



Building Applications and Solutions with Microsoft 365 Core Services

Course MS-600T00: 4 days; Instructor-Led

Introduction

The Building applications and solutions with Microsoft 365 core services course is designed for persons who are aspiring to the Microsoft Teams Application Developer role. In this course, students will learn how to build collaboration solutions leveraging 4 central elements of the Microsoft 365 platform: implementing Microsoft identity, working with Microsoft Graph, and building applications for Microsoft Teams. In Implement Microsoft identity, students will learn to implement Microsoft identity including registering an application, implementing authentication, configuring permissions to consume an API, and creating a service to access Microsoft Graph. In Work with Microsoft Graph, students will learn how to access user data, explore query parameters, manage a group lifecycle, access files, and optimize network traffic using Microsoft Graph. In Build apps for Microsoft Teams, students will look at the components of a Teams App, work with webhooks, tabs, conversational bots, and other Microsoft Teams app capabilities. They will also learn to deploy Microsoft Teams apps.

Audience

Students in this course are interested in the Microsoft 365 development platform or in passing the Microsoft Teams Application Developer Associate certification exam. Students should also have 1-2 years experience as a developer. This course assumes students know how to code and have a basic understanding of REST APIs, JSON, OAuth2, OData, OpenID Connect, Microsoft identities including Azure AD and Microsoft accounts, Azure AD B2C, and permission/consent concepts.

Job role: Administrator

Preparation for exam: [MS-600](#)

Prerequisites

Before attending this course, students should have:

- 1-2 years experience as a developer. This course assumes students know how to code and have a basic understanding of REST APIs, JSON, OAuth2, OData, OpenID Connect, Microsoft identities including Azure AD and Microsoft accounts, Azure AD B2C, and permission/consent concepts.
- It is recommended that students have some experience developing solutions on Microsoft Teams through all phases of software development.

Course Outline

Module 1: Getting Started with Microsoft Identity

Microsoft identity platform is an evolution of the Azure Active Directory (Azure AD) developer platform. It allows developers to build applications that sign in users, and access resources in both external applications such as Microsoft Office 365, the Azure portal, and thousands of other SaaS applications as well as internal resources, such as apps on your corporate network and intranet, along with any cloud apps developed by your own organization. In this module, you will learn the basics of Microsoft identity including the different types of tokens, account types, and supported topologies.

In this module, you will:

- Explain the different types of tokens used in Microsoft Identity solutions
- Compare and contrast the different account types
- Compare and contrast the supported Microsoft Identity Topologies

Lessons

- Introduction

- Different types of tokens used in Microsoft identity
- Exercise - Different types of tokens used in Microsoft identity
- Account types in Microsoft identity
- Exercise - Account types in Microsoft identity
- Identity topology options
- Exercise - Identity topology options

Module 2: Application types in Microsoft identity

The Microsoft Identity platform enables developers to build many different types of applications to satisfy diverse business requirements and different scenarios. By supporting multiple OAuth 2.0 standard authentication protocols, developers can create different types of applications that meet business needs including single page applications, web apps, mobile or native apps, and services or daemon apps. In this module, you'll learn how you can implement different OAuth 2.0 protocol grant types (flows) in popular application types.

In this module, you will:

- Compare and contrast different grant types (flows) in the OAuth 2.0 protocol
- Evaluate which authentication protocol to use based on the app scenario
- Implement different authentication protocols in different application types

Lessons

- Introduction
- Single-page applications
- Exercise - Single-page applications
- Web apps that sign in users and call APIs
- Exercise - Web apps that sign in users & call APIs
- Daemon and non-interactive apps
- Exercise - Daemon and non-interactive apps

Module 3: Permissions and Consent Framework

The Microsoft identity platform implements the OAuth 2.0 authorization protocol. This protocol is a method that a third-party app can access web-hosted resources on behalf of a user. The web-hosted resources can define a set of permissions that you can use to implement functionality in smaller chunks. Developers can leverage one of two types of permissions supported by the Microsoft identity platform depending on the app scenario. In this module, you'll learn the different types of permissions and consent framework models for obtaining permissions from users to use them in apps.

In this module, you will:

- Compare and contrast different permission types supported by the Microsoft identity platform
- Compare and contrast the difference between static and dynamic consent in user permissions
- Create an app that implements dynamic consent for incrementally obtaining permissions as needed from users

Lessons

- Introduction
- Understand the permissions and consent framework in the Microsoft identity platform
- Exercise - Create a single page app
- Delegated permissions and consent
- Exercise - Delegated permissions and consent
- Application permissions and consent
- Exercise - Application permissions and consent

Module 4: Secure custom APIs with Microsoft Identity

Many solutions involve creating web APIs to expose functionality to different clients and consumers. Developers can secure these APIs using Microsoft identity to ensure only approved apps can access the web APIs provided they've been granted the necessary permissions. In this module, you'll learn how to secure a web API with Microsoft identity and how to call it from another application.

In this module, you will:

- Create a custom web API that is secured with Microsoft identity
- Create a custom web app that calls a custom web API secured with Microsoft identity
- Create a custom daemon app that calls a custom web API secured with Microsoft identity

Lessons

- Introduction
- Create and secure a web API with Microsoft identity
- Exercise - Create and secure a web API with Microsoft identity
- Call secured APIs from web applications
- Exercise - Call secured APIs from web applications
- Call secured APIs from daemon apps
- Exercise - Leverage app roles to secure custom APIs

Module 5: Work with users, groups, and roles in custom apps and APIs

Role-based access control (RBAC) is a popular mechanism to enforce authorization in applications. The administrator assigns roles to different users and groups to control who can access to what content and functionality. Using RBAC with Application Roles and Role Claims, developers can securely enforce authorization in their apps with little effort on their part. Another approach is to use Azure AD Groups and Group Claims. In this module, you'll learn how to use both Azure AD Groups and Application Roles to provide fine grained access control to an application.

In this module, you will:

- Create a custom ASP.NET web app that is secured with Microsoft identity
- Demonstrate how to obtain security groups as a claim in the token and use them in the app
- Demonstrate how to use app roles to grant users access to an app

Lessons

- Introduction
- Role-based access control in Microsoft identity
- Exercise - Create and secure a web app with Microsoft identity
- Utilize security groups in custom apps and APIs secured with Microsoft identity
- Exercise - Utilize security groups in custom web apps and APIs
- Leverage application roles in custom apps and APIs
- Exercise - Utilize app roles in custom web apps and APIs

Module 6: Optimize data usage when using Microsoft Graph with query parameters

Microsoft Graph provides a unified programmability model that you can use to build apps for organizations and consumers that interact with the data of millions of users. The Microsoft Graph REST APIs implements many of the OData protocol's query parameters. In this module, you'll learn how to manipulate queries using query parameters.

In this module, you will:

- Demonstrate how to manipulate REST queries with query parameters
- Create queries that expand complex entities
- Demonstrate how to search for content with Microsoft Graph
- Optimize Microsoft Graph queries with batching

Lessons

- Introduction
- Microsoft Graph of Query Parameters
- Exercise - Retrieve and control information returned from Microsoft Graph
- Expand related entities & search content in Microsoft Graph
- Exercise - Expand related entities & search content in Microsoft Graph
- Reduce traffic with batched requests

Module 7: Optimize network traffic with Microsoft Graph

Microsoft Graph provides a unified programmability model that you can use to build apps for organizations and consumers that interact with the data of millions of users. In this module, students will learn how Microsoft has implemented throttling to Microsoft Graph to limit the overuse of Microsoft Graph resources. Students will learn how to avoid requests from being throttled, and how to properly handle scenarios when Microsoft Graph throttles high user traffic in a graceful way.

In this module, you will:

- Explain how Microsoft Graph maintains resource health
- Identify when Microsoft Graph throttles requests
- Decide the appropriate pattern to address throttled requests
- Create queries that mitigate throttling scenarios

Lessons

- Introduction
- Understand throttling in Microsoft Graph
- Exercise - Understand throttling in Microsoft Graph
- Avoid throttling & implement throttling strategies
- Exercise - Avoid throttling & implement throttling strategies
- Eliminate polling Microsoft Graph with delta query
- Exercise - Eliminate polling Microsoft Graph with delta query

Module 8: Access User Data from Microsoft Graph

Users are the core of most operations in Microsoft 365. Microsoft Graph enables developers full control over the lifecycle of users in Microsoft 365 including creating, updating, and deleting users and to listing users in the organization. In this module, you'll learn how to use Microsoft Graph to work with users in Microsoft 365 including the required permissions.

In this module, you will:

- Demonstrate how to get a list of users
- Demonstrate how to get details, including a profile picture, of a user
- Demonstrate how to manage the lifecycle of a user from creation to deletion

Lessons

- Introduction
- Working with users in the organization
- Exercise - Working with users in the organization
- User profile photos and related users
- Exercise - Working with profile photos and related users
- Modifying users

Module 9: Manage Group Lifecycle with Microsoft Graph

Groups are collections of users who share access to resources in Microsoft services or in your apps. Developers can use Microsoft Graph to create and manage different types of groups. In this module, you'll learn how to manage the lifecycle of groups, the different types of groups and obtain information about the users associated with a group using Microsoft Graph.

In this module, you will:

- Demonstrate how to get information about a group
- Demonstrate how to get information about a user's groups
- Demonstrate how to manage the lifecycle of a group

Lessons

- Introduction
- Working with groups in the organization
- Exercise - Working with groups in the organization
- Users and their groups

- Exercise - Users and their groups
- Manage group lifecycle
- Exercise - Manage group lifecycle

Module 10: Access Files with Microsoft Graph

OneDrive is the files hub for Office 365. OneDrive enables users to access and collaborate on files no matter where they're stored. Microsoft Graph enables developers to use a single API to work with the files in OneDrive. Files in Office 365 are stored in drives. Users can store files in a personal drive, their OneDrive, or in a shared drive powered by a SharePoint document library. In this module, you'll learn how to access files in OneDrive, both reading and writing files, and how to traverse relationships between files and users.

In this module, you will:

- Demonstrate how to retrieve a list of files OneDrive
- Demonstrate to download a file from OneDrive using a unique ID
- Get a list of files trending around the signed in user
- Demonstrate how to upload a large file to OneDrive

Lessons

- Introduction
- Access and download files from OneDrive
- Exercise - Access and download files from OneDrive
- Uploading files to OneDrive
- Exercise - Upload files to OneDrive
- Work with file relationships and trends in OneDrive
- Exercise - Work with file relationships and trends in OneDrive

Module 11: Use Change Notifications and Track Changes with Microsoft Graph

Microsoft Graph enables developers to consume user information stored in Microsoft 365 in custom applications. Data is retrieved from Microsoft Graph through a REST API or using one of the various native SDKs provided by Microsoft. In this module, you'll learn how to work with change notifications (webhooks) & track changes (delta query) in the Microsoft Graph.

In this module, you will:

- Demonstrate how to use the Microsoft Graph .NET SDK
- Demonstrate how to subscribe and receive notifications when entities change with Microsoft Graph
- Demonstrate how to retrieve a list of all entities that have changed using delta query

Lessons

- Introduction
- Microsoft Graph overview and .NET core web APIs
- Exercise - Azure AD apps .NET core web APIs
- Microsoft Graph change notifications
- Exercise - Microsoft Graph change notifications
- Microsoft Graph track changes (delta query)
- Exercise - Microsoft Graph track changes (delta query)

Module 12: Introduction to building apps for Microsoft Teams

Microsoft Teams is an extensible platform you can build custom apps on. Understand what is possible with a Microsoft Teams custom app, and determine if it's right for you.

In this module, you will:

- Describe the components of a Microsoft Teams app
- List the options for distributing a Microsoft Teams app
- List the extensibility points available in Microsoft Teams
- Choose the correct extensibility point(s) based on your scenario

Lessons

- Introduction
- What are Microsoft Teams apps?
- How do you create an app for Microsoft Teams?
- When should you choose to build a custom Microsoft Teams app?

Module 13: Task-oriented interactions in Microsoft Teams with messaging extensions

In this module, you'll learn how to create different types of messaging extensions in a custom Microsoft Teams app.

In this module, you will:

- Demonstrate how to create an action-based messaging extension for Microsoft Teams
- Demonstrate how to create search-based messaging extension for Microsoft Teams
- Demonstrate how to unfurl a URL with messaging extension for Microsoft Teams

Lessons

- Introduction
- Microsoft Teams messaging extensions and action commands
- Exercise - Create action command messaging extensions
- Search command message extensions
- Exercise - Create search command messaging extensions
- Link unfurling message extensions
- Exercise - Implement link unfurling messaging extensions

Module 14: Create embedded web experiences with tabs for Microsoft Teams

Tabs are Microsoft Teams-aware webpages embedded in Microsoft Teams. They can be added as part of a channel or a group chat inside a team or as a personal app for an individual user. As part of your app, you can add custom tabs to embed your own web content in Teams. Two types of tabs are available in Teams, channel/group and personal. In this module, you'll learn how to create tabs and add them to your Microsoft Teams app.

In this module, you will:

- Evaluate the differences between personal and channel/group tabs.
- Create a channel/group tab with a configuration experience.
- Create a tab that uses authentication to call a protected REST API.

Lessons

- Introduction
- Create a custom Microsoft Teams personal tab
- Exercise - Create a custom Microsoft Teams personal tab
- Create a custom Microsoft Teams channel or group tab
- Exercise - Create a custom Microsoft Teams channel or group tab
- Implement authentication in a custom tab
- Exercise - Implement authentication in a custom tab

Module 15: Create interactive conversational bots for Microsoft Teams

Conversational bots allow users to interact with your web service through text, interactive cards, and task modules. Conversational bots can be scoped to handling a few simple commands or complex, artificial intelligence powered and natural language processing virtual assistants. They can be one aspect of a larger application, or completely stand alone. In this module, you'll learn how to create and add bots to custom Microsoft Teams apps.

In this module, you will:

- Demonstrate how to create a conversation bot for Microsoft Teams
- Demonstrate how to subscribe to and respond to events in a conversation bot in Microsoft Teams
- Demonstrate how to incorporate authentication in a conversation bot in Microsoft Teams

Lessons

- Introduction
- Overview of bots with Microsoft Teams
- Exercise - Creating conversational bots for Microsoft Teams

- Bots in Microsoft Teams channels and group chats
- Exercise - Bots in Microsoft Teams channels and group chats
- Proactive messages from bots
- Exercise - Proactive messages from bots

Module 16: Collect Input in Microsoft Teams with Task Modules

Task modules are modals that you can populate with either an Adaptive Card or an embedded web/content page for use in your custom Microsoft Teams app's user experience for workflows that require data input. Task modules allow you to gather information in a Teams-aware popup. In this module, you'll learn how to create and add task modules to your Microsoft Teams app.

In this module, you will:

- Create a task module for a tab
- Demonstrate how to create a task module that includes an adaptive card
- Create a task module for a bot

Lessons

- Introduction
- Collecting user input with task modules
- Exercise - Collecting user input with task modules
- Using adaptive cards and deep links in task modules
- Exercise - Using adaptive cards and deep links in task modules
- Using task modules with bots
- Exercise - Using task modules with bots

Module 17: Connect web services to Microsoft Teams with webhooks and Office 365 Connectors

Webhooks and connectors are a simple way to connect your web services to channels and teams inside Microsoft Teams. Outgoing webhooks allow your users to send text messages from a channel to your web services. Connectors allow users to subscribe to receive notifications and messages from your web services. There are two types of connectors available in Microsoft Teams: incoming webhooks and Office 365 connectors. In this module, you'll learn about webhooks and connectors and how to implement them in Microsoft Teams channels.

In this module, you will:

- Demonstrate how to create and use an outgoing webhook for a Microsoft Teams channel
- Demonstrate how to create and use an incoming webhook for a Microsoft Teams channel
- Demonstrate how to create, register, and use an Office 365 Connector for Microsoft Teams

Lessons

- Introduction
- Connect web services to Microsoft Teams with webhooks
- Exercise - Create outgoing webhooks
- Create incoming webhooks
- Exercise - Create incoming webhooks
- Use Office 365 Connectors in Microsoft Teams
- Exercise - Create and add Office 365 Connectors to teams

Module 18: Microsoft Teams – Use the teamwork Microsoft Graph endpoint

Microsoft Teams is the ultimate hub for teamwork & intelligent communications. Microsoft Teams delivers chat-based collaboration, meetings, calling, and enterprise voice features. Developers can tap into the power of Microsoft Teams with Microsoft Graph to integrate your custom applications. In this module, you'll learn how to use Microsoft Graph to interact with Microsoft Teams.

In this module, you will:

- Understand how to use Microsoft Graph to communicate with Microsoft Teams
- Demonstrate how to get a list of all teams and a specific team with Microsoft Graph
- Demonstrate how to configure build-in tabs within a Microsoft Teams team with Microsoft Graph

- Demonstrate how to send a notification to a user or a channel using the Microsoft Teams activity feed with Microsoft Graph

Lessons

- Introduction
- Use Microsoft Graph with Microsoft Teams
- Exercise - Teamwork endpoint introduction
- Configure a built-in tab with Microsoft Graph
- Exercise - Configure a built-in tab with Microsoft Graph
- Use Microsoft Graph to post to the activity feed
- Exercise - Use Microsoft Graph to post to the activity feed

Module 19: Microsoft Teams – Authentication and Single Sign-on

Developers can create Microsoft Teams apps to create new experiences for their users and integrate with existing business solutions. When custom applications need to access user information protected by Azure AD, and data from other services, apps will need to establish a trusted connection with these providers. In this module, you'll learn about the different authentication flows supported by Microsoft Teams that you can use in your custom apps.

In this module, you will:

- Understand the authentication options available to developers creating custom Microsoft Teams tabs and bots
- Create a Microsoft Teams tab that uses SSO authentication
- Create a bot for Microsoft Teams that uses SSO authentication

Lessons

- Introduction
- Understand authentication and single sign-on (SSO) in Microsoft Teams apps
- Exercise - Implement single sign-on (SSO) for Microsoft Teams apps
- Single sign-on (SSO) with Microsoft Teams tabs
- Exercise - Single sign-on (SSO) with Microsoft Teams tabs
- Single sign-on (SSO) with Microsoft Teams bots
- Exercise - Single sign-on (SSO) with Microsoft Teams bots

Module 20: Create interactive meeting apps for Microsoft Teams

Meetings enable collaboration, partnership, informed communication, and shared feedback. The meeting app can deliver a user experience for each stage of the meeting lifecycle. Meeting lifecycle includes pre-meeting, in-meeting, and post-meeting app experience, depending on the attendee's status. In this module, you'll learn how to create custom apps to be used in Microsoft Teams meetings.

In this module, you will:

- Understand the capabilities of Microsoft Teams meetings extensibility feature
- Create a Microsoft Teams meetings app that meeting attendees can use before and during a meeting
- Implement a summary view of the meeting after the meeting has concluded

Lessons

- Introduction
- Understand Microsoft Teams meetings apps
- Exercise - Creating meeting apps for Microsoft Teams
- In-meeting experience & participant roles
- Exercise - In-meeting experience & participant roles
- Implement a post-meeting experience for attendees
- Exercise - Implement a post-meeting experience for attendees

Module 21: Distribute your Microsoft Teams app

Use the Developer Portal to modify app definitions and manage app packages. Leverage the Microsoft Teams Framework (TeamsFx) to set up CI/CD pipelines and automate deployment.

In this module, you will:

- Manage app definitions and packages in the Developer Portal for Teams
- Upload a custom app to a single user or team
- Upload an app to the App Catalog for your organization
- Automate deployment of Microsoft Teams apps

Lessons

- Introduction
- Manage apps in the Developer Portal
- Exercise - Manage apps in the Developer Portal
- Upload to a user or team
- Exercise - Upload an app to a user or team
- Publish to your organization
- Exercise - Publish an app to your organization
- Automate Teams app deployment
- Exercise - Automate app deployment

Module 22: Monitor and maintain Microsoft Teams solutions

Leverage Microsoft Purview's risk and compliance solutions and Application Insights to understand how users are interacting with your app. Use Azure Log Analytics and other Azure Monitor tools to analyze log data from your application.

In this module, you will:

- Recommend audit settings using Microsoft 365 Audit logging
- Review and evaluate performance using App Insights
- Assess new SDK versions for impact to published apps
- Analyze logs, usage data, and audit data

Lessons

- Introduction
- Configure audit logging
- Exercise - Configure audit logging
- Monitor performance using App Insights
- Exercise - Monitor performance using App Insights
- Analyze app logs
- Exercise - Analyze logs using Log Analytics