



Simple
& Brilliant

DSci

Field of Data Science

Paul Julitz

Notizen

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Teil I

Artificial Intelligence

Kapitel 1

Azure ML Python Development

1 Basics Azure ML API/SDK/CLI

1.1 Overview

SDK vs. CLI The Python `azureml-SDK v2/ azure-ai-ml (AMLSDKv2)` with the package library

`azure-ai-ml`

and the `azureml-SDK v1/ azureml-core (AMLSDKv1)` with

`azureml-core`

are Application programming interface (API) s for the Azure ML (Azure ML) workspace and it's services. The Command Line Interface (CLI) package for AML contains a more compact command line style workflows, that need to be executed. The format in v2 is normally `<noun><verb><option>`.

The Software Development Kit (SDK) is more directed to the development, while the CLI is more convient for a Continuous Integration (CI) / Continuous Development (CD) process. The later is due to the more compact way of executing commands.¹

1.1.1 *Example SDK/ CLI

References: [Start Setup VS-Code Case: VSCode Desktop Tutorial: Reference SDK/CLI v2 Example Doc git Repo Example SDK/CLI v2](#)

1.1.2 * Utilizing other ressources in Azure ML workspace

With both Azure and Azure ML Extension it is possible to manage the resources directly.

¹Reference: [Difference CLI, SDK, MLOps Python AML](#)

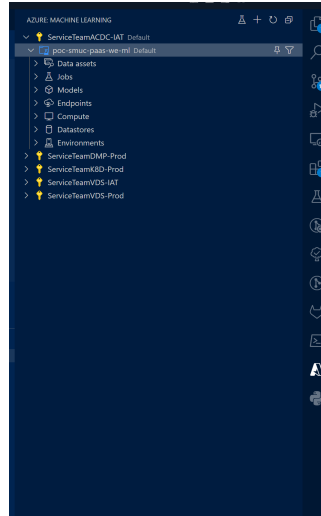


Abbildung 1.1: Azure and Azure ML Extension

1.2 (VSCode) Remote Control of Resources

1.2.1 Jupyter Notebook Remoteserver Connection

Reference: [Getting started with VS-Code Desktop](#)

With this functionality, any local Jupyter Notebook (Web Interface) can use the a remote server connection to execute code on a compute instance with a Kernel (General Jupyter).

To run a Jupyter Notebook (Web Interface), a Kernel (General Jupyter) needs to be selected.

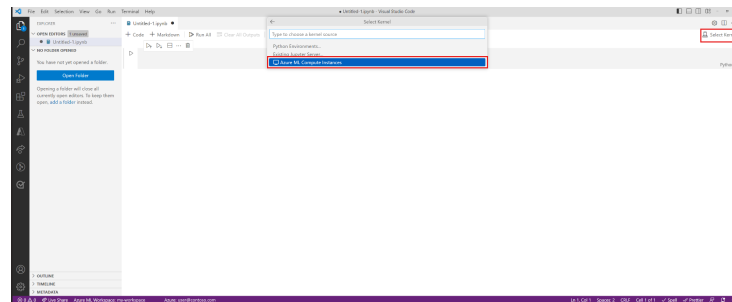


Abbildung 1.2: Kernel Selection in a Jupyter Notebook

In Visual Studio Code (vscode) , there are multiple options to select a Kernel (General Jupyter). With the Azure ML extension, the option *Azure ML Compute Instance* is available to. On the compute instance, a variety of Kernel (General Jupyter) are pre-installed.

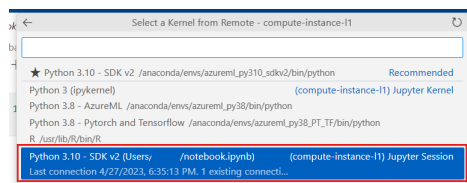


Abbildung 1.3: Kernel Sources

This connection allows to utilize the Azure ML Compute Instance, not all the other resource's. In the following the interaction between and to the other resources will be discussed.

Problem & Fix: Unable to connect One problem accrued.

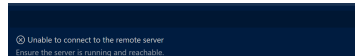


Abbildung 1.4: Error message after selecting Azure ML Compute Instance

For the moment, rollback the Jupyter Notebook (Web Interface) extension to a version v2023.10.xxx helped.²

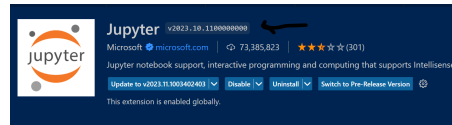


Abbildung 1.5: Rollback version

1.2.2 Setting Up Azure ML CLI

Tunnel Connection If a tunnel is made between vscode and the the workspace the CLI can be access by the terminal, see [Using az login --identity](#)

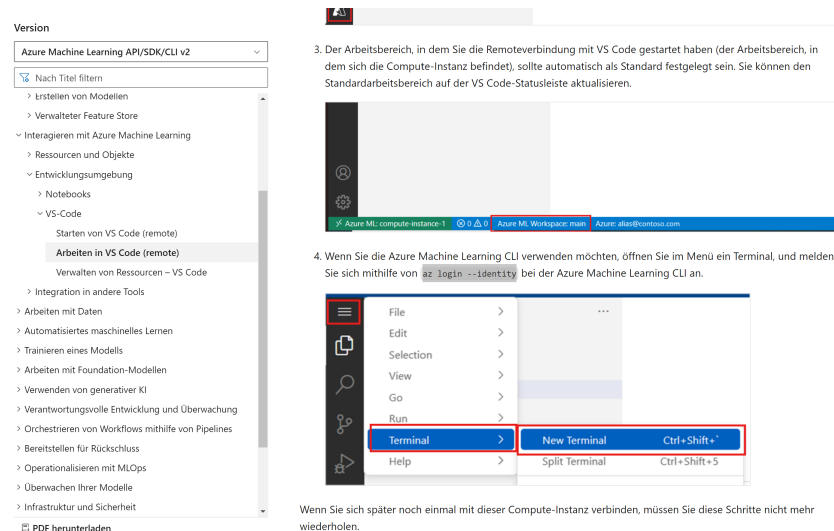


Abbildung 1.6: Remote IDE - CLI v2

***Remotely with a local setup** [Installation reference](#), then see [above command](#) to verify

1.3 Configure local Virtual Environment (SDK v1)

Reference: [Guide Installing SDK for Local Computer](#)

This section will explain how to use AML with your local computer as a compute resources.

²Posted Problem, Pull Request and Workaround

- Create a Python ven with conda on you local computer
- Install the newest AMLSDKv1. ³

```
1 pip install azureml-core
```

Listing 1.1: Installing Azure ML SDK core package

The SDK contains many more optional packages, see [Optional Packages for Azure ML](#)

- Installing Jupyter Notebook (Web Interface) required packages.

³Because the more extensive example is setup with AMLSDKv1, we will start from here to. The idea is, that more functionally are provides by AMLSDKv2 then this will be incrementally be used. [Installation Guide](#)

Teil II

Anhang

Anhang A

Abkürzungsverzeichnis

Symbole

- .ipynb** Jupyter Notebook file format which is interoperable across many platforms. The name also refers to the user-facing web interface called Jupyter Notebook.. *Glossar:* Jupyter Notebook (Web Interface)
- .json** JavaScript Object Notation. *Glossar:* JSON

A

- AML** Azure ML. 4, 6
- AMLSDKv1** The azureml-SDK v1 with the library package azureml-core. 4, 7
- AMLSDKv2** The azureml-SDK v2 with the library package azure-ai-ml. 4, 7
- API** Application programming interface. 4

C

- CD** Continuous Development. 4
- CI** Continuous Integration. 4
- CLI** Command Line Interface. 4, 6

E

- EC2** Amazon Elastic Computing Cloud. *Glossar:* Amazon Elastic Computing Cloud

H

- HTTP** Hypertext Transfer Protocol. *Glossar:* HTTP

J

- JSON** JavaScript Object Notation. *Glossar:* JSON

N

- Na** Not available. *Glossar:* Na (R)
- NaN** Not a Number. *Glossar:* NaN

O

- O(OKR)** Objective form the OKR logic. *Glossar:* Objective (OKR)
- ODBC** Open Database Connectivity (Connection). *Glossar:*

S

SDK Software Development Kit. 4, 7

SQL Structured Query Language. *Glossar*: SQL

U

URL Uniform Resource Locator. *Glossar*: URL

V

ven Virtuel Environment first. 7

vscode Visual Studio Code is an IDE for source-code editing and developing.. 5, 6