Agenda

- Background
- Product Definition
- Technical Architecture
Background
What is XBRL?

- eXtensible Business Reporting Language
- Open standard based on XML
- Supported by XBRL.org and over 550 organizations worldwide
- Standardizes how to exchange financial information
  - Semantics
  - Validation
  - Extensibility
  - Business rules

“…will make it easier to generate, validate, aggregate, and analyze business and financial information which in turn will improve the quality, timeliness, completeness, and comparability of the information that companies use to make decisions”

2007 Breakthrough Ideas Harvard Business Review
XBRL Use Case 1: Regulators / Hubs
(Analytics, Publishing over Reports/Taxonomy Submissions)
XBRL Use Case 2: Regulated Enterprises
(Aggregation, Submission, Publishing of Subsidiary Instance/Taxonomies)
Product Definition
XBRL Storage in Oracle Database

• Requirements
  • Highlighted use cases associated with large volumes of XBRL
  • Require storage platform to support XBRL query and processing

• Solution alternatives
  • Relational Technology based solutions
    • Available today from Oracle Partners
    • XBRL information extracted out and stored relationally
    • XBRL documents also stored in the database or the file system
  
  • XML Technology based solutions
    • Additional alternative based on XML technology
    • XBRL content stored in its original XML representation
    • XML technology used for queryability over the content

⇒ XBRL Extension to Oracle Database 11g Release 2 XML DB …
Oracle XBRL Extension Goals

- Taxonomy creation, validation
- Report Generation, Submission
- Report Validation
- Taxonomies and Report publishing
- Data Integrity and management
- Analytics and Queryability
- Formula Generation

Single Repository for the full XBRL lifecycle
Oracle XBRL Extension Capabilities

- Store reports as submitted in XML
- Maintain consistency and integrity
- Queryability and Analytics over content
- View Reports as filed
- Scalable XBRL Services

Submitted Reports

Oracle XBRL Extension

Maintained Taxonomies
XBRL Extension to Oracle XML DB

Data Movement

- Taxonomy Designer
- XBRL Processing Engine
- XBRL Application
- Oracle BI Enterprise Edition

Report Submissions
Report Queries
BI Reports and Dashboards

Oracle XBRL Repository
Features

- **XBRL Storage**
  - Native XBRL storage
  - Document integrity enforcement based on XBRL DTS rules

- **Queryability**
  - XML, Relational Querability with XBRL semantics
  - 3NF Logical Data Model
  - Physical Data Model pre-tuned for Oracle

- **OLAP**
  - ETL packages
  - Dimensions, both explicit and typed
  - Out of the box integration with Oracle BI EE

- **Integration with 3rd Party Products**
  - XBRL Processing
    - Full validation with DTS discovery
    - Formula execution support
  - Taxonomy Designer
    - Full IDE for Creating and editing taxonomies
End-to-End Solution

Technical Highlights
- Full XBRL Processing Capabilities
  Integrated XBRL Processing Engine
- Scalable Query and Services
  Minimized Loading for Taxonomies & Instances into Memory
- XBRL Storage
  Provides storage and management of XBRL content including doc integrity

Oracle XBRL Extension
- XBRL Services
- XBRL Query
  - Instance Views
  - Taxonomy Views
- Protocols, SQL, XQuery
- XBRL Storage
- Instance Documents
- Taxonomies
Technical Architecture
Oracle XML DB Overview

- **Schema-Based XML**
  - Object-Relational Storage
  - Binary Storage

- **Schema-Less XML**
  - Binary Storage
  - Text Storage

- **Relational Content**
  - XML Views

- **XML Indexing**
  - B-Tree Indexing
  - XML Indexing
  - Functional Indexing
  - Full-Text Indexing

- **Access Paradigms**
  - Table / Row
  - File / Folder
  - Content and Meta-data
What is XML DB?

- **XMLType**: Native flexible, scalable, XML storage, processing and indexing
- **XQuery, XML Schema, XSLT**: enable XML centric development
- **SQL/XML** for SQL-Centric XML publish and SQL/Xquery interaction
- **SQL/XML** and **XML/SQL** interoperability
- **XML/Relational Duality of views**
- **Standards** compliant
XBRL Technical Challenges

• XBRL has added challenges
  • XBRL Processing Engine
    • Process content based on business rules, XML engine not enough
  • Dynamic reconstruction of hierarchical relationships
    • Hierarchical relationships not explicit and not static, need to be reconstructed from linkbases prior to any useful operations
  • Queryability over large volumes of documents
    • Need efficient Queryability, Analytics over both instances and taxonomies
  • Scalable Lookups of Schemas and Linkbases
    • Taxonomies large, numerous, extensible. Need scalable lookups when operating on large volumes
  • Maintaining Taxonomy Document Integrity
    • Managed individually by XBRL applications today
XBRL Extension to Oracle XML DB

- **XBRL Storage**
  - Database native XML Persistence for XBRL content
  - Taxonomy integrity enforcement

- **XBRL Query**
  - Queryability
    - Queries over instance and taxonomy documents
    - PL/SQL APIs
  - Representational views over XBRL Content
    - 3NF Logical Data Model Views
    - XBRL Representation Views using Network Generation APIs
    - Derived and Aggregate View Generation ETL Packages
    - No need to load XML Schemas and Linkbases in memory
XBRL Extension to Oracle XML DB

- Business Intelligence Analytics
  - Relational views based on XBRL Dimensions
  - Integration with Oracle BIEE
- XBRL Services
  - Services to render XBRL reports, diff documents
  - All services dynamic and scalable
Architecture Summary

• Targeted as a scalable XBRL platform
  • Goal is to meet customer scalability and performance needs
  • Document search and comparison for very large repositories

• Leverages Oracle XML DB and SQL/XQuery
  • Replaces custom code with XBRL dictionary
  • Single source of data synchronized between XML and SQL
  • Access to XBRL data for Dashboards and BI Tools
  • Ad hoc queries and BI integration via SQL Layer
Third Party Vendor Integration

• Oracle XBRL Extension supports
  • Industry standard Internet protocols and APIs
    • WebDAV, SOAP, JDBC, etc.
  • Transformation services providing 3NF and derived relational views

• Easy integration with 3rd party vendor products
  • Taxonomy discovery and composition
  • Taxonomy and instance document validation
  • Business intelligence analytics and reporting
Hardware and Software
Engineered to Work Together