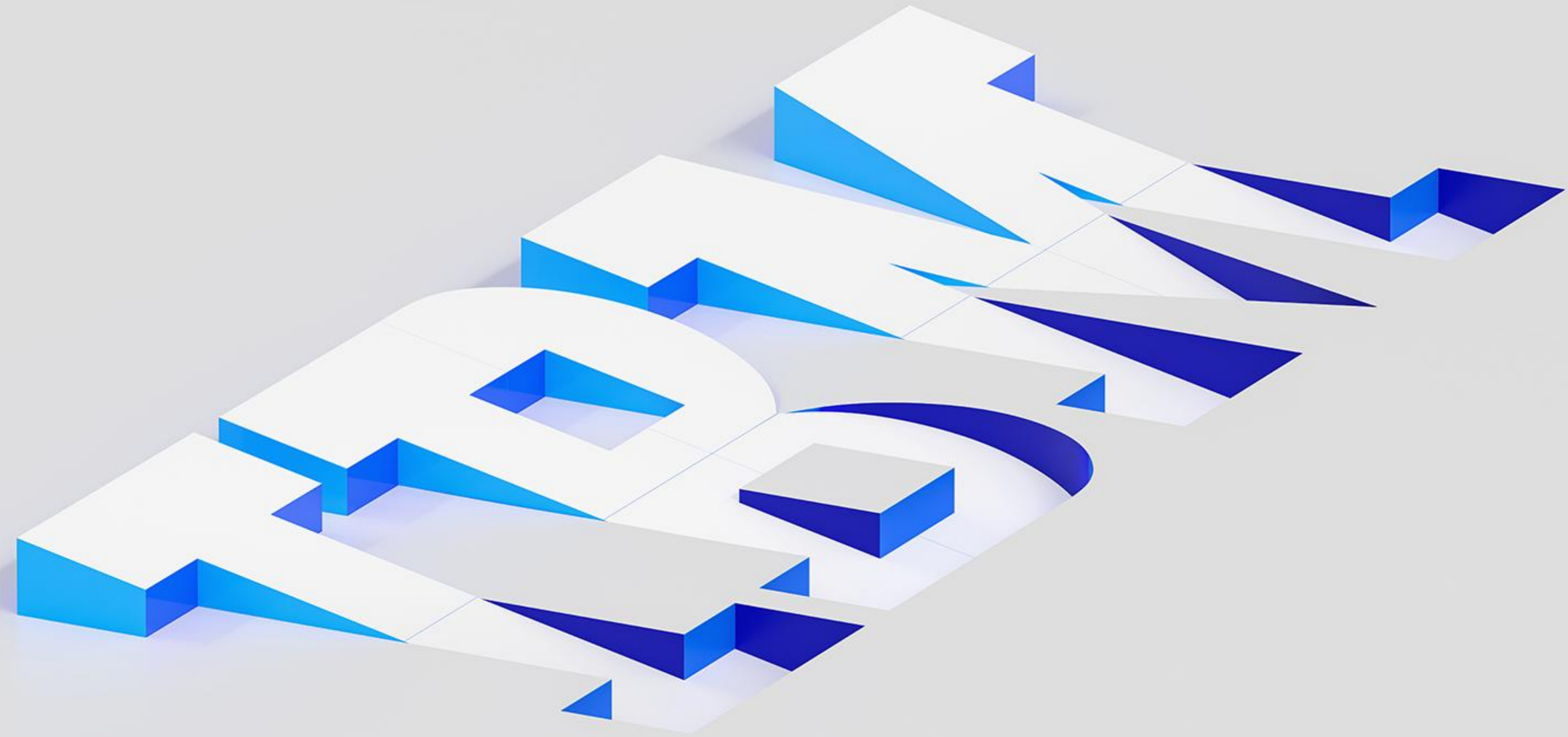


Module 3: integration techniques



Goal: We want to integrate AI
into our IBM i workloads

The 4 layers of AI integration

Goal: We want to integrate AI into our IBM i workloads

Local AI Inference

- Run LLMs on Power hardware
- Run LLMs on IBM i



Embedded AI transactions

- AI SDK for Db2 for i

```
values  
dbsdk_v1.wx_generate('Hello  
world');
```

Bridge IBM i data with AI stacks

- Mapepire, Agentic AI



Scale and govern enterprise AI

- watsonx



Embedded AI Transactions

Today

- Watsonx, Ollama, OpenAI-Compatible support
- **Wallaroo**
- Manual Installation, basic usage

Soon...

- Other LLM providers
- Improved usage and support
- Better docs
- Integrations with other AI stacks

AI SDK for Db2 for i

<https://github.com/IBM/AI-SDK-Db2-IBMi>

Bridge IBM i data with AI stacks

Connect IBM i and the AI world.

What is Mapepire?

Welcome to Mapepire

A cloud-friendly IBM i database access layer, built with simplicity and performance in-mind.

[Find out more →](#)

Pick your client language ⓘ

Super easy to use way to access Db2 for i from any application



How does it work?

Connect to Database

Communication over
secure web sockets

```
{  
  "id": "id2",  
  "type": "connect",  
  "technique": "tcp",  
  "application": "Java client"  
}
```



Application uses
Mapepire client SDK

```
{  
  "id": "id2",  
  "job": "112480/QUSER/QZDASOINIT",  
  "success": true  
}
```

Managed using Service
Commander

Mapepire AI Demo: Salary Insights Analyzer

This notebook demonstrates how to integrate **Mapepire** (IBM i database connector) with **AI** to analyze organizational data.

What This Demo Does

1. Connects to IBM i using Mapepire
2. Queries employee and department data
3. Uses Ollama (local AI) to analyze salary patterns and generate insights
4. Displays both raw data and AI-generated analysis

Prerequisites

- IBM i system with SAMPLE2 database tables (EMPLOYEE, DEPARTMENT)
- Ollama running locally with a model installed (e.g., llama3.2)
- Environment variables set: `IBMI_HOST`, `IBMI_USER`, `IBMI_PASSWORD`

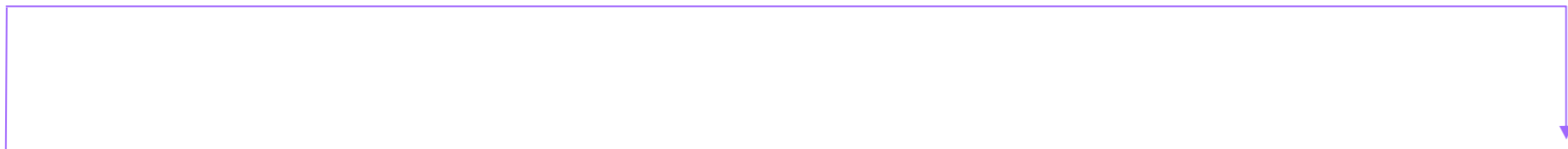
Section 1: Setup and Imports

```
1 import os
2 from dotenv import load_dotenv
3 import pandas as pd
4 from mapepire_python.client import SQLJob
5 from mapepire_python import connect
6 from mapepire_python.data_types import DaemonServer
7 import ollama
8
9 # Load environment variables from .env file (if present)
10 load_dotenv()
11
12 print("✓ All imports successful")
```

Python

Scale and govern enterprise AI

Leverage foundation models to automate data search, discovery, and linking in watsonx.data



watsonx.ai

Train, validate, tune and deploy AI models

watsonx.data

Scale AI workloads, for all your data, anywhere

watsonx.governance

Enable responsible, transparent and explainable AI workloads

Leverage governed enterprise data in watsonx.data to seamlessly train or fine-tune foundation models

Direct, manage and monitor activities across the AI lifecycle, meeting risk and regulatory requirements with watsonx.governance

watsonx.data

The screenshot shows the 'Add component - DB2 for IBM I' configuration page in the IBM watsonx.data interface. The page is dark-themed and contains a sidebar with navigation options: 'Add component' (selected) and 'Configuration'. The main content area is titled 'Add component - DB2 for IBM I' and includes a sub-header 'Select the type of component you want to add to the lakehouse infrastructure and provide the necessary information.' The configuration is organized into sections: 'General information' with a 'Display name' field (example: 'Your Database 01'); 'Data source configuration' with 'Database name' (example: 'your_db_01'), 'Hostname' (examples: 'your.hn.com, 1.23.456.789') and 'Port' (example: '1234') fields, 'Username' (placeholder: 'Enter your database username') and 'Password' (placeholder: 'Enter your database password' with a toggle icon) fields, and a 'Port is SSL enabled' toggle switch (currently off). The 'Associated catalog' section has an 'Associated catalog' label with an info icon and a 'Catalog name' field (example: 'your_catalog_01'). At the bottom, there are three buttons: 'Cancel', 'Back', and 'Create'.

IBM watsonx.data

Add component - DB2 for IBM I

Select the type of component you want to add to the lakehouse infrastructure and provide the necessary information.

- ✓ Add component
- Configuration

General information

Display name

Example: Your Database 01

Data source configuration

Database name

Example: your_db_01

Hostname	Port
Examples: your.hn.com, 1.23.456.789	Example: 1234

Username	Password
Enter your database username	Enter your database password

Port is SSL enabled

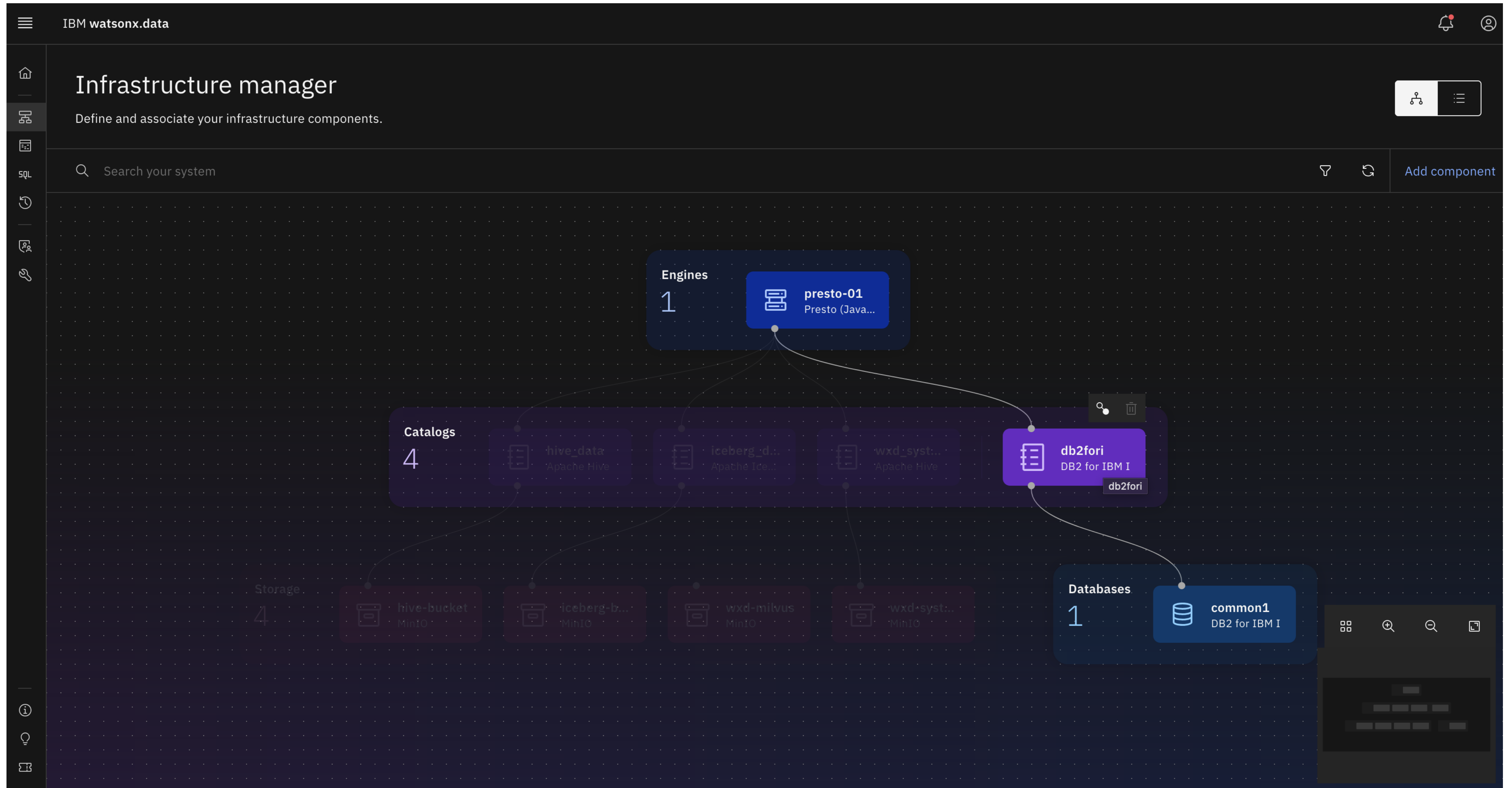
Associated catalog ⓘ

Associated catalog

Example: your_catalog_01

Cancel Back Create

watsonx.data



watsonx.data

The screenshot displays the IBM watsonx.data Query workspace. The interface includes a sidebar with navigation icons and a list of catalogs under 'db2fori'. The main workspace shows a query editor with the SQL statement: `select * from sample.department`. Below the editor, the results are displayed in a table format. The table has columns: deptno, deptname, mgrno, admrdept, and location. The results show 14 rows of department data. The interface also includes a 'Run on presto-01' button and a 'Worksheet results 10' indicator.

Engine: presto-01

Filter for tables

Catalogs associated

- db2fori
 - aaadtalib
 - actestlib
 - aeciesla
 - aeciesla1
 - afsstarter
 - aghirpt
 - allow1
 - alusher
 - amra

Untitled 1

```
1 select * from sample.department
```

Worksheet results 10

```
^ select * from sample.department
```

Run time: 10.575s

Result set

deptno	deptname	mgrno	admrdept	location
A00	SPIFFY COMPUTER SERVICE DIV.	000010	A00	null
B01	PLANNING	000020	A00	null
C01	INFORMATION CENTER	000030	A00	null
D01	DEVELOPMENT CENTER	null	A00	null
D11	MANUFACTURING SYSTEMS	000060	D01	null
D21	ADMINISTRATION SYSTEMS	000070	D01	null
E01	SUPPORT SERVICES	000050	A00	null
E11	OPERATIONS	000090	E01	null
E21	SOFTWARE SUPPORT	000100	E01	null
F22	BRANCH OFFICE F2	null	E01	null

1-10 of 14 items

1 of 2 pages

watsonx.ai: add IBM i connection

Add connection
Connect to your remote data through a new connection or an existing platform connection.

Find connectors

Recents

- Platform connections
- Generic protocols and APIs

Data source types (59)

- Amazon Redshift
- Amazon S3 (Simple Storage Ser...
- Apache Cassandra
- Apache Derby
- Apache HDFS (Hadoop Distribut...
- Apache Hive
- Apache Impala
- Apache Kafka
- Box
- DataStax Enterprise
- Denodo
- Dremio
- Dropbox
- Elasticsearch
- Google BigQuery
- Google Cloud Pub/Sub
- Google Cloud Storage

Recents

IBM Db2 for i

IBM Db2 for i is an integrated Relational Database Management System that leverages the high performance, virtualization, and energy efficiency features of IBM Power Systems.

Compatible tools

- Catalogs
- DataStage
- Data Product Hub
- Data Virtualization
- Metadata import
- Watson Studio
- watsonx BI Assistant

Cancel Next

watsonx.ai: fill in credentials

IBM Cloud Pak for Data

Search in your workspaces

Upgrade

Adam Shedivy's Account

Dallas

AS

Projects / IBM i demo

Launch IDE

Create connection: IBM Db2 for i

Enter the connection information.

[Test connection](#)

- Connection overview
- Connection details**
- Credentials
- Certificates
- Private connectivity

Connection details

Driver ⓘ

JT400

Hostname or IP address (required) ⓘ

my_host.my_company.com or 12.34.56.789

Port (required) ⓘ

1234

Command Timeout ⓘ

600

Location (required) ⓘ

Db2 location name

Max transport objects ⓘ

Credentials

All users access the data with the credentials that you provide. Shared credentials are less secure.
[Learn more](#)

[Cancel](#) [Back](#) [Create](#)

watsonx.ai: New IBM i asset

Projects / IBM i demo

Overview **Assets** Jobs Manage

Find assets

Import assets + New asset

6 assets

All assets

Asset types

> Data access 1

> Data 2

> Flows 2

Notebooks 1

Connections

<input type="checkbox"/>	Name	Created by	Last modified	
<input type="checkbox"/>	 common1 Connection	Created by you	21 hours ago Modified by you	⋮

watsonx.ai: prepare and visualize data

IBM Cloud Pak for Data

Search in your workspaces

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Projects / IBM i demo




Launch IDE

What do you want to do?





Select a task based on your goal. You'll use a tool to create an asset for that goal.

Search for a task or tool

Recents

-  Prepare and visualize data
[Learn more](#)
with Data Refinery
-  Connect to a data source
with Connection
-  Work with data and models in Python or R notebooks
with Jupyter notebook editor

Prepare data ⓘ

-  Connect to a data source
with Connection
-  Replicate data
with Data Replication
-  Prepare and visualize data
with Data Refinery
-  Define reusable sets of parameters
with Parameter set

Work with models ⓘ

watsonx.ai: select data from IBM i system

IBM Cloud Pak for Data Search in your workspaces Upgrade ? Adam Shedivy's Account Dallas AS

Projects / IBM i demo Launch IDE

Prepare and visualize data

Select data from project

↑ Find

Connections 1

- common1

↑ sample

common1 4

- SAMPLE
- PUISAMPLES
- SAMPLEDB
- SAMPLEXML

↑ Find

SAMPLE 57

- ACT
- CL_SCHED
- DEPARTMENT
- DEPT
- EMP
- EMP_ACT
- EMP_PHOTO
- EMP_PHOTO_RESUME
- EMP_RESUME
- EMPACT
- EMPLOYEE
- EMPPROJECT
- IN_TRAY
- ORG

Selected assets 1 / 1

All asset details must load before final selection.

- DEPARTMENT ✓

Type
Table

Path
/SAMPLE/DEPARTMENT

Fields (5)

Field	Type
DEPTNO	char
DEPTNAME	varchar
MGRNO	char
ADMRDEPT	char
LOCATION	char

Connection name
common1

Connection owner
Adam Shedivy
adam.shedivy@ibm.com

Connector
IBM Db2 for i (db2iseries)

Cancel Select

watsonx.ai: view data

Steps Use a code template to add a step

Data Profile Visualizations

Viewing source ↻

	DEPTNO String	DEPTNAME String	MGRNO String	ADMRDEPT String	LOCATION String
1	A00	SPIFFY COMPUTER SERVICE DIV.	000010	A00	--
2	B01	PLANNING	000020	A00	--
3	C01	INFORMATION CENTER	000030	A00	--
4	D01	DEVELOPMENT CENTER	--	A00	--
5	D11	MANUFACTURING SYSTEMS	000060	D01	--
6	D21	ADMINISTRATION SYSTEMS	000070	D01	--
7	E01	SUPPORT SERVICES	000050	A00	--
8	E11	OPERATIONS	000090	E01	--
9	E21	SOFTWARE SUPPORT	000100	E01	--
10	F22	BRANCH OFFICE F2	--	E01	--
11	G22	BRANCH OFFICE G2	--	E01	--
12	H22	BRANCH OFFICE H2	--	E01	--
13	I22	BRANCH OFFICE I2	--	E01	--
14	J22	BRANCH OFFICE J2	--	E01	--

About this asset ✕

Name ✎

Department
Data Refinery flow

Description ✎

What is the purpose of this Data Refinery flow?

Asset details

Steps: 1

Associated assets

📄 Source: common1/SAMPLE/DEPART...

📄 Target: common1_SAMPLE_DEPART...

Last modified

Wed, Oct 23, 2024, 10:08 AM

Adam Shedivy

Created on

Wed, Oct 23, 2024, 10:08 AM

Adam Shedivy

watsonx.ai: visualize Db2 for i data

Projects / IBM i demo / Department

Steps Use a code template to add a step

Data Profile Visualizations

PIE CHART

CHART TYPE Scatter plot Line Histogram Pie Bar Relationship Pareto Heat map Word cloud

ACTIONS

Category* DEPTNAME

Summary Count Count Unique Sum

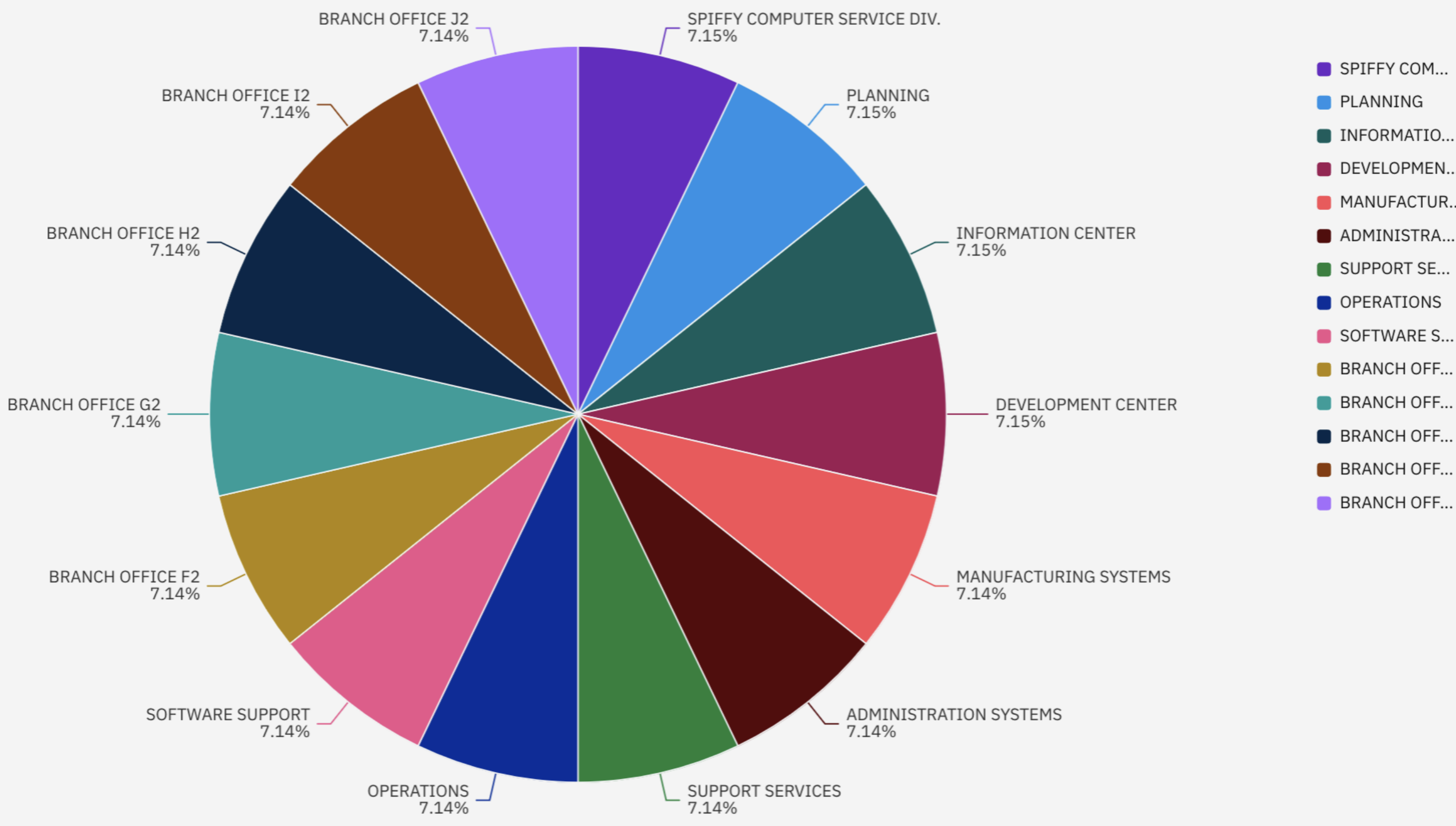
Pie type Normal Ring Rose Rose Area Rose Ring Half Rose

Show value Off

Outer field None

Outer label angle 230

Legend orient Horizontal



About this asset

Name

Department Data Refinery flow

Description

What is the purpose of this Data Refinery flow?

Asset details

Steps: 1

Associated assets

Source: common1/SAMPLE/DEPART... Target: common1_SAMPLE_DEPART...

Last modified Wed, Oct 23, 2024, 10:08 AM

Adam Shedivy

Created on Wed, Oct 23, 2024, 10:08 AM

Adam Shedivy

watsonx.ai: Add a “step” to combine data sources

Projects / IBM i demo / Department



Steps (1)

Use a code template to add a step

Data Profile **Visualizations**

PIE CHART

CHART TYPE Scatter plot Line Histogram **Pie** Bar Relationship Pareto Heat map Word cloud

Category* DEPTNAME

Summary
 Count
 Count Unique
 Sum

Pie type
 Normal
 Ring
 Rose
 Rose Area
 Rose Ring
 Half Rose

Show value Off

Outer field None

Outer label angle 230

Legend orient Horizontal

ACTIONS

Department	Percentage
Manufacturing Systems	22.92%
Spiffy Computer Service Div.	10.42%
Operations	14.59%
Software Support	12.50%
Administration Systems	14.59%
Information Center	8.33%
Planning	2.09%
Development Center	2.08%
Branch Office J2	2.08%
Branch Office I2	2.08%
Branch Office H2	2.08%
Branch Office G2	2.08%
Branch Office F2	2.08%
Support Services	2.08%

New step +

watsonx.ai: work with data using Python notebooks

IBM Cloud Pak for Data

Search in your workspaces

Upgrade

Adam Shedivy's Account

Dallas

AS

Projects / IBM i demo / Employee-notebook

File Edit View Run Kernel Help

Code

Python 3.11

Not Trusted Memory:222 / 8192 MB

```
[2]: import os, types
import pandas as pd
from botocore.client import Config
import ibm_boto3

def __iter__(self): return 0

# @hidden_cell
# The following code accesses a file in your IBM Cloud Object Storage. It includes your credentials.
# You might want to remove those credentials before you share the notebook.

cos_client = ibm_boto3.client(service_name='s3',
                              ibm_api_key_id='jc62ZQJ4mZbF3GV9t0ir1h5d0Zf8t0x7fcaxM1n7niWK',
                              ibm_auth_endpoint="https://iam.cloud.ibm.com/identity/token",
                              config=Config(signature_version='oauth'),
                              endpoint_url='https://s3.direct.us-south.cloud-object-storage.appdomain.cloud')

bucket = 'ibmidemo-donotdelete-pr-wz07z0atiqlx1l'
object_key = 'data_asset/common1_SAMPLE_EMPL0YEE_shaped_8dook4569g813wullx96pe9hx'

body = cos_client.get_object(Bucket=bucket,Key=object_key)['Body']
# add missing __iter__ method, so pandas accepts body as file-like object
if not hasattr(body, "__iter__"): body.__iter__ = types.MethodType( __iter__, body )

df_1 = pd.read_csv(body)
df_1.head(5)
```

	EMPNO	FIRSTNAME	MIDINIT	LASTNAME	WORKDEPT	PHONENO	HIREDATE	JOB	EDLEVEL	SEX	BIRTHDATE	SALARY	BONUS	COMM
0	30	SALLY	A	KWAN	C01	4738	1975-04-05	MANAGER	20	F	1941-05-11	38250.0	800.0	3060.0
1	70	EVA	D	PULASKI	D21	7831	1980-09-30	MANAGER	16	F	1953-05-26	36170.0	700.0	2893.0
2	110	VINCENZO	G	LUCCHESI	A00	3490	1958-05-16	SALESREP	19	M	1929-11-05	46500.0	900.0	3720.0
3	140	HEATHER	A	NICHOLLS	C01	1793	1976-12-15	ANALYST	18	F	1946-01-19	28420.0	600.0	2274.0
4	170	MASATOSHI	J	YOSHIMURA	D11	2890	1978-09-15	DESIGNER	16	M	1951-01-05	24680.0	500.0	1974.0

[]:

Read data

Generate a code snippet to load data from a data asset or connection into your notebook.

Select data from project +

watsonx.ai: add data to notebook

IBM Cloud Pak for Data

Search in your workspaces

Upgrade

Adam Shedivy's Account

Dallas

AS

Projects / IBM i demo / Employee-notebook

Select data from project

Find

Categories 3

- Connection
- Data asset**
- Feature group

Find

Data assets 2

- common1_SAMPLE_DEPARTME...**
- common1_SAMPLE_EMPLOYEE_...

Selected assets 1 / 1

All asset details must load before final selection.

common1_SAMP... ✓

Type
Data asset

Size
7 KB

Mime type
text/csv

Created at
2024/10/23 10:11:29

Last updated at
2024/10/23 10:11:30

Cancel Select

watsonx.ai: load data as Dataframe

IBM Cloud Pak for Data Search in your workspaces Upgrade Adam Shedivy's Account Dallas AS

Projects / IBM i demo / Employee-notebook

File Edit View Run Kernel Help Not Trusted Memory:222 / 8192 MB Python 3.11

1	70	EVA	D	PULASKI	D21	7831	1980-09-30	MANAGER	16	F	1953-05-26	36170.0	700.0	2893.0
2	110	VINCENZO	G	LUCCHESI	A00	3490	1958-05-16	SALESREP	19	M	1929-11-05	46500.0	900.0	3720.0
3	140	HEATHER	A	NICHOLLS	C01	1793	1976-12-15	ANALYST	18	F	1946-01-19	28420.0	600.0	2274.0
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```
[ ]:
import os, types
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def __iter__(self): return 0

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# The following code accesses a file in your IBM Cloud Object Storage. It includes your credentials.
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cos_client = ibm_boto3.client(service_name='s3',
                              ibm_api_key_id='jc62ZQJ4mZbF3GV9t0ir1h5d0Zf8t0x7fcaxM1n7niWK',
                              ibm_auth_endpoint="https://iam.cloud.ibm.com/identity/token",
                              config=Config(signature_version='oauth'),
                              endpoint_url='https://s3.direct.us-south.cloud-object-storage.appdomain.cloud')

bucket = 'ibmidemo-donotdelete-pr-wz07z0atiqlx1l'
object_key = 'data_asset/common1_SAMPLE_DEPARTMENT_shaped_81y1lqq7m1ynlj3boc8zr6dlp'

body = cos_client.get_object(Bucket=bucket,Key=object_key)['Body']
# add missing __iter__ method, so pandas accepts body as file-like object
if not hasattr(body, "__iter__"): body.__iter__ = types.MethodType( __iter__, body )

df_2 = pd.read_csv(body)
df_2.head(10)
```

Read data

Generate a code snippet to load data from a data asset or connection into your notebook.

Selected data

common1_SAMPLE_DEPARTMEN T_shaped

Load as

pandas DataFrame

Insert code to cell

The 4 layers of AI integration

Goal: We want to integrate AI into our IBM i workloads

Local AI Inference

- Run LLMs on Power hardware
- Run LLMs on IBM i



Embedded AI transactions

- AI SDK for Db2 for i

```
values  
dbsdk_v1.wx_generate('Hello  
world');
```

Bridge IBM i data with AI stacks

- Mapepire, Agentic AI



Scale and govern enterprise AI

- watsonx



AI on IBM I guide - <http://ibm.biz/ai-ibmi>

A comprehensive guide to using AI with IBM i

Search

Ctrl K

Home

AI software stacks [start here](#) >

Accessing Db2 from AI >

IBM Cloud Pak for Data

Python programs

Rocket AI Hub

Rocket CE

watsonx.ai

watsonx.data

Streaming Db2 transactions >

Streaming operational data >

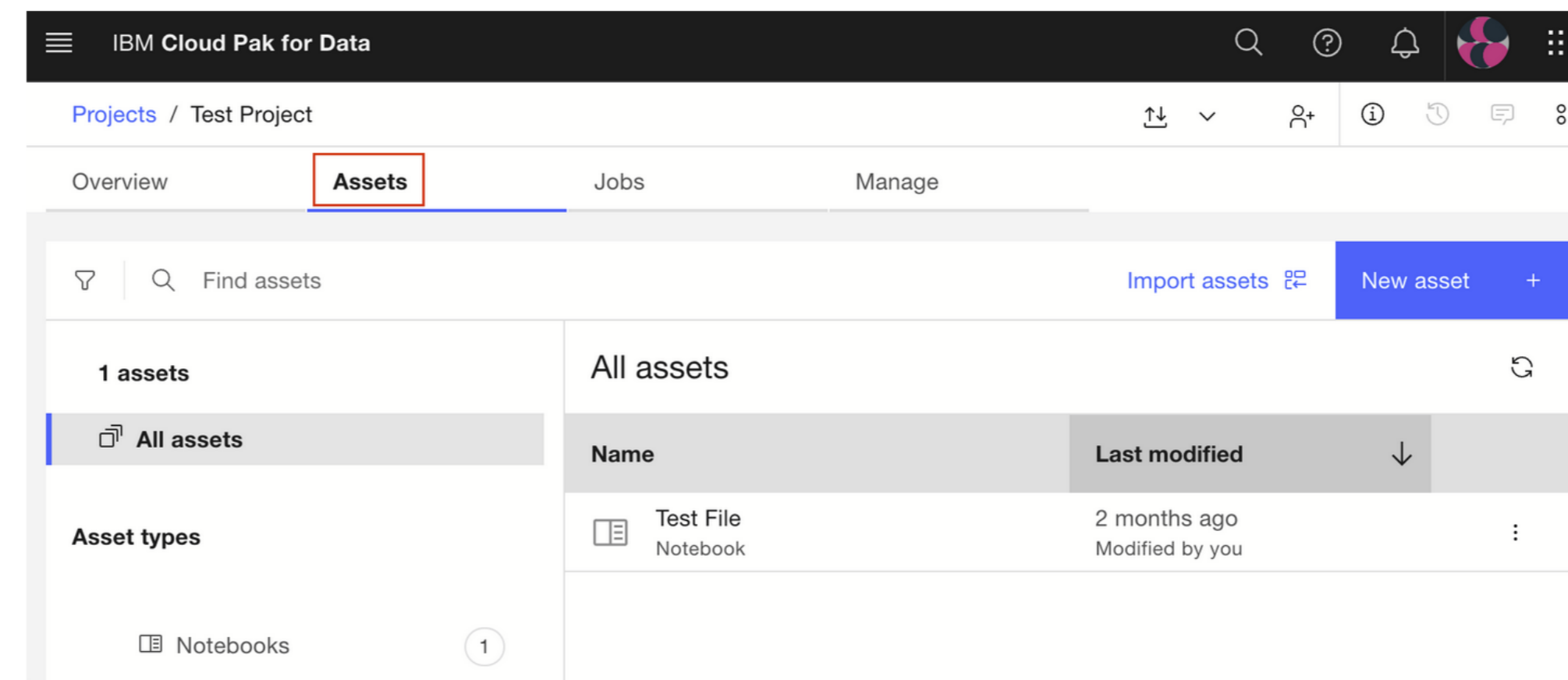
Calling AI from IBM i >

Code assistance >

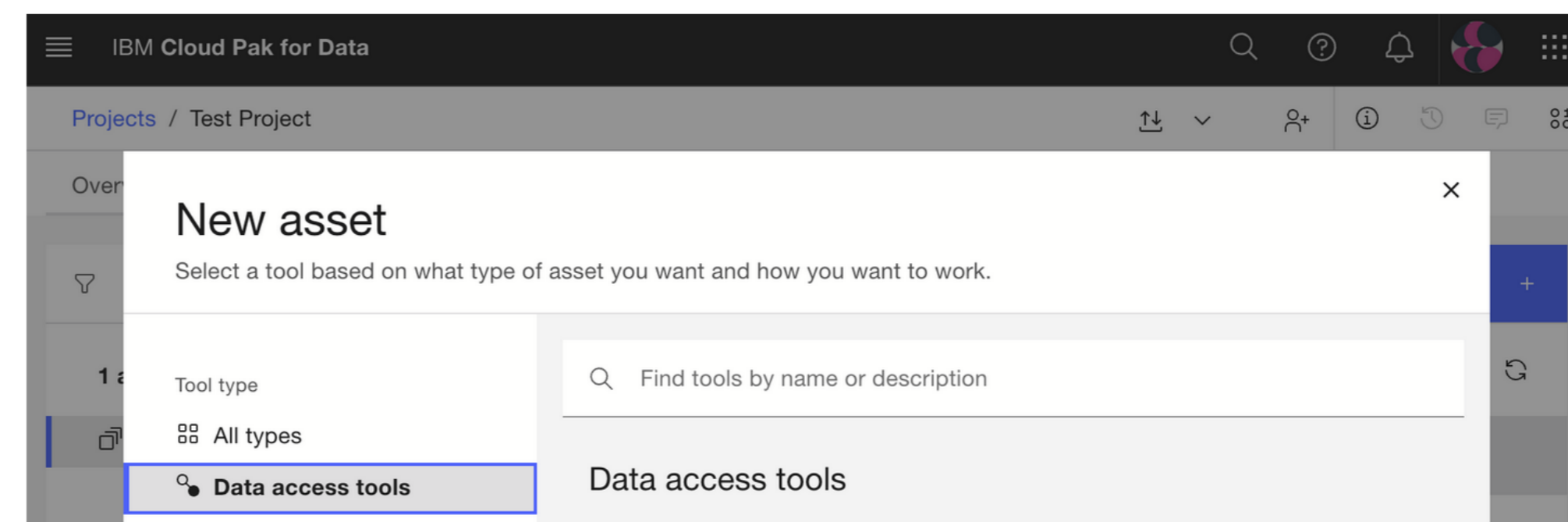
Other Useful links (external) >

Access Db2 from IBM Cloud Pak 4 Data

Go to the project page, and click the Assets tab



Click New asset > Data access tools > Connection



On this page

Overview

[Access Db2 from IBM Cloud Pak 4 Data](#)

Go to the project page, and click the Assets tab

Click New asset > Data access tools > Connection

Select the IBM Db2 for i connector

Upload JDBC driver files

Enter the connection information

Verify the connection

Create the connection

Add data assets from the connection

IBM