

## SQL 2005 New Features

### Three Categories

- n **Database Administration** Features
- n **Database Development** Features
- n **Business Intelligence** Features

## Database Administration Features

- n Native 64 Bit Support
- n NUMA Support
- n Support for Hyper-Threading
- n Integration of .NET Framework
- n Supports XML Data types
- n Security Enhancements
- n New Set of Management Tools
- n Updated Set of Performance Tools
- n Server Management Framework completely revamped
- n Database Availability Enhancements
- n New Backup and Restore Features

## Database Development Features

- n Integration of .NET Common Language Runtime (CLR)
- n T-SQL Enhancements
- n ADO.NET Enhancements
- n Notification Services added as a new subsystem
- n SQL Server Service Broker added as a new subsystem
- n New Native XML data type
- n XQuery Support
- n Native HTTP SOAP Access

## Business Intelligence Features

- n New Reporting Services subsystem
- n Totally rewrote DTS and renamed Integration Services
- n Analysis Services Engine Enhancements
- n New Analysis Services Management and Development features
- n New Object Definition Language (ODL)
- n New Unified Dimensional Model
- n New Data Mining Algorithms

## Administration - Native 64 Bit Support

- n 32 bit version of SQL Server can address a max of 32GB of RAM using Advanced Windowing Extensions(AWE) – physical addressable memory limited to 4GB (2GB for OS and 2GB for applications)
- n Native 64-bit – raising the max addressable memory to 32TB

## Administration - NUMA Support

- n Non-Uniform Memory Architecture Support
- n A system architecture – manages CPU and memory usage more efficiently
- n The processors are able to access the data in RAM faster than the RAM and system bus can provide it

### Administration- Hyper Threading

- n CPU technology
- n Creates two logical processors for each physical processor in a system
- n Each logical processor – executing separate threads simultaneously
- n Provide better resource consumption

### Administration –Enhanced Multiple Instance Support

- n SQL 2000 – 15 instances
- n SQL 2005 – 50 instances

### Administration – New Data Types

- n Varbinary(max)
  - n XML data type
- ```
create table MyXMLDocs  
  (DocID INT Primary Key Identity,  
   MyXmlDoc XML)  
insert into MyXmlDocs Values ('<tag1>  
<id>1</id><text>text</text></tag1>')
```

### Administration – Native HTTP Support

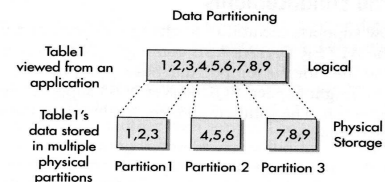
- n Process incoming web services requests without the presence of IIS or another web server
- n Support both Windows and SQL Server authentication, as well as SSL

### Administration – Database Data File Enhancements

- n Change the path of a database's data and log files – offline operation
- n Alter database <name> modify file(name=<'data\_file\_name'> , filename=<'new path'>
- n SQL 2000 only supports such changes for tempdb database

### Administration – Data Partitioning

- n Break a single database object such as a table or an index into multiple pieces



## Administration – Online Indexing Operations

- n Older version: didn't allow any access to an index while it was being rebuilt
- n 2005 enables applications to access the index as well as perform update, insert, and delete operations on a table while the index rebuilding operation is running
- n Rebuilt a clustered index – no need to rebuild the related non-clustered indexes

## Administration – Bulk Data Loading

- n Uses an XML-base format file
- n Old BCP format file can still be used
- n Supports logging of bad rows so the data loading can continue even if invalid row and data are encountered

## Administration – Full Text Search

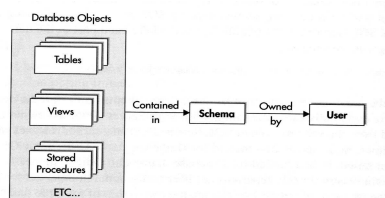
- n Old version: require the use of stored procedure
- n 2005 version: new DDL statements, such as “create fulltext catalog” and “create fulltext index”
- n 2005 version: backup and restore; ability to use thesaurus to find synonyms of search words.

## Administration – Security Enhancement

- n User-Schema Separation
- n Stored Procedure Execution Context
- n More Granular Permissions Control
- n Password Policy Enforcement
- n Catalog Security

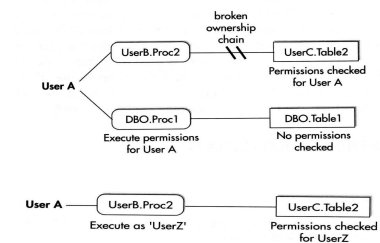
## Administration – Security Enhancement

- n User-Schema Separation



## Administration – Security Enhancement

- n Stored Procedure Execution Context



## Administration – Security Enhancement

### More Granular Permission Control

- n add more permission at different scope
- n the principle of least privileges
- n DBA controls exactly what permission are
- n Same permission can be applied at multiple scopes

## Administration – Security Enhancement

### Password Policy Enforcement

- n Enforce password strength
- n Password expiration
- n Account lockout policies
- n Enabled in the default installation

## Administration – Security Enhancement

### Catalog Security

- n Implemented as “catalog views”
- n Secured by default
- n Use “View Definition” to grant permission

Server 2000: system tables in the individual database and in the master database

## New Set of Management Tools

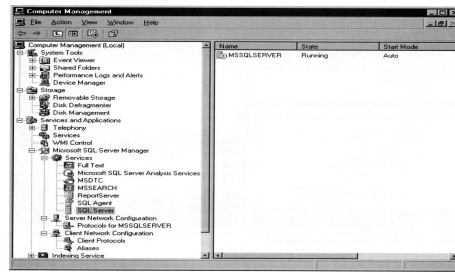
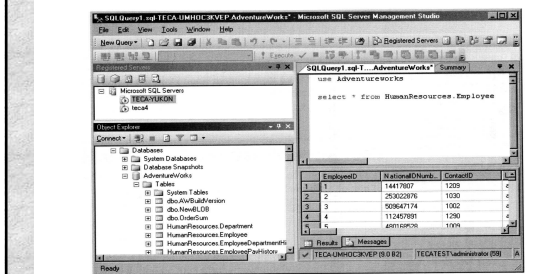


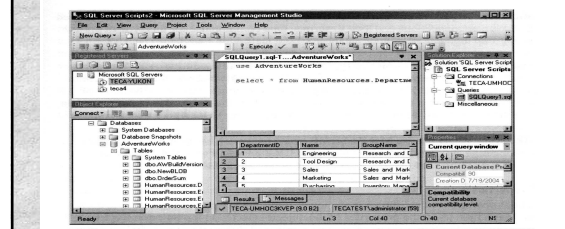
Figure 2-1 SQL Computer Manager

## New Set of Management Tools SQLServer Management Studio



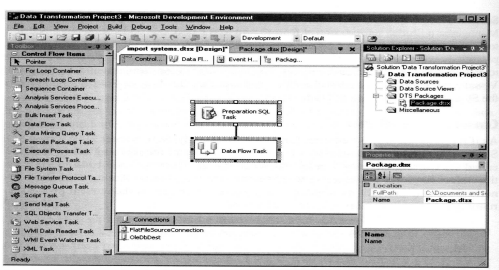
## New Set of Management Tools

### SMS – Solution Explorer



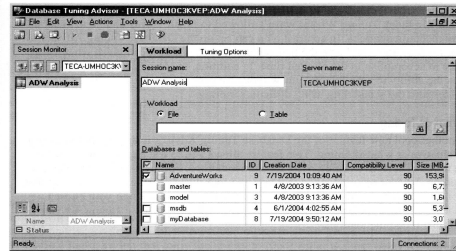
## Business Intelligence Development Tools

### Business Intelligence Development Studio



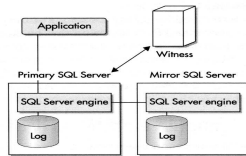
## Administration - Performance Tools

### Database Tuning Advisor



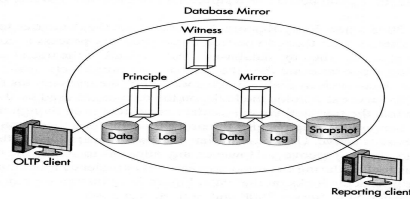
## Administration - Database Mirroring

- Enables a second standby database to be available in about 2-3 seconds
- Zero data loss and up-to-date with the primary database server



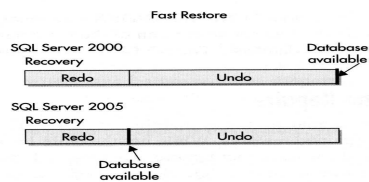
## Administration - Snapshot Isolation

- Can be access in read-only mode for reporting



## Administration - Fast Recovery

- SQL 2000, not available until all of the redo and undo operations were completed
- SQL 2005, immediately available



## Administration - Dedicated Administration Connection

- DBA has access to the server regardless of the server's current workload
- Kill any runaway processes
- Command line operation:  
c:\Sqlcmd -A

#### Administration – Online Restore

- n SQL 2000, the database is not available during a restore operation
- n SQL 2005, the database is available as soon as the primary filegroup is restore; only the data being restored is unavailable

#### Administration – Others

- n Concurrent database and log backup
- n Backup of Full-text Catalogs
- n Database page checksum
- n Continue Past Restore Errors
- n Backup Media Mirroring
- n Hot-Plug Memory
- n Improved Dynamic Configuration

#### Database Development Features

- n Integration of .NET Common Language Run-time (CLR)
- n T-SQL Enhancements
- n ADO.NET Enhancements
- n Notification Services added as a new subsystem
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#### Development- Integration of .NET Common Language Run-time

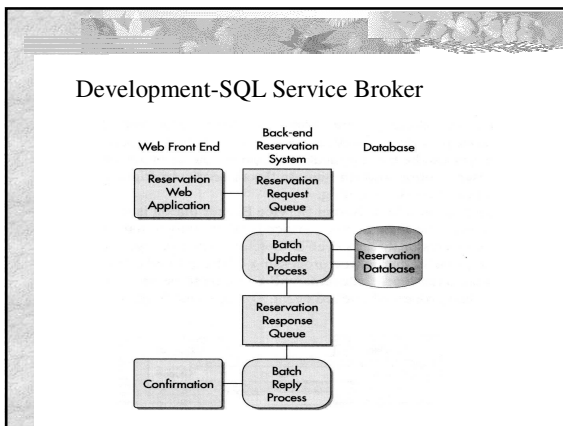
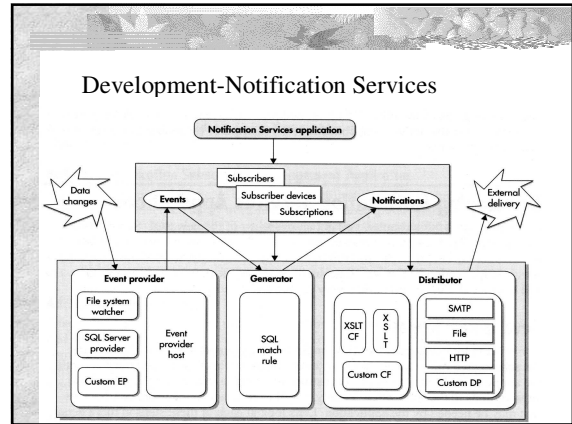
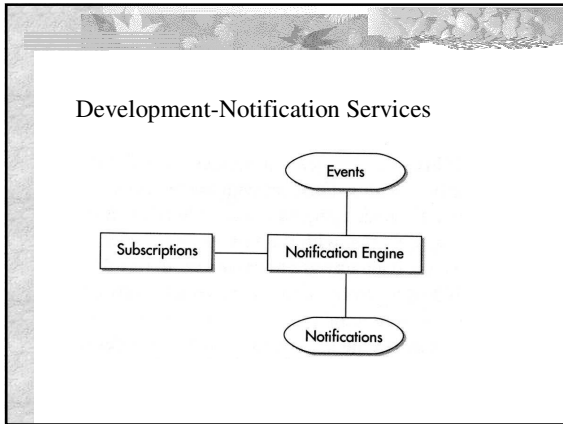
- n “Assembly” is the unit of deployment for .Net objects with the database
- n Create a DLL using Visual Studio 2005
- n Import that DLL into SQL Server as an assembly
- n Link that assembly to a database object such as a store procedure or a trigger

#### Development-T-SQL Enhancement

- n Top clause can use a variable or a scalar subquery, such as “select top @number ..”
- n Common Table Expression – handle recursive queries
- n PIVOT-transforms a set of rows into columns
- n UNPIVOT – transforms pivoted columns back into rows
- n .....

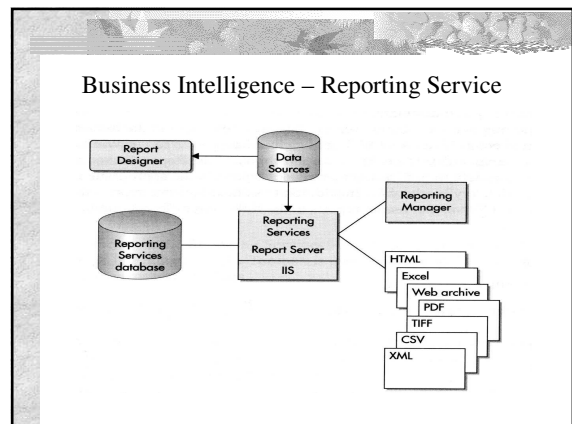
#### Development-ADO.Net Enhancements

- n Server side cursor for the application
- n Asynchronous support – issue multiple database requests on different threads without blocking the threads
- n Multiple Active Result Sets
- n Paging – bind to a range of rows from a result set
- n Bulk insert
- n Common Connection Model – a new Provider Factory

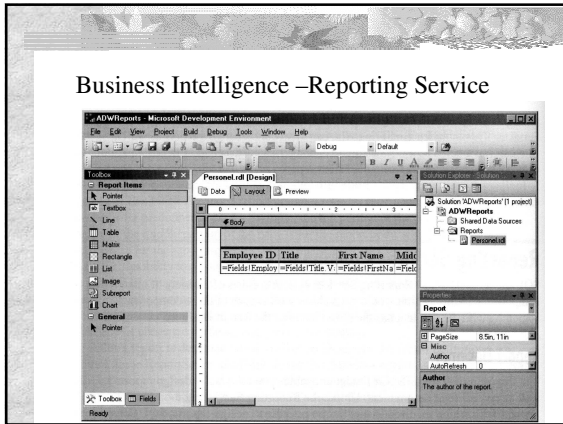


- ### Development-XML Integration
- n Native XML data type
  - n Xquery Support
  - n XML indexes
  - n FOR XML Enhancement
  - n OPENXML Enhancement
  - n XML Bulk Load
  - n Native HTTP SOAP Access
  - n XML Enhancement for Analysis Server
  - n System XML Catalog Views

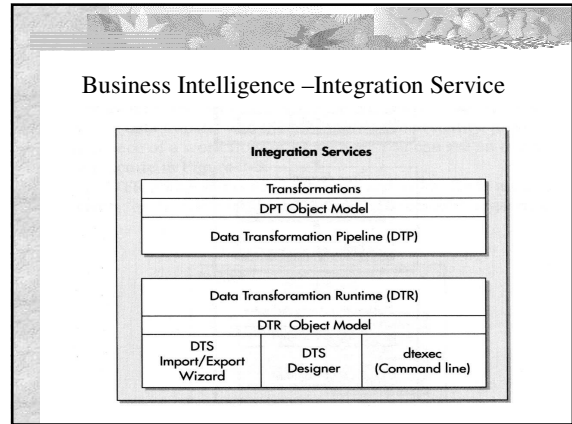
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## Business Intelligence –Reporting Service



## Business Intelligence –Integration Service



## Business Intelligence –Analysis Services

Data Mining prediction can help make better decision and make the best use of its resources

Decision Tree -2000

Times Series - 2005

Custering and Sequence Clustering-2000

Naïve Bayes -2005

Association Rules -2005