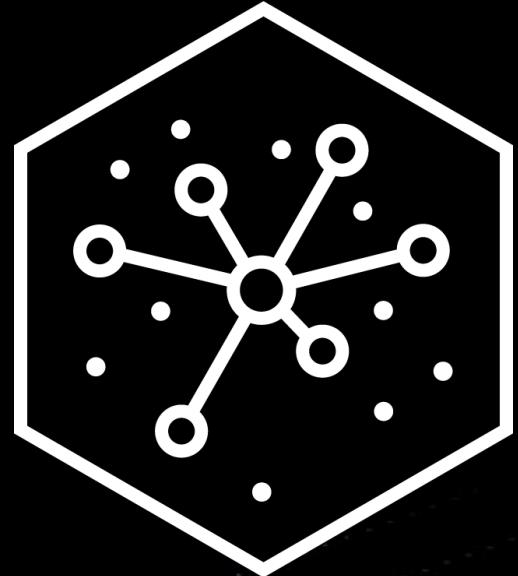


Hands-On AI, NLP, and Optimization Workshop

Starts at 9:00am EST

Hands-On AI, NLP, and Optimization Workshop

Starts at 9:00am EST

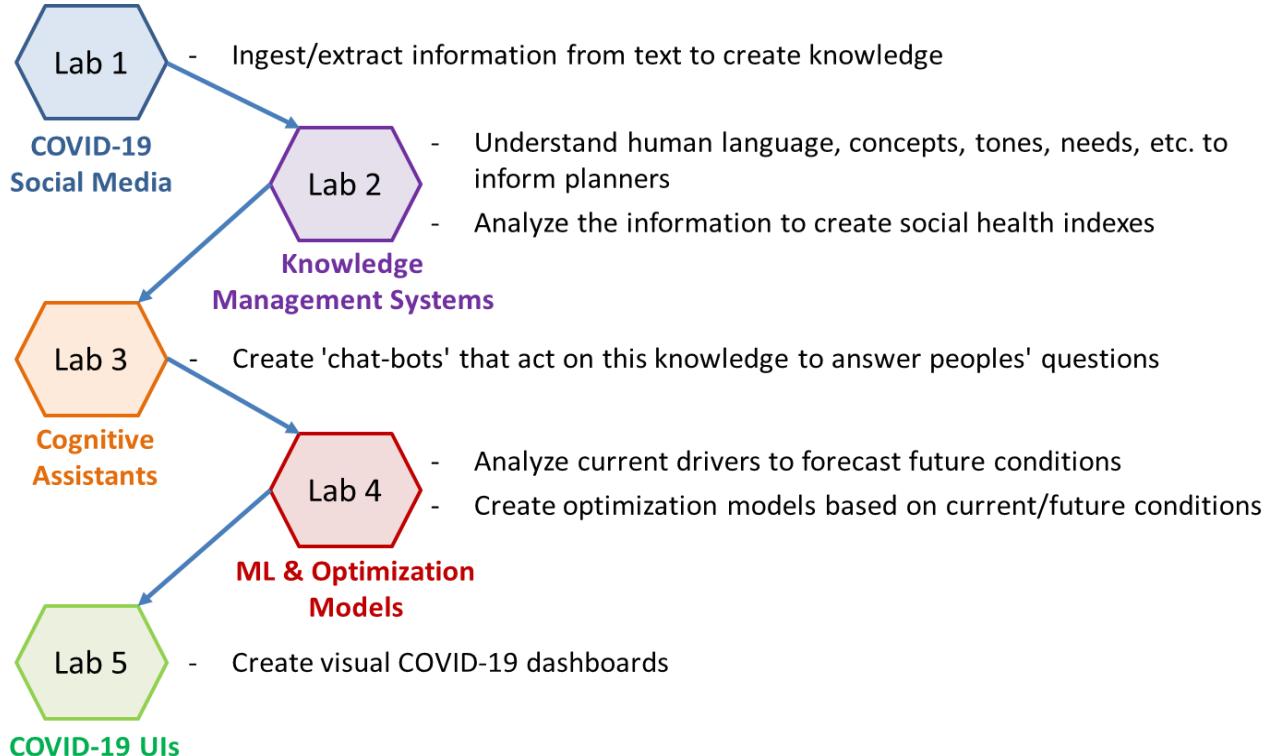
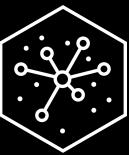


Agenda

Time	Description
9:00am – 10:00am	Introduction to Cloud Pak for Data, Watson Services, and Watson Studio
10:00am – 10:30am	Lab-0 – Setup Environment
10:30 am – 12:00pm	Lab 1 – Develop pandemic and socioeconomic annotators to extract domain-specific information
12:00pm – 1:30pm	Lunch + Lab 2 – Create a knowledge management system (KMS), ingest data, train the KMS to generate knowledge, and analyze information to create a COVID-19 stability index
1:30 pm – 2:45 pm	Lab 3 – Develop a COVID-19 Chatbot Assistant
2:45pm – 3:45pm	Lab 4 – Forecast COVID-19 outbreaks – optimal assignment of patients to areas.
3:45pm – 5:00pm	Lab 5 – Develop COVID-19 Dashboards
5:00pm – 5:15pm	Wrap up – Q&A

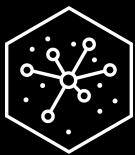
Workshop Goals

Apply Analytics and AI to COVID-19 use case



IBM A3 Center

Enabling clients to use technologies to develop art-of-the-possible solutions



The screenshot shows the IBM Industries website with a dark blue header. The top navigation bar includes the IBM logo, a search bar, and user icons. Below the header, a large banner features a blue-toned architectural photograph of a modern building's glass facade. The banner text reads: "Get cognitive answers at the IBM A3 Center" and "Meet your agency's goals with IBM Analytics, Automation, and AI solutions. Visit us at the Center for Cognitive Government, Washington, DC." A blue button labeled "Contact the A3 Center" is visible. The main content area below the banner is white and contains sections for "Upcoming events" and two event cards: "Hands-On Workshop on AI, NLP, and Optimization" and "End to End Data Science".

IBM Industries

Federal Solutions Trends & Insights Education Contracts Events

Search

Contact the A3 Center

Get cognitive answers at the IBM A3 Center

Meet your agency's goals with IBM Analytics, Automation, and AI solutions. Visit us at the Center for Cognitive Government, Washington, DC.

Upcoming events

Reserve your seat now for these IBM events

Hands-On Workshop on AI, NLP, and Optimization

May 6, 2021
Virtual event

→ Learn more

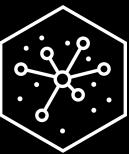
End to End Data Science

May 20, 2021
Virtual event

→ Learn more

IBM Federal and Public Sector Garage

Co-create and co-execute a minimally viable product



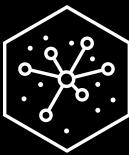
Get started co-creating with the IBM Garage

Sessions	Framing	Discovery	Solutioning	Scoping	MVP Build
Client outcomes	<ul style="list-style-type: none">Understand the strategyDetermine business / technology initiative(s) to focus onAlign stakeholders on vision and desired outcomeConfirm executive sponsor, product owner, and governance model	<ul style="list-style-type: none">Understand target end usersUnderstand 'as-is' context of business and/or technologyGuide narrowing focus	<ul style="list-style-type: none">Diverge to explore potential solutionsConverge to select solution to invest in validatingIdentify platform / initial technical components to be usedDevelop roadmap	<ul style="list-style-type: none">Define hypothesis to be tested / proof-points to be provenDefine scope of MVPIdentify resources needed to build MVP	<ul style="list-style-type: none">Build MVP that leverages IBM hybrid cloud technologiesDefine a secure minimum viable architecture that mitigates riskSet up cloud platform and automationBuild skills and evolve culture through pairingCreate an implementation roadmap for a hybrid, multi-cloud platform and DevOps adoption that leverages IBM hybrid cloud
Approach	<ul style="list-style-type: none">Business landscapeInitiative explorationVision definitionOpportunity canvas	<ul style="list-style-type: none">Process miningEnd-user researchTechnical discoveryData assessmentModernization assessment	<ul style="list-style-type: none">VisioningGenerating big ideas'Just enough' architectureRapid prototypingIdentify acceleratorsPlatform initiation	<ul style="list-style-type: none">Hypotheses definitionMVP definitionData requiredEnd user validation needed	<p>WORKLOAD</p> <p>PLATFORM</p>

IBM Garage / © 2021 IBM Corporation

IBM Federal and Public Sector Garage

Design Thinking Session



Presentation Outline



- **IBM Cloud Pak for Data Overview** 
- **Watson Services Overview**
- **Watson Studio Overview**
- **Labs**

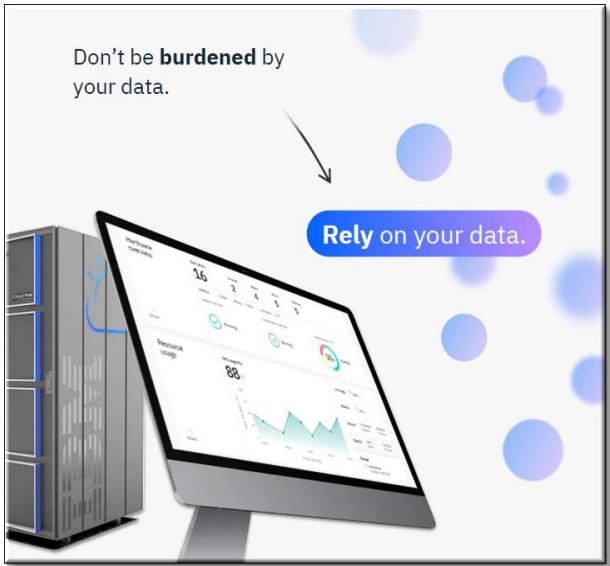
IBM Cloud Pak for Data



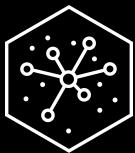
IBM Cloud Pak for Data is a single unified, integrated platform which helps to simplify the collection, organization and analysis of data.

With it, enterprises can turn data into insights through an integrated cloud-native architecture.

IBM Cloud Pak for Data is extensible and easily customized to unique client data and AI landscapes through an integrated catalog of IBM, open source, and third-party microservices.



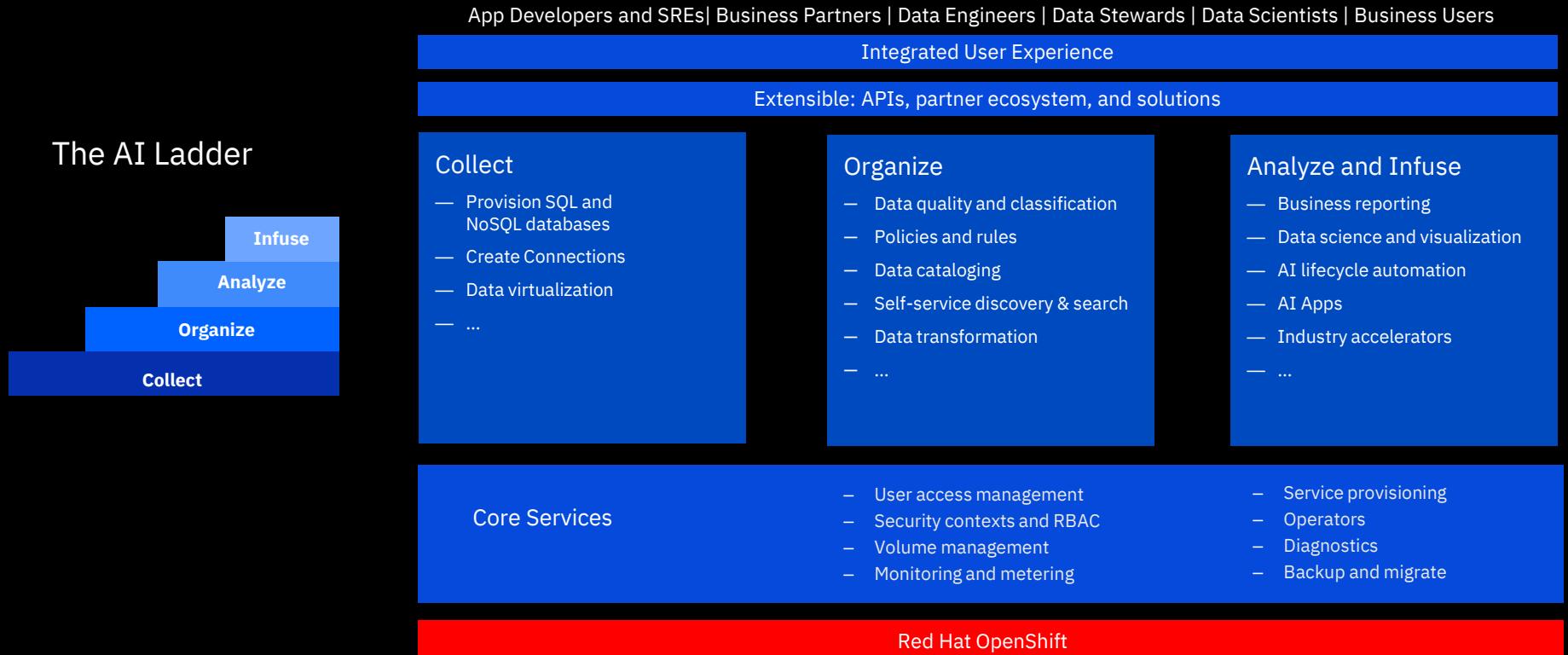
Considerations for Cloud Pak for Data



- Integrated Multi-modal platform
 - Use tool of choice and collaborate via project entities
 - Code/Click Options
 - All Analytics – Dashboard, Predictive, Prescriptive
 - All Data
 - Seamless user experience
- Hybrid Cloud
 - Cloud native architecture
 - Cloud agnostic – any vendor cloud or data center
 - Scalable data and analytic services
 - Flexibility to move data science to the data.
- Operationalize Machine Learning
 - Ease and flexibility of deployment at enterprise scale
 - Advanced model management capabilities.
 - Monitoring model performance
- Governance
 - Omnipresent, yet invisible – infused throughout
 - Data automatically integrated with governance capability for auto-discovery, catalog, and search subject to policies and rules
- Automate, Automate, Automate

IBM Cloud Pak for Data

Unified, modular, deployable anywhere



Cloud Pak for Data Deployment Options



- **Cloud Pak for Data as a Service**

- Managed offering provided on the IBM Cloud
 - Used for today's labs

- **Cloud Pak for Data**

- Available anywhere Red Hat OpenShift is supported
 - Public Clouds – IBM, Amazon Web Service, Microsoft Azure, Google Cloud
 - On-premise

- **Cloud Pak for Data System**

- Pre-configured hardware
 - Same capabilities as Cloud Pak for Data
 - On-premise

IBM Cloud Satellite

Build Faster. Securely. Anywhere

Consume IBM Cloud services anywhere.

- On prem, at the edge or on other public clouds

Flexible Infrastructure options:

- Meet you where you are with existing infrastructure, integrated appliances or your public cloud accounts

Industry Optimized including FS Cloud :

- Controls strong enough for banks and regulated industries coming 2H2021



Presentation Outline



- **IBM Cloud Pak for Data Overview**
- **Watson Services Overview**
- **Watson Studio Overview**
- **Labs**



Watson - Solutions



Watson Assistant



Watson Discovery



Tone Analyzer



Personality Insights



Natural Language Understanding



Visual Recognition



Knowledge Studio



Speech-to-Text



Language Translator



Text-to-Speech



Natural Language Classifier

Watson Accelerators



Voice of the Customer



Customer Care



Expert Assist



Compliance Assist



Watson Expert Services



Design



Learn



Plan



Build



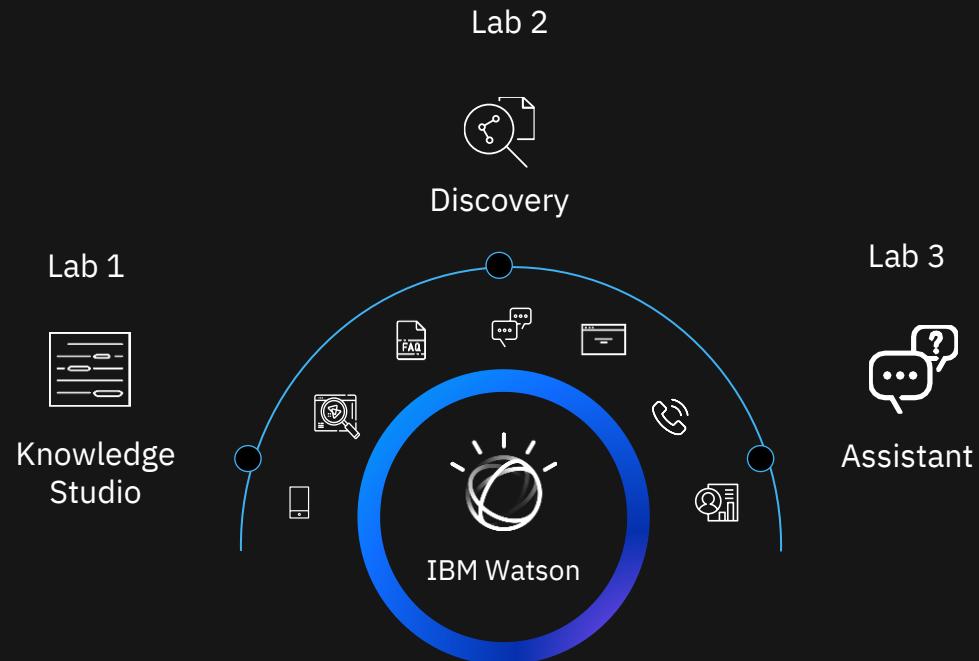
Deploy



On Demand Consulting

+ Custom Engagements

IBM Watson NLP



Knowledge Studio



Knowledge Studio

Domain-specific insight



Visually build domain-specific NLP models

- Bring experts together in a collaborative environment to teach Watson to understand the linguistic nuances of your domain.
- Build models without requiring deep technical skills or coding
- Apply curated model to multiple applications including Discovery and Assistant

IBM Watson Knowledge Studio

VIEW DETAILS | REPLACE | CONCORDANCE | ATTRIBUTE VIEW | In Progress | SAVE | CLOSE

STEP 2: THE FIRST STAGE MALWARE IS EXECUTED

Once the Upatre malware is executed, its sole purpose is to download Dyre. This is completed in a few stages.

It's important to note that this stage of the process is completely dynamic. URLs and payloads are constantly shifting in order to evade detection.

The Upatre malware itself constantly evolves and remains obfuscated, allowing it to evade antivirus measures as well.

1) Upatre contacts checkip.dyndns.org in order to determine the public IP address of the machine it is on. This website replies with a simple message 'Current IP Address: x.x.x.x'. The malware uses this information to understand who it has infected.

2) Next, a STUN (Session Traversal Utilities for NAT) server is contacted to determine the public IP address and the type of NAT (Network Address Translation) service it's sitting behind.

3) Internet connectivity is checked to determine if a proxy is being utilized by contacting google.com.

4) Upatre makes its initial contact with the Command & Control (C&C) server.

5) Upatre downloads Dyre from a varied list of domains as well as changing filenames.

For example, metflex(.)uk(.)com hosted a file named à€œt_image.jpgâ€, which is the Dyre malware.

How Knowledge Studio makes sense of natural language

Unstructured Data

“This on-site investigation focused on the performance of the **Certified Advanced 208-Compliant air bag system** in a **2005 Ford Escape XLT 4x4** sport utility vehicle. This **two-vehicle crash** occurred in **July 2014** at **1539** hours in the state of Colorado.”

Structured Data

Part of car

Certified Advanced 208-Compliant air bag system

Model year

2005

Manufacturer

Ford

Model

Escape XLT 4x4

Incident

Two-vehicle crash

Date of incident

July 2014

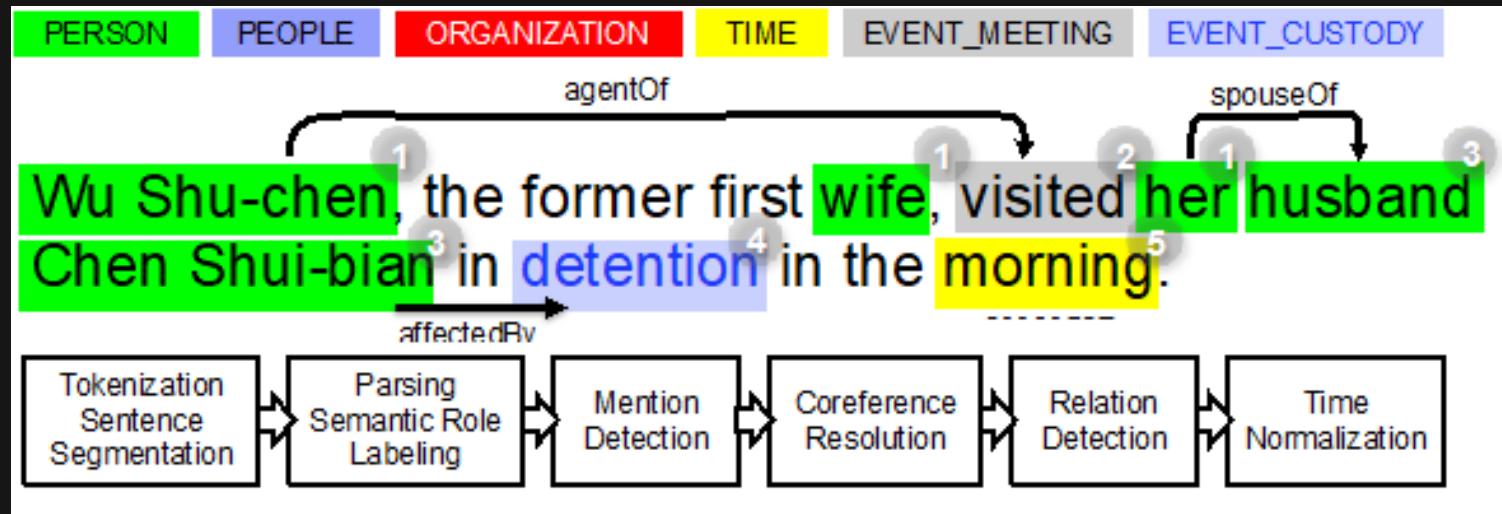
Time of incident

1539

Annotator



How Knowledge Studio makes sense of natural language



Watson Discovery



Watson Discovery

Deep Text Analysis and Document Conversion



Diverse data ingestion

Using APIs, web uploads, or data crawler and feed-through
Document conversion to deal with multiple, varied file types.

Apply enrichments

Uses custom models to extract, entities, relationships, keywords, sentiment, etc.

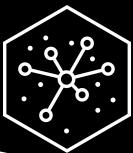
Extract insights

Use simple but powerful queries that support multiple query types including Boolean, filter, and aggregation queries to discover patterns, trends, and answers.

The screenshot displays the IBM Watson Discovery interface. On the left, a sidebar shows a collection named "collection for demo" with "Data settings". Below this are sections for "Extract fields" and "Enrich fields". A preview of a document titled "accenture-2016-10-k.pdf" is shown, with the first page containing the United States Securities and Exchange Commission Form 10-K for Accenture. To the right of the document preview is a large, colorful treemap visualization representing extracted data fields. The treemap is composed of various colored rectangles (blue, pink, purple, yellow, green) of different sizes, corresponding to the fields listed in the legend on the right. The legend includes categories like "header", "text", "table_of_contents", and "title". A "Fields" section on the right lists items such as "answer", "author", "footer", "header", "question", "subtitle", and "text", each associated with a colored circle. A "Clusters" section shows a single item labeled "table". At the bottom right, there is a "Submit page" button and a note stating "Viewing: Annotations of Luke Palamaro".

Watson Discovery

Comparison versus Traditional Search



Discovery search

💡 How to properly install child restraints

147 answers found in 7 documents

[Service Manual for 2008 Pontiac G8.pdf](#)

Lower Anchors and Tethers for Children (LATCH)

"... int, following the instructions that came with that restraint, and also the instructions in this manual. When installing a child restraint with a top tether, you must also use either the lower anchors or the safety belts to properly secure the child restraint. A child restraint must never be installed using only the top tether and anchor. In order to use the LATCH system in your vehicle, you need a child restraint that has LATCH attachments. The child restraint manufacturer will provide you with instructions on how to use the child restraint an ..."

confidence 59%

child restraint

LATCH system uses anchors

LATCH system

installation of a child restraint

...

[Service Manual for 2008 Pontiac G8.pdf](#)

Securing Child Restraints (Rear Seat)

"... dy the instructions that came with your child restraint to make sure it is compatible with this vehicle. If your child restraint has the LATCH system, see Lower Anchors and Tethers for Children (LATCH) on page 1-40 for how to install your child restraint using LATCH. If you secure a child restraint using a safety belt and it uses a top tether, see Lower Anchors and Tethers for Children (LATCH) on page 1-40 for top tether anchor locations. Do not secure a child restraint in a position without a top tether anchor if a national or local law req ..."

confidence 45%

child restraint

top tether

safety belt

use of the top tether

...

[Service Manual for 2008 Pontiac G8.pdf](#)

confidence 43%

Traditional search

💡 install child restraint

6 documents found

[Service Manual for 2008 Pontiac G8.pdf](#)

2008 Pontiac G8 Owner Manual GENERAL MOTORS, GM, the GM Emblem, PONTIAC, the PONTIAC Emblem, are registered trademarks of General Motors Corporation, and the name G8 is a trademark of ...

[Chevrolet Express 2006 Equipment Adaptive.pdf](#)

14V706000 CHEVROLET EXPRESS 2006 EQUIPMENT ADAPTIVE Record: Cummings Mobility Conversion & Supply (Cummings) is recalling certain model year 2006-2014 Ford E-150, E-250, E-350, Chevrolet Express, 2006 ...

[Ford Focus 2001 Electric Component.pdf](#)

02V288000 FORD FOCUS 2001 ELECTRICAL SYSTEM: BATTERY: CABLES Record: Certain passenger vehicles equipped with zetec engines, loose or broken attachments and misrouted battery cables could lead to cabl ...

[Honda CR-V 2002 Seats.pdf](#)

02V251000 HONDA CR-V 2002 SEATS AMERICAN HONDA MOTOR CO. Record: On certain sport utility vehicles, the front seat anchorage nut strength is insufficient because the nuts were installed improperly. If ...

[Pontiac Sunfire 1996 Steering Rack.pdf](#)

02V286000 PONTIAC SUNFIRE 1996 STEERING: RACK AND PINION Record: Certain passenger vehicles and mini vans have lower pinion bearings in the power rack and pinion assembly in which the retainer tabs we ...

Discovery + Knowledge Studio

Social Media Analysis

Discover trends, patterns, and sentiment with aggregate analysis of news and social media sources. Surface anomalies, key events, and relationships.



Watson Discovery News

Continuously updated collection of 13 million+ articles from international news sources and social media sites.

Contract Analysis

Ability to extract data and elements from contracts and other governing or regulatory documents to streamline business processes.



Content Intelligence

Automatically understand and extract the structure and content of contracts, invoices, and purchase orders - without prior training.

IP Analysis

Ability to understand highly-technical legal and product document to assist patent officers in assessing novelty.



IBM IP Advisor

Assists IBM IP professionals in analyzing patent applications against large corpus of prior art, legal documentation, current news sources, etc.

Watson Assistant





Watson Assistant

Build, train, and deploy conversational interaction on any device, application, or channel – on any cloud.

Low-code platform

Intuitive building interface that helps you— from coders to the C-suite – to successfully build and deploy an assistant quickly.

Powered by best in class NLU

Best in class AI powers the underlying intent-based language models.

Connects to any channel

You have channels, applications, and content in place, allowing the Assistant to connect to external web services and software.

Seamlessly hands off to agents

Connect existing service to desk for transfer to human agents.

Flexible Dialogue

Nuanced dialogue options allowing for flexible conversation structure including disambiguation and contextual understanding.

Analytics

Visualize trends in message data, allowing action to be taken and improvements to be made where required.

DTE Bank Assistant

Okay I will help you setup a Travel Alert. I just need a few pieces of information from you about your trip. First, where are you going?

i am traveling to Rome tomorrow

When do you come back?

in a week

Your account has been setup for a travel alert for 2020-04-30 to 2020-05-06 while traveling to Rome. Thank you.

I have your Mobile number as [444-555-6666](#). Would you like to update it?

Yes

No

Type something... →

Intents

Intent Password Reset

“ I forgot my password...”

“ How do I get a new password? ”

“ Can’t login into your site... ”

“ My login isn’t working, please help... ”

“ Can you reset my password? ”

Assistant Language Model

Extract other key information from a question

“ I'm frustrated,
I haven't been
able to login
into your online
billing system ,”

Intent	Password Reset
Entities	Online Billing System
Emotional Tone	Anger
Context	Bill Smith, 47 / Gold Member
Context	Mobile

Watson Assistant Search Skill

Simple integration between Watson Assistant and Watson Discovery to provide answers to all of your customers' and employees' questions

- Improve the coverage of your assistant by calling out to a “search skill” from any dialog node
- Search results are formatted automatically by search skill
- Ingestion and Sync to common knowledge base and CMS products, like Salesforce Knowledge, Box, Sharepoint, and others...

The screenshot shows the "Skills / DemoSkill" configuration page. On the left, there's a "Configure Search Response" section with fields for "Title (optional)" (set to "Visa Signature"), "Body (optional)" (set to "Chase Sapphire®. For questions, call 1..."), and "URL (optional)" (set to "This guide applies to Benefit Information"). Below this is a "Define the text your search skill will display to the end user" section with tabs for "Message" (selected), "No results found", and "Connectivity issue". The "Message" tab contains a preview of search results for the query "is lost luggage covered". The results include a card for "Lost Luggage" with a subtitle about benefit amounts for lost items, and another card for "Travel and Emergency Assistance Services" with a subtitle about lost luggage locator services.

Try it out

Preview how search skill results will be surfaced

Clear X

is lost luggage covered

I searched my knowledge base and found this information which might be useful:

Lost Luggage

The benefit amounts for jewelry, watches, cameras, video recorders, and other electronic equipment are part of and not in addition to

[{"Benefit Information What is the Lost Lugga..."]

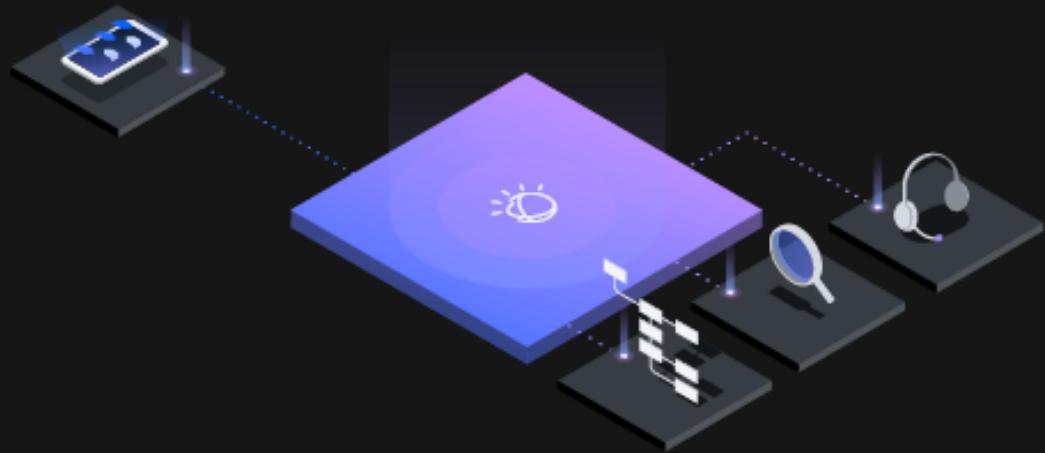
["Travel and Emergency Assistance Services"]

. • Lost Luggage Locator Service can help you through the common carrier's claim procedures or can arrange shipment of

[{"What are Travel and Emergency Assistance ..."]]

Watson Assistant Voice Interaction

- Watson answers the most common queries using Watson Assistant with natural sounding neural speech synthesis.
- Fast-track your customers to the answers they need.
- Watson can send and receive SMS & MMS messages during an ongoing voice call
- Allows Watson to send and receive information which is not suitable as a spoken response - e.g. web links, images of damage to property, email addresses, 2 factor authentication texts
- At any point during a call Watson can initiate a call transfer to an agent



Watson Assistant

Retain Industry/Organization Knowledge

Make deep institutional knowledge available to everyone in the organization by creating chatbots and knowledge management systems that can share expertise.

- Reduce workload on experts
- Retain learnings from SMEs as they change roles or departments.

Improve Customer Experience

Watson answers the most common queries using a Watson powered virtual agent with natural sounding neural speech synthesis

- Reduce calls going to human agents
- Resolve queries more quickly

Assist Agents

Watson listens in to ongoing call between caller and agent, producing live transcript and sends the live transcript to Watson Discovery to find relevant information.

- Faster call resolution



Presentation Outline



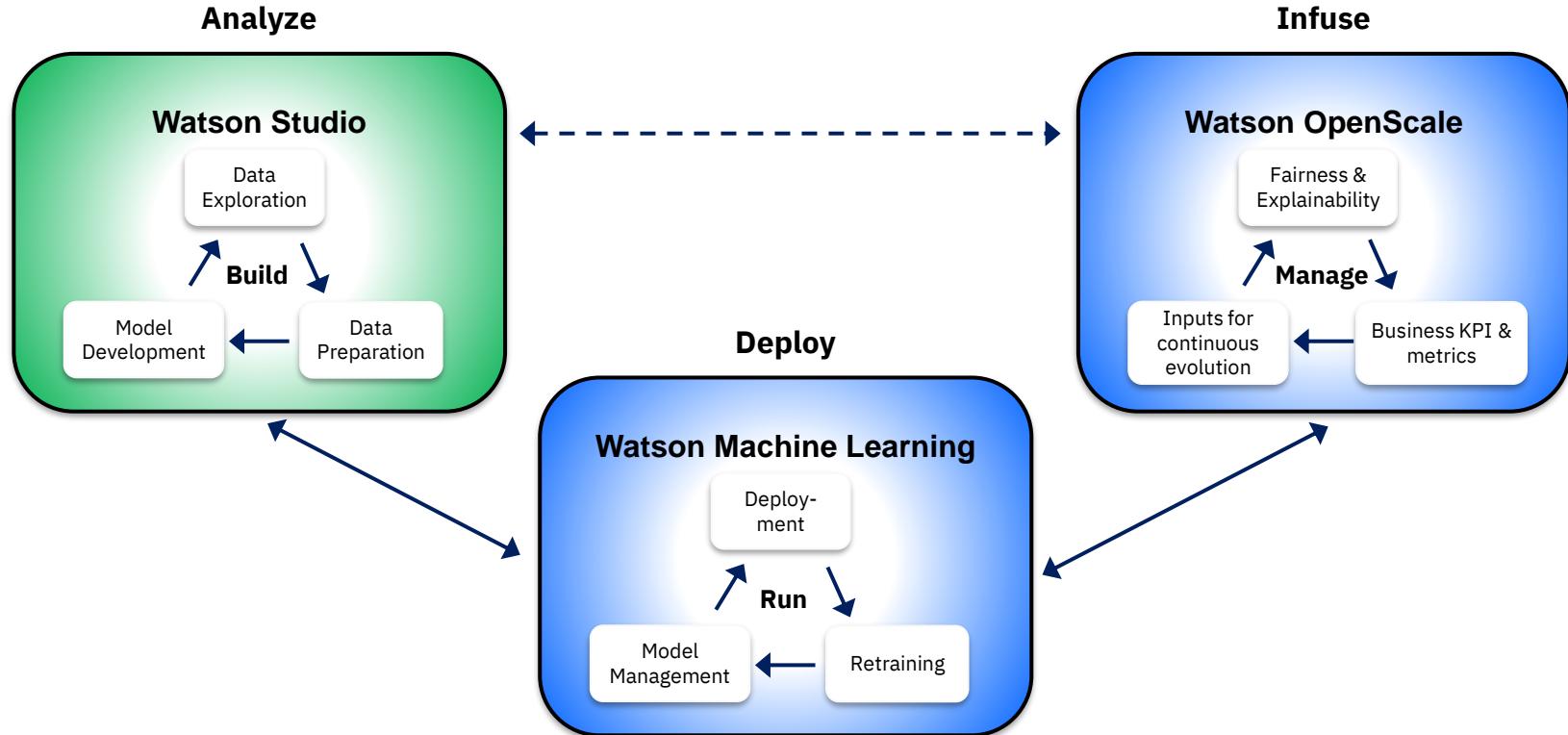
- **IBM Cloud Pak for Data Overview**
- **Watson Services Overview**
- **Watson Studio Overview**
- **Labs**





Analyze

The Data Science Lifecycle: Overview



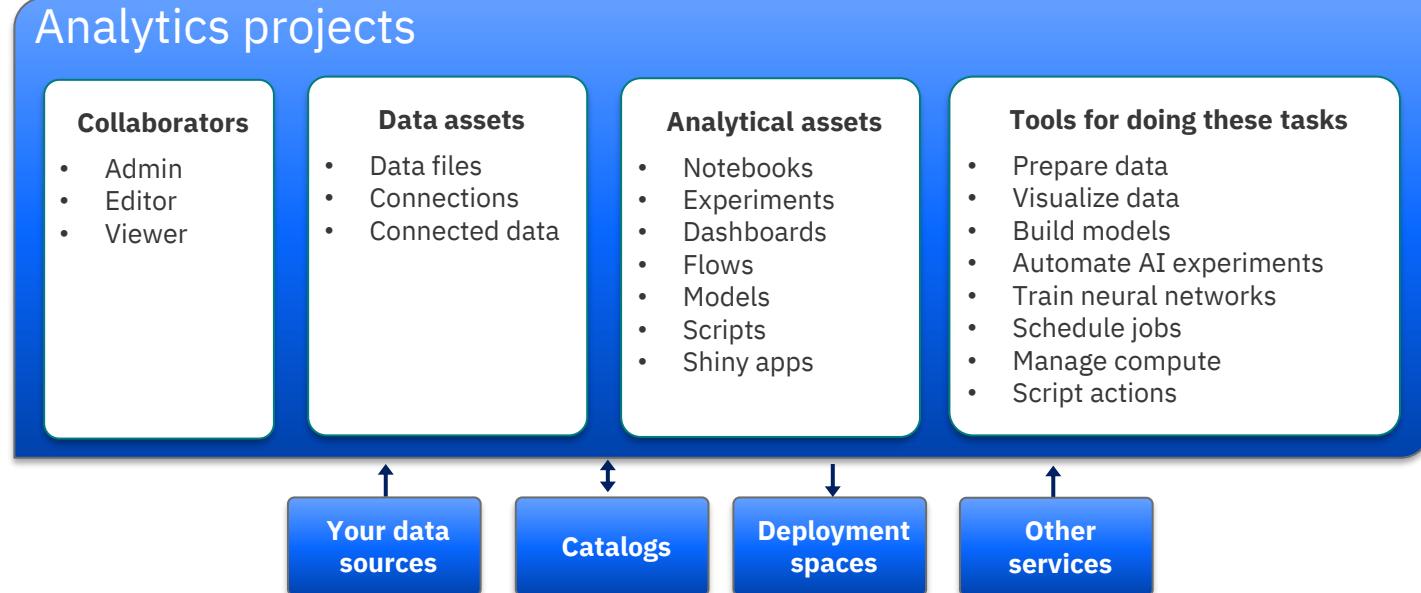


Analyze

Watson Studio: Collaborating with Analytics Projects

Watson Studio provides the environment and tools to collaborate on business problems.

Watson Studio is centered around the *Analytics Project*. Data scientists and business analysts use analytics projects to organize resources and analyze data with various tools.





Analyze

Watson Studio Integration

Watson Studio integrates with these services:

Watson Knowledge Catalog

- Easily move assets between projects and catalogs
- Catalogs and projects support the same types of data assets
- Data protection rules are enforced on catalog assets that you add to projects

Watson Machine Learning:

- You can easily move assets between analytics projects and deployment spaces

Watson Studio service includes these tools:

- Data Refinery
- Jupyter notebook editor
- JupyterLab IDE

Watson Studio projects can manage these separately installed service assets:

- Watson Machine Learning AutoAI experiments
- Watson Machine Learning Accelerator DL experiments
- Cognos Dashboards Embedded
- IBM Streams flows
- SPSS Modeler flows
- Decision Optimization models
- RStudio R Shiny apps



Analyze

Refine data with visualizations

Refine can cleanse and shape tabular data with a graphical flow editor using functions and logical operators.

Use it to remove data that is incorrect, incomplete, improperly formatted, etc.

Shape the data by filtering, sorting, combining or removing columns. You can create a Data Refinery flow as a set of ordered operations on the data to run repeatedly any time.



ID Smallint	GENDER String	STATUS String	CHILDREN Smallint	ESTINCOME Decimal	HOMEOWNER String	AGE Smallint	TAXID String
Identif... ▾	Gender ▾	Code ▾	Code ▾	Not clas... ▾	Indicator ▾	Code ▾	US So... ▾
481	F	M	2	28267	N	30	386283240
482	F	M	2	36725.1	N	56	162447113
483	M	S	1	94188.3	N	58	673845765
484	F	M	2	91861	Y	42	209619292



Data Refinery also includes a graphical interface to profile data to validate it with 20+ customizable charts that give perspective and insights into the data.



Analyze

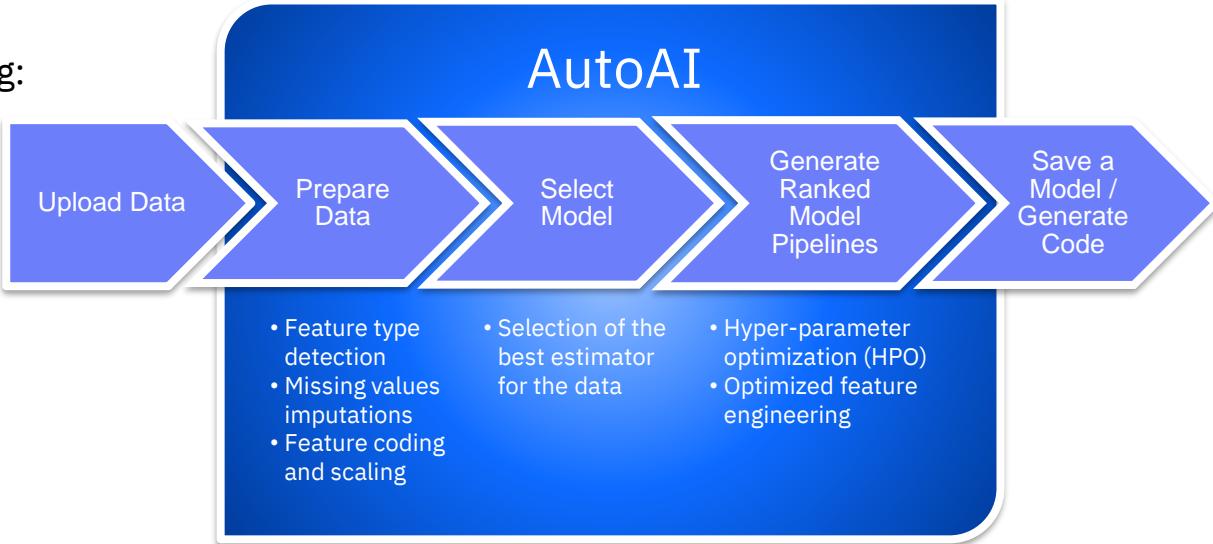
AutoAI * – Overview

AutoAI is an award-winning technology that simplifies the Machine Learning model creation and AI lifecycle by automating the following:

- **Data preparation**
- **Model development**
- **Feature engineering**
- **Hyper-parameter optimization**

AutoAI delivers training feedback visualizations for real-time model performance results with:

- **Binary, Multiclass, and Regression support**
- **One-click model deployment**



* AutoAI is enabled with the Watson Machine Learning service install, but it is driven through a Watson Studio Analytics Project



Analyze

AutoAI – Pipelines

AutoAI pipeline leaderboard

Shows the ranking of the pipelines for each potential model, the higher the better.

Pipeline leaderboard

Rank ↑	Name	Algorithm	Accuracy (Optimiz...)	Enhancements
★ 1	Pipeline 4	Random Forest Classifier	0.950	HPO-1 FE HPO-2
2	Pipeline 8	LGBM Classifier	0.949	HPO-1 FE HPO-2
3	Pipeline 7	LGBM Classifier	0.946	HPO-1 FE

After AutoAI completes its model creation steps, you can drill into the pipeline(s) to understand how it came to its conclusion.

Save the pipeline in your project as a:

- **model**
- **notebook**





Analyze

Notebooks, RStudio and other tools

The default notebook environment:
Jupyter Notebook with Python

The screenshot shows a Jupyter Notebook interface with the title "TradingPlatform Customer Attrition Risk Prediction using SparkML". The notebook contains a brief introduction about the importance of maintaining profitability through user investments and a list of three tasks to be completed:

1. Ingest merged customer demographics and trading activity data
2. Visualize merged dataset and get better understanding of data to build hypotheses for prediction
3. Leverage SparkML library to build classification model that predicts whether customer has propensity to churn

Developer tool services available:

- Jupyter Lab
- Jupyter Notebooks with Python for GPU
- Jupyter Notebooks with R
- RStudio Server

...



The grid displays six service cards:

- Jupyter Notebooks with Python 3.6 for GPU**: Open Source. Description: Optional development environment to create Jupyter Notebooks that use GPU-accelerated Python 3.6 libraries.
- Jupyter Notebooks with R 3.6**: Open Source. Description: Optional development environment to create Jupyter Notebooks that use R 3.6 libraries.
- Lightbend Platform**: Partner Premium. Description: Lightbend Platform makes it easy to deploy Reactive Microservices, real-time streaming and Machine Learning (ML).
- Open Source Management**: IBM. Description: Make it easy for developers and data scientists to find and access approved open source packages.
- RStudio Server with R3.6**: Partner Enabled. Description: Optional development environment for working with R.
- Jupyter Notebooks**: This card is identical to the one in the first row.

Analyze

Watson Studio notebooks: Build Data Science & Machine Learning models



We split original dataset into train and test datasets. We fit the pipeline to training data and apply the trained model to transform test data and generate churn risk class prediction

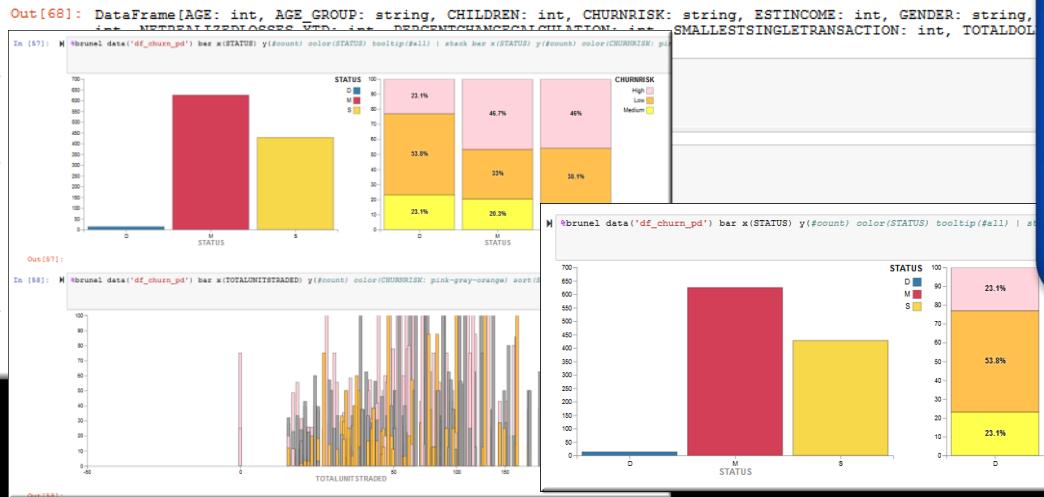
```
In [67]: # instantiate a random forest classifier, take the default settings
rf=RandomForestClassifier(labelCol="label", featuresCol="features")

# Convert indexed labels back to original labels.
labelConverter = IndexToString(inputCol="prediction", outputCol="predictedLabel", labels=labelIndexer.labels)

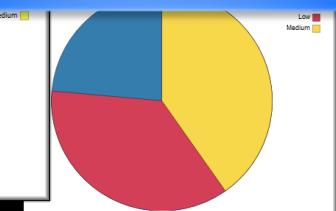
stages += [labelIndexer, assembler, rf, labelConverter]

pipeline = Pipeline(stages = stages)
```

```
In [68]: # Split data into train and test datasets
train, test = df_churn.randomSplit([0.7,0.3], seed=100)
train.cache()
test.cache()
```

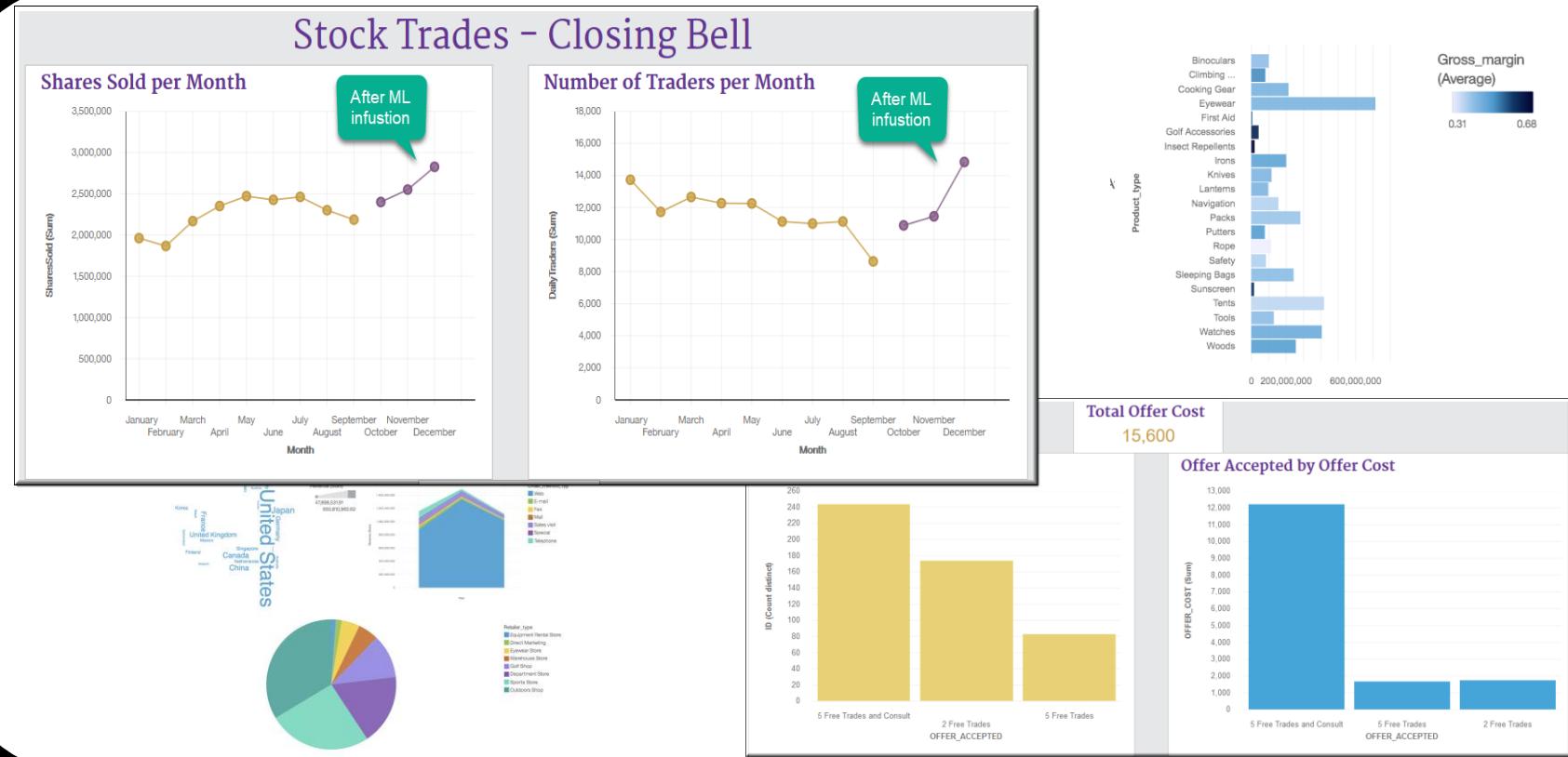


- Data Scientists and Data Engineers collaborate with each other in CPD platform
 - while still maintaining data governance
 - Collaboration using GitHub or BitBucket is integrated into the platform, which brings a cohesiveness to the work culture and helps to automate CI/CD pipe line
 - Exploit GPUs for deep learning predictive ML models
 - Programmatically build data visualizations and data wrangling
 - Real-time or batch model scoring
 - Evaluate model accuracy





Analyze Cognos Dashboards Embedded





Analyze

Premium Service: SPSS Modeler

The screenshot displays the IBM Watson Premium Service interface for SPSS Modeler. The main area shows a data flow diagram with nodes like 'Data Audit', 'Target D...', 'Decision ...', 'Partition', 'Analysis', and 'Table'. A 'Chart' node is open, showing a histogram of 'Age' with a count of 5, a distribution curve, and a kernel density estimate. Below it is a 'Spreadsheet' viewer showing a table of data with columns: Age, Sex, BP, Cholesterol, Na, and K. The table contains 10 rows of data points. On the left, there's a sidebar with icons for various modeling techniques: Association Rules, Auto Classifier, Auto Numeric, C5.0, C&R Tree, CHAID, GLE, Linear, Linear-AS, and Linear SVM.

	Age	Sex	BP	Cholesterol	Na	K
1	23	F	HIGH	HIGH	0.792595	0.030268
2	47	M	LOW	HIGH	0.739309	0.056946
3	47	M	LOW	HIGH	0.697269	0.068944
4	28	F	NORMAL	HIGH	0.563682	0.072289
5	61	F	LOW	HIGH	0.559294	0.030969
6	22	F	NORMAL	HIGH	0.678901	0.078641
7	49	F	NORMAL	HIGH	0.789637	0.048588
8	41	M	LOW	HIGH	0.766935	0.069461
9	60	M	NORMAL	HIGH	0.777205	0.05123
10	43	M	LOW	NORMAL	0.526102	0.027164

SPSS Modeler

- A leading visual data science and machine-learning and predictive analytics solution
- Helps enterprises accelerate time to value and achieve desired outcomes by speeding up operational tasks for data scientists and business analysts
- Tap into data assets and modern applications, with complete algorithms and models that are ready for immediate use

Analyze

Premium Service: Decision Optimization



Decision Optimization (DO) enables data science teams to capitalize on the power of *prescriptive analytics* and build solutions using a combination of techniques like optimization and machine learning.

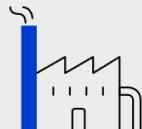
Integrated with Watson Studio, Decision Optimization can combine optimization techniques with coding and non-coding tools, model management and deployment – as well as other data science capabilities.

Decision Optimization evaluates millions of possibilities – balancing trade-offs and business constraints to find the best possible solution.

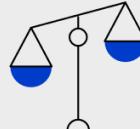
Insights that drive optimal decisions to complex problems



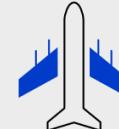
Determine location
and capacity
of warehouses



Determine which plant
should manufacture
which product



Build financial
portfolios by balancing
risks and rewards

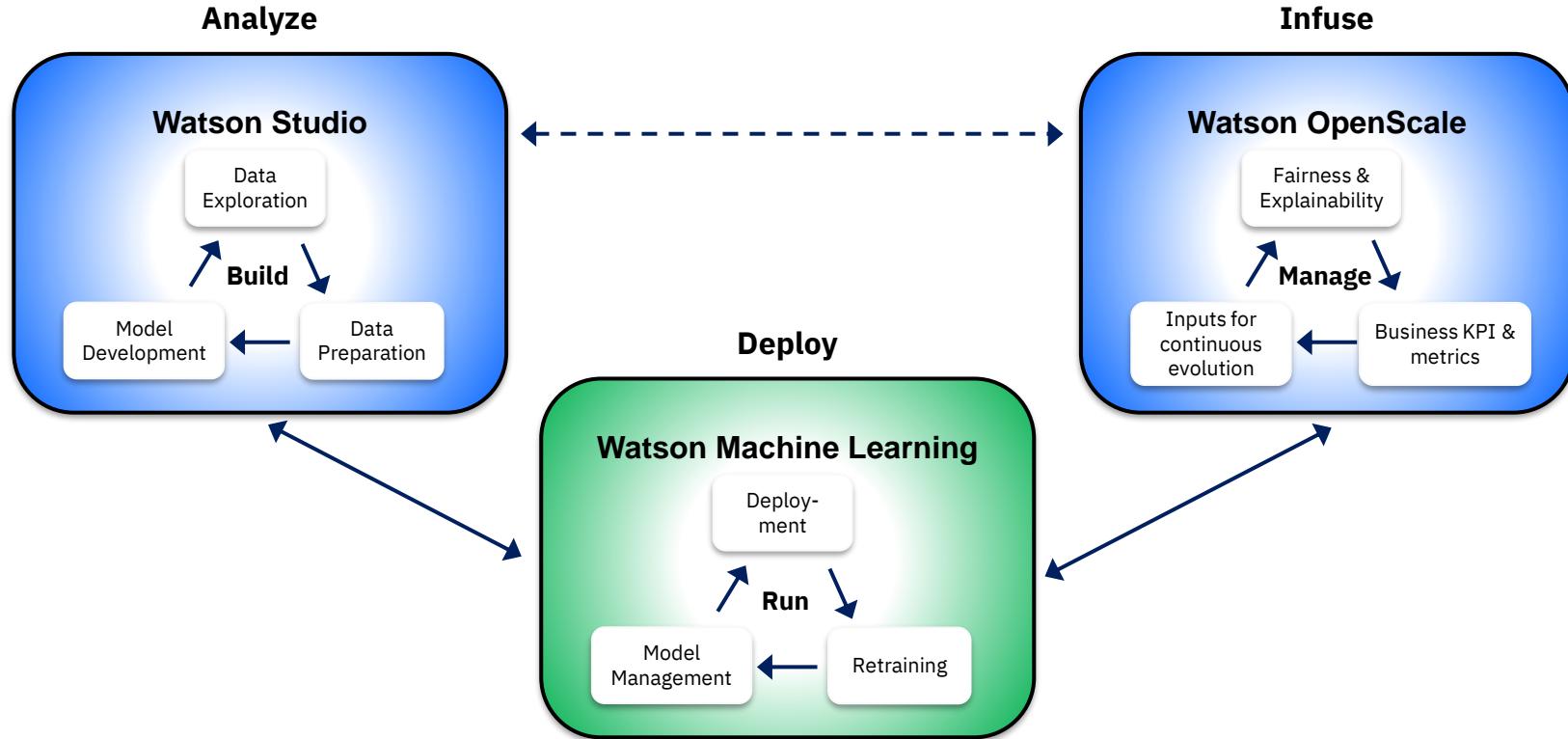


Allocate aircraft
and crew to flights



Deploy

The Data Science Lifecycle: Overview





Deploy

Watson Machine Learning: Deployment Spaces

A **Deployment Space** is where you can:

- Promote and save models
- Create the deployments from the models
- Find the information you need to score the model and get a prediction back
- Embed the deployment in an app so you can interact with it programmatically

The screenshot shows two views of the Watson Studio interface. The top view is a 'Watson Studio PROJECT' window with a single 'Asset' node. The bottom view is a 'Watson Machine Learning DEPLOYMENT SPACE' window with an 'Asset' node connected to two 'Deployment' nodes. A horizontal arrow points from the Asset in the PROJECT to the Asset in the DEPLOYMENT SPACE.

Watson Studio PROJECT

Watson Machine Learning DEPLOYMENT SPACE

Asset

Asset

Deployment

Deployment

Prepare data and train

Configure, test, deploy and monitor



Deploy

Watson Machine Learning: Deployments

A **Deployment** is the last stage of the model development work. It means you put the model into production so that you can pass data to the model and return a score (or prediction).

After deploying a model, you can access the model *endpoint*, which you will need to make the model available for wider use in applications.

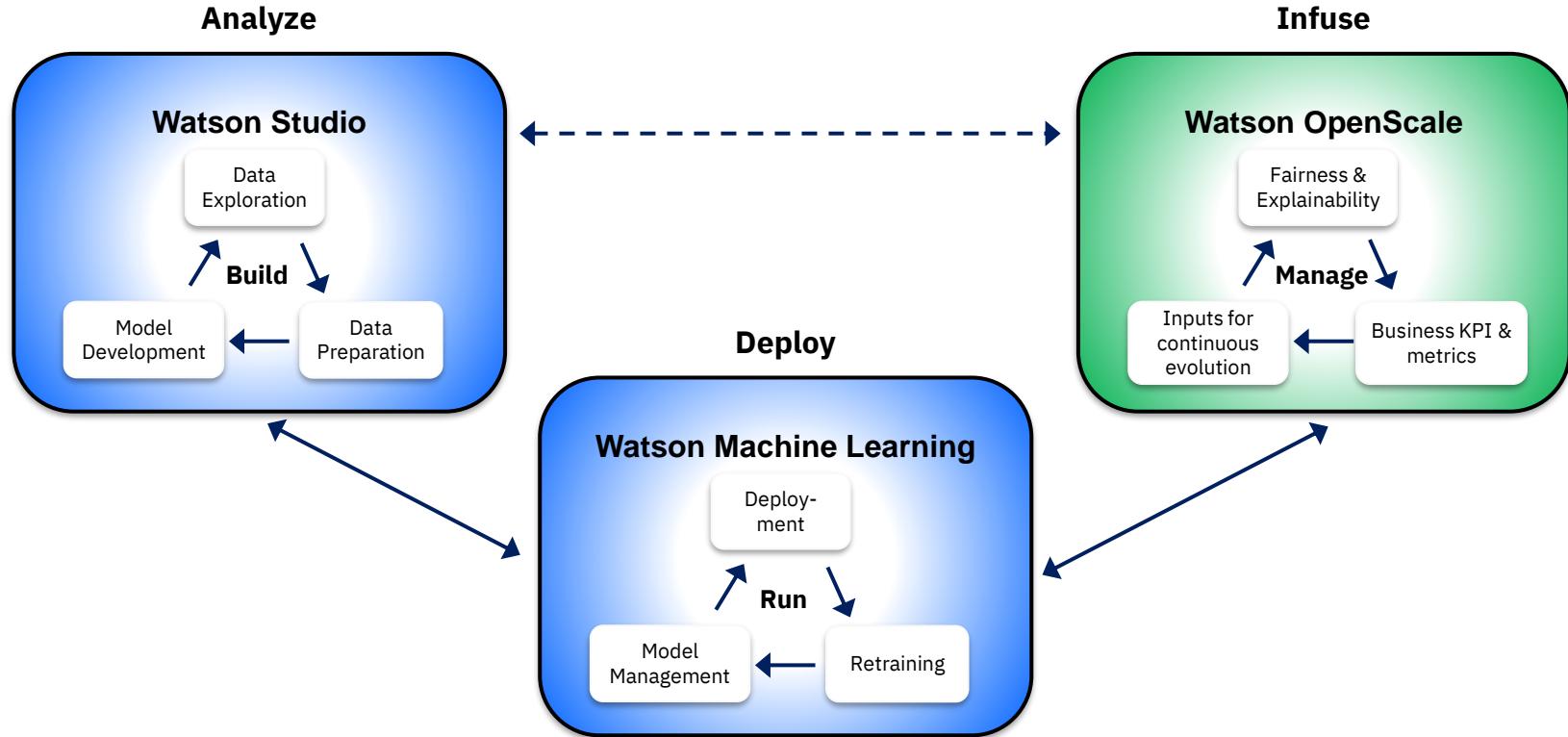
There are three type of WML deployments:

- **Online** – Provides an API endpoint needed to access the deployment programmatically to use in an application. Code snippets are provided in a variety of programming languages that illustrate how to access the deployment.
- **Batch** – Processes input data from a file and writes the output to a file.
- **CoreML**



Infuse

The Data Science Lifecycle: Overview





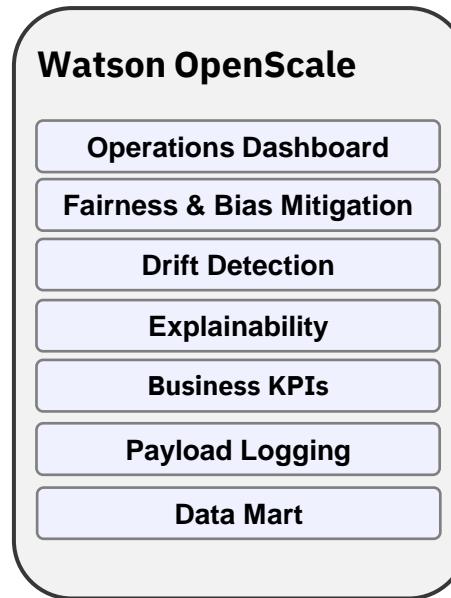
Infuse

Watson OpenScale: Overview

Watson OpenScale:

- Automates and operates AI at scale across its entire lifecycle
- Delivers transparent, explainable outcomes freed from bias and drift
- Provides confidence in AI outcomes and spans the gap between the teams that operate AI and the business units that use these applications
- Monitors models developed in a 3rd party IDE, open source framework and hosted in a 3rd party or private model serve engine

Monitor AI at Scale



Model build / train frameworks



Model serving environments

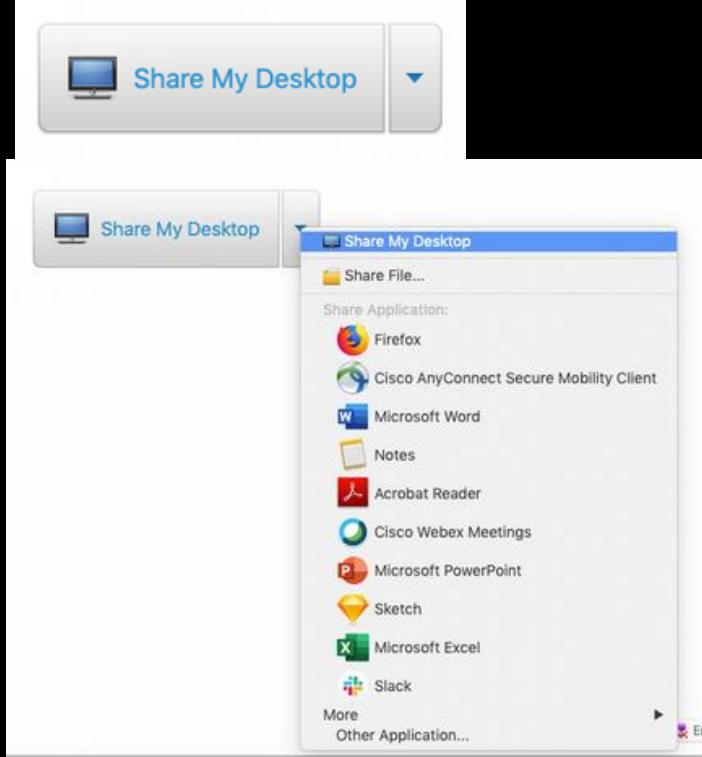
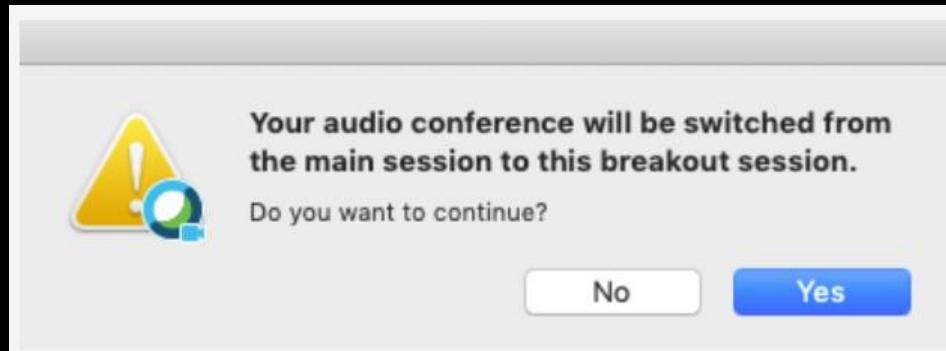
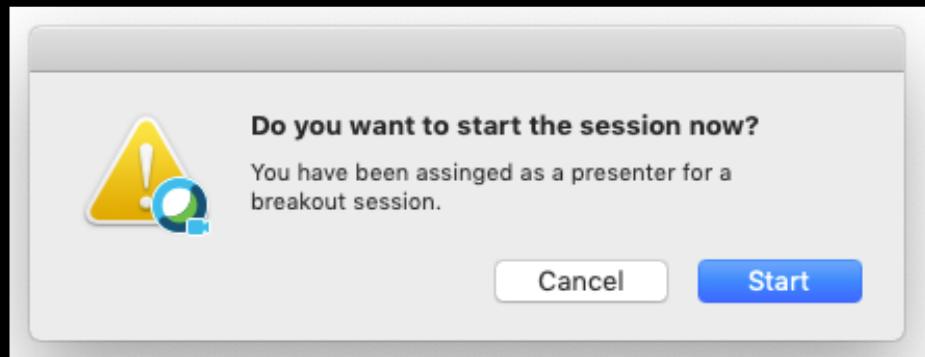


Presentation Outline



- **IBM Cloud Pak for Data Overview**
- **Watson Services Overview**
- **Watson Studio Overview**
- **Labs** A large blue arrow pointing to the left, positioned to the right of the 'Labs' item in the list.

Breakout Rooms



Note: you will need to un-mute when you join the breakout room

Lab Tips



- Labs are in www.github.com/bleonardb3/AI_POT_05-06-2021 repository.
- You will need an IBM Cloud account that has been activated for Watson Studio use. In case, you didn't have a chance to signup, the instructions are in the github repo.
- Instructions for each Lab are in the [README](#) file in the respective Lab folder.
- Cloud development enables making frequent improvements in the user interface. We reviewed the lab instructions and made screen updates so they should be pretty faithful to the user interface. Small differences may occur but shouldn't get in the way of successfully completing the labs.
- Use Firefox or Chrome browsers. Do not use Internet Explorer or Edge as the browser. For Mac users do not use Safari.

Github Repository



bleonardb3 / AI_POT_05-06-2021

Code Issues Pull requests Actions Projects Wiki Security Insights Settings

main · 1 branch · 0 tags Go to file Add file · Code

bleonardb3 Add files via upload	cb85528 3 hours ago	59 commits
Lab-0	Update README.md	9 hours ago
Lab-1	Add files via upload	2 days ago
Lab-2	Add files via upload	yesterday
Lab-3	Add files via upload	3 hours ago
Lab-4	Update README.md	yesterday
Lab-5	Add files via upload	2 days ago
README.md	Update README.md	10 days ago
Sign up Instructions.pdf	Add files via upload	9 hours ago

Github Repository



Setup Watson Studio Environment

Introduction

This lab is a pre-requisite lab. It will set up the Watson Studio environment for subsequent labs and introduce you to the Project features of Watson Studio. Watson Studio is an integrated platform of tools, services, data, and meta-data to help companies and agencies accelerate their shift to be data driven organizations. The platform enables data professionals such as data scientists, data engineers, business analysts, and application developers collaboratively work with data to build, train, deploy machine learning and deep learning models at scale to infuse AI into business to drive innovation. Watson Studio is designed to support the development and deployment of data and analytics assets for the enterprise.

Objectives:

Upon completing the lab, you will have:

1. Created a project
2. Created an object storage instance and associated it with the project
3. Associated an existing Watson Machine Learning service instance with the project
4. Created a deployment space.

Step 1. Please click on the link below to download the instructions to your machine.

[Instructions.](#)

Lab 0: Setup Watson Studio Environment



Lab-0: Setup Watson Studio Environment



Introduction

This lab is a pre-requisite lab. It will set up the Watson Studio environment for subsequent labs and introduce you to the Project features of Watson Studio. Watson Studio is an integrated platform of tools, services, data, and meta-data to help companies and agencies accelerate their shift to be data driven organizations. The platform enables data professionals such as data scientists, data engineers, business analysts, and application developers collaboratively work with data to build, train, deploy machine learning and deep learning models at scale to infuse AI into business to drive innovation. Watson Studio is designed to support the development and deployment of data and analytics assets for the enterprise.

Objectives:

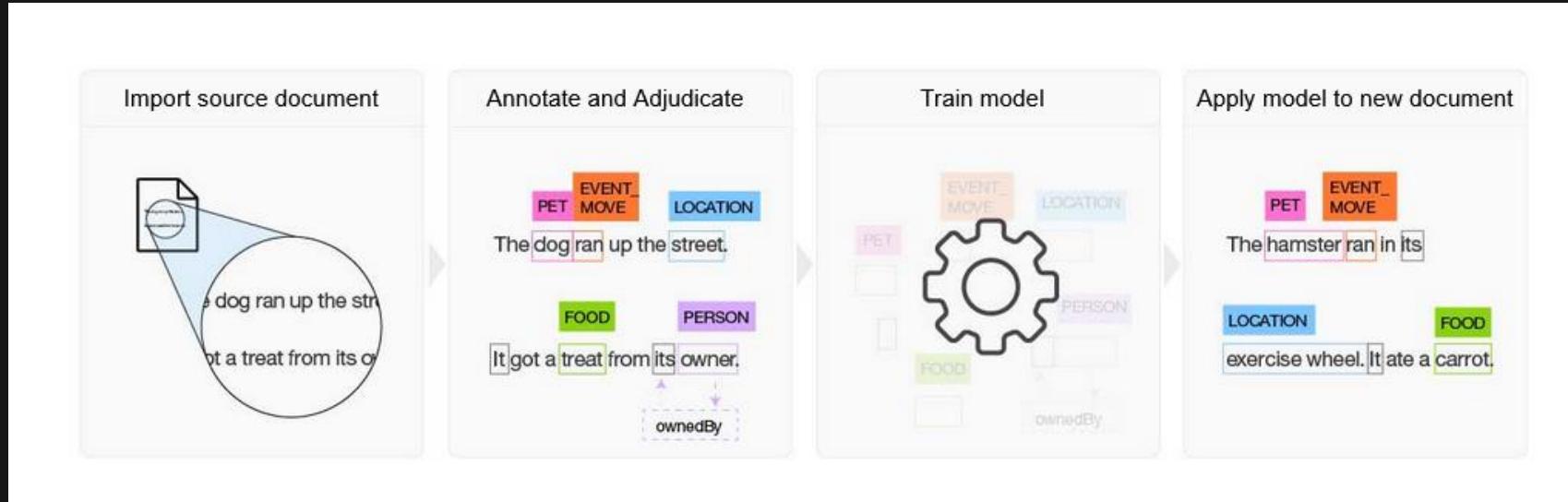
Upon completing the lab, you will know how to:

- Create a project
- Create an object storage instance and associate it with the project
- Associate an existing Watson Machine Learning service instance with the project
- Create a deployment space.

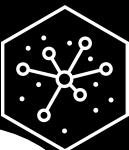
Cloud Pak for Data

Please work on Lab-0. We will return at 10:45 am EST for a brief introduction to the next lab.

Lab 1 – Watson Knowledge Studio



Lab-1: Watson Knowledge Studio



Introduction

In this lab, you will use Watson Knowledge Studio to develop socioeconomic annotators for COVID-19.

Objectives:

Upon completing the lab, you will know how to:

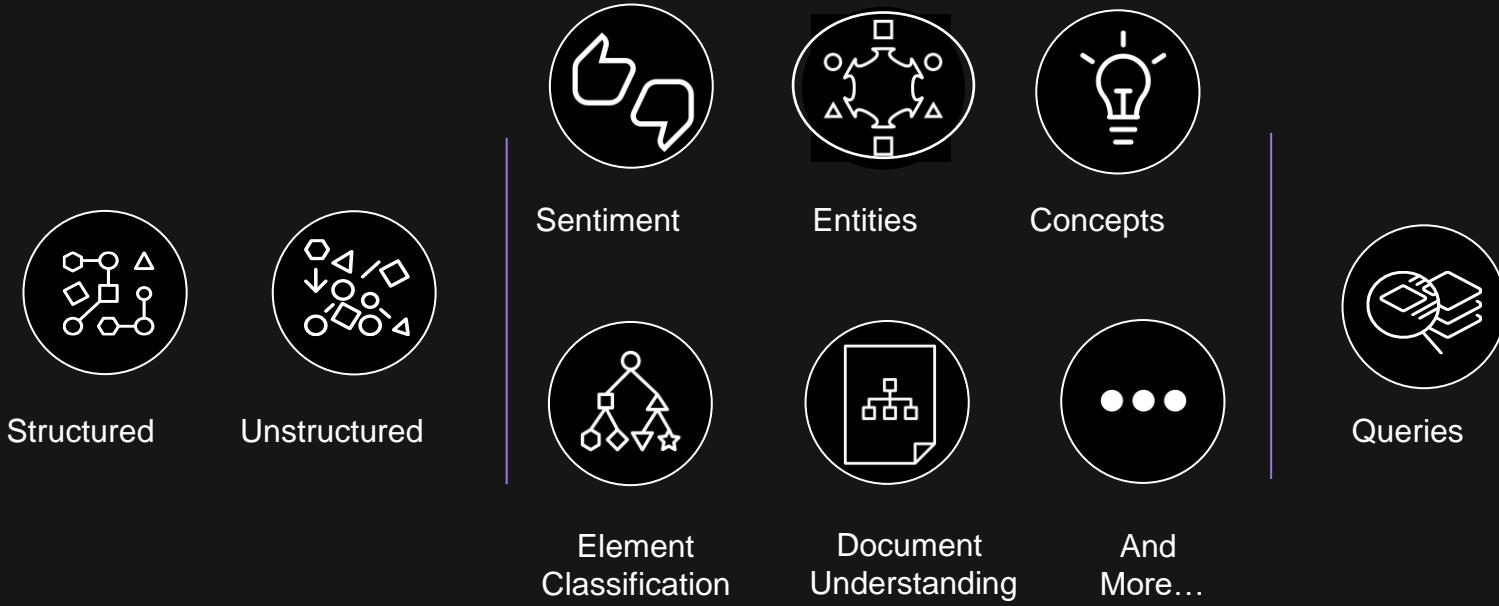
- Create and edit a type system
- Create a dictionary for each entity type
- Upload a training corpus
- Perform manual annotation
- Train and create a machine learning (ML) annotator
- Save and deploy the ML annotator to Watson Discovery

Cloud Pak for Data

Please work on Lab-1. We will return
at 12:00 pm EST for a brief
introduction to the next lab.

Lab 2: Watson Discovery





Lab-2: Watson Discovery



Introduction

In this lab, you will use Watson Discovery to develop a knowledge management system (KMS), train the KMS to generate knowledge and analyze information to create a COVID-19 vulnerability index.

Objectives:

Upon completing the lab, you will know how to:

- Create a collection and upload data
- Add the entity model from Knowledge Studio
- Perform custom entity extraction
- Retrieve the analyzed files using the Discovery API
- Calculate the COVID-19 vulnerability index
- Perform Smart Document Understanding on a COVID-19 publication
- Create and run Natural Language Queries
- Use relevancy training to improve the relevance of results

Cloud Pak for Data

Please work on Lab-2. We will return at 1:45 pm EST for a brief introduction to the next lab.

Lab 3: Watson Assistant





Watson Assistant

Build, train, and deploy conversational interaction on any device, application, or channel – on any cloud.

Low-code platform

Intuitive building interface that helps you— from coders to the C-suite – to successfully build and deploy an assistant quickly.

Powered by best in class NLU

Best in class AI powers the underlying intent-based language models.

Connects to any channel

You have channels, applications, and content in place, allowing the Assistant to connect to external web services and software.

Seamlessly hands off to agents

Connect existing service to desk for transfer to human agents.

Flexible Dialogue

Nuanced dialogue options allowing for flexible conversation structure including disambiguation and contextual understanding.

Analytics

Visualize trends in message data, allowing action to be taken and improvements to be made where required.

DTE Bank Assistant

Okay I will help you setup a Travel Alert. I just need a few pieces of information from you about your trip. First, where are you going?

i am traveling to Rome tomorrow

When do you come back?

in a week

Your account has been setup for a travel alert for 2020-04-30 to 2020-05-06 while traveling to Rome. Thank you.

I have your Mobile number as [444-555-6666](#). Would you like to update it?

Yes

No

Type something... →

Lab-3: Watson Assistant



Introduction:

This lab will build a chatbot to respond to questions about COVID-19. Watson Assistant and Watson Discovery services from IBM will be used to build the chatbot.

Objectives:

The goal of this lab is to familiarize the user with the Watson Assistant service. Watson Assistant is IBM's AI offering that lets you build, train, and deploy conversation interactions into any application, device, or channel. Watson Assistant can be deployed on any cloud or on-premises environment.

After completing this lab, you will be familiar with these features of Watson Studio.

- Provision an instance of Watson Assistant Trial
- Add a dialog skill to your Watson Assistant instance
- Connect your Watson Assistant with Watson Discovery
- Create Cloud Functions
- Integrate data sources via a Watson Assistant webhook

Cloud Pak for Data

Please work on Lab-3. We will return at 2:45 pm EST for a brief introduction to the next lab.

Lab 4: Predictive Analytics+ Decision Optimization



Machine Learning and Optimization

Better together



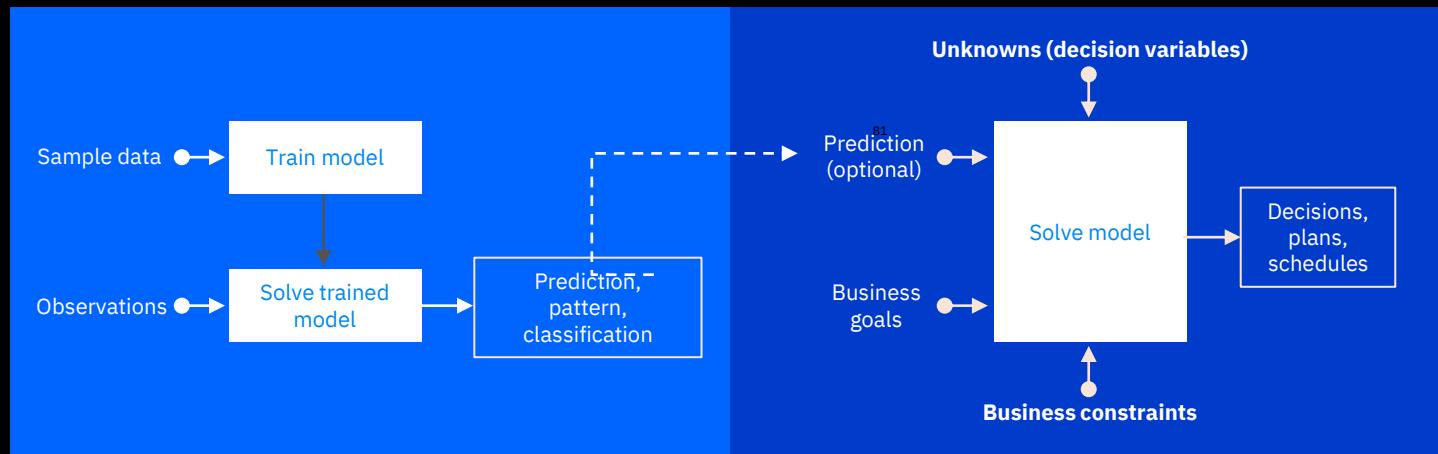
Predictive analytics

- Basic (supervised): You **know the answer**, and you **train the machine how to find it**.
- Advanced: Unsupervised, reinforcement, deep learning



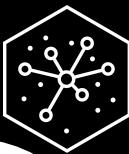
Prescriptive analytics

- You **don't know the answer**, and you **provide the machine the logic on what is a good and a bad solution**.
- Advanced: Robust, stochastic, etc



Lab-4: Watson Studio

Predictive Analytics + Decision Optimization



Introduction:

This lab will apply predictive analytics to analyze different factors among people to predict future COVID-19 infection rates in an area. Based on areas predicted to have high COVID-19 infections – this lab will apply optimization techniques to optimize the planning of transferring COVID-19 patients from hospitals located in epidemic areas to hospitals with less COVID-19 patients. Our hope is to educate people how to apply IBM's predictive and optimization technologies to help them improve planning and responding to COVID-19 cases.

Objectives:

The goal of this lab is to educate user on how to apply IBM predictive analytics and optimization tools to different applications of COVID-19 like (1) predicting future infections and (2) optimizing response for better decision making. We intend students learn these skills.

- Load data from different places to be used for analysis
- Represent the current situation on a map using folium
- Use a Linear Regression to predict new cases to come for each department
- Use Decision Optimization to model and optimize plan transfers
- Use folium to display the optimized future patient transfers plan

Cloud Pak for Data

Please work on Lab-4. We will return at 3:45 pm EST for a brief introduction to the next lab.

Lab 5 Intro – Cognos Analytics



Cognos Analytics

COVID-19 Dashboard

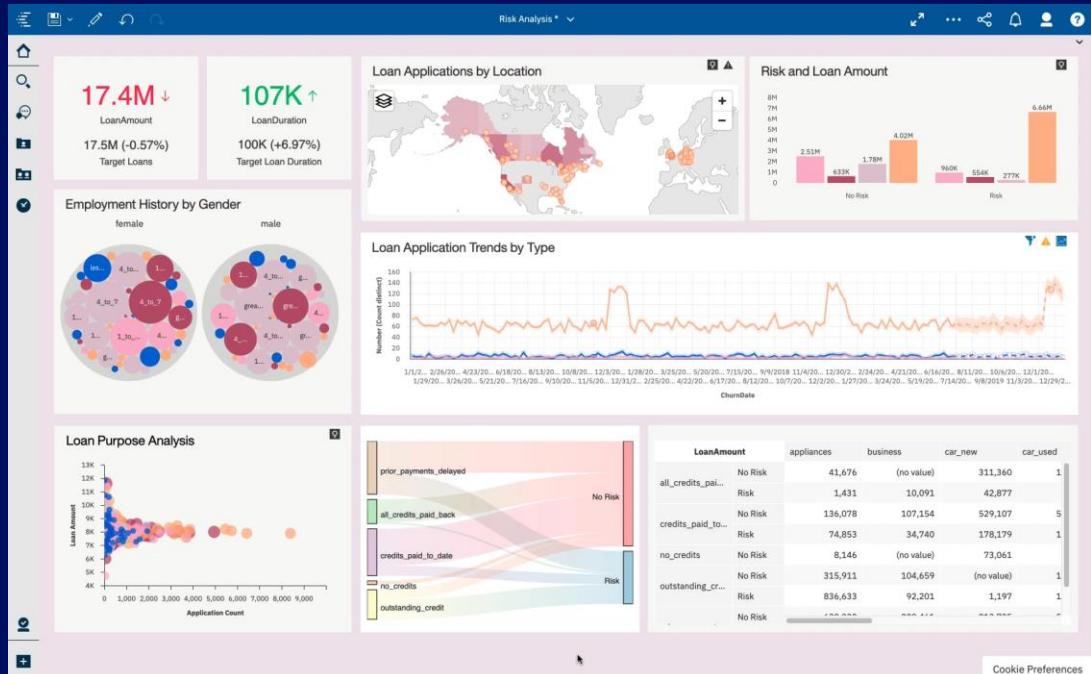


IBM Cloud

Cognos Analytics

Cognos Analytics is self-service analytics, infused with AI and machine learning.

- Enables you to create stunning visualizations to share your findings through *dashboards* and *reports*
- These can be embedded (infused) into your applications
- The Cognos Analytics service makes it easier for you to extract meaning from your data with features such as:
 - **Automated data preparation**
 - **Automated modeling**
 - **Automated creation of visualizations and dashboards**
 - **Data exploration**



Weather API

Tracking Global Progression of COVID-19

- Data collected from API:
 - Total cases up to May 20th
 - New cases added each day
 - Total Deaths up to May 20th
 - New deaths added per day
- Sourced from WHO, U.S. state and country government sources
- Bundled into 3 csv files



Lab-5: Cognos Analytics – COVID-19 Dashboard



Introduction:

This lab will build a series of Cognos Dashboards to display COVID-19 data.

Objectives:

The goal of the lab is to familiarize the user with the use of the Cognos Analytics web-based business intelligence suite. IBM Cognos Analytics contains integrated toolsets for reporting, analytics, and visualization. This lab will focus on the visualization component. We will be creating three tabs similar to those on the IBM & Weather Channel COVID-19 Dashboard

After completing this lab you will be familiar with these features of Cognos Analytics:

- Create a Cognos Dashboard using templates.
- Upload data into Cognos Analytics
- Build and customize visualizations
- Create links to external websites tabs
- Work with calculations and filters for individual tiles

Cloud Pak for Data

Please work on Lab-5. We will return at 5:00 pm EST for a wrap-up.

Additional Information



IBM A3 Center

<https://www.ibm.com/industries/federal/analytics>

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Thank you for your time today!

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