



## Parte 2 - Lavoriamo con Watson Modeler Flows

### Set up di Watson Machine Learning in Watson Studio

Usando la funzionalità di Modeler è possibile scrivere modelli, fare il loro training e il loro deployment usando il framework di SPSS Modeler e un'interfaccia di programmazione grafica. Il Model Builder può essere utilizzato in modalità completamente automatica, se il file di training contiene un campione significativo di dati: in questa modalità il servizio di Watson Machine Learning suggerisce il modello matematico da utilizzare e automaticamente fa il suo training.

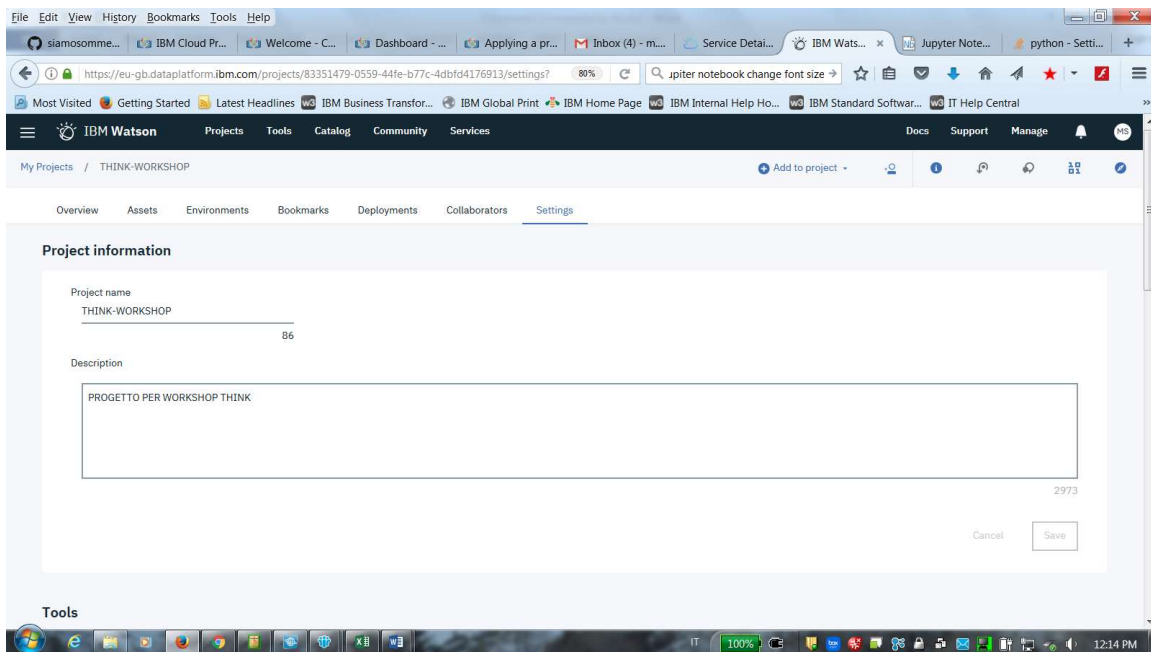
Con il Flow Editor usiamo il Model Builder in modalità grafica componendo blocchi specializzati in import dei dati, operazioni sui record dati, modelli matematici, deployment del modello, output dei dati.

Il Flow Editor ha anche un'ambiente grafico specifico per la scrittura e il deployment delle Artificial Neural Network. Troverai blocchi già pronti per layer Convolutional e Recurrent, Activation layer e potrai esportare il modello grafico della rete neurale scegliendo uno dei principali framework di riferimento.

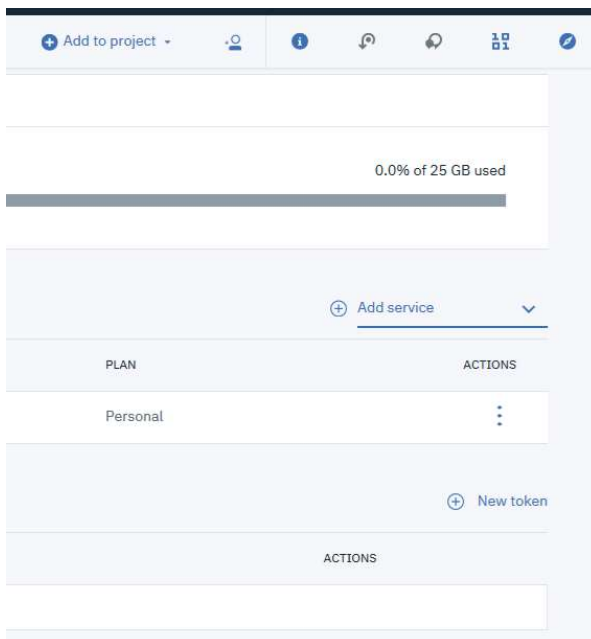
Per il nostro laboratorio utilizziamo il servizio di Watson Machine Learning accoppiato al Modeler Flows di Watson Studio.



Torna sul menu di progetto e vai nella sezione Settings.

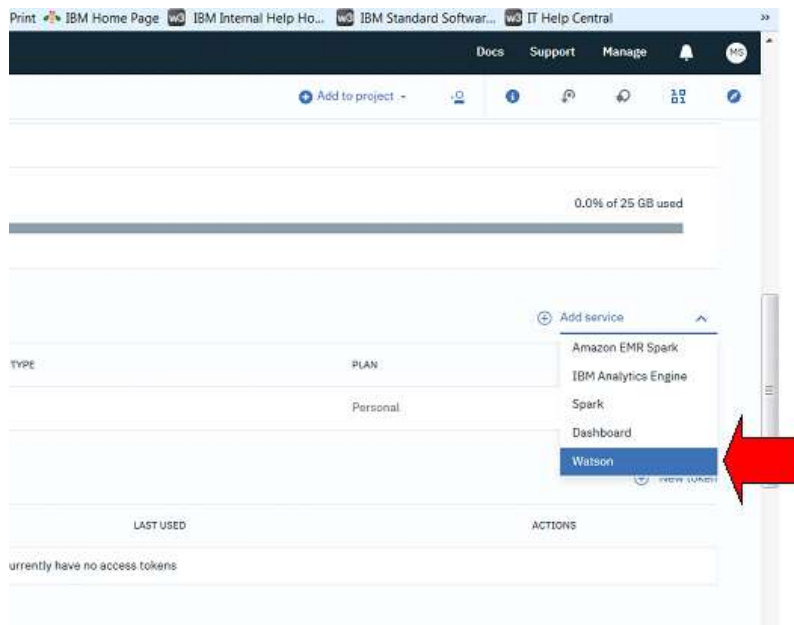


Scegli di aggiungere un servizio al progetto:

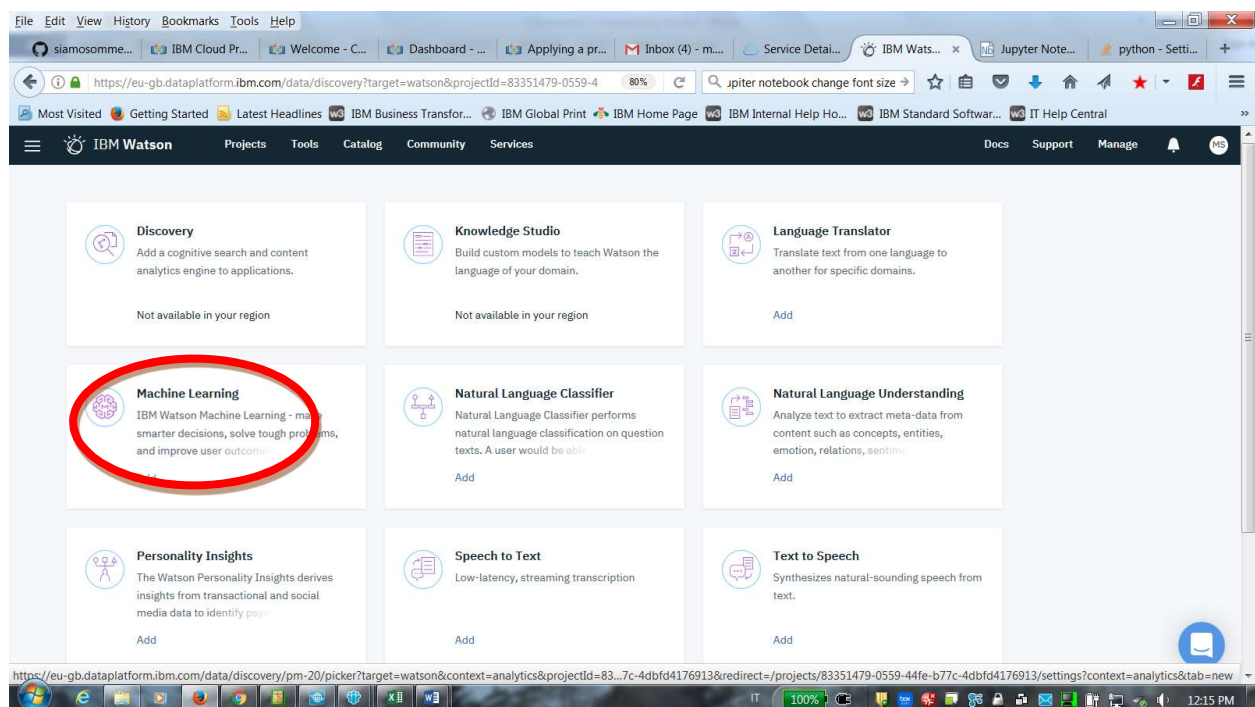




Dalla lista di servizi che e' possibile aggiungere, scegli un servizio di tipo Watson:



Seleziona il servizio di Watson Machine Learning:



Verifica che il piano scelto sia un piano Lite e procedi con Create.



Si apre la home page del servizio Watson Machine Learning:

### Machine Learning

Existing New

#### 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 using the best tools and the latest expert social environment built by and for scientists.

**Pricing Plan:** Monthly Process shown above reflect the: [United States](#)

PLAN	FEATURES	PRICING
<input checked="" type="radio"/> Lite	<p>Service instance (5 models per instance)</p> <p>5,000 predictions</p> <p>50 capacity unit-hours:</p> <p>Compute Tier: k80 = 2 capacity units for 1 training hour</p> <p>Compute Tier: k80x2 = 4 capacity units for 1 training hour</p> <p>Compute Tier: k80x4 = 8 capacity units for 1 training hour</p> <p>Otherwise 1 capacity unit for 1 computation hour</p> <p>Max 8 k80 GPUs (Deep Learning Training)</p>	Free

Verifica che il piano scelto sia Lite e procedi con create. Fai reload nella pagina di creazione del Model, e il nuovo servizio di Watson Machine Learning (WLM) comparirà come selezionabile.

## Preparazione del modello con Modeler Flow

Vai alla sezione Modeler Flows del progetto e seleziona un new Flow. Si apre il pannello per configurare un nuovo Flow: scegli di creare il flow con New e dai un nome al Flow. Lascia il resto ai valori di default e procedi con Create.

### Modeler

New From file From example

**Name\***

WineWLM

43

**Description**

Type description here.

500

**Select flow type**

☒ Modeler Flow ☐ Neural Network Modeler BETA

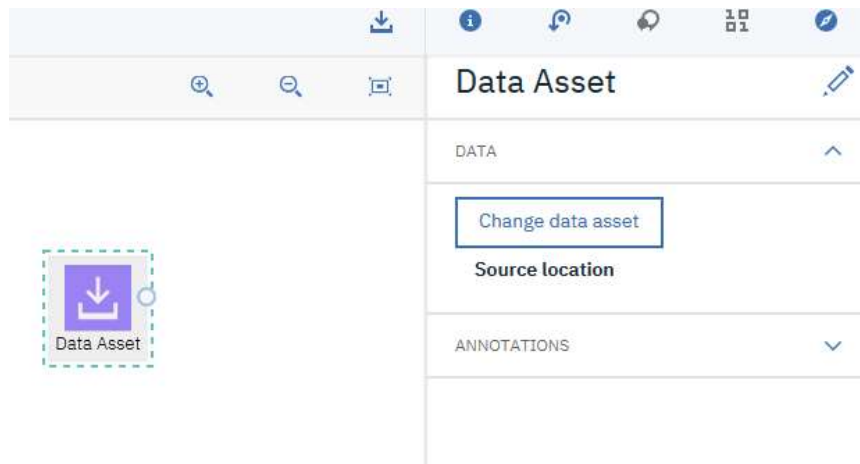
**Runtime**

☒ IBM SPSS Modeler ☐ Scala Spark 2.1 BETA

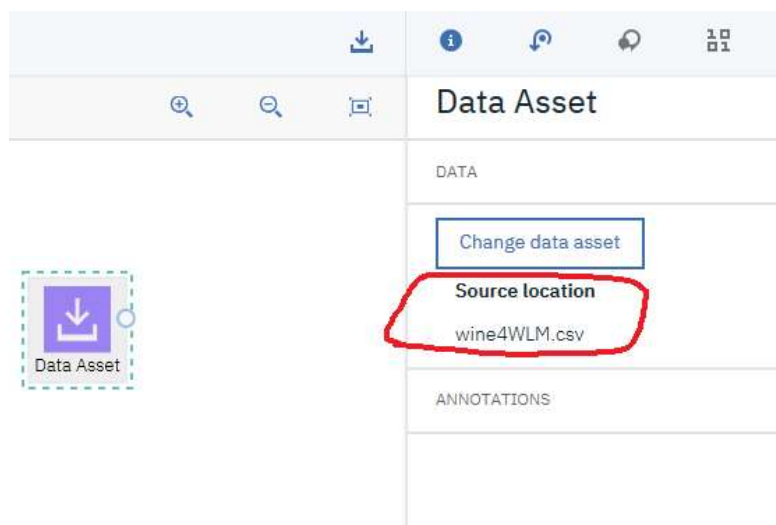


A questo punto si apre la console del Modeler. A sinistra compare la palette dei nodi.

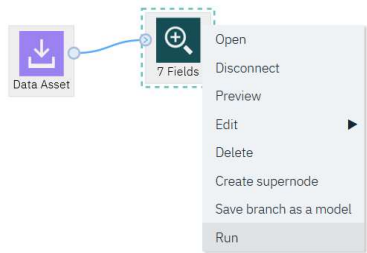
Apri i nodi di tipo Import e fai un drag and drop del nodo Data Asset. Con un doppio click sul nodo stesso si apre il pannello di configurazione del nodo:



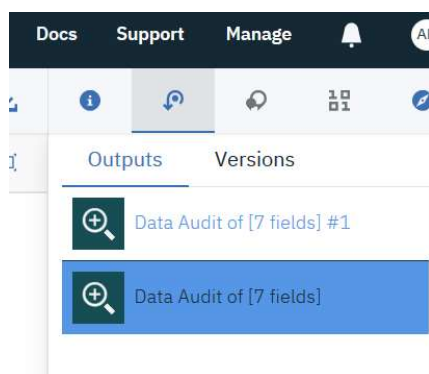
Scegli Change Data Asset e, quando comparirà la lista dei file che sono data asset del progetto, seleziona il file wineWLM.csv e fai OK. A questo punto dovresti vedere il file appena selezionato come source location:



Dai nodi di output, prendi il nodo Data Audit e, sempre con un drag and drop, portalo nel Flow che stai costruendo. Metti in collegamento i due nodi e fai RUN del nodo usando tasto del mouse.



In questo modo puoi vedere come sono i dati contenuti nel file, andando nella sezione output a destra dello schermo, fai un doppio click sulla rifa Data Audit:



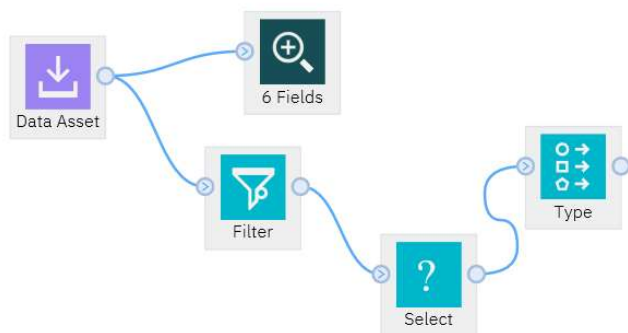
Si apre un pannello riassuntivo sui dati e i loro parametri:

	Field	Graph	Measurement	Min	Max	Mean	Std. Dev	Skewness	Unique	Valid
1	Year		Continuous	1952	1981	1967.321	8.525	-0.112	--	28
2	Price		Continuous	6.205	8.494	7.051	0.625	0.423	--	28
3	WinterRain		Continuous	376	830	607.107	126.810	0.074	--	28
4	AGST		Continuous	14.983	17.650	16.495	0.653	-0.314	--	28
5	HarvestRain		Continuous	38	292	145.750	71.871	0.612	--	28
6	Age		Continuous	3	31	15.893	8.239	0.190	--	28

	Field	Measurement	Outliers	Extremes	Action	Impute Missing	Method	% Complete	Valid Records	Null Value	Empty String	White Space	Blank Value
1	Year	Continuous	0	0	None	Never	Fixed	100.000	28	0	0	0	0
2	Price	Continuous	0	0	None	Never	Fixed	100.000	28	0	0	0	0
3	WinterRain	Continuous	0	0	None	Never	Fixed	100.000	28	0	0	0	0
4	AGST	Continuous	0	0	None	Never	Fixed	100.000	28	0	0	0	0
5	HarvestRain	Continuous	0	0	None	Never	Fixed	100.000	28	0	0	0	0
6	Age	Continuous	0	0	None	Never	Fixed	100.000	28	0	0	0	0



Andiamo a togliere le colonne che non sono rilevanti per il nostro modello. Per fare questo e' necessario prendere un nodo Filter, un nodo Select e un nodo Type e collegarli come segue:



Con un doppio click apriamo la configurazione del nodo Filter. Seleziona retain the selected field, selezioniamo i parametri della variabile indipendente, Price, AGST, Age, WinterRain, HarvestRain, quindi procedi con Save:

### Select Fields for Filter

Search in column Field name		Filter: <input type="checkbox"/> <input type="checkbox"/>	Reset
<input type="checkbox"/> Field name ^	Data type ^		
<input type="checkbox"/> Year	integer		
<input checked="" type="checkbox"/> Price	double		
<input checked="" type="checkbox"/> WinterRain	integer		
<input checked="" type="checkbox"/> AGST	double		
<input checked="" type="checkbox"/> HarvestRain	integer		
<input checked="" type="checkbox"/> Age	integer		

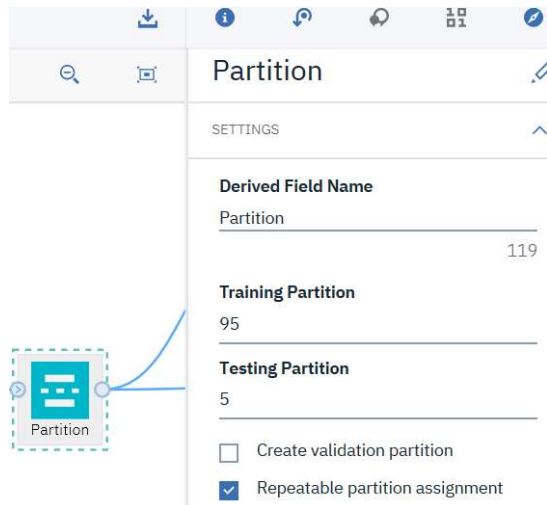
Andiamo a specificare quale sara' la nostra variabile target. Apri la configurazione del nodo Types, fai Configure Types, Add Columns, scegli Price e imposta il Role di Price a Target e procedi con Save:

### Configure Types

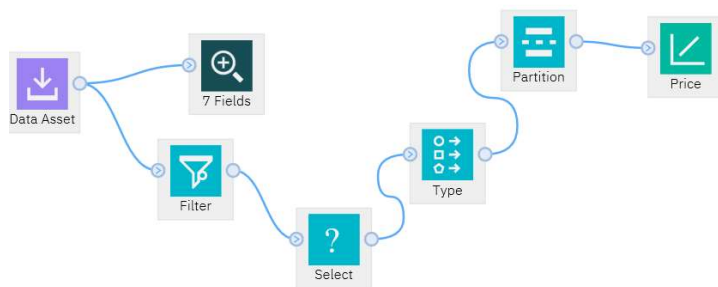
Read Values					
Types					
Field ^	Measure ^	Role ^	Value mode ^	Values ^	Check ^
Price	Default	Input	Read		None
		...			
		Input			
		Target			
		Both			



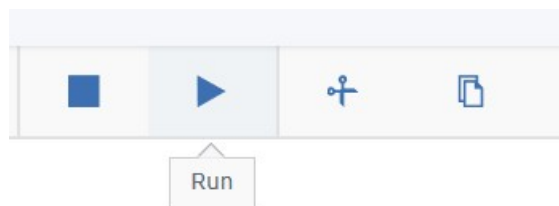
Collegiamo al nodo target il nodo partition per specificare la porzione di dataset da usare come training. Scegli di suddividere il file in 95% training e 5% test:



Adesso colleghiamo il nodo model e scegliamo il nodo Linear:



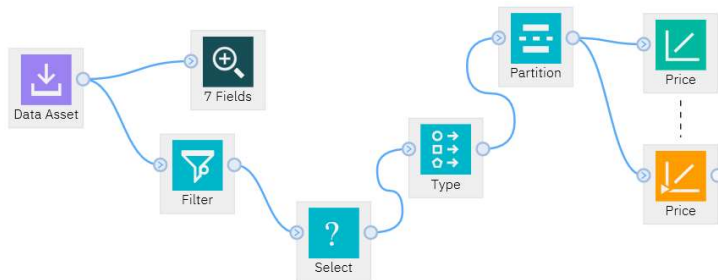
Procedi con esecuzione del Flow andando su RUN del flow:







Quando Il modello termina esecuzione compare il nodo di output di esecuzione del modello:



Posizionati su questo ultimo e con il tasto destro del mouse seleziona View Model:

## Model Evaluation ⓘ

TARGET : PRICE

Model Accuracy



0.848

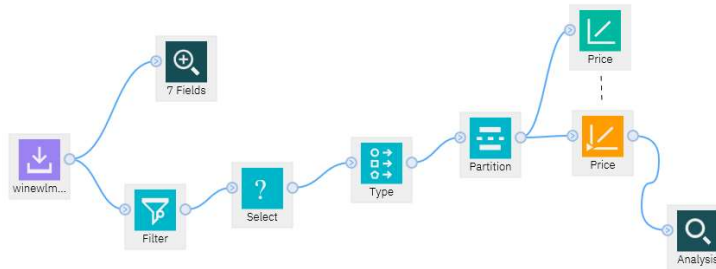
Model Evaluation Measures

<b>R<sup>2</sup></b>	0.848
<b>Adjusted R<sup>2</sup></b>	0.797
<b>Akaike Information Criterion (AIC)</b>	-40.178
<b>Corrected Akaike Information Criterion (AICc)</b>	-34.724

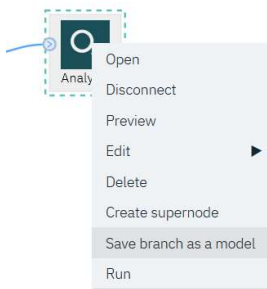


## Deployment del modello con Watson Machine Learning

Collegiamo il nodo di Analysis che useremo per fare il deployment del modello:



Vai sul nodo di Analysis e con il right click del mouse seleziona save as model:



Nel pannello che segue dai un nome al modello e procedi con Save:

## Save Model

### Terminal node Analysis

Model Name

winemodel

41

### Machine Learning Service

predictive-modeling-lk



The model will be saved to your project. You can access your model and create deployments from the Models section under Assets.



Uscendo dal canvas del Modeler Flow e tornando sulla pagina di sommario del progetto, nella sezione Models troverai il modello che hai appena creato:

Models		
NAME	STATUS	TYPE
winemodel	trained	spss-modeler-18.1

Modeler flows		
NAME	TYPE	CREATED BY
WMLwine	SPSS	[REDACTED]
wlmwine1	SPSS	[REDACTED]

Clicca su winemodel e vai su deployment. Il modello non ha ancora deployment quindi procedi con Add Deployment, dai un nome al deployment e procedi con Save:

Create Deployment

Web Service

Name

winemodeldep

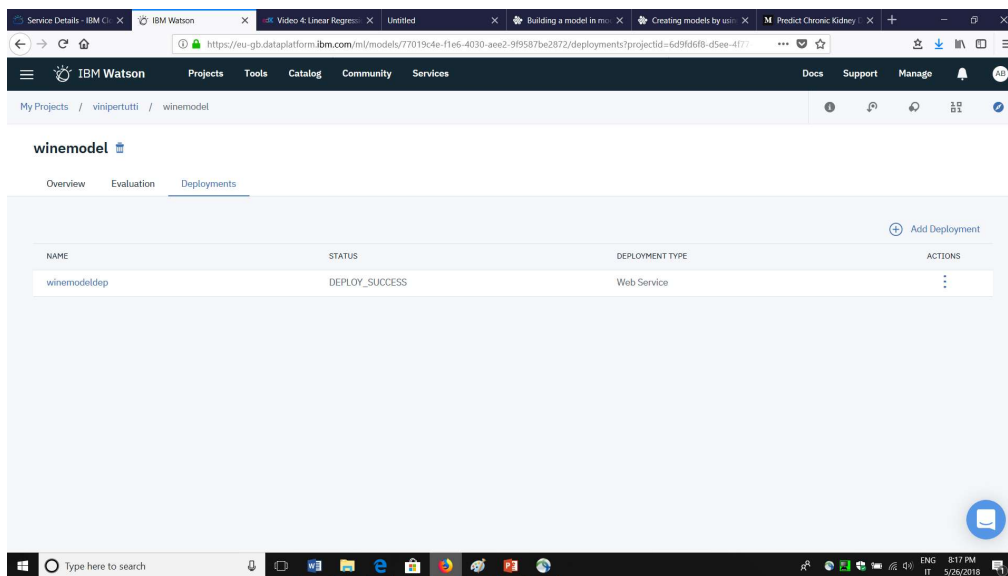
Description

Web Service Deployment Description

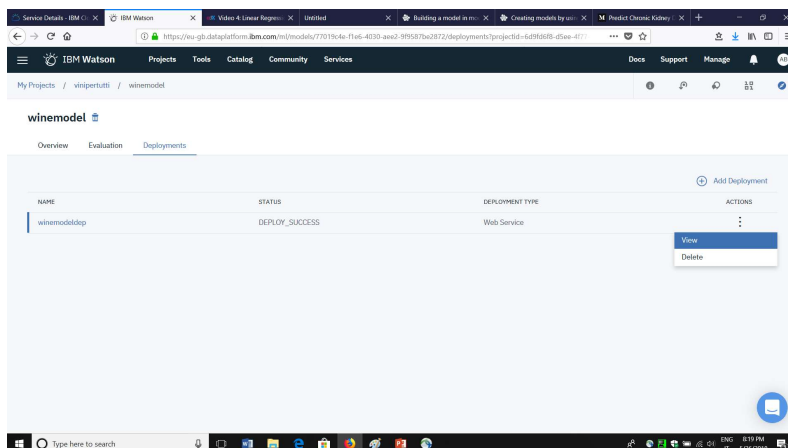
A questo punto parte l'operazione di deployment del tuo modello, puoi vedere il procedure del deployment guardando lo STATUS. Quando il deployment e' avvenuto con successo lo STATUS diventa DEPLOY SUCCESS.



## Hands-on: Diventiamo Sommelier grazie al Machine Learning con Watson!



Vai in corrispondenza di ACTION e scegli View:



Nella pagina che si apre vai alla sezione implementation dove trovi un https scoring end-point. Se apri poi la pagina View API Specification troverai REST API in formato Swagger.

<https://cognitiveclass.ai/>



## Reference

IBM Cloud: <https://www.ibm.com/cloud/>

IBM Watson Studio: <https://datascience.ibm.com/>

IBM Watson Machine Learning:  
<https://www.ibm.com/support/knowledgecenter/DSXDOC/analyze-data/ml-overview.html>

IBM Apache Spark: <https://www.ibm.com/cloud/spark>

Cognitive class: <https://cognitiveclass.ai/>

Sommelier Lab: <https://github.com/Danizu/siamosommelier>

IBM Cloud Object Storage (COS): <https://www.ibm.com/cloud/object-storage>



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