Microsoft

Workshop –
SQL Server: Common
Administration Tasks
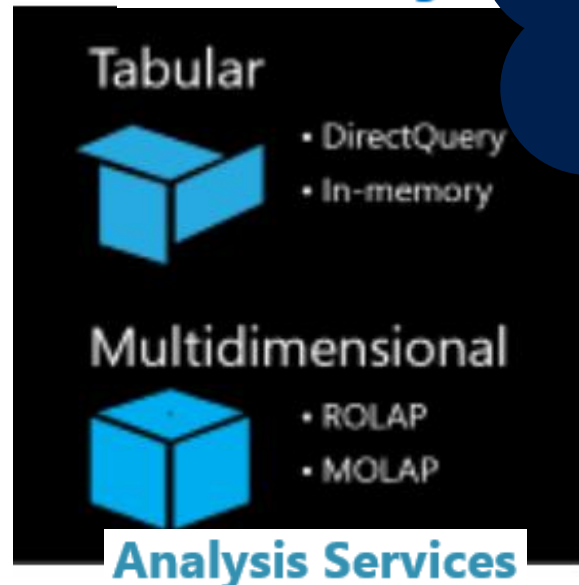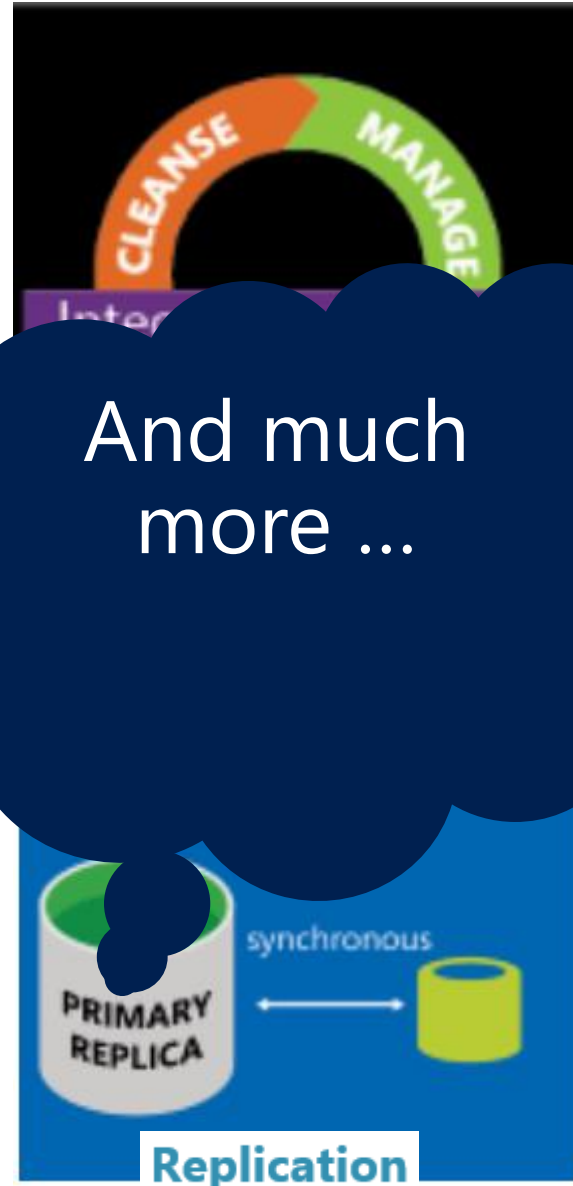
Microsoft Services

Microsoft

Lesson: Introduction to SQL Server

Understand SQL Server components and editions

Microsoft Services

SQL Server Components

SQL Server Editions

Enterprise
- Tier 1 applications
- Comprehensive datacenter capabilities for mission-critical database, business intelligence, and advanced analytics workloads

Standard
- Non-critical applications
- Core data management and business intelligence capabilities for workloads with minimal IT resources

Developer
- Development and test only
- Provides the full feature set of SQL Server Enterprise Edition

Express
- Learning, development and production for desktop, web and small server applications up to 10 GB disk size
- Entry-level, free edition of SQL Server

Features supported by SQL Server Editions

			Developer[1]	Express	Standard	Enterprise
Mission critical performance	Maximum number of cores	New	Unlimited	4 cores	24 cores	Unlimited
	Maximum memory utilized per instance		OS Max	1 GB	128 GB	OS Max
	Maximum size		524 PB	10 GB	524 PB	524 PB
	Production use rights			●	●	●
	Basic OLTP		●	●	●	●
	Manageability (Management Studio, Policy-Based Management)		●	●	●	●
	Basic high availability (2-node single database failover, non-readable secondary)	New	●		●	●
	Enterprise data management (Master Data Services, Data Quality Services)		●			●
	Advanced OLTP (In-memory OLTP, Operational analytics)	New	●			●
	Advanced HA (Always On - multi-node, multi-db failover, readable secondaries)		●			●
Security	Basic security (Row-level security, data masking, basic auditing, separation of duties)	New	●		●	●
	Advanced security (Transparent Data Encryption, Always Encrypted)	New	●			●
Data warehousing	Advanced data integration (Fuzzy grouping and look ups, change data capture)		●			●
	Data warehousing (In-Memory ColumnStore, Partitioning)	New	●			●
	PolyBase[2]		●		●	●

[1] SQL Server 2016 Developer Edition offers the full feature set of SQL Server 2016 Enterprise Edition, but Developer Edition is for development and test only, and not for production environments or use with production data.
[2] Scale out relational and non-relational data queries with the simplicity of T-SQL using PolyBase, which requires single Microsoft SQL Server 2016 Enterprise Edition as head node.

Microsoft

Knowledge Check

- Name some components that make up the SQL Server platform?

- What is the difference between Enterprise and Developer edition?

Microsoft

Lesson: Planning SQL Server Installation

Understand the prerequisites to install SQL Server

Microsoft Services

Hardware Requirements

Memory
- Minimum: [obscured]
- Recomme[obscured]

Processor
- Minim[obscured]
- Recom[obscured]

Storage
- Minimum of 6GB ava[obscured] hard-disk space.
- Actual disk space req[obscured]ments – It depends.
- Supported storage types – local disk, shared storage, SMB file share

Most production SQL Servers will require more processing power and greater amounts of memory.

Software Requirements

Operating System
- Windows Server 2012 and above

Network Software
- Supported OS for SQL Server 2016 has built-in network software

.NET Framework
- .NET Framework 4.6
- SQL Server 2016 setup automatically installs .NET framework

Security Requirements and Best Practices

Setup user account

- Member of local administrators group
- Rights to "Local Policy Object Display Name", Backup files and directories", "Debug Programs" and "Manage auditing and security log"
- For failover cluster installations, you must be a local administrator with permissions to login as a service, and to act as part of the operating system on all failover cluster nodes.

SQL Service accounts

- Use low privileged Windows domain or local account
- Do not use local or domain administrator accounts
- Use separate accounts for different SQL services

Security Best Practices

- Enhance physical security and use firewalls
- Isolate Services
- Use NTFS files system
- Do not install on domain controller

Other Best Practices

- 64-KB NTFS allocation unit size

- Isolate transaction log files from data files

- Place tempdb on separate fast disk

- Set queue depth on HBAs to 64 or higher

- Make sure all device drivers are up-to-date

- Configure page file – at least 8 GB in size

- Set windows power saving plan to "High Performance"

Knowledge Check

- Does SQL Server need an local administrator account for the service accounts?

- What is the recommendation for windows power saving plan?

Microsoft

Lesson: Step by Step SQL Server Installation

Install SQL Server

Microsoft Services
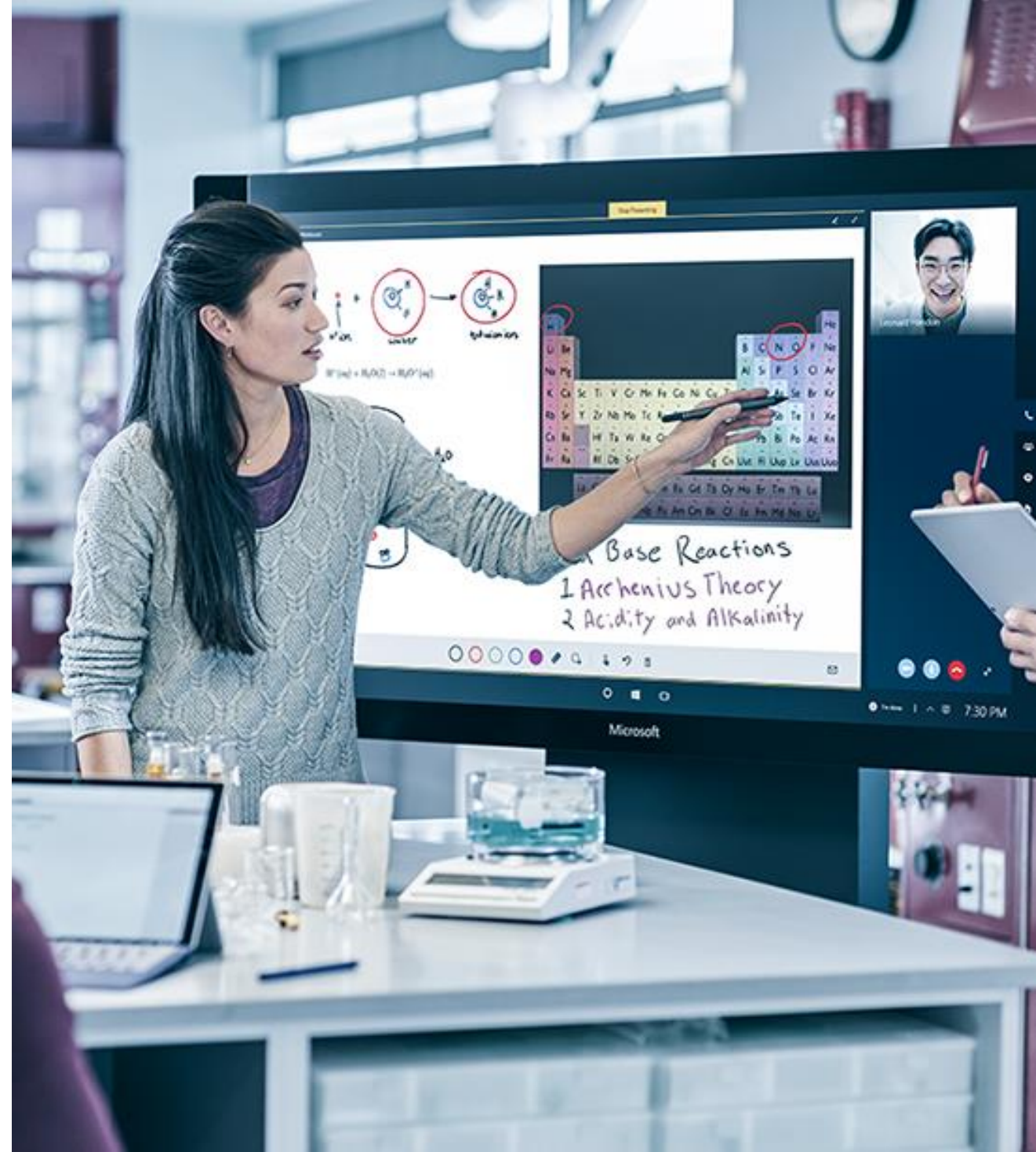
Different Ways to Install SQL Server

- ## Installation Wizard
  - Easiest method to install SQL Server
- ## Command Prompt
  - Most control
- ## Configuration File
  - Install SQL Server throughout the enterprise using the same configuration
- ## Sysprep
  - Prepare un-configured instance of SQL Server and configure it later
  - This method is useful for developing a template, for example a Virtual Machine template that can be deployed multiple times

Default versus Named Instance

- Multiple instances of SQL Server is supported on a single computer
- Each SQL Server instance consist of a distinct set of services and databases
- An instance is either a default instance or a named instance
  - **Only one instance can be the default instance and is identified by the server name and all other instances are named instances**
- A named instance is identified by the computer name plus the instance name
  - **Example: ServerName\InstanceName**
- You can install a named instance without installing the default instance
- Each instance is accessed through it's own network Port

Lab: Install SQL Server

Walk through installing SQL Server using Wizard.

Knowledge Check

- What are the different methods of installing SQL Server?
- Can you install two default instances of SQL Server on the same computer?

Lesson: SQL Server Configuration Manager (SSCM)

Learn to use SSCM

Microsoft Services

Features of SQL Server Configuration Manager

SQL Server Services
- Start, stop, pause, or restart
- Change service accounts and passwords
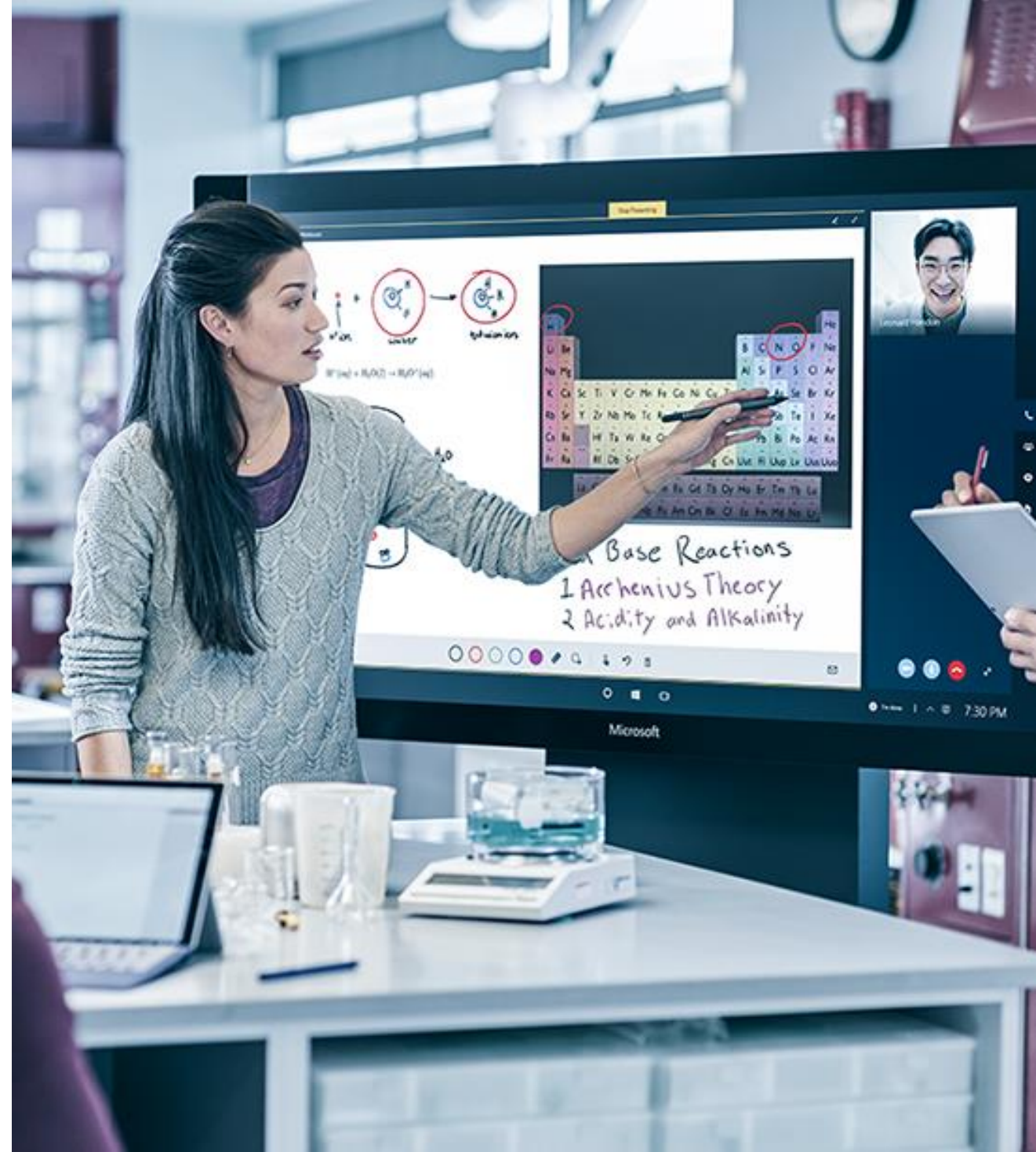- Change the start mode

SQL Server Properties
- Add or Alter startup parameters, trace flags
- Configure FILESTREAM on instance level
- Configure AlwaysOn

Server and Client Network Protocols
- Enable or disable specific protocols
- Specify network level security
- Alter protocol specific parameters
- Change client protocol order

Lab: Using SQL Server Configuration Manager

Walk through the SQL Server Configuration Manager tool and show you how to use the tool effectively.

Knowledge Check

- List some features of SQL Server Configuration Manager?

Microsoft

Lesson: SQL Server Management Studio (SSMS)

Become familiar with SSMS

Microsoft Services

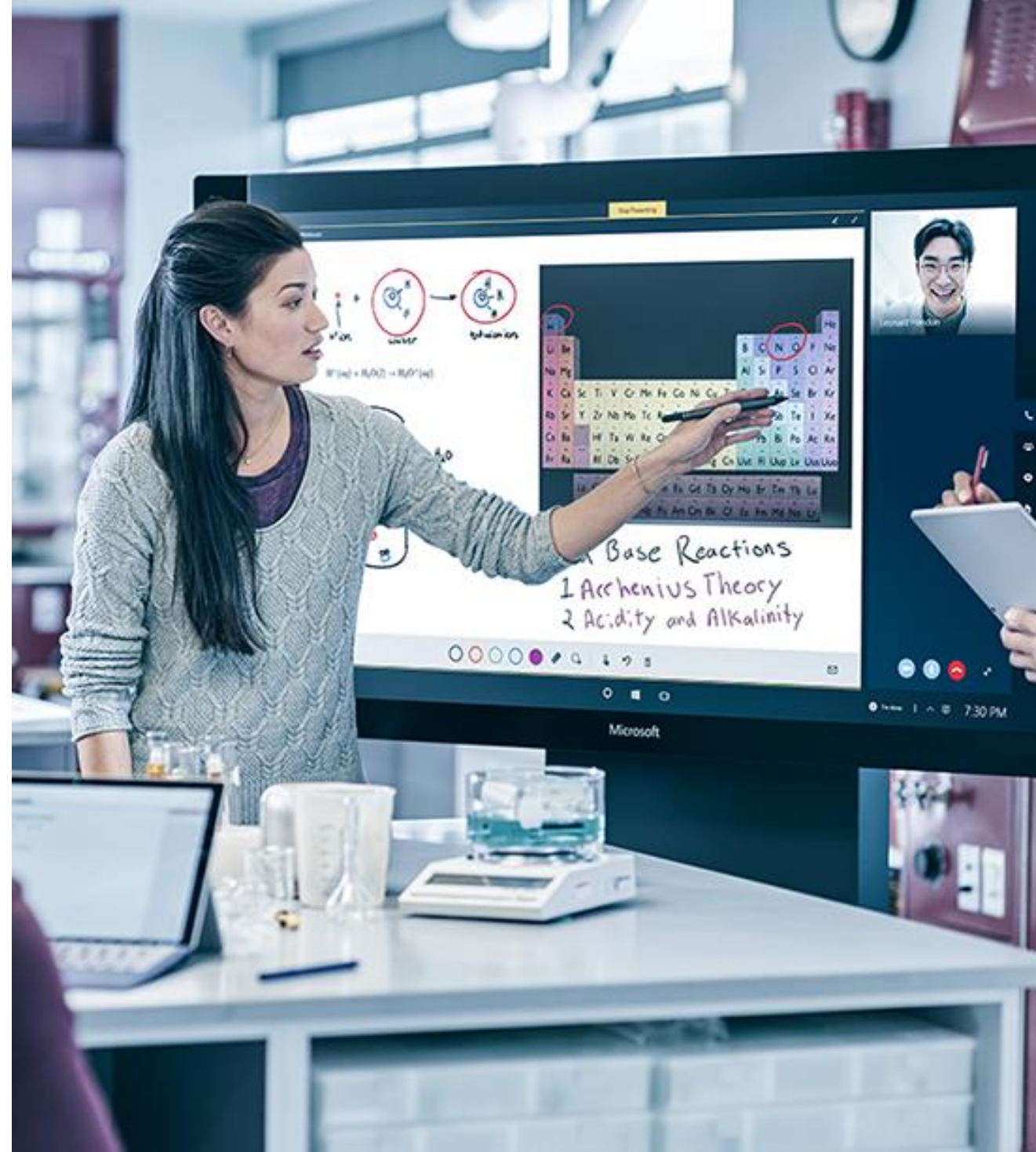# Overview of SQL Server Management Studio

- Integrated environment and graphical user interface for both administrators and developers
- Commonly used to
  - Connect to an instance of the Database Engine, SSAS, SSRS, SSIS or Azure SQL Database
  - Configure SQL Server properties
  - Administer and develop all components of SQL Server
  - Create and manage database and SSAS objects
  - Launch scripting tools
  - Monitor current activity
  - And more ....

How to install SSMS?

- SQL Server 2016 setup media does not have the binaries for SSMS.
- We need to download it separately ([link](#)) and install it
- SSMS is a free tool and does not require a SQL Server license
- This version of SSMS works with all supported versions of SQL Server

Lab: Using SQL Server Management Studio

Walk through the SQL Server Management Studio and show you how to use the tool effectively.

Knowledge Check

- What are some common uses of SQL Server Management Studio?

Microsoft

Lesson: SQLCMD

Become familiar with SQLCMD utility

Microsoft Services

Overview of SQLCMD Utility

- Lets you ent...
  - Command pr...
  - Query Editor i...
  - Windows scrip...
- You can dow...d [here](#)
- Run SQLCMD... options
- Examples

sqlcmd –S CONT... m sys.tables"
sqlcmd –S Srv2\... –v MAX=100


```
C:\Program Files\Microsoft SQL Server\Client SDK\ODBC\130\Tools\Binn>sqlcmd /?
Microsoft (R) SQL Server Command Line Tool
Version 13.1.811.168 NT
Copyright (c) 2015 Microsoft. All rights reserved.

usage: Sqlcmd            [-U login id]          [-P password]
  [-S server]            [-H hostname]          [-E trusted connection]
  [-N Encrypt Connection][-C Trust Server Certificate]
  [-d use database name] [-l login timeout]     [-t query timeout]
  [-h headers]           [-s colseparator]      [-w screen width]
  [-a packetsize]        [-e echo input]        [-I Enable Quoted Identifiers]
  [-c cmdend]            [-L[c] list servers[clean output]]
  [-q "cmdline query"]   [-Q "cmdline query" and exit]
  [-m errorlevel]        [-V severitylevel]     [-W remove trailing spaces]
  [-u unicode output]    [-r[0|1] msgs to stderr]
  [-i inputfile]         [-o outputfile]        [-z new password]
  [-f <codepage> | i:<codepage>[,o:<codepage>]] [-Z new password and exit]
  [-k[1|2] remove[replace] control characters]
  [-y variable length type display width]
  [-Y fixed length type display width]
  [-p[1] print statistics[colon format]]
  [-R use client regional setting]
  [-K application intent]
  [-M multisubnet failover]
  [-b On error batch abort]
  [-v var = "value"...]  [-A dedicated admin connection]
  [-X[1] disable commands, startup script, environment variables [and exit]]
  [-x disable variable substitution]
  [-j Print raw error messages]
  [-g enable column encryption]
  [-G use Azure Active Directory for authentication]
  [-? show syntax summary]
```
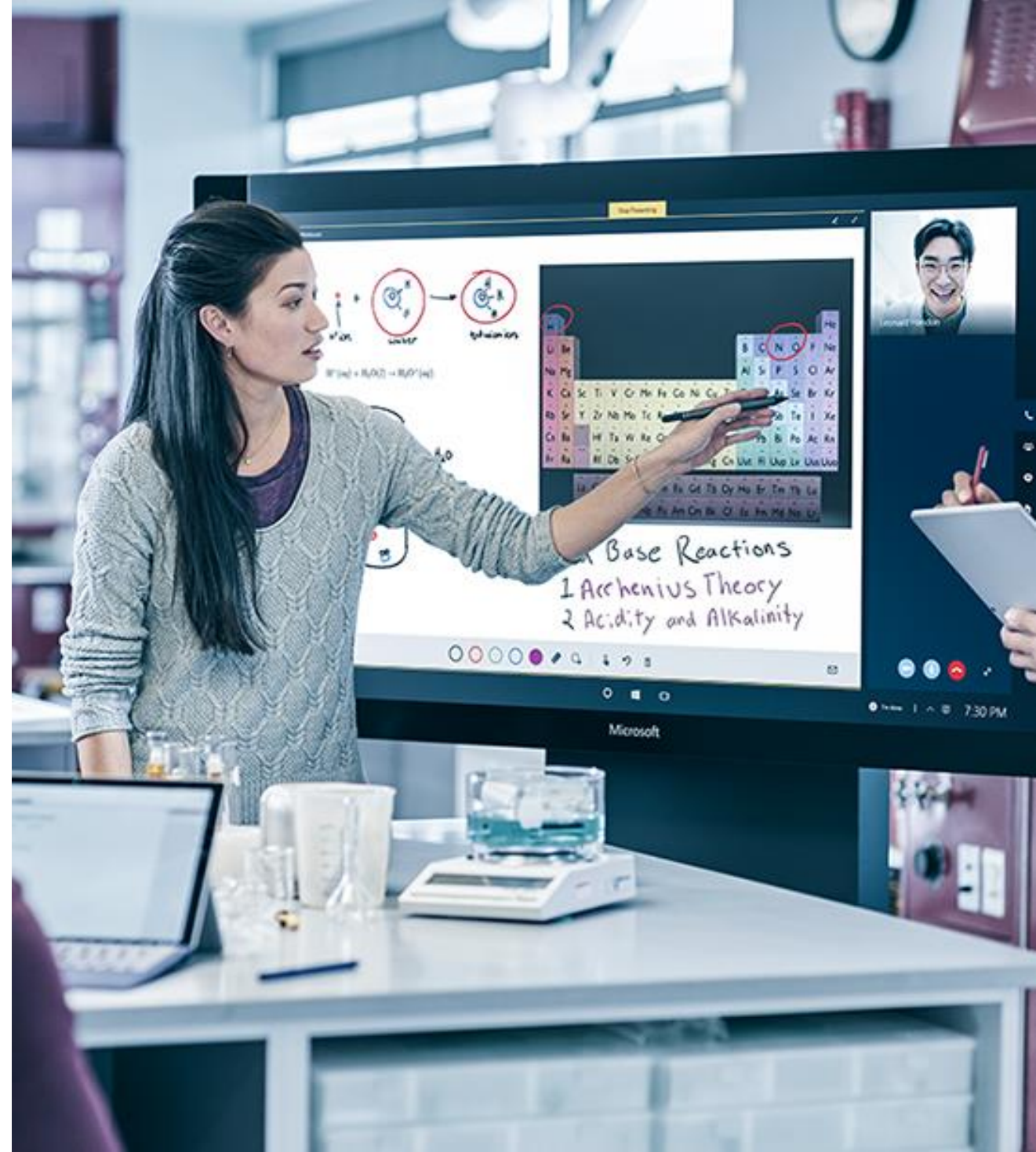
Lab: Using SQLCMD

Walk through the SQLCMD utility and show you how to use it effectively.

Knowledge Check

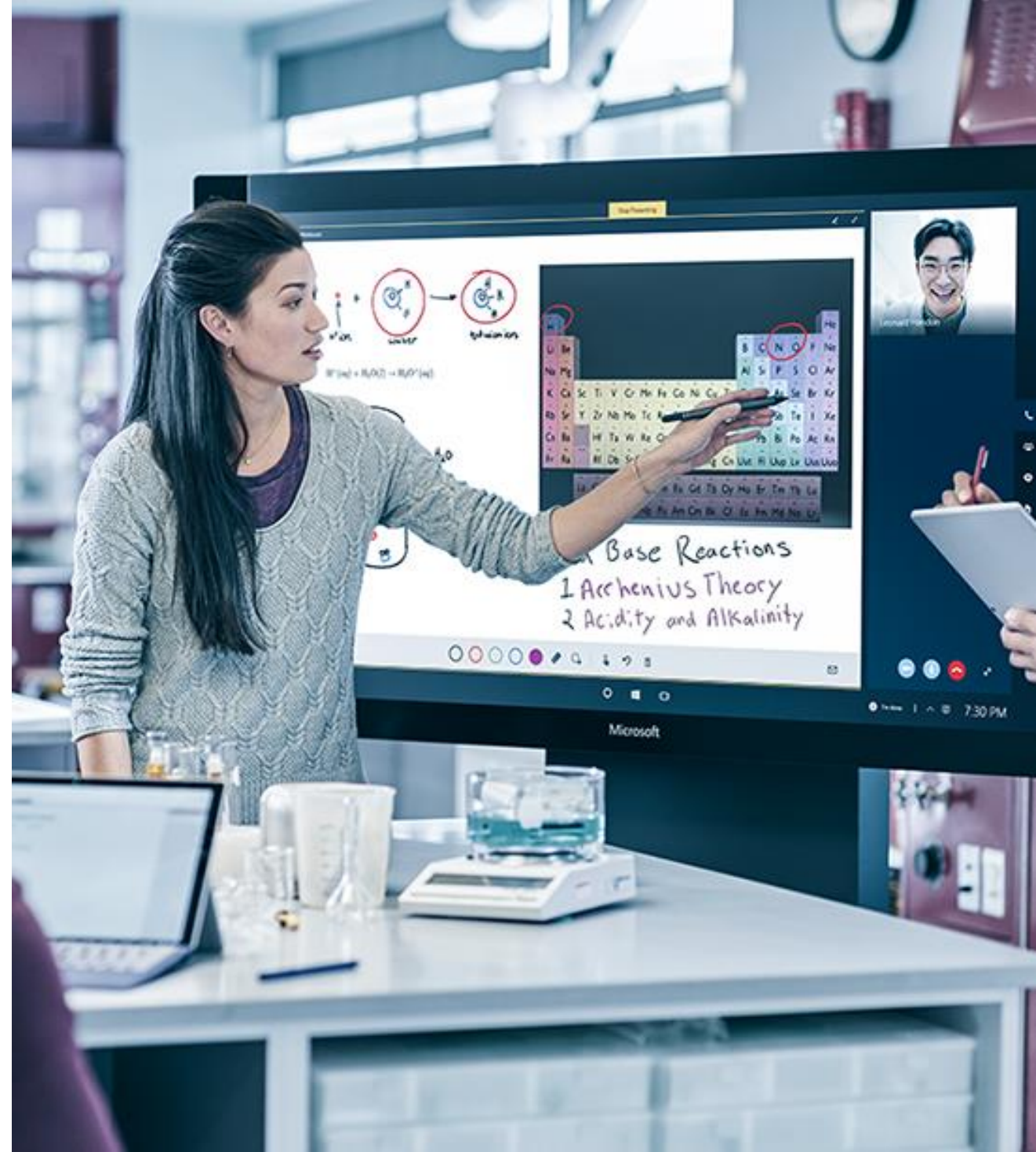- What is the use of sqlcmd utility?

SQL Server Configuration Options

- Configuration options are used to manage and optimize SQL Server
- To view all SQL Server configuration options run

  ```
  select * from sys.configurations;
  ```

- Configuration options can be accessed using
  - SQL Server Management Studio – most commonly used options available
  - SP_CONFIGURE (T-SQL) – all options available
    - When using SP_CONFIGURE, you must run either RECONFIGURE or RECONFIGURE WITH OVERRIDE after setting a configuration option
- Most options can be set without restarting SQL Server but some options do need a restart.
  - To find the options that will need a SQL Server restart run

    ```
    select * from sys.configurations where is_dynamic=0
    ```

Lab: Review and modify SQL Server configuration options using TSQL and SSMS

Show the most commonly used configuration options and discuss best practices.

Knowledge Check

- What is the purpose of configuration options?

- How can you find if setting a configuration value will need a server restart?

Microsoft