Module 3: Understanding Analysis Services Architecture

Overview
- Microsoft Data Warehousing Overview
- Analysis Services Components
- Metadata Repository
- Cube Storage Options
- Client Architecture
- Office 2000 OLAP Components

Microsoft Data Warehousing Overview

Data Transformation Services
- Transforming and Moving Data
- Scheduling DTS Tasks
- Automating OLAP Administrative Tasks

Data Warehouse Storage
- Not Limited to SQL Server 2000
  - SQL Server 6.5, SQL Server 7.0, Microsoft Access 97, Microsoft Access 2000, Oracle 7.3, Oracle 8.0
  - Any ODBC / OLE DB provider

Analysis Services
**Client Interfaces**

- APIs:
  - Low level: OLE DB for OLAP and OLE DB for Data Mining
  - High level: ADO-MD

**Client Applications**

- Office 2000
- Third-Party Applications
- Custom Applications

**Analysis Services Components**

- Analysis Services Architecture
- Analysis Manager
- Analysis Server Characteristics

**Analysis Services Architecture**

Note: ADO = Asynchronous Data Objects

**Analysis Manager**

- Application for Database Administration
- Snap-In to MMC (Microsoft Management Console)
- Decision Support Objects

**Analysis Server Characteristics**

- OLE DB for OLAP Provider
- OLE DB Provider
- Windows 2000 and Windows NT Service
Metadata Repository
- Contains All Metadata for Analysis Server
- By Default, an Access Database
- msmdrep.mdb
- Can Migrate Repository to SQL Server
  - SQL Server 7.0 OLAP Services format
  - SQL Server 2000 Meta Data Services repository format

Cube Storage Options
- Storage Modes
- Partitioning
- Virtual Cubes
- Linked Cubes
- Database Architecture
- Analysis Server Limits

Storage Modes
- MOLAP
- ROLAP
- HOLAP

Partitioning
- Current Year
- Prior Year
- History
- MOLAP 35% agg
- MOLAP 10% agg
- ROLAP 0% agg

Virtual Cubes
- Equivalent of RDBMS View
- Subset of One Cube
- Combination of Data from Multiple Cubes
- Virtually No Storage Consumed

Linked Cubes
- Linked Cubes Characteristics
  - Are based on source cubes stored on different servers
  - Reference entire source cubes and not subsets
  - Appear as regular cubes
  - Always have ROLAP storage mode with no aggregations
- Linked Cubes Limitations
  - Can only be created with SQL Server 2000 Enterprise Edition
  - Cannot be used to write back cube data
  - Can only be created on Analysis Server with query access to source cube
**Database Architecture**
- Analysis Server Contains One or More Databases
- Each Database Contains One or More Cubes
- Each Cube Contains One or More Partitions
- Each Partition Can Have a Different Storage Mode, a Different Aggregation Design, and a Different Storage Location

**Analysis Server Limits**

<table>
<thead>
<tr>
<th>Items</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Databases per server</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Cubes per database</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Cubes per virtual cube</td>
<td>64</td>
</tr>
<tr>
<td>Dimensions per cube</td>
<td>128</td>
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<tr>
<td>Measures per cube</td>
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<tr>
<td>Calculated members per cube</td>
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</tr>
<tr>
<td>Levels per dimension</td>
<td>64</td>
</tr>
<tr>
<td>Partitions per cube</td>
<td>Unlimited</td>
</tr>
</tbody>
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**Client Architecture**
- PivotTable Service
- PTS Architecture
- Intelligent Caching
- Multidimensional Expressions
- Internet Support on Clients

**Multidimensional Expressions**
- Used as the Syntax for Modeling and Querying an OLAP Database
- Supported by PTS
- Part of the OLE DB for OLAP API
- Used to Create Calculated Members
- Key to Advanced Analytical Capabilities of Analysis Services

**Internet Support on Clients**
- Uses IIS (Internet Information Server) to Provide Authentication Over the Internet
- Uses HTTP to Pass Through Firewalls
- Supports Automatic Setup through ASP
- Requires SQL Server 2000 Enterprise Edition
Office 2000 OLAP Components

- Excel PivotTables
- Local Cubes
- Web Pivot Control

Review

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