

Data Science Workshop

An Experiential Journey with Data to Inspire *Your* Work (Prework: Setup Instructions)

Maureen Norton

Neeraj Madan

Mwai Kalengamaliro

July 27th, 2022

Agenda

1. [Predictive Analytics and Machine Learning Solutions](#)
2. Overview of [Watson Studio](#) and [Watson Machine Learning](#)
3. Setup an Environment
 - Registration ([Create an account](#))
 - Setup an Environment ([API Key](#), [Watson Machine Learning](#), [Cloud Object Storage](#), and [Watson Studio](#))
4. [Create a Project](#)

Predictive Analytics and Machine Learning Solutions

To name a few:

1. IBM Watson Studio
2. SAS Advanced Analytics
3. RapidMiner
4. Amazon SageMaker
5. Azure Machine Learning Studio (Microsoft)
6. Google Cloud AI Platform

“The Forrester Wave™: Multimodal Predictive Analytics And Machine Learning Solutions, Q3 2018”, Forrester Research, September 2018

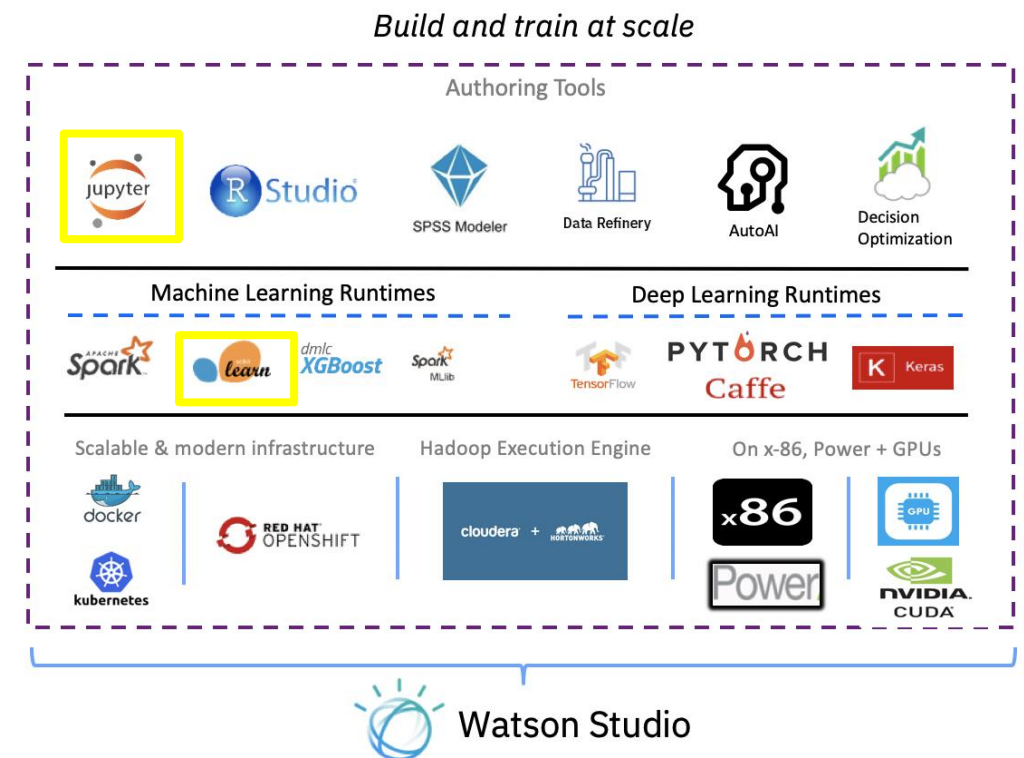
IBM Watson Studio Overview (1 of 4)

(Enterprise Data Science platform that helps your team work together to build models to make better data driven decisions for your business)

Analyze any data, no matter where it lives

Empower your entire organization with notebooks, visual productivity, and automation tools

One platform to rule them all from discovery to production



IBM Watson Studio Overview (2 of 4)

(Enterprise Data Science platform that helps your team work together to build models to make better data driven decisions for your business)

Analyze any data, no matter where it lives

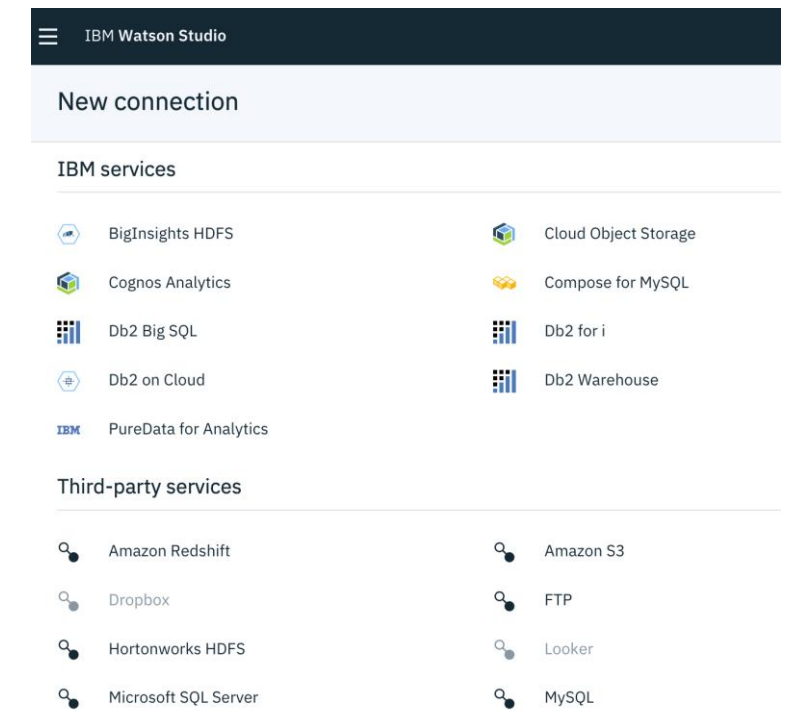
Connect to and analyze your data without moving a single byte through dozens of connectors and multiple deployment options.

Empower your entire organization with notebooks, visual productivity, and automation tools

Leverage your entire organization with a variety of tools in a single integrated platform.

One platform to rule them all from discovery to production

Analyze data, build predictive models, and seamlessly integrate Watson Machine Learning to deploy at scale



IBM Services like Cognos & DB2

3rd Party Services like Amazon S3, Hadoop, & Microsoft SQL Server

We have Public Cloud, Private Cloud, & Desktop/Server deployment options

IBM Watson Studio Overview (3 of 4)

(Enterprise Data Science platform that helps your team work together to build models to make better data driven decisions for your business)

Analyze any data, no matter where it lives

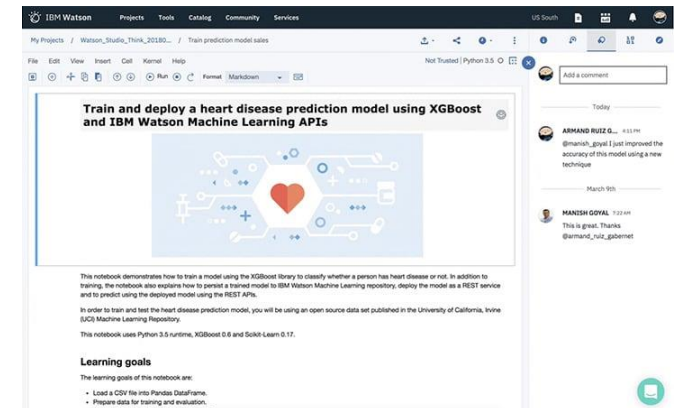
Connect to and analyze your data without moving a single byte through dozens of connectors and multiple deployment options.

Empower your entire organization with notebooks, visual productivity, and automation tools

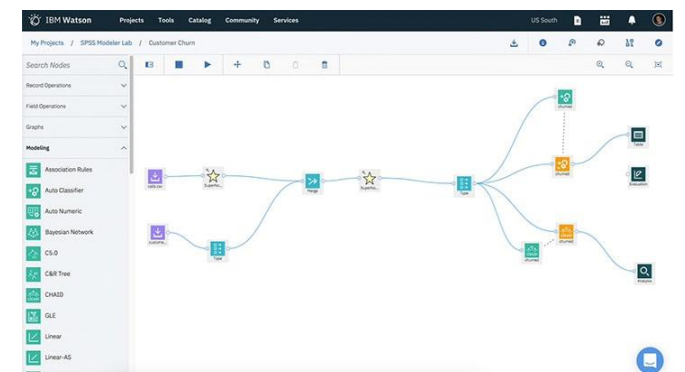
Leverage your entire organization with a variety of tools in a single integrated platform.

One platform to rule them all from discovery to production

Analyze data, build predictive models, and seamlessly integrate Watson Machine Learning to deploy at scale



Super charged Jupyter Notebooks & R Studio as most popular IDEs for data scientists well integrated with data connectors and rich set of default environments



Visual tools such as SPSS Modeler, Data Refinery, & AutoAI for non coders to analyze data and build models

IBM Watson Studio Overview (4 of 4)

(Enterprise Data Science platform that helps your team work together to build models to make better data driven decisions for your business)

Analyze any data, no matter where it lives

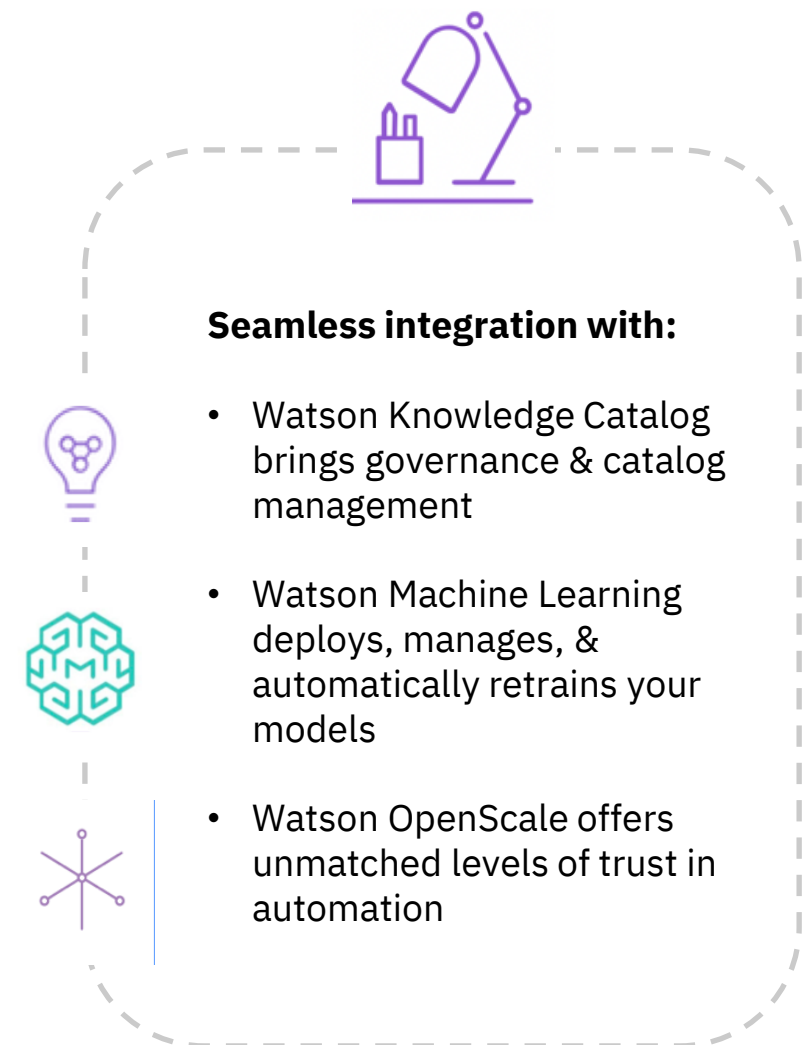
Connect to and analyze your data without moving a single byte through dozens of connectors and multiple deployment options.

Empower your entire organization with notebooks, visual productivity, and automation tools

Leverage your entire organization with a variety of tools in a single integrated platform.

One platform to rule them all from discovery to production

Analyze data, build predictive models, and seamlessly integrate Watson Machine Learning to deploy at scale



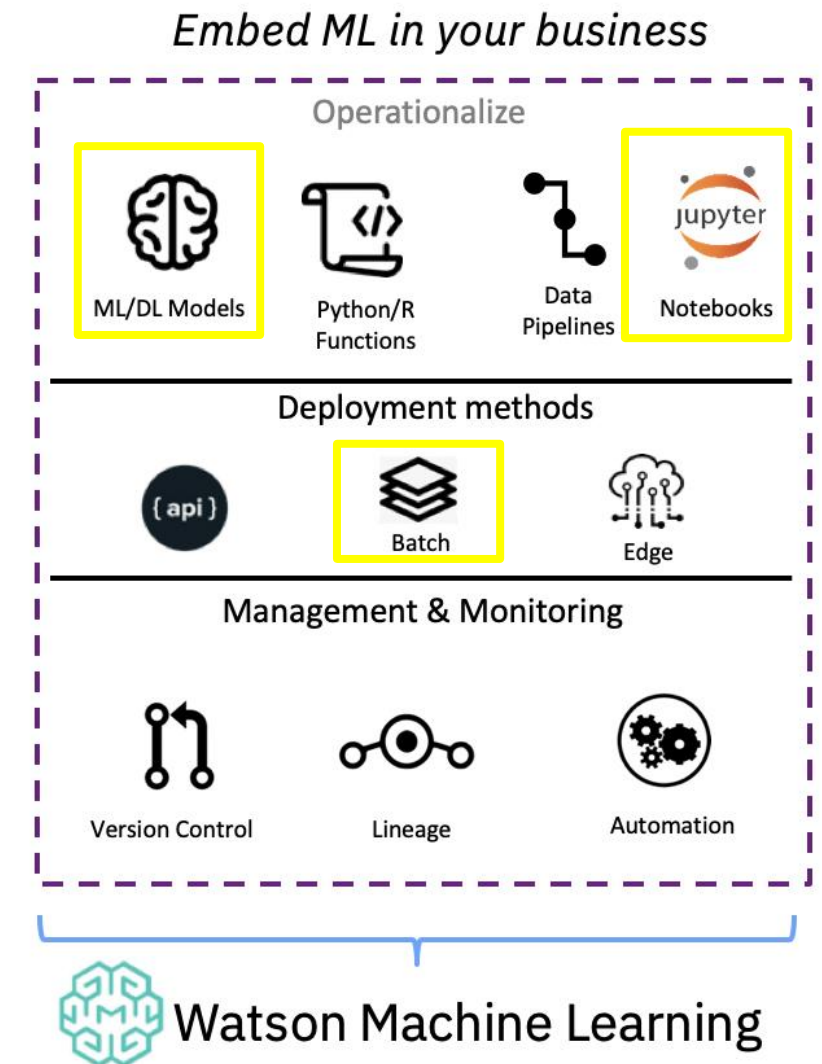
IBM Watson Machine Learning Overview (1 of 4)

(Embed Machine Learning and Deep Learning in your Business)

Deploy and Manage Models

Intelligent Model Operations

Accelerate Compute Intensive Workloads



IBM Watson Machine Learning Overview (2 of 4)

(Embed Machine Learning and Deep Learning in your Business)

Deploy and Manage Models

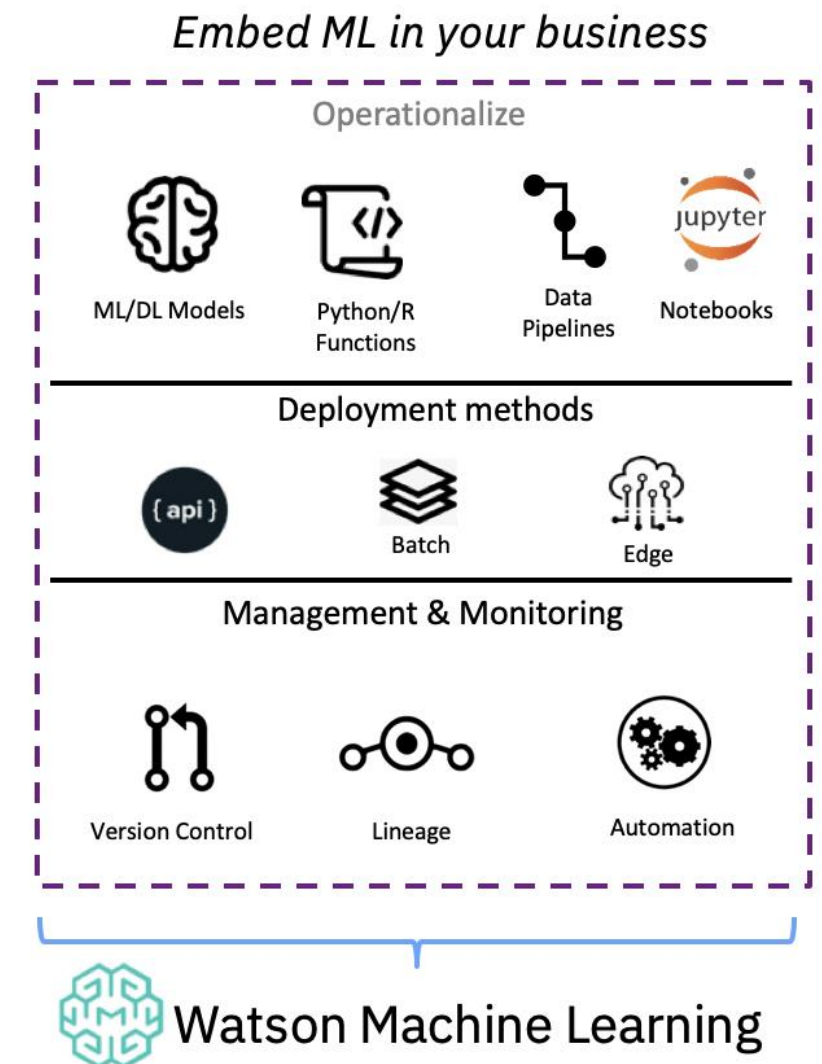
Move models to production, in an easy, secure, and compliant way.

Intelligent Model Operations

Embed intelligent training services, with feedback loops that constantly learn from new data, regardless where it resides.

Accelerate Compute Intensive Workloads

Distribute your deep learning training and Hadoop/Spark workloads with multi-tenant job scheduling .



IBM Watson Machine Learning Overview (3 of 4)

(Embed Machine Learning and Deep Learning in your Business)

Deploy and Manage Models

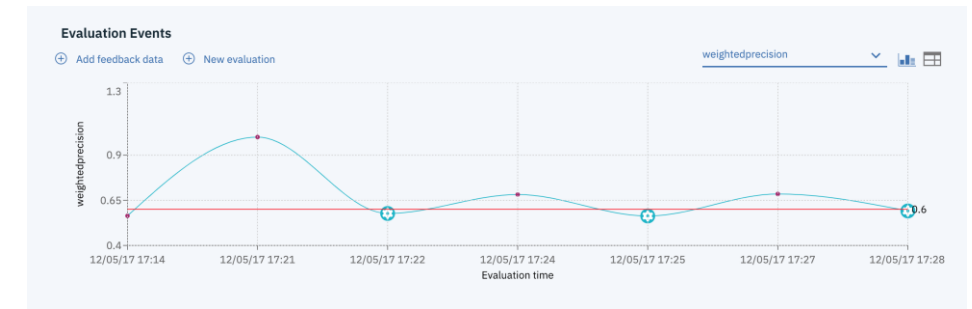
Move models to production, in an easy, secure, and compliant way.

Intelligent Model Operations

Embed intelligent training services, with feedback loops that constantly learn from new data, regardless where it resides.

Accelerate Compute Intensive Workloads

Distribute your deep learning training and Hadoop/Spark workloads with multi-tenant job scheduling .



- **Configure learning systems**
- **Flexible management experience**
 - User Interface
 - CLI
 - APIs
 - Python SDK

IBM Watson Machine Learning Overview (4 of 4)

(Embed Machine Learning and Deep Learning in your Business)

Deploy and Manage Models

Move models to production, in an easy, secure, and compliant way.

Intelligent Model Operations

Embed intelligent training services, with feedback loops that constantly learn from new data, regardless where it resides.

Accelerate Compute Intensive Workloads

Distribute your deep learning training and Hadoop/Spark workloads with multi-tenant job scheduling .



- **Visually monitor training jobs**
 - Experiments
 - AutoAI
- **WML Accelerator for optimized Spark and GPU jobs**
- **Integration with Hadoop for in-place batch training and scoring**

Getting Started: Setup an Environment

Registration (Sign up / Log into [IBM Cloud](#)) (1 of 4)

Create an IBM Cloud account

Already have an IBM Cloud account? [Log in](#)

Account information

Email

Enter your email id

Password

Enter password

Next ↓

☐ Verify email

☐ Personal information

☐ Account notice

Continue

IBM Cloud

Hello,

Thank you for signing up for IBM Cloud!

Your 7-digit verification code is:

XXXXXX

Enter this verification code on the IBM Cloud registration page where you requested the code. This code is valid for 30 minutes.

Welcome and happy building!

Thank you,
IBM Cloud

Visit the [IBM Cloud console](#).

© Copyright IBM Corporation 2014, 2022.

IBM

Getting Started: Setup an Environment

Registration (Sign up / Log into [IBM Cloud](#)) (2 of 4)

Create an IBM Cloud account

Already have an IBM Cloud account? [Log in](#)

☒ **Account information** [Edit](#)

☒ **Verify email**

We sent a 7-digit verification code to **neerajmadan2701@gmail.com**.
This code is valid for 30 minutes.

Verification code

[Next](#) [Resend code](#)

☐ **Personal information**

☐ **Account notice**

[Continue](#)



Create an IBM Cloud account

Already have an IBM Cloud account? [Log in](#)

☒ **Account information** [Edit](#)

☒ **Verify email**

☐ **Personal information**

First name

Last name

Country or region

[Next](#)

☐ **Account notice**

Getting Started: Setup an Environment

Registration (Sign up / Log into [IBM Cloud](#)) (3 of 4)

Create an IBM Cloud account

Already have an IBM Cloud account? [Log in](#)

☒ **Account information**

Edit [↗](#)

☒ **Verify email**

☒ **Personal information**

Edit [↗](#)

☒ **Account notice**

IBM may use my contact data to keep me informed of products, services and offerings:

☐ by email

You can withdraw your marketing consent at any time by submitting an [opt-out request](#). Also you may unsubscribe from receiving marketing emails by clicking the unsubscribe link in each email.

More information on our processing can be found in the [IBM Privacy Statement](#). By submitting this form, I acknowledge that I have read and understand the IBM Privacy Statement.

☒ I accept the product [Terms and Conditions](#) of this registration form.

Continue →

By creating, or using, an IBMid to access an IBM Web site or other service, you acknowledge that you have read, understand, and agree to be bound by the below terms, in addition to the terms in the IBM Terms of Use, the IBM Privacy Agreement and the "About your IBMid Account Privacy" section of this notice provide details on how IBM protects your personal data.

Most IBMid accounts are individual IDs, meaning you manage your own account information and access your account through the IBMid login service (i.e. IBMid is the authenticating agency).

If your account is created using an email address containing a domain owned by an organization which you are employed by, contracted to, or volunteer for, your organization can:

- inquire about the status of your ID
- request your account settings (including your personal information)
- at its option, convert it to an enterprise ID.

If your account was created as (or is converted to) an enterprise ID, your organization manages your account information. It is also the authenticating agency for your ID, meaning your access is controlled by your organization's login service.

[Last updated: 2021-10-16]

What data does IBM collect?

Why IBM needs your data

How your data is obtained

How IBM uses your data

How IBM protects your data

How long we keep your data

About your IBMid Account Privacy

☒ I acknowledge that I understand how IBM is using my Basic Personal Data and (if applicable) how my organization may become the authenticating agency for my IBMid account. I certify that my age is at least the age of consent for my country of residence.

Continue →

Getting Started: Setup an Environment

Registration (Sign up / Log into [IBM Cloud](#)) (4 of 4)

Verify identity

Account information

Register with a code ⓘ

Account type

☒ Company ☐ Personal

Next ↓

☐ Company information

☐ Billing information

☐ Payment information

Create account ⓘ

Verify identity

Apply code [Register without a code ⓘ](#)

Enter the code that has been provided to you. You can apply the code to only one account, and it can't be removed.

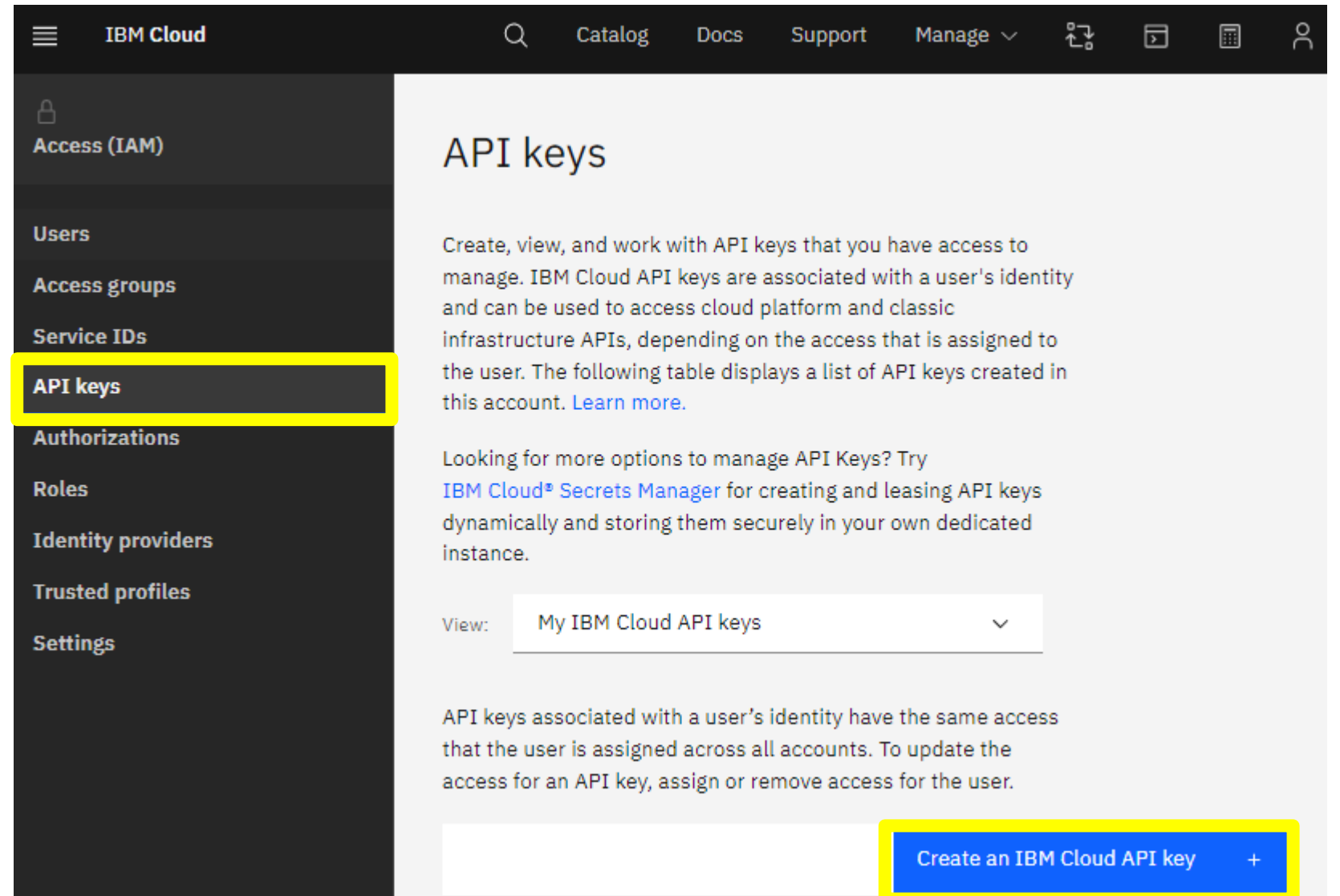
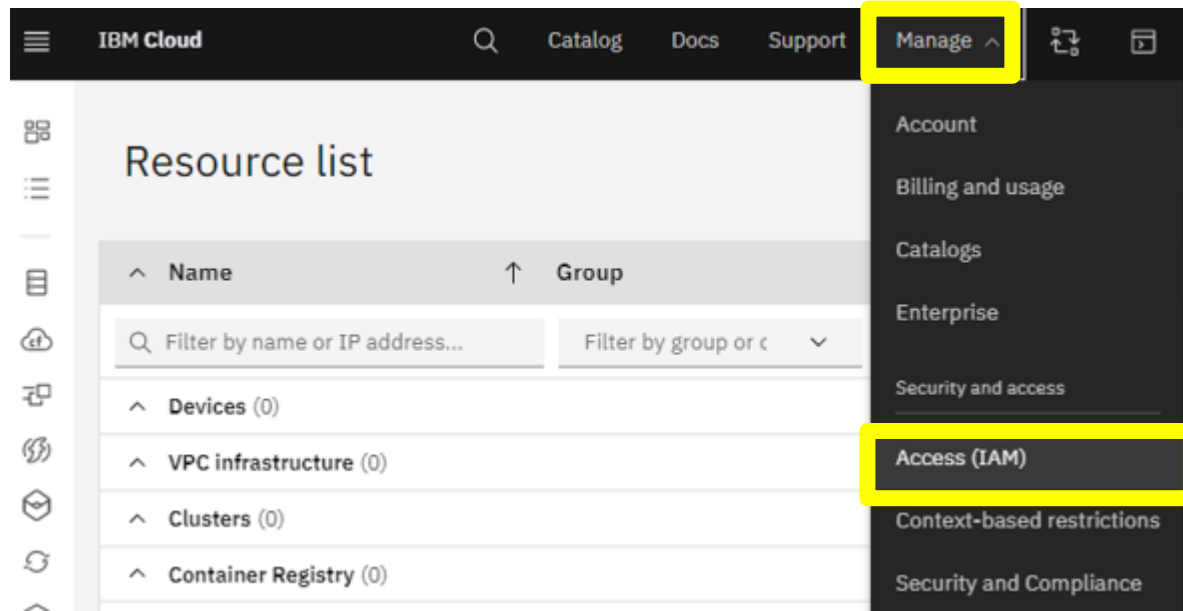
Enter code

Account ID: 745111b659bc4eeabc00a9d9dc9d53b6 ⓘ

Create account ⓘ

Getting Started: Access (IAM)

API Key (1 of 2)



Getting Started: Access (IAM)

API Key: Create, Copy and Download API Key (2 of 2)

Create API key

×

Name

Enter name of API Key

Description

Cancel

Create

API key successfully created

Copy the API key or click download to save it. You won't be able to see this API key again, so you can't retrieve it later. The API key is no longer displayed after 286 seconds.

API key

.....

Copy

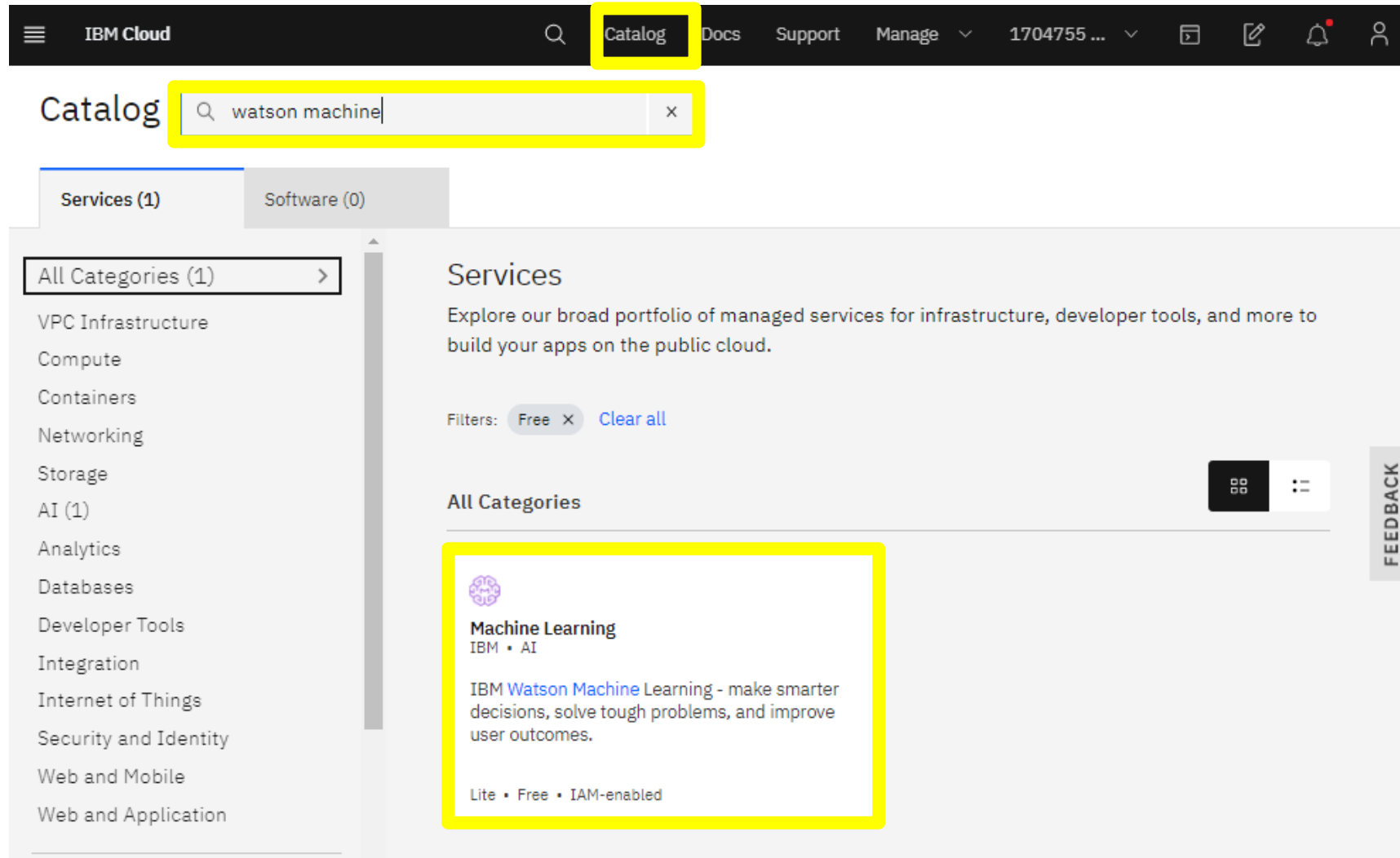


Download



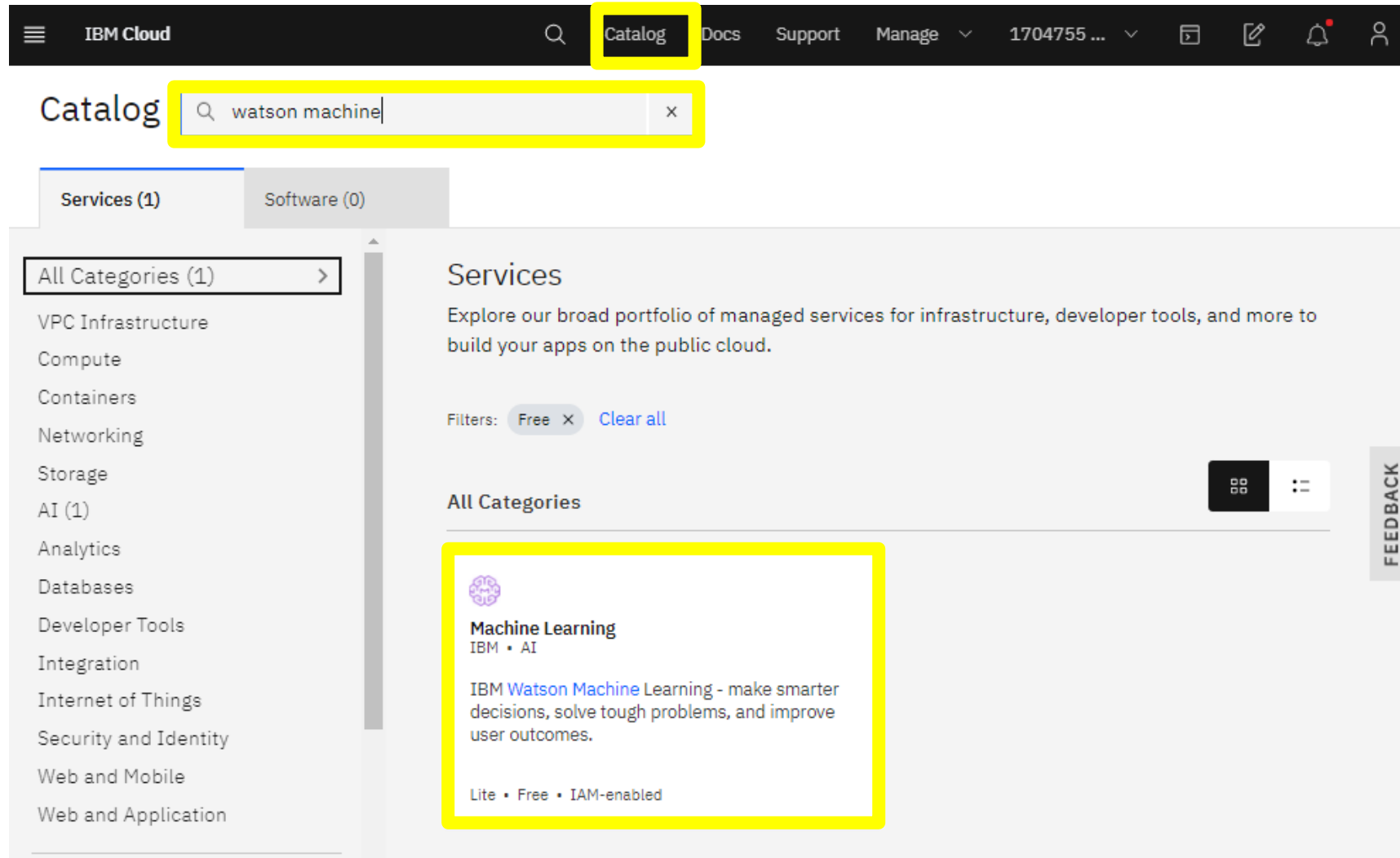
Getting Started: Setup an Environment

Watson Machine Learning (1 of 2)



Getting Started: Setup an Environment

Watson Machine Learning (1 of 2)



Getting Started: Setup an Environment

Watson Machine Learning (2 of 2)

IBM Watson Studio

Upgrade

Neeraj Madan's Account

NM

Machine Learning

IBM Watson Machine Learning is a full-service IBM Cloud offering that makes it easy for developers and data scientists to work together to integrate predictive capabilities with their applications. The Machine Learning service is a set of REST APIs that you can call from any programming language to develop applications that make smarter decisions, solve tough problems, and improve user outcomes.

Features

Machine Learning features

Take advantage of machine learning models management (continuous learning system) and deployment (online, batch, streaming). Select any of widely supported machine learning frameworks: TensorFlow, Keras, Caffe, PyTorch, Spark MLlib, scikit learn, xgboost and SPSS.

Wide choice of interfaces

Use the command line interface and Python client to manage your artifacts. Extend your application with artificial intelligence through the Watson Machine Learning REST API.

Integration with Watson Studio

Create and train machine learning models with the best tools and the latest expertise in a social environment built by and for data scientists.

Pricing Plan: Monthly Process shown above reflect the: United States

PLAN	FEATURES	PRICING
<div>Lite</div>	<div><div>Service instance</div><div>5 model deployments</div><div>5,000 predictions</div><div>50 capacity unit-hours (CUH) included:</div><div>Capacity Type:</div><div><div>1 (one) NVIDIA K80 GPU = 2 capacity units required per hour</div><div>1 (one) NVIDIA V100 GPU = 8 capacity units required per hour</div><div>1 vCPU and 4 GB RAM = 0.5 capacity units required per hour</div><div>2 vCPU and 8 GB RAM = 1 capacity units required per hour</div><div>4 vCPU and 16 GB RAM = 2 capacity units required per hour</div><div>8 vCPU and 32 GB RAM = 4 capacity units required per hour</div><div>16 vCPU and 64 GB RAM = 8 capacity units required per hour</div></div><div>Auto AI</div><div>8 vCPU and 32 GB RAM = 20 capacity units required per hour</div><div>Decision Optimization</div><div>2 vCPU and 8 GB RAM = 30 capacity units required per hour</div><div>4 vCPU and 16 GB RAM = 40 capacity units required per hour</div><div>16 vCPU and 64 GB RAM = 60 capacity units required per hour</div></div>	Free

The lite plan instance of the IBM Watson Machine Learning service provides you with a maximum of 5 deployed models, 5,000 predictions per month, and 50 capacity unit-hours per month during which model can be trained, evaluated, and deployed to be available to accept prediction events, with a minimum of 1 minute per training job.



Confirm Creation

Region

Dallas

Plan

Lite

Resource group

Default

Service name

pm-20-uu

Cancel

Confirm

Create



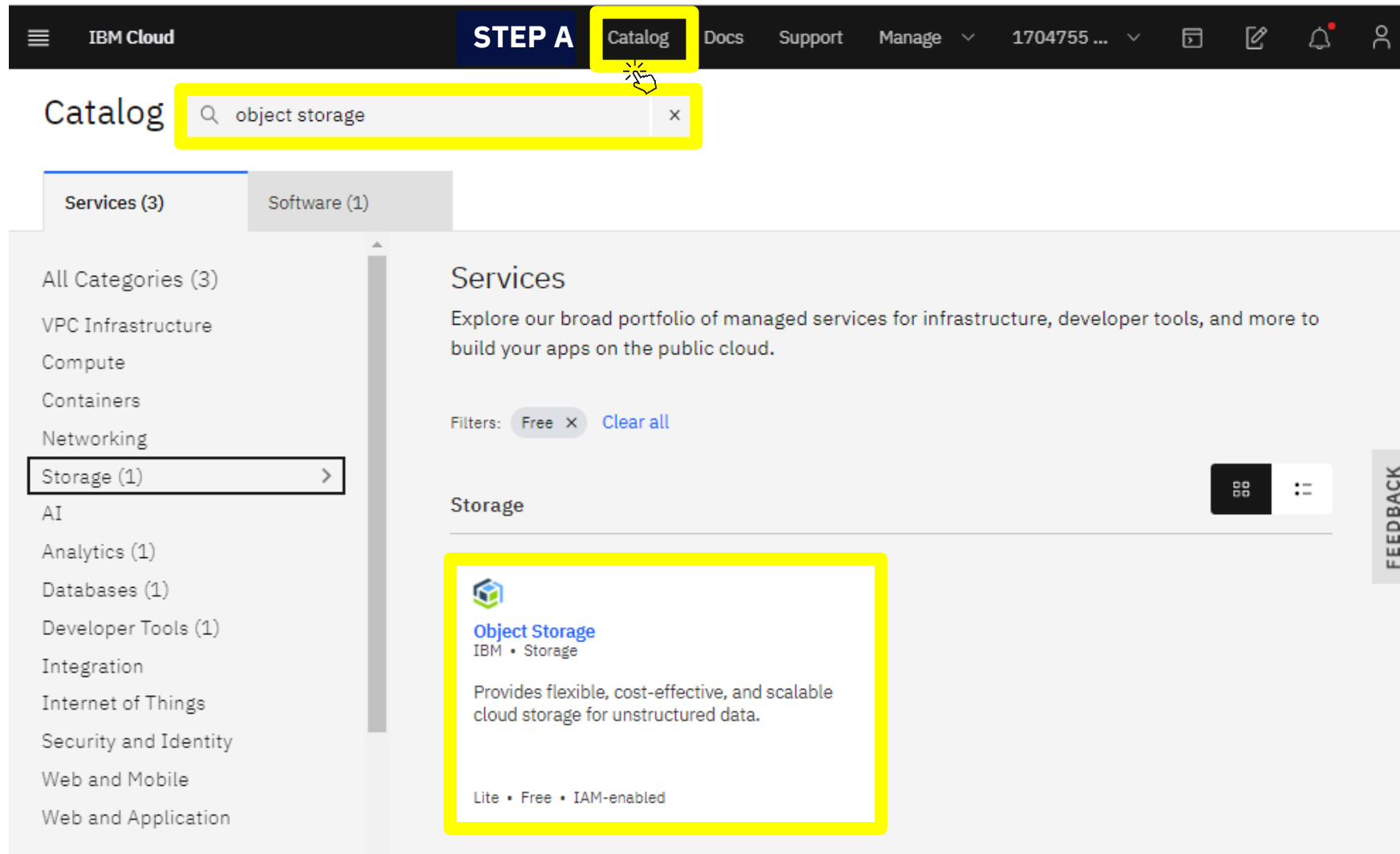
STEP D

STEP E



Getting Started: Setup an Environment

Cloud Object Storage (1 of 2)



Getting Started: Setup an Environment

Cloud Object Storage (2 of 2)

IBM Watson Studio

Upgrade

Neeraj Madan's Account

NM

Existing

New

Cloud Object Storage

IBM Cloud Object Storage is a highly scalable cloud storage service, designed for high durability, resiliency and security. Store, manage and access your data via our self-service portal and RESTful APIs. Connect applications directly to Cloud Object Storage use other IBM Cloud Services with your data.

Features

Storage for the IBM Cloud

IBM Cloud Object Storage provides unstructured data storage for cloud applications. Libraries and SDKs support a common set of S3 API functions for connecting new applications to scalable cloud storage and integrating your data into other services on the IBM Cloud Platform as well as IBM Watson services. IBM Cloud Object Storage is available with Regional, Cross Region and single site resiliency options worldwide.

Built-in Aspera high-speed transfer

With IBM Cloud Object Storage Aspera high-speed data transfer, you can improve data transfer performance by quickly transferring data over long distances, and under various network conditions. It is natively integrated into Cloud Object Storage and there is no additional cost for uploading data.

Storage Classes and Archive Policy

Choose storage classes based on your usage patterns for active, less-active, and cold workloads with Standard, Vault, and Cold Vault respectively. Use Flex class for dynamic data access with usage patterns that are hard to predict. For rarely used data that requires long-term retention, simply set an Archive policy with our existing storage-class tiers allowing you to reduce costs even further with our lowest priced Archive storage.

Access and Key Management

IBM Identity and Access Management (IAM) policies allow for granular access control at the bucket level using role-based policies. Key Protect support allows customers to have their own managed encryption keys for higher level data security.

Pricing Plan: Monthly Process shown above reflect the: **United States**

PLAN	FEATURES	PRICING
<input checked="" type="radio"/> Lite	1 COS Service Instance Storage up to 25 GB/mo. Up to 20,000 GET requests/mo. Up to 2,000 PUT requests/mo. Up to Data Retrieval 10 GB/mo. Up to 5GB Public Outbound Applies to aggregate total across all storage bucket classes	Free
<input type="radio"/> Standard	There is no minimum fee, so you pay only for what you use.	Expand each section to view details

Cancel

Create



STEP D

Confirm Creation

Plan

Lite

Resource group

Default

Service name

cloud-object-storage-qx

Cancel

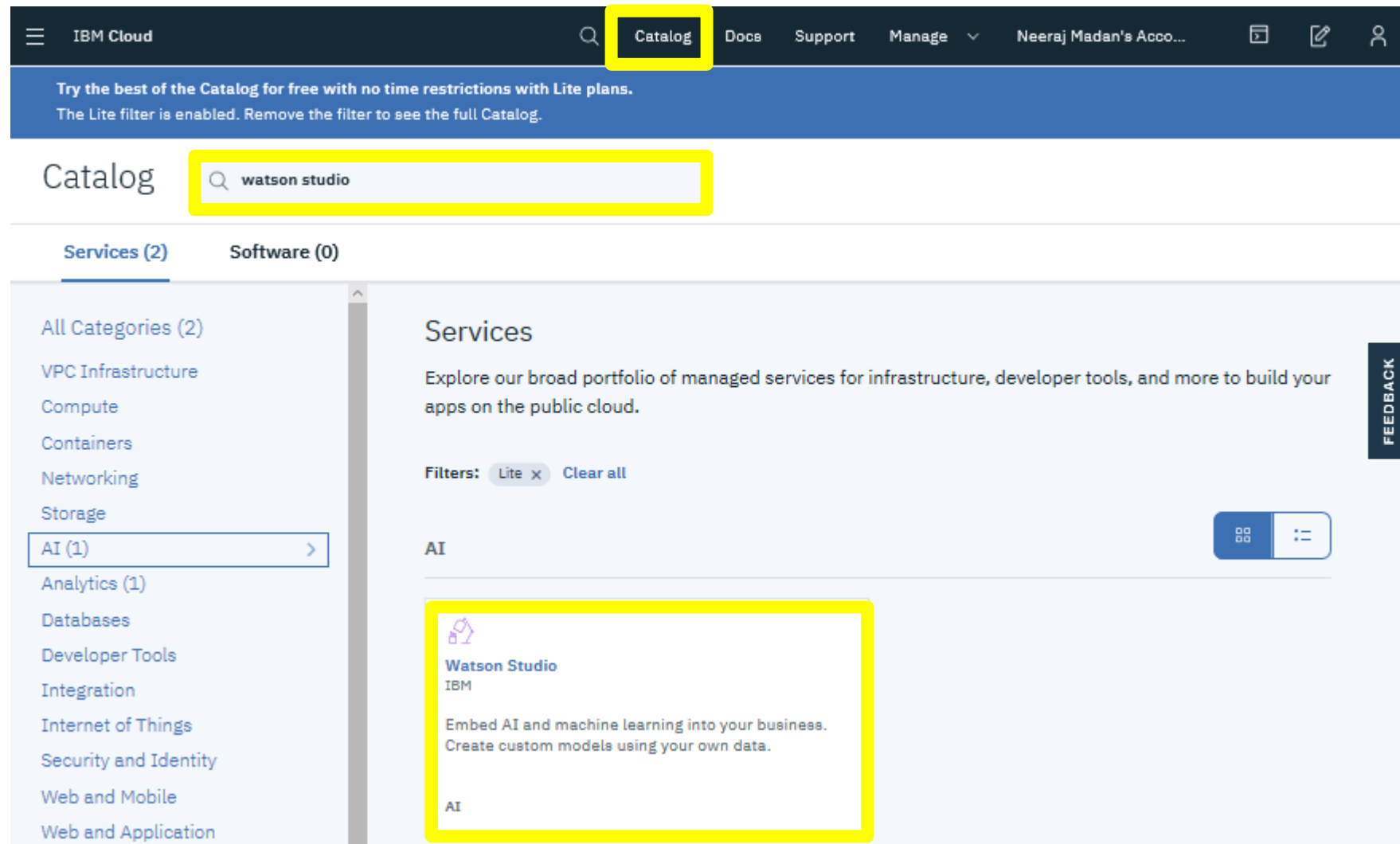
Confirm

STEP E



Getting Started: Setup an Environment

Watson Studio Service (1 of 2)



Getting Started: Setup an Environment

Watson Studio Service (2 of 2)

The screenshot shows the IBM Cloud Watson Studio service page. The top navigation bar includes 'IBM Cloud', 'Catalog', 'Docs', 'Support', 'Manage', and a user profile. The main header features the 'Watson Studio' logo, tabs for 'Lite', 'IBM', 'Service', and 'IAM-enabled', and links for 'Need Help?', 'Contact Support', and 'View docs'. The 'Create' tab is active, showing a 'Select a region' dropdown with 'Dallas' selected, a 'Select a pricing plan' section with a table of plans, and a 'Create' button. The 'Lite' plan is selected and highlighted with a yellow box. The 'Create' button is also highlighted with a yellow box. The 'Summary' section on the right shows the service details: 'Watson Studio', 'Region: Dallas', 'Plan: Lite', 'Service name: Watson Studio-79', and 'Resource group: Default'. The 'Create' button is highlighted with a yellow box.

IBM Cloud

Watson Studio Lite IBM Service IAM-enabled

Author: IBM • Date of last update: 01/13/2020

Need Help? [Contact Support](#) [View docs](#)

Create About

Select a region

Dallas

Select a pricing plan

Displayed prices do not include tax. Monthly prices shown are for country or region: [United States](#)

PLAN	FEATURES	PRICING
✓ Lite	1 authorized user 60 capacity unit-hours monthly limit 1 free small compute environment with 1 vCPU and 4 GB RAM (does not require capacity unit-hours)	Free

The Lite plan for Watson Studio offers everything you need to become a better data scientist or domain expert in a collaborative environment.

Lite plan services are deleted after 30 days of inactivity.

Create

Add to estimate

[View terms](#)

FEEDBACK

Getting Started: Final Check

Verify Services and Storage; Launch Watson Studio

The screenshot shows the IBM Cloud console interface. On the left, the 'Resource List' is highlighted. A blue arrow points to the 'Services' section, which contains a table of services. A yellow box highlights the 'Services' section header and the first two rows of the table. Another yellow box highlights the 'Dallas' location for both 'Watson Studio-79' and 'pm-20-jx'. A third yellow box highlights the 'Storage' section header and the 'cloud-object-storage-qx' entry. Below the services table, a 'Provide your information to continue' form is shown. A yellow box highlights the 'Company name' and 'Phone number' input fields. A blue arrow points from the form to a 'Go to IBM Watson Studio' button, which is also highlighted with a yellow box. The button is located at the bottom right of the form.

Services to show Watson Studio, Cloud Object Storage, and Machine Learning Services.

Services (2)				
Watson Studio-79	Default	Dallas	Watson Studio	Active
pm-20-jx	Default	Dallas	Machine Learning	Active

Storage (1)				
cloud-object-storage-qx	Default	Global	Cloud Object Storage	Provisioned

Provide your information to continue

Company name

Phone number

Continue

IBM may use my contact data to keep me informed of products, services, and offerings:

☐ by email

☐ by phone

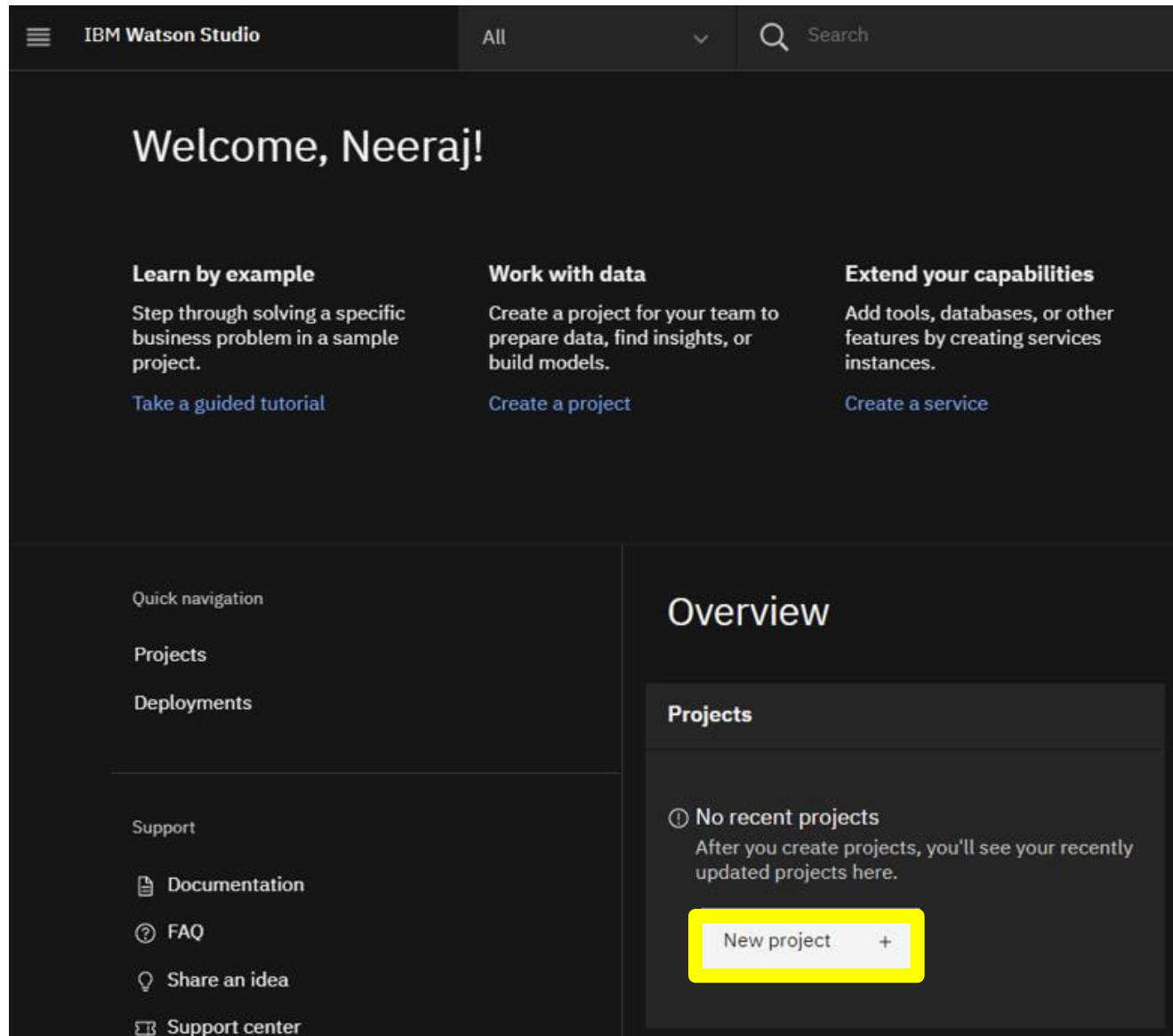
You can withdraw your marketing consent at any time by submitting an [opt-out request](#). Also, you may unsubscribe from receiving marketing emails by clicking the unsubscribe link in each email. More information on our processing can be found in the [IBM Privacy Statement](#).

By submitting this form, I acknowledge that I have read and understand the IBM Privacy Statement and I accept the product [Terms and Conditions](#) of this registration form.

Go to IBM Watson Studio


Getting Started: Create a Project


Select a New Project (1 of 4)





Getting Started: Create a Project


Mention the Project Name (2 of 4)

 IBM Watson Studio

Upgrade 



Neeraj Madan's Account 

NM 

Define project details

Name

Description

Project description

Choose project options

☐ Restrict who can be a collaborator 

Project includes integration with [Cloud Object Storage](#) for storing project assets.

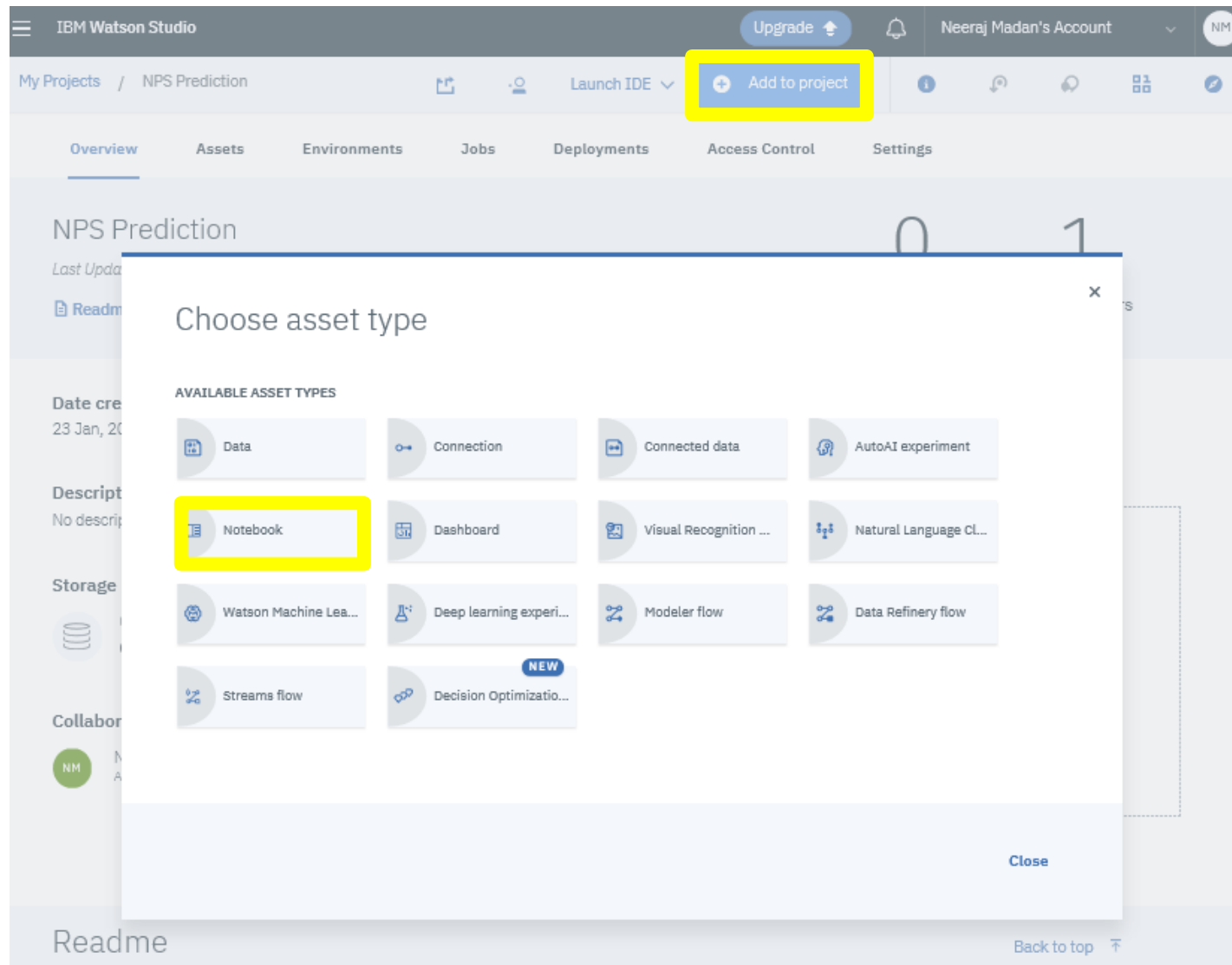
Storage

Cancel

Create

Getting Started: Create a Project

Add a notebook to your project (3 of 4)



Getting Started: Create a Project

Import a notebook from GitHub (4 of 4)

IBM Watson Studio

My Projects / NPS Prediction / Add Notebook

New notebook

Blank From file **From URL**

Name

NPS Prediction 26 characters remaining

Description (optional)

Type your Description here 500 characters remaining

Select runtime

IBM Runtime 22.1 on Python 3.9 XS

The selected runtime has 1 vCPU and 4 GB RAM and is free.
[Learn more](#) about capacity unit hours and Watson Studio pricing plans.

Notebook URL

Use the notebook link mentioned below

Notebook URL:

<https://github.com/neemadan/An-Experiential-Journey-With-Data-to-Inspire-Your-Work/blob/master/An%20Experimental%20Journey%20With%20Data%20to%20Inspire%20Your%20Work.ipynb> (To be used in the workshop)

Getting Started: Create a Deployment

Select a New Project (1 of 3)

The screenshot displays the IBM Watson Studio user interface. At the top, a dark header bar contains the 'IBM Watson Studio' logo, a filter dropdown set to 'All', and a search bar. Below the header, a large section titled 'Welcome, Neeraj!' offers three main paths: 'Learn by example' (with a 'Take a guided tutorial' link), 'Work with data' (with a 'Create a project' link), and 'Extend your capabilities' (with a 'Create a service' link). The bottom of the interface is divided into three panels. The left panel is a sidebar with 'Quick navigation' links for 'Projects' and 'Deployments', and a 'Support' section with links to 'Documentation', 'FAQ', 'Share an idea', and 'Support center'. The middle panel, titled 'Overview', shows a 'Projects' section with a message 'No recent projects' and a 'New project' button. The right panel, titled 'Deployments', features an information icon and a prominent yellow square containing a white '+' sign, indicating the option to create a new deployment.

IBM Watson Studio

All

Search

Welcome, Neeraj!

Learn by example
Step through solving a specific business problem in a sample project.
[Take a guided tutorial](#)

Work with data
Create a project for your team to prepare data, find insights, or build models.
[Create a project](#)

Extend your capabilities
Add tools, databases, or other features by creating services instances.
[Create a service](#)

Quick navigation

Projects

Deployments

Support

Documentation

FAQ

Share an idea

Support center

Overview

Projects

① No recent projects
After you create projects, you'll see your recently updated projects here.

New project +

Deployments ⓘ

+

Getting Started: Create a Deployment

Select a New Project (2 of 3)

New deployment space

Use a space to collect assets in one place to create, run, and manage deployments

Define details

Name

Deployment space name

Description (Optional)

Deployment space description

Deployment space tags (optional) ⓘ

Add a tag

Select services

Select storage service ⓘ

Cloud Object Storage-t4

Select machine learning service (optional) ⓘ

Machine Learning-xe

Upload space assets (optional)

Populate your space with assets exported from a project or space to a .zip file. You can add more assets after the space is created.

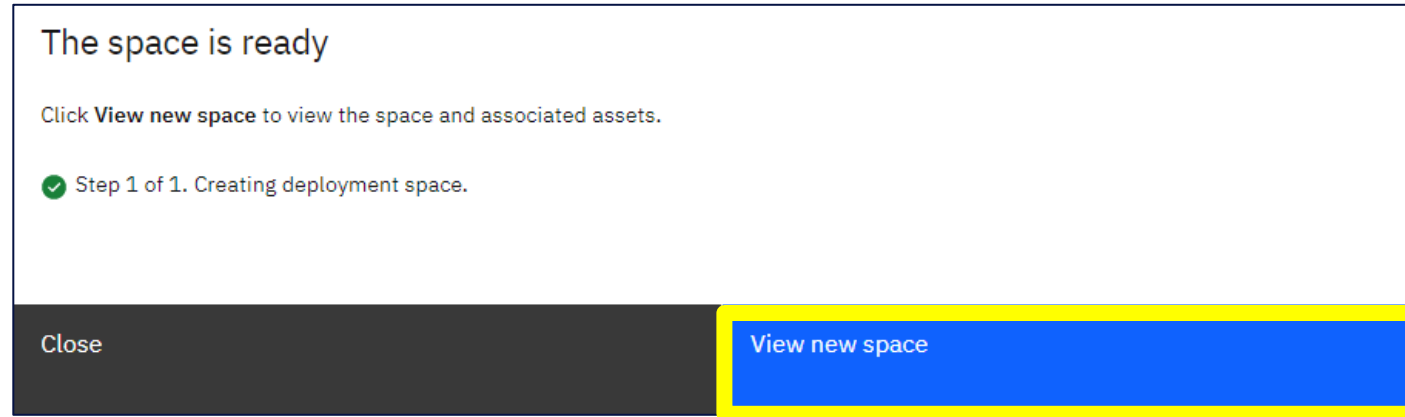
Drop .zip file here or browse your files to upload

Cancel




Create

Getting Started: Create a Deployment

Select a New Project (2 of 3)



Contact Us

	<p>Name: Maureen Norton Email Id: nortonm@us.ibm.com LinkedIn: https://www.linkedin.com/in/maureennorton/</p>
	<p>Name: Mwai Kalengamaliro Email Id: mkaleng@us.ibm.com LinkedIn: https://www.linkedin.com/in/mwai-kalengamaliro/</p>
	<p>Name: Neeraj Madan Email Id: nmadan@us.ibm.com LinkedIn: https://www.linkedin.com/in/neerajmadan/</p>

