase IV: Cached Solution

Third party software configured to update global cache in near-real time



Transaction Management between traditional RDBMS systems and Native XML Data-Stores

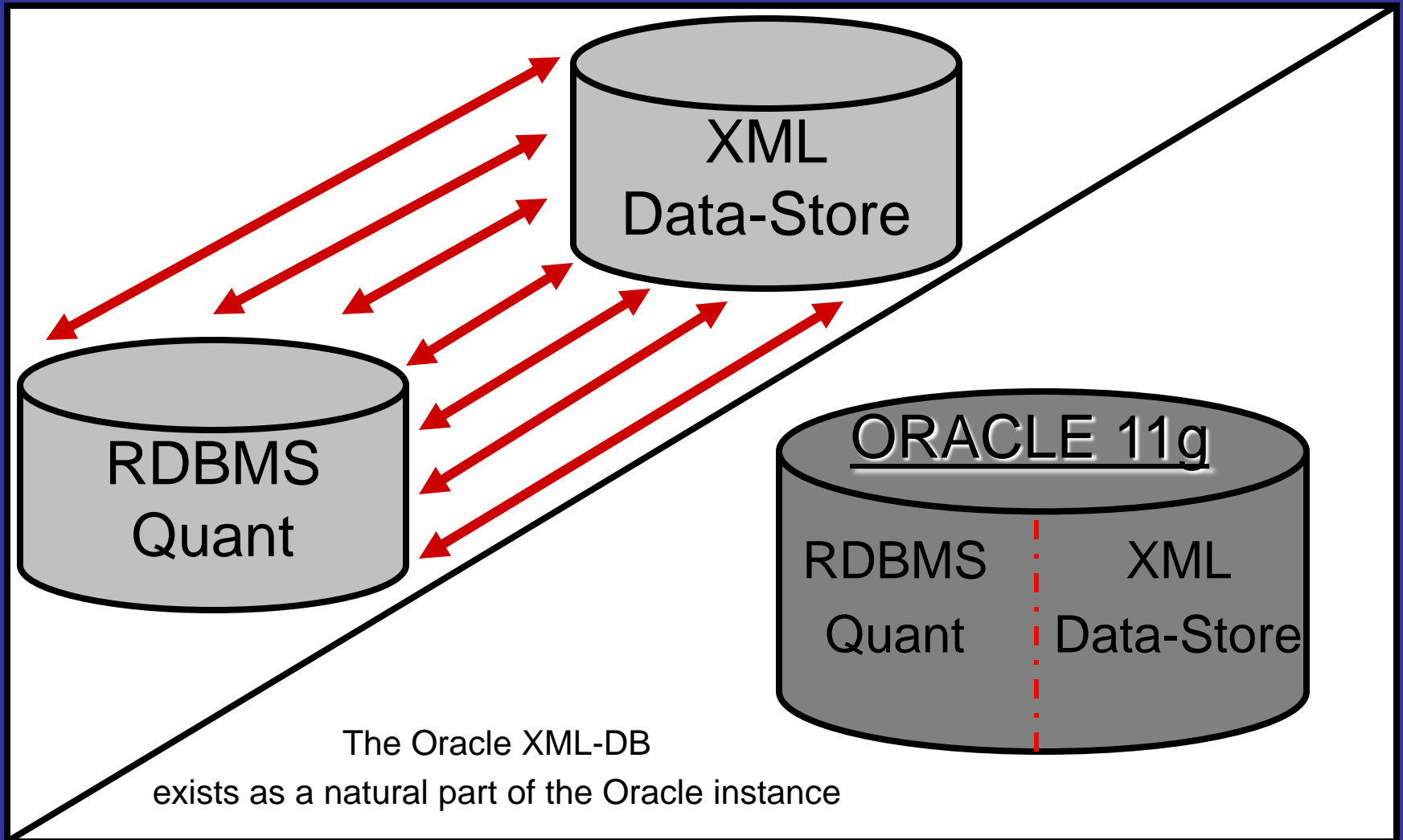
Scenario:

Given a qualitative change on behalf of an S&P Analyst

Possible solutions:

1. Create a bridge
2. Leverage third party tool
3. Update systems independently & reconcile at end-of-hour, end-of-day or end-of-week.
4. Other

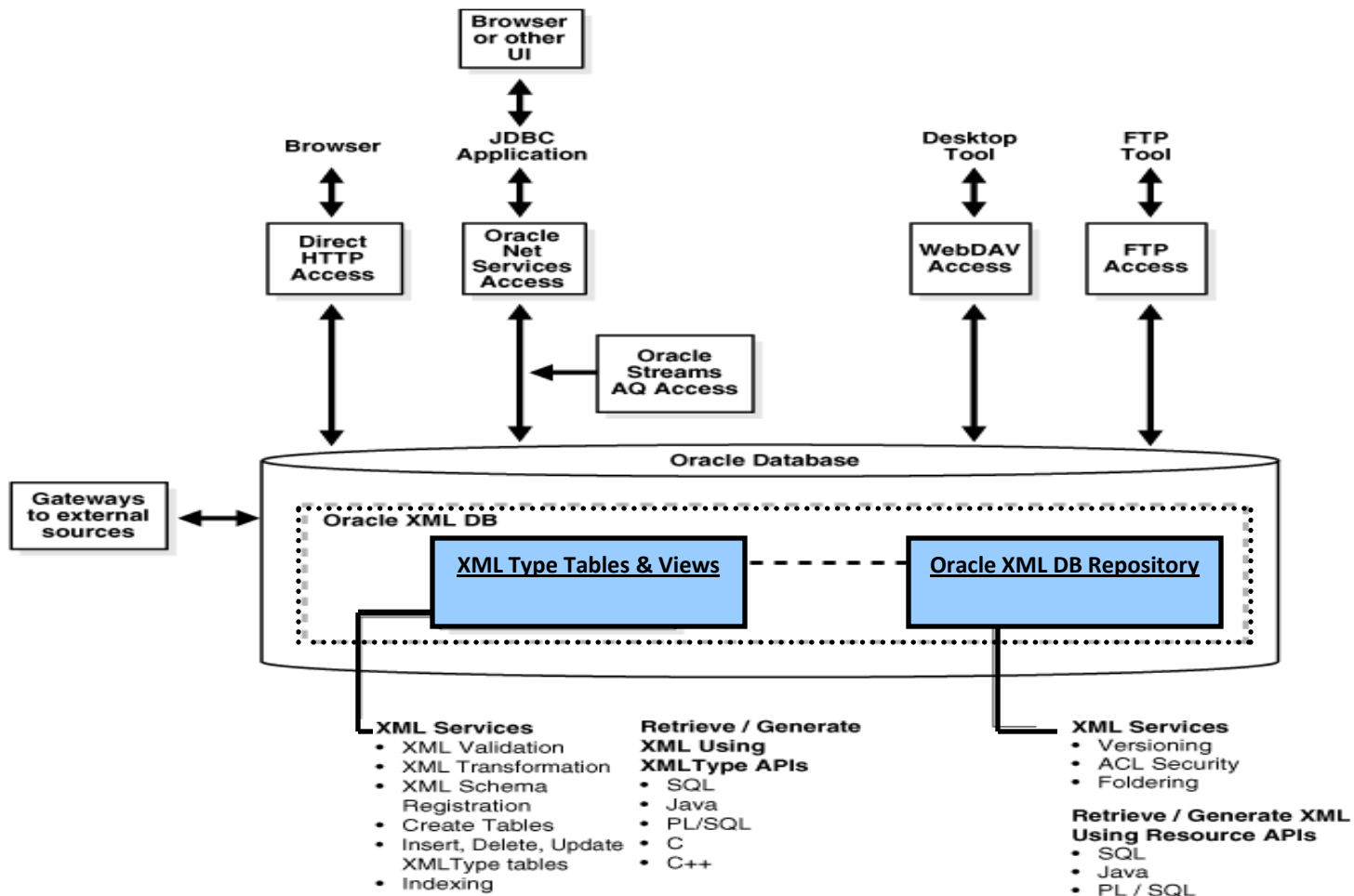
Persistence Layer Architecture & Role of Oracle XML-DB in Transaction Management



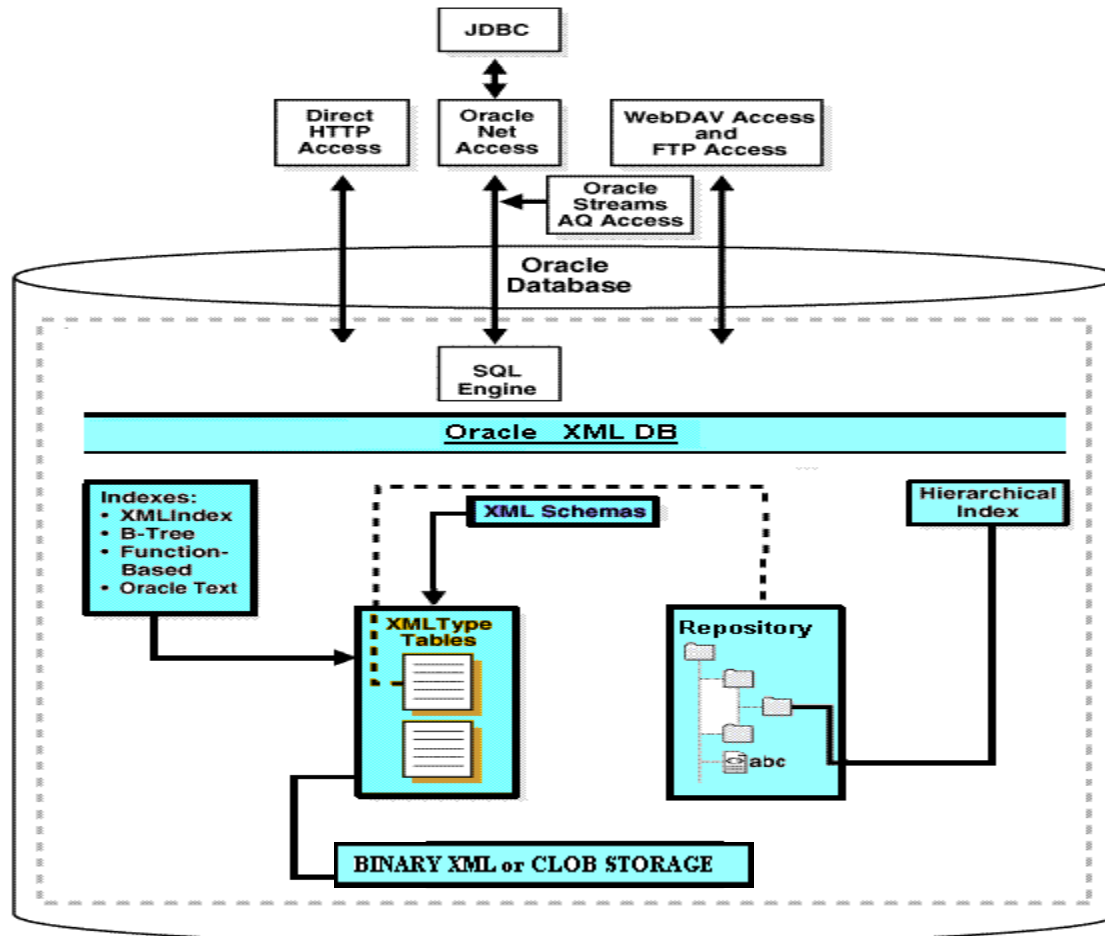
Oracle XML DB

"Oracle XML DB is a set of Oracle Database technologies related to high-performance XML storage and retrieval. It provides native XML support by encompassing both SQL and XML data models in an interoperable manner."

Data Persistence and Oracle XML DB Architecture



Data Persistence and Oracle XML DB Architecture drill down



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The Oracle XML-DB Implementation

Creating and configuring Oracle's XDB:

- » Configuring Http Access
- » Configure the servlet
- » Setting the User Privileges
- » Base Folder View via WebDav
- » Creating the Folders & Resources
- » Grant Privileges to ALPHA** & BETA**
- » Set the Access Control Lists
- » ALPHA XML TABLE(S) & DCLS

**Alpha, Beta, Gamma, etc. are pseudonyms that will be used through out this presentation

****APLHA****

Configuring Http Access

**To configure and set the HTTP port,
DBA executes the following sql script:**

```
set echo on  
set DEFINE ^  
DEFINE logDir_var=^1  
spool ^logDir_var.Configure_HTTP_Access.txt  
SELECT dbms_xdb.gethttpport FROM dual;  
EXEC xdb.dbms_xdb.sethttpport(8080);  
SELECT dbms_xdb.gethttpport FROM dual;  
spool off  
set echo off  
set DEFINE off
```

Further, the following series of slides illustrate configuration and creation scripts that need to be executed by the Oracle DBA.

****Alpha, Beta, Gamma, etc. are pseudonyms that will be used through out this presentation**

ALPHA

Configure the Servlet

```
set echo on
set DEFINE ^

DEFINE logDir_var=^1

DECLARE
  l_servlet_name VARCHAR2(32) := 'orawsv';
BEGIN
  DBMS_XDB.deleteServletMapping(l_servlet_name);
  DBMS_XDB.deleteServlet(l_servlet_name);
  DBMS_XDB.addServlet( name => l_servlet_name, language => 'C', dispname => 'Oracle Query Web
Service', descrip => 'Servlet for issuing queries as a Web Service', schema => 'XDB');

  DBMS_XDB.addServletSecRole( servname => l_servlet_name, rolename => 'XDB_WEBSERVICES',
  rolelink => 'XDB_WEBSERVICES');

  DBMS_XDB.addServletMapping( pattern => '/orawsv/*', name => l_servlet_name);

END;
```

Setting the User Privileges for ALPHA

```
set echo on
set DEFINE ^

DEFINE logDir_var=^1

GRANT XDB_WEBSERVICES TO ALPHA;
GRANT XDB_WEBSERVICES_OVER_HTTP TO ALPHA;
GRANT XDB_WEBSERVICES_WITH_PUBLIC TO ALPHA;

GRANT XDB_WEBSERVICES TO BETA;
GRANT XDB_WEBSERVICES_OVER_HTTP TO BETA;
GRANT XDB_WEBSERVICES_WITH_PUBLIC TO BETA;

GRANT execute on XDB.DBMS_XDB to ALPHA;
GRANT execute on XDB.DBMS_XDB BETA;

set echo off
set DEFINE off
```

Oracle XDB

ALPHA - Base Folder View via WebDav

Index of / - Microsoft Internet Explorer provided by Standard and Poor's

OracleXMLDB: Viewing the data via WEBDAV

File Edit View Favorites Tools Help

Index of /

Index of /

Name	Last modified	Size
ALPHA/	Fri, 05 Mar 2010 18:12:59 GMT	-
public/	Tue, 02 Mar 2010 18:04:39 GMT	-
sys/	Tue, 02 Mar 2010 18:14:18 GMT	-

To be created in the next slide...

Creating the Folders & Resources

```
declare  
result boolean;  
begin  
    result := dbms_xdb.createFolder ('/ALPHA');  
    result := dbms_xdb.createFolder ('/ALPHA/OMEGA');  
    result := dbms_xdb.createFolder ('/ALPHA/OMEGA/GAMMA');  
    result := dbms_xdb.createFolder ('/ALPHA/OMEGA/DELTA');  
    commit;  
end;
```

Grant Privileges to ALPHA & BETA

```
DECLARE
b BOOLEAN;
BEGIN
b := DBMS_XDB.createResource('/sys/acls/all_ALPHA_acl.xml',
'<acl description="myacl"
xmlns='http://xmlns.oracle.com/xdb/acl.xsd' xmlns:dav="DAV:"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://xmlns.oracle.com/xdb/acl.xsd http://xmlns.oracle.com/xdb/acl.xsd">
<ace>
<grant>true</grant><principal>BETA</principal>
<privilege><all/></privilege>
</ace>
<ace>
<grant>true</grant><principal>ALPHA</principal>
<privilege>
<all/>
</privilege>
</ace>
</acl>');
END;
```

Set the Access Control Lists

```
begin
  dbms_xdb.setacl ('/ALPHA/OMEGA/GAMMA','/sys/acls/all_ALPHA_acl.xml');
end;
commit;
begin
  dbms_xdb.setacl ('/ALPHA/OMEGA/DELTA','/sys/acls/all_ALPHA_acl.xml');
end;
commit;
begin
  dbms_xdb.setacl ('/ALPHA/OMEGA','/sys/acls/all_ALPHA_acl.xml');
end;
commit;
begin
  dbms_xdb.setacl ('/ALPHA','/sys/acls/all_ALPHA_acl.xml');
end;
commit;
```

ALPHA XML TABLE(S) & DCLS

(Run as 'ALPHA'...)

```
CREATE TABLE ALPHA.ALPHAXMLTAB OF SYS.XMLTYPE  
TABLESPACE ALPHA_XMLDATA_BUF;
```

```
GRANT DELETE, INSERT, SELECT, UPDATE ON  
ALPHA.ALPHAXMLTAB TO BETA;
```

```
GRANT SELECT ON ALPHA.ALPHAXMLTAB TO ****_SELECT;
```

```
GRANT DELETE, INSERT, SELECT, UPDATE ON  
ALPHA.ALPHAXMLTAB TO ****_SUDIX;
```

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Oracle XML Functions

XML Functions

The XML functions operate on or return XML documents or fragments. The SQL XML functions are:

APPENDCHILDXML	SYS_DBURIGEN	XMLFOREST
DELETEXML	SYS_XMLAGG	XMLPARSE
DEPTH	SYS_XMLGEN	XMLPI
EXTRACT (XML)	UPDATEXML	XMLQUERY
EXISTSNODE	XMLAGG	XMLROOT
EXTRACTVALUE	XMLCDATA	XMLSEQUENCE
INSERTCHILDXML	XMLCOLATTVAL	XMLSERIALIZE
INSERTXMLBEFORE	XMLCOMMENT	XMLTABLE
PATH	XMLCONCAT	XMLTRANSFORM

Oracle XML Functions

EXTRACT (XML)

Applies a VARCHAR2 XPath string and returns an XMLType instance containing an XML fragment. You can specify an absolute *XPath_string* with an initial slash or a relative *XPath_string* by omitting the initial slash. If you omit the initial slash, the context of the relative path defaults to the root node.

EXTRACTVALUE

Takes as arguments an XMLType instance and an XPath expression and returns a scalar value of the resultant node. The result must be a single node and be either a text node, attribute, or element. If the result is an element, then the element must have a single text node as its child, and it is this value that the function returns. You can specify an absolute *XPath_string* with an initial slash or a relative *XPath_string* by omitting the initial slash. If you omit the initial slash, the context of the relative path defaults to the root node.

If the specified XPath points to a node with more than one child, or if the node pointed to has a non-text node child, then Oracle returns an error.

Querying data from Oracle XDB Alpha XML Table

Java get methods to illustrate prepared strings with select statements

private static final String selectTodaysOmegaArticles =

```
"select EXTRACT(object_value, '/').getClobVal() as xmlContent from alphaxmltab "  
+      "where EXTRACTVALUE(object_value, '/OmgaContent/@type')=:articleType "  
+      "and trunc(to_timestamp_tz(translate(EXTRACTVALUE(object_value,  
"/OmgaContent/MetaData/Property[@name='PublishDate']"), 'T', ' '), 'YYYY-MM-DD  
HH24:MI:SSTZH:TZM") at time zone '{0}')=trunc(current_timestamp at time zone '{0}') "  
+      "order by to_timestamp_tz(translate(EXTRACTVALUE(object_value,  
"/OmgaContent/MetaData/Property[@name='PublishDate']"), 'T', ' '), 'YYYY-MM-DD  
HH24:MI:SSTZH:TZM") desc ";
```

private static final String selectLatestOmegaArticleFromDB =

```
" select EXTRACT(object_value, '/').getClobVal() as xmlContent from alphaxmltab "  
+      " where EXTRACTVALUE(object_value, '/Editorial/@type')=:articleType " +  
+      " and trunc(to_timestamp_tz(translate(EXTRACTVALUE(object_value, '/  
OmgaContent/MetaData/Property[@name='PublishDate']"), 'T', ' '), 'YYYY-MM-DD  
HH24:MI:SSTZH:TZM") at time zone '{0}')=trunc(current_timestamp at time zone '{0}') "  
+      " order by to_timestamp_tz(translate(EXTRACTVALUE(object_value, '/  
OmgaContent/MetaData/Property[@name='PublishDate']"), 'T', ' '), 'YYYY-MM-DD  
HH24:MI:SSTZH:TZM") desc "  
+      " ) where rownum <2";
```

Inserting & Updating data into Oracle XDB Alpha XML Table

EXISTSRESOURCE Function

This function indicates if a resource is in the hierarchy. Matches resource by a string that represents its absolute path.

Syntax

```
DBMS_XDB.EXISTSRESOURCE(abspath IN VARCHAR2)  
RETURN BOOLEAN;
```

Parameters

abspath Path name of the resource whose ACL document is required

Return Values

TRUE if the resource is found.

Inserting & Updating data into Oracle XDB Alpha XML Table

CREATERESOURCE Functions

The functions create a new resource. Overload options are below.

1) Creates a new resource with the given XMLType data as its contents:

```
DBMS_XDB.CREATERESOURCE(  
path IN VARCHAR2,  
data IN SYS.XMLTYPE)  
RETURN BOOLEAN;
```

2) Given a REF to an existing XMLType row, creates a resource whose contents point to that row. That row should not already exist inside another resource:

```
DBMS_XDB.CREATERESOURCE(  
path IN VARCHAR2,  
datarow IN REF SYS.XMLTYPE)  
RETURN BOOLEAN;
```

Other overload options:

3) String. 4) BLOB. 5) CLOB. 6) BFILE.

Inserting & Updating data into Oracle XDB Alpha XML Table

```
FUNCTION FUNC_ALPHA_OMEGA_INSERT(Article_ID VARCHAR2,Article_type VARCHAR2, xmlFile CLOB)
RETURN NUMBER
IS
    v_xmlRepName varchar2(20) := 'ALPHA';      refr ref xmltype;          v_result boolean;
    v_product varchar2(20) := 'OMEGA';        xmlFile_tgt xmltype;      v_acticle_id varchar2(50);
    v_article_type VARCHAR2(50);             xmlFileName varchar2(100); v_rowCount number := 0;
BEGIN
    xmlFile_tgt:= XMLType.createXML(xmlFile);
    v_article_type := UPPER(Article_type); v_acticle_id := Article_ID;
    *****
    INSERT INTO ALPHA.APLHAXMLTAB X VALUES (xmlFile_tgt) returning ref(X) into refr;
    *****
    IF dbms_xdb.existsResource('/'|| v_xmlRepName || '/' || v_product || '/' || v_article_type ) THEN
        v_result := dbms_xdb.createResource('/'|| v_xmlRepName || '/' || v_product || '/' || v_article_type || '/' ||
            v_acticle_id||'_' || xmlFileName, refr);
    END IF;
    COMMIT;
    return v_rowCount;
ELSE
    update remusxmltab set OBJECT_VALUE = xmlFile_tgt where (EXTRACTVALUE(object_value,'Editorial/@id')
        = Article_ID
        AND (EXTRACTVALUE(object_value,'Editorial/@type')) =vc_article_type ;
    return v_rowCount;
END IF;
    ****
END FUNC_ALPHA_OMEGA_INSERT;
/
```

Use Case Outline & Agenda

- S&P Equity Research Services
- Data Management Overview
- ERS Global Data Architecture & Oracle XML DB
- Configuring Oracle XML DB Repository
- Querying, Inserting and Updating data
- Performance and Indexing Oracle XML DB

Indexes & Improving Performance

Function-Based Indexes

A **function-based** index is created by evaluating the specified functions for each row in the target table or column and storing the value in the index.

Creating Function-Based Indexes on Unstructured XMLType Tables and Columns

If a function-based index is defined on XML data that is *not* managed using structured storage, then the index is created by invoking the function on the XML content and indexing the result.

Our use case leverages function based indexes for improving the query performance.

Indexes & Improving Performance

These examples show the creation of an index based on the SQL function `extractValue`, where the XML data is in unstructured (CLOB) storage.

```
create index APLHA.alpha_xml_doc_id_idx on ALPHA.alphaxmltab  
(extractvalue(Object_value,'/AlphaXMLDocs/@id'));
```

```
create index ALPHA.alpha_xml_doc_type_idx on ALPHA.alphaxmltab  
(extractvalue(Object_value,'/AlphaXMLDocs/@type'));
```

```
create index APLHA.alpha_xml_Pen_Name_idx ON ALPHA.alphaxmltab  
(extractvalue(Object_value,'/AlphaXMLDocs  
/MetaData/PropertyGroup/Property[@name="PenName"]'));
```

```
create index APLHA.alpha_xml_User_Name_idx ON ALPHA.alphaxmltab  
(extractvalue(Object_value,'/AlphaXMLDocs  
/MetaData/PropertyGroup/Property[@name="UserFullName"]'));
```

Indexes & Performance

11g R2 and XMLIndex

• Problem scenario:

‘...Unstructured Storage Presents an Indexing Problem for XML Data...’

“For unstructured XML storage, indexing a database column using the standard sorts of index (B-tree, bitmap) is generally not helpful for accessing particular parts of an XML document. If an XMLType column that contains an XML document is stored as a Binary XML instance, then the details within that document are inaccessible to the column index—the entire document acts as a single unit as far as the column index is concerned...”

• Solution: XMLIndex

“XMLIndex provides a general, XML-specific index that indexes the internal structure of XML data. One of its main purposes is to overcome the indexing limitation presented by unstructured storage of XML data, that is, Binary XML storage. It does this by indexing the XML tags of your document and identifying document fragments based on XPath expressions that target them. It can also index scalar node values, to provide quick lookup based on individual values or ranges of values...”

Selected Further Reading

Suggested Books

- Database in Depth: Relational Theory for Practitioners by C. J. Date. Published, May, 2005.
- Date on Database: Writings 2000-2006 by C. J. Date. Published Nov, 2006.
- The Interpretation of Financial Statements by Benjamin Graham. 1st Edition, 1937.

Articles and Reference

- Oracle® XML DB Developer's Guide 11g Release 1. Published May 2008.
- Consensus Database Design & the Collaboration Method, The NYOUG Tech Journal. Published June, 2008.
- Dictionary of Finance and Investment Terms. 8th edition, published May, 2010.

Disclaimer

Opinions & observations expressed in this presentation are my own and do not necessarily represent those of my employer.

Wrap Up and Q&A