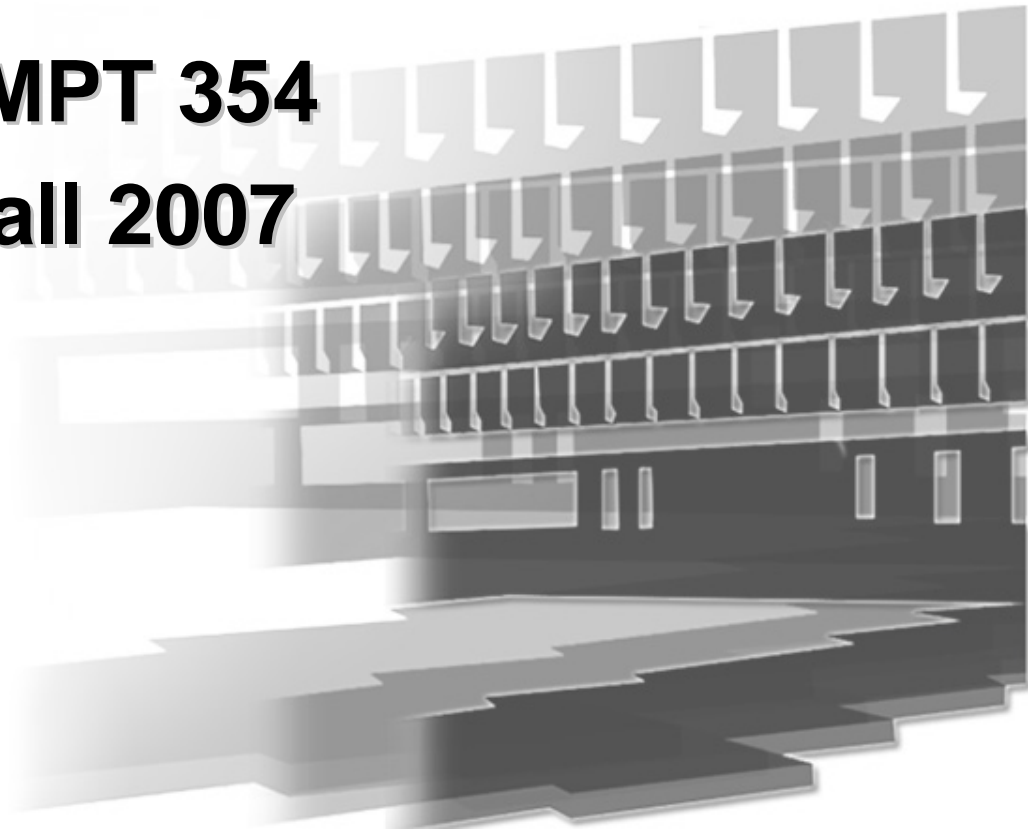


A Tutorial on SQL Server 2005

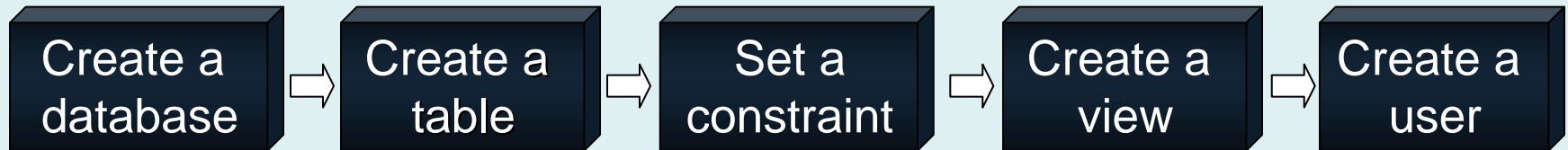
CMPT 354

Fall 2007



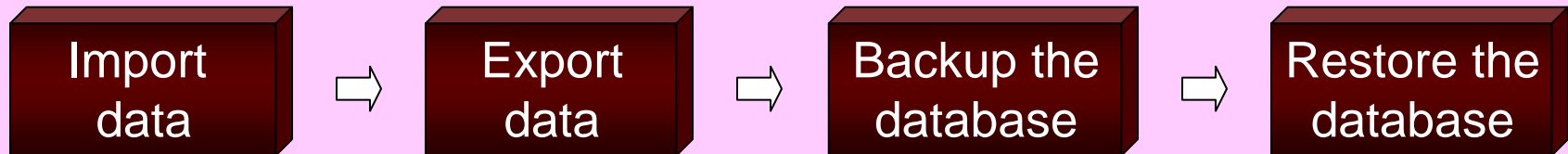
Road Map

Create Database Objects

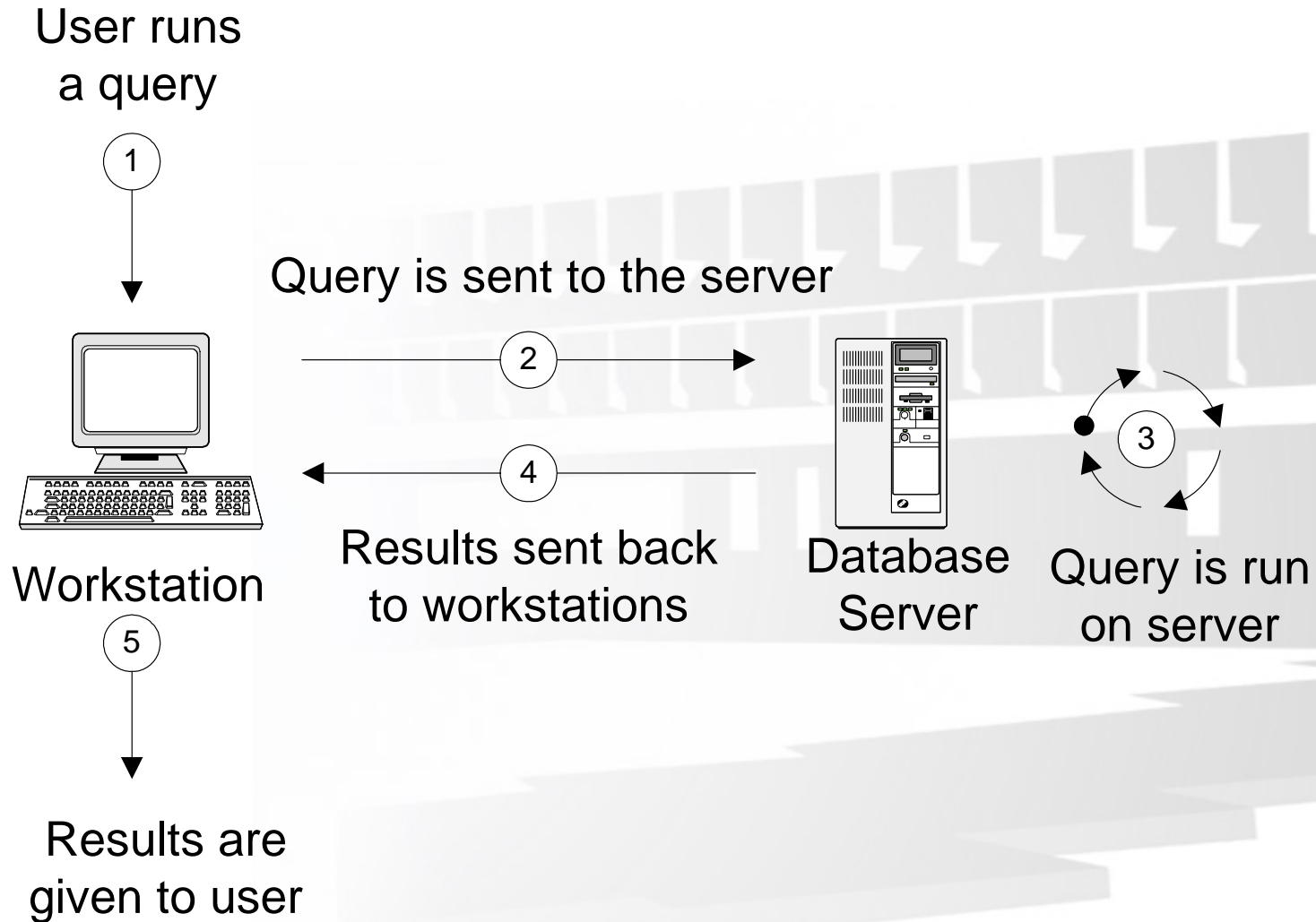


Query

Manage the Data



Client-Server Architecture



Versions of SQL Server 2005

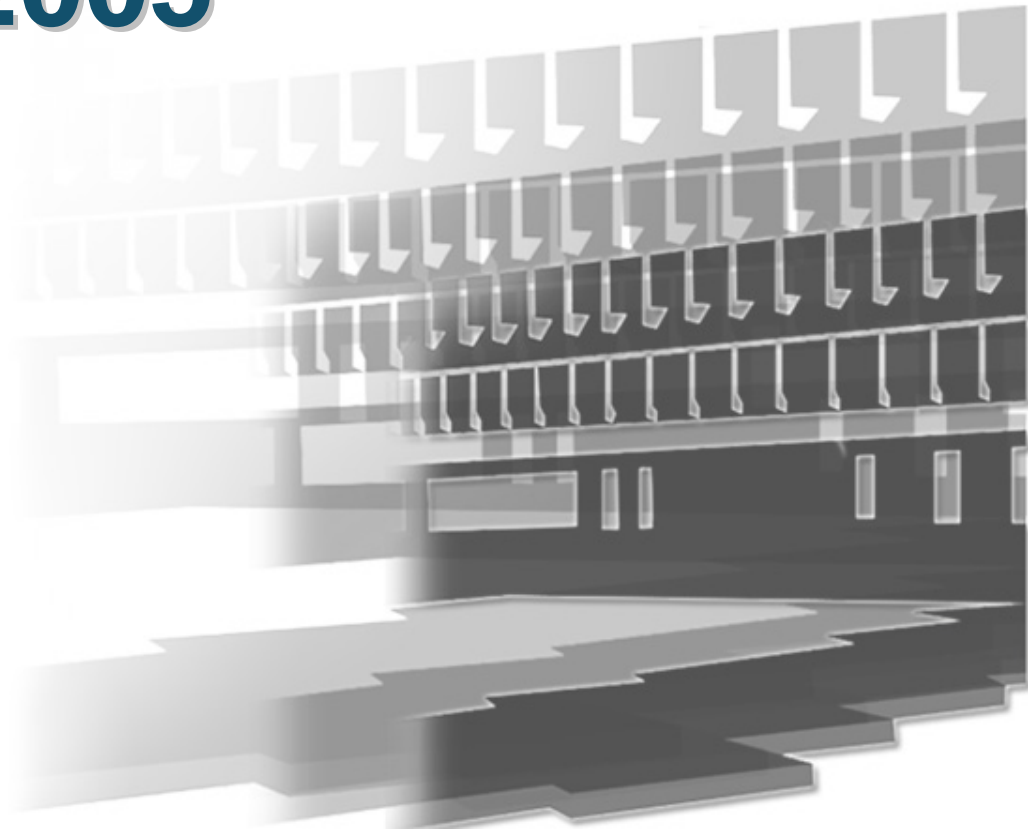
- Enterprise (only support Windows Server OS)
 - Includes all of the features of SQL Server 2005 and meets the high demands of enterprise online transaction processing and data warehousing applications
- Standard (mostly support Windows Server OS)
 - Includes the essential functionality needed for e-commerce, data warehousing, and line-of-business solutions
- Workgroup
 - Includes the core database features of the SQL Server product line, and is the data management solution for small organizations that need a database with no limits on size or number of users
- **Express (free)**
 - A free, easy-to-use, lightweight, and embeddable version of SQL Server 2005, includes powerful features such as SQL Server 2005 Reporting Services and SQL Server 2005 Management Studio Express
- **Developer (can support Windows XP OS)**
 - Includes all of the functionality of Enterprise Edition, but is licensed only for development, test, and demo use
- Compact
 - A free, easy-to-use embedded database engine that lets developers build robust Windows Desktop and mobile applications that run on all Windows platforms

Reference: <http://technet.microsoft.com/en-us/library/ms144275.aspx>

Administrator's Duties

- Install and configure SQL Server 2005
- Plan and create databases
- Back up the databases
- Restore the databases when necessary
- Set up and manage users for SQL Server
- Manage security for new users and existing users
- Import and export data
- Set up and manage tasks, alerts, and operators
- Manage the replication environment
- Tune the SQL Server system for the optimal performance
- Troubleshoot any SQL Server problems

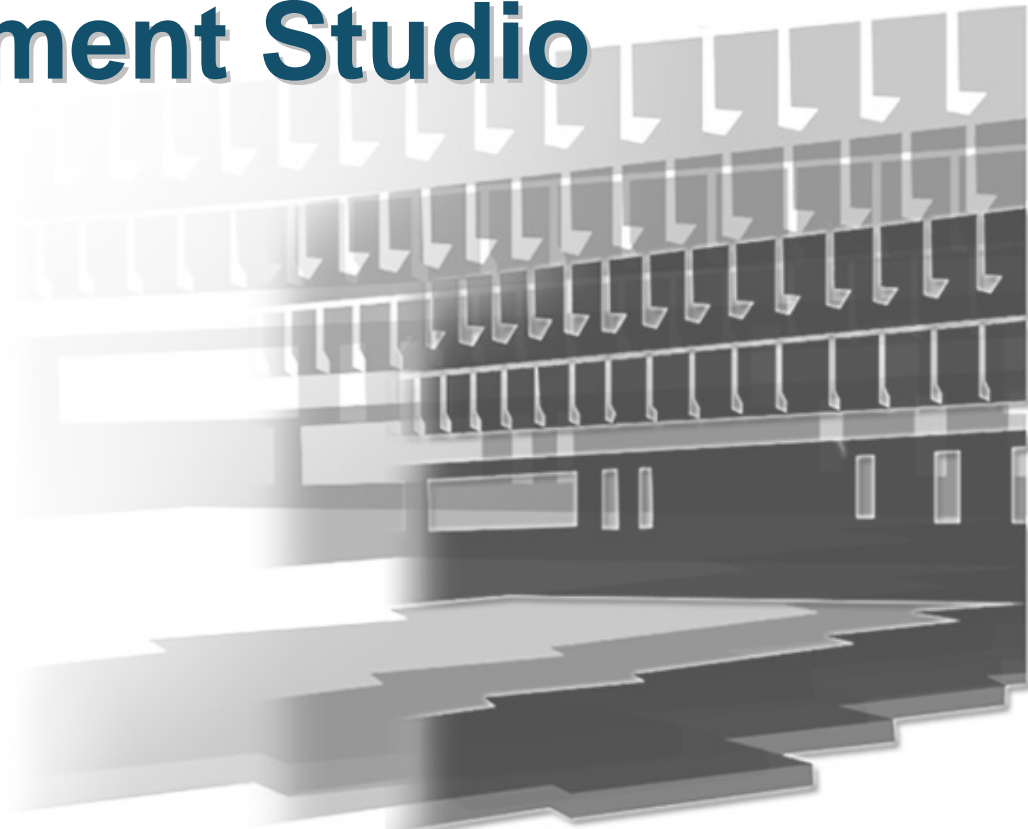
Installing SQL Server 2005



A Simplified Installation Process

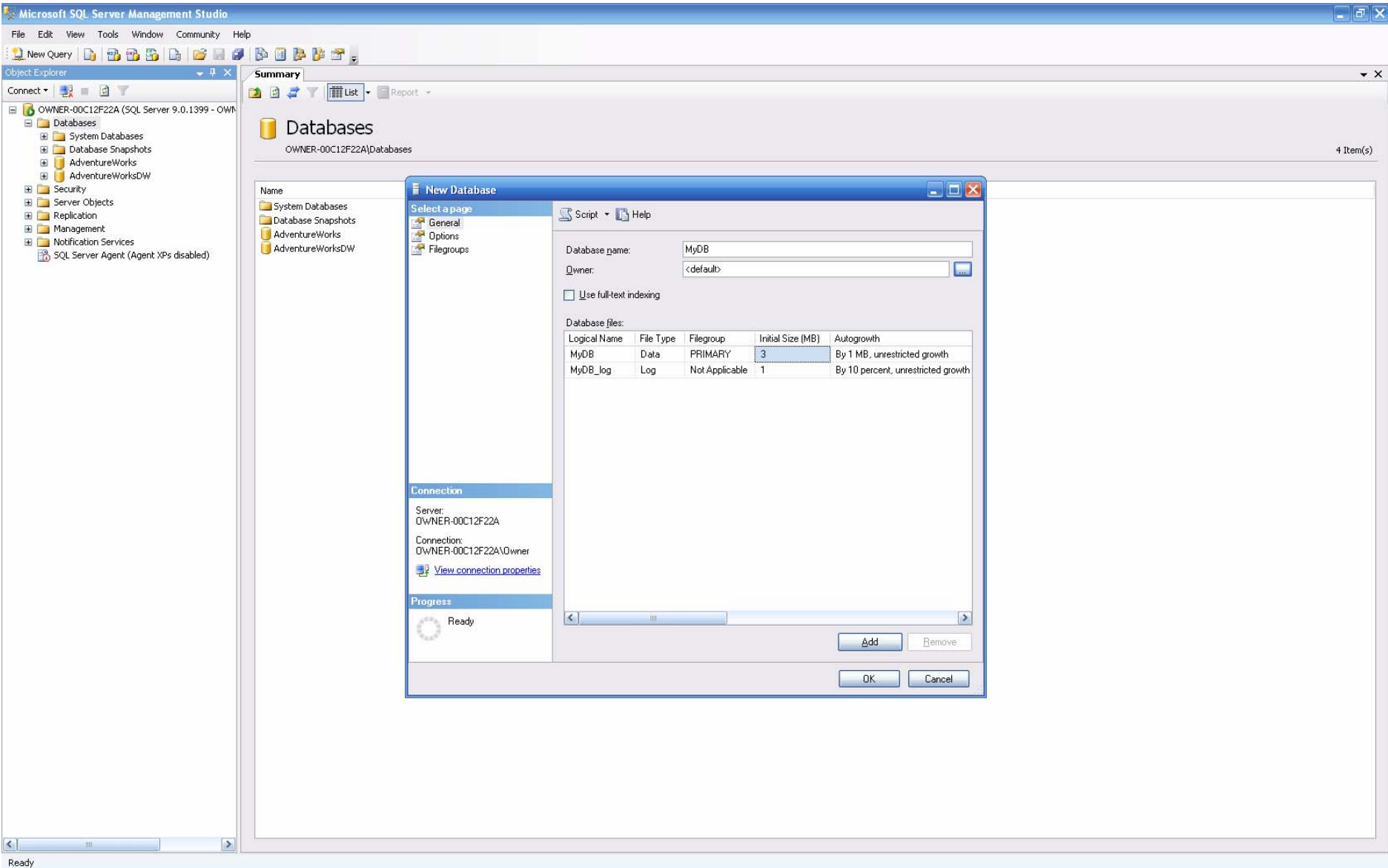
- Starting from setup.exe
- Click buttons other than “Cancel” in the Wizard (using most of the default setup)
 - Select components to install:
 - SQL Server Database Services
 - Workstation components, books online and development tools
 - User “Advanced” option to setup installation path and include sample databases
 - Create a default instance
 - Use the built-in System account: Local System
 - User Windows Authentication Mode

Create Database Objects with Microsoft SQL Server Management Studio



Create A Database

- Start the Management Studio
- Connect to your SQL Server
- Right-click the Databases folder in the console tree, choose New Database from the context menu
- Fill in the boxes in the database properties sheet
- Click OK when you are finished.



Create A Table

- Open Management Studio, drill down to the DB354 database, and expand it
- Right-click on Tables and select New Table
- Type the column name and data type, and setup column properties (in the window at the bottom of the screen)
- Click on the Save button, enter a name for the table and click OK

Microsoft SQL Server Management Studio

File Edit View Project Table Designer Tools Window Community Help

New Query

Object Explorer

Connect

OWNER-00C12F22A (SQL Server 9.0.1399 - OWN)

Databases

- System Databases
- Database Snapshots
- AdventureWorks
- AdventureWorksDW
- MyDB
- DB354
- Database Diagrams
- Tables
- Views
- Synonyms
- Programmability
- Service Broker
- Storage
- Security
- Security
- Server Objects
- Replication
- Management
- Notification Services
- SQL Server Agent (Agent XPs disabled)

Table - dbo.Table_1* Summary

Column Name	Data Type	Allow Nulls
user_id	int	<input type="checkbox"/>
user_name	nchar(10)	<input checked="" type="checkbox"/>

Choose Name

Enter a name for the table:

user

OK Cancel

Column Properties

Deterministic	Yes
DTS-published	No
Full-text Specification	No
Has Non-SQL Server Subscriber	No
Identity Specification	No
(Is Identity)	No
Identity Increment	
(Is Identity)	

Properties

[Tbl] dbo.Table_1

(Identity)

(Name) Table_1

Database Name DB354

Description

Schema dbo

Server Name owner-00c12f22a

Table Designer

Identity Column user_id

Indexable Yes

Regular Data Space PRIMARY

Replicated No

Row GUID Column

Text/Image Filegro. PRIMARY

Create A Constraint

- Open Management Studio and drill down to target table and expand it
- Right-click on Constraints and select New Constraint
- In the Check Constraint dialog box type the constraint expression
- Click OK to create the constraint

Microsoft SQL Server Management Studio

File Edit View Project Table Designer Tools Window Community Help

New Query

Object Explorer

Connect

OWNER-00C12F22A (SQL Server 9.0.1399 - OWN)

- Databases
 - System Databases
 - Database Snapshots
 - AdventureWorks
 - AdventureWorksDW
 - MyDB
 - DB354
 - Database Diagrams
 - Tables
 - System Tables
 - dbo.user
 - Columns
 - user_id (int, not null)
 - user_name (nchar(10), null)
 - Keys
 - Constraints
 - Triggers
 - Indexes
 - Statistics
 - Views
 - Synonyms
 - Programmability
 - Service Broker
 - Storage
 - Security
 - Security
 - Server Objects
 - Replication
 - Management
 - Notification Services
 - SQL Server Agent (Agent XPs disabled)

Table - dbo.user* Summary

Column Name	Data Type	Allow Nulls
user_id	int	<input type="checkbox"/>
user_name	nchar(10)	<input checked="" type="checkbox"/>

Check Constraints

Selected Check Constraint:

CK_user

Editing properties for existing check constraint.

(General)

Expression user_name > 'a'

(Identity)

(Name) CK_user

Description

(Table Designer)

Check Existing Data On Cre: Yes

Enforce For INSERTS And UF: Yes

Enforce For Replication: Yes

Buttons: Add, Delete, Close

Column Properties

Data Type	nchar
Default Value or Binding	
Length	10
Table Designer	
Collation	<database default>
Computed Column Specification	
Condensed Data Type	nchar(10)
Computed Column Specification	

Properties

[Tbl] dbo.user

(Identity)

(Name) [user]

Database Name DB354

Description

Schema dbo

Server Name owner-00c12f22a

(Table Designer)

Identity Column user_id

Indeable Yes

(Regular Data Space PRIMARY)

Replicated No

Row GUID Column

Text/Image Filegro: PRIMARY

Item(s) Saved

Create Views

- Open Management Studio and drill down to the target database
- Expand the database and locate View
- Right-click on View and select New View
- In Tables page, select target table and click Add
- Edit the view definition in the appearing GUI
- Click the Save button
- Name the view and save it

Microsoft SQL Server Management Studio

File Edit View Project Query Designer Tools Window Community Help

New Query

Object Explorer

Connect

- OWNER-00C12F22A (SQL Server 9.0.1399 - OWN)
- Databases
 - System Databases
 - Database Snapshots
 - AdventureWorks
 - AdventureWorksDW
 - MyDB
 - DB354
 - Database Diagrams
 - Tables
 - Views
 - System Views
 - Synonyms
 - Programmability
 - Service Broker
 - Storage
 - Security
 - Security
 - Server Objects
 - Replication
 - Management
 - Notification Services
 - SQL Server Agent (Agent XPs disabled)

View - dbo.View_2* View - dbo.View_1 Table - dbo.user* Summary

user

- * (All Columns)
- user_id
- user_name

Properties

[Col] user_name

(Identity)

(Name) user_name

View Designer

Allow Nulls	Yes
Collation	Chinese_PRC_CI_AS
Data Type	nchar
Length	10
Precision	0
Scale	0
Size	20

Choose Name

Enter a name for the view:

View_user

OK Cancel

Column	Alias	Table	Output	Sort Type
user_id		[user]	<input checked="" type="checkbox"/>	
user_name		[user]	<input checked="" type="checkbox"/>	

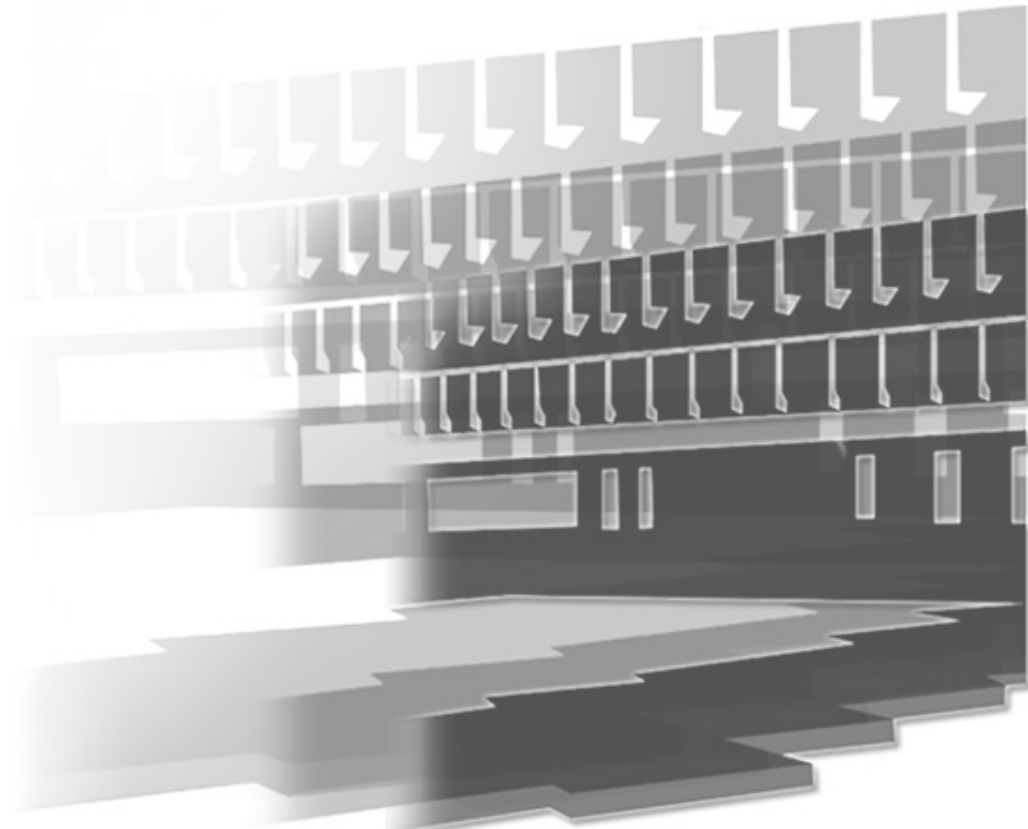
```

SELECT user_id, user_name
FROM dbo.[user]

```

(Identity)

User Management

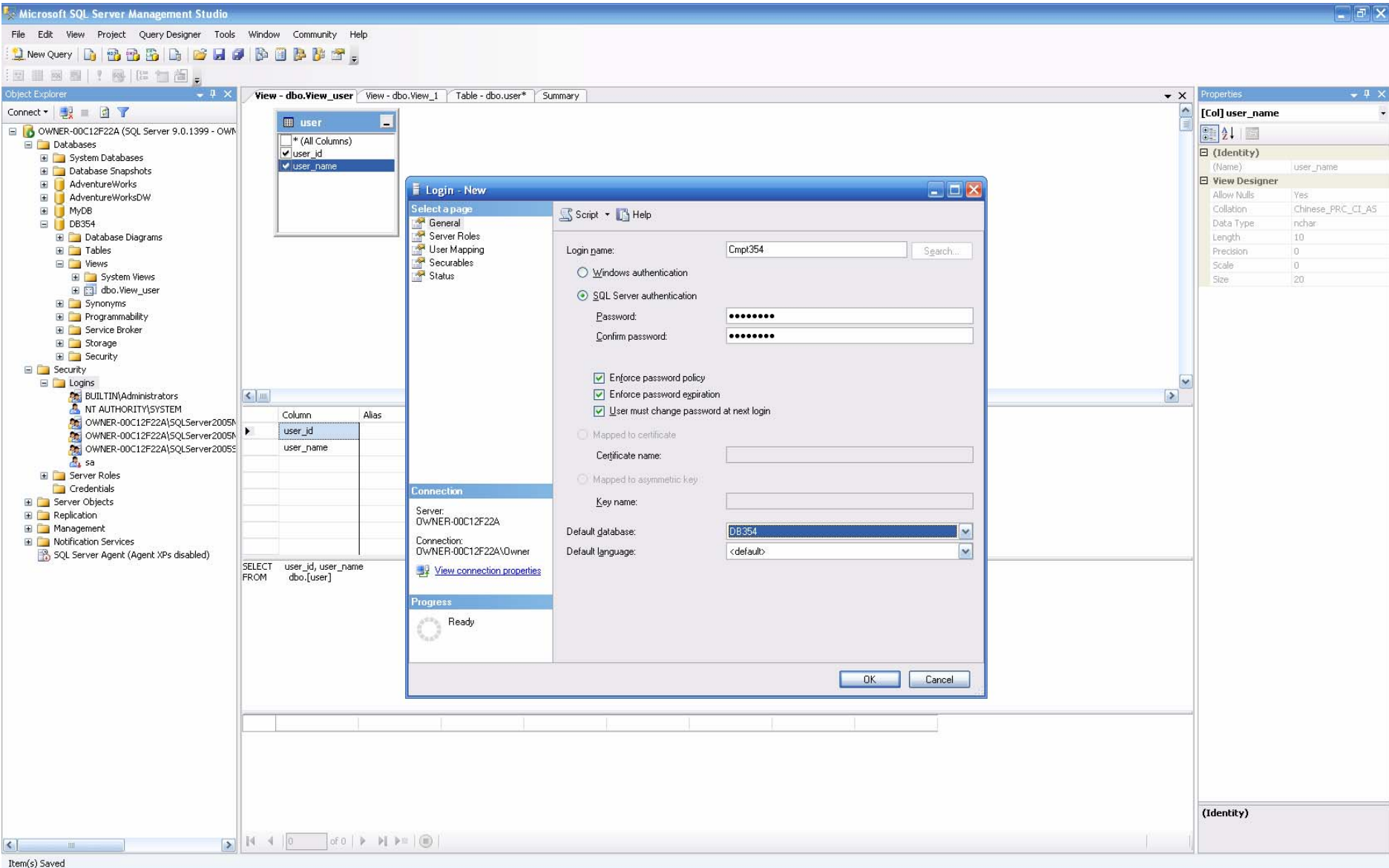


Security Modes

- **Windows Authentication Mode**
 - The user logs on to a Windows domain; the user name and password are verified by Windows
 - The user then opens a trusted connection with SQL Server
 - Since this is a trusted connection, SQL does not need to verify the user password
- **Mixed Mode (SQL Server and Windows)**
 - The user logs on to their network, Windows or otherwise
 - Next, the user opens a non-trusted connection to SQL Server using a separate user name and password
 - The user name and password should be verified by SQL Server

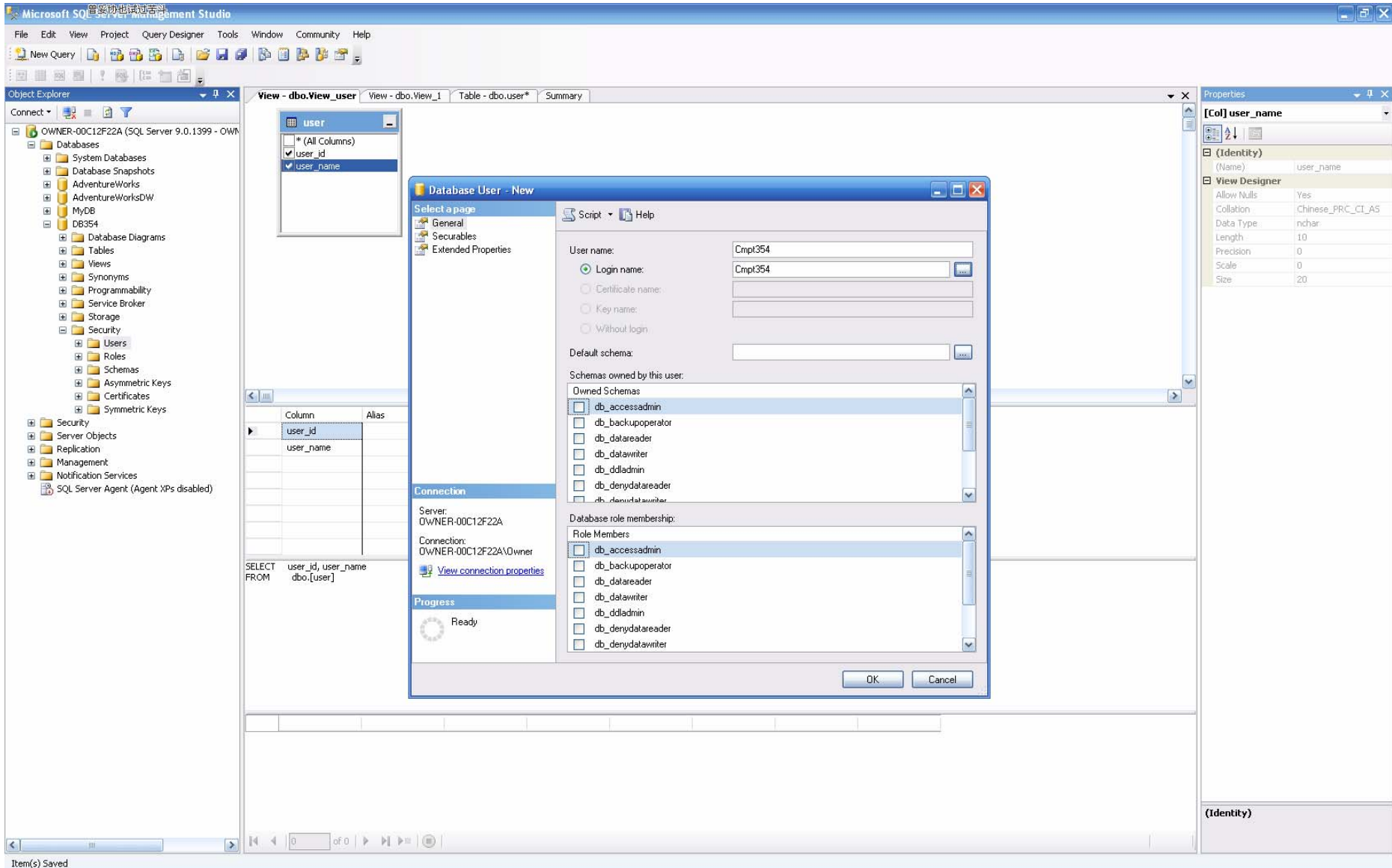
Create a standard login

- Open Management Studio and expand your server
- Expand Security and then click Logins
- Right-click Logins and select New Login from the context menu
- In the Login name box, type Cmpt354
- Select SQL Server Authentication mode
- In the Password text box, type a complex string and confirm it
- Uncheck “User must change password at next login”
- Under Default database, select your target database as the default database
- Click the OK button



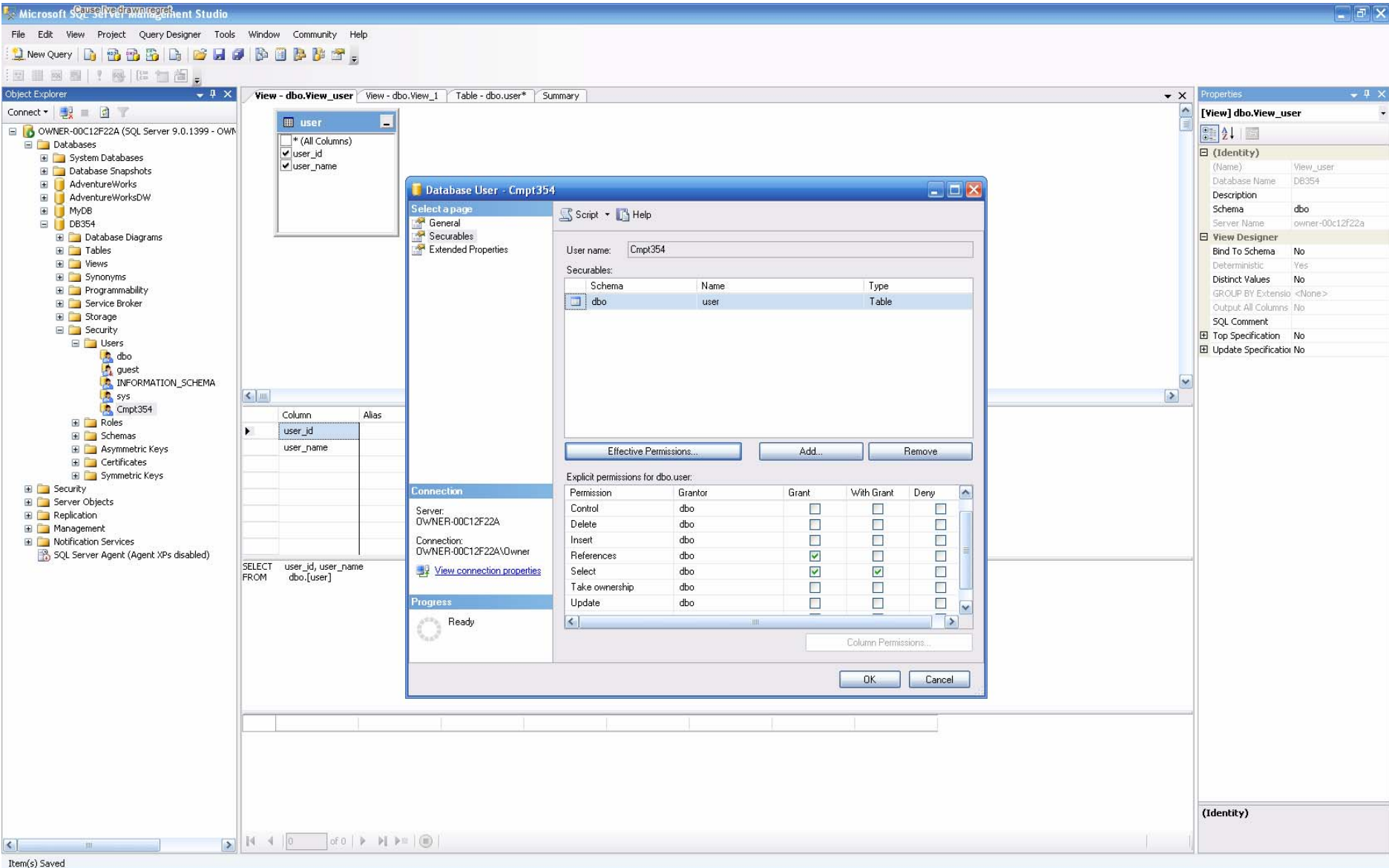
Creating Database User Accounts

- Open Management Studio and expand your server
- Expand Databases by clicking the plus sign next to the icon
- Expand the target database, then expand Security
- Right-click the Users icon and from the context menu, select New User
- Input a User name
- Click the button at the right of Login name box, then browse all the available names
- Select the target name (Cmpt354, the one you just created)
- Click OK

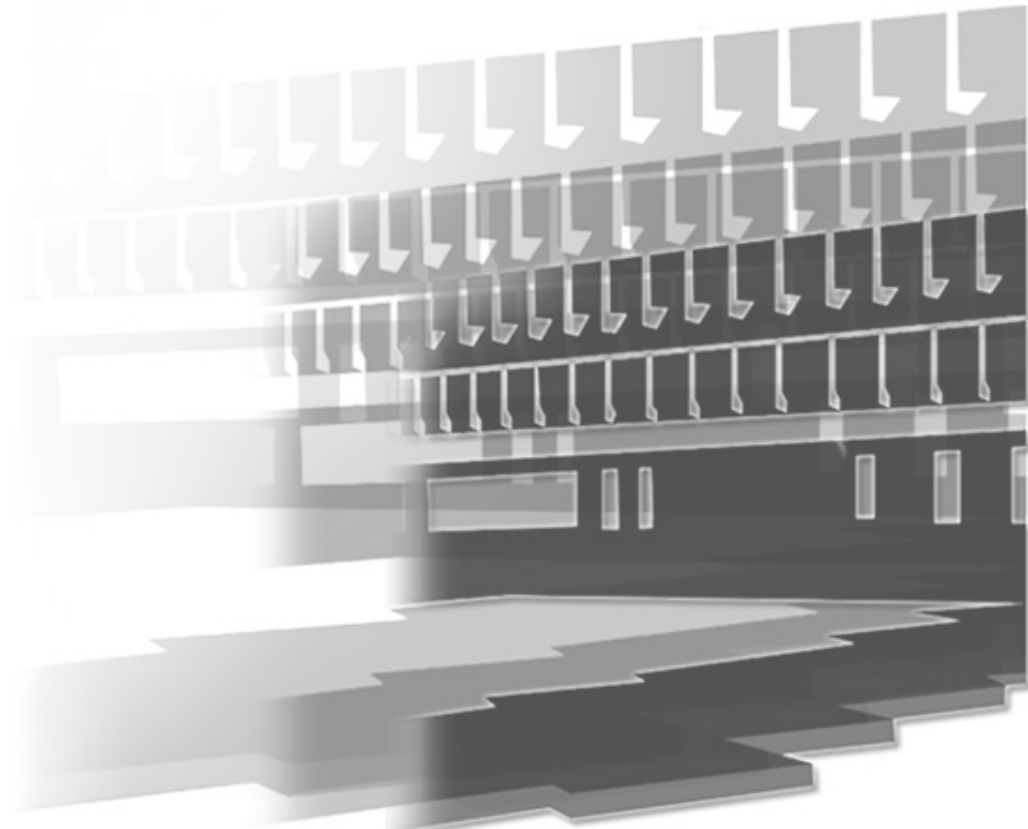


Granting, Revoking, and Denying Permissions

- Open Management Studio, expand your server and Databases, then select the target database
- Expand the database, then expand Security and Users
- Double-click the target user, and select the Securables page from the dialog window
- In Securables section, click Add, and in the Add Objects window click OK
- In the Select Objects window, click Object Types, then check Tables and click OK
- Browse available table and check the target table, then click OK
- If necessary, define more detailed permissions on the target table
- Click OK to return to Enterprise Manager.



Query the Database



Query Analyzer

- Different than SQL Server 2000, the Query Analyzer is integrated in Management Studio
- From the Management Studio menu, select File → New → Query with Current Connection
- In the appearing page, enter the following:
 - SELECT * FROM **TargetDatabase..**TableName
- Click Execute button or press Ctrl+E or F5
- The query will be executed and gives you results

OR

- From the Available Databases listbox, ***select the target database***
- Run the query: SELECT * FROM TableName
- You will get the same result set

The screenshot displays the Microsoft SQL Server Management Studio interface. The Object Explorer on the left shows the server hierarchy for 'OWNER-00C12F22A (SQL Server 9.0.1399 - OWN)'. The central query window contains the SQL statement: `select * from users`. The Results pane at the bottom shows a table with two columns: `user_id` and `user_name`. The Properties window on the right indicates that the query executed successfully. The status bar at the bottom shows 'Query executed successfully.' and '0 rows'.

user_id	user_name
---------	-----------

Save the Query as a Script File

- Click “File”
- Select “Save SQLQuery1.sql as...”
- Type in the file name you want
- Click “Save”

How to Use T-SQL

- **Creating a Database**

```
CREATE DATABASE DB354
ON PRIMARY
(NAME = 'DB354Data',
FILENAME = 'C:\Microsoft SQL Server\MSSQL\Data\DB354Data.MDF',
SIZE = 4,
MAXSIZE = 10,
FILEGROWTH = 10%)
LOG ON
(NAME = 'DB354Log',
FILENAME = 'C:\Microsoft SQL Server\MSSQL\Data\DB354Log.LDF',
SIZE = 1,
MAXSIZE = 4,
FILEGROWTH = 10%)
```

- **Dropping databases**

```
DROP DATABASE DB354
```

How to Use T-SQL (cont.)

- Create a table with a constraint

```
CREATE TABLE Table354  
(  
  Column1 int NULL,  
  Column2 char(10) Null,  
  CONSTRAINT chk_id CHECK (Column1 BETWEEN 0 and 100)  
)
```

How to Use T-SQL (cont.)

- Create a view

```
USE DB354  
CREATE VIEW view354 ON dbo.Table354  
AS  
SELECT Column1 FROM Table354
```

- Execute queries

```
USE DB354  
SELECT * FROM Table354 WHERE Column1>50
```

Importing and Exporting Your Data

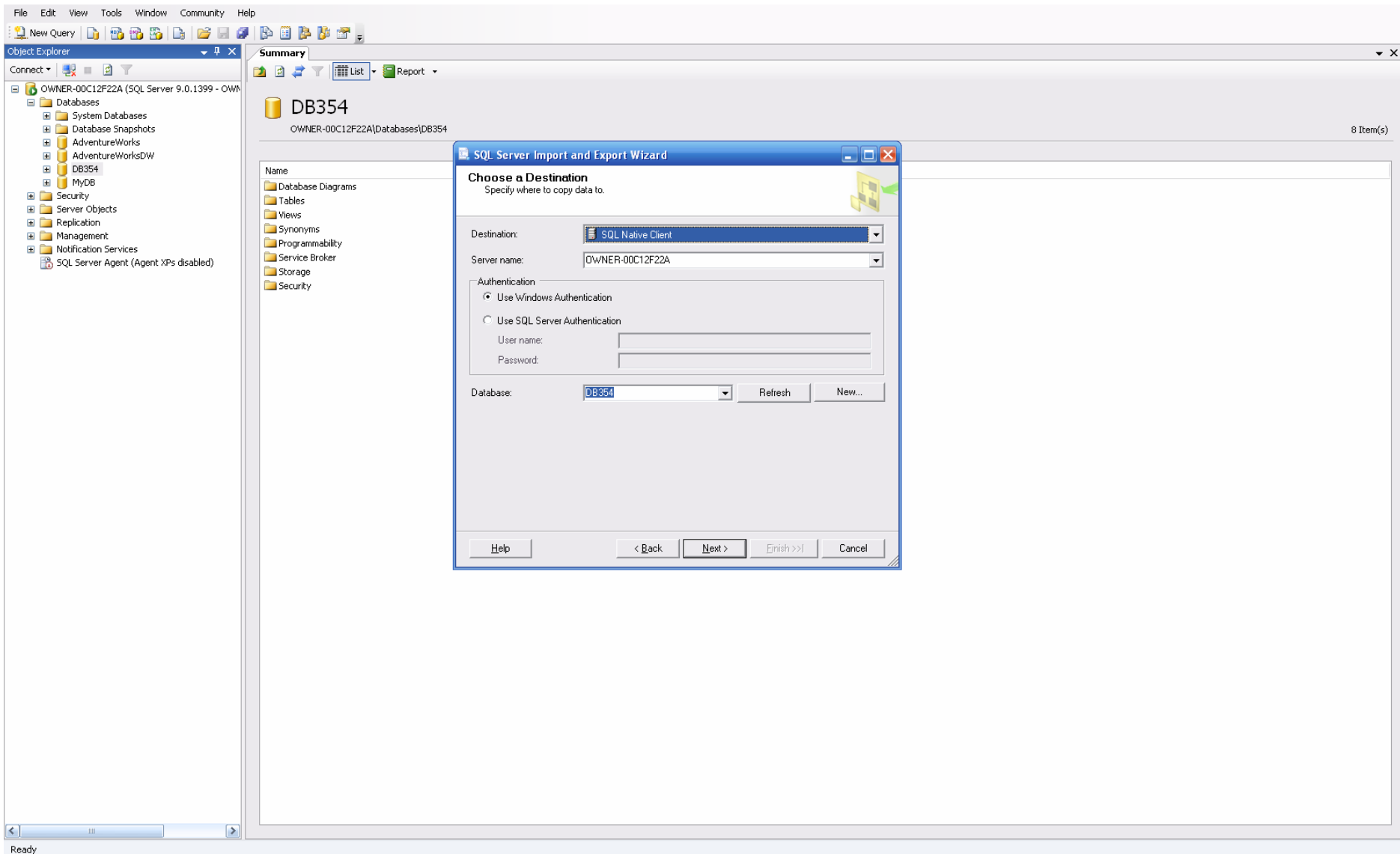


Exporting A Table

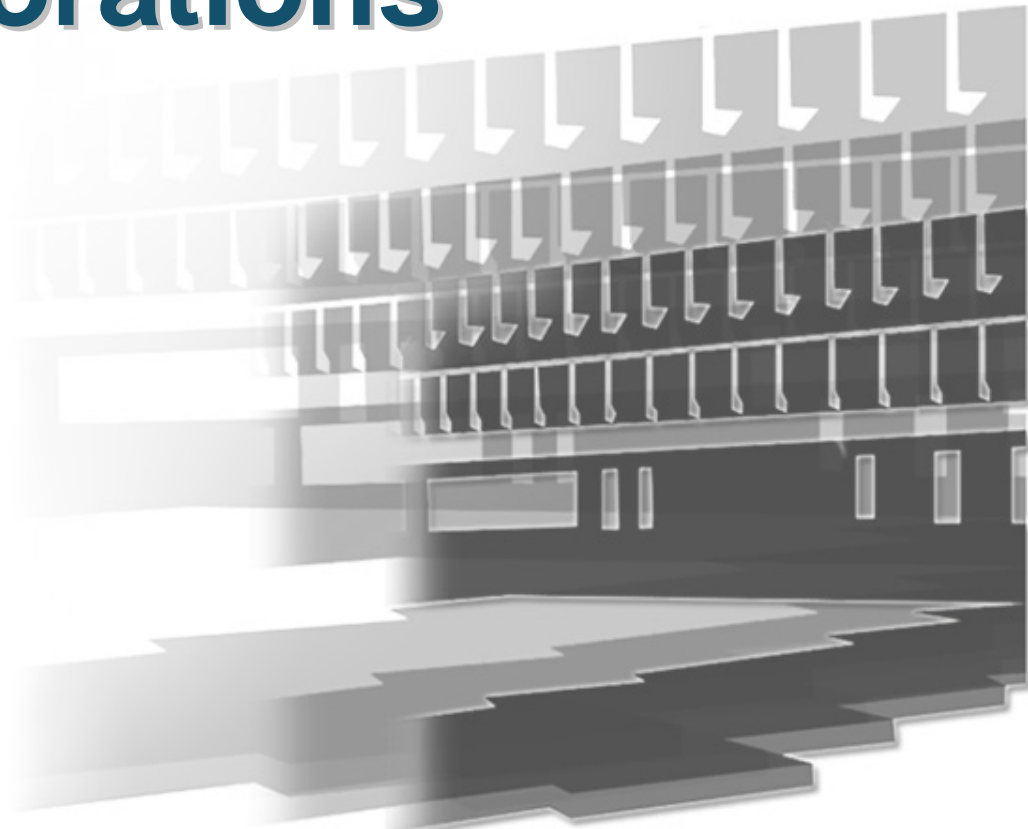
- From Management Studio, locate the target database and select it
- Right-click on the database, then select Tasks → Export Data from the context menu
- Use the Wizard to setup data source, server name, authentication mode, and database (use the default ones), then Next
- Setup data destination, such as a flat file (file path and name need to be specified), then Next to copy data from a table
- Choose a table and use default delimiter option
- Execute immediately

Importing a Table

- Use Import Data Wizard
- Specify data source first
- Then specify data destination
 - The table to which data is imported needs to be specified



Database Backups and Restorations



Why Backups?

- Data can be corrupted by a variety of problems:
 - Failure of the hard disk drive
 - Failure of the hard disk controller
 - Motherboard failure
 - Power outage or spike
 - Virus attack
 - Accidental change or deletion of data
 - Malicious change or deletion of data

SQL Database Backup Modes

- Three Recovery Model
 - Full recovery: everything gets logged in the database
 - Bulk-logged recovery: Inserts, updates, and deletes get logged, but bulk copies, SELECT INTO statements, and index creations do not
 - Simple recovery (default mode) : nothing is held in the transaction log
- You can set the mode by using the Options tab of the database property sheet

Backup Choices

- Full database backups: The entire database is backed up
- Transaction log backups: Add all the changes in the transaction log to your full database backups
- Differential database backups: Back up only data that has changed since the last full backup
 - For example, if a person's bank account changed 10 times in one day, the transaction log backup would contain all 10 changes but the differential backup would contain just the final amount
- Filegroup backups: Allow you to back up different pieces of the database, based on the various files that make up the database

Backing Up Databases

- Highlight the target database. Open the Backup dialog box by right-clicking and choosing Tasks → Back Up
- User default setup to do a simple backup
- Click OK to start the backup
- After the backup completes, click OK on the Confirmation screen to close the Backup dialog box

Restoring a Full Database

- Restore the target database by right-clicking it and choosing Tasks → Restore → Database
- Select the proper backups
- Go to the Options tab. Make sure that the recovery completion state is set to Leave Database Nonoperational so you can restore the transaction log later
- Click OK to start the restoration. Click OK at the Restoration Confirmation screen

Programming with SQL Server

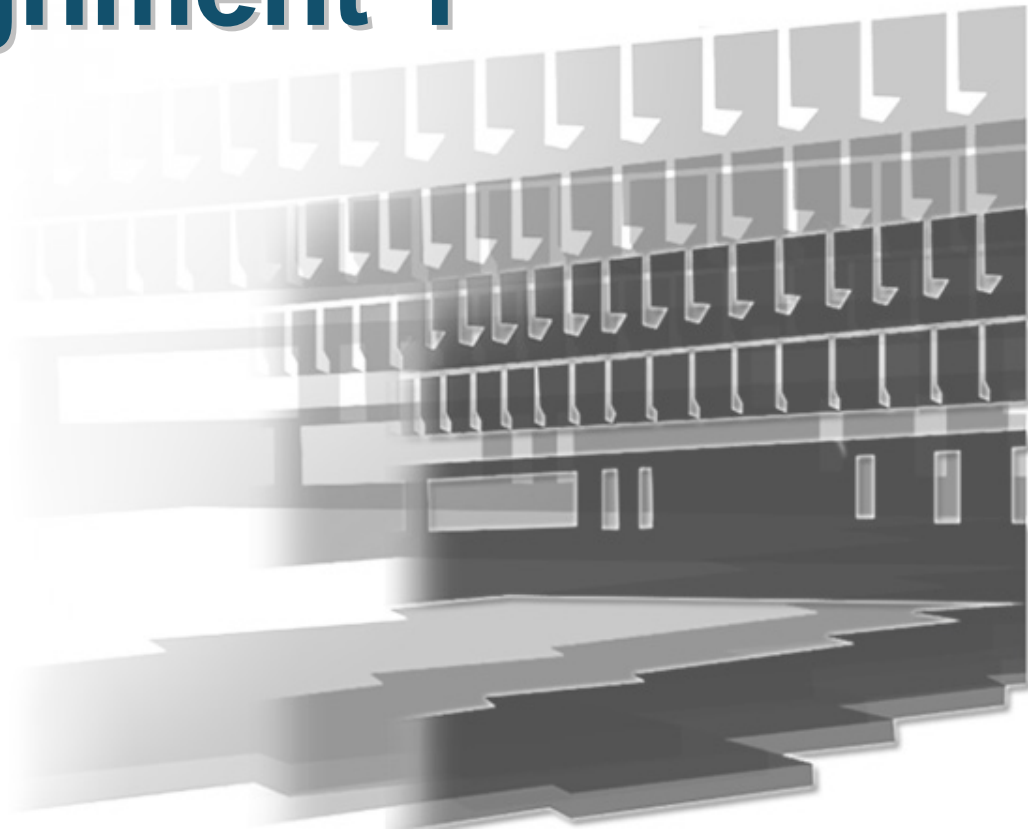
- Connecting to SQL Server with C#
- Make sure that SQL Server Browser service is running

Programming with SQL Server

Code Framework:

```
// Specify reference.
using System.Data;
using System.Data.SqlClient;
// Define SQL Server connection.
SqlConnection sqlConn = null;
// Specify connection parameters. Note that we are connecting to the local server with Window authentication mode.
sqlConn = new SqlConnection("Data Source=your-machine-name;Initial Catalog=DB354;Integrated Security=True");
// Open connection.
sqlConn.Open();
// Define command object.
SqlCommand cmd = sqlConn.CreateCommand();
// Compose SQL command.
String strCommand = "insert into users (user_name) values ('some name')";
// Execute SQL command.
if(sqlConn != null) {
    try {
        cmd.CommandText = strCommand;
        cmd.ExecuteNonQuery();
    }
    catch(Exception) {
        return;
    }
}
// Close connection.
if(sqlConn != null) {
    sqlConn.Close();
    sqlConn = null;
}
```

Submitting Answers to Assignment 1



What to Submit

- Write a pure SQL query for each problem
- Put all the 5 queries in **ONE** script file
- Use your student # as the script file name
- Use “/* comments */” for comments
- An example script file to submit

```
/* Q1 */  
SELECT *  
FROM Customer  
  
/* Q2 */  
Put query here  
  
/* Q3 */  
Put query here  
  
/* Q4 */  
Put query here  
  
/* Q5 */  
Put query here
```

If your student # is 999999999,
save the script file as “99999999.sql”,
then submit this file

How to Submit

- For submission details, please follow the submission instruction on the submission web server
 - <https://submit.cs.sfu.ca/>

References

- SQL Server Books Online
- Microsoft Developer Network
 - <http://msdn.microsoft.com/>
- MSDN online documentation
 - <http://msdn.microsoft.com/sqlserver/>
- Microsoft's Data Access page:
 - <http://www.microsoft.com/data/>
- Books in the library

Thank you!

