# Querying with Transact-SQL

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#### Meet Your Instructors

#### Graeme Malcolm | @graeme\_malcolm

- Senior content developer at Microsoft
- Consultant, trainer, and author since SQL Server 4.2





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- Principal Technologist at Content Master
- SQL Server specialist consultant, author, and trainer

### Course Topics

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01   Introduction to Transact-SQL	07   Using Table Expressions
02   Querying Tables with SELECT	08   Grouping Sets and Pivoting Data
03   Querying Multiple Tables with Joins	09   Modifying Data
04   Using Set Operators	10   Programming with Transact-SQL
05   Using Functions and Aggregating Data	11   Error Handling and Transactions
06   Using Subqueries and APPLY	

#### Setting Expectations

- Target Audience
  - Aspiring database professionals
  - Application developers
  - Anyone preparing for SQL Server certification exams
- Course Materials
  - Online video presentations
  - Downloadable labs
- Suggested Approach
  - Complete each module and lab in turn
  - Engage with fellow students at Born To Learn

#### Course Lab Environment

- Labs are based on the AdventureWorksLT sample database in Azure SQL Database
  - Setup instructions are in the *Getting Started* guide
- There is a lab for each module, consisting of:
  - Challenges based on the techniques discussed in the module
  - References to relevant documentation
  - Suggested solution scripts

## DEMO

Using Azure SQL Database

#### SQL Server Training and Certification

- Microsoft Virtual Academy
  - www.microsoftvirtualacademy.com
- Microsoft Official Curriculum
  - www.microsoft.com/learning
- Microsoft Press
  - www.microsoftpressstore.com
- Microsoft Certified Professional Program
  - www.microsoft.com/learning
- Born to Learn
  - borntolearn.mslearn.net

#### 01 Introduction to Transact-SQL



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#### Module Overview

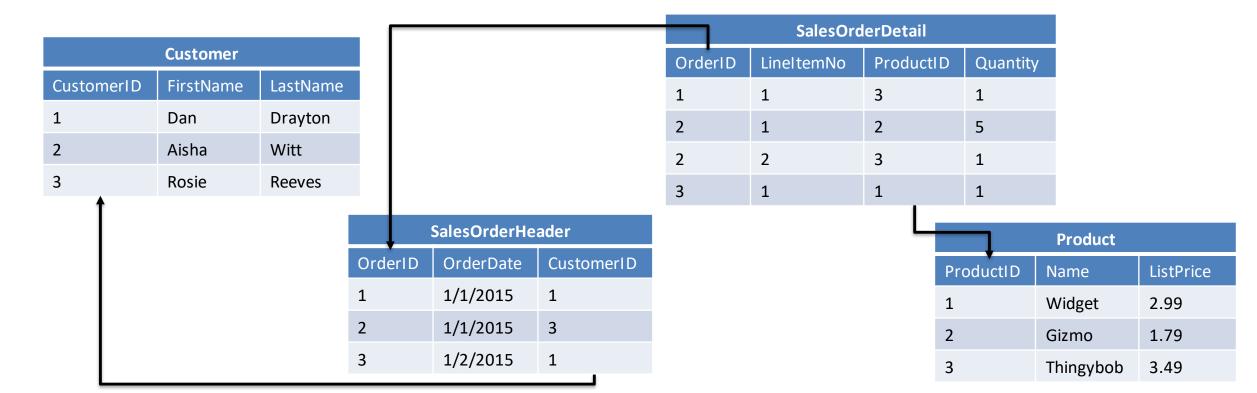
- What is Transact-SQL?
- Relational Databases
- Schemas and Object Names
- SQL Statement Types
- The SELECT Statement
- Working with Data Types
- Working with NULLs

#### What is Transact-SQL?

- Structured Query Language (SQL)
  - Developed by IBM in 1970s
  - Adopted as a standard by ANSI and ISO standards bodies
  - Widely used in industry
- Microsoft's implementation is Transact-SQL
  - Referred to as T-SQL
  - Query language for SQL Server and Azure SQL Database
- SQL is declarative, not procedural
  - Describe what you want, don't specify steps

#### Relational Databases

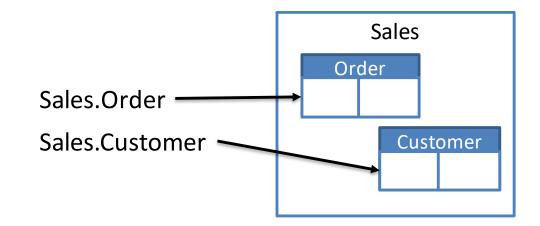
- Entities are represented as *relations* (tables), in which their attributes are represented as *domains* (columns)
- Most relational databases are normalized, with relationships defined between tables through primary and foreign keys

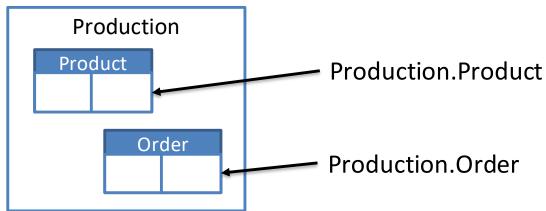


#### Schemas and Object Names

- Schemas are namespaces for database objects
- Fully-qualified names: [server\_name.][database\_name.][schema\_name.]object\_name
- Within database context, best practice is to include schema name:

schema\_name.object\_name





#### SQL Statement Types

Data Manipulation Language (DML)	Data Definition Language (DDL)	Data Control Language (DCL)
Statements for querying and	Statements for defining	Statements for assigning
modifying data:	database objects:	security permissions:
• SELECT	• CREATE	• GRANT
• INSERT	• ALTER	• REVOKE
• UPDATE	• DROP	• DENY
• DELETE		

Focus of this course

#### The SELECT Statement

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Element	Expression	Role
SELECT	<select list=""></select>	Defines which columns to return
FROM		Defines table(s) to query
WHERE	<search condition=""></search>	Filters rows using a predicate
GROUP BY	<pre><group by="" list=""></group></pre>	Arranges rows by groups
HAVING	<search condition=""></search>	Filters groups using a predicate
ORDER BY	<order by="" list=""></order>	Sorts the output

```
SELECT OrderDate, COUNT(OrderID)
FROM Sales.SalesOrder
WHERE Status = 'Shipped'
GROUP BY OrderDate
HAVING COUNT(OrderID) > 1
ORDER BY OrderDate DESC;
```

#### Basic SELECT Query Examples

All columns

```
SELECT * FROM Production.Product;
```

• Specific columns

```
SELECT Name, ListPrice
FROM Production.Product;
```

Expressions and Aliases

```
SELECT Name AS Product, ListPrice * 0.9 AS SalePrice FROM Production.Product;
```

## DEMO

Basic SELECT Queries

# Working with Data Types Transact-SQL Data Types

<b>Exact Numeric</b>	Approximate Numeric	Character	Date/Time	Binary	Other
tinyint	float	char	date	binary	cursor
smallint	real	varchar	time	varbinary	hierarchyid
int		text	datetime	image	sql_variant
bigint		nchar	datetime2		table
bit		nvarchar	smalldatetime		timestamp
decimal/numeric		ntext	datetimeoffset		uniqueidentifier
numeric					xml
money					geography
smallmoney					geometry

# Working with Data Types Data Type Conversion

- Implicit Conversion
  - Compatible data types can be automatically converted
- Explicit Conversion
  - Requires an explicit conversion function
    - CAST / TRY\_CAST
    - CONVERT / TRY\_CONVERT
    - PARSE / TRY\_PARSE
    - STR

## DEMO

Converting Data Types

# Working with NULLs NULL Values

- NULL represents a missing or unknown value
- ANSI behaviour for NULL values:
  - The result of any expression containing a NULL value is NULL
    - 2 + NULL = NULL
    - 'MyString: ' + NULL = NULL
  - Equality comparisons always return false for NULL values
    - NULL = NULL returns false
    - NULL IS NULL returns true

# Working with NULLs NULL Functions

- ISNULL(column/variable, value)
  - Returns value if the column or variable is NULL
- NULLIF(column/variable, value)
  - Returns NULL if the column or variable is value
- COALESCE (column/variable1, column/variable2,...)
  - Returns the value of the first non-NULL column or variable in the list

## DEMO

Working with NULLs

#### Introduction to Transact-SQL

- What is Transact-SQL?
- Relational Databases
- Schemas and Object Names
- SQL Statement Types
- The SELECT Statement
- Working with Data Types
- Working with NULLs

• Lab: Introduction to Transact-SQL



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