100 XP

Introduction

3 minutes

In App Service, app settings are variables passed as environment variables to the application code.

Learning objectives

After completing this module, you'll be able to:

- Create application settings that are bound to deployment slots.
- Explain the options for installing SSL/TLS certificates for your app.
- Enable diagnostic logging for your app to aid in monitoring and debugging.
- Create virtual app to directory mappings.

Next unit: Configure application settings

Continue

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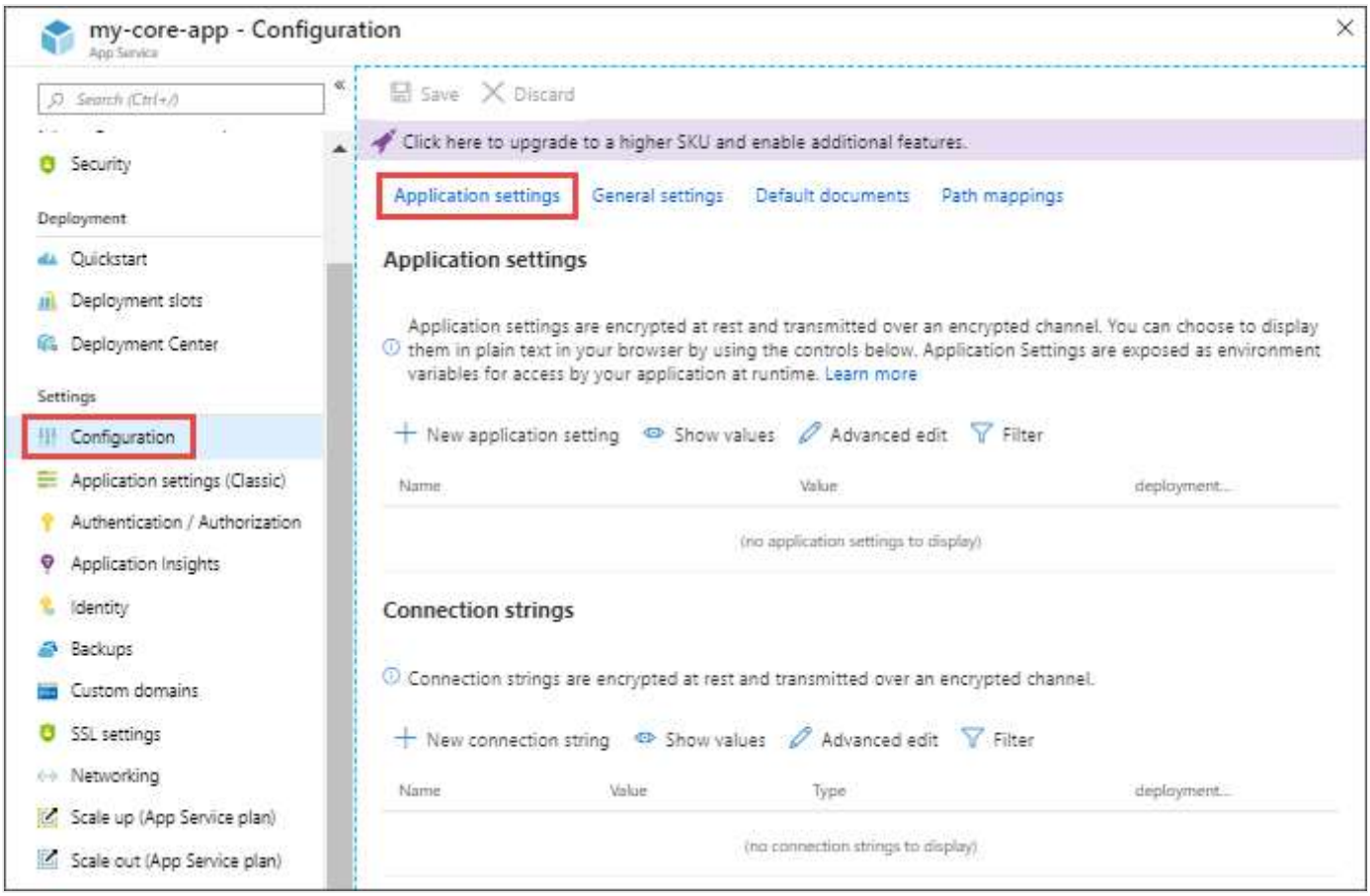
Configure application settings

3 minutes

In App Service, app settings are variables passed as environment variables to the application code. For Linux apps and custom containers, App Service passes app settings to the container using the `--env` flag to set the environment variable in the container.

Application settings can be accessed by navigating to your app's management page and selecting **Configuration > Application Settings**.



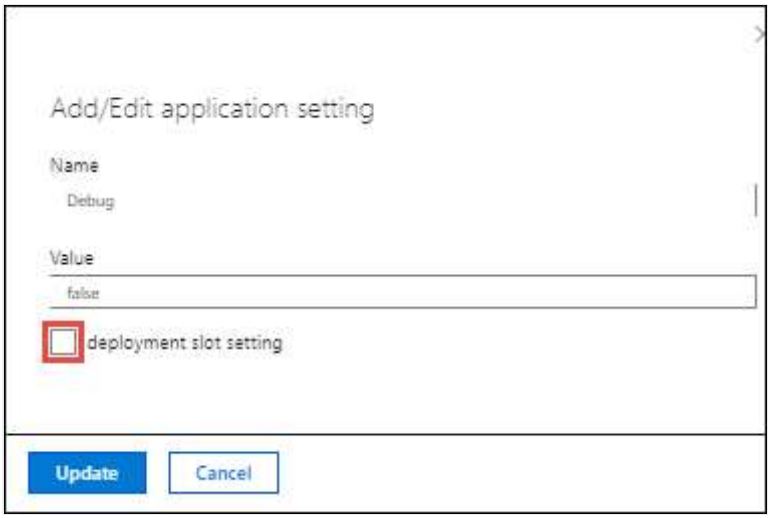
For ASP.NET and ASP.NET Core developers, setting app settings in App Service are like setting them in `<appSettings>` in *Web.config* or *appsettings.json*, but the values in App Service override the ones in *Web.config* or *appsettings.json*. You can keep development settings (for example, local MySQL password) in *Web.config* or *appsettings.json*, but production secrets (for example, Azure

MySQL database password) safe in App Service. The same code uses your development settings when you debug locally, and it uses your production secrets when deployed to Azure.

App settings are always encrypted when stored (encrypted-at-rest).

Adding and editing settings

To add a new app setting, click **New application setting**. If you are using deployment slots you can specify if your setting is swappable or not. In the dialog, you can stick the setting to the current slot.



To edit a setting, click the **Edit** button on the right side.

When finished, click **Update**. Don't forget to click **Save** back in the **Configuration** page.

> **Note**
>
> In a default, or custom, Linux container any nested JSON key structure in the app setting name like `ApplicationInsights:InstrumentationKey` needs to be configured in App Service as `ApplicationInsights__InstrumentationKey` for the key name. In other words, any `:` should be replaced by `__` (double underscore).

Editing application settings in bulk

To add or edit app settings in bulk, click the **Advanced** edit button. When finished, click **Update**. App settings have the following JSON formatting:

JSON Copy

```
[
  {
    "name": "<key-1>",
    "value": "<value-1>",
    "slotSetting": false
  },
  {
    "name": "<key-2>",
    "value": "<value-2>",
    "slotSetting": false
  },
  ...
]
```

Configure connection strings

For ASP.NET and ASP.NET Core developers the values you set in App Service override the ones in *Web.config*. For other language stacks, it's better to use app settings instead, because connection strings require special formatting in the variable keys in order to access the values. Connection strings are always encrypted when stored (encrypted-at-rest).

> **Tip**
>
> There is one case where you may want to use connection strings instead of app settings for non-.NET languages: certain Azure database types are backed up along with the app only if you configure a connection string for the database in your App Service app.

Adding and editing connection strings follow the same principles as other app settings and they can also be tied to deployment slots. Below is an example of connection strings in JSON formatting that you would use for bulk adding or editing.

JSON Copy

```
[
  {
    "name": "name-1",
    "value": "conn-string-1",
    "type": "SQLServer",
    "slotSetting": false
  },
  {
```

```
    "name": "name-2",
    "value": "conn-string-2",
    "type": "PostgreSQL",
    "slotSetting": false
  },
  ...
]
```

Next unit: Configure general settings

Continue >

How are we doing? ☆ ☆ ☆ ☆ ☆

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Configure general settings

3 minutes

In the **Configuration** > **General settings** section you can configure some common settings for your app. Some settings require you to scale up to higher pricing tiers.

Below is a list of the currently available settings:

- **Stack settings**: The software stack to run the app, including the language and SDK versions. For Linux apps and custom container apps, you can also set an optional start-up command or file.

- **Platform settings**: Lets you configure settings for the hosting platform, including:
  - **Bitness**: 32-bit or 64-bit.
  - **WebSocket protocol**: For ASP.NET SignalR or socket.io, for example.
  - **Always On**: Keep the app loaded even when there's no traffic. By default, **Always On** is not enabled and the app is unloaded after 20 minutes without any incoming requests. It's required for continuous WebJobs or for WebJobs that are triggered using a CRON expression.
  - **Managed pipeline version**: The IIS pipeline mode. Set it to **Classic** if you have a legacy app that requires an older version of IIS.

  - **HTTP version**: Set to 2.0 to enable support for HTTPS/2 protocol.
  - **ARR affinity**: In a multi-instance deployment, ensure that the client is routed to the same instance for the life of the session. You can set this option to **Off** for stateless applications.

- **Debugging**: Enable remote debugging for ASP.NET, ASP.NET Core, or Node.js apps. This option turns off automatically after 48 hours.
- **Incoming client certificates**: require client certificates in mutual authentication. TLS mutual authentication is used to restrict access to your app by enabling different types of authentication for it.

Next unit: Configure path mappings

Continue >

How are we doing? ☆ ☆ ☆ ☆ ☆

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Configure path mappings

3 minutes

In the **Configuration** > **Path mappings** section you can configure handler mappings, and virtual application and directory mappings. The **Path mappings** page will display different options based on the OS type.

Windows apps (uncontainerized)

For Windows apps, you can customize the IIS handler mappings and virtual applications and directories.

Handler mappings let you add custom script processors to handle requests for specific file extensions. To add a custom handler, select **New handler**. Configure the handler as follows:

- **Extension**: The file extension you want to handle, such as **.php* or *handler.fcgi*.
- **Script processor**: The absolute path of the script processor. Requests to files that match the file extension are processed by the script processor. Use the path `D:\home\site\wwwroot` to refer to your app's root directory.
- **Arguments**: Optional command-line arguments for the script processor.

Each app has the default root path (`/`) mapped to `D:\home\site\wwwroot`, where your code is deployed by default. If your app root is in a different folder, or if your repository has more than one application, you can edit or add virtual applications and directories.

You can configure virtual applications and directories by specifying each virtual directory and its corresponding physical path relative to the website root (`D:\home`). To mark a virtual directory as a web application, clear the **Directory** check box.

Linux and containerized apps

You can add custom storage for your containerized app. Containerized apps include all Linux apps and also the Windows and Linux custom containers running on App Service. Click **New Azure**

Storage Mount and configure your custom storage as follows:

- **Name**: The display name.
- **Configuration options**: Basic or Advanced.
- **Storage accounts**: The storage account with the container you want.
- **Storage type**: **Azure Blobs** or **Azure Files**. Windows container apps only support Azure Files.
- **Storage container**: For basic configuration, the container you want.
- **Share name**: For advanced configuration, the file share name.
- **Access key**: For advanced configuration, the access key.
- **Mount path**: The absolute path in your container to mount the custom storage.

Next unit: Enable diagnostic logging

Continue >

How are we doing? ☆ ☆ ☆ ☆ ☆

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Enable diagnostic logging

3 minutes

There are built-in diagnostics to assist with debugging an App Service app. In this lesson, you will learn how to enable diagnostic logging and add instrumentation to your application, as well as how to access the information logged by Azure.

The table below shows the types of logging, the platforms supported, and where the logs can be stored and located for accessing the information.

Type	Platform	Location	Description
Application logging	Windows, Linux	App Service file system and/or Azure Storage blobs	Logs messages generated by your application code. The messages can be generated by the web framework you choose, or from your application code directly using the standard logging pattern of your language. Each message is assigned one of the following categories: **Critical**, **Error**, **Warning**, **Info**, **Debug**, and **Trace**.
Web server logging	Windows	App Service file system or Azure Storage blobs	Raw HTTP request data in the W3C extended log file format. Each log message includes data like the HTTP method, resource URI, client IP, client port, user agent, response code, and so on.
Detailed error logging	Windows	App Service file system	Copies of the *.htm* error pages that would have been sent to the client browser. For security reasons, detailed error pages shouldn't be sent to clients in production, but App Service can save the error page each time an application error occurs that has HTTP code 400 or greater.

Type	Platform	Location	Description
Failed request tracing	Windows	App Service file system	Detailed tracing information on failed requests, including a trace of the IIS components used to process the request and the time taken in each component. One folder is generated for each failed request, which contains the XML log file, and the XSL stylesheet to view the log file with.
Deployment logging	Windows, Linux	App Service file system	Helps determine why a deployment failed. Deployment logging happens automatically and there are no configurable settings for deployment logging.

Enable application logging (Windows)

1. To enable application logging for Windows apps in the Azure portal, navigate to your app and select **App Service logs**.
2. Select **On** for either **Application Logging (Filesystem)** or **Application Logging (Blob)**, or both. The **Filesystem** option is for temporary debugging purposes, and turns itself off in 12 hours. The **Blob** option is for long-term logging, and needs a blob storage container to write logs to.
3. You can also set the **Level** of details included in the log as shown in the table below.

Level	Included categories
Disabled	None
Error	Error, Critical
Warning	Warning, Error, Critical
Information	Info, Warning, Error, Critical
Verbose	Trace, Debug, Info, Warning, Error, Critical (all categories)

4. When finished, select **Save**.

Enable application logging (Linux/Container)

1. In **App Service logs** set the **Application logging** option to **File System**.
2. In **Quota (MB)**, specify the disk quota for the application logs. In **Retention Period (Days)**, set the number of days the logs should be retained.
3. When finished, select **Save**.

Enable web server logging

1. For **Web server logging**, select **Storage** to store logs on blob storage, or **File System** to store logs on the App Service file system.
2. In **Retention Period (Days)**, set the number of days the logs should be retained.
3. When finished, select **Save**.

Add log messages in code

In your application code, you use the usual logging facilities to send log messages to the application logs. For example:

- ASP.NET applications can use the `System.Diagnostics.Trace` class to log information to the application diagnostics log. For example:

```
C#                                                                    Copy

System.Diagnostics.Trace.TraceError("If you're seeing this, something bad hap-
pened");
```

- By default, ASP.NET Core uses the `Microsoft.Extensions.Logging.AzureAppServices` logging provider.

Stream logs

Before you stream logs in real time, enable the log type that you want. Any information written to files ending in .txt, .log, or .htm that are stored in the `/LogFiles` directory (`d:/home/logfiles`) is streamed by App Service.

> **Note**
>
> Some types of logging buffer write to the log file, which can result in out of order events in the stream. For example, an application log entry that occurs when a user visits a page may be displayed in the stream before the corresponding HTTP log entry for the page request.

- Azure portal - To stream logs in the Azure portal, navigate to your app and select **Log stream**.
- Azure CLI - To stream logs live in Cloud Shell, use the following command:

```
Bash                                                    Copy
az webapp log tail --name appname --resource-group myResourceGroup
```

- Local console - To stream logs in the local console, install Azure CLI and sign in to your account. Once signed in, follow the instructions for Azure CLI above.

Access log files

If you configure the Azure Storage blobs option for a log type, you need a client tool that works with Azure Storage.

For logs stored in the App Service file system, the easiest way is to download the ZIP file in the browser at:

- Linux/container apps: `https://<app-name>.scm.azurewebsites.net/api/logs/docker/zip`
- Windows apps: `https://<app-name>.scm.azurewebsites.net/api/dump`

For Linux/container apps, the ZIP file contains console output logs for both the docker host and the docker container. For a scaled-out app, the ZIP file contains one set of logs for each instance. In the App Service file system, these log files are the contents of the */home/LogFiles* directory.

Next unit: Configure security certificates

Continue >

How are we doing? ☆ ☆ ☆ ☆ ☆

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Configure security certificates

3 minutes

You have been asked to help secure information being transmitted between your companies app and the customer. Azure App Service has tools that let you create, upload, or import a private certificate or a public certificate into App Service.

A certificate uploaded into an app is stored in a deployment unit that is bound to the app service plan's resource group and region combination (internally called a *webspace*). This makes the certificate accessible to other apps in the same resource group and region combination.

The table below details the options you have for adding certificates in App Service:

Option	Description
Create a free App Service managed certificate	A private certificate that's free of charge and easy to use if you just need to secure your custom domain in App Service.
Purchase an App Service certificate	A private certificate that's managed by Azure. It combines the simplicity of automated certificate management and the flexibility of renewal and export options.
Import a certificate from Key Vault	Useful if you use Azure Key Vault to manage your certificates.
Upload a private certificate	If you already have a private certificate from a third-party provider, you can upload it.
Upload a public certificate	Public certificates are not used to secure custom domains, but you can load them into your code if you need them to access remote resources.

Private certificate requirements

The free **App Service managed certificate** and the **App Service certificate** already satisfy the requirements of App Service. If you want to use a private certificate in App Service, your certificate must meet the following requirements:

- Exported as a password-protected PFX file, encrypted using triple DES.
- Contains private key at least 2048 bits long
- Contains all intermediate certificates in the certificate chain

To secure a custom domain in a TLS binding, the certificate has additional requirements:

- Contains an Extended Key Usage for server authentication (OID = 1.3.6.1.5.5.7.3.1)
- Signed by a trusted certificate authority

Creating a free managed certificate

To create custom TLS/SSL bindings or enable client certificates for your App Service app, your App Service plan must be in the **Basic**, **Standard**, **Premium**, or **Isolated** tier. Custom SSL is not supported in the **F1** or **D1** tier.

The free App Service managed certificate is a turn-key solution for securing your custom DNS name in App Service. It's a TLS/SSL server certificate that's fully managed by App Service and renewed continuously and automatically in six-month increments, 45 days before expiration. You create the certificate and bind it to a custom domain, and let App Service do the rest.

The free certificate comes with the following limitations:

- Does not support wildcard certificates.
- Does not support usage as a client certificate by certificate thumbprint.
- Is not exportable.
- Is not supported on App Service Environment (ASE).
- Is not supported with root domains that are integrated with Traffic Manager.
- If a certificate is for a CNAME-mapped domain, the CNAME must be mapped directly to `<app-name>.azurewebsites.net`.

Import an App Service Certificate

If you purchase an App Service Certificate from Azure, Azure manages the following tasks:

- Takes care of the purchase process from GoDaddy.
- Performs domain verification of the certificate.

- Maintains the certificate in Azure Key Vault.
- Manages certificate renewal.
- Synchronize the certificate automatically with the imported copies in App Service apps.

If you already have a working App Service certificate, you can:

- Import the certificate into App Service.
- Manage the certificate, such as renew, rekey, and export it.

> **Note**
>
> App Service Certificates are not supported in Azure National Clouds at this time.

Upload a private certificate

If your certificate authority gives you multiple certificates in the certificate chain, you need to merge the certificates in order. Then you can Export your merged TLS/SSL certificate with the private key that your certificate request was generated with.

If you generated your certificate request using OpenSSL, then you have created a private key file. To export your certificate to PFX, run the following command. Replace the placeholders `<private-key-file>` and `<merged-certificate-file>` with the paths to your private key and your merged certificate file.

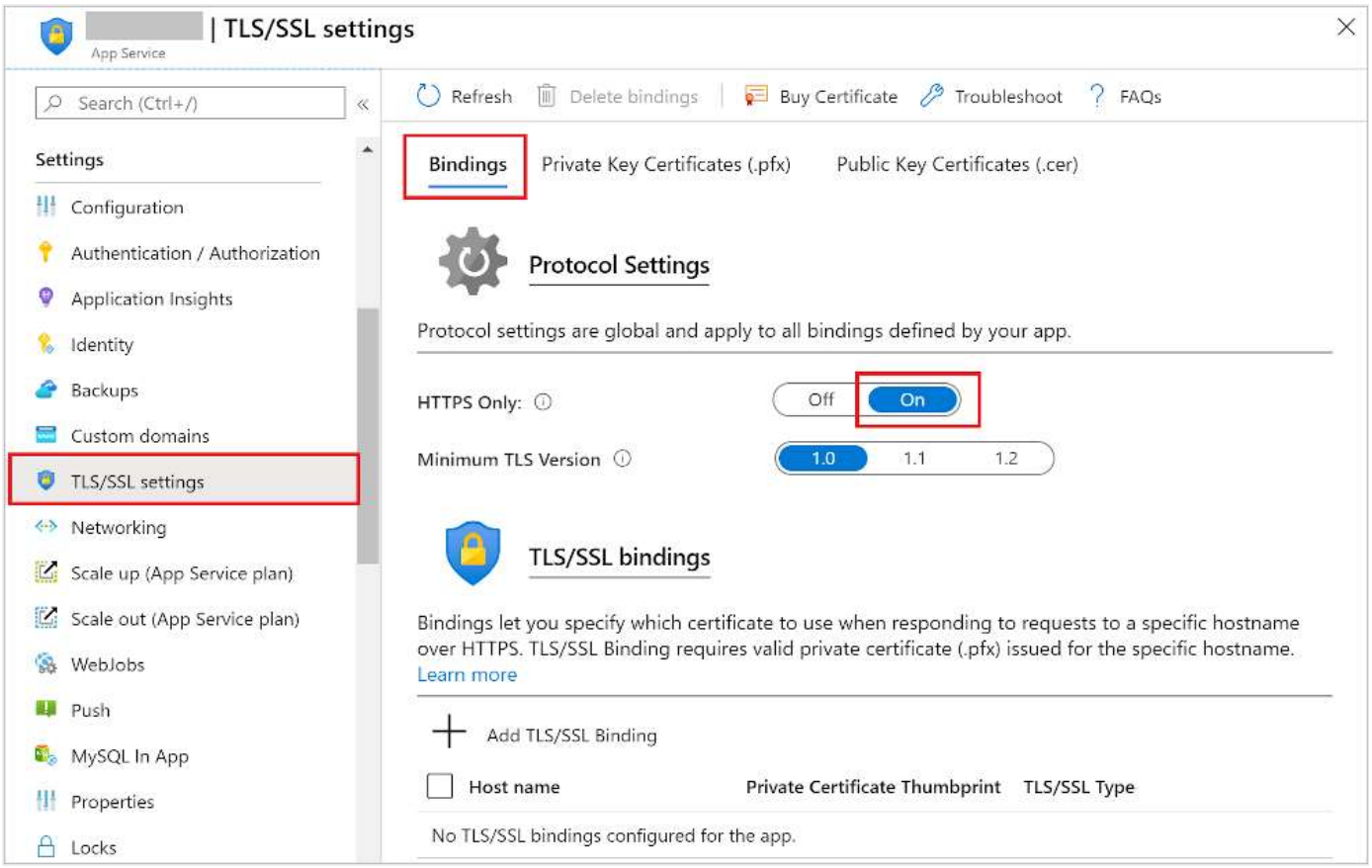
Bash Copy

```
openssl pkcs12 -export -out myserver.pfx -inkey <private-key-file> -in <merged-cer-
tificate-file>
```

When prompted, define an export password. You'll use this password when uploading your TLS/SSL certificate to App Service.

Enforce HTTPS

By default, anyone can still access your app using HTTP. You can redirect all HTTP requests to the HTTPS port by navigating to your app page and, in the left navigation, select **TLS/SSL settings**. Then, in **HTTPS Only**, select **On**.



Next unit: Manage app features

Continue >

How are we doing? ☆ ☆ ☆ ☆ ☆

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Manage app features

3 minutes

Feature management is a modern software-development practice that decouples feature release from code deployment and enables quick changes to feature availability on demand. It uses a technique called feature flags (also known as feature toggles, feature switches, and so on) to dynamically administer a feature's lifecycle.

Basic concepts

Here are several new terms related to feature management:

- **Feature flag**: A feature flag is a variable with a binary state of *on* or *off*. The feature flag also has an associated code block. The state of the feature flag triggers whether the code block runs or not.
- **Feature manager**: A feature manager is an application package that handles the lifecycle of all the feature flags in an application. The feature manager typically provides additional functionality, such as caching feature flags and updating their states.
- **Filter**: A filter is a rule for evaluating the state of a feature flag. A user group, a device or browser type, a geographic location, and a time window are all examples of what a filter can represent.

An effective implementation of feature management consists of at least two components working in concert:

- An application that makes use of feature flags.
- A separate repository that stores the feature flags and their current states.

How these components interact is illustrated in the following examples.

Feature flag usage in code

The basic pattern for implementing feature flags in an application is simple. You can think of a feature flag as a Boolean state variable used with an `if` conditional statement in your code:

C# Copy

```
if (featureFlag) {
    // Run the following code
}
```

In this case, if `featureFlag` is set to `True`, the enclosed code block is executed; otherwise, it's skipped. You can set the value of `featureFlag` statically, as in the following code example:

C# Copy

```
bool featureFlag = true;
```

You can also evaluate the flag's state based on certain rules:

C# Copy

```
bool featureFlag = isBetaUser();
```

A slightly more complicated feature flag pattern includes an `else` statement as well:

C# Copy

```
if (featureFlag) {
    // This following code will run if the featureFlag value is true
} else {
    // This following code will run if the featureFlag value is false
}
```

Feature flag declaration

Each feature flag has two parts: a name and a list of one or more filters that are used to evaluate if a feature's state is *on* (that is, when its value is `True`). A filter defines a use case for when a feature should be turned on.

When a feature flag has multiple filters, the filter list is traversed in order until one of the filters determines the feature should be enabled. At that point, the feature flag is *on*, and any remaining filter results are skipped. If no filter indicates the feature should be enabled, the feature flag is *off*.

The feature manager supports *appsettings.json* as a configuration source for feature flags. The following example shows how to set up feature flags in a JSON file:

JSON Copy

```
"FeatureManagement": {
    "FeatureA": true, // Feature flag set to on
    "FeatureB": false, // Feature flag set to off
    "FeatureC": {
        "EnabledFor": [
            {
                "Name": "Percentage",
                "Parameters": {
                    "Value": 50
                }
            }
        ]
    }
}
```

Feature flag repository

To use feature flags effectively, you need to externalize all the feature flags used in an application. This approach allows you to change feature flag states without modifying and redeploying the application itself.

Azure App Configuration is designed to be a centralized repository for feature flags. You can use it to define different kinds of feature flags and manipulate their states quickly and confidently. You can then use the App Configuration libraries for various programming language frameworks to easily access these feature flags from your application.

Next unit: Knowledge check

Continue >

How are we doing? ☆ ☆ ☆ ☆ ☆

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Knowledge check

3 minutes

Check your knowledge

1. In which of the app configuration settings categories below would you set the language and SDK version?

- ○ Application settings
- ○ Path mappings
- ◉ General settings

✔ That's correct. This category is used to configure stack, platform, debugging, and incoming client certificate settings.

2. Which of the following types of application logging is supported on the Linux platform?

- ○ Web server logging
- ○ Failed request tracing
- ◉ Deployment logging

✔ That's correct. Deployment logging is supported on the Linux platform.

3. Which of the following choices correctly lists the two parts of a feature flag?

- ○ Name, App Settings
- ◉ Name, one or more filters

✔ That's correct. Each feature flag has two parts: a name and a list of one or more filters that are used to evaluate if a feature's state is *on*.

- ○ Feature manager, one or more filters

Next unit: Summary

Continue >

How are we doing? ★ ★ ★ ★ ★ Great

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Summary

3 minutes

In this module, you learned how to:

- Create application settings that are bound to deployment slots.
- Explain the options for installing SSL/TLS certificates for your app.
- Enable diagnostic logging for your app to aid in monitoring and debugging.
- Create virtual app to directory mappings.

Module complete:

Continue to next module

How are we doing? ★ ★ ★ ★ ★ Great