



AI DEPLOYMENT AND OPERATIONS

CHAIR OF ARTIFICIAL INTELLIGENCE | PROF. DR. HEINER STUCKENSCHMIDT
GREENPEAK PARTNERS | LINDA HONG

PROJECT SEMINAR

LEARNING GOALS

At the end of the seminar, you should be familiar with the following topics:

- Usage of an energy data set to predict the future electricity demand
- Basic understanding of the German electricity market and the current challenges and opportunities
- Basic understanding about what a Private Equity Company is doing and how we leverage AI in our operations
- **Understand the usage of cloud technologies**
- **Usage of Azure to conduct a machine learning project**
- **Usage of Databricks to conduct cloud computation**
- **Usage of Github to track version control**
- Usage of Terraform to configure infrastructure as code
- Conduct a group work to train working in teams

HAPPY TO HAVE YOU ON BOARD!

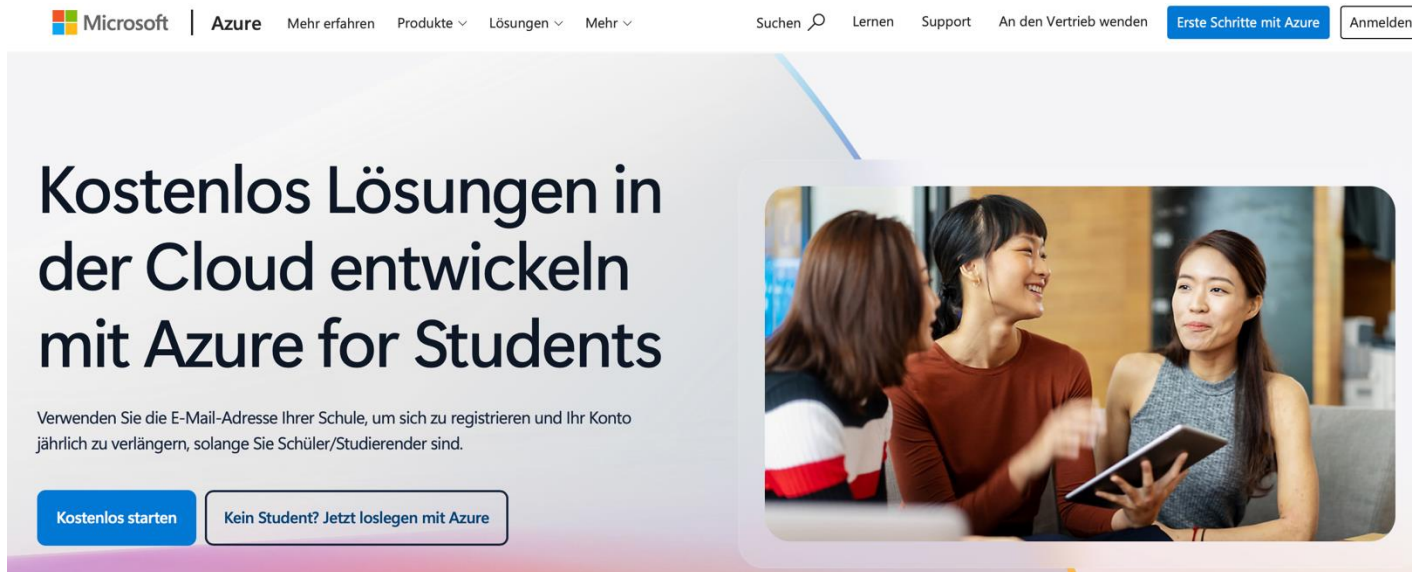
Prof. Stuckenschmidt and I selected 12 students for this seminar.

<u>Wochentag</u>	<u>Datum</u> ▲	<u>Von - Bis</u>	<u>Raum</u>	
Mi	09.09.2026	17:15 - 18:45	ZOOM-Lehre-104 (Virtuelles Gebäude)	
Mi	23.09.2026	17:15 - 18:45	ZOOM-Lehre-104 (Virtuelles Gebäude)	
Mi	07.10.2026	17:15 - 18:45	ZOOM-Lehre-104 (Virtuelles Gebäude)	
Mi	21.10.2026	17:15 - 18:45	ZOOM-Lehre-104 (Virtuelles Gebäude)	→ today
Mi	04.11.2026	17:15 - 18:45	ZOOM-Lehre-104 (Virtuelles Gebäude)	→ You can hand in your CV here
Mi	18.11.2026	17:15 - 18:45	ZOOM-Lehre-104 (Virtuelles Gebäude)	→ Q&A session
Mi	02.12.2026	17:15 - 18:45	ZOOM-Lehre-104 (Virtuelles Gebäude)	→ Final group presentation

Since we are a small group, feel free to ask questions!

GET READY TO USE AZURE FOR THE GROUP PROJECTS

1. Free resources at Microsoft Azure for Students [here](#)
2. Create an account with your student mail (with @uni-mannheim.de)



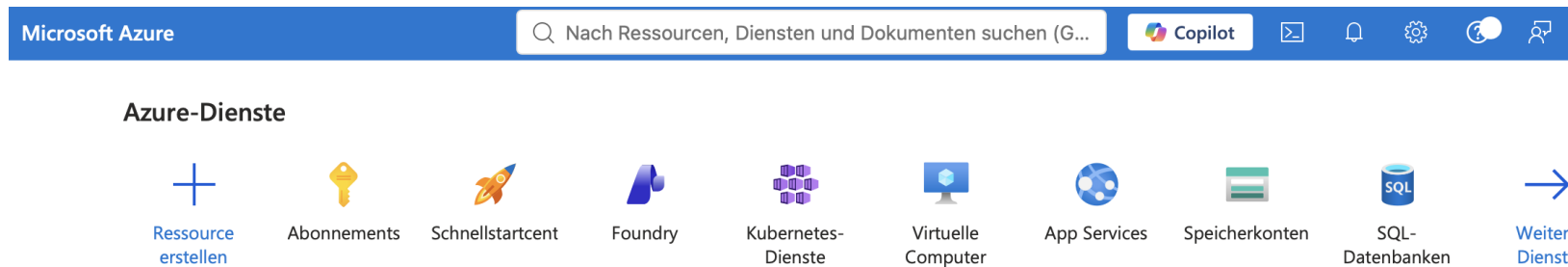
The screenshot shows the Microsoft Azure website's 'Azure for Students' landing page. At the top, there is a navigation bar with the Microsoft logo, 'Azure', and links for 'Mehr erfahren', 'Produkte', 'Lösungen', and 'Mehr'. Search, 'Lernen', 'Support', and 'An den Vertrieb wenden' links are also present, along with buttons for 'Erste Schritte mit Azure' and 'Anmelden'. The main heading reads 'Kostenlos Lösungen in der Cloud entwickeln mit Azure for Students'. Below this, a subtext states: 'Verwenden Sie die E-Mail-Adresse Ihrer Schule, um sich zu registrieren und Ihr Konto jährlich zu verlängern, solange Sie Schüler/Studierender sind.' Two buttons are visible: 'Kostenlos starten' and 'Kein Student? Jetzt loslegen mit Azure'. On the right, there is an image of three young women in a classroom setting, one holding a tablet.

3. You get 100 USD free credit as a student

Did it work for everyone?

HOW TO NAVIGATE THROUGH AZURE (1/3)

1. Navigate to the Azure page

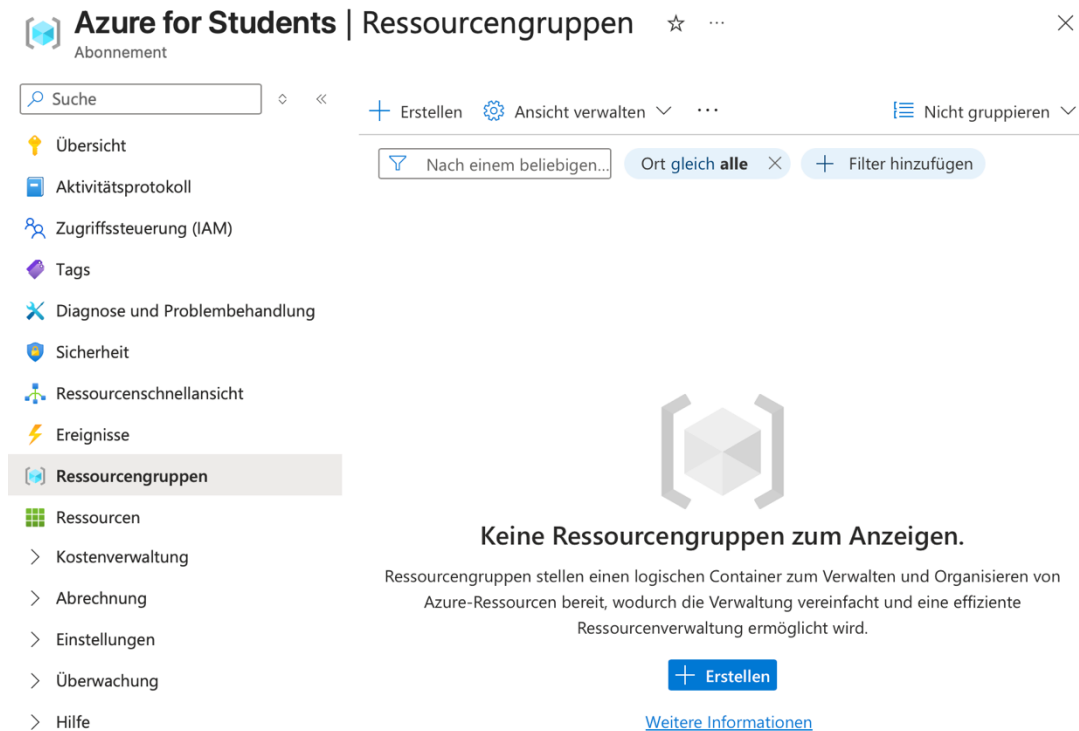


2. Create a subscription (a subscription is a logical container where you create all relevant applications in one container)
3. Your subscription is stored in one tenant (a logical organization, in this case, this is the organization of the university; other organizations are companies etc. You can have multiple tenants within one company)
4. With your user, you can be assigned to different tenants

HOW TO NAVIGATE THROUGH AZURE (2/3)

Please invite me to your workspace: lindhong@mail.uni-mannheim.de

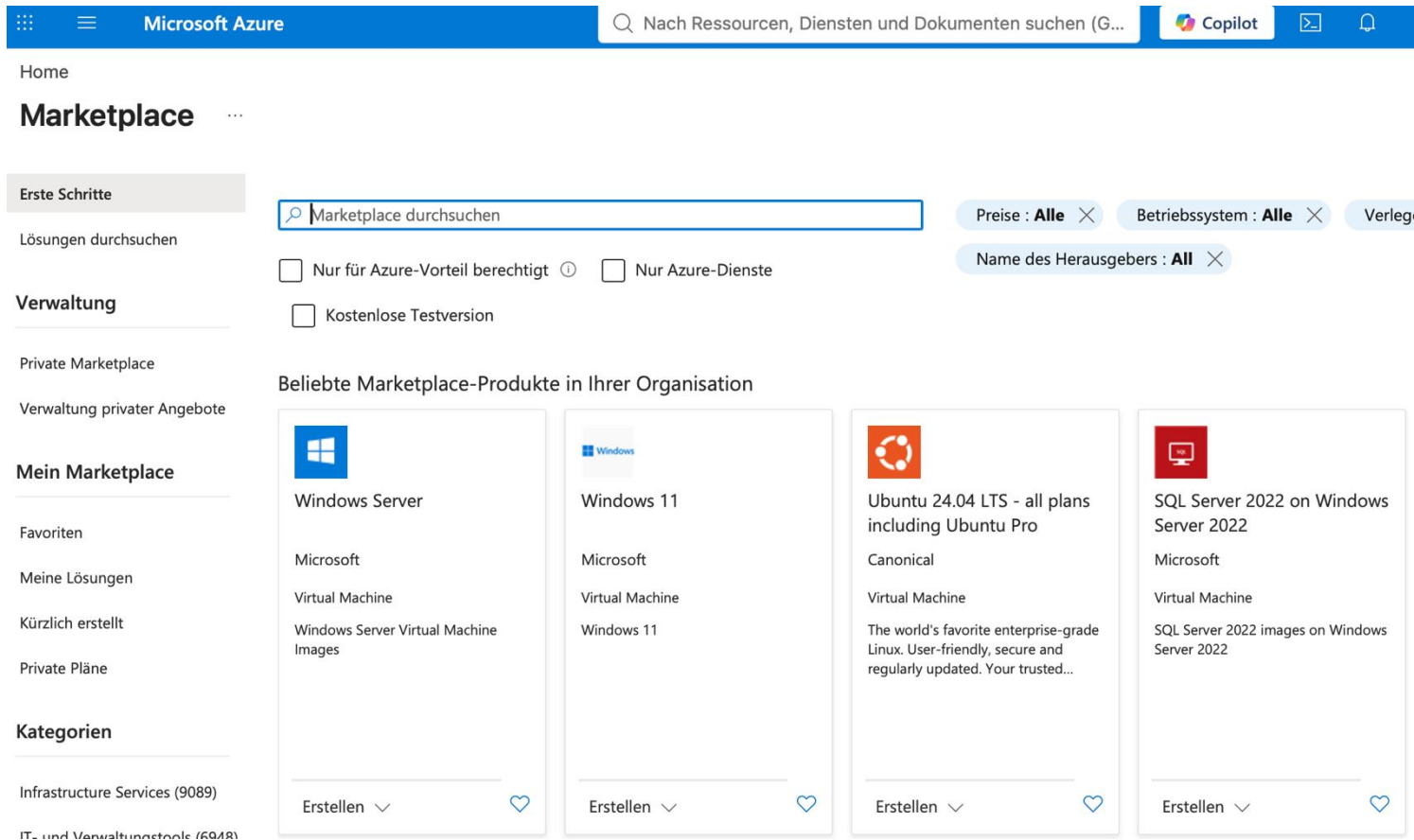
1. Create a resource group (management of the cloud services)



2. If you build software, it makes sense to have one resource group per environment (development, production)

HOW TO NAVIGATE THROUGH AZURE (3/3)

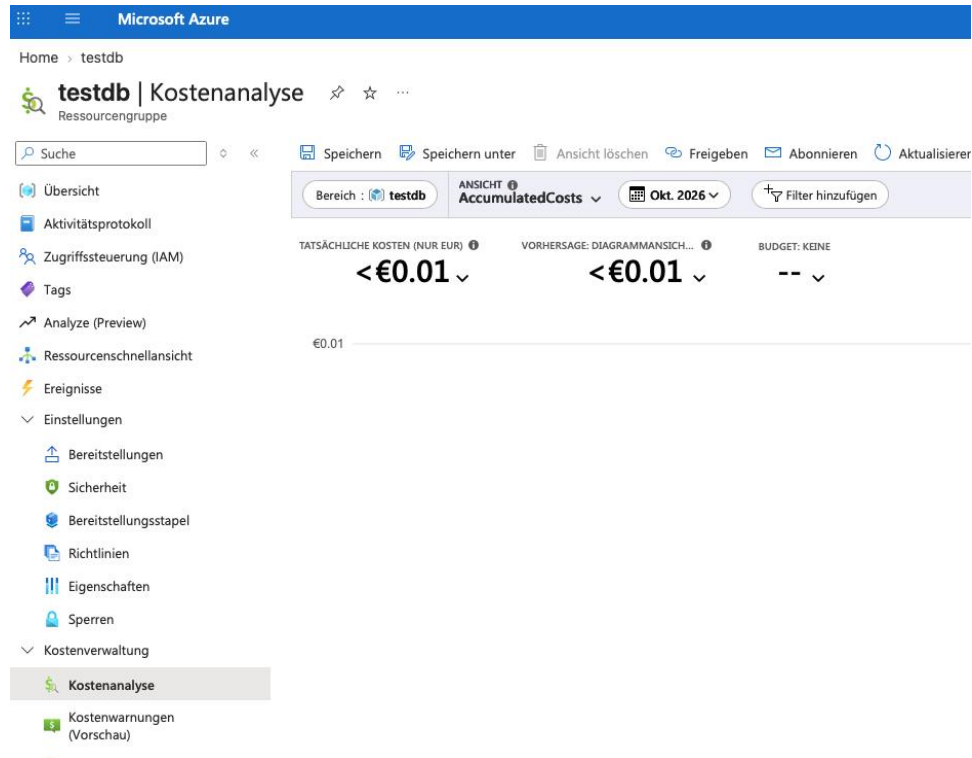
1. On the marketplace, you find Azure and third party products



The screenshot shows the Microsoft Azure Marketplace interface. At the top, there's a blue header with the Microsoft Azure logo, a search bar, and a Copilot button. Below the header, the 'Marketplace' section is active. On the left, there's a sidebar with navigation options: 'Erste Schritte', 'Lösungen durchsuchen', 'Verwaltung', 'Private Marketplace', 'Verwaltung privater Angebote', 'Mein Marketplace', 'Favoriten', 'Meine Lösungen', 'Kürzlich erstellt', 'Private Pläne', 'Kategorien', 'Infrastructure Services (9089)', and 'IT- und Verwaltungstools (6948)'. The main area displays search filters: 'Marketplace durchsuchen' (search bar), 'Preise: Alle', 'Betriebssystem: Alle', 'Verleg', and 'Name des Herausgebers: All'. Below the filters, there's a section titled 'Beliebte Marketplace-Produkte in Ihrer Organisation' showing four product cards: 'Windows Server', 'Windows 11', 'Ubuntu 24.04 LTS - all plans including Ubuntu Pro', and 'SQL Server 2022 on Windows Server 2022'. Each card includes the product name, provider (Microsoft or Canonical), and a description. At the bottom of each card, there's an 'Erstellen' button and a heart icon.

HOW TO NAVIGATE THROUGH AZURE (4/4)

1. Keep track of your costs in the cost analysis

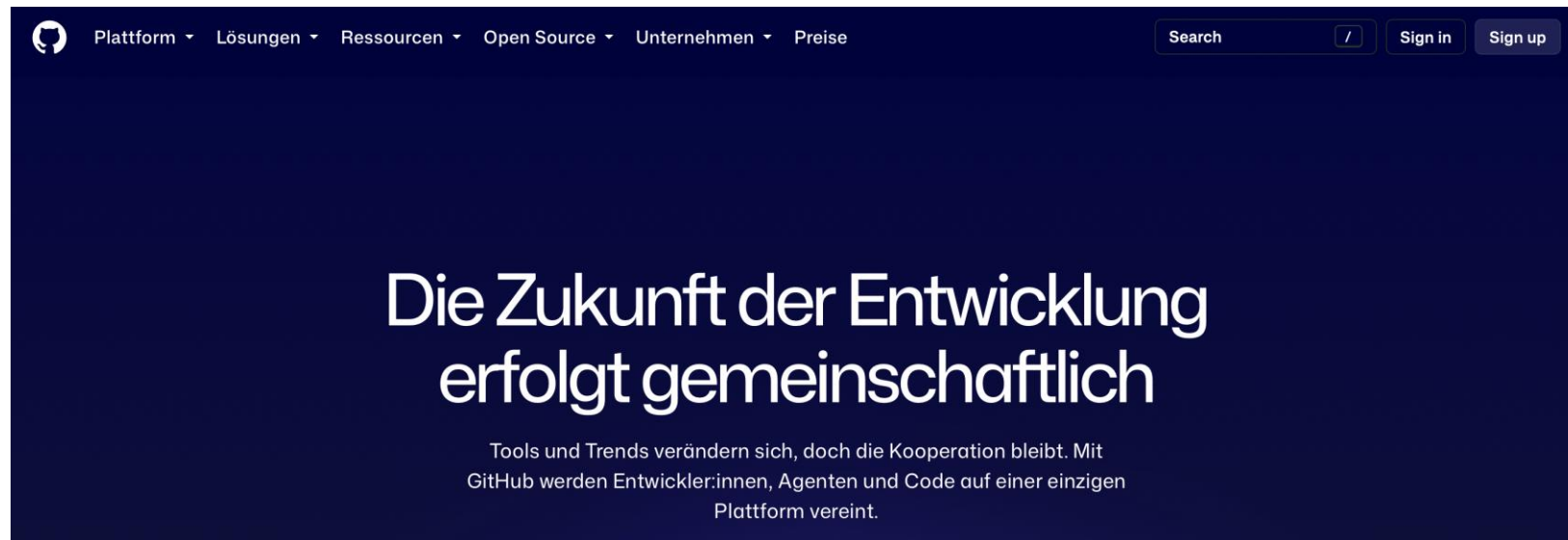


The screenshot shows the Microsoft Azure portal interface for the 'testdb | Kostenanalyse' page. The left sidebar contains a navigation menu with options like 'Übersicht', 'Aktivitätsprotokoll', 'Zugriffssteuerung (IAM)', 'Tags', 'Analyze (Preview)', 'Ressourcenschnellansicht', 'Ereignisse', 'Einstellungen', 'Bereitstellungen', 'Sicherheit', 'Bereitstellungstapel', 'Richtlinien', 'Eigenschaften', 'Sperrungen', 'Kostenverwaltung', 'Kostenanalyse', and 'Kostenwarnungen (Vorschau)'. The main content area displays the cost analysis for the resource group 'testdb'. It includes a search bar, a 'Bereich : testdb' dropdown, an 'ANSICHT: AccumulatedCosts' dropdown, and a 'Okt. 2026' date selector. Below these, there are three cost metrics: 'TATSÄCHLICHE KOSTEN (NUR EUR)' with a value of '<€0.01', 'VORHERSAGE: DIAGRAMMANSICHT...' with a value of '<€0.01', and 'BUDGET: KEINE' with a value of '--'. A 'Filter hinzufügen' button is also present.

2. You can setup automated alerts to avoid overrunning costs; with the student account, you have 100USD free credits

VERSION CONTROL (1/2)

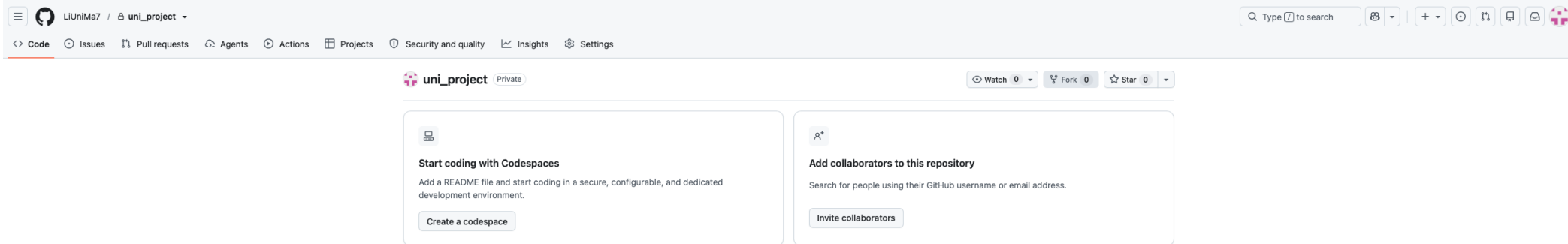
1. Git is a version control system; it can also take care of performing certain actions (e.g. CI/CD pipelines)
2. You should always check your code into a git repository to track any changes in the data



3. Please hand in your code in Github

VERSION CONTROL (2/2)

Please invite me to your repository: lindhong@mail.uni-mannheim.de



1. Please add rules to your git repository and add code reviews

DATABRICKS

1. Databricks is a Data and AI platform that has many functionalities tailored towards data & AI topics
2. The functionality is similar to local notebooks, but in the cloud

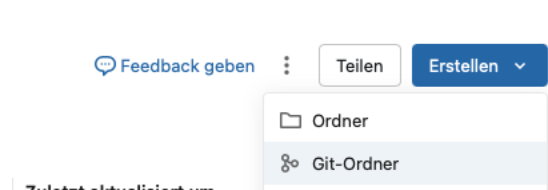
Explore the Databricks Data + AI Platform

Learn more about how the Databricks Data + AI Platform empowers your teams across all your data and AI workloads.

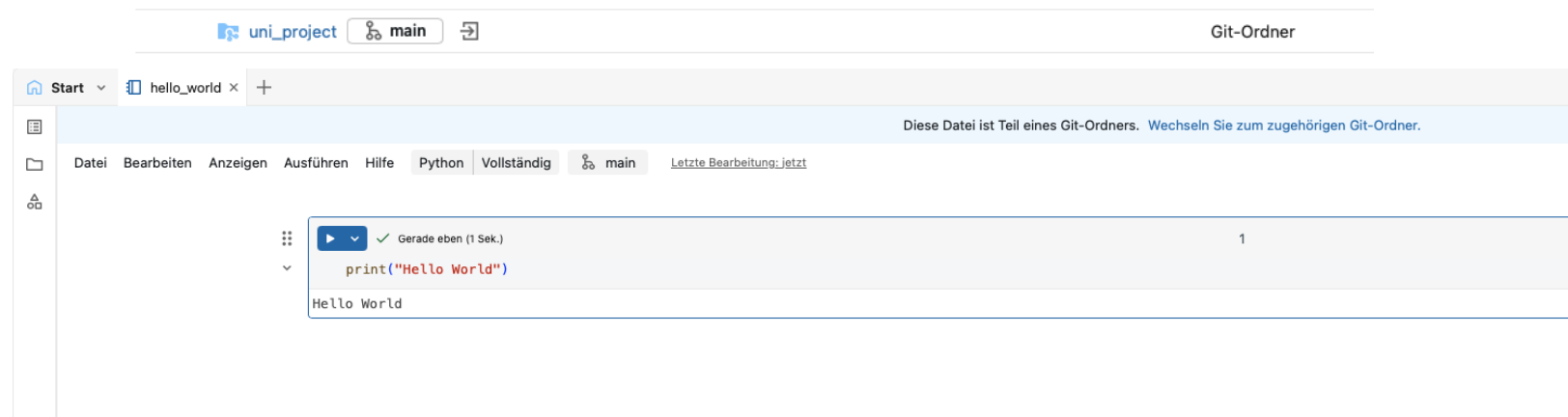
 Lakebase → Build real-time AI apps faster with a fully managed, autoscaling Postgres database platform.	 Genie → Get trusted answers from your data faster with natural language and governed insights.	 Unity Gateway → Govern enterprise AI with unified access, cost control, observability and guardrails.	 Lakehouse → Unify data and analytics on an open lakehouse to lower costs and deliver insights faster.
 Agent Bricks → Create and govern AI agents faster with enterprise context and access to leading models.	 Unity Catalog → Govern data, apps and AI agents with one unified, open catalog for trusted insights.	 Lakeflow → Build reliable data pipelines for analytics and AI with unified ingestion and orchestration.	 Databricks Apps → Build and deploy secure data and AI apps faster with serverless compute and governance.

LINK YOUR ACCOUNT TO A GIT FOLDER

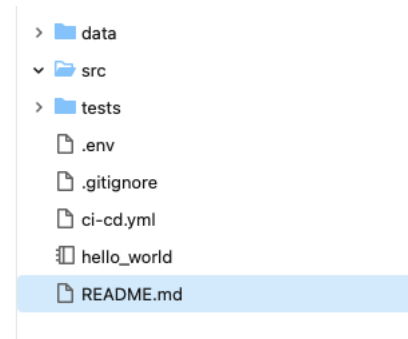
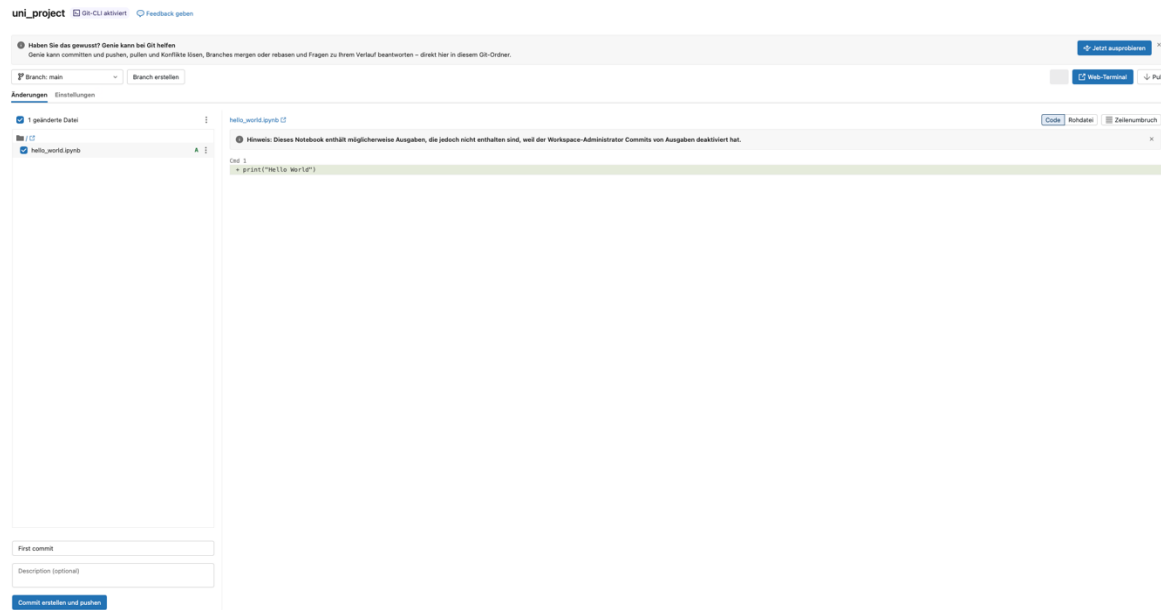
1. Link your work path with git



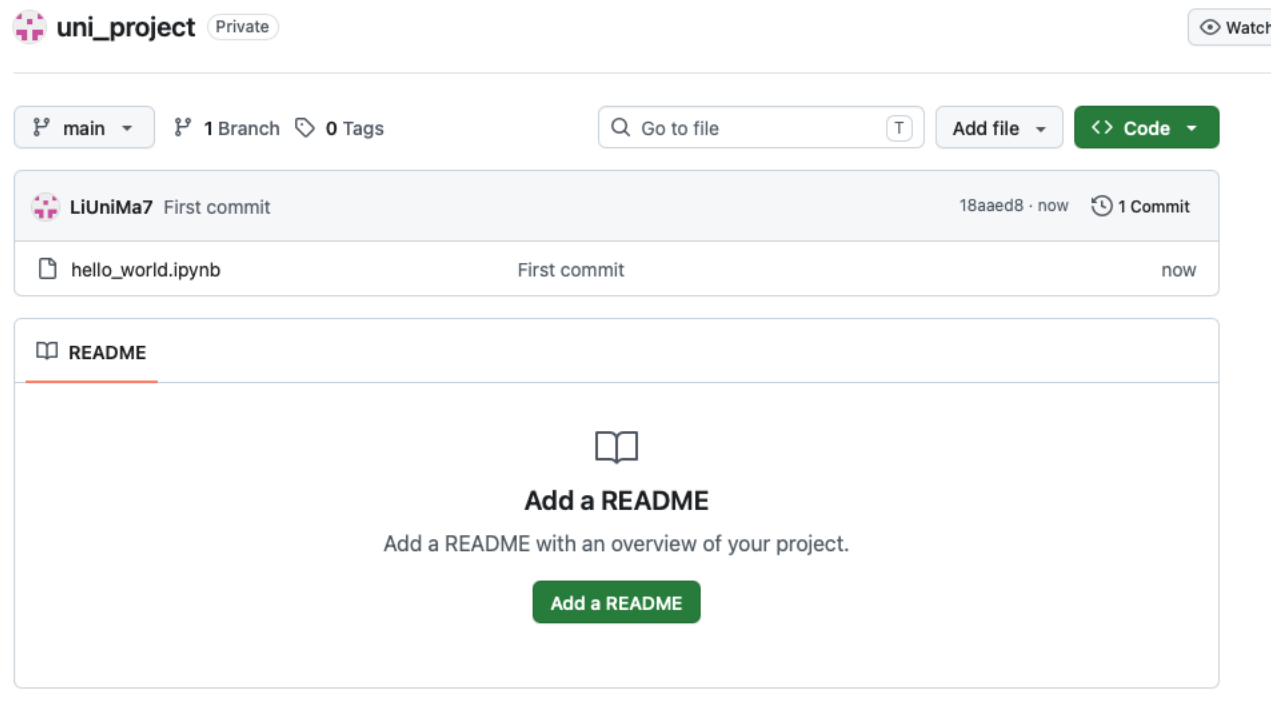
2. Choose the authentication with a token as it is a safer option (limit of rights)
3. You can start doing computes in Databricks



CHECK IN YOUR CODE (1/2)



CHECK IN YOUR CODE (2/2)



The screenshot shows a GitHub repository interface for a project named 'uni_project', which is marked as 'Private'. At the top right, there is a 'Watch' button. Below the repository name, the current branch is 'main', with '1 Branch' and '0 Tags' indicated. A search bar labeled 'Go to file' is present, along with 'Add file' and 'Code' buttons. The commit history shows a single commit by 'LiUniMa7' with the message 'First commit', hash '18aaed8', and timestamp 'now'. A file named 'hello_world.ipynb' is listed as part of this commit. Below the commit list, the 'README' section is visible, featuring a large 'Add a README' button and a prompt to 'Add a README with an overview of your project.'

UPLOAD YOUR DATA

Microsoft Azure

databricks

Neu

Workspace

Zuletzt

Katalog

Jobs & Pipelines

Berechnen

Entdecken

Marketplace

SQL

SQL-Editor

Abfragen

Dashboards

Genie-Agenten

Warnungen

Abfrageverlauf

Katalog

Focus: EIN

Keine verfügbaren Computing-Ressourcen gefunden.

Catalog

Suchbegriff eingeben

Meine Organisation

test

default

Volumes (1)

data

information_schema

system

ai

Keine Daten

information_schema

Erhaltene Shares

Suchen Sie nach Daten, Notebooks, zuletzt geöffneten Assets und mehr ...

test

Catalog Explorer > test > default

data

Übersicht

Dateien

Details

Berechtigungen

Beschreibung

KI generieren

Hinzufügen

/Volumes/test/default/data

Aktualisieren

Verzeichnis erstellen

Dateien und Verzeichnisse auf dieser Ebene filtern

Name	Größe	Letzte Änderung
Realisierter_Stromverbrauch_201901010000_202501010000_Tag.csv	151.07 KB	Vor 1 Sekunde

Über dieses Volume

Eigentümer lindhong@mail.uni-mannheim.de

Tags

Tags hinzufügen

TRACK YOUR BUDGET

Home > testdb | Kostenwarnungen (Vorschau) > Warnungsregeln > Budgets

Budget erstellen

Budget

✓ Erstellen Sie ein Budget

ⓘ Warnungen festlegen

Erstellen Sie ein Budget, und legen Sie Warnungen fest, mit denen Sie Ihre Kosten überwachen können.

Budgetumfang

Das von Ihnen erstellte Budget wird dem ausgewählten Bereich zugewiesen. Verwenden Sie zusätzliche Filter wie Ressourcengruppen, um Ihr Budget bei Bedarf detaillierter zu überwachen.

Bereich

testdb

Filter

Filter hinzufügen

Budgetdetails

Geben Sie Ihrem Budget einen eindeutigen Namen. Wählen Sie das Zeitfenster, das während jedes Evaluierungszeitraums analysiert wird, das Ablaufdatum und den Betrag aus.

*Name

Alarm

*Zurücksetzungszeitraum ⓘ

Monatlich

*Erstellungsdatum ⓘ

2026

Oktober

1

*Ablaufdatum ⓘ

2028

September

30

Budgetbetrag

Schwellenwert für Budgetbetrag angeben

Betrag *

5

ANSICHT DER MONATLICHEN KOS

Zurück

Weiter >

Home > testdb | Kostenwarnungen (Vorschau) > Warnungsregeln > Budgets

Budget erstellen

Budget

✓ Erstellen Sie ein Budget ✓ Warnungen festlegen

Konfigurieren Sie Warnungsbedingungen, und senden Sie E-Mail-Benachrichtigungen basierend auf Ihren Ausgaben.

* Warnungsbedingungen

Typ	% des Budgets	Betrag	Aktionsgruppe	Aktionsgruppentyp
Tatsächliche Ko... ▼	50 ✓	2,5	Keine ▼	🗑
Typ auswählen ▼	Wert in % eingeben	-	Keine ▼	

[Aktionsgruppe verwalten](#) ⓘ

* Warnungsempfänger (E-Mail)

Warnungsempfänger (E-Mail)

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DATABRICKS USAGE IN AZURE

Home > testdb_test | Übersicht


testdb_test
☆ ☆ ...


Azure Databricks-Dienst

Hiermit werden Zugriffssteuerungseinstellungen für diesen Azure Databricks Service aufgelistet. +2

Suche

Löschen

Übersicht

Aktivitätsprotokoll

Zugriffssteuerung (IAM)

Tags

Diagnose und Problembehandlung

Ressourcenschnellansicht

> Einstellungen

> Überwachung

> Automation

> Hilfe

Zusammenfassung

Status : Active

Ressourcengruppe : testdb

Standort : Germany West Central

Abonnement : Azure for Students

Abonnement-ID : c9c0f73a-874e-46a9-95c6-cece1a85cdae

Tags (bearbeiten) : Tags hinzufügen

Arbeitsbereichstyp : Serverless

URL : https://adb-7405607426055517.17.azuredatabricks.net

Tarif : Premium (+ rollensbasierte Zugriffssteuerungen)



Arbeitsbereich starten

Dokumentation



Erste Schritte



Daten aus Datei importieren



Daten aus Azure Storage importieren



Notebook



Administratorhandbuch



Hinzufügen oder Entfernen von Favoriten durch Drücken von Cmd+Shift+F

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DATABRICKS USAGE IN AZURE

Microsoft Azure

databricks

+

Neu

Workspace

Zuletzt

Katalog

Jobs & Pipelines

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Abfragen

Dashboards

Genie-Agenten

Warnungen

Abfrageverlauf

SQL Warehouses

Data Engineering

Ausführungen

Daten-Ingestion

Visuelle Datenvorb...

KI/ML

Playground

Agenten

KI-Gateway

Willkommen bei Databricks

Frage stellen...

Fragen

Suchen

Code

Genie One ausprobieren

Genie One fragen

ermöglicht es Ihnen, Fragen aus allen Daten in Ihrem Workspace zu stellen, ohne Daten manuell zu finden oder SQL-Abfragen zu schreiben. [Genie One ausprobieren](#)

Vorgeschlagen

Favoriten

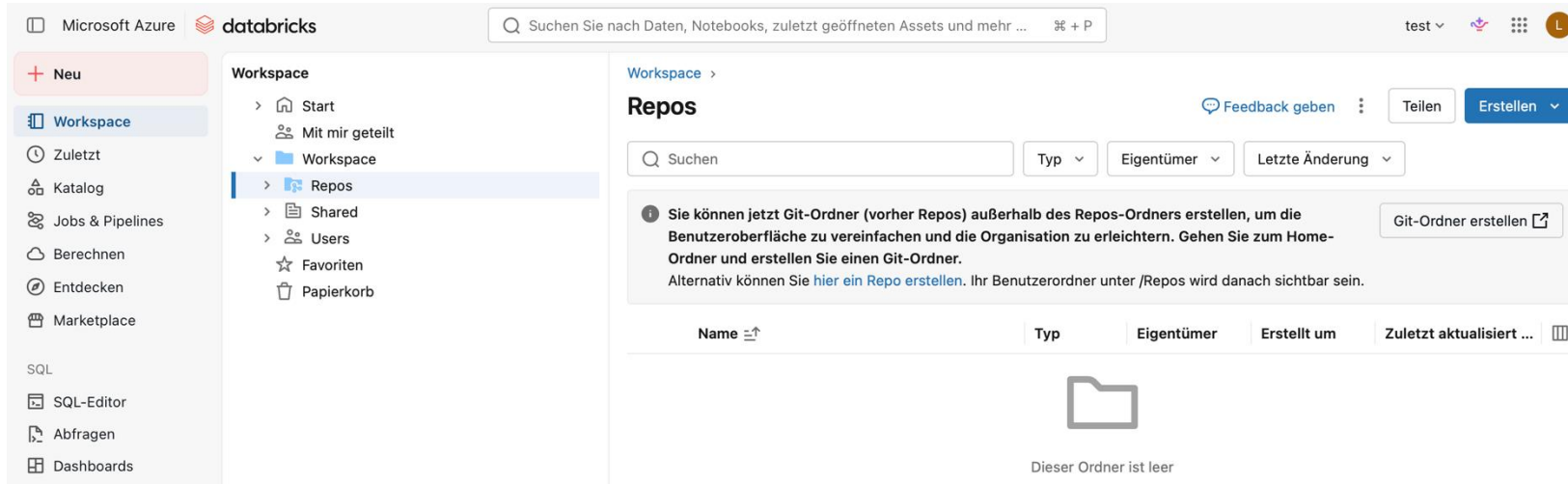
Beliebt

Mosaic AI

Was ist neu?

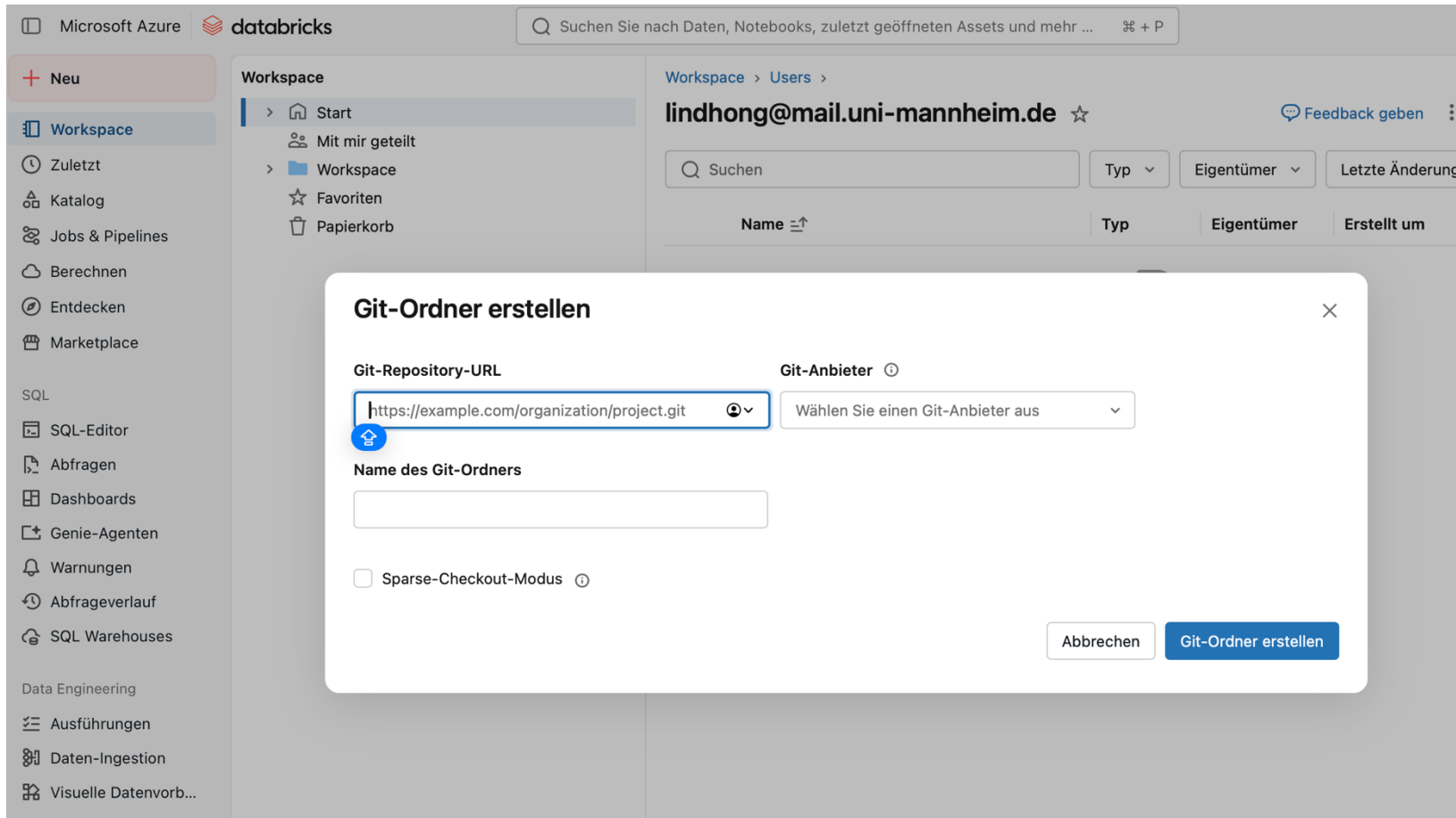
Noch keine Vorschläge

DATABRICKS USAGE IN AZURE



The screenshot shows the Databricks workspace interface. On the left, there is a sidebar with navigation options: 'Neu', 'Workspace', 'Zuletzt', 'Katalog', 'Jobs & Pipelines', 'Berechnen', 'Entdecken', 'Marketplace', and 'SQL' (with sub-items 'SQL-Editor', 'Abfragen', and 'Dashboards'). The main area is titled 'Workspace' and shows a tree view with 'Start', 'Mit mir geteilt', 'Workspace', 'Repos', 'Shared', 'Users', 'Favoriten', and 'Papierkorb'. The 'Repos' section is selected, displaying a message: 'Sie können jetzt Git-Ordner (vorher Repos) außerhalb des Repos-Ordners erstellen, um die Benutzeroberfläche zu vereinfachen und die Organisation zu erleichtern. Gehen Sie zum Home-Ordner und erstellen Sie einen Git-Ordner. Alternativ können Sie [hier ein Repo erstellen](#). Ihr Benutzerordner unter /Repos wird danach sichtbar sein.' Below this message is a table with columns: 'Name', 'Typ', 'Eigentümer', 'Erstellt um', and 'Zuletzt aktualisiert ...'. The table is currently empty, with a folder icon and the text 'Dieser Ordner ist leer' below it.

DATABRICKS USAGE IN AZURE



The screenshot displays the Databricks web interface. On the left is a navigation sidebar with categories like 'Neu', 'Workspace', 'SQL', and 'Data Engineering'. The main area shows the 'Workspace' view for user 'lindhong@mail.uni-mannheim.de'. A modal dialog titled 'Git-Ordner erstellen' is open in the center. It contains the following fields and options:

- Git-Repository-URL:** A text input field containing 'https://example.com/organization/project.git'.
- Git-Anbieter:** A dropdown menu with the placeholder text 'Wählen Sie einen Git-Anbieter aus'.
- Name des Git-Ordners:** An empty text input field.
- Sparse-Checkout-Modus:** An unchecked checkbox.
- Buttons:** 'Abbrechen' (Cancel) and 'Git-Ordner erstellen' (Create Git Folder).

DATABRICKS COMPUTE

Microsoft Azure

+ Neu

Workspace

Zuletzt

Katalog

Jobs & Pipelines

Berechnen

Entdecken

Marketplace

SQL

SQL-Editor

Abfragen

Dashboards

Genie-Agenten

databricks

Suchen Sie nach Daten, Notebooks, zuletzt geöffneten Assets und mehr ...

test

Berechnen

Serverless

SQL Warehouses

KI-Suche

Apps

Lakebase

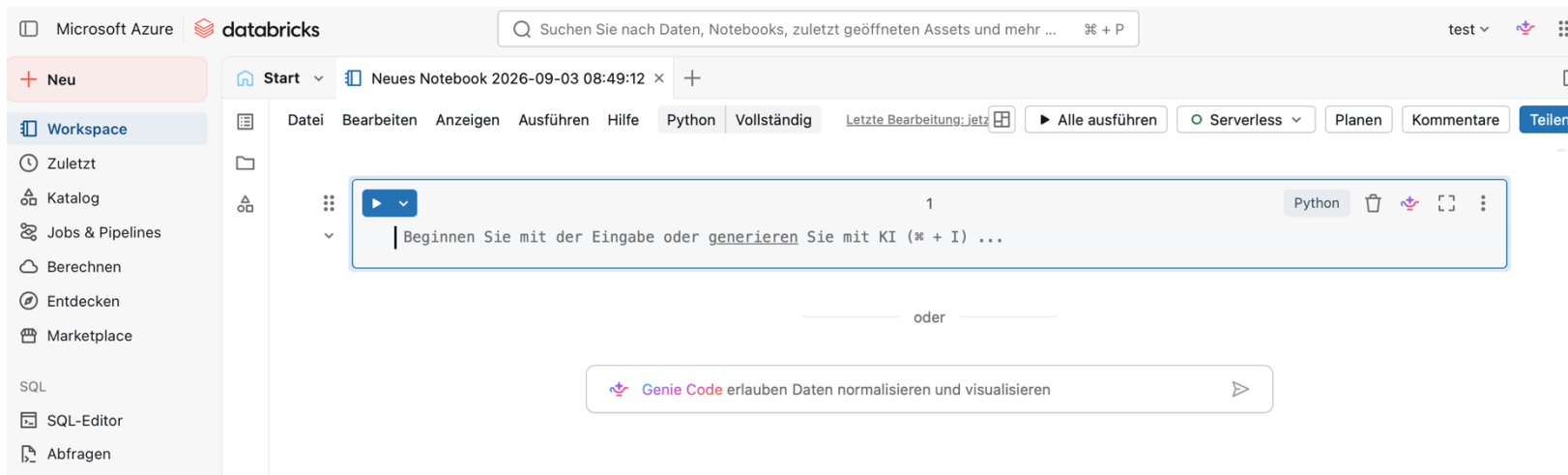
Name	Typ	Ersteller
Default Interactive Compute	Interaktiv	System Default
Default Automated Compute	Automatisiert	System Default

< Previous

Next >

20 / page

DATABRICKS NOTEBOOKS



The screenshot shows the Databricks Notebook interface. At the top, there's a header with "Microsoft Azure" and "databricks" logos, a search bar, and a user profile "test". Below the header, a sidebar on the left contains navigation options: "Neu", "Workspace", "Zuletzt", "Katalog", "Jobs & Pipelines", "Berechnen", "Entdecken", "Marketplace", "SQL", "SQL-Editor", and "Abfragen". The main area displays a notebook titled "Neues Notebook 2026-09-03 08:49:12". The notebook has a toolbar with "Datei", "Bearbeiten", "Anzeigen", "Ausführen", "Hilfe", "Python", "Vollständig", "Letzte Bearbeitung: jetzt", "Alle ausführen", "Serverless", "Planen", "Kommentare", and "Teilen". The notebook content shows a code cell with a play button, a dropdown menu, and the text "Beginnen Sie mit der Eingabe oder generieren Sie mit KI (% + I) ...". Below the code cell, there's a button "Genie Code erlauben Daten normalisieren und visualisieren".

LEARNING GOALS

At the end of the seminar, you should be familiar with the following topics:

- Usage of an energy data set to predict the future electricity demand
- Basic understanding of the German electricity market and the current challenges and opportunities
- Basic understanding about what a Private Equity Company is doing and how we leverage AI in our operations
- **Understand the usage of cloud technologies**
- **Usage of Azure to conduct a machine learning project**
- **Usage of Databricks to conduct cloud computation**
- **Usage of Github to track version control**
- Usage of Terraform to configure infrastructure as code
- Conduct a group work to train working in teams



**THANK YOU FOR
YOUR ATTENTION!**

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