The Azure Machine Learning SDK for Python

While graphical interfaces like Azure Machine Learning studio make it easy to create and manage machine learning assets, it is often advantageous to use a code-based approach to managing resources. By writing scripts to create and manage resources, you can:

- Automate asset creation and configuration to make it repeatable.
- Ensure consistency for resources that must be replicated in multiple environments (for example, development, test, and production)
- Incorporate machine learning asset configuration into developer operations (*DevOps*) workflows, such as continuous integration / continuous deployment (CI/CD) pipelines.

Azure Machine Learning provides software development kits (SDKs) for Python and R, which you can use to create, manage, and use assets in an Azure Machine Learning workspace.

Note: This course focuses on the Python SDK because it has broader capabilities than the R SDK, which is in preview at the time of writing.

Installing the Azure Machine Learning SDK for Python

You can install the Azure Machine Learning SDK for Python by using the `pip` package management utility, as shown in the following code sample:

```
pip install azureml-sdk
```

The SDK is installed using the Python pip utility, and consists of the main **azureml-sdk** package as well as numerous other ancillary packages that contain specialized functionality. For example, the **azureml-widgets** package provides support for interactive widgets in a Jupyter notebook environment. To install additional packages, include them in the `pip install` command:

```
pip install azureml-sdk azureml-widgets
```

More Information: For more information about installing the Azure Machine Learning SDK for Python, see the **SDK documentation**. Also, you should be aware that the SDK is updated on a regular basis, and review the **release notes for the latest release**.

Connecting to a Workspace

After installing the SDK package in your Python environment, you can write code to connect to your workspace and perform machine learning operations. The easiest way to connect to a workspace is to use a workspace configuration file, which includes the Azure subscription, resource group, and workspace details as shown here:

```
{
    "subscription_id": "1234567-abcde-890-fgh...",
    "resource_group": "aml-resources",
    "workspace_name": "aml-workspace"
}
```

Tip: You can download a configuration file for a workspace from the **Overview** page of its blade in the Azure portal or from Azure Machine Learning studio.

To connect to the workspace using the configuration file, you can use the **from_config** method of the **Workspace** class in the SDK, as shown here:

```
from azureml.core import Workspace

ws = Workspace.from_config()
```

By default, the **from_config** method looks for a file named **config.json** in the folder containing the Python code file, but you can specify another path if necessary.

As an alternative to using a configuration file, you can use the **get** method of the **Workspace** class with explicitly specified subscription, resource group, and workspace details as shown here - though the configuration file technique is generally preferred due to its greater flexibility when using multiple scripts:

```
from azureml.core import Workspace

ws = Workspace.get(name='aml-workspace',
                   subscription_id='1234567-abcde-890-fgh...',
                   resource_group='aml-resources')
```

Whichever technique you use, if there is no current active session with your Azure subscription, you will be prompted to authenticate.

Working with the Workspace Class

The **Workspace** class is the starting point for most code operations. For example, you can use its **compute_targets** attribute to retrieve a dictionary object containing the compute targets defined in the workspace, like this:

```
for compute_name in ws.compute_targets:
    compute = ws.compute_targets[compute_name]
    print(compute.name, ":", compute.type)
```

The SDK contains a rich library of classes that you can use to create, manage, and use many kinds of asset in an Azure Machine Learning workspace.

More Information: For more information about the Azure Machine Learning SDK, see the **SDK documentation**.