

Microsoft Azure Portal for “Data Science”

Introduction

After having made experiences in Python, Jupyter-Notebooks and various data science topics, my aim was to dig deeper into cloud computing platforms. I choose “*Microsoft Azure*” as it seemed the best option regarding both criteria “*pricing*” and “*privacy*” (Google or Amazon seemed to me less ideal either in “*costs*” or in “*privacy*”).

In this document I will describe my first experiences with “*Microsoft Azure*”. My aim was to create an Azure account, get familiar with it to run my Jupyter-Notebooks on a virtual machine and develop other data science tools. I will touch different topics in this document, like

- “**configuration steps**”: what do I need to know to set up everything (e.g. a virtual machine)?
- “**billing aspects**”: what aspects are relevant regarding the costs?
- “**issue solving**”: what can I do if I have technical issues?

I did not have any mentor or training material apart of the Microsoft documentation, which I found on their website. It was a jump directly into the “real-world” and I can definitively say: I learnt a lot with this hands-on approach.

Create an Azure Account

First, I needed to create an Microsoft Azure account. Microsoft offers a “free” Azure Account here:

<https://azure.microsoft.com/en-us/free/>

“Free” means, that you will have access for 12 months on popular services like “File Storage”, “Virtual Machines”, “SQL Databases”, but limited to a maximum usage (e.g. 5 GB of storage, 750 hours of usage...). Included in this “Free” subscription are about 170 Euros for special Azure services, which you can use in the first month (30 days).

My first attempt was to register immediately using the link above. But I recommend making use of pre-configured machines for the purpose of doing “Data Science” and to open a new Azure Account by starting here:

“Data Science Virtual Machines” (pre-configured machines)

<https://azure.microsoft.com/en-us/services/virtual-machines/data-science-virtual-machines/>

Then you need to go through the Azure configuration steps, which requires to decide if you want to go for a Linux or a Windows configuration (I did both to better understand the differences).

During the configuration process you need to choose names for the following components:

- **Azure Resource Manager** ist der Bereitstellungs- und Verwaltungsdienst für Azure. Er bietet eine Verwaltungsebene, die das Erstellen, Aktualisieren und Löschen von Ressourcen in Ihrem Azure-Konto ermöglicht.
- Ein **Azure Storage-Konto** enthält all Ihre Azure Storage-Datenobjekte: Blobs, Dateien, Warteschlangen, Tabellen und Datenträger. Das Speicherkonto stellt einen eindeutigen Namespace für Ihre Azure Storage-Daten bereit, auf den von jedem Ort der Welt aus über

HTTP oder HTTPS zugegriffen werden kann. Daten in Ihrem Azure Storage-Konto sind dauerhaft und hochverfügbar, sicher und extrem skalierbar.

- **Azure Virtual Network (VNET)** ist der grundlegende Baustein für Ihr privates Netzwerk in Azure. Mit VNET können zahlreiche Arten von Azure-Ressourcen (beispielsweise virtuelle Azure-Computer) sicher untereinander sowie mit dem Internet und mit lokalen Netzwerken kommunizieren. VNET ähnelt einem herkömmlichen Netzwerk, das Sie in Ihrem Rechenzentrum betreiben, bietet jedoch zusätzliche Vorteile der Infrastruktur von Azure, z. B. Skalierbarkeit, Verfügbarkeit und Isolation.
- Eine **Netzwerkschnittstelle** ermöglicht einem virtuellen Azure-Computer die Kommunikation mit Internet, Azure und lokalen Ressourcen.
- Der virtuelle Computer kann **Datenträger** enthalten, um die Speicherkapazität zu erhöhen.

I used "My..." as a prefix for all names which I was asked for during the installation process in order to distinguish better (e.g. *MyResourcegroup*, *MyvirtComputer*,....). Don't worry, if you don't understand what the difference is between a "*Storage-Konto*" and a "*Datenträger*" or what the purpose of these components is. You will learn it later.

You will also have to decide for size, speed, ... of the storage and CPUs, which will lead to different monthly costs at the end. There is a cost calculator and you can spend some hours for understanding pros and cons of these components:

<https://azure.microsoft.com/de-de/pricing/>

But as you earned 170 Euro for your registration to the Microsoft Azur Portal which you can use during the first month of your registration it does not matter what you choose here. Later you will have to dig deeper into the "cost-analysis" again, because a virtual machine with all these nice components (as described above) can easily cost between 10 and 150 Euro per month. Therefore think about your configuration and costs, but it is not necessary to think about it at this point in time. I will come back to this point later.

At the end of the installation process you will see the Azure Portal. The "Home" screen looks like this:

The screenshot shows the Microsoft Azure Home page. At the top, there's a search bar with the placeholder "Nach Ressourcen, Diensten und Dokumenten suchen (G+)" and a user profile for "andreas.traut". Below the search bar is the "Azure-Dienste" header with a plus icon for creating new resources. To the right are icons for "Alle Ressourcen", "Mesanwendun", "Virtuelle Computer", "Monitor", "Netzwerkschnitt", "Ressourcengrup", "Azure Databricks", "Abonnements", and "Weitere Dienste".

Kürzlich verwendete Ressourcen

Name	Typ	Zuletzt angezeigt
Free Trial	Abonnement	vor 42 Minuten
MyResourcegroup-vnet	Virtuelles Netzwerk	vor 18 Stunden
MyvirtComputer-nsg	Netzwerksicherheitsgruppe	vor 18 Stunden
MyvirtComputer	Virtueller Computer	vor 18 Stunden
MyvirtComputer-ip	Öffentliche IP-Adresse	vor 18 Stunden
myvirtcomputer152	Netzwerkschnittstelle	vor 18 Stunden

Navigieren

- Abonnements
- Ressourcengruppen
- Alle Ressourcen
- Dashboard

Extras

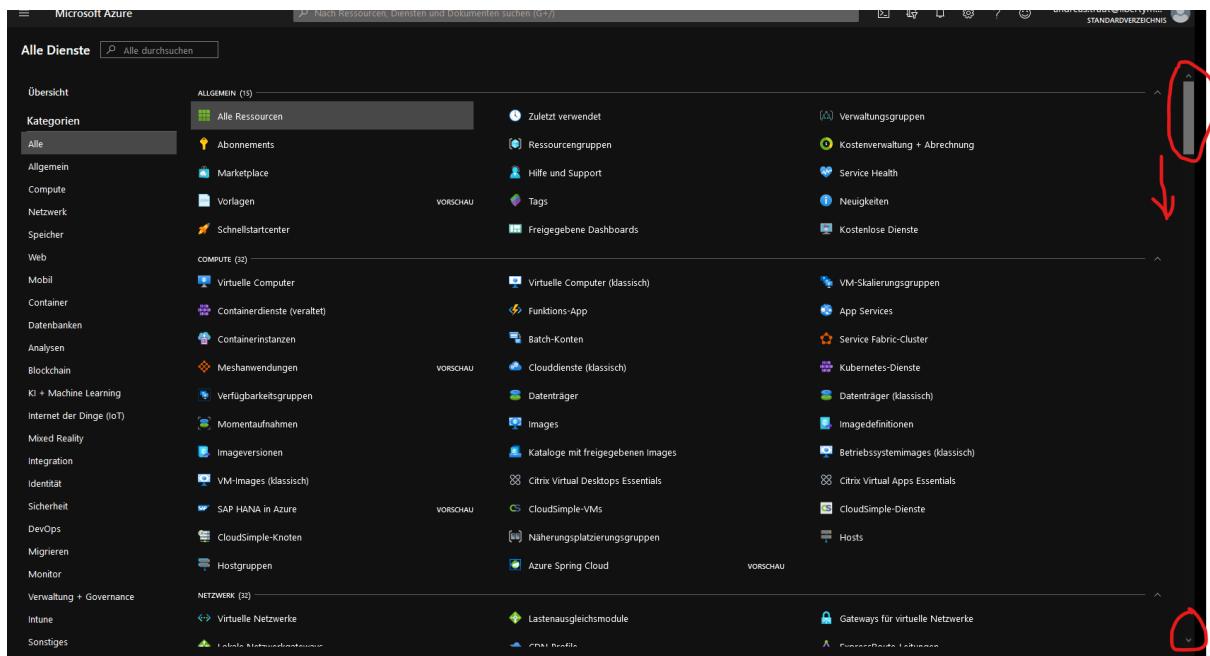
- Microsoft Learn
- Azure Monitor
- Security Center
- Kostenverwaltung

My components for doing “Data Science” are already configured. When you go to “Alle Ressourcen” you will see the following (as I configured one Virtual Machines for Linux and one for Windows, I have a bit more components here):

The screenshot shows the "Alle Ressourcen" list view. The table displays 14 items, each with a checkbox, a small icon, and details like Name, Typ, Ressourcengruppe, Standort, Abonnement, Variante, Ressourcentyp, and Tags. The resources include various Azure services like Virtual Networks, Storage Accounts, Virtual Machines, and Network Security Groups.

Name	Typ	Ressourcengruppe	Standort	Abonnement	Variante	Ressourcentyp	Tags
MyUbuntuResourceGroup-vnet	Virtuelles Netzwerk	MyUbuntuResourceGroup	Nordeuropa	Free Trial		microsoft.network/virtualnet...	
myubunturesourcegroupd	Speicherkonto	MyUbuntuResourceGroup	Nordeuropa	Free Trial	Storage	microsoft.storage/storagea...	
MyUbuntuvirtComp	Virtueller Computer	MyUbuntuResourceGroup	Nordeuropa	Free Trial		microsoft.compute/virtualm...	
MyUbuntuvirtComp-ip	Öffentliche IP-Adresse	MyUbuntuResourceGroup	Nordeuropa	Free Trial		microsoft.network/publicipa...	
MyUbuntuvirtComp-nsg	Netzwerksicherheitsgruppe	MyUbuntuResourceGroup	Nordeuropa	Free Trial		microsoft.network/networks...	
mybuntuvirtcomp305	Netzwerkschnittstelle	MyUbuntuResourceGroup	Nordeuropa	Free Trial		microsoft.network/network...	
MyUbuntuvirtComp_OsDisk_1_d813e4b094bd4aeeb0...	Datenträger	MYBUNTRESOURCEGR...	Nordeuropa	Free Trial		microsoft.compute/disks	
MyWinResourceGroup-vnet	Virtuelles Netzwerk	MyWinRessourceGroup	Nordeuropa	Free Trial		microsoft.network/virtualnet...	TagNameMyWin: TagValue...
mywinressourcegroupdiag	Speicherkonto	MyWinRessourceGroup	Nordeuropa	Free Trial	Storage	microsoft.storage/storagea...	TagNameMyWin: TagValue...
MyWinVirComp	Virtueller Computer	MyWinRessourceGroup	Nordeuropa	Free Trial		microsoft.compute/virtualm...	TagNameMyWin: TagValue...
MyWinVirComp-ip	Öffentliche IP-Adresse	MyWinRessourceGroup	Nordeuropa	Free Trial		microsoft.network/publicipa...	TagNameMyWin: TagValue...
MyWinVirComp-nsg	Netzwerksicherheitsgruppe	MyWinRessourceGroup	Nordeuropa	Free Trial		microsoft.network/networks...	TagNameMyWin: TagValue...
mywinvirtcomp371	Netzwerkschnittstelle	MyWinRessourceGroup	Nordeuropa	Free Trial		microsoft.network/network...	TagNameMyWin: TagValue...
MyWinVirComp_OsDisk_1_c8194add1c344e73b5a04f...	Datenträger	MYWINRESOURCEGR...	Nordeuropa	Free Trial		microsoft.compute/disks	TagNameMyWin: TagValue...

When you choose “Weitere Dienste” on the “Home” screen you will see that there are tons of further configurations (see the red arrow on the right side) as follows:



You really do not need to understand what is going on here in detail but having a glance at the Azure portal can be helpful to see the complexity and variety of the Azure Portal. Take a bit of time to navigate through this portal. It can be confusing in the beginning.

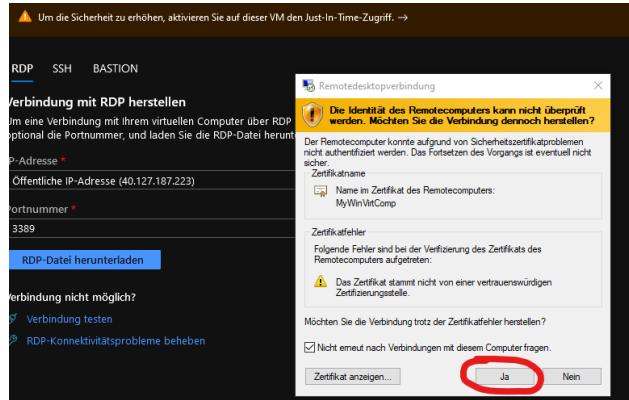
As I guided you in my short manual directly to the pre-configured “Data Science Virtual Machines” the required components (here: “*Virtuelles Netzwerk*”, “*Netzwerkschnittstelle*”, “*Speicherkonto*”, “*Virtueller Computer*”) have already been set automatically during the configuration process. My first attempt was to have a clean, empty Azure Portal (using <https://azure.microsoft.com/en-us/free/>) and adding step-by-step the components from this list. I can assure you: this is a bad approach for beginners because you will get lost. Better follow my described approach above.

Connect to the virtual computer

Now as we have our configuration done we will want to connect to our virtual computer (=virtual machine=VM). In the Azure portal you can select your virtual computer (e.g. mine is named “*MyWinVirtComp*”). Then click on “*Verbinden*” and choose “*RDP*” as follows (there are other ways to

connect to a virtual computer, like SSH or Bastion, but we do not go into these details here):

This will connect you to your virtual computer. You will probably need to accept some warnings concerning certificates popping up like this one:



Then you should be connected to your virtual computer, which looks like this:



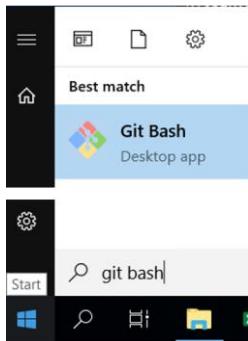
As you can see from the screenshot it has already lots of pre-installed tools and popular data analytics tools, as for example Visual Studio, Power BI, Jupyter Notebook and so on for data science development, data exploration and modelling tasks. Find an explanation about the Data Science Virtual Machine here: <https://docs.microsoft.com/en-us/azure/machine-learning/data-science-virtual-machine/vm-do-ten-things>

- Share code with your team by using GitHub. Access your repository by using the pre-installed Git clients: Git Bash and Git GUI.
- Use a Jupyter notebook to experiment with your data in a browser by using Python 2, Python 3, and Microsoft R.
- Explore data and develop models locally by using Microsoft Machine Learning Server and Python.
- Deploy models built through R and Python on Azure Machine Learning so client applications can access your models by using a simple web service interface.
- Extend your storage space and share large-scale datasets/code . Access Azure data and analytics services like Azure Blob storage, Azure Data Lake, Azure Cosmos DB, Azure SQL Data Warehouse, and Azure SQL Database.
- Build reports and a dashboard by using the Power BI Desktop
- Dynamically scale your virtual computer to meet your project's needs.
- Install additional tools on your virtual machine.

I will not try to dig into all possible applications but the first bullets seemed interesting to me and I get into these topics.

Use “Git Bash” and run a Jupyter-Notebook on my virtual computer

As a first step I decided to use “Git Bash” and download my Github-Repository “*Visualization-of-Data-with-Python*” from Github as follows:



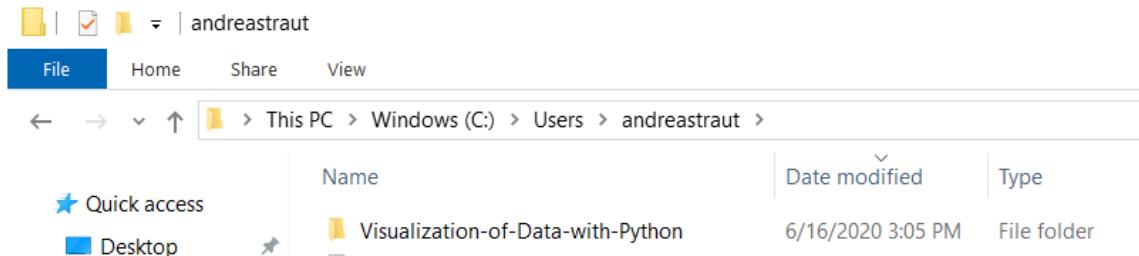
Now I needed to type:

```
git clone https://github.com/AndreasTraut/Visualization-of-Data-with-Python
```

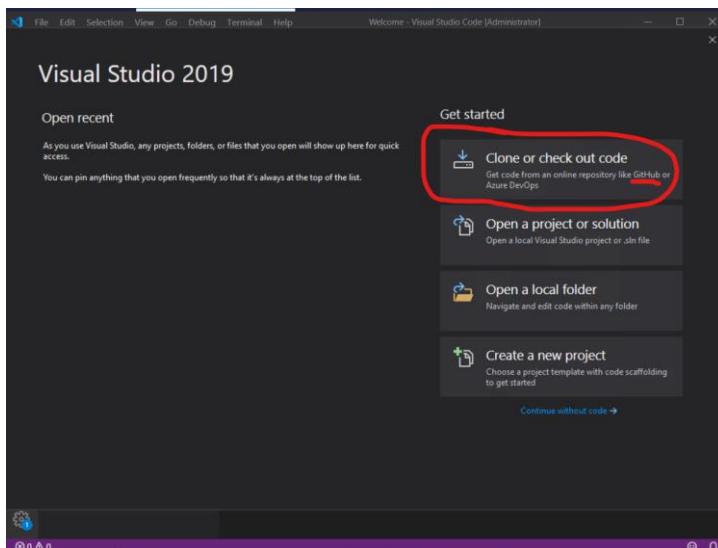
as you can see in the following screenshot:

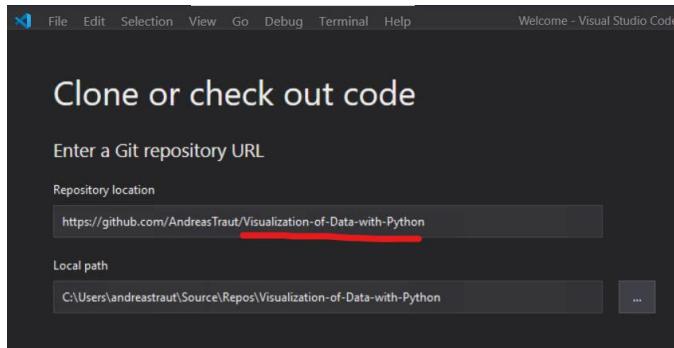
```
MINGW64:/c/Users/andreastraut
andreastraut@MywinVirtComp MINGW64 ~
$ git clone https://github.com/AndreasTraut/Visualization-of-Data-with-Python
Cloning into 'Visualization-of-Data-with-Python'...
remote: Enumerating objects: 259, done.
remote: Counting objects: 100% (259/259), done.
remote: Compressing objects: 100% (209/209), done.
remote: Total 391 (delta 127), reused 151 (delta 50), pack-reused 132
Receiving objects: 100% (391/391), 4.47 MiB | 8.75 MiB/s, done.
Resolving deltas: 100% (199/199), done.
```

As a result, a folder “*Visualization-of-Data-with-Python*” was created on my virtual computer, into which the repository had been downloaded as follows:

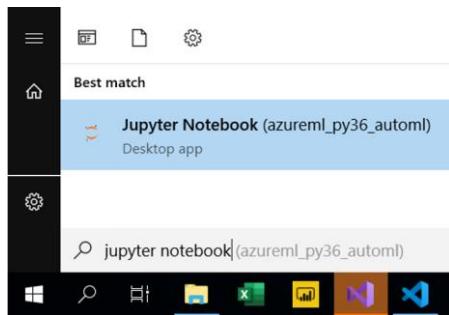


Another possibility instead of using the “*Git Bash*” would have been to use the “*Visual Studio 2019*” and click on “*Clone and check out code*”:

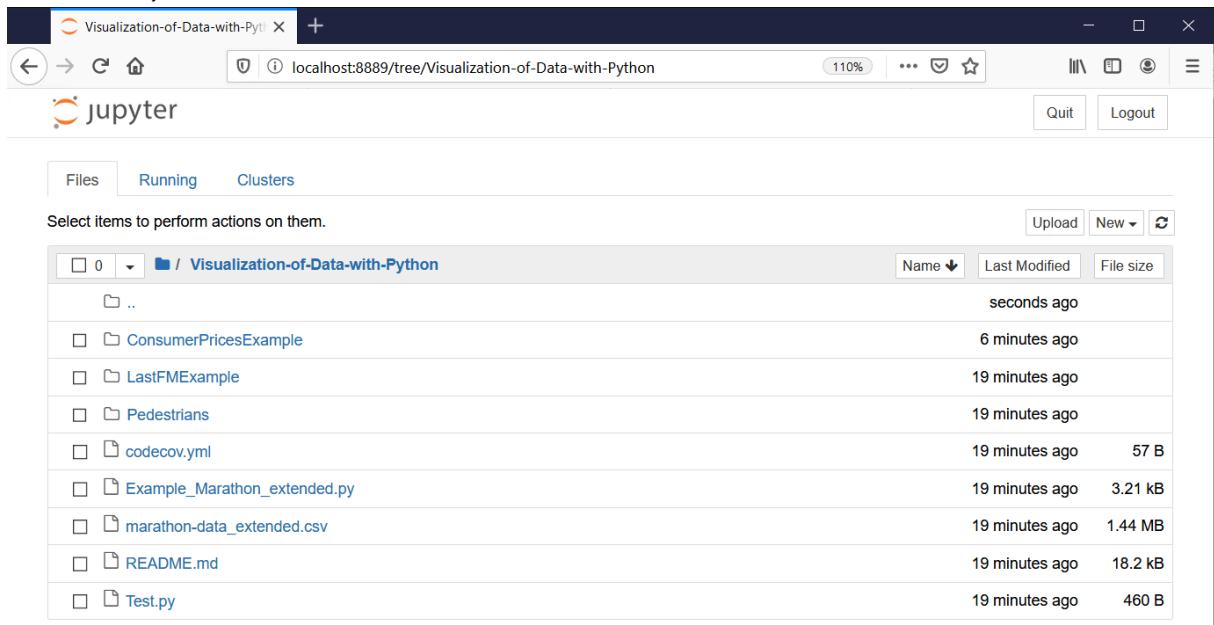




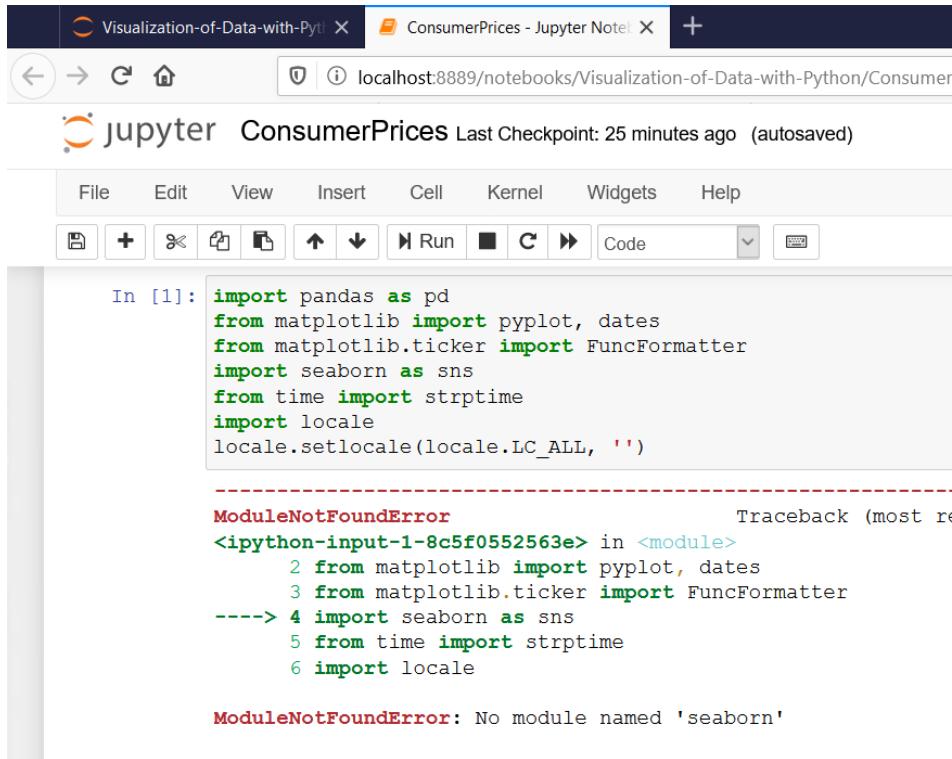
Next, I opened “*Jupyter*” as follows:



A browser (e.g. Firefox-Browser) will open and I had to navigate to the new folder “*Visualization-of-Data-with-Python*” as follows:



I decided to test, if my Jupyter-Notebook “*ConsumerPrices.ipynb*” is working on the virtual machine and got a message, that “seaborn” has not yet been installed:



```
In [1]: import pandas as pd
from matplotlib import pyplot, dates
from matplotlib.ticker import FuncFormatter
import seaborn as sns
from time import strftime
import locale
locale.setlocale(locale.LC_ALL, '')

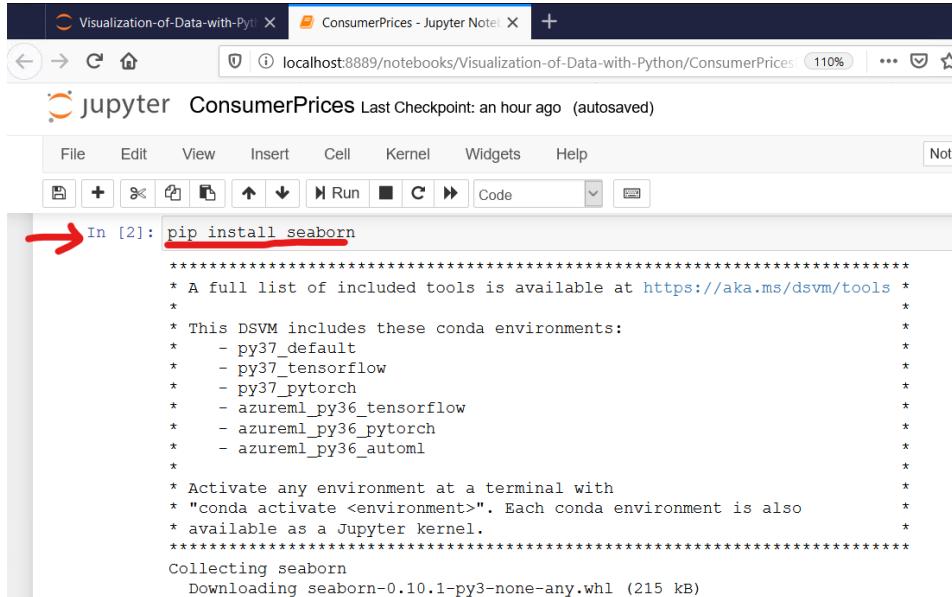
-----
ModuleNotFoundError Traceback (most recent call last)
<ipython-input-1-8c5f0552563e> in <module>
      2 from matplotlib import pyplot, dates
      3 from matplotlib.ticker import FuncFormatter
----> 4 import seaborn as sns
      5 from time import strftime
      6 import locale

ModuleNotFoundError: No module named 'seaborn'
```

I needed to install it by typing

```
pip install seaborn
```

as follows:



```
In [2]: pip install seaborn
*****
* A full list of included tools is available at https://aka.ms/dsvm/tools *
*
* This DSVM includes these conda environments:
*   - py37_default
*   - py37_tensorflow
*   - py37_pytorch
*   - azureml_py36_tensorflow
*   - azureml_py36_pytorch
*   - azureml_py36_automl
*
* Activate any environment at a terminal with
* "conda activate <environment>". Each conda environment is also
* available as a Jupyter kernel.
*****
Collecting seaborn
  Downloading seaborn-0.10.1-py3-none-any.whl (215 kB)
```

After this, the notebook worked as on my personal computer and I knew, that I can continue with my Jupyter projects on the virtual machine as usual and as I already showed in other Github-Repositories. Great. 😊

The screenshot shows a web browser window with the address bar displaying 'localhost:8889/notebooks/Visualization-of-Data-with'. The main content area is a Jupyter Notebook titled 'ConsumerPrices'. The notebook interface includes a toolbar with File, Edit, View, Insert, Cell, Kernel, Widgets, Help, and various cell type icons. Below the toolbar, the code cell In [3] contains Python imports for pandas, matplotlib, seaborn, time, and locale. The output cell Out [3] shows the result of the locale.setlocale command. The status bar at the bottom indicates the last checkpoint was 26 minutes ago.

```
In [3]: import pandas as pd
from matplotlib import pyplot, dates
from matplotlib.ticker import FuncFormatter
import seaborn as sns
from time import strftime
import locale
locale.setlocale(locale.LC_ALL, '')

Out[3]: 'English_United States.1252'
```

I do not want to get deeper into the development of Jupyter-Notebooks here, because my aim was to make experiences with Microsoft Azure and virtual machines. The tests as described above were a sufficient proof for me that I could continue from this point on whenever I want.

Next, I wanted to test, how "Visual Studio 2019" works with ".py" files and therefore opened my Github repository "pedestrians.py". Similarly, as in the Jupyter-notebook above I needed to install some packages like "pandas" and "matplotlib" as they have not been installed yet on the virtual machine, by typing

```
pip install pandas
```

as follows:

```

Pedestrians > Pedestrians.py
1  # -*- coding: utf-8 -*-
2  """
3  Created on Wed Mar 25 11:46:07 2020
4
5  @author: andre
6  """
7  import pandas as pd
8  from matplotlib import pyplot, dates
9  import seaborn as sns
10 from matplotlib.ticker import FuncFormatter
11 import glob
12
13 Run Cell | Run Below | Debug cell
14 #%% read all files
15 all_files = glob.glob("*.csv")
16 li = []
17 for filename in all_files:
18     df = pd.read_csv(filename, index_col=None, header=0, sep=';')
19     li.append(df)
20 df = pd.concat(li, axis=0, ignore_index=True)

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

1: Python

```

lization-of-Data-with-Python/Pedestrians/Pedestrians.py
Traceback (most recent call last):
  File "c:/Users/andreasraut/Visualization-of-Data-with-Python/Pedestrians/Pedestrians.py", line 7, in <module>
    import pandas as pd
ModuleNotFoundError: No module named 'pandas'
(base) PS C:\Users\andreasraut\Visualization-of-Data-with-Python> pip install pandas
Collecting pandas
  Downloading pandas-1.0.4-cp37-cp37m-win_amd64.whl (8.7 MB)
    8.7 MB 78 kB/s
Collecting pytz>=2017.2
  Downloading pytz-2020.1-py2.py3-none-any.whl (510 kB)
    510 kB 6.4 MB/s

```

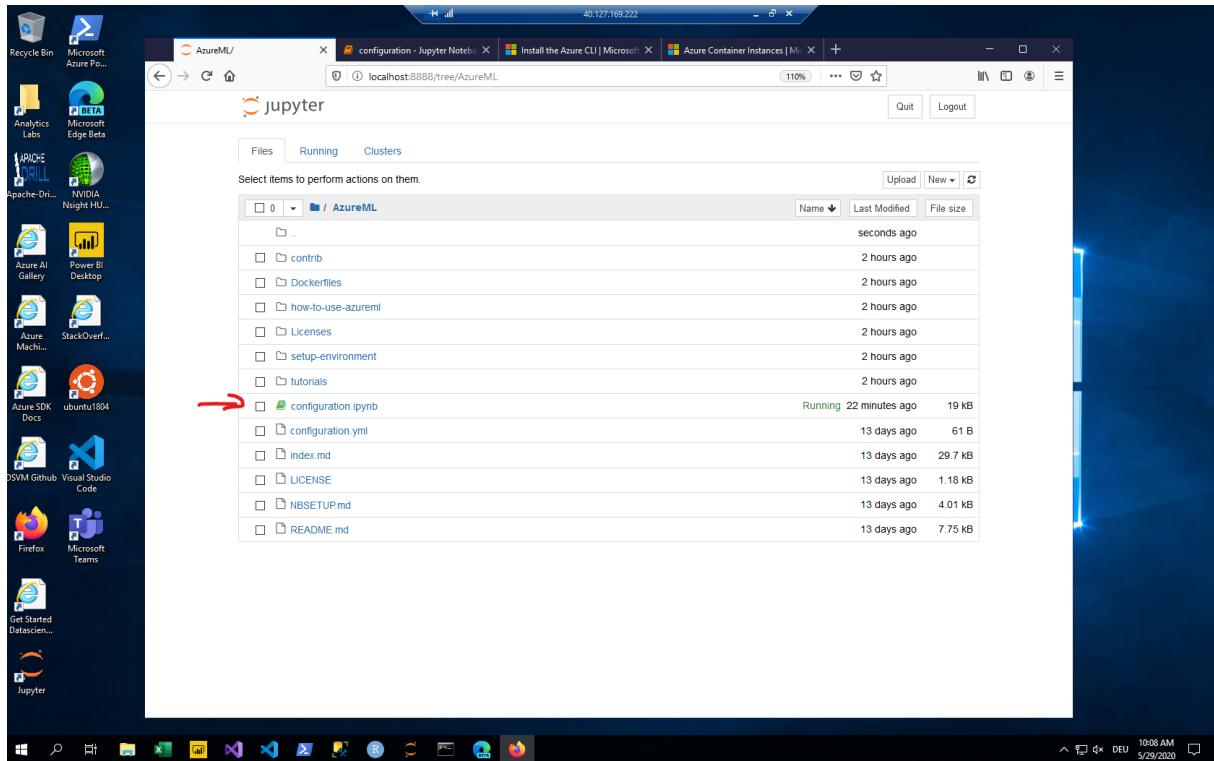
Ln 63, Col 69 Spaces: 4 UTF-8 CRLF Python

After having installed all necessary packages I was able to use the Microsoft „Visual Studio 2019“ for debugging python files. Similarly, here: I don't want to dig deeper into this topic as this is not the purpose here. And I am already familiar with another IDE (=integrated developer environment), called Anaconda Spyder, which I can recommend (it is available for free).

Azure Machine Learning and Azure Container Instances

As a next example I wanted to have a look at the „Azure Machine Learning Jupyter Notebooks“. I will only touch on this topic and you can skip this chapter (or only cross read quickly) if you are more interested into learning about my experiences on “Cost Analysis” and “Issue Solving”, which are perhaps a bit more interesting and which you will find in separate chapters below. But I find it helpful to also provide some documentation on “Azure Machine Learning” as it shows at a glance, how things around “virtual computers” can become complicated quickly.

To begin with “Azure Machine Learning” I had to go through the “configuration.ipynb” as follows:



Azure Machine Learning uses of [Azure Container Instance \(ACI\)](#) to deploy dev/test web services. Before I continue describing the next installation steps, I will introduce the concept of “Containers”. You can read about “*Azure Container Instances*” here:

<https://azure.microsoft.com/en-us/services/container-instances/>

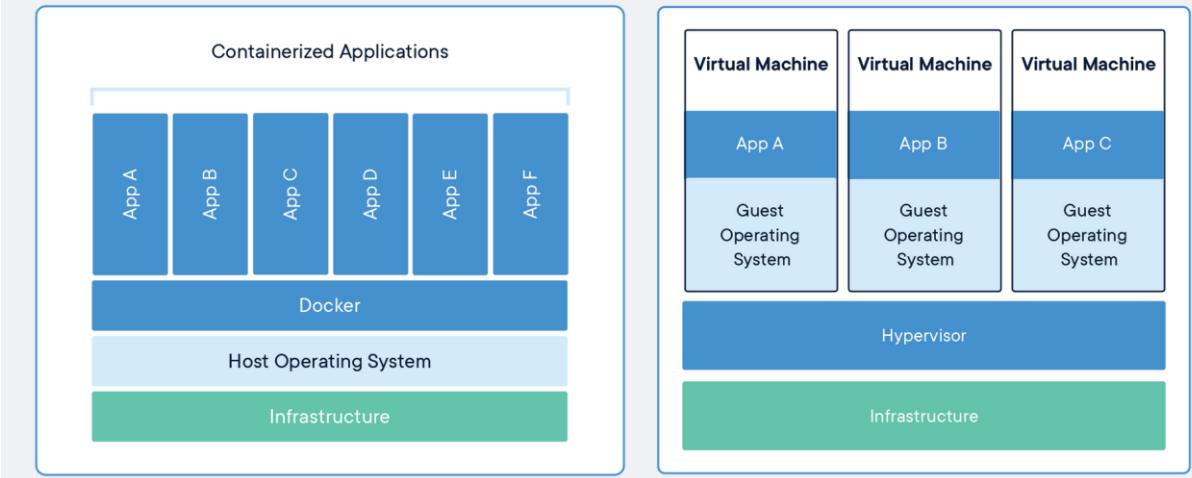
For doing this I will start with „Docker“: according to wikipedia “Docker is a computer program that performs operating-system-level virtualization, also known as ‘containerization’ ”. The Docker-Website <https://www.docker.com/resources/what-container> explains what “Containers” are and what the difference to a “Virtual Machine” is:

Containers are an abstraction at the app layer that packages code and dependencies together. Multiple containers can run on the same machine and share the OS kernel with other containers, each running as isolated processes in user space. Containers take up less space than VMs (container images are typically tens of MBs in size), can handle more applications and require fewer VMs and Operating systems.

Virtual machines (VMs) are an abstraction of physical hardware turning one server into many servers. The hypervisor allows multiple VMs to run on a single machine. Each VM includes a full copy of an operating system, the application, necessary binaries and libraries - taking up tens of GBs. VMs can also be slow to boot.

Comparing Containers and Virtual Machines

Containers and virtual machines have similar resource isolation and allocation benefits, but function differently because containers virtualize the operating system instead of hardware. Containers are more portable and efficient.

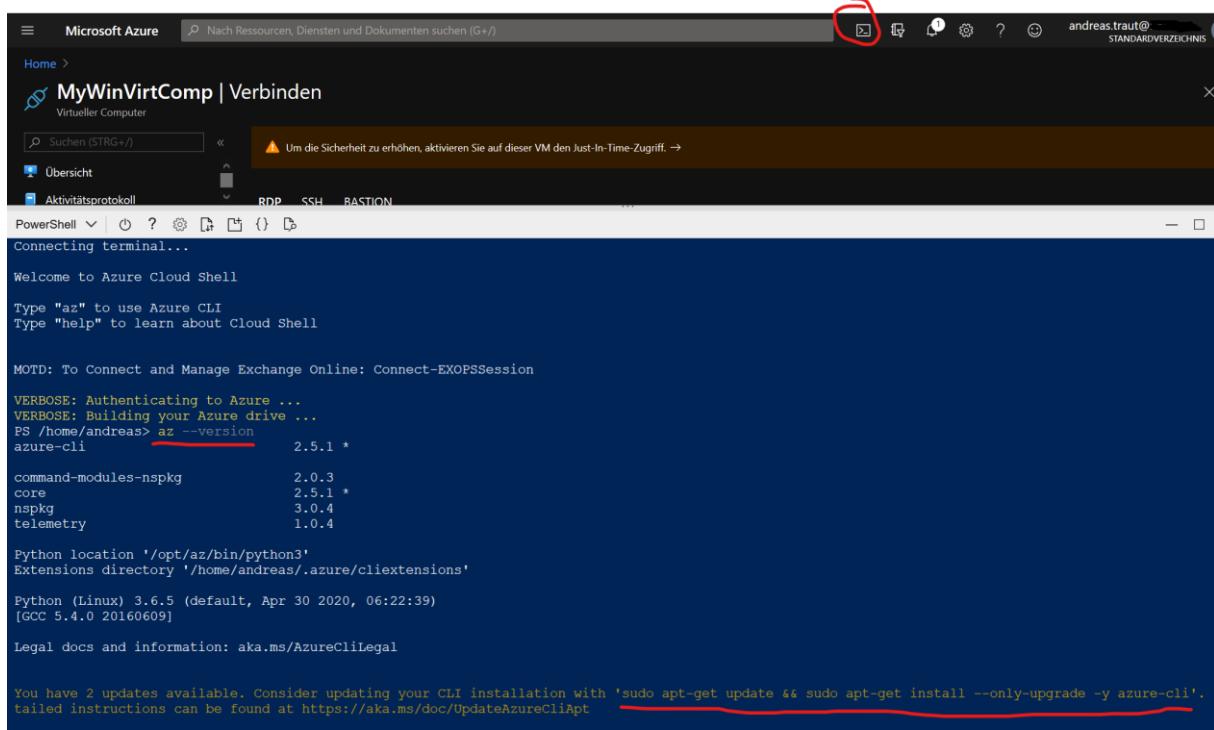


Therefore, a container is basically a Virtual Machine without a hypervisor. These containers can be preconfigured with scripts to install specific software and provide customized functionality.

On <https://docs.microsoft.com/en-us/azure/container-instances/container-instances-overview> you can read: “Containers are becoming the preferred way to package, deploy, and manage cloud applications. Azure Container Instances offers the fastest and simplest way to run a container in Azure, without having to manage any virtual machines and without having to adopt a higher-level service. Azure Container Instances is a great solution for any scenario that can operate in isolated containers, including simple applications, task automation, and build jobs. For scenarios where you need full container orchestration, including service discovery across multiple containers, automatic scaling, and coordinated application upgrades, we recommend [Azure Kubernetes Service \(AKS\)](#).”

Azure Command-Line Interface (CLI): The next step is to use the Azure Command Line Interface (CLI). Documentation on the Azure Command-Line Interface (CLI) can be found here <https://docs.microsoft.com/en-us/cli/azure/?view=azure-cli-latest>

Open the Azure portal and open the Powershell (see red marking in this screenshot, more documentation here <https://docs.microsoft.com/en-us/azure/cloud-shell/quickstart>):



```
Microsoft Azure | MyWinVirtComp | Verbinden
Search (STRG+F) | Um die Sicherheit zu erhöhen, aktivieren Sie auf dieser VM den Just-In-Time-Zugriff. →
Übersicht | Aktivitätsprotokoll | RDP | SSH | PERSISTENT
PowerShell | ? | Connecting terminal...
Welcome to Azure Cloud Shell
Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

MOTD: To Connect and Manage Exchange Online: Connect-EXOPSSession

VERBOSE: Authenticating to Azure ...
VERBOSE: Building your Azure drive ...
PS /home/andreas> az --version
azurerci 2.5.1 *
command-modules-nspkg 2.0.3
core 2.5.1 *
nspkg 3.0.4
telemetry 1.0.4

Python location '/opt/az/bin/python3'
Extensions directory '/home/andreas/.azure/cliextensions'
Python (Linux) 3.6.5 (default, Apr 30 2020, 06:22:39)
[GCC 5.4.0 20160609]
Legal docs and information: aka.ms/AzureCliLegal

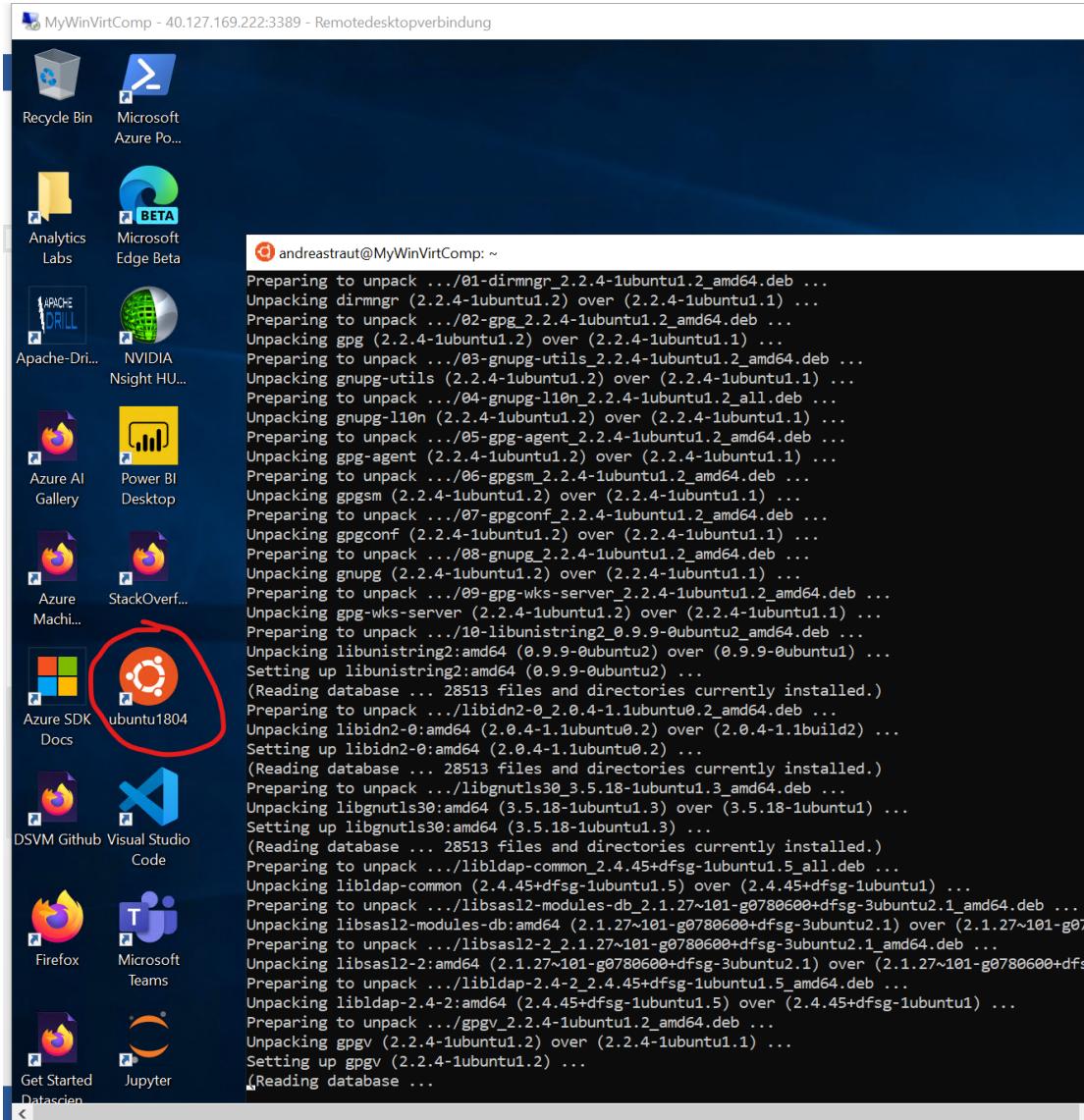
You have 2 updates available. Consider updating your CLI installation with 'sudo apt-get update && sudo apt-get install --only-upgrade -y azure-cli'. Detailed instructions can be found at https://aka.ms/doc/UpdateAzureCliapt
```

Then type “az –version” to get the current version number. If an update is needed you can follow the documentation here: <https://docs.microsoft.com/en-us/cli/azure/install-azure-cli-apt?view=azure-cli-latest#update>

This documentation describes, that an update should be done by typing

```
sudo apt-get update && sudo apt-get upgrade
```

Commands which begin with “sudo” should be entered in the virtual computer in “Ubuntu”, see this screenshot:



You can check if an Azure Container Instance has already been registered by opening the “Microsoft Azure PowerShell” on your virtual Computer (see blueish icon on top left) and typing the command:

```
az provider show -n Microsoft.ContainerInstance -o table
```

I opened the Azure Portal and used the “Bash” (see red circle) to type in this command:

```
PS /home/andreas> az provider show -n Microsoft.ContainerInstance -o table
Namespace          RegistrationPolicy   RegistrationState
Microsoft.ContainerInstance  RegistrationRequired  Registered
PS /home/andreas> [REDACTED]
```

Configure your Azure ML workspace: Now let's continue following the instructions in the “*configuration.ipynb*” Jupyter Notebook and configure a Azure Machine Learning (ML) workspace. First we have to set some variables. You need your subscription ID, your RessourceGroupName, a WorkspaceName (which is new) and a WorkspaceRegion:

```
import os
subscription_id = os.getenv("SUBSCRIPTION_ID", default="3bfe64c6-b1b9-475a-bbbc-661c30e3bf28")
resource_group = os.getenv("RESOURCE_GROUP",
default="MyWinRessourceGroup")
workspace_name = os.getenv("WORKSPACE_NAME", default="MyWorkSpace")
workspace_region = os.getenv("WORKSPACE_REGION", default="WestUS2")
```

You can skip the chapter “Access your Workspace” in the Jupyter Notebook and go directly to “Create a Workspace. The following code needs to be run:

```
from azureml.core import Workspace
# Create the workspace using the specified parameters
ws = Workspace.create(name = workspace_name,
                      subscription_id = subscription_id,
                      resource_group = resource_group,
                      location = workspace_region,
                      create_resource_group = True,
                      sku = 'basic',
                      exist_ok = True)

ws.get_details()
# write the details of the workspace to a configuration file to the
notebook library
ws.write_config()
```

When finished you will see it in your Azure Portal as follows:

The screenshot shows the Microsoft Azure portal interface. The left sidebar is titled 'MyWinRessourceGroup' and contains navigation links for Überblick, Aktivitätsprotokoll, Zugriffssteuerung (IAM), Tags, Ereignisse, Einstellungen, Kostenverwaltung, and Überwachung. The main content area displays a list of resources under the heading 'MyWinRessourceGroup'. The resources listed are:

Name	Typ	Standort
MyWinRessourceGroup-vnet	Virtuelles Netzwerk	Nordeuropa
mywinressourcegroupdiag	Speicherkonto	Nordeuropa
MyWinVirtComp	Virtueller Computer	Nordeuropa
MyWinVirtComp-ip	Öffentliche IP-Adresse	Nordeuropa
MyWinVirtComp-msg	Netzwerksicherheitsgruppe	Nordeuropa
mywinvirtcomp371	Netzwerkschnittstelle	Nordeuropa
MyWinVirtComp_OsDisk_1_c8194add1c344e73b5a04f7e805dcfd	Datenräger	Nordeuropa
MyWorkSpace	Machine Learning	USA, Westen 2
myworkspinsights72e7a9d1	Application Insights	USA, Westen 2
myworkspkeyvault7c3992a1	Schlüsseltresor	USA, Westen 2

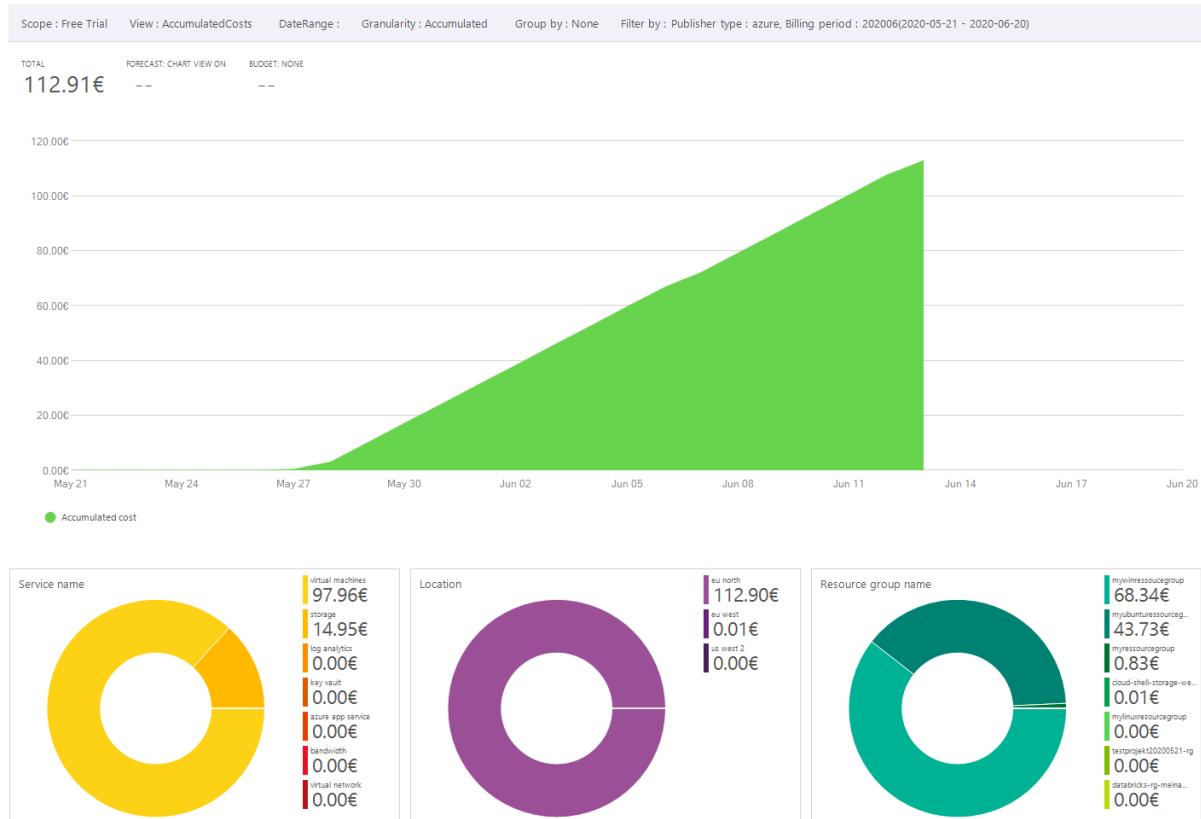
Create compute resources for your training experiments.

I will stop at this point...you can imagine, that digging in to all these topics can lead into a very long project...

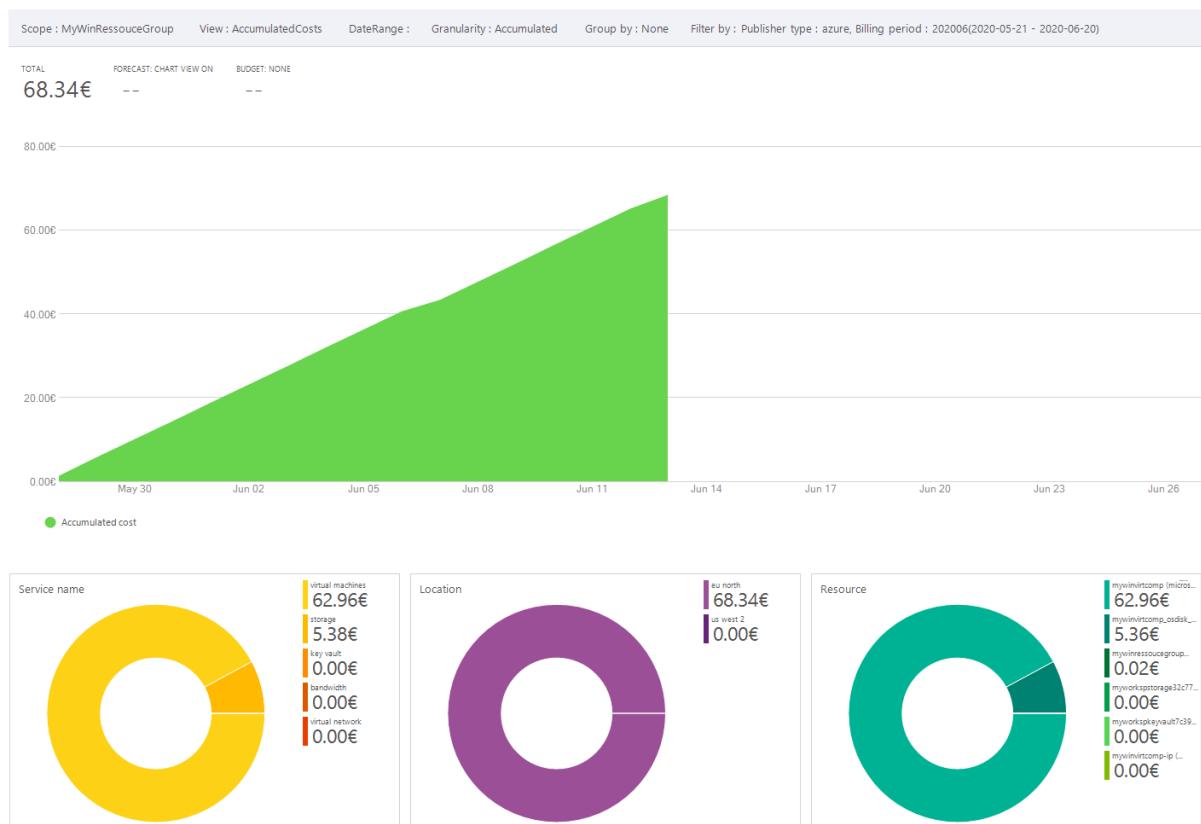
Cost Analysis

Now let's come back to the cost analysis, which is a very essential part of the configuration and even if it seems a bit boring for "programmer-nerds", it is highly recommended to dig into this topic as early as possible. As said, you will need to do this cost analysis at the end of your 30 days trial period anyway in order not to be surprised by bills afterwards. Microsoft reminded me 7 days ahead with an E-Mail to "upgrade", which was in fact a signal towards a "downgrade" to a cheaper virtual machine 😊. I do not want to say that Microsoft Azure is expensive, because this is not the case. I just do not want to spend too much money on my experiment here. In fact, Microsoft Azure is a lot cheaper than Amazon EWS and has a lot better concerning "privacy-arguments" than Google. To me it seems as if Microsoft Azure is the best choice when evaluating "privacy and cost" at the same time. As I already use a lot of Microsoft products (Outlook, Word, Windows, OneDrive) Microsoft would always be my first choice for cloud computing.

As shown in the screenshot below: the cost for me (taken from the initial bonus 170 Euros) at the end of the first month for the two virtual machines (one Windows VM and one Linux VM) was 112,91 Euro whereas 97,96 Euro was for the two virtual machines and 14,95 Euro for the storage. The Resource-Group "MyWinResourceGroup" (the one for the Windows Virtual Machines including the different components as described in the beginning of this documentation) did cost me 68,34 Euro and the one for Linux 43,73 Euro, so Windows is a bit more expensive than Linux:



Here is the overview for the Resource-Group “MyWinVirtComp”:



I wanted to understand these 62,96 Euros for the “virtual machines” a bit better. Therefore, I opened the Azure portal and found, that the pre-configured virtual machine was the “D2_v3” which a

predicted cost of about 122,51 Euros (depending on the run-time) as follows:

VM-Größe ↑	Familie ↑↓	vCPUs ↑↓	RAM (GiB) ↑↓	Datenträger ↑↓	Max. IOPS ↑↓	Temporärer Speicher (GiB) ↑↓	Premium-Datenträger ↑↓	Kosten/Monat ↑↓
B2s	Allgemein	2	4	4	1280	8	Unterstützt	33,00 €
A1_v2	Allgemein	1	2	2	2x500	10	Nicht unterstützt	38,17 €
A1	Allgemein	1	1,75	2	2x500		Nicht unterstützt	55,40 €
B2ms	Allgemein	2	8	4	1920	16	Unterstützt	61,07 €
F1	Compute-o...	1	2	4	4x500	16	Nicht unterstützt	62,79 €
F1s	Compute-o...	1	2	4	3200	4	Unterstützt	62,79 €
A2	Allgemein	2	3,5	4	4x300		Nicht unterstützt	69,56 €
D51_v2	Allgemein	1	3,5	4	3200	7	Unterstützt	71,41 €
D1_v2	Allgemein	1	3,5	4	4x500	50	Nicht unterstützt	71,41 €
D1	Allgemein	1	3,5	4	4x500	50	Nicht unterstützt	79,41 €
DS1	Allgemein	1	3,5	4	3200	7	Unterstützt	79,41 €
A2_v2	Allgemein	2	4	4	4x500	20	Nicht unterstützt	80,03 €
A2	Allgemein	2	3,5	4	4x300		Nicht unterstützt	110,81 €
F2s_v2	Compute-o...	2	4	4	3200	16	Unterstützt	115,73 €
B4ms	Allgemein	4	16	8	2880	32	Unterstützt	121,89 €
D2s_v3	Allgemein	2	8	4	3200	16	Unterstützt	122,51 €
D2a_v4	Allgemein	2	8	4	4x500	50	Nicht unterstützt	122,51 €

Die genannten Preise sind Preisschätzungen in Ihrer lokalen Währung, die nur die Kosten für die Azure-Infrastruktur umfassen sowie anwendbare Rabatte für das Abonnement und den Standort berücksichtigen. In den Preisen sind keine Kosten für Software enthalten. Die endgültigen Gebühren werden in Ihrer lokalen Währung in den Ansichten für Kostenanalyse und Abrechnung angezeigt. Zeigen Sie den Azure-Preisrechner an.

I tried to understand the difference of these virtual machines and found the following (see <https://azure.microsoft.com/de-de/pricing/details/virtual-machines/linux/#Linux>):

Allgemein—Av2	Computeoptimiert—Fsv2	Allgemein—Dv3	Arbeitsspeicheroptimiert—Ev3
Kosteneffizient Die virtuellen Computer der Av2-Serie bieten eine kostengünstige Option für Entwicklungs- und Testumgebungen, Websites und Webanwendungen mit geringer Auslastung, Microservices und kleinen Datenbanken.	Hohe Computeleistung Fsv2 ist unsere neueste computeoptimierte VM-Familie, die dank des Intel® Xeon® Platinum 8168-Prozessors (Skylake) eine enorme Computeleistung erzielt.	Ausgewogene CPU und ausgewogener Arbeitsspeicher Die Dv3-Familie stellt die aktuelle Generation der universellen virtuellen Computer mit Intel® Xeon® -Prozessoren dar. Sie eignet sich hervorragend für verschiedene Workloads.	Hohes Verhältnis von Speicher zu Kern Ev3 ist unsere neueste Generation speicheroptimierter virtueller Computer mit Intel® Xeon® -Prozessoren. Diese ist hervorragend für relationale Datenbankserver, Caches und In-Memory-Analysen geeignet.
Spezifikationen: A1 v2 1 vCPU(s) 2 GiB RAM Ab €0,0043/Stunde 	Spezifikationen: F2s v2 2 vCPU(s) 4 GiB RAM Ab €0,0087/Stunde 	Spezifikationen: D2 v3 2 vCPU(s) 8 GiB RAM Ab €0,0106/Stunde 	Spezifikationen: E2 v3 2 vCPU(s) 16 GiB RAM Ab €0,0135/Stunde

I realized that maybe a better choice for me would be to downgrade from a "Dv3"-series computer to a "Av2"-series computer, but let us have a closer look. The following website explained the differences, e.g. between "*Computeoptimiert*" (the "*Fsv2* series) and "*Arbeitsspeicheroptimiert*" (the "*Ev3* series): <https://docs.microsoft.com/de-de/azure/virtual-machines/linux/sizes>

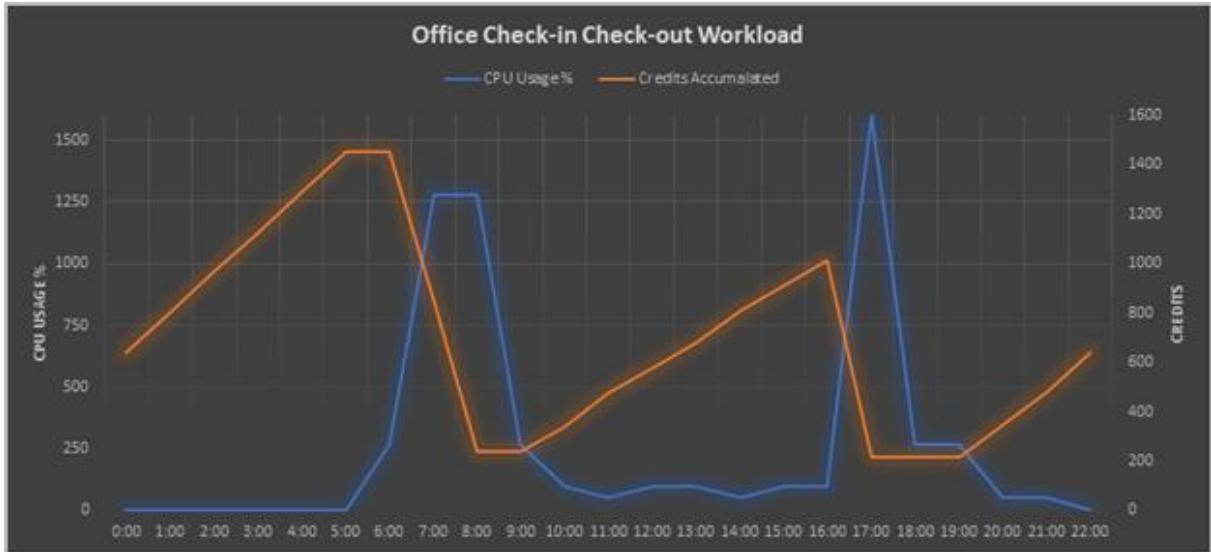
type	Größen	BESCHREIBUNG
Allgemeiner Zweck	B, Dsv3, Dv3, Dasv4, Dav4, DSv2, Dv2, Av2, DC, DCv2	Ausgewogenes Verhältnis von CPU zu Arbeitsspeicher. Ideal für Tests und Entwicklung, kleine bis mittlere Datenbanken sowie Webserver mit geringer bis mittlerer Auslastung.
Computeoptimiert	Fsv2	Hohes Verhältnis von CPU zu Arbeitsspeicher. Ideal für Webserver, Network Appliances, Stapelverarbeitungsvorgänge und Anwendungsserver mit mittlerer Auslastung.
Arbeitsspeicheroptimiert	Esv3, Ev3, Easv4, Eav4, Mv2, M, DSv2, Dv2	Hohes Verhältnis von Speicher zu CPU. Hervorragend geeignet für relationale Datenbankserver, mittlere bis große Caches und In-Memory-Analysen.
Speicheroptimiert	Lsv2	Hoher Datenträgerdurchsatz und E/A, ideal für Big Data, SQL, NoSQL-Datenbanken, Datawarehousing und große transaktionale Datenbanken.
GPU	NC, NCv2, NCv3, ND, NDv2 (Vorschau), NV, NVv3, NVv4	Spezielle virtuelle Computer als Ziel für aufwendiges Grafikrendering und Videobearbeitung sowie für Modelltraining und Rückschlüsse (ND) mit Deep Learning. Mit einem oder mehreren GPUs verfügbar.
High Performance Computing	HB, HBv2, HC, H	Unsere virtuellen Computer mit den schnellsten und leistungsfähigsten CPUs, die optional über Netzwerkschnittstellen mit hohem Durchsatz (RDMA) verfügen.

And very useful for me was also the price-calculator: <https://azure.microsoft.com/de-de/pricing/calculator/>, which calculated a predicted cost of 145,27 \$ based on 730 hours usage with an “D2v3” computer.

The screenshot shows the Azure Pricing Calculator interface. At the top, it displays the configuration: "1 D2 v3 (2 vCPU(s), 8 GB RAM) x 730 Hours; Windows – ...". Below this, there are dropdown menus for REGION (Europa, Norden), BETRIEBSSYSTEM (Windows), TYP (Nur Betriebssystem), and TARIF (Standard). Under INSTANZ, it shows "D2 v3: 2 vCPU(s), 8 GB RAM, 50 GB temporärer Speicher, 0,199 \$/Stunde". To the right, under VIRTUELLE MASCHINEN, it shows "1" selected. Further down, the "Einsparungsmöglichkeiten" section lists options for Compute (D2 v3) and Betriebssystem (Windows), with the total cost calculated as 145,27 \$.

Compute (D2 v3)	Betriebssystem (Windows)	Total Cost		
<input checked="" type="radio"/> Nutzungsbasierter Bezahlung <input type="radio"/> 1 Jahr reserviert (~65 % Rabatt) <input type="radio"/> 3 Jahre reserviert (~77 % Rabatt)	<input checked="" type="radio"/> Enthaltene Lizenz <input type="radio"/> Azure-Hybridvorteil	78,11 \$ Monatsdurchschnitt (0,00 \$ Vorabkosten)	67,16 \$ Monatsdurchschnitt (0,00 \$ Vorabkosten)	= 145,27 \$ Monatsdurchschnitt (0,00 \$ Vorabkosten)

At the end of my analysis the “Av2”-series (see <https://docs.microsoft.com/de-de/azure/virtual-machines/av2-series>) and the “B”-series (see <https://docs.microsoft.com/de-de/azure/virtual-machines/sizes-b-series-burstable>) seemed to be the best choice for me. As I knew that I would continue my experiment here only during my leisure time after having completed my daily work, my usage would correspond a bit to the blue line in this chart: partial time usage. The “B”-series will add a credit each time when I am not using the computer (see orange line):



I decided for using the “B1s” which should cost me around 10 Euros per month:

[Virtual Machines](#) ⓘ 1 B1S (1 vCPU(s), 1 GB RAM) x 730 Hours; Windows – (N...)

Virtual Machines

REGION:	BETRIEBSYSTEM:	TYP:	TARIF:
Europa, Norden	Windows	(Nur Betriebssystem)	Standard
INSTANZ:	VIRTUELLE MASCHINEN		
B1S: 1 vCPU(s), 1 GB RAM, 4 GB temporärer Speicher, 0,0153 \$/Stunde	1	x	730 Hours

Einsparungsmöglichkeiten

Sparen Sie bis zu 72 % des Preises bei nutzungsbasierter Bezahlung für Reserved Virtual Machine Instances mit einem oder drei Jahren Laufzeit. Reservierte Instanzen eignen sich hervorragend für Anwendungen mit konstanter Nutzung und für Anwendungen, die eine reservierte Kapazität benötigen. [Erfahren Sie mehr zu den Preisen für reservierte VM-Instanzen.](#)

Compute (B1S)	Betriebssystem (Windows)	
<input checked="" type="radio"/> Nutzungsbasierter Bezahlung <input type="radio"/> 1 Jahr reserviert (~46 % Rabatt) <input type="radio"/> 3 Jahre reserviert (~64 % Rabatt) 8,25 \$ Monatsdurchschnitt (0,00 \$ Vorabkosten)	<input checked="" type="radio"/> Enthalte Lizenz <input type="radio"/> Azure-Hybridvorteil 2,92 \$ Monatsdurchschnitt (0,00 \$ Vorabkosten)	= 11,17 \$ Monatsdurchschnitt (0,00 \$ Vorabkosten)

Changing from to “B1s” can be done in the Azure portal very easily and quickly by selecting and hitting “Größe ändern” as follows:

MyWinVirtComp | Größe

Von Azure-Benutzern am meisten verwendete Größen

VM-Größe ↑	Familie ↑	vCPUs ↑↓	RAM (GiB) ↑↓	Datenträger ↑↓	Max. IOPS ↑↓	Temporärer Speicher (GiB) ↑↓	Premium-Datenträger ↑↓	Kosten/Monat ↑↓
B1s	Allgemein	1	0.5	2	160	4	Unterstützt	6,34 €
B1s	Allgemein	1	1	2	320	4	Unterstützt	9,42 €
A0	Allgemein	1	0.75	1	1x300		Nicht unterstützt	11,08 €
A0	Allgemein	1	0.75	1	1x300		Nicht unterstützt	12,31 €
B1ms	Allgemein	1	2	2	640	4	Unterstützt	16,13 €
A1	Allgemein	1	1,75	2	2x300		Nicht unterstützt	20,93 €
B2ms	Allgemein	2	4	4	1280	8	Unterstützt	33,00 €
A1_v2	Allgemein	1	2	2	2x500	10	Nicht unterstützt	38,17 €
A1	Allgemein	1	1,75	2	2x500		Nicht unterstützt	55,40 €
B2ms	Allgemein	2	8	4	1920	16	Unterstützt	61,07 €
F1	Compute-Optimized	1	2	4	4x500	16	Nicht unterstützt	62,79 €
F1s	Compute-Optimized	1	2	4	3200	4	Unterstützt	62,79 €
A2	Allgemein	2	3,5	4	4x300		Nicht unterstützt	69,56 €
DS1_v2	Allgemein	1	3,5	4	3200	7	Unterstützt	71,41 €
D1_v2	Allgemein	1	3,5	4	4x500	50	Nicht unterstützt	71,41 €
D1	Allgemein	1	3,5	4	4x500	50	Nicht unterstützt	79,41 €
DS1	Allgemein	1	3,5	4	3200	7	Unterstützt	79,41 €

Die genannten Preise sind Preisschätzungen in Ihrer lokalen Währung, die nur die Kosten für die Azure-Infrastruktur umfassen sowie anwendbare Rabatte für das Abonnement und den Standort berücksichtigen. In den Preisen sind keine Kosten für Software enthalten. Die endgültigen Gebühren werden in Ihrer lokalen Währung in den Ansichten für Kostenanalyse und Abrechnung angezeigt. Zeigen Sie den Azure-Preisrechner an.

Größe ändern

I had to reboot the virtual machine, but was then able to reconnect again to my much cheaper virtual machine. But unfortunately, I had some issues when I disconnected and tried to re-connect to my VM again. See the next chapter for hints on solving issues.

Issue Solving

I had issues on re-connect to my virtual machine after the change to "B1s" and as an example how to solve issues I will provide some hints for you and share my experiences here. I wanted to re-connect with the "RDP" as I always did, as follows:

MyWinVirtComp

Übersicht

RDP

SSH

Bastion

Standort : Nordeuropa

Abonnement (Ändern) : Free Trial

Abonnement-ID : 3bfe64c6-b1b9-475a-bbbc-661c30e3bf28

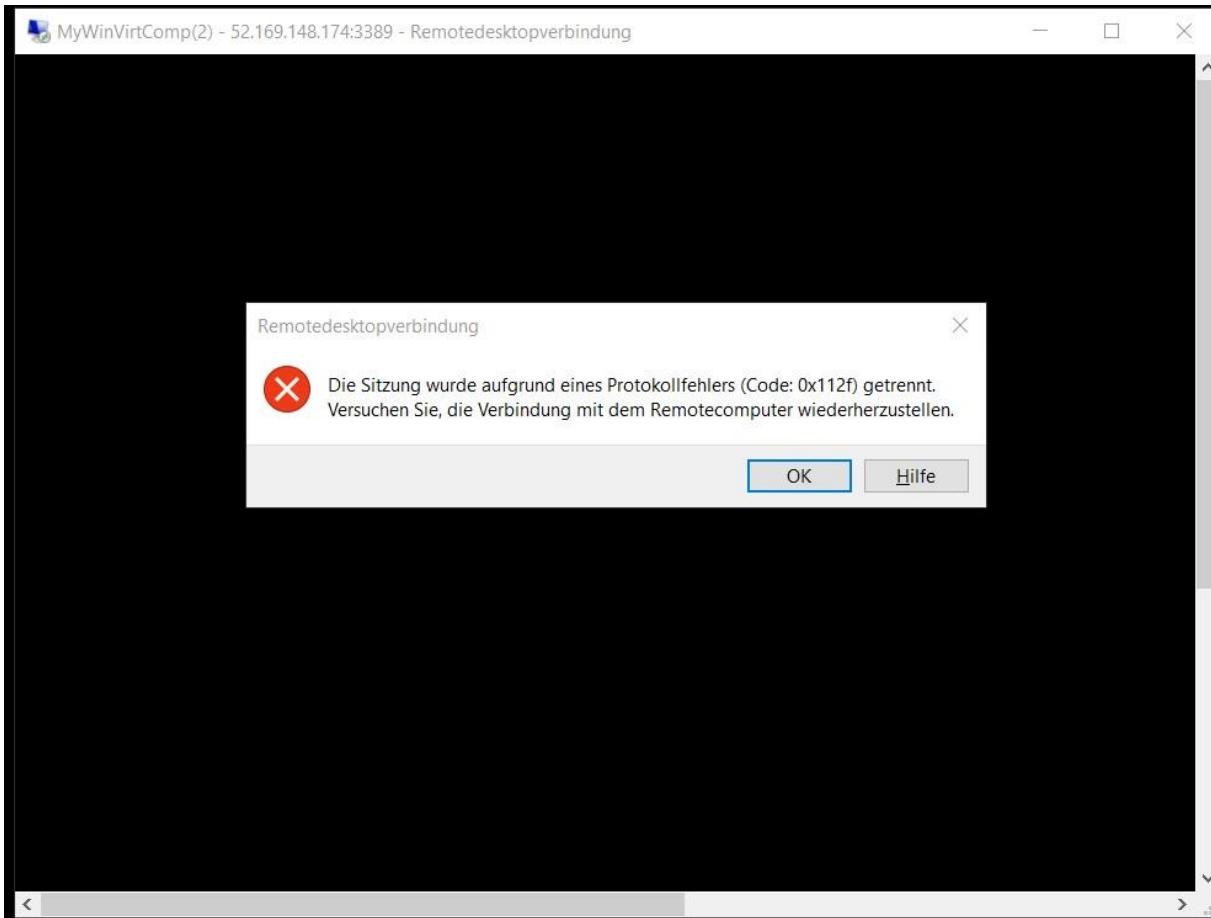
Computername : MyWinVirtComp

Betriebssystem : Windows (Windows Server 2019 Datacenter)

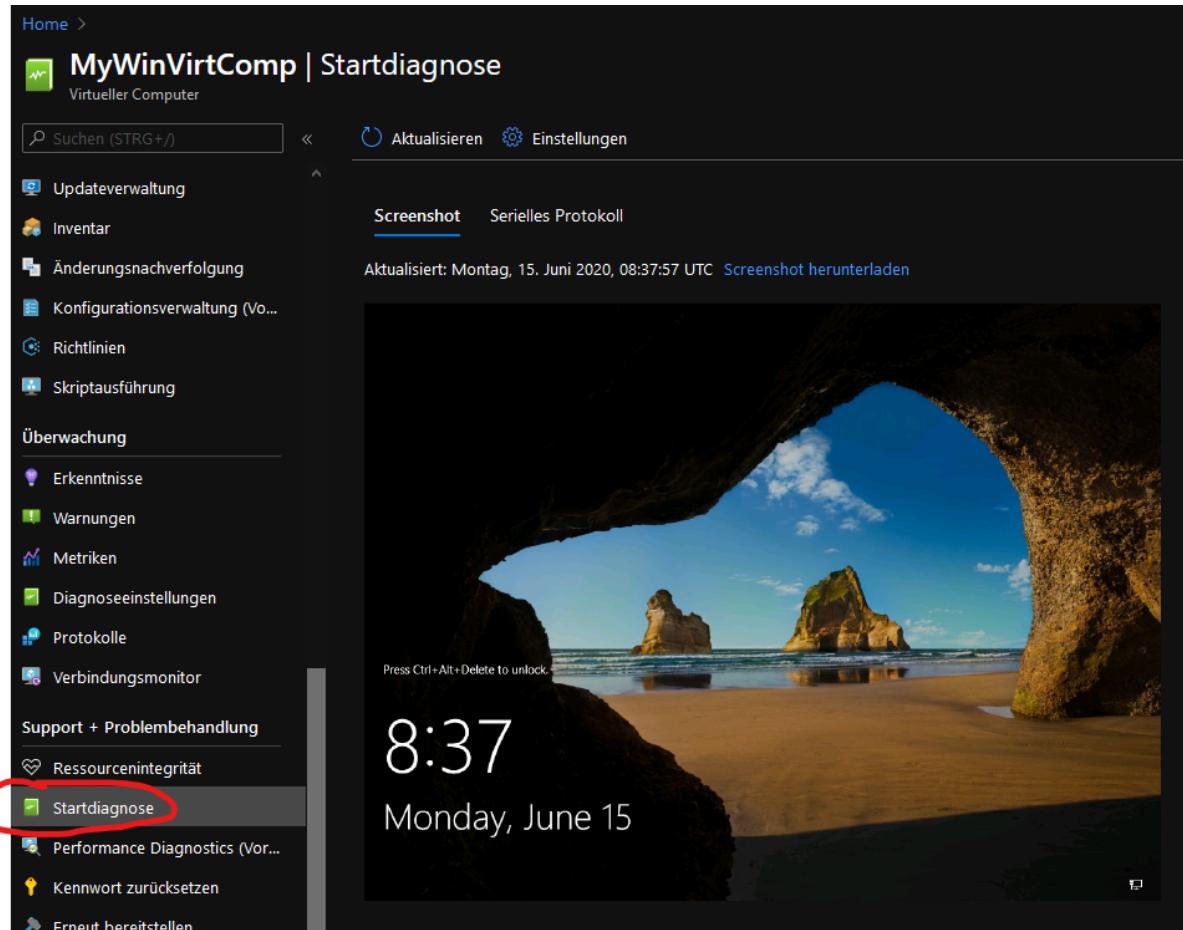
Größe : Standard B1s (1 vcpus, 1 GiB Arbeitsspeicher)

Tags (Ändern) : TagNameMyWin : TagValueMyWin

...but I received error messages as for example the follow one:

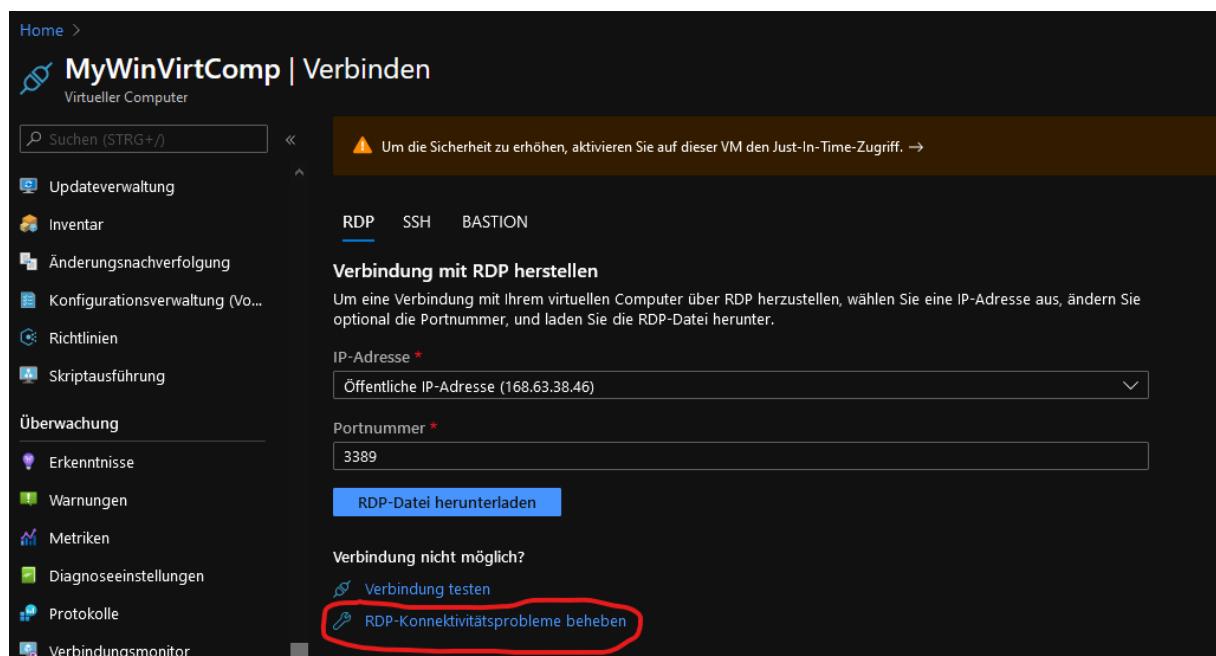


I didn't know what to do with the error code "0x112f" and therefore decided as a first step to reboot the virtual machine and have a look at "Startdiagnose", which will show you the initial screen of the virtual machine:



Looks good so far, but the RDP connection still did not work for me. I used the button “*Verbindung testen*” as shown in the screenshot below to test the connection and received an “everything ok” message. I also remember that I did not receive any warning or error message when I change the configuration of my virtual computer.

In order to solve this issue I went through the support, which I got from the button “*RDP-Konnektivitätsprobleme beheben*”:



It was the following long list of links "*Empfohlene Schritte Manuelle Schritte zur Problembehebung*" with lots of documentation and manual steps, which I tried to follow step-by-step:



Manuelle Schritte zur Problembehandlung

Vier von fünf Kunden konnten ihr VM-Konnektivitätsproblem mit den unten aufgeführten Schritten lösen.

Empfohlene Schritte

1. [Detaillierte Problembehandlung beim Herstellen einer Remotedesktopverbindung mit virtuellen Windows-Computern in Azure](#)
2. Verwenden Sie diese Artikel, um die Problembehandlung für häufige Fehler durchzuführen:
 - o [Schnelle Maßnahmen zum Behandeln allgemeiner RDP-Verbindungsprobleme](#)
 - o [Behandeln von RDP-Verbindungsfehlern bei virtuellen Azure-Computern anhand der Ereignis-ID](#)
 - o [Problembehandlung von Authentifizierungsfehlern bei der Verwendung von RDP für das Herstellen von Verbindungen mit Azure-VMs](#)
 - o [Interner Fehler beim Herstellen einer Verbindung mit einem virtuellen Azure-Computer über Remotedesktop](#)
 - o [Häufiges Trennen der Remotedesktopverbindung auf einem virtuellen Azure-Computer](#)
 - o [Beheben eines allgemeinen RDP-Fehlers auf einer Azure-VM](#)
 - o [Remotedesktopdienste für eine Azure-VM werden nicht gestartet](#)
 - o [Zurücksetzen des Remotezugriffs zur Behebung von Remoteserverproblemen mit PowerShell oder der Befehlszeilschnittstelle](#)

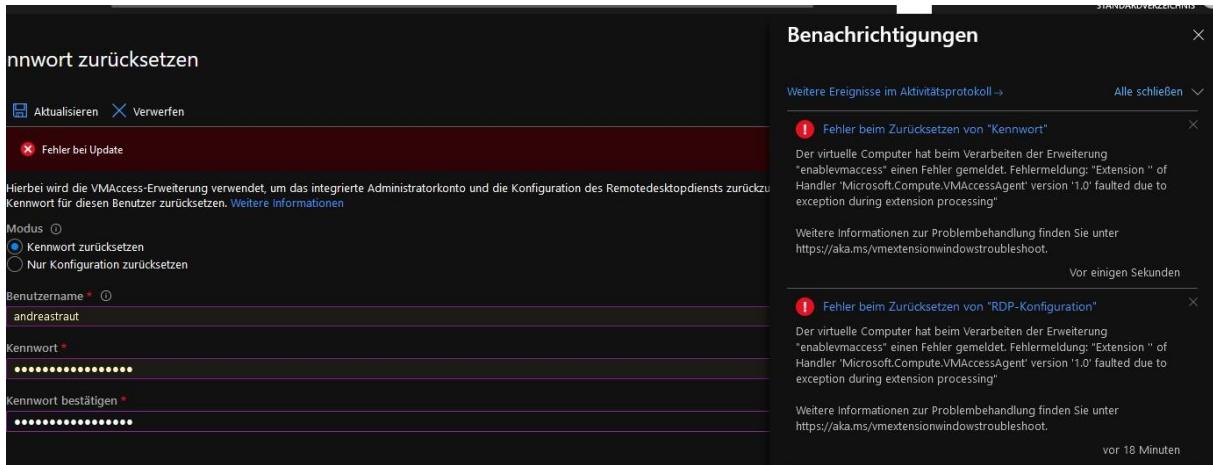
Empfohlene Dokumente

- [Detaillierte Problembehandlung beim Herstellen einer Remotedesktopverbindung mit virtuellen Windows-Computern in Azure](#)
- [Problembehandlung bei bestimmten RDP-Fehlermeldungen in einer Windows-VM in Azure](#)
- [Zurücksetzen des Remotedesktopdiensts oder seines Anmeldekennworts in einer Windows-VM](#)
- [Zurücksetzen eines lokalen Windows-Kennworts im Offlinemodus für eine Azure-VM](#)
- [Verwenden der Startdiagnose zum Beheben von Problemen mit virtuellen Windows-Computern in Azure](#)
- [Zurücksetzen der Netzwerkschnittstelle für die Windows-VM in Azure](#)

Empfohlener Dienst

- [Einblicke in Ihr Azure-Netzwerk mit Azure Network Watcher](#)

The first link instructed me to reset my password ("Kennwort") and reset my configuration, but it did not work for some reason:



I went through some other instructions of this link list "*Empfohlene Schritte Manuelle Schritte zur Problembehebung*" but still had difficulties. Therefore I posted a question on the Microsoft Community (see <https://docs.microsoft.com/en-us/answers/products/>) and received in very short time some useful hints, which I will share with you. To get more information about an issue, you can do the following:

1. Inspect the “**deployment history**” as described here <https://docs.microsoft.com/en-us/azure/azure-resource-manager/templates/deployment-history?tabs=azure-portal#get-deployment-operations-and-error-message>:

2. View your “**activity logs**” as described here <https://docs.microsoft.com/en-us/azure/azure-resource-manager/management/view-activity-logs>

Microsoft Azure

Nach Ressourcen, Diensten und Dokumenten suchen (G+/-)

Dashboard > Aktivitätsprotokoll

☰ Spalten bearbeiten ⏪ Aktualisieren 🛡 Diagnoseeinstellungen ⏪ Als CSV herunterladen 📁 Protokolle | 🔍 Aktuelle Filter anheften 🔍 Filter zurücksetzen

🔍 Suche Quick Insights

Abonnement : Free Trial Ereignisschweregrad : Fehler Zeitraum : Letzte 24 Stunden Filter hinzufügen

19 Elemente.

Name des Vorgangs	Status	Zeit	Zeitstempel
⊖ ⓘ Create Deployment	Fehler	vor 15 Stunden	Sun Jun 14 2020 19:11:48 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create or Update Virtual Machine Extension	Fehler	vor 15 Stunden	Sun Jun 14 2020 19:11:47 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create or Update Virtual Machine Extension	Fehler	vor 15 Stunden	Sun Jun 14 2020 19:11:47 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 15 Stunden	Sun Jun 14 2020 19:11:48 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 15 Stunden	Sun Jun 14 2020 19:11:48 GMT+0200 (Mitteleuropäische Sommerzeit)
⊖ ⓘ Create or Update Virtual Machine Extension	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:41:33 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create or Update Virtual Machine Extension	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:39:41 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:39:41 GMT+0200 (Mitteleuropäische Sommerzeit)
⊖ ⓘ Create or Update Virtual Machine Extension	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:39:06 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create or Update Virtual Machine Extension	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:37:09 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:37:09 GMT+0200 (Mitteleuropäische Sommerzeit)
⊖ ⓘ Create or Update Virtual Machine Extension	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:34:10 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create or Update Virtual Machine Extension	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:32:58 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:32:58 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Write MaintenanceConfigurations	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:34:01 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Verify Ip Flow	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:16:36 GMT+0200 (Mitteleuropäische Sommerzeit)
⊖ ⓘ Create or Update Virtual Machine Extension	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:15:19 GMT+0200 (Mitteleuropäische Sommerzeit)
⊖ ⓘ Delete Public Ip Address	Fehler	vor 22 Stunden	Sun Jun 14 2020 12:02:40 GMT+0200 (Mitteleuropäische Sommerzeit)
⊖ ⓘ Delete Virtual Network	Fehler	vor 22 Stunden	Sun Jun 14 2020 12:02:08 GMT+0200 (Mitteleuropäische Sommerzeit)

Microsoft Azure

Nach Ressourcen, Diensten und Dokumenten suchen (G+/-)

Home > Aktivitätsprotokoll

☰ Spalten bearbeiten ⏪ Aktualisieren 🛡 Diagnoseeinstellungen ⏪ Als CSV herunterladen 📁 Protokolle | 🔍 Aktuelle Filter anheften 🔍 Filter zurücksetzen

🔍 Suche Quick Insights

Abonnement : Free Trial Ereignisschweregrad : Fehler Zeitraum : Letzte 24 Stunden Ressourcentyp : microsoft.resources/deployments

Erste 7 Elemente.

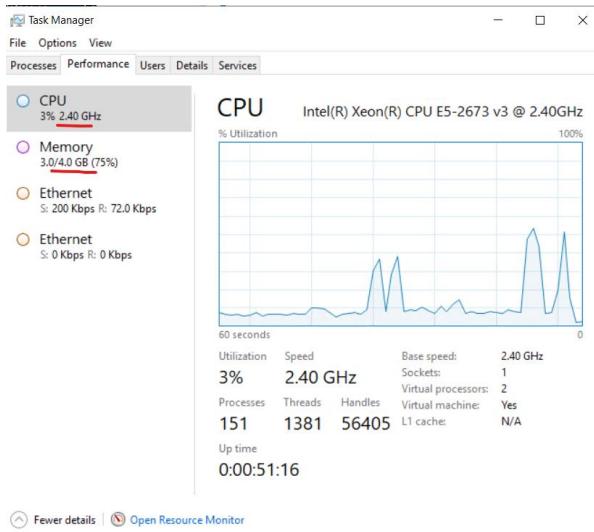
Name des Vorgangs	Status	Zeit	Zeitstempel
⊖ ⓘ Create Deployment	Fehler	vor 15 Stunden	Sun Jun 14 2020 19:11:48 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 15 Stunden	Sun Jun 14 2020 19:11:48 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 15 Stunden	Sun Jun 14 2020 19:11:48 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:39:41 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:37:09 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:32:58 GMT+0200 (Mitteleuropäische Sommerzeit)
ⓘ Create Deployment	Fehler	vor 16 Stunden	Sun Jun 14 2020 18:15:18 GMT+0200 (Mitteleuropäische Sommerzeit)

3. Verify the “**Service Health**”, which showed me that there were some general issues on the Azure directories, which may have affected me. Unfortunately I received this a bit late (see 6 hours ago, whereas my issues above are already 15 hours old), which leads to the following conclusion for me for future issues: yes, I learnt how the “*deployment history*” and the “*activity log*” works in the Azure portal. But honestly: this concept is not new, and I already know from my first Intel 80286 computer as-of 1990. What I learnt from this above is not to dig too deep into issue solving and better wait one day until someone else in the big community rises similar issues, which are solved then for everyone. 😊

4. Unfortunately, my issue has not been solved like described in step 3 above. Therefore, I opened a “**Support-Ticket on the Azure Portal**” and got the final solution to my issue: instead of choosing “*B1s*”, which is very small (CPU, RAM) I should choose a bigger VM-size “*B2s*” as follows:

VM-Größe ↑	Familie ↑	vCPUs ↑	RAM (GiB) ↑	Datenträger ↑	Max. IOPS ↑	Temporärer Speic... ↑	Premium-Datentr... ↑	Kosten/Monat ↑
B1s	Allgemein	1	1	2	320	4	Unterstützt	9,42 €
B1ms	Allgemein	1	2	2	640	4	Unterstützt	16,13 €
B2s	Allgemein	2	4	4	1280	8	Unterstützt	33,00 €
B2ms	Allgemein	2	8	4	1920	16	Unterstützt	61,07 €
D1_V2	Allgemein	1	3,5	4	3200	7	Unterstützt	71,41 €
B4ms	Allgemein	4	16	8	2880	32	Unterstützt	121,89 €
D2s_V3	Allgemein	2	8	4	3200	16	Unterstützt	122,51 €
DS2_V2	Allgemein	2	7	8	6400	14	Unterstützt	142,82 €
D4s_V3	Allgemein	4	16	8	6400	32	Unterstützt	245,01 €
DS3_V2	Allgemein	4	14	16	12800	28	Unterstützt	286,26 €
D8s_V3	Allgemein	8	32	16	12800	64	Unterstützt	490,02 €
B1s	Allgemein	1	0,5	2	160	4	Unterstützt	6,34 €

After having changed this configuration (which took me only a few minute), I was able to reconnect to my virtual machine. I verified, if the CPU and memory on my virtual machine correspond to the settings, which I made in the Azure portal:



At this point I was a bit frustrated, because I am wondering, why I did not receive any warning for choosing a too small configuration for my virtual machine. I spent nearly two days for going through the list of "*Empfohlene Schritte Manuelle Schritte zur Problembehebung*" but my issue was a simple misconfiguration. But that's how programming works and should give you an idea how issue solving on Microsoft Azure can be.

Azure Storage Explorer

The "*Azure Storage Explorer*" is a software tool (see here for more information <https://azure.microsoft.com/en-us/features/storage-explorer/#overview>), that you can download on your personal computer and which will help you to manage your storage accounts. I have for example the following storage accounts:

Alle Ressourcen							
Standardverzeichnis							
<input type="button"/> Hinzufügen		<input type="button"/> Ansicht verwalten		<input type="button"/> Aktualisieren		<input type="button"/> In CSV-Datei exportieren	
<input type="button"/> Nach Name filtern...		<input type="button"/> Abonnement == alle		<input type="button"/> Ressourcengruppe == alle		<input type="button"/> Typ == Speicherkonto	
Name	Typ	Ressourcengruppe	Standort	Abonnement	Variante	Ressourcentyp	Tags
csb10032000b7f56d00	Speicherkonto	cloud-shell-storage-westeuropa	Europa, Westen	Free Trial	StorageV2	microsoft.storage/storageaccounts	<code>ms-resource-usage: azure-cloud-shell</code>
mywinresourcegroupdiag	Speicherkonto	MyWinRessourceGroup	Nordeuropa	Free Trial	Storage	microsoft.storage/storageaccounts	<code>TagNameMyWin: TagValueMyWin</code>
myworkspstorage32c776...	Speicherkonto	MyWinRessourceGroup	USA, Westen 2	Free Trial	StorageV2	microsoft.storage/storageaccounts	...

The "*Azure Storage Explorer*" looks like this:

The screenshot shows the Microsoft Azure Storage Explorer interface. In the center, the 'MyTesttabelle' table is displayed with the following data:

PartitionKey	RowKey	MyName	Timestamp
MyPartitionKey	MyRowKey	test	2020-05-29T09:19:10.374Z

The left sidebar shows the storage account structure, including 'Free Trial [andreas.traut]' and 'mywinressoucegroupdiag'. A red arrow points to the 'mywinressoucegroupdiag' storage account. Another red arrow points to the 'Tables' section under it, and a third red arrow points to the 'MyTesttabelle' table.

You can find for example the table “*MyTesttabelle*” as shown above also in the Azure Portal (<https://portal.azure.com>):

The screenshot shows the Azure Portal interface for the 'mywinressoucegroupdiag' storage account. Under the 'Tabellen' (Tables) section, the 'MyTesttabelle' table is listed with its URL:

Tabelle	URL
MyTesttabelle	https://mywinressoucegroupdiag.table.core.windows.net/MyTesttabelle

Summary

I will stop my documentation of my experiences with “Microsoft Azure” at this point. It should be sufficient for someone interested in reading and for a first glance. Of course, I will continue myself working and learning more about “Microsoft Azure”. I touched the following topics:

- **“configuration steps”**: what do I need to know to set up everything (e.g. a virtual machine)?
 - *I learnt: The setup can be overly complex. Knowing which components you need for running a “virtual computer” requires a rather good understanding and I doubt that many people know how to use these hundreds of components, which are offered in the “Microsoft Azure” portal. Fortunately, you only need a handful, but knowing which one these are is not easy. There are lots of options you can choose and there is a risk of mis selecting or selecting inappropriate components or not selecting all required components.*
- **“billing aspects”**: what aspects are relevant regarding the costs?
 - *I learnt: Billing aspects are more complex than I would have thought. On the one hand you have the “technical requirements” and on the other hand you have “cost restrictions”. Matching the minimum technical requirements and maximum cost restrictions is not easy. I described that my cost restrictions seduced me to select a configuration for my virtual computer, which was below my minimum technical requirement. I spent a lot of time until I found that I have to change my configuration to a more expensive one, which met my technical requirements. There are lots of options in “Microsoft Azure” and you must have skills on both sides: the technology and the accounting for optimizing your business plan.*
- **“issue solving”**: what can I do if I have technical issues?
 - *I learnt: Issue solving can be frustrating because of a huge number of possible root causes for an issue. Microsoft provides a lot of documentation and concepts to find a solution for your issue, but the challenge is to find the correct recipe. In my opinion the “Microsoft Azure” documentation has too many cross references and is not well structured. There is a risk that you get lost in the “Microsoft Azure” documentation jungle and that you spend a lot of time.*

I hope that this was helpful to get a short glance at how “Microsoft Azure” works and what topics you will be confronted when using it. I learnt a lot from this “hands-on” approach and many things are clearer for me now. I will continue learning and hope that this documentation was helpful for someone who wants to take the same steps as me.

All the best for you!

Greetings, Andreas