

Ibn Tofail University
The National School of Applied Sciences, Kenitra



Mini project of IBM Certification

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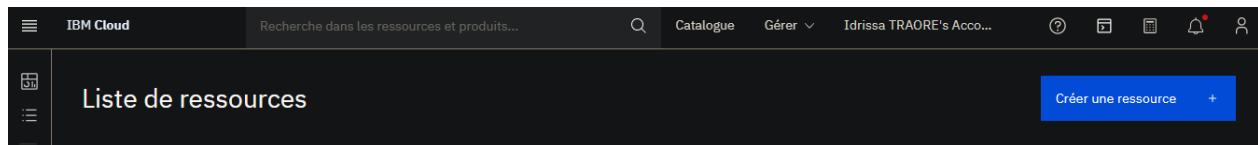
Academic year 2022-2023

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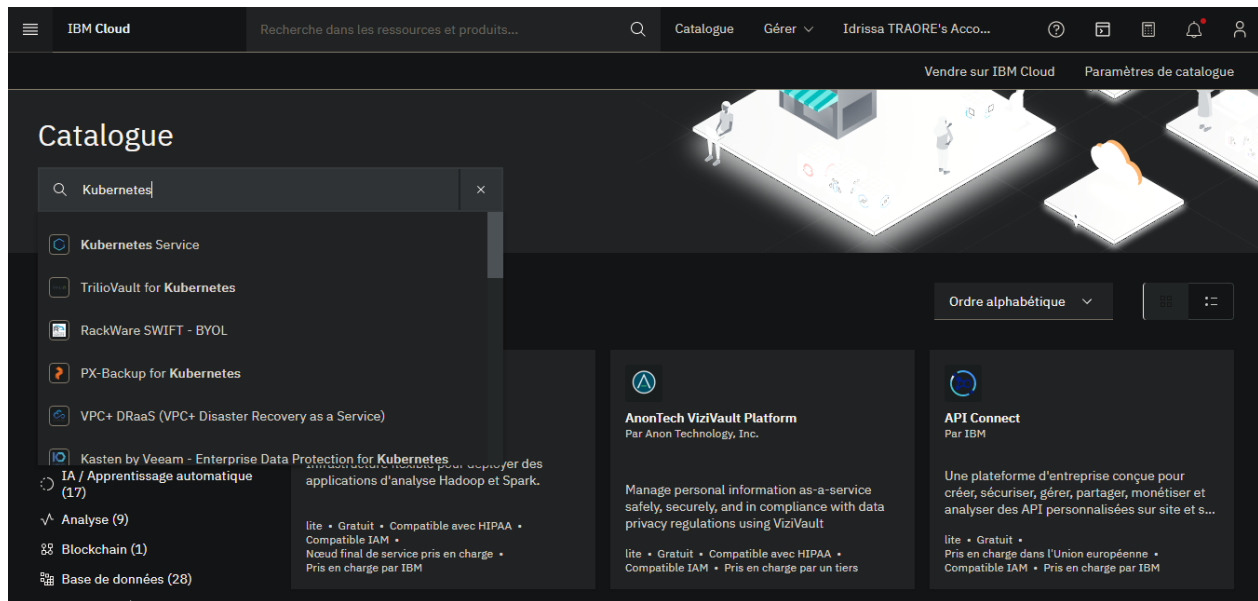
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Create a Kubernetes cluster on which to deploy the Node-RED app

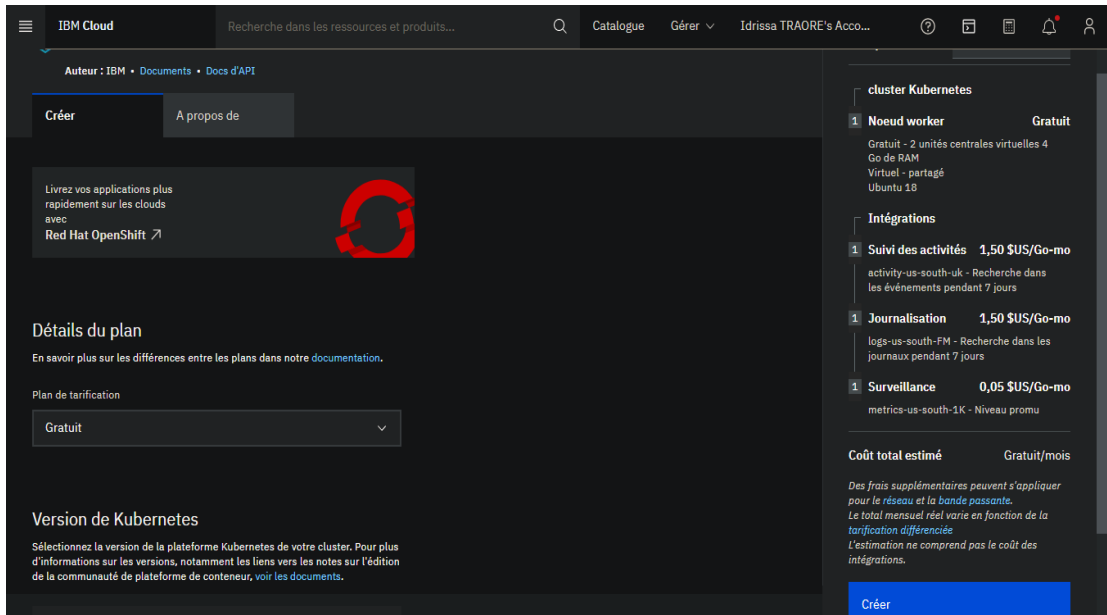
1. After being logged in my IBM account, I click on list of resource



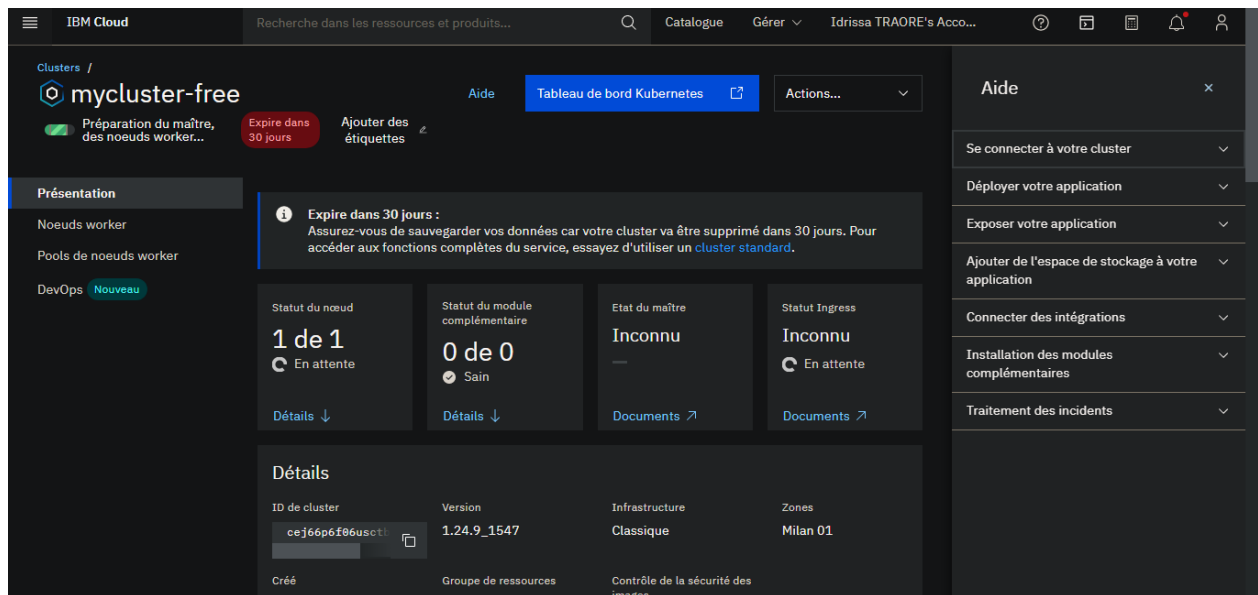
2. I search the catalog for “Kubernetes”, then click Kubernetes Service



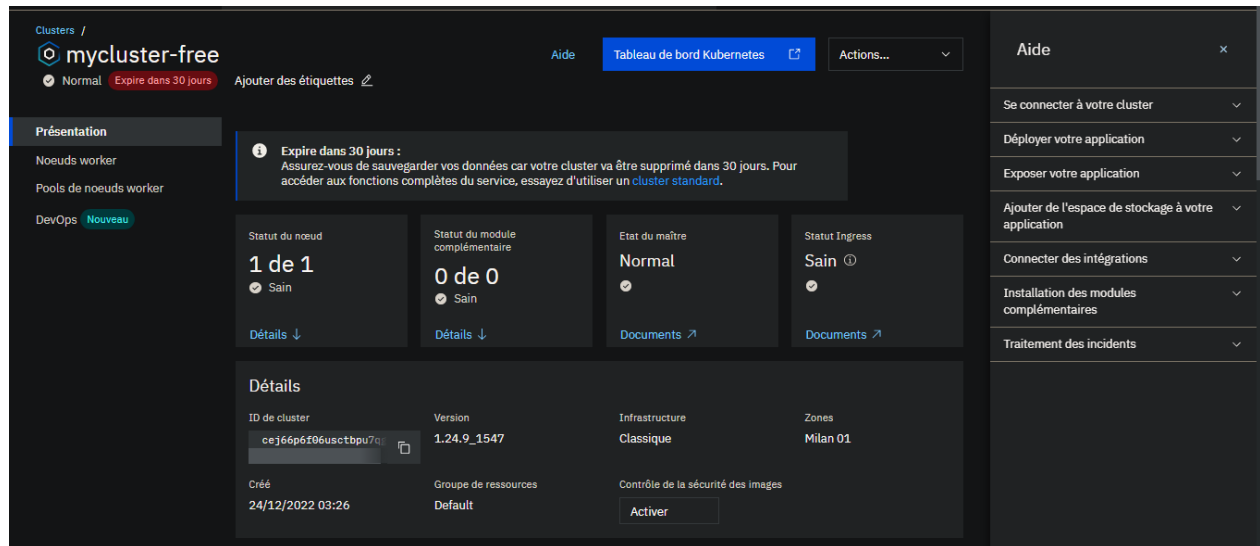
3. I select the Free pricing plan and leave the default values for the other fields, then click Create



4. I wait until the cluster is deployed, that is, cluster status is Normal

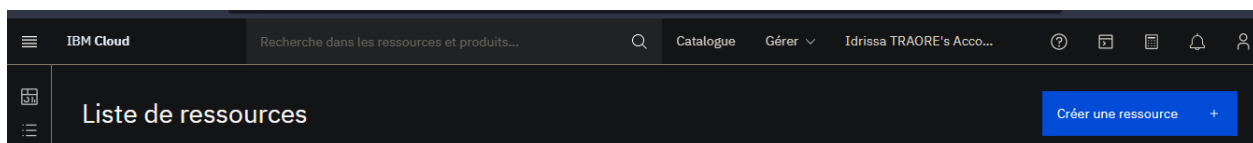


Finally, it is, now

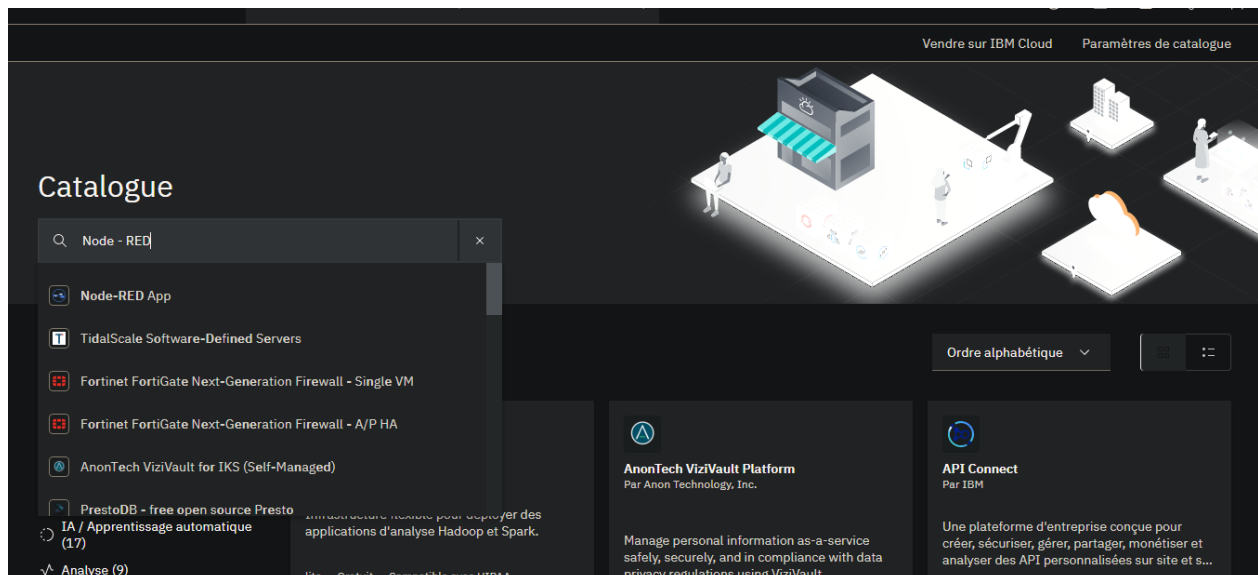


Create and deploy the Node-RED app.

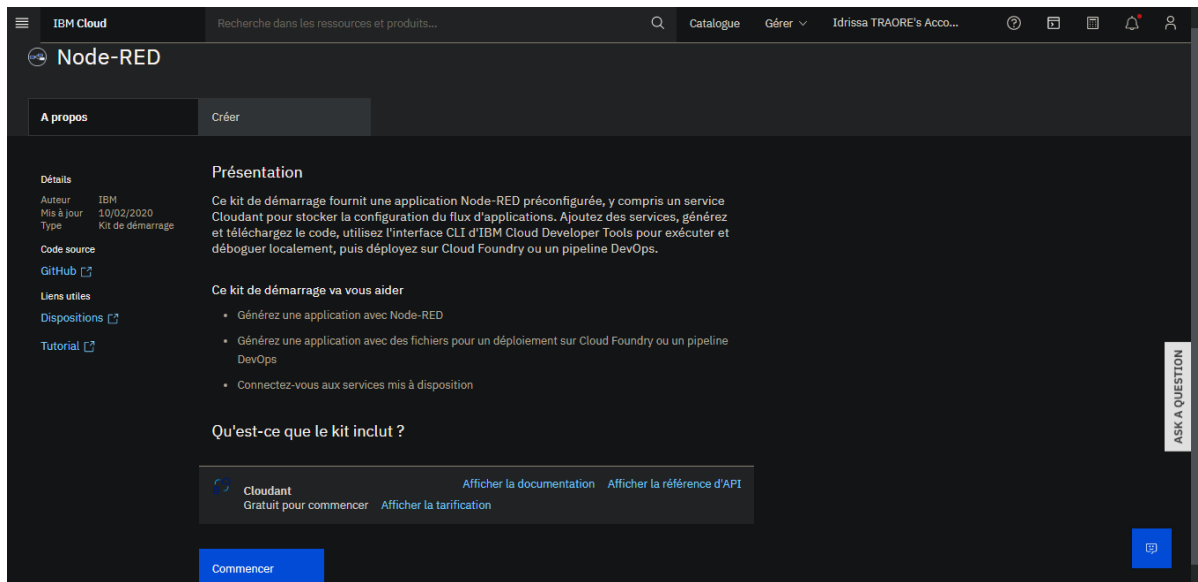
1. I click on create a resource again



2. I search the catalog for "Node-RED", then click Node-RED App.



3. I click the Create tab, leave the default values for all fields, and then click Create.



Détails de l'application

Nom de l'application

Node RED MRJNX 2022-12-24

Acceptez le nom par défaut ou entrez une valeur pouvant comporter entre 2 et 128 caractères.

Groupe de ressources

Default

Etiquettes ⓘ

Exemples : env:dev, version-1

Plateforme

☒ Node.js

Détails du service

Cloudant

Région

Francfort

Groupe de ressources

Default

Plan de tarification

Lite

[Détails concernant la tarification](#) [Dispositions](#)

Annuler **Créer**

4. The Node-RED App administration page opens. So I Click on Deploy your app.

The screenshot shows the 'Node RED MRJNX 2022-12-24' application administration page. The page is divided into several sections:

- Détails:** Includes fields for 'UTL de l'application', 'Source' (with a 'Télécharger le code' button), 'Groupe de ressources' (set to 'Default'), 'Cible de déploiement', and 'Créé' (24/12/2022).
- Services:** A section for managing services, including a 'Cloudant' service with links to 'Ouvrir le tableau de bord', 'Documentation', and 'Référence de l'API'. There are buttons for 'Connecter des services existants' and 'Créer un service'.
- Automatisation du déploiement:** A section for configuring deployment automation, including a 'Configuration de la distribution continue' and a 'Déploiement de votre application' button.
- Initiation rapide:** A sidebar on the right with a 'Configuration de votre application' section, providing instructions on how to connect services and deploy the application.

5. I select Kubernetes Service for deployment target.

The screenshot shows the 'Node RED MRJNX 2022-12-24' application administration page, specifically the 'Automatisation du déploiement' section. The page is divided into several sections:

- Header:** Includes the title 'Node RED MRJNX 2022-12-24' and a subtitle 'Sélectionner la cible de déploiement Configurer la chaîne d'outils DevOps'.
- Automatisation du déploiement:** A section for configuring deployment automation, including a 'Sélectionnez votre cible de déploiement et configurez votre chaîne d'outils DevOps. Une fois que vous avez cliqué sur **Créer**, la chaîne d'outils est créée et le processus de déploiement démarre automatiquement.'
- Cible de déploiement:** A section for selecting a deployment target, featuring three options: 'Kubernetes Service' (IBM), 'Red Hat OpenShift' (IBM), and 'Code Engine' (IBM). Each option includes a description of the service and its capabilities.
- Clé d'API IBM Cloud:** A section for entering the API key for IBM Cloud, including a text input field and a 'Nouveau' button.

6. Click New + to generate an IBM Cloud API key, then click OK.

Créer une clé d'API avec un accès complet

Avertissement : vous allez créer une clé d'API qui permettra à quiconque la possédant de faire tout ce que vous pouvez faire. Vous pouvez améliorer votre situation en matière de sécurité en utilisant l'[interface utilisateur IAM pour créer une clé d'API d'ID de service](#) qui limite l'accès uniquement aux éléments dont votre pipeline a besoin et en la collant dans le modèle d'interface utilisateur à la place. Pour plus d'informations sur les clés d'API et sur les accès, voir la [documentation relative à IAM](#).

Nom	Description
Clé d'API pour NodeREDMYXDI2022-12-24	

☐ Sauvegarder cette clé dans un magasin de secrets pour la réutiliser

AnnulerOK

7. Leave the default values and then click Next.

Cible de déploiement

Kubernetes Service
IBM

Déployez, mettez à l'échelle et gérez vos charges de travail d'application conteneurisée sur des clusters hautement disponibles.

Red Hat OpenShift
IBM

Déployez vos applications sur des clusters hautement disponibles qui sont livrés avec Red Hat OpenShift on IBM Cloud installé.

Code Engine
IBM

Exécutez votre application, travail ou conteneur sur une plateforme sans serveur gérée. Mettez automatiquement à l'échelle les charges de travail et ne payez que pour les ressources que vous consommez.

Clé d'API IBM Cloud

.....

Nouveau +

Région Container Registry

Dallas

Espace de nom Container Registry

Espace de nom Container Registry

Région du cluster

Francfort

Groupe de ressources du cluster

Default

Espace de nom du cluster

default

Nom du cluster

mycluster-free

Type de déploiement

Helm

AnnulerSuivant

8. I leave the default values and click Create

Liste des ressources / Détails de l'application /

Node RED MCGSA 2022-12-24

☑ Sélectionner la cible de déploiement ➤ Configurer la chaîne d'outils DevOps

Configurer la chaîne d'outils DevOps

Attribuez un nom à votre chaîne d'outils et sélectionnez la région dans laquelle créer votre chaîne d'outils.

Nom de chaîne d'outils DevOps

NodeREDMCGSA2022-12-24

Acceptez le nom par défaut ou entrez une valeur pouvant comporter jusqu'à 100 caractères.

Région

Dallas

Précédent Créer

Initiation aux applications

Etape 2. Configurer la chaîne d'outils DevOps

La chaîne d'outils DevOps inclut l'outil Delivery Pipeline dans lequel vous pouvez vérifier le statut du déploiement, lancer des générations, gérer le déploiement et afficher des journaux et des historiques.

1. Indiquez un nom pour votre chaîne d'outils.
2. Sélectionnez la région dans laquelle votre chaîne d'outils doit être créée.
3. Sélectionnez le groupe de ressources ayant accès à votre nouvelle chaîne d'outils. [En savoir plus](#)
4. Une fois vos sélections terminées, cliquez sur Créer.

9. I'm waiting for the URL

Liste des ressources / Détails de l'application /

Node RED MYXDI 2022-12-24

Ajouter des étiquettes

Actions...

Détails

URL de l'application	Vous devez d'abord déployer votre application
Source	https://us-south.git.cloud.ibm.com/idrissatraore0911/NodeRE...
Groupe de ressources	Default
Cible de déploiement	Vous devez d'abord déployer votre application
Créé	24/12/2022

Services




Cloudant

[Ouvrir le tableau de bord](#) [Documentation](#) [Référence de l'API](#)

Données d'identification

Connecter des services existants + Créer un service +

Automatisation du déploiement

Nom	NodeREDMYXDI2022-12-24
Emplacement	Dallas
Intégrations d'outils	  
Nom	ci-pipeline
Statut	En cours
Nom	pr-pipeline
Statut	Aucune étape sélectionnée

Initiation rapide

Configuration de votre application

Pour connecter les services et les chaînes d'outils DevOps à votre application :

1. Utilisez la carte Services pour connecter un service à votre application. Sélectionnez une instance de service existante ou créez-en une nouvelle. [En savoir plus](#)
2. Si vous voulez voir le code avant le déploiement de votre application, cliquez sur Télécharger le code pour obtenir le fichier .zip.
3. Cliquez sur Déploiement de votre application dans la carte Automatisation du déploiement pour sélectionner la cible de déploiement et configurer le service Distribution continue. Le déploiement démarre automatiquement.
4. Une fois le déploiement démarré, vous pouvez en afficher son statut, modifier votre application, afficher votre référentiel ou visualiser l'URL de l'application.
5. Si vous avez modifié votre application, veuillez à la

Here it is

Détails	
URL de l'application	http://159.122.183.134:30549
Source	https://us-south.git.cloud.ibm.com/idrissatraore0911/NodeRE...
Groupe de ressources	Default
Cible de déploiement	mycluster-free
Créé	24/12/2022

10. To start the Node-RED app configuration, click App URL. The welcome page is displayed. Click Next.

Welcome to your new Node-RED instance on IBM Cloud

We know you're eager to start wiring up your flows, but first there are a couple of tasks you should do:

- Secure your Node-RED editor
- Learn how to install additional nodes

Previous

Next

11. I am prompted to secure my application. In this lab, I do not secure the Node-RED editor for easy access. I Click Not recommended: I allow anyone to access the editor and make changes, then check Tick this box to confirm I want my editor to be insecure and I click Next.

Secure your Node-RED editor

☐ Secure your editor so only authorised users can access it

☒ *Not recommended: Allow anyone to access the editor and make changes*

Your editor will not be secured. Anyone with the URL will be able to access your flows, data and bound services.

☒ Tick this box to confirm you want your editor to be insecure

PreviousNext

Next steps:

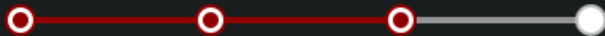
Learn how to install additional nodes

Node-RED provides a [huge catalog of extra nodes](#) you can install into the editor.

Many of these nodes can be installed directly from the editor's palette manager feature. However that can cause issues due to the limited memory of the default Node-RED starter application.

The *recommended approach* is to edit your application's `package.json` file to include the additional node modules and then redeploy the application. This can be done using the Continuous Delivery feature on the application's IBM Cloud dashboard.

For more information, follow [this tutorial on IBM Developer](#).



Previous

Next

12. Click Next, then Finish. The page that is shown in the following figure is displayed.

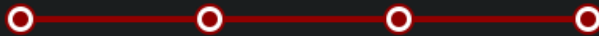
Finish the install

You have made the following selections:

- *Not recommended:* Allow anyone to access the editor and make changes

You can change these settings at any time by setting the following environment variables via the IBM Cloud console:

- `NODE_RED_USERNAME` - the username
- `NODE_RED_PASSWORD` - the password
- `NODE_RED_GUEST_ACCESS` - if set to ``true``, allows anyone read-only access to the editor

[Previous](#)[Finish](#)

This is what it shows:

Node-RED

Flow-based programming for the Internet of Things

Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways.

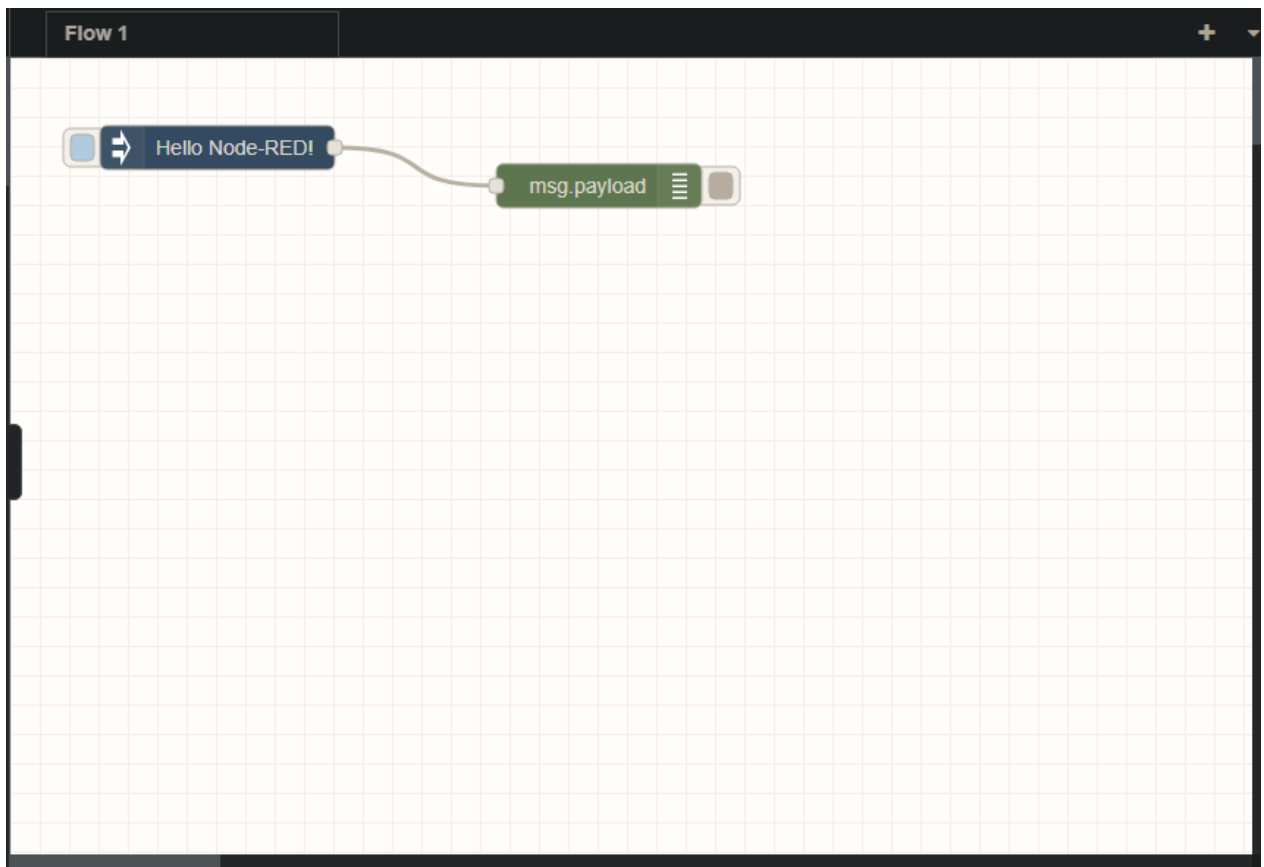
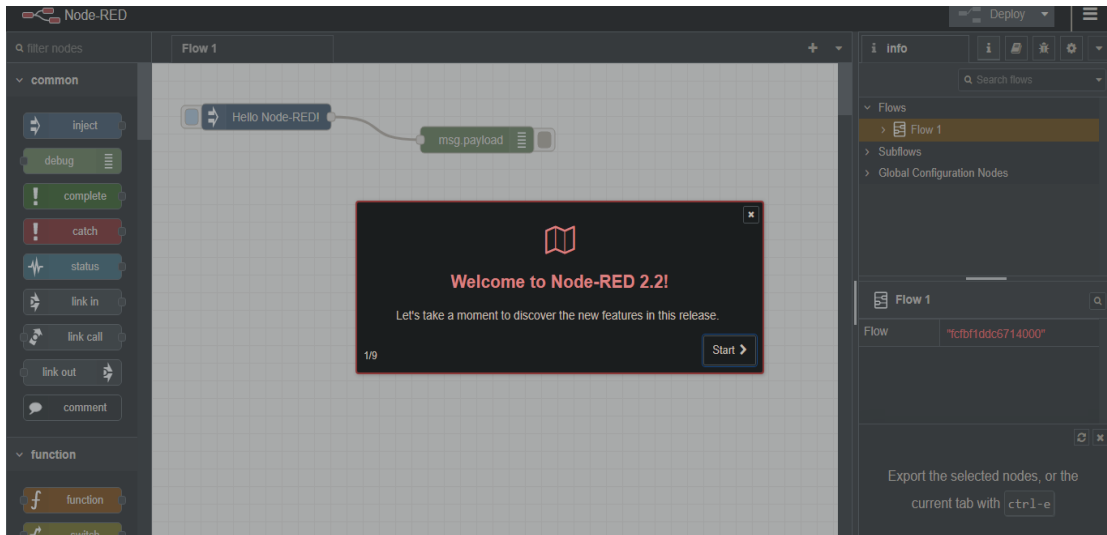
This instance is running as an IBM Cloud application, giving it access to the wide range of services available on the platform.

More information about Node-RED, including documentation, can be found at nodered.org.

[Go to your Node-RED flow editor](#)

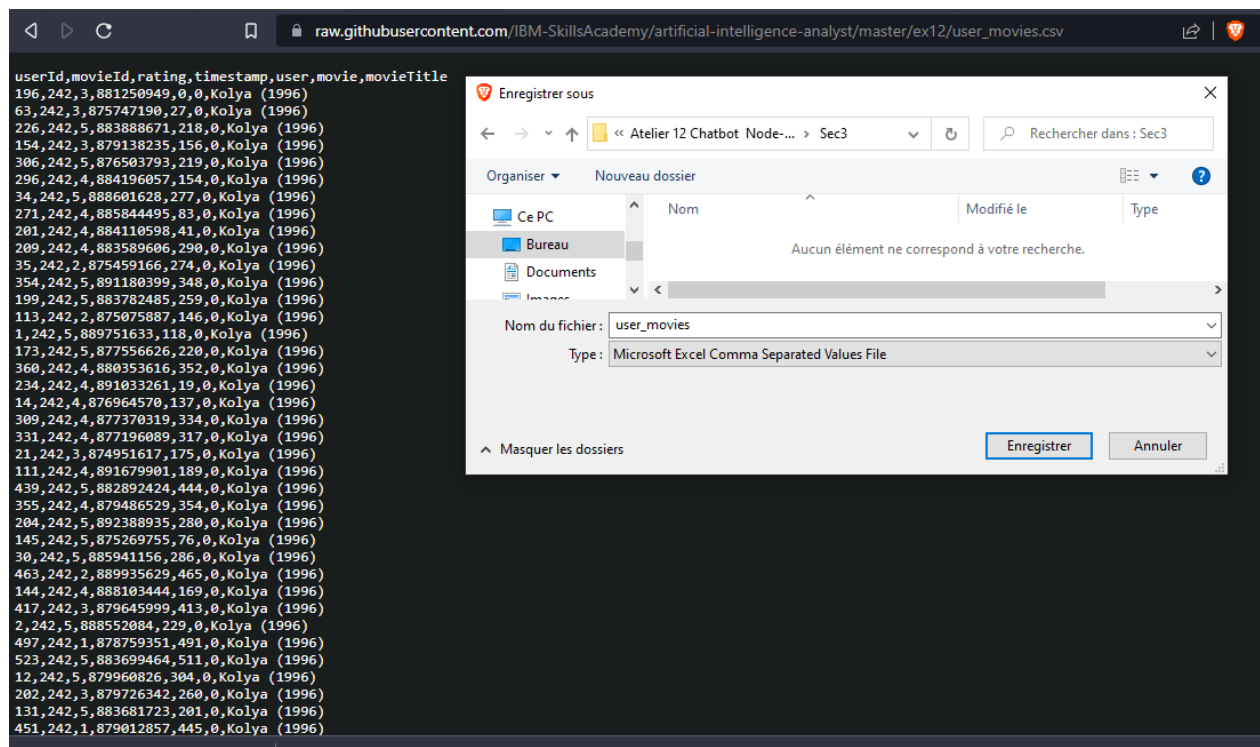
[Learn how to customise Node-RED](#)

13. Click Go to your Node-RED flow editor and the Node-RED Flow editor is displayed as shown in the following figure.



Create a Db2 service and load movies data.

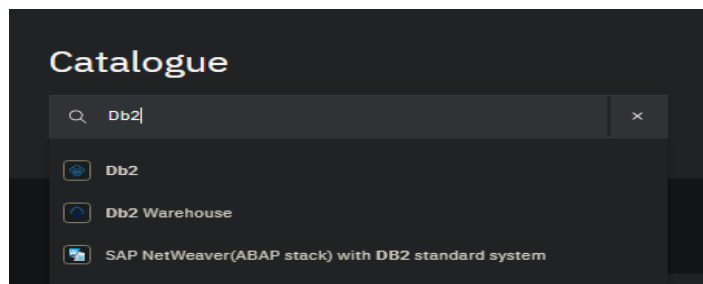
- I download the file user_movies.csv from github



- In the IBM Cloud Dashboard, I click Create resource +



- Search the catalog for “Db2”, then click Db2.



- Ensure that the Lite plan is selected, leave the default values, accept the license agreement, and then click Create.

Service

Fournisseur
IBM

Dernière mise à jour
11/10/2022

Catégorie
Base de données

Conformité
Pris en charge dans l'Union européenne
Compatible avec HIPAA
Compatible IAM

Emplacement
Sydney
Francfort
Londres
Dallas
São Paulo
Toronto
Tokyo
Milan 01
Montréal 01
Washington DC

Liens connexes
Documentation des API
Documentation Dispositions

Londres (eu-gb)

Sélectionner un plan de tarification

Les prix affichés n'incluent pas les taxes. Les tarifs mensuels affichés sont valables pour le pays ou l'emplacement : [Etats-Unis](#)

Plan	Fonctions et capacités	Tarification
Lite	200 Mo de stockage de données 15 connexions simultanées Système à service partagé	Gratuit
<p>Le plan gratuit fournit un service Db2 gratuit pour le développement et l'évaluation. Il est soumis à un certain nombre de limitations, comme indiqué. Vous pouvez continuer d'utiliser le plan gratuit aussi longtemps que nécessaire, mais il est demandé aux utilisateurs de prolonger leur compte gratuit tous les 90 jours par courriel électronique. Si vous ne le souhaitez pas, votre plan gratuit est supprimé 90 jours plus tard. Cela permet d'offrir des ressources gratuites à tout le monde.</p> <p>Les services du plan Lite sont supprimés au bout de 30 jours d'inactivité.</p>		
Standard	Instance avec mise à l'échelle flexible du traitement et du stockage L'instance de base commence à 8 Go de mémoire RAM et 20 Go de stockage	0,136 \$US USD/Instance-Hour 0,00027 \$US USD/Gigabyte-Hours 0,097 \$US USD/Virtual Processor Core-Hour 0,00003 \$US USD/BACKUP_GIGABYTE_HOURS 0,0969 \$US USD/SERVICEENDPOINT_INSTANCE_HOURS

Récapitulatif

Db2

Gratuit

Localisation: Londres
 Plan: Lite
 Nom du service: Db2-li
 Groupe de ressources: Default

☒ J'ai lu et j'accepte les dispositions des contrats de licence ci-dessous : [Dispositions](#)

Créer

Ajouter à l'estimation

Then, I saw this message and I clicked on “accept”

Créer une instance de service

Votre compte IBM Cloud est désigné comme validé pour Financial Services

Votre compte est activé pour utiliser les services IBM Cloud désignés comme validés pour Financial Services. Votre commande en cours inclut au moins un service ou un centre de données qui n'est pas validé pour Financial Services. Vous et tous les utilisateurs autorisés de votre compte êtes seuls responsables de l'utilisation des services validés pour Financial Services ou d'autres services IBM Cloud dans le cadre de toute pratique réglementée ou professionnelle, et vous devez prendre conseil auprès de vos propres experts concernant votre utilisation des services IBM Cloud.

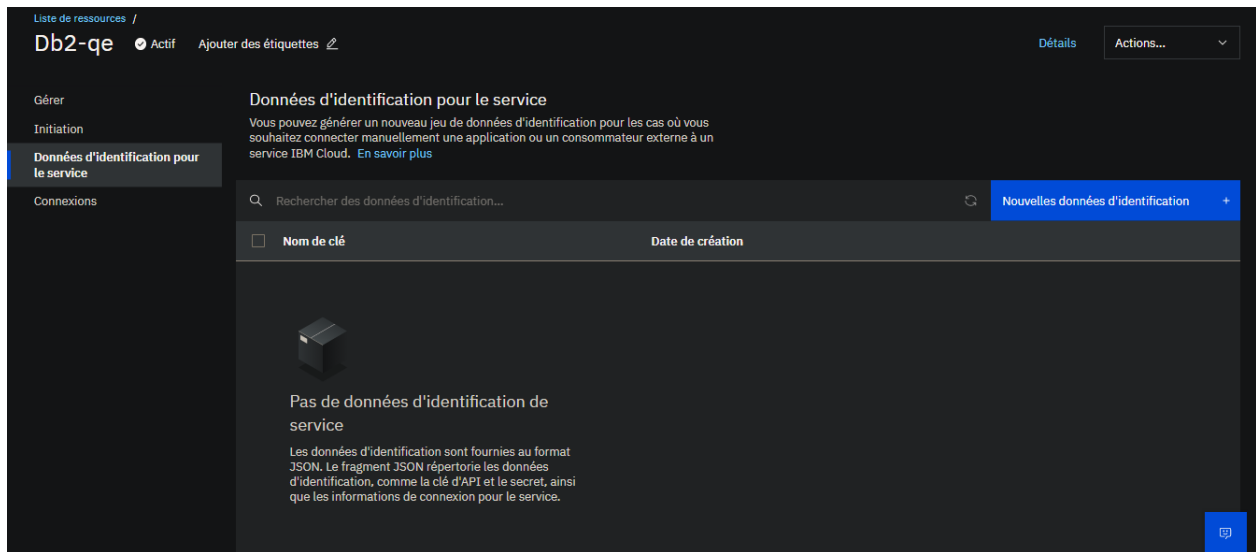
Annuler

Accepter

- I am redirected to the Resource list page. So, I wait until the Db2 service status is Active and then clicked your Db2 service.

Base de données (2)						
	Db2-qe	Default	Londres	Db2	● Actif	—
	node-red-myxdi-2022--cloudant-167185...	Default	Francfort	Cloudant	● Actif	—

- Click Service credentials and then click new credential +.



- I clicked on Add.

Créer des données d'identification

Nom :

services_credential-1

Rôle : ⓘ

Responsable

Options avancées ▾

Annuler

Ajouter

- Expand the service credentials. Copy the following parameters; you use them in “Part 6: Integrating the solution components by using Node-RED”:

```

"db2": {
  "name": "1dd14d0c-1b52-4f63-a606-53ecba28771d",
  "composed": [
    "db2 -u xdq97333 -p d61gs1Q8Vi6mIXxW --ssl --sslCAFile 1dd14d0c-1b52-4f63-a606-53ecba28771d --authenticationDatabase admin --host 815fa4db-dc03-4c70-869a-a9cc13f33084.bs2io90108kqb1od81cg.databases.appdomain.cloud:30367"
  ],
  "environment": {},
  "type": "cli"
},
"db2": {
  "authentication": {
    "method": "direct",
    "password": "d61gs1Q8Vi6mIXxW",
    "username": "xdq97333"
  },
  "certificate": {}
}

```

- Click Manage, then click Go to UI and start importing movies data.

Liste de ressources /

Db2-qe

✓ Actif Ajouter des étiquettes

Gérer

Initiation

Données d'identification pour le service

Connexions

Getting started

Where can I find my credentials?

Get your username and password by clicking the "Service Credentials" link to the left and selecting "New Credentials".

Don't see this menu on the left? Click on "Manage in IBM Cloud" to open the IBM Cloud dashboard.

[Go to UI](#) [Getting started docs](#)

- Click Data from the left menu.

IBM Db2 on Cloud

Charger les données Charger l'historique Tables Vues Index Alias Tables de requêtes matérialisées (MQT) Séquences Objets d'application

Source Cible Définir Finaliser

Vous chargez le fichier **user_movies.csv**

d'en-tête.

Amazon S3 Cloud Object Storage

Faire glisser un fichier ici ou parcourir les fichiers

Suivant

- I click browse files, then select the user_movies.csv file that I downloaded previously from https://github.com/IBM-SkillsAcademy/artificial-intelligence-analyst/blob/master/ex12/user_movies.csv

Therefore, I select my default schema, then click new table + and name the table USER_MOVIE, then click Create. I take note of the schema name; I use it in “6: Integrating the solution components by using Node-RED”.

Sélectionner une cible de chargement

Schéma

Rechercher des schémas

XDQ97333

Table

USER_MOVIE

Aucune entrée trouvée.

Créer une table

USER_MOVIE

Créer

Retour Suivant

- Click Next to define the table.

Sélectionner une cible de chargement

Schéma

Rechercher des schémas

XDQ97333

Table

USER_MOVIE

USER_MOVIE

Retour Suivant

- Change the type of MOVIE TITLE column to VARCHAR(200) by clicking the pencil icon next to VARCHAR(24).

I Change Maximum number of characters to 200. I Click OK and then Next.

Edit column data type

movieTitle
VARCHAR(24)

Kolya (1996)

Kolya (1996)

Kolya (1996)

Kolya (1996)

Kolya (1996)

Data type
VARCHAR

Maximum number of characters (1 - 32592)
200

Fermer OK

	USERID SMALLINT	MOVIEID SMALLINT	RATING SMALLINT	TIMESTAMP INTEGER	USER SMALLINT	MOVIE SMALLINT	MOVIE TITLE VARCHAR(200)
1	196	242	3	881250949	0	0	Kolya (1996)
2	63	242	3	875747190	27	0	Kolya (1996)
3	226	242	5	883888671	218	0	Kolya (1996)
4	154	242	3	879138235	156	0	Kolya (1996)
5	306	242	5	876503793	219	0	Kolya (1996)
6	296	242	4	884196057	154	0	Kolya (1996)
7	34	242	5	888601628	277	0	Kolya (1996)
8	271	242	4	885844495	83	0	Kolya (1996)
9	201	242	4	884110598	41	0	Kolya (1996)

Retour Suivant

- The Review settings page is displayed. Click Begin Load.

Source
Cible
Définir
Finaliser

Vous chargez le fichier `user_movies.csv` vers `XDQ97333.USER_MOVIE`

Révision des paramètres

Récapitulatif

Page de codes : 1208 (Valeur par défaut)

Séparateur : , (Valeur par défaut)

Format d'heure : HH:MM:SS (Valeur par défaut)

Format de date : YYYY-MM-DD (Valeur par défaut)

Format d'horodatage : YYYY-MM-DD HH:MM:SS (Valeur par défaut)

Délimiteur de chaîne : (Valeur par défaut)

Option

Nombre maximal d'avertissements

1000

Retour
Commencer le chargement

- Wait until the data is loaded successfully. Confirm that no errors occurred while the data was loaded then I click View table. The table looks like the following figure.

XDQ97333.USER_MOVIE
Retour

Exporter au format CSV

	USERID SMALLINT	MOVIEID SMALLINT	RATING SMALLINT	TIMESTAMP INTEGER	USER SMALLINT	MOVIE SMALLINT	MOVIE TITLE VARCHAR(200)
1	1	242	5	889751633	118	0	Kolya (1996)
2	1	195	5	876892855	118	112	Terminator, The (1984)
3	1	21	1	878542772	118	106	Muppet Treasure Island (
4	1	151	4	875072865	118	103	Willy Wonka and the Choc
5	1	96	5	875072716	118	102	Terminator 2: Judgment I
6	1	174	5	875073198	118	101	Raiders of the Lost Ark (1
7	1	132	4	878542889	118	100	Wizard of Oz, The (1939)
8	1	208	5	878542960	118	96	Young Frankenstein (197
9	1	23	4	875072895	118	94	Taxi Driver (1976)
10	1	209	4	888732908	118	93	This Is Spinal Tap (1984)

- Click the Administration icon from the left menu. Copy the REST API host name. You use it in “ 6: Integrating the solution components by using Node-RED.”

IBM Db2 on Cloud

Connexions

2. Installez les pilotes en exécutant le fichier `ibm_data_server_driver_package_win64_v11.5.exe` en tant qu'administrateur.

3. Dans la section Ressources de configuration de connexion, choisissez si vous voulez ou non sécuriser vos connexions en utilisant SSL. Si votre application utilise son propre pilote et que vous voulez vous connecter avec SSL, téléchargez le certificat SSL (DigiCertGlobalRootCA.crt). Pour les applications Java, utilisez la chaîne JDBC comme URL de base de données dans votre appel à la méthode JDBC `getConnection`. Pour les applications ODBC, ajoutez de nouvelles entrées au fichier de configuration du pilote `db2dsdriver.cfg` en exécutant les commandes suivantes :

Pour les connexions avec SSL

```
db2cli writecfg add -database bludb -host 815fa4db-dc03-4c70-869a-a9cc13f33084.bs2io90108kqb1od81cg.databases.appdomain.cloud -port 30367
db2cli writecfg add -dsn dashdb -database bludb -host 815fa4db-dc03-4c70-869a-a9cc13f33084.bs2io90108kqb1od81cg.databases.appdomain.cloud -port 30367
db2cli writecfg add -database bludb -host 815fa4db-dc03-4c70-869a-a9cc13f33084.bs2io90108kqb1od81cg.databases.appdomain.cloud -port 30367 -parameter "SecurityTransportMode=SSL"
```

Pour les connexions sans SSL

```
db2cli writecfg add -database bludb -host 815fa4db-dc03-4c70-869a-a9cc13f33084.bs2io90108kqb1od81cg.databases.appdomain.cloud -port <port>
db2cli writecfg add -dsn dashdb -database bludb -host 815fa4db-dc03-4c70-869a-a9cc13f33084.bs2io90108kqb1od81cg.databases.appdomain.cloud -port <port>
```

Numéro de port : 30367

Nom de la base de données : bludb

ID utilisateur : <user name>

Mot de passe : *****

Version : Compatible avec Db2, version 11.5.0 ou ultérieure

[Télécharger le certificat SSL](#)

Chaîne JDBC

```
jdbc:db2://815fa4db-dc03-4c70-869a-a9cc13f33084.bs2io90108kqb1od81cg.databases.appdomain.cloud:30367/bludb:user=<user name>;password=<your_password>;sslConnection=true;
```

Nom d'hôte de l'API REST

bs2ipcul0apon0jufi80lite.db2.cloud.ibm.com

Informations complémentaires

- Package de pilote Db2 (IBM Knowledge Center)
- IBM Data Server Client Packages
- Connexion de CLPPlus à une base de données Db2 (IBM Knowledge Center)

Create a Watson Assistant and configure it.

- From the IBM Cloud Dashboard, click Resource list.

IA / Apprentissage automatique (4)						
	Knowledge Studio-x2	Default	Francfort	Knowledge Studio	Actif	—
	Watson Assistant-On	Default	Sydney	Watson Assistant	Actif	—
	Watson Machine Learning-mc	Default	Francfort	Watson Machine Learning	Actif	cpdaas
	Watson Studio-2h	Default	Francfort	Watson Studio	Actif	—

- Click Launch Watson Assistant.

Liste de ressources /

Watson Assistant-On

Actif Ajouter des étiquettes

Détails Actions...

Gérer

Données d'identification pour le service

Plan

Connexions

Démarrer en lançant l'outil

[Lancer Watson Assistant](#) [Tutoriel d'initiation](#) [Référence d'API](#)

Plan

Lite

[Mise à niveau](#)

Données d'identification

[Télécharger](#) [Afficher les identifiants](#)

Clé d'API :

.....

URL :

<https://api.au-syd.assistant.watson.cloud.ibm.com/instances/187c2a...>

- From the menu at the top, click the assistants' list, then click Create New +.

- Name the assistant Movie recommender, then click Create Assistant.

Create a new assistant ✕

Assistant name

Movie recommender

Your assistant name will be kept internally and not visible to your customers

Description (optional) 0/128

Add a description for this assistant

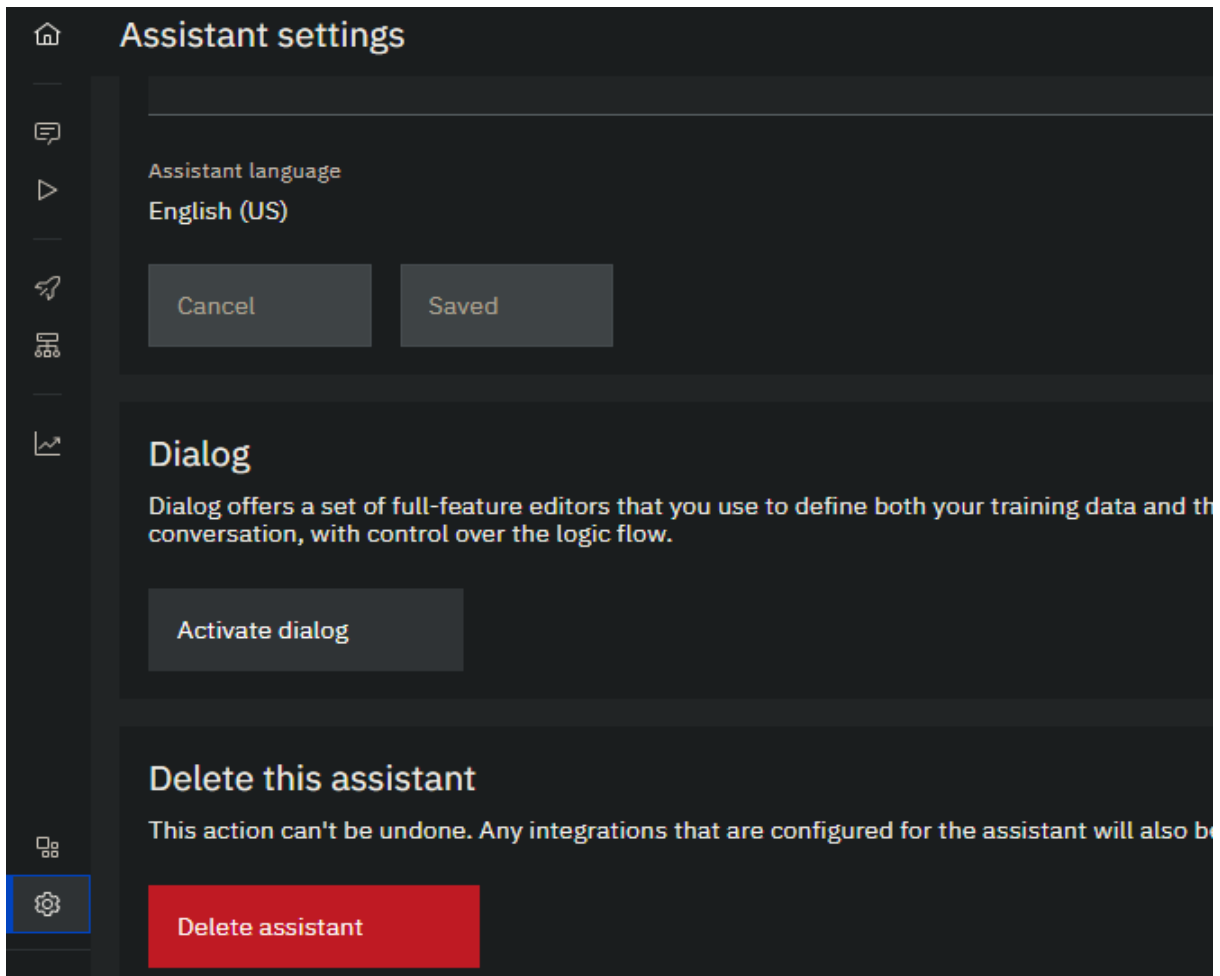
Assistant language

English (US) ▾

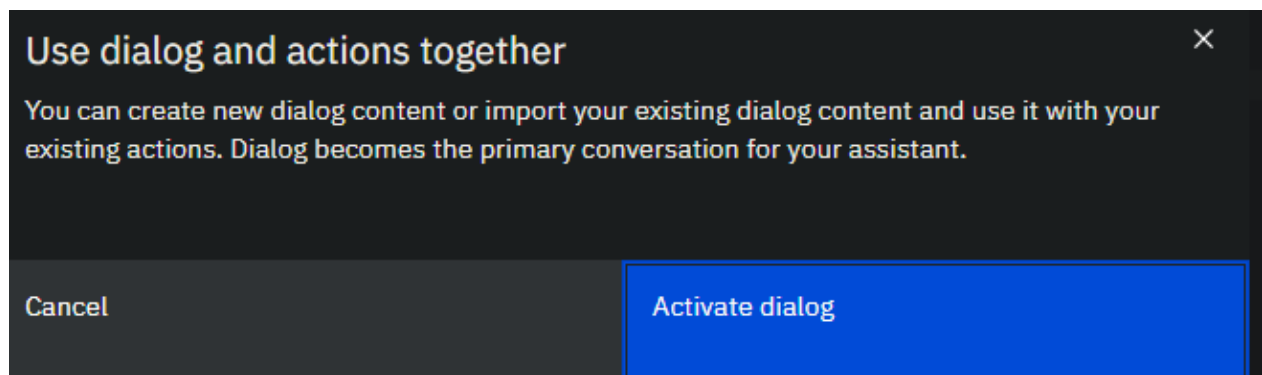
This is the language your assistant will speak.

Cancel Create assistant

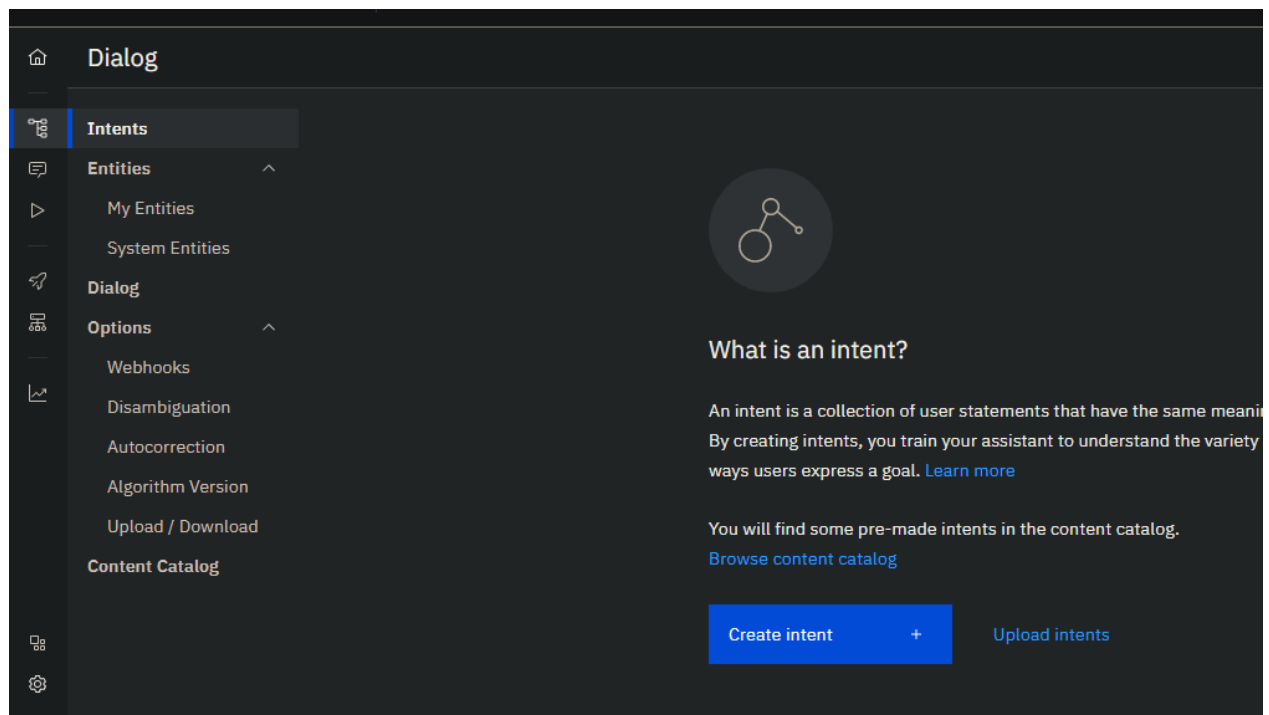
In the Assistant settings page, click Activate dialog.



5. At the window “Use dialog and actions together” click Activate dialog.



6. From the left menu click Dialog, then click Create Intent +.



7. Name the intent `movie_recommendation`, then click Create intent.

The screenshot shows the 'Create intent' form. At the top, there is a back arrow and the title 'Create intent'. Below the title, the 'Intent name' label is followed by a text input field containing the text '# film_recommendation'. Underneath the input field is the instruction 'Name your intent to match a customer's question or goal'. Below this is the 'Description (optional)' label, followed by a text area with the placeholder text 'Add a description to this intent'. At the bottom left of the form is a blue 'Create intent' button.

8. Type user examples as follows

Add example

☐ User examples (6) ↑ Added 11

<input type="checkbox"/> Dis-moi quel film je devrais regarder	a few seconds ago
<input type="checkbox"/> Donnez-moi un film à regarder	a few seconds ago
<input type="checkbox"/> Pouvez-vous recommander un film à regarder?	a few seconds ago
<input type="checkbox"/> Quel est un bon film à regarder?	a few seconds ago
<input type="checkbox"/> Quel film proposez-vous que je regarde?	a few seconds ago
<input type="checkbox"/> Recommande-moi un film	a few seconds ago

Showing 1–6 of 6 examples

1 1 of 1 pages

- Return to the main assistant page. Click System Entities, then enable `@sys-number`. To personalize the movie recommendations, you use user IDs.

Dialog Try it

The following entities are prebuilt by IBM to recognize references to things like numbers and dates in user input. Turn on a system entity to start using it. You cannot edit system entities. [Learn more](#)

Name (5)	Description	Status
✓ @sys-time	Extracts time mentions (at 10)	<input type="checkbox"/> Off
✓ @sys-date	Extracts date mentions (Friday)	<input type="checkbox"/> Off
✓ @sys-currency	Extracts currency values from user examples including the amount and the unit. (20 cents)	<input type="checkbox"/> Off
✓ @sys-percentage	Extracts amounts from user examples including the number and the % sign. (15%)	<input type="checkbox"/> Off
✓ @sys-number	Extracts numbers mentioned from user examples as digits or written as numbers. (21)	<input type="checkbox"/> Off

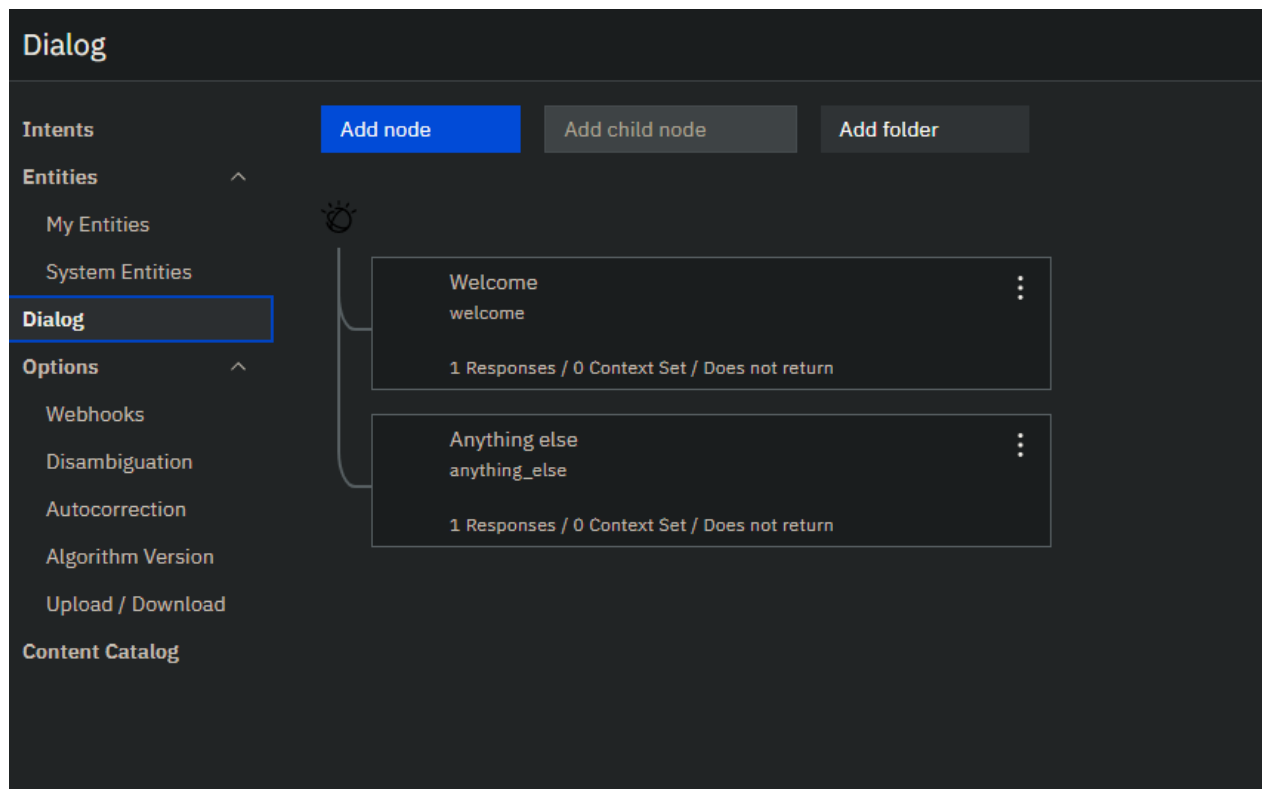
^ [@sys-number](#) Extracts numbers mentioned from user examples as digits or written as numbers. (21) ☒ On

Extracts numbers mentioned from user examples as digits (e.g. 21) or written out (e.g. twenty one). The value extracted is represented as canonical numeric string (e.g. 21). [Learn more](#)

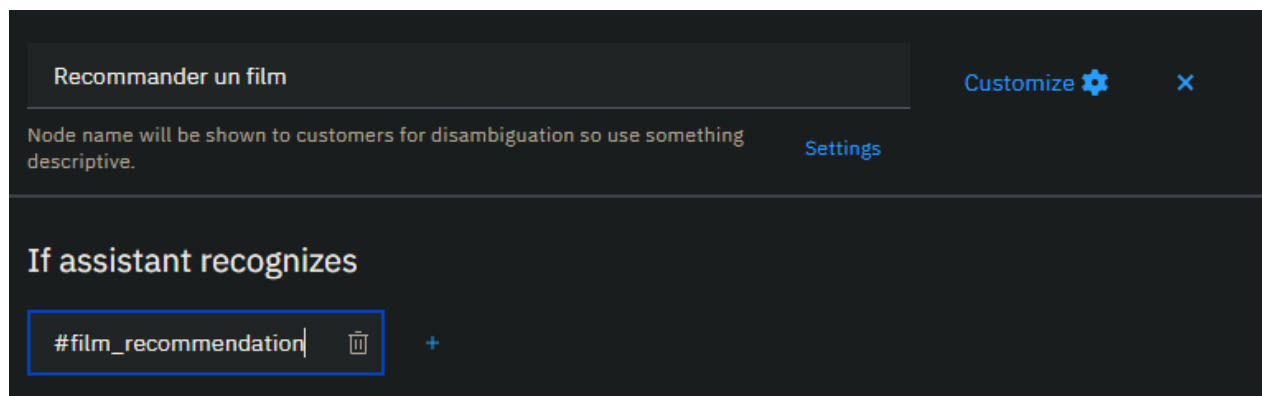
Recognize Format

21
twenty one
3.14

- Select Dialog from the menu pane on the left.



11. Enable customizations for Slots and Callout to Webhooks.



12. Enable Slots and Callout to Webhooks as shown in the following figure and then click Apply.

Customize "Recommander un film" ×

external sources per node

☐ **Call an action**

This calls an action that is in the same assistant as this dialog. The dialog pauses until the action completes, which could be in the same dialog turn or take multiple turns to complete. [Learn more](#)

☐ **Call a webhook**

Enable this setting to send a POST request from this dialog node to the webhook URL. The URL and headers are defined in the Webhooks settings of the Options tab. After you enable this setting, the Multiple conditional responses setting is enabled automatically to support adding a response to show when the request is successful and another response to show if the request fails. [Learn more](#)

!

Webhook URL missing
Specify the request URL for the web app you want to call out.

Options

Cancel

Apply

- Check for the presence of a user ID. Add @sys-number in the “Check for” field, save it as \$id, then add Can I please have your ID? in the “If not present, ask” field.

Then check for 0 Manage handlers

	Check for	Save it as	If not present, ask	Type		
1	@sys-number	\$id	Puis-je avoir votr	Required	⚙️	🗑️

- Set the webhook URL. Enter the APP URL that you copied in “Part 2 Creating and deploying the Node-RED App”:

IBM Watson Assistant Lite Upgrade Movie recommend...

Dialog

Intents

Entities

My Entities

System Entities

Dialog

Options

Webhooks

Disambiguation

Autocorrection

Algorithm Version

Upload / Download

Content Catalog

Webhooks

A webhook is a mechanism that allows you to call out to an external program based on events in your dialog.

Webhook setup

Specify the request URL for an external API you want to be able to invoke from dialog nodes. Watson will call this URL when configured to do so from a dialog node. [Learn more](#)

URL

<http://159.122.183.134:30549/movies>

Headers

Add HTTP headers for authorization or any other parameters required for invoking the webhook.

Header name	Header value
-------------	--------------

[Add header +](#) [Add authorization +](#)

Next step

To trigger this webhook from an individual dialog node, enable webhooks from the Customize page of the node. [Go to dialog](#)

15. Configure the call out to the webhook. Enter Key and Value as shown in the following figure.





Then call out to my webhook [Learn more](#)

Parameters

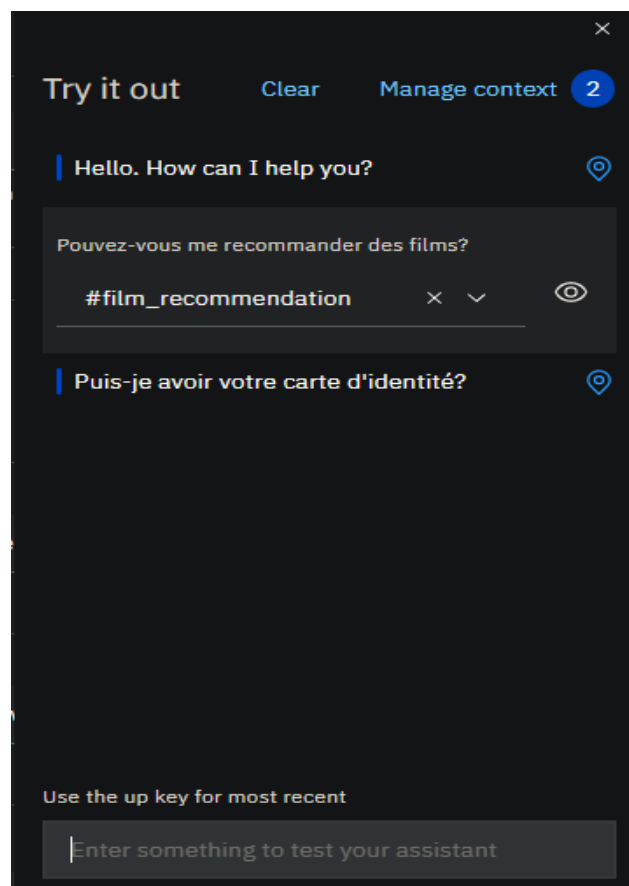
Key	Value
id	"\$id"

[Add parameter +](#)

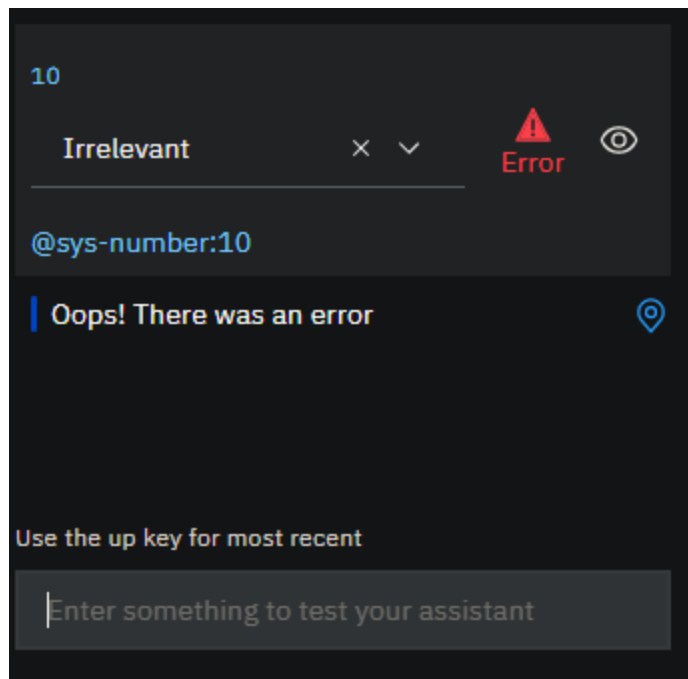
16. Leave the webhook return variable as is. The webhook responds to your request with JSON data. Leave the response as `webhook_result_1`, which is a variable that stores the data. Click Try it to test the assistant up to this point.

Assistant responds			
	If assistant recognizes	Respond with	
1	<code>\$webhook_result_1</code>	<code>\$webhook_result_1.movies</code>	 
2	<code>anything_else</code>	Oops! There was an error	 

17. Type Can you recommend some movies for me? The assistant detects the #movie_recommendation intent, then it asks you for your ID.



18. Type “10” as your ID. The assistant detects “10” as @sys-number, and for now it returns an error message “Oops! There was an error” because you did not implement the webhook in Node-RED yet.



Train and deploy the recommender model.

1. Click IBM Cloud Shell. Run the following command to get API Key:

```
idrissatraore0911@cloudshell:~$ ibmcloud iam api-key-create API_KEY_NAME
Creating API key API_KEY_NAME under 90cb73d331b64dab99340a1241473dfe as idrissatraore0911@gmail.com...
OK
API key API_KEY_NAME was created

Please preserve the API key! It cannot be retrieved after it's created.

ID          ApiKey-08cda5f4-1192-48a9-9bae-9c0fd5d5d3b5
Name        API_KEY_NAME
Description
Created At   2022-12-24T07:02+0000
API Key      G6L7aFqaawkOmIp2q-G41LR4sPypRZSBA4cj9K--KmdM
Locked      false
idrissatraore0911@cloudshell:~$
```

2. To get the location and the corresponding url, run the following command:

```

idrissatraore0911@cloudshell:~$ ibmcloud resource service-instance Watson\ Machine\ Learning-mc
Retrieving service instance Watson Machine Learning-mc in all resource groups under account Idrissa TRAORE's Account as idrissatraore0911@gmail.com...
OK

Name:           Watson Machine Learning-mc
ID:             crn:v1:bluemix:public:pm-20:eu-de:a/90cb73d331b64dab99340a1241473dfe:1b83a1ee-f759-4cc7-b60b-5a1eefde0f86::
GUID:          1b83a1ee-f759-4cc7-b60b-5a1eefde0f86
Location:      eu-de
Service Name:  pm-20
Service Plan Name:  lite
Resource Group Name:  Default
State:        active
Type:         service_instance
Sub Type:
Locked:       false
Created at:   2022-12-22T22:05:02Z
Created by:   idrissatraore0911@gmail.com
Updated at:   2022-12-22T22:05:05Z
Last Operation:
               Status    create succeeded
               Message    Completed create instance operation

idrissatraore0911@cloudshell:~$

```

3. To get the space id, from IBM Cloud Pak for Data, click the hamburger menu > Deployments.

Déploiements Nouvel espace de déploiement +

1 espace

Activité **Espaces**

Filtrer par : Tous les espaces

Nom	Dernière modification	Votre rôle	Collaborateurs	Balises	Déploiements en ligne	Travaux
Espace UAT	22 déc. 2022, 23:21	Admin	IT		2	0

4. Click the Manage tab. Copy Space GUID. Use this value for space_id.

Espace UAT

Espace UAT Présentation Actifs **Déploiements** Travaux **Gérer**

Général Contrôle d'accès Environnements

Général

Détails de l'espace

Nom
Espace UAT

Description
Aucune description fournie.

Espace GUID
b33217e9-99de-43f4-a7f2-8a1eaf97...

Date de création
22 déc. 2022, 23:14
par Idrissa TRAORE (You)

Dernière mise à jour
22 déc. 2022, 23:21

Cloud Object Storage [Gérer](#)

Stockage utilisé
42.16 KB utilisé(s)

Nom
Cloud Object Storage-hu

Compartment
ef4ab0ee-fed0-4cc0-a38b-07993d9cab2b

Service d'apprentissage autom...

Download the notebook file `collaborative_filtering_movielens_with_model_dep.ipynb` from https://github.com/IBM-SkillsAcademy/artificial-intelligence-analyst/blob/master/ex12/collaborative_filtering_movielens_with_model_dep.ipynb

5. From the IBM Cloud Dashboard, click Resource list.

Expand Services and software, then click your Watson Studio service.

Nom	Groupe	Emplacement	Produit	Statut	Etiquettes
Filtrer par nom ou adresse IP...					
Filtrer par groupe ou org					
Filtrer...					
Q Filtrer...					
Q Filtrer...					
Filtrer...					
^ Stockage (1)					
Cloud Object Storage-hu	Default	Global	Cloud Object Storage	Actif	1
^ IA / Apprentissage automatique (4)					
Knowledge Studio-x2	Default	Francfort	Knowledge Studio	Actif	—
Watson Assistant-0n	Default	Sydney	Watson Assistant	Actif	—
Watson Machine Learning-mc	Default	Francfort	Watson Machine Learning	Actif	1
Watson Studio-2h	Default	Francfort	Watson Studio	Actif	—
^ Analyse (0)					
^ Blockchain (0)					

6. Expand Services and software, then click your Watson Studio service.

Liste de ressources /

Watson Studio-2h

Actif Ajouter des étiquettes

Détails Actions...

Gérer

Plan

Watson Studio in Cloud Pak for Data

Watson Studio is one of the core services in Cloud Pak for Data as a Service. Build, deploy and manage AI models, and optimize decisions on IBM Cloud Pak for Data.

Launch in IBM Cloud Pak for Data

IBM Watson Studio in Cloud Pak for Data

IBM Cloud Pak for Data Unifying platform

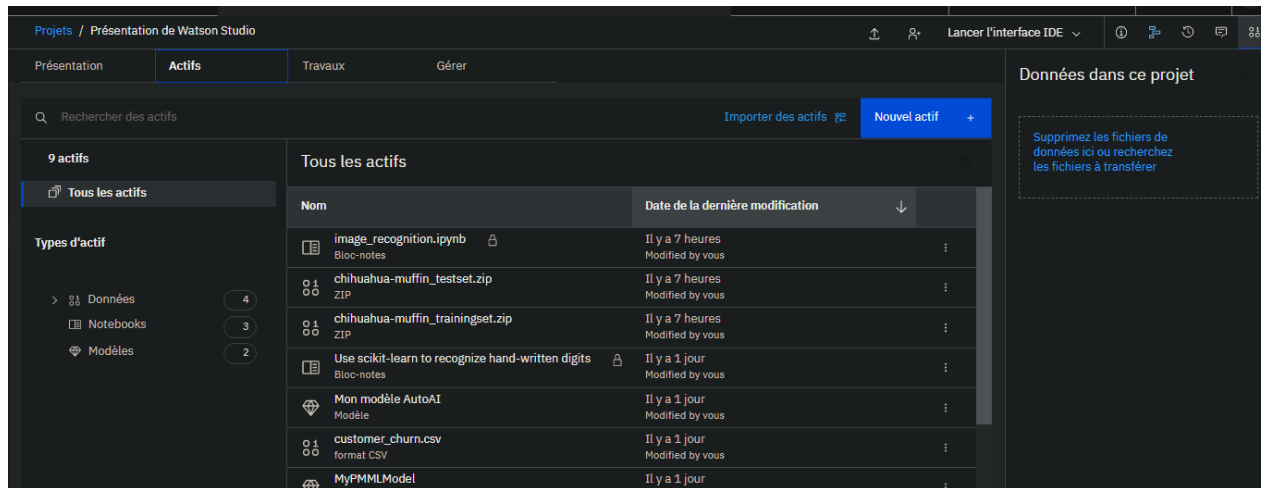
IBM Cloud Base cloud infrastructure

IBM Watson Studio is part of IBM Cloud Pak for Data and serves as the data science capability of the data fabric architecture.

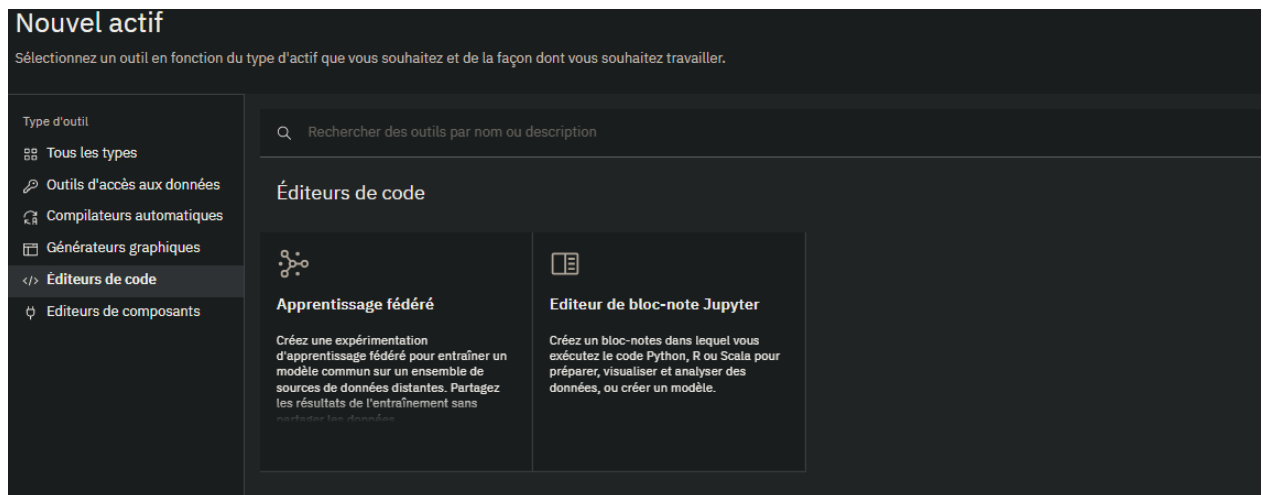
Helpful links

Documentation Learning path Videos

7. Open your Watson Studio project. Click the Assets tab and then click New asset +



8. From the left pane choose Code editors, then click Jupyter notebook editor.



9. Configure the new asset.

Nouveau bloc-notes

Vide **A partir d'un fichi...** A partir d'une URL

Nom
collaborative_filtering_movielens_with_model_dep

Description (facultatif)
Entrer votre description ici

Sélectionner un contexte d'exécution
Runtime 22.2 on Python 3.10 XS (2 vCPU 8 GB RAM)

Le contexte d'exécution a 2 vCPU et 8 GB RAM.
Il consomme Nombre d'unités de capacité par heure.
[En savoir plus](#) sur les CUH et sur les plans de tarification Watson Studio.

Fichier de bloc-notes
Transférez uniquement les fichiers .ipynb. Taille de fichier maximale : 52 MB.

Glissez-déposez les fichiers ici ou téléchargez-les

collaborative_filtering_movielens_with_model_de Annuler Créer

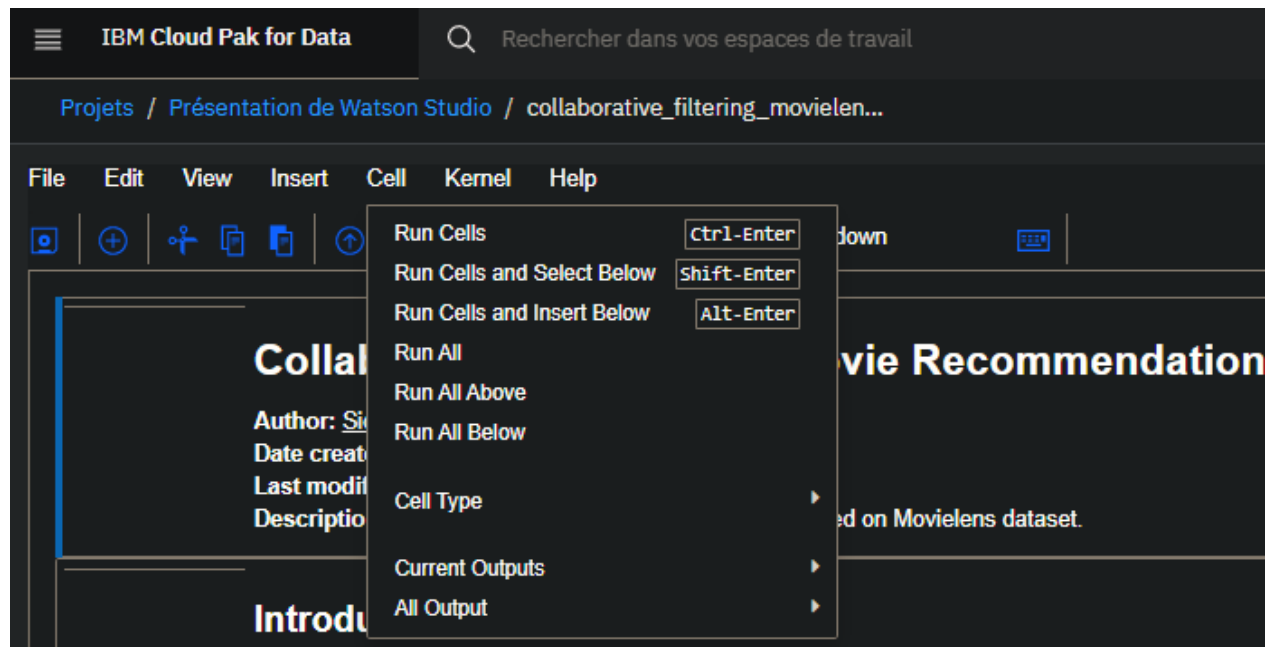
10. Wait until the notebook is opened, then click Not trusted then Trust.

Trust this notebook?

A trusted Jupyter notebook may execute hidden malicious code when you open it. Selecting trust will immediately reload this notebook in a trusted state. For more information, see the Jupyter security documentation: [here](#)

Cancel Trust

11. Click Cell > All Output > Clear to remove any output from previous runs.



12. Read the notebook comments and run the cells one by one until you reach the cell to save the model. Compare your output with the following figures.

```
In [1]: import pandas as pd
import numpy as np
from zipfile import ZipFile
import tensorflow as tf
from tensorflow import keras
from tensorflow.keras import layers
from pathlib import Path
import matplotlib.pyplot as plt
```

First, load the data and apply preprocessing

```
In [2]: # Download the actual data from http://files.grouplens.org/datasets/movielens/ml-latest-small.zip
# Use the ratings.csv file
movielens_data_file_url = (
    "http://files.grouplens.org/datasets/movielens/ml-latest-small.zip"
)
movielens_zipped_file = keras.utils.get_file(
    "ml-latest-small.zip", movielens_data_file_url, extract=False
)
keras_datasets_path = Path(movielens_zipped_file).parents[0]
movielens_dir = keras_datasets_path / "ml-latest-small"

# Only extract the data the first time the script is run.
if not movielens_dir.exists():
    with ZipFile(movielens_zipped_file, "r") as zip:
        # Extract files
        print("Extracting all the files now...")
        zip.extractall(path=keras_datasets_path)
        print("Done!")

ratings_file = movielens_dir / "ratings.csv"
df = pd.read_csv(ratings_file)
```

```
Downloading data from http://files.grouplens.org/datasets/movielens/ml-latest-small.zip
978202/978202 [=====] - 1s 1us/step
Extracting all the files now...
Done!
```

```
In [3]: user_ids = df["userId"].unique().tolist()
user2user_encoded = {x: i for i, x in enumerate(user_ids)}
userencoded2user = {i: x for i, x in enumerate(user_ids)}
movie_ids = df["movieId"].unique().tolist()
movie2movie_encoded = {x: i for i, x in enumerate(movie_ids)}
movie_encoded2movie = {i: x for i, x in enumerate(movie_ids)}
df["user"] = df["userId"].map(user2user_encoded)
df["movie"] = df["movieId"].map(movie2movie_encoded)

num_users = len(user2user_encoded)
num_movies = len(movie_encoded2movie)
df["rating"] = df["rating"].values.astype(np.float32)
# min and max ratings will be used to normalize the ratings later
min_rating = min(df["rating"])
max_rating = max(df["rating"])

print(
    "Number of users: {}, Number of Movies: {}, Min rating: {}, Max rating: {}".format(
        num_users, num_movies, min_rating, max_rating
    )
)
```

```
Number of users: 610, Number of Movies: 9724, Min rating: 0.5, Max rating: 5.0
```

Prepare training and validation data

```
In [4]: df = df.sample(frac=1, random_state=42)
x = df[["user", "movie"]].values
# Normalize the targets between 0 and 1. Makes it easy to train.
y = df["rating"].apply(lambda x: (x - min_rating) / (max_rating - min_rating)).values
# Assuming training on 90% of the data and validating on 10%.
train_indices = int(0.9 * df.shape[0])
x_train, x_val, y_train, y_val = (
    x[:train_indices],
    x[train_indices:],
    y[:train_indices],
    y[train_indices:],
)
```

Create the model

We embed both users and movies in 50-dimensional vectors.

The model computes a match score between user and movie embeddings via a dot product, and adds a per-movie and per-user bias. The match score is scaled to the $[0, 1]$ interval via a sigmoid (since our ratings are normalized to this range).

In [5]: EMBEDDING_SIZE = 50

```
class RecommenderNet(keras.Model):
    def __init__(self, num_users, num_movies, embedding_size, **kwargs):
        super(RecommenderNet, self).__init__(**kwargs)
        self.num_users = num_users
        self.num_movies = num_movies
        self.embedding_size = embedding_size
        self.user_embedding = layers.Embedding(
            num_users,
            embedding_size,
            embeddings_initializer="he_normal",
            embeddings_regularizer=keras.regularizers.l2(1e-6),
        )
        self.user_bias = layers.Embedding(num_users, 1)
        self.movie_embedding = layers.Embedding(
            num_movies,
            embedding_size,
            embeddings_initializer="he_normal",
            embeddings_regularizer=keras.regularizers.l2(1e-6),
        )
        self.movie_bias = layers.Embedding(num_movies, 1)

    def call(self, inputs):
        user_vector = self.user_embedding(inputs[:, 0])
        user_bias = self.user_bias(inputs[:, 0])
        movie_vector = self.movie_embedding(inputs[:, 1])
        movie_bias = self.movie_bias(inputs[:, 1])
        dot_user_movie = tf.tensordot(user_vector, movie_vector, 2)
        # Add all the components (including bias)
        x = dot_user_movie + user_bias + movie_bias
        # The sigmoid activation forces the rating to between 0 and 1
        return tf.nn.sigmoid(x)

model = RecommenderNet(num_users, num_movies, EMBEDDING_SIZE)
model.compile(
    loss=tf.keras.losses.BinaryCrossentropy(), optimizer=keras.optimizers.Adam(learning_rate=0.001)
)
```

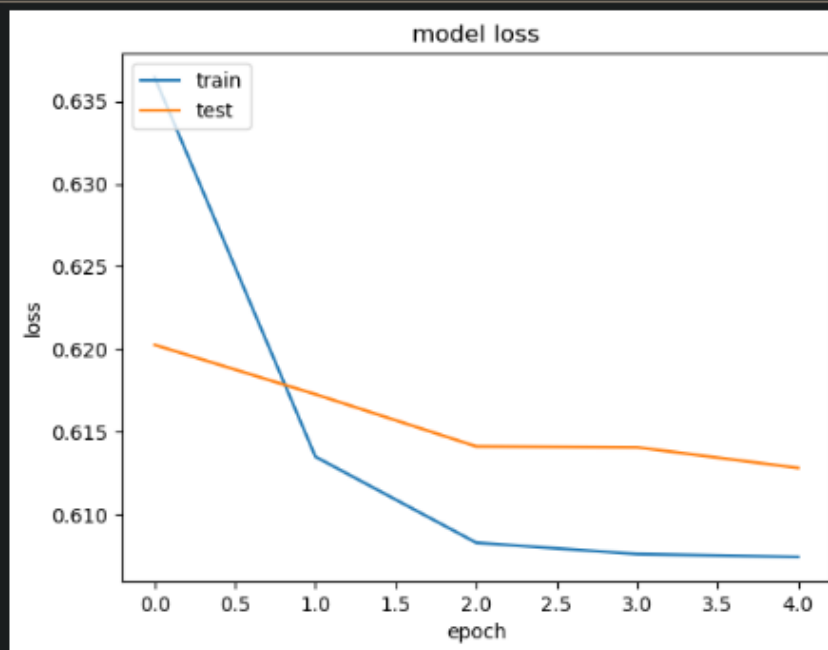
Train the model based on the data split

```
In [14]: history = model.fit(
    x=x_train,
    y=y_train,
    batch_size=64,
    epochs=5,
    verbose=1,
    validation_data=(x_val, y_val),
)
```

```
Epoch 1/5
1418/1418 [=====] - 10s 7ms/step - loss: 0.6365 - val_loss: 0.6203
Epoch 2/5
1418/1418 [=====] - 10s 7ms/step - loss: 0.6135 - val_loss: 0.6173
Epoch 3/5
1418/1418 [=====] - 10s 7ms/step - loss: 0.6083 - val_loss: 0.6141
Epoch 4/5
1418/1418 [=====] - 9s 7ms/step - loss: 0.6076 - val_loss: 0.6140
Epoch 5/5
1418/1418 [=====] - 10s 7ms/step - loss: 0.6074 - val_loss: 0.6128
```

Plot training and validation loss

```
In [15]: plt.plot(history.history["loss"])
plt.plot(history.history["val_loss"])
plt.title("model loss")
plt.ylabel("loss")
plt.xlabel("epoch")
plt.legend(["train", "test"], loc="upper left")
plt.show()
```



```
298/298 [=====] - 1s 1ms/step
Showing recommendations for user: 119
=====
Movies with high ratings from user
-----
Lion King, The (1994) : Adventure|Animation|Children|Drama|Musical|IMAX
Green Mile, The (1999) : Crime|Drama
Up (2009) : Adventure|Animation|Children|Drama
Avatar (2009) : Action|Adventure|Sci-Fi|IMAX
The Imitation Game (2014) : Drama|Thriller|War
-----
Top 10 movie recommendations
-----
Usual Suspects, The (1995) : Crime|Mystery|Thriller
Godfather, The (1972) : Crime|Drama
Casablanca (1942) : Drama|Romance
Star Wars: Episode V - The Empire Strikes Back (1980) : Action|Adventure|Sci-Fi
Goodfellas (1990) : Crime|Drama
Godfather: Part II, The (1974) : Crime|Drama
Cool Hand Luke (1967) : Drama
Jaws (1975) : Action|Horror
Raising Arizona (1987) : Comedy
Fight Club (1999) : Action|Crime|Drama|Thriller
```

```
In [17]: model.save('movies_model', save_format='tf')
!tar -C movies_model -zcvf movies_model.tar.gz ./

INFO:tensorflow:Assets written to: movies_model/assets
./
./saved_model.pb
./keras_metadata.pb
./variables/
./variables/variables.index
./variables/variables.data-00000-of-00001
./assets/
```

```
In [18]: # Model deployment:
# Add your region and apikey
# Add space guid
```

13. To deploy the model, replace the url, apikey, and space id with your values that you obtained in the section “Getting the values for “apikey”, “url”, and “space_id””. Then, run the following cells.

```
In [19]: from ibm_watson_machine_learning import APIClient

wml_credentials = {
    "url": "https://eu-de.ml.cloud.ibm.com",
    "apikey": "lHz1UvO1gNfxzI7MaBBkiQg5g622tRAXuzW2xwYMH_a"
}

client = APIClient(wml_credentials)

space_id = 'b33217e9-99de-43f4-a7f2-8a1eaf97b98a'
client.set_default_space(space_id)

'SUCCESS'
```

```
In [20]: sample_saved_model_filename = "movies_model.tar.gz"
software_spec_uid = client.software_specifications.get_id_by_name("tensorflow_rt22.1-py3.9")

metadata = {
    client.repository.ModelMetaNames.NAME: 'keras movie model',
    client.repository.ModelMetaNames.TYPE: 'tensorflow_rt22.1',
    client.repository.ModelMetaNames.SOFTWARE_SPEC_UID: software_spec_uid
}
model_details = client.repository.store_model(
    model=sample_saved_model_filename,
    meta_props=metadata
)
```



```
In [21]: published_model_uid = client.repository.get_model_id(model_details)
# Deploy the model
metadata = {
    client.deployments.ConfigurationMetaNames.NAME: "Keras movie model deployment",
    client.deployments.ConfigurationMetaNames.ONLINE: {}
}

model_deployment_details = client.deployments.create(published_model_uid, meta_props=metadata)

#####

Synchronous deployment creation for uid: '4108b143-d334-4443-806a-8b82f297ca76' started

#####

initializing
Note: online_url is deprecated and will be removed in a future release. Use serving_urls instead.
...
ready

-----
Successfully finished deployment creation, deployment_uid='8d66e588-8359-4ce2-9aee-1b22e06ca279'
-----
```

```
In [22]: # copy deployment_uid from the previous cell and replace it here

In [23]: model_deployment_id = "8d66e588-8359-4ce2-9aee-1b22e06ca279"
payload = {"input_data": [{"values": [[23,123]]}]}

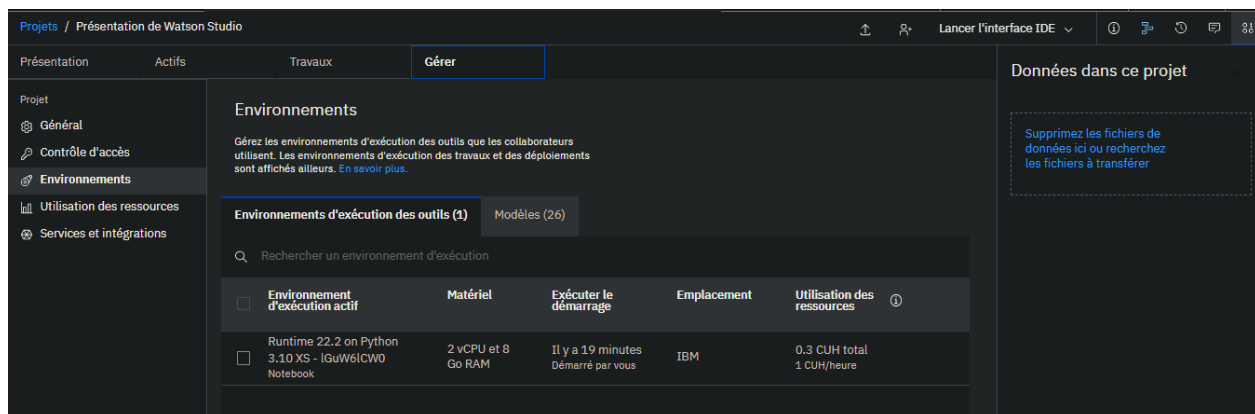
scores = client.deployments.score(model_deployment_id, payload)

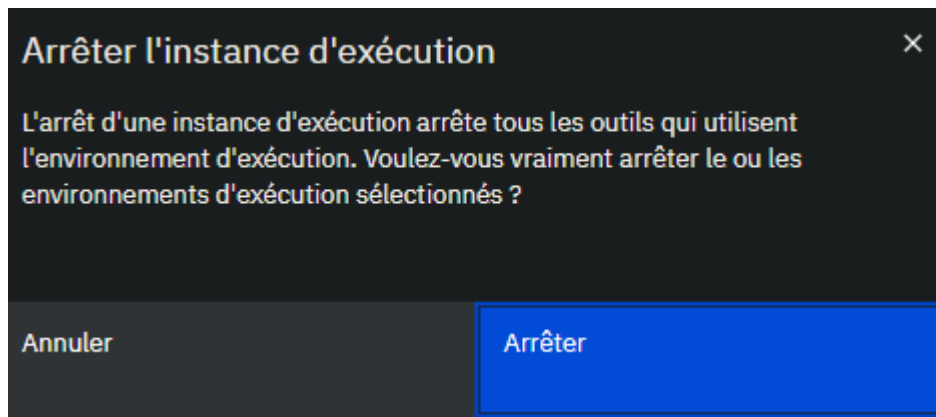
print(scores)

{'predictions': [{'id': 'output_1', 'values': [[0.49973264336586]]}]}
```

```
In [ ]:
```

14. Stop the notebook runtime environment to limit your consumption of capacity unit hours (CUH).





15. Click the hamburger menu, then click Deployments.

Click your space, click the Deployment tab, then click the deployed model.

Espace UAT

Présentation Actifs **Déploiements** Travaux Gérer

🔍 Rechercher

Nom	Type	Statut	Actif	Date de la dernière modification	
🔗 Keras movie model deployment	En ligne	✅ Déployé	keras movie model	il y a 8 minutes Idrissa TRAORE (You)	⋮
🔗 Mon déploiement AutoAI	En ligne	✅ Déployé	Mon modèle AutoAI	il y a 1 jour Idrissa TRAORE (You)	⋮
🔗 UAT Deployment	En ligne	✅ Déployé	MyPMMLModel	il y a 1 jour Idrissa TRAORE (You)	⋮

16. Copy the Endpoint. You use it as model_url in “Section 6: Integrating the solution components by using Node-RED”

Keras movie model deployment ✅ Déployé En Ligne

Référence d'API Test

Lien direct

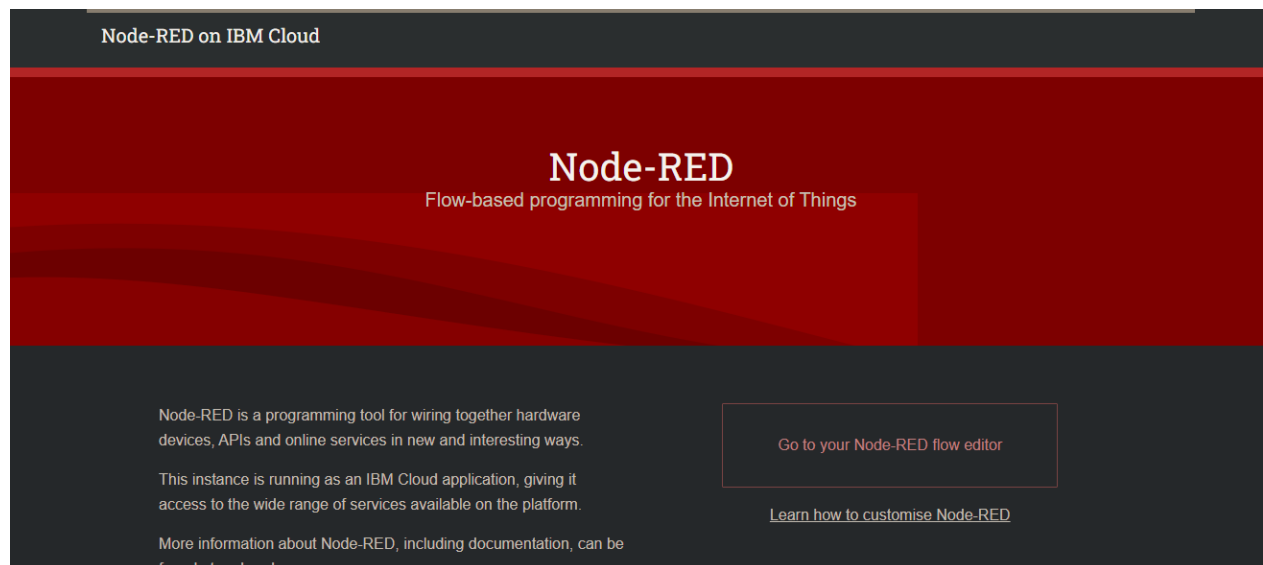
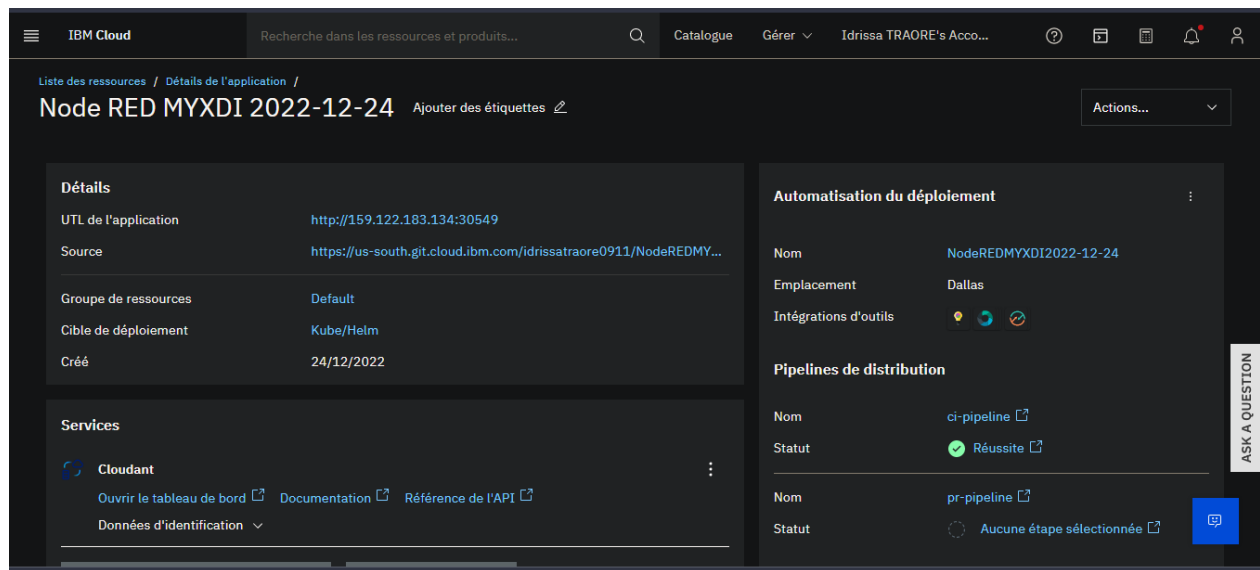
Noeud final Bearer <token> ⓘ

`https://eu-de.ml.cloud.ibm.com/ml/v4/deployments/8d66e588-8359-4ce2-9aee-1b22e06ca279/predictions?version=`

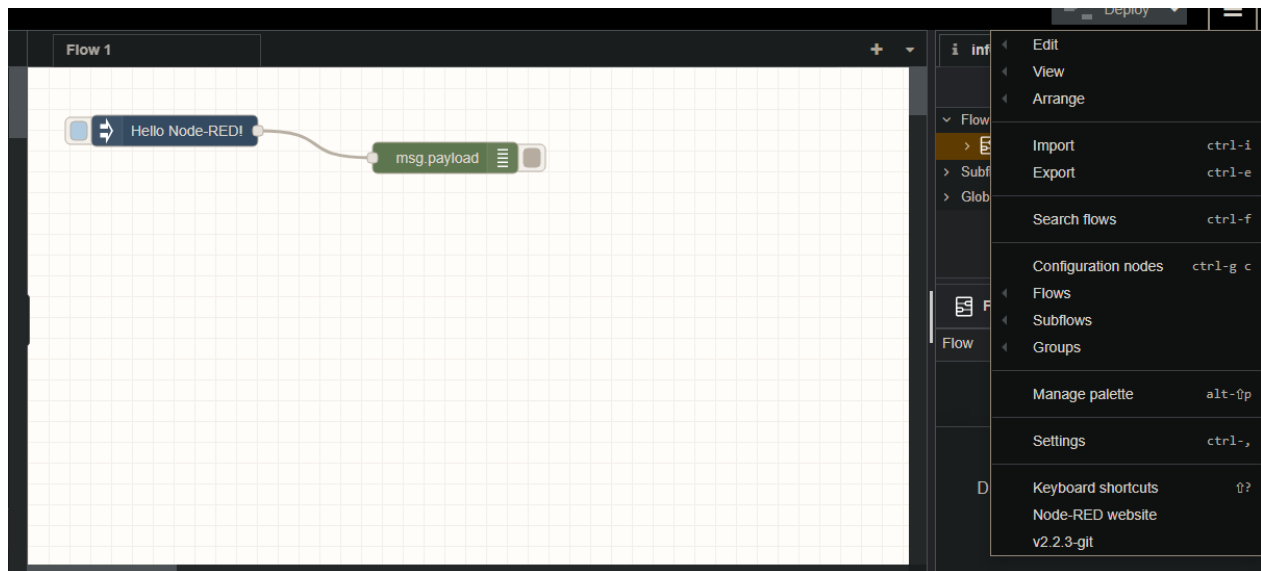
IAM

Integrate the solution components by using node-RED.

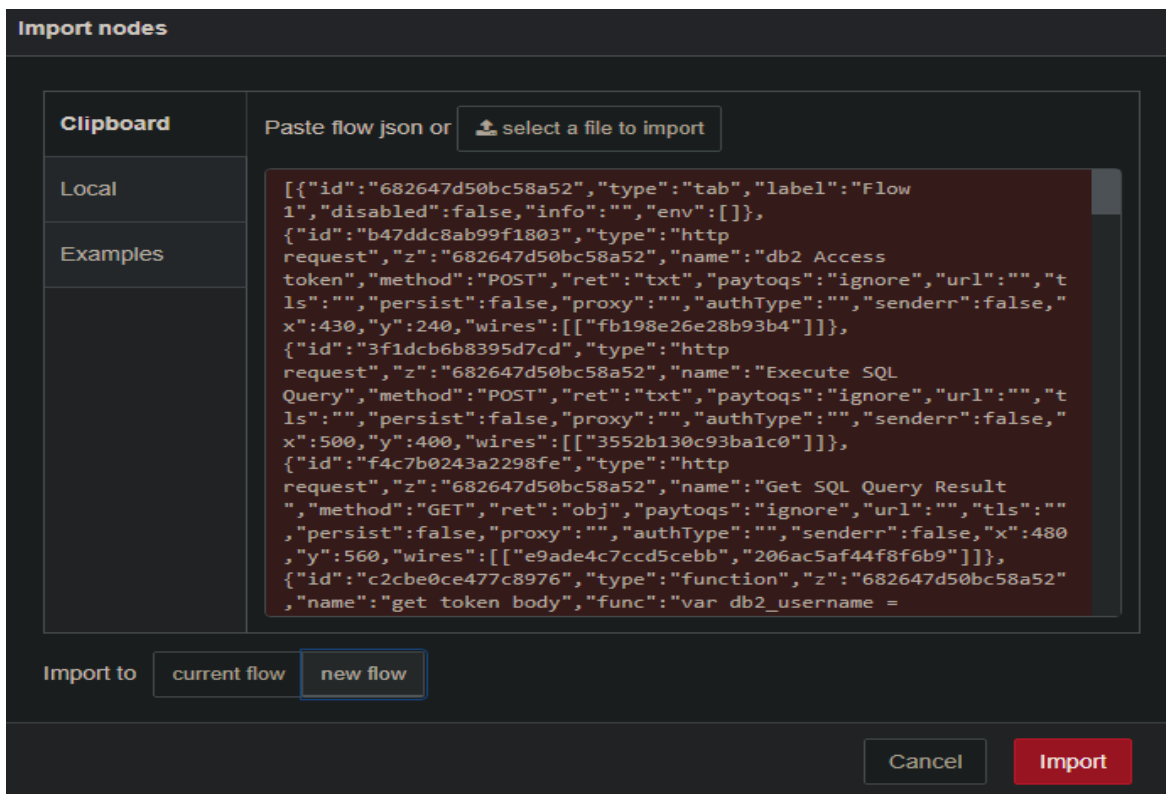
1. Download the file `movie_recommender.json` from https://github.com/IBM-SkillsAcademy/artificial-intelligence-analyst/blob/master/ex12/movie_recommender.json
From IBM Cloud Dashboard, click Resource list.
Expand Apps, then click your Node-RED app.
Click the App URL, then click Go to your Node-RED flow editor.



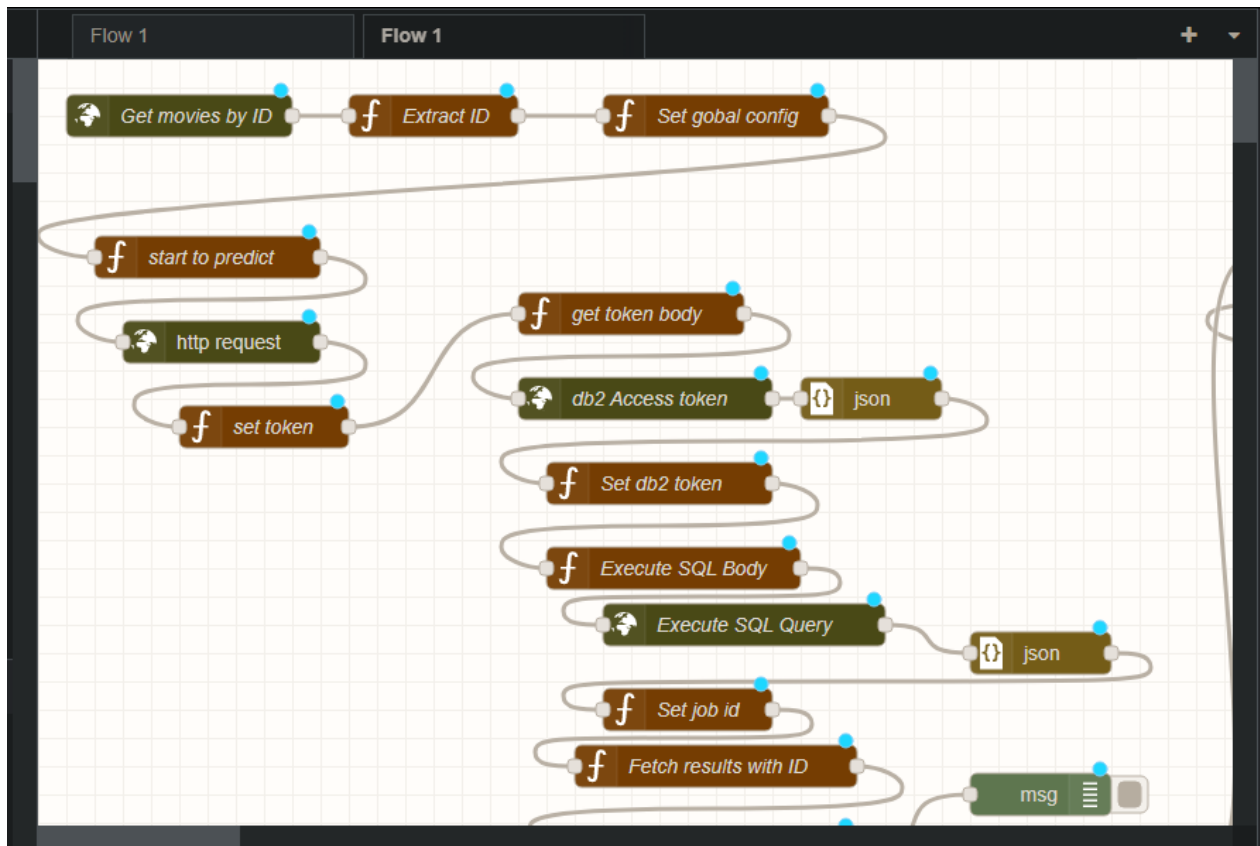
2. The flow editor opens. Click the hamburger menu at the upper right and then click Import to import the integration flow.



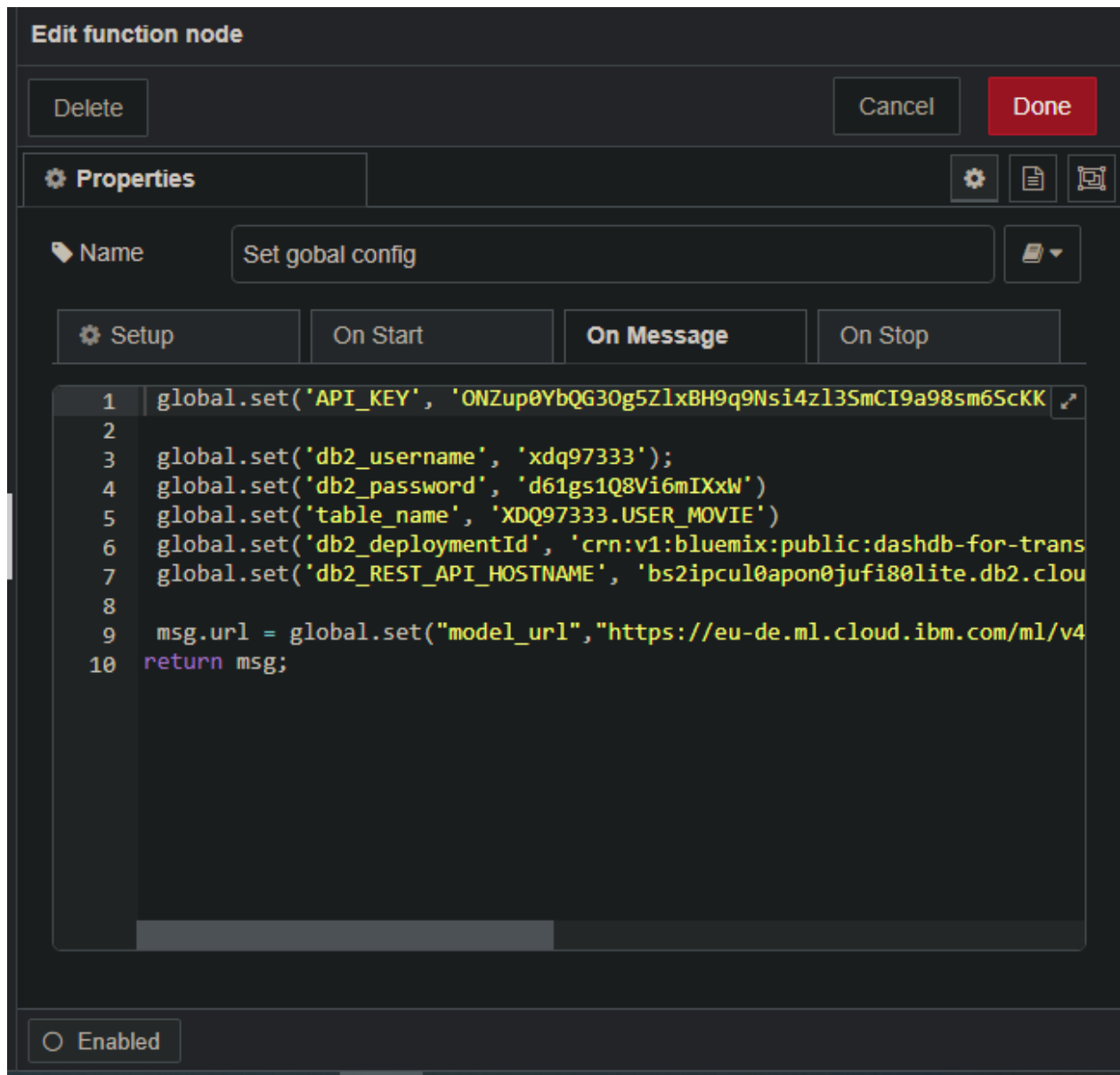
3. Click select a file to import and browse to the file movie_recommender.json that you downloaded earlier from https://github.com/IBM-SkillsAcademy/artificial-intelligence-analyst/blob/master/ex12/movie_recommender.json



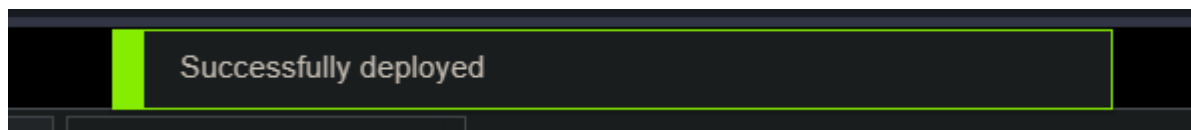
4. Select new flow for the field “Import to” and then click Import.



5. Double-click Set global config node and replace the following parameters with your values, then click Done.
I insert my apikey, db2_username, db2_password, db2_deploymentId, model_url, table_name

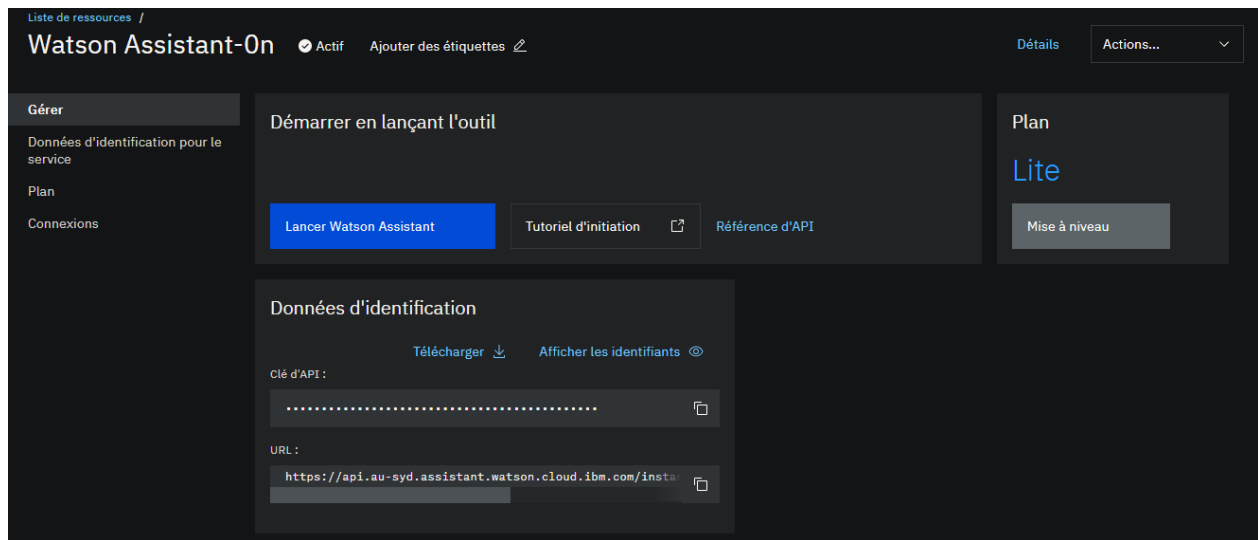


6. Click Deploy to deploy the flow.

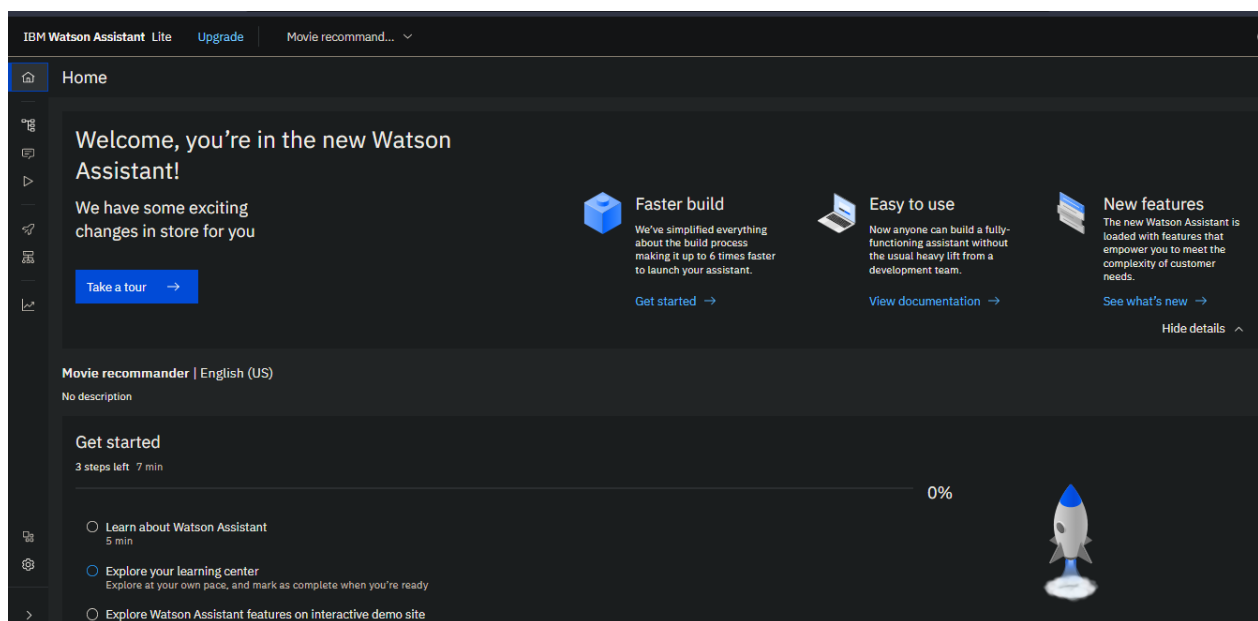


Test the entire movie recommender system.

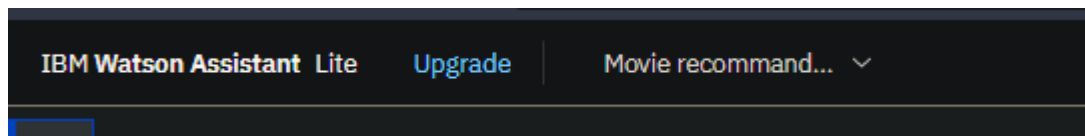
1. From the IBM Cloud Dashboard, click Resource list. Expand Services and software, then click your Watson Assistant service.



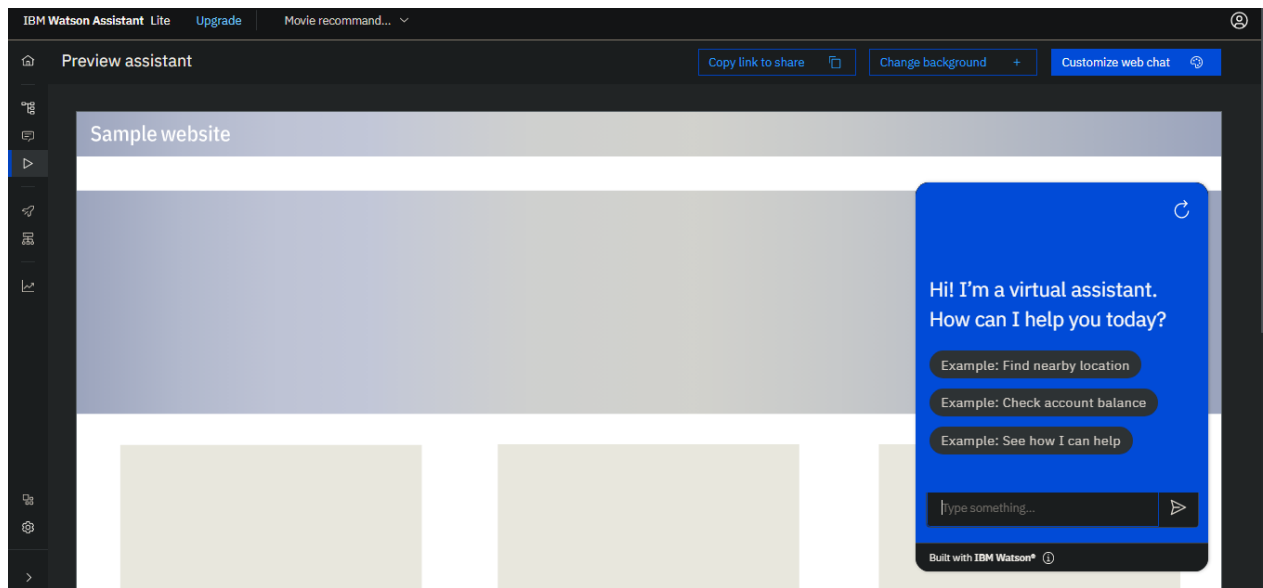
2. Click Launch Watson Assistant.



3. Select the Movie recommender assistant.



4. Click Preview from the left pane.



5. Ask the assistant "Can you recommend a movie?". The assistant asks for your user id. Enter "10", for example. Then, you get the list of movies recommendations.

