

Applying AI, NLP, and Optimization to COVID-19

November 12, 2020

The session starts at 9:00am.

Applying AI, NLP, and Optimization to COVID-19

Power of data. Simplicity of design. Speed of innovation.

Asad Mahmood
Bernie Beekman
Lee Angelelli
Michael Cronk
Prithvi Rao

Agenda

Time	Description
9:00am – 10:00am	Introduction to IBM Cloud, Watson Services, Watson Studio, and Decision Optimization
10:00am – 11:30am	Lab 1 – Develop pandemic and socioeconomic annotators to extract domain-specific information
11:30am – 12:00pm	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
12:00pm – 12:30pm	Lunch
12:30pm – 1:00pm	Lab 2 – Create a KMS (continued)
1:00pm – 1:15pm	Lab 3 – Introduction
1:15pm – 2:30pm	Lab3 – Develop a COVID-19 Chatbot Assistant
2:30 pm – 2:45pm	Lab4 – Introduction
2:45pm – 3:30pm	Lab4 – Forecast COVID-19 outbreaks – find optimal ways to relocate sick people among areas
3:30pm – 3:45pm	Lab5 – Introduction
3:45pm – 4:45pm	Lab5 – Develop dashboards that display COVID-19 statistics
4:45pm – 5:00pm	Wrap up – Q&A

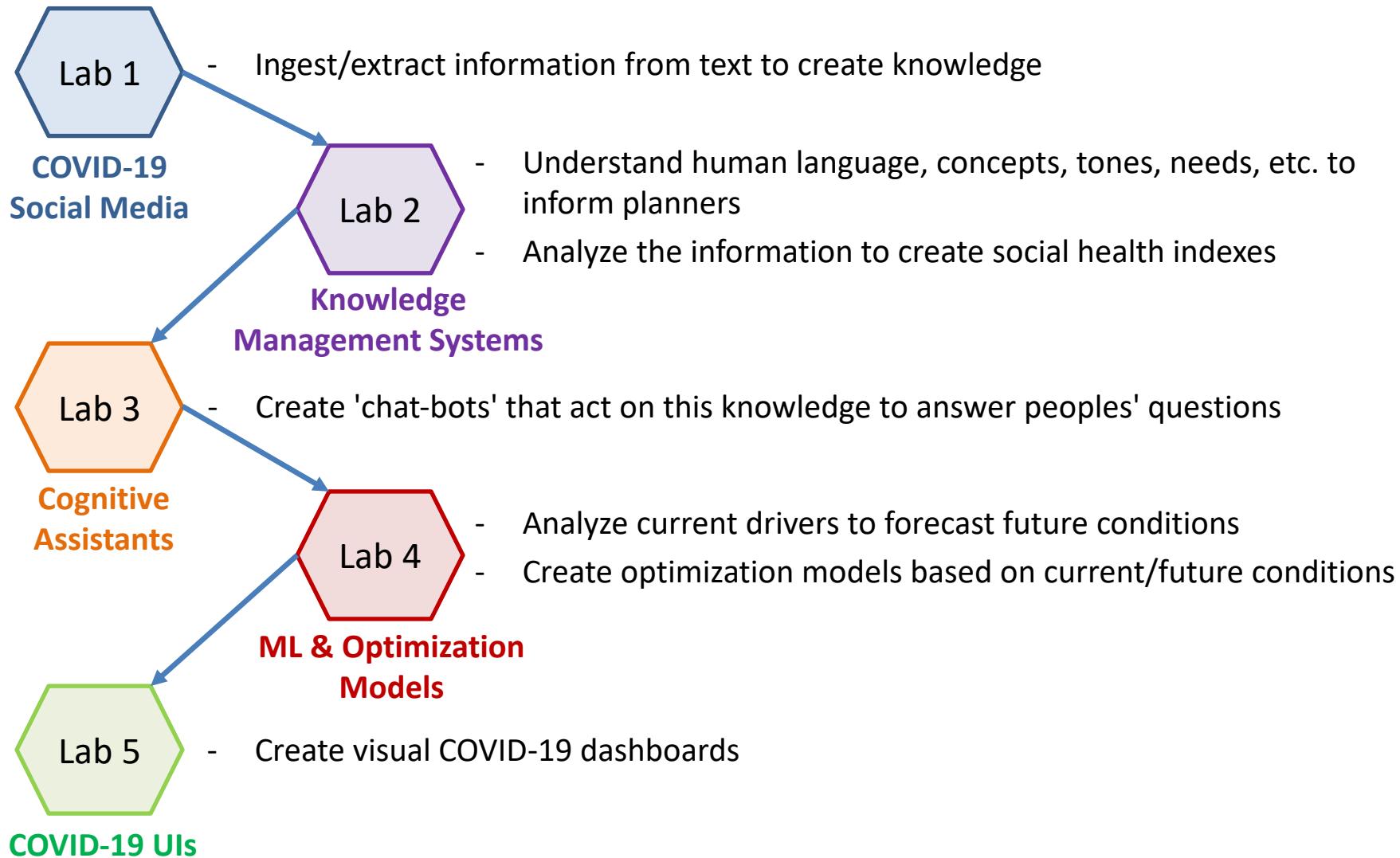
Introduction - Applying AI and Analytics to CoVID-19

- **Situation:** COVID-19 virus is causing global deaths and socioeconomic instability
- **Problem:** People scared about their livelihood; they have disengaged in economies and society
 - Challenges in collecting/analyzing information about COVID-19 and its impacts at speed and scale
 - Difficult to understand the diverse local/national populations' health and psychological effects caused by COVID-19
- **Impacts:** Lack of insight into current/future situation leading to non-optimal decisions/responses
 - Minimal insight into coronavirus spread, inaccurate demographic info about infections/symptoms
 - Peoples fears/needs, overcrowded hospitals, and necessary financial response
 - Shutdown of economies, educational impacts, community unrest, uncontrolled deficits expanding, etc.
- **Need:** Data-Driven environment supported by intelligent systems with capabilities to:
 - Collect structured/unstructured data, extract features, and create situational awareness
 - Understanding current/future (predicted) COVID-19 surges/resurges
 - Identify current/future problems, obstacles, and impacts on societies, economies, education, politics, etc.
 - Reason on massive amounts of data and decision criteria to improve human decision making
 - Generate optimized response(s) for localized areas while showing aggregated affects at the national level



Training Session Goals

- Through a series of labs – attendees will develop these capabilities that will enable planners to respond with speed at scale



IBM A3 Center helping clients understand technologies and develop art-of-the-possible solutions

IBM Industries

Search



Federal Solutions ▾ Trends & Insights Education Contracts Events ▾

Industries > Federal >

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.

[Contact the A3 Center](#)

Upcoming events

Reserve your seat now for these IBM events

Hands-On Workshop on AI, NLP, and Optimization applied to Covid-19 Use Cases

November 12, 2020
Virtual event

AAAI 2020 Fall Symposium - AI in Government and Public Sector

November 13-14, 2020
Virtual event

COVID-19 and CARES Act Solutions

→ Data and AI for Return to Work

[Let's talk](#)

IBM Design Thinking Client Workshops

Please send your request for Design Thinking workshop to a3center@us.ibm.com

We use IBM Design Thinking to:

Solve complex problems in complex environments

Focus thinking on user experience

Encourage cross-function collaboration and fast iteration



Initial Framing Session

- ✓ Frame your business issues as opportunities to test
- ✓ Validate path to handle challenges.



Design Thinking Session



- ✓ Outline measures for success
- ✓ Identify challenges and inefficiencies
- ✓ Drill down into functionality and design to address challenges



Proof of Concept Build

- ✓ Adopt DevOps
- ✓ Develop collaboratively
- ✓ Continuously deploy code

IBM Design Thinking Client Workshops – Sessions and Artifacts



Outline

- **IBM Cloud Overview**
- **Watson Services Overview**
- **Watson Studio Overview**
- **Labs**



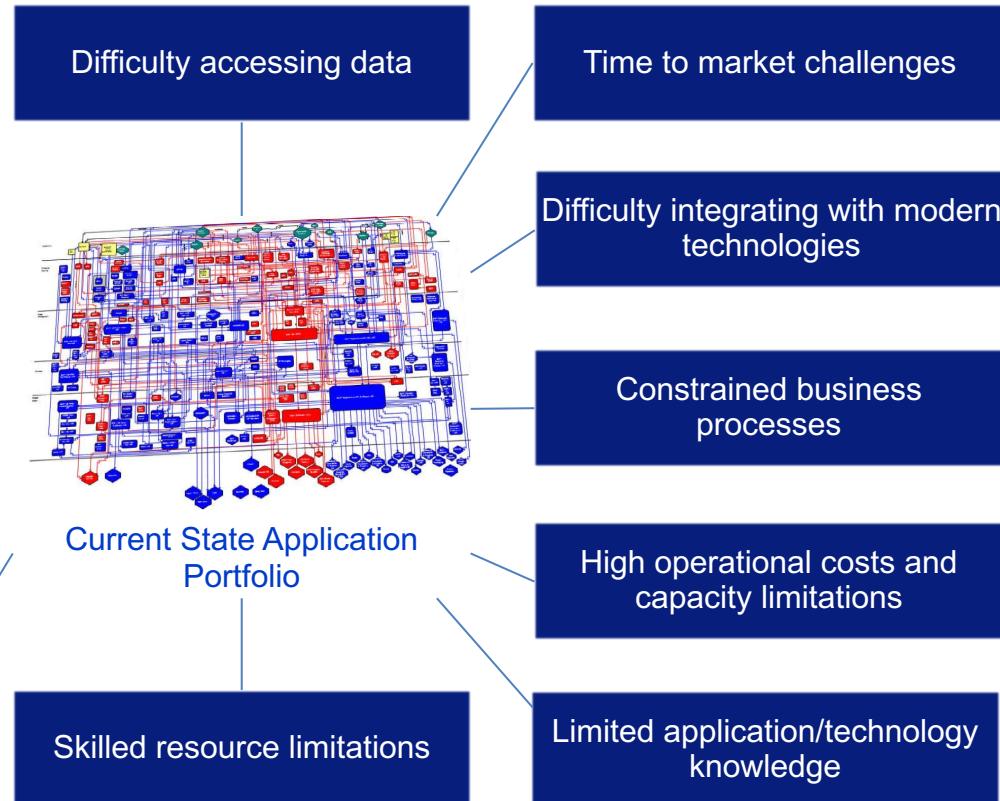
Drivers for Application Modernization in IBM Cloud

Current state constraints driving application modernization

Application modernization is improving the state of many things

- Decades of application evolution have produced multiple drivers for application modernization
- Multiple modernization approaches are required to address each driver
- Business and IT needs determine application modernization drivers

Compliance and regulatory requirements



Difficulty accessing data

Time to market challenges

Difficulty integrating with modern technologies

Constrained business processes

High operational costs and capacity limitations

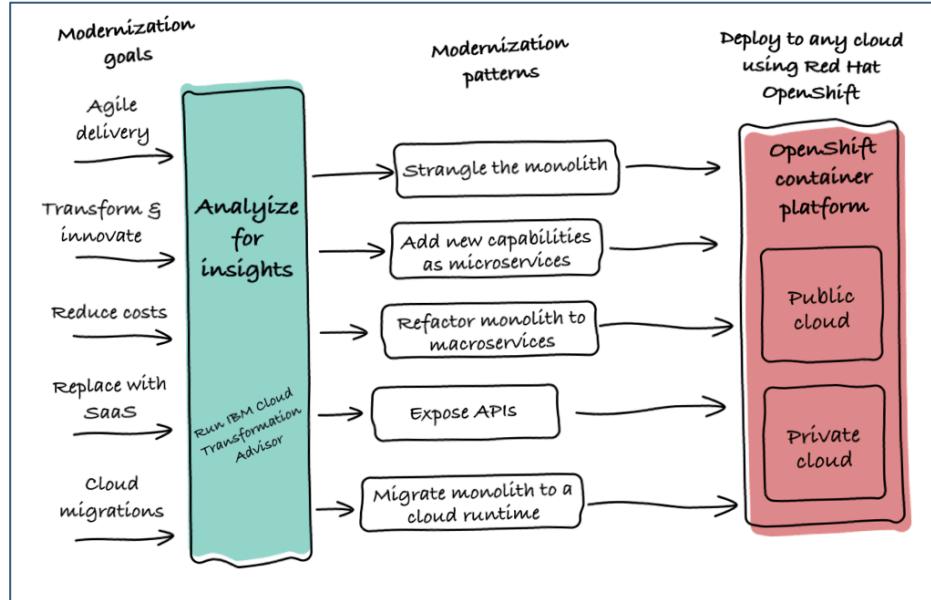
Current State Application Portfolio

Skilled resource limitations

Limited application/technology knowledge

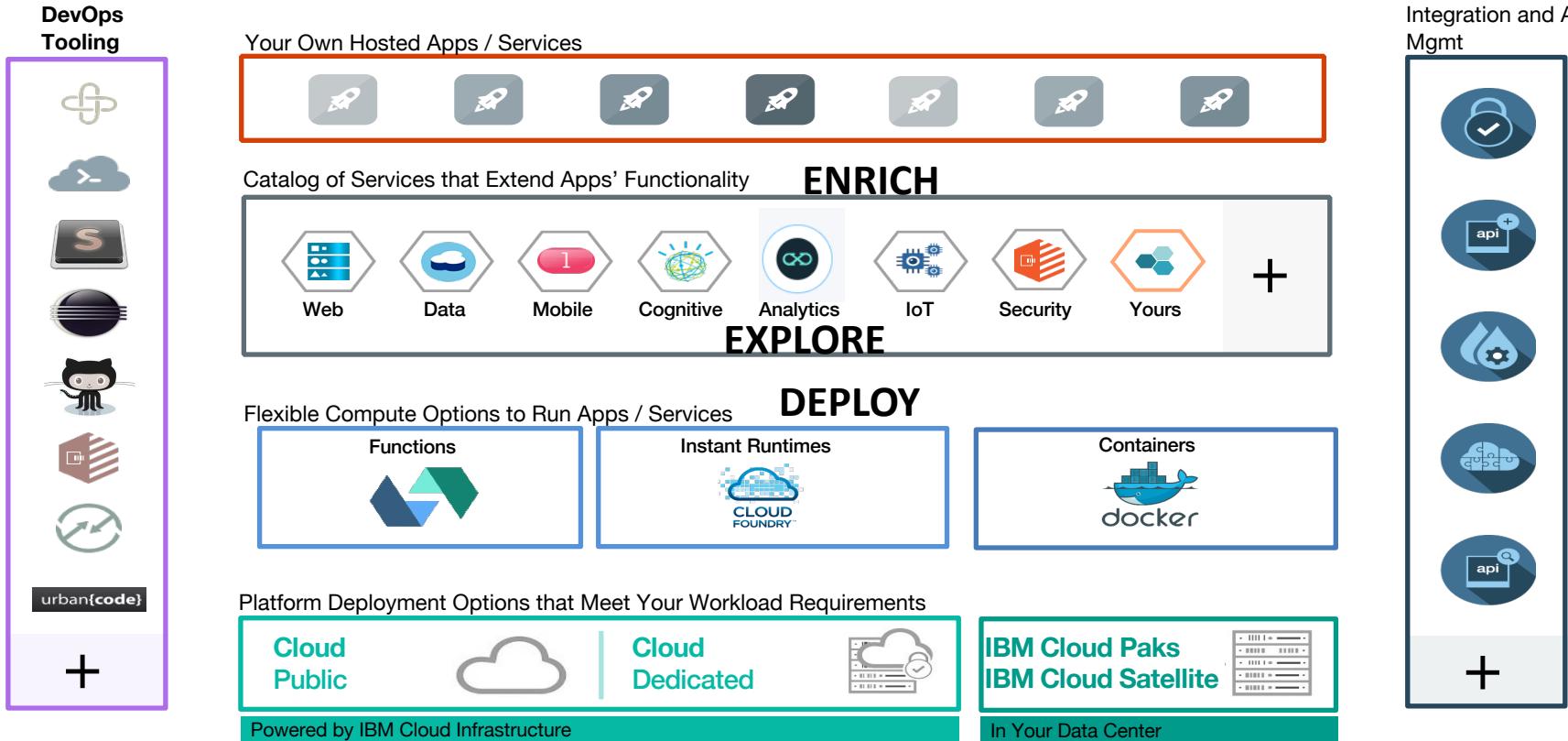
What is Modernization?

- Containerize an Existing Application / Workload ?
- Refactor Applications into Microservices ?
- Strangle a over Monolith over time with new Microservices ?
- Completely rewrite into new microservices ?
- Automate deployment ?
- Lift and Shift into a Cloud ?
- Expose Applications through API's ?
- Augment Old Code with new microservices ? APIs / Services (AI, Data Science) ?
- What About My Data !!!!!!!



<https://www.ibm.com/cloud/garage/content/field-guide/app-modernization-field-guide/>

What is IBM Cloud?



Instant Environments

The developer can choose any language runtime or bring your own. Zero to production in one command.

DevOps

Development, monitoring, deployment, and logging tools allow the developer to run the entire application.

APIs and Services

A catalog of 125+ IBM, third party, and open source API services allow the developer to stitch an application together in minutes.

Build your apps, your way

Use the most prominent compute technologies to power your app: Cloud Foundry, Docker, Kubernetes.

On-Prem Integration

Build hybrid environments. Connect to on-premise assets plus other public and private clouds.

Flexible Pricing

Sign up in minutes. Pay as you go and subscription models offer choice and flexibility.

Why Migrate/Modernize Applications to the IBM Cloud?

**IBM Cloud:
the most
open and
secure
public
cloud for
business**



Open Innovation

Best public cloud for open source, including OpenShift

- Build and run apps with ease on managed **Red Hat OpenShift on IBM Cloud**
- IBM Cloud runs its entire platform, including Watson & IBM Blockchain on **Kubernetes** (1k+ clients, 16k+ clusters in production)
- Automated deployment of **Cloud Paks** and complex workloads with our schematics and infrastructure as a code offering.
- IBM contributes to and operationalizes open source projects like Razee, Istio, Knative, and Eirini to provide clients a full portfolio of cloud native tools



Security Leadership

Market leading data protection across the platform

- Highest industry compliance for data encryption
- Configurable so that not even IBMers can see your data
- Single dashboard threat management with IBM Security integration
- Industry leader in container security



Enterprise Grade

Reliable foundation for enterprise workloads

- **#1 VMware public cloud**
- Cloud migration for **Power AIX, IBMi**, Z, SAP and mission critical
- Broadest portfolio of secure compute choices: Bare metal, **Virtual Private Cloud (VPC)**, virtual servers, containers, and serverless resources



Red Hat OpenShift on IBM Cloud Capabilities

Simplified cluster management

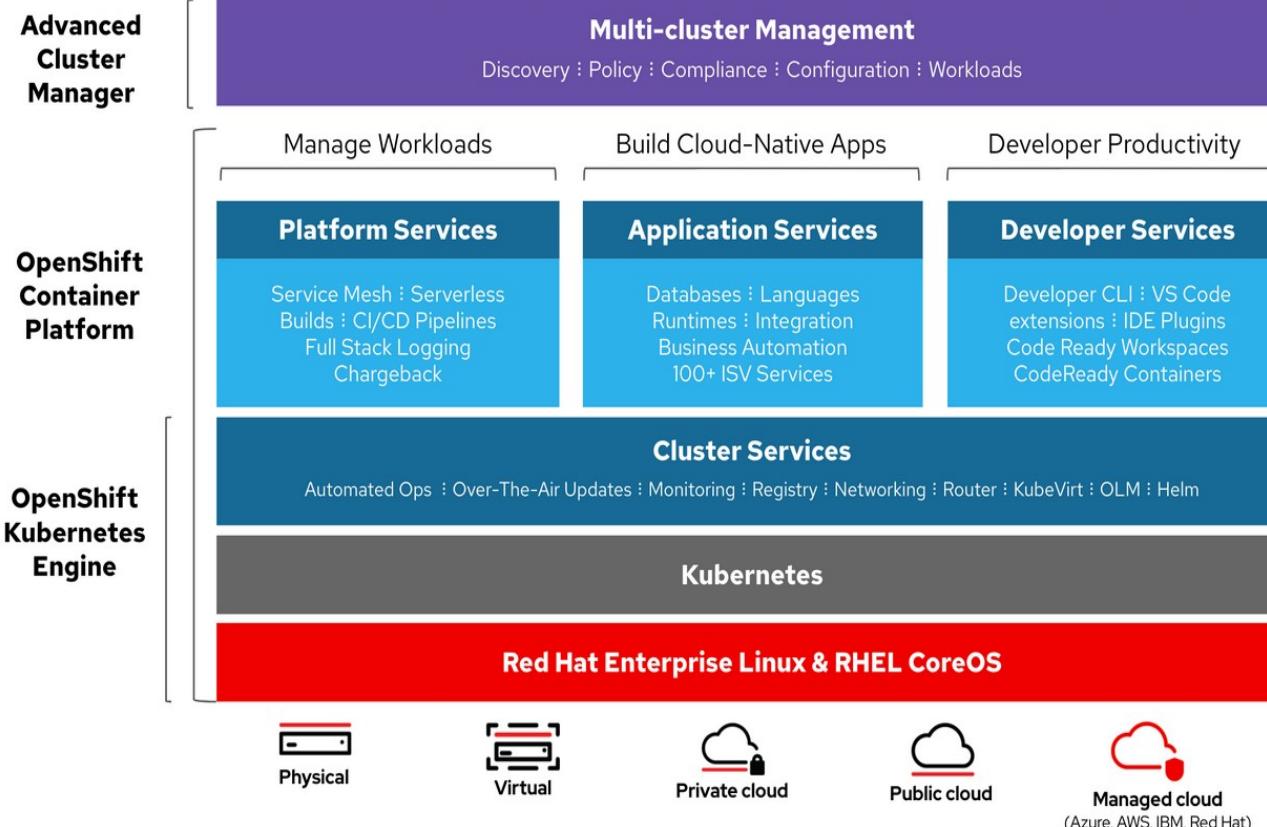
Design your own cluster

Security & isolation

Extend apps with IBM Cloud services

Native open-source experience

Integrated operational tools



IBM Cloud DevOps Capabilities

[Cloud.net/devops](https://cloud.net/devops)

Deliver to market with speed, control, confidence and compliance

Cognitive DevOps Insights

Continuous Delivery
Speed with control

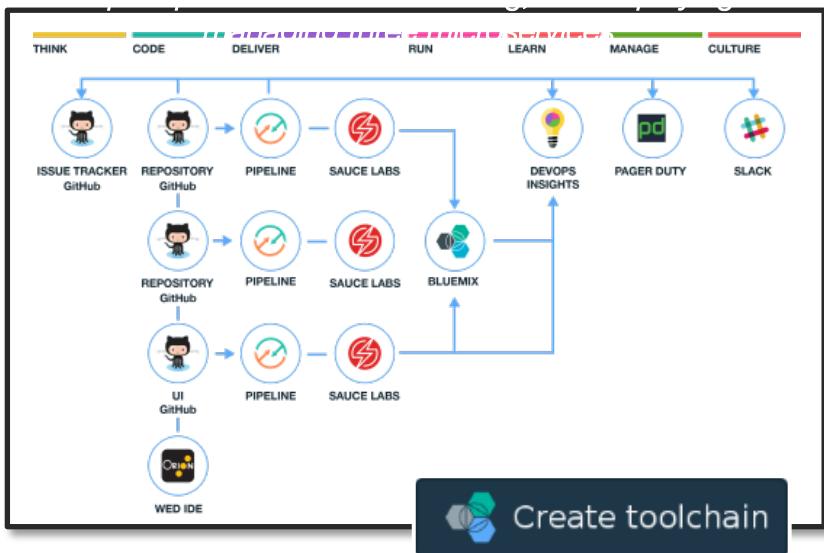
Continuous Availability
*Always on
Automated ops*

Continuous Security
Protect & defend

Open Toolchain



Built on the Open Toolchain foundation



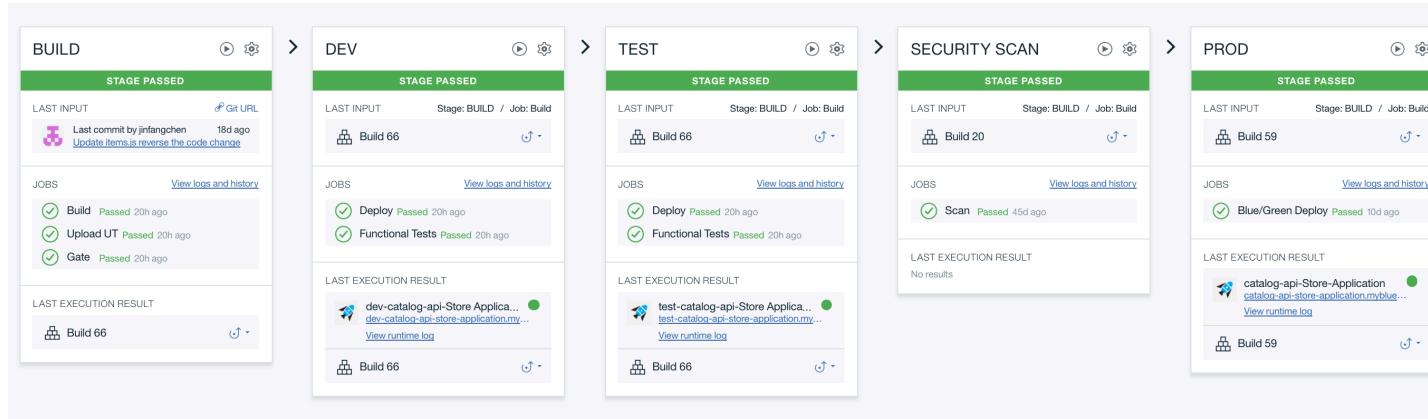
Toolchains provide an integrated set of tools that support the best practices to build, deploy and manage your apps

You can create toolchains that include Cloud services, open source tools, and third-party tools that make development and operations repeatable and easier to manage

Rapidly instantiate new toolchains from templates to on-board new teams quickly



Deliver Continuously using an Integrated Pipeline



Import Code

Import, build, and deploy an application from a GitHub repository in a few clicks

Continuous Integration

Automate builds and deployments for many types of code, running builds automatically when code changes

Continuous Testing

Drive automated unit tests, function tests, security scans, and more; with quality gates

Deliver to Multiple Platforms

Deploy applications to Cloud Foundry, Cloud, IBM Containers, other clouds, or on-premises systems

Five key principles define IBM's approach...

1

Hybrid

Enable enterprises across Public, Private, and traditional environments

2

Multicloud

Manage other vendors' Clouds, acknowledging the reality that client environments are heterogeneous

3

Open

Build capabilities that are open by design, enabling client flexibility and reducing vendor "lock in"

4

Secure

Provide reliability and continuous security for the client's environment

5

Management

Consistent service level, support, logging, management & delivery across complete cloud environments

Delivered by a composable cloud platform that is uniquely...

Multimodal

(VM, Containers, Bare metal, Serverless)



IBM Cloud Platform

Multiarchitecture

(x86, Power, IBM i, AIX, IBM Z)

Addressing both **Enterprise** and **Hyperscale** workloads

Cloud Paks – Accelerate your journey to cloud

Enterprise-ready, containerized software solutions that give you an open, faster, more secure way to move core business applications for any cloud

IBM containerized software

Packaged with Open Source components, pre-integrated with the common operational services, and secure by design



Operational services

Logging, monitoring, metering, security, identity access management, image registry



Container platform

Kubernetes-based and portable



Complete yet simple

Application, data and AI services, fully modular and easy to consume

IBM certified

Full software stack support, and ongoing security, compliance and version compatibility

Run anywhere

On-premises, on private and public clouds, and in pre-integrated systems



Pre-integrated
Systems



IBM Cloud



RED HAT
OPENSHIFT



aws



Azure



openstack™



Google Cloud

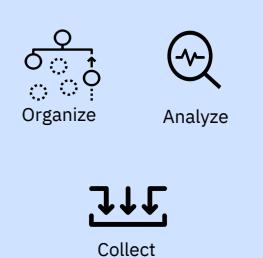
Cloud Paks – Pre-integrated for cloud use cases

Today, IBM offers clients the first six Cloud Paks...

Cloud Pak for Applications



Cloud Pak for Data



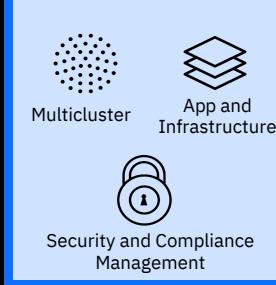
Cloud Pak for Integration



Cloud Pak for Automation



Cloud Pak for Multicloud Management



Cloud Pak for Security



Container platform and operational services



AWS

MS Azure

Google Cloud



Cloud Paks on IBM Cloud

Integrated with IBM's public cloud, leveraging RedHat OpenShift on IBM Cloud

IBM Cloud Pak for Applications

IBM Cloud Pak for Data

IBM Cloud Pak for Integration

IBM Cloud Pak for Automation

IBM Cloud Pak for Multicloud Management



IBM public cloud

- Build and modernize on a cloud platform explicitly architected for workload and data portability.
- Move those securely with Bring Your Own Key, Level 4 FIPS, and built-in industry compliance including PCI, HIPAA, GDPR, SOC1 and SOC2.
- Leverage a managed OpenShift that directly integrates into the same Kubernetes service that maintains 25,000+ clusters and 250 billion on-demand forecasts daily at The Weather Company.
- Enjoy push-button integrations with IBM and Red Hat middleware and cloud services through IBM Cloud Schematics and IBM Cloud Content Catalog.
- Compute isolation choices including bare metal worker nodes.
- Managed OpenShift offering with HA masters, multizone clusters, and 99.99% SLA.

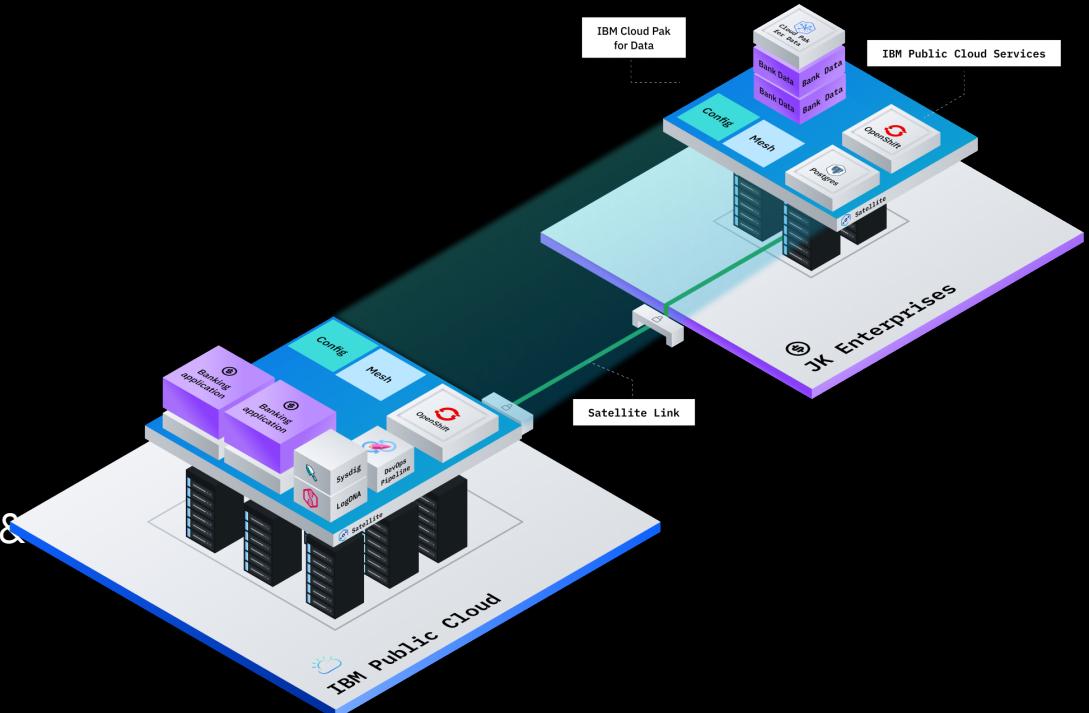
What is IBM Cloud Satellite?

IBM Public Cloud Extended to Customer Infrastructure

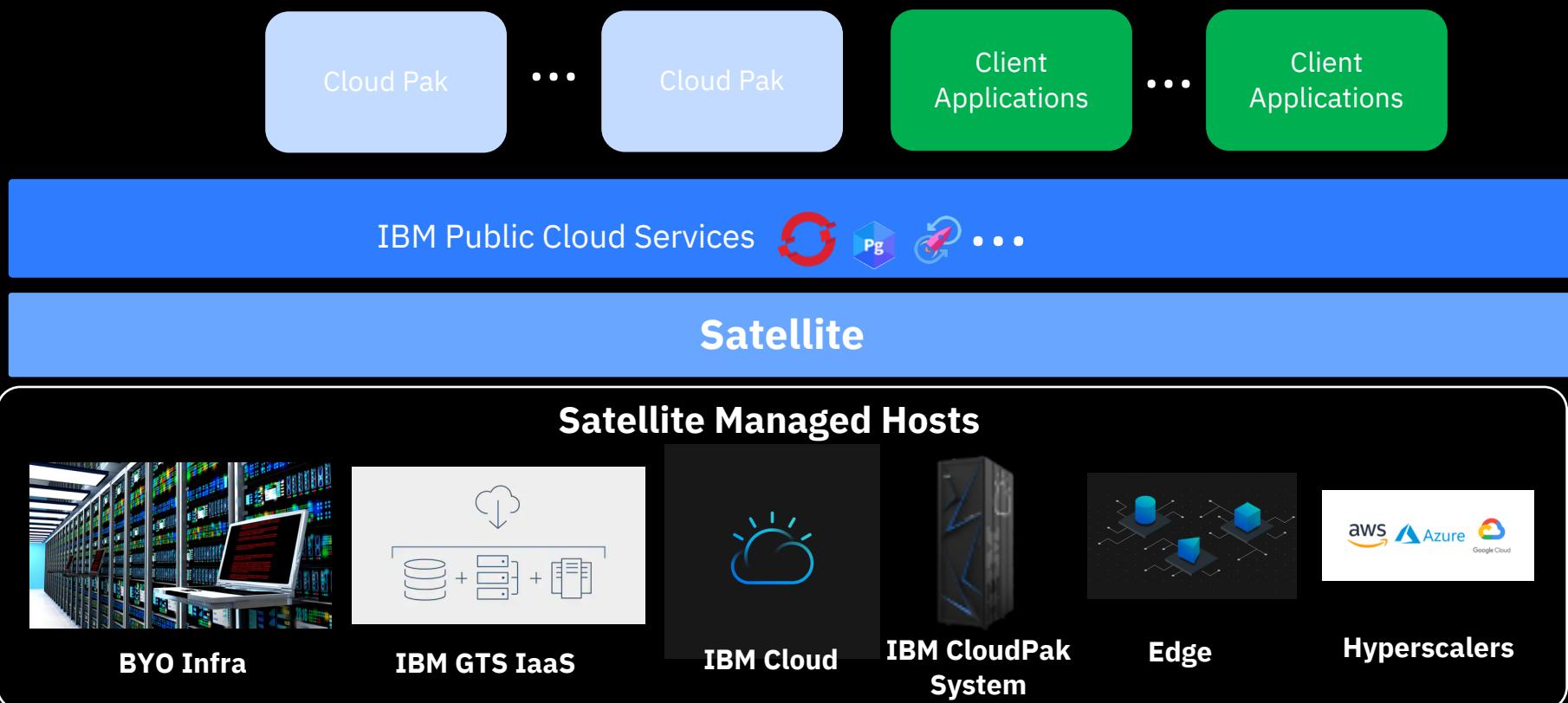
IBM Cloud services anywhere a client needs them, delivered as-a-service from a single pane of glass controlled through the public cloud.

Benefits

- Achieve consistency & app performance across distributed cloud environments
- Enables IBM Cloud-managed services at client locations
- End to end security where data & workload reside
- Reduces management cost



IBM Cloud Services, Cloud Paks, & Client Workloads on Client Defined Infrastructure



What Market Space is Satellite Part of?

Gartner defines the space as
"Distributed Cloud"

"Distributed cloud is the answer to the question "What is the future of cloud computing?" It refers to the distribution of public cloud services to different physical locations while the operation, governance and evolution of the services remain the responsibility of the public cloud provider."

IDC defines the space as
"Local Cloud as a Service"

"Use of public cloud stacks for customer premises/dedicated infrastructure is expected to grow rapidly in the next 5 years, and will account for about 19% of all core shipments in 2023"

Game Changer

The advent of local cloud as a service, built on an ARR model, promises to transform existing enterprise private cloud and hosted private cloud markets as well as spur a wave of innovative edge services.



Core Competitors to Satellite
Azure Arc, Google Anthos, AWS Outpost/Wavelength

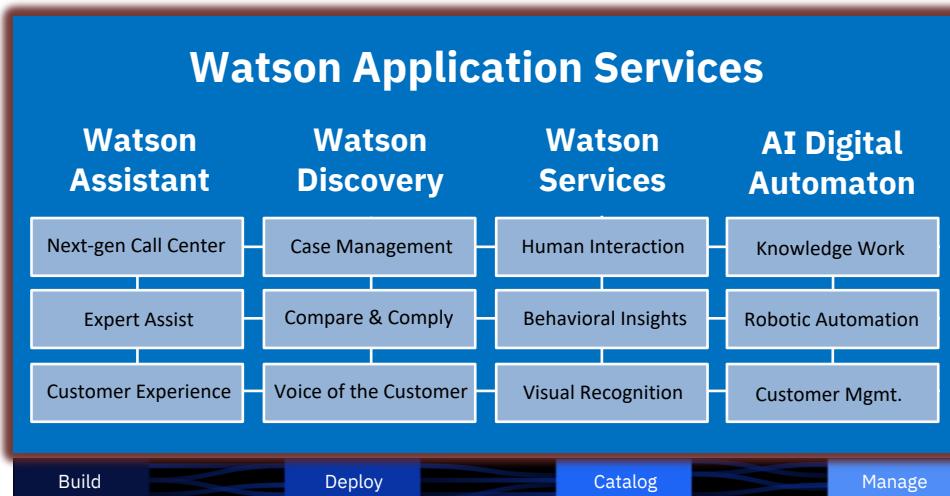
Outline

- IBM Cloud Overview
- Watson Services Overview 
- Watson Studio Overview
- Labs

IBM Watson AI Services

Use IBM AI capabilities to create cognitive systems that can:

- **Understand** – understand human language
- **Reason** - understand underlying concepts, forms hypothesis, and can infer based on present data
- **Learn** - value increases over time as AI improve with each new piece of information and with each new interaction
- **Interact** – the ability to talk, hear, and interact with humans in a natural way



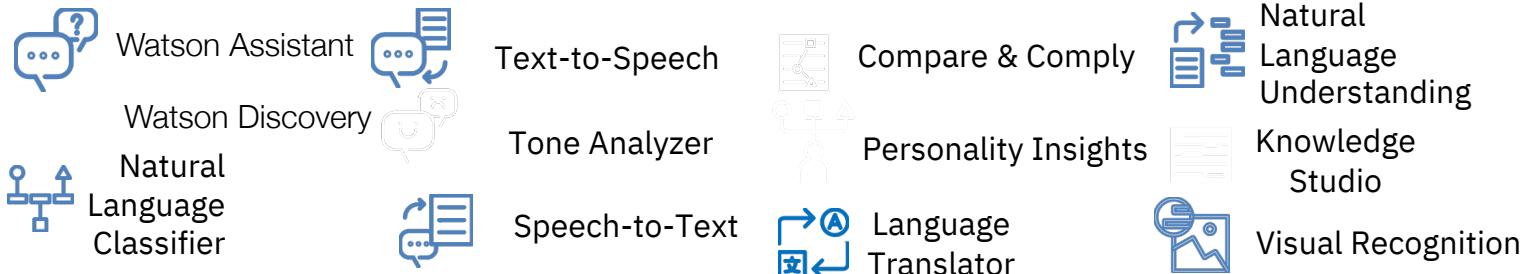
Predict and shape future outcomes

Optimize labor to higher value work

Automate decision, processes & experiences

Reimagine new business models

Watson Services



<https://cloud.ibm.com/catalog?category=ai>

Watson Knowledge Studio

- Create a machine learning model
 - Understands the linguistic nuances, meaning, and relationships specific to an industry
- Create a rule-based model
 - Finds entities in documents based on rules that you define
- Build models without requiring deep technical skills or coding
- Apply curated model to multiple applications including Discovery and Assistant

Watson Knowledge Studio

Completed Close

Relation Type

- agentOf
- assignedVersionID
- A associatedActor
- C associatedCampaign
- associatedTarget
- U attribution
- basedIn
- before
- circumvent
- definedQuantity
- detects

The installer filename of BlackEnergy 3 is still msieexec.exe.

Discovery

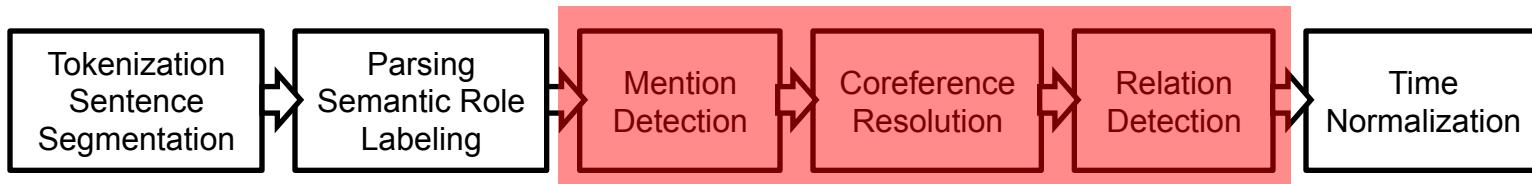
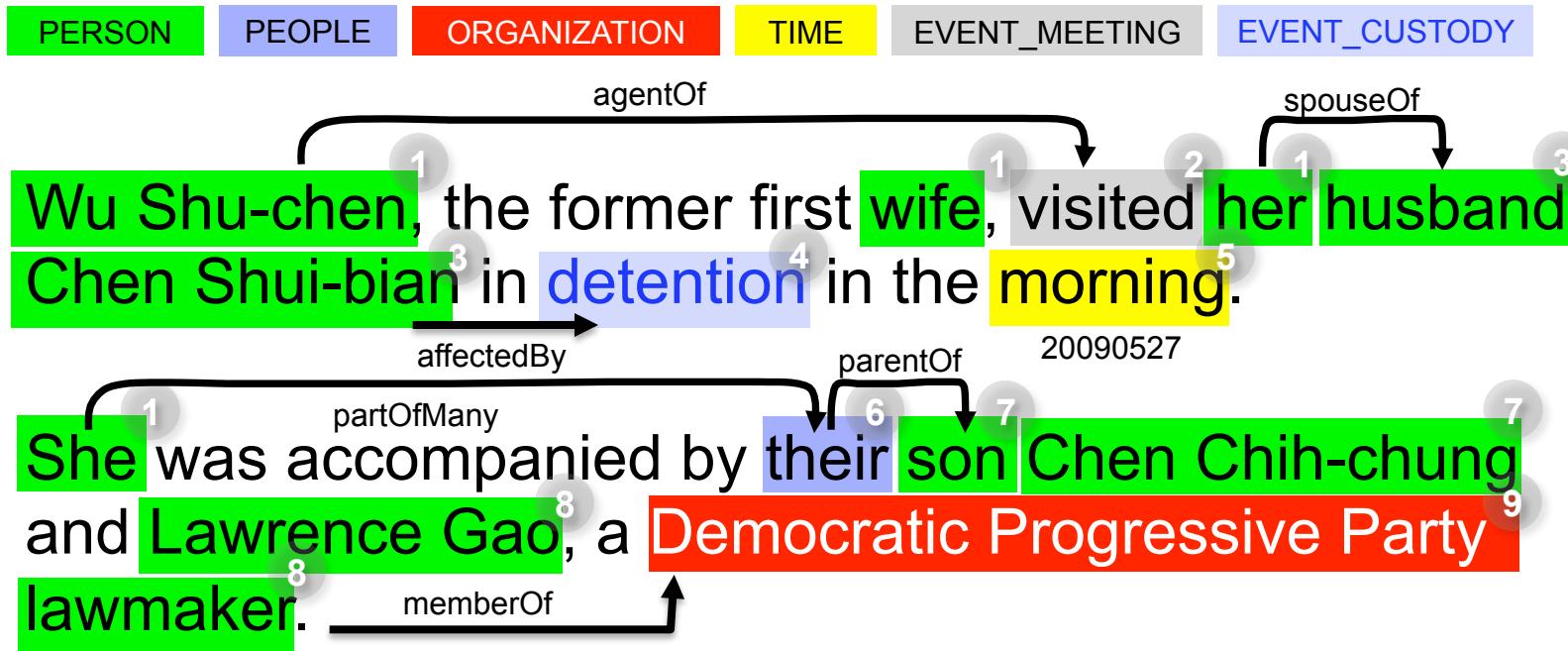
However, it is delivered and executed by a dropper which opens a decoy document in the foreground

Natural Language Understanding

Detailed description: The screenshot shows the Watson Knowledge Studio interface. On the left, two knowledge graphs are displayed. Graph 10 shows entities like 'RESO...', 'RESOU...', 'TTP', and 'INDICATOR' connected via 'hasAttribute' and 'relatedTTP'. Graph 11 shows entities like 'R', 'THREA...', 'RESO...', 'THR...', and 'RESOURCE' connected via 'observedAction' and 'leveragedResource'. A vertical list on the right lists various relation types with color-coded boxes. Two blue arrows point from the interface to boxes labeled 'Discovery' and 'Natural Language Understanding'.

WKS Annotation Example

- Uses mention/relation detection and coreference to understand human language



Watson Discovery Service

Rapidly add a cognitive search and content analytics engine to applications to identify patterns, trends and actionable insights that drive better decision-making



- **Automate Data Ingestion** using the APIs, web upload or data crawler and feed through Document Conversion to deal with multiple file types
- **Apply enrichments** to make the raw data ‘smarter’ with easy Natural Language Processing and custom models to extract entities, relations, keywords, sentiment, etc.
- **Combine Diverse Content Sources** to create one-of-a-kind applications that leverage data from pre-enriched sources and private content from across the enterprise
- **Extract Insights** with simple but powerful queries that support multiple query types including boolean, filter, and aggregation queries to discover patterns, trends and answers
- **Extend conversation apps** to find answers without modeling intents

| Data

Private data



| Ingestion

Convert and enrich by leveraging Watson APIs to add NLP meta data to your content, making it easier to explore and discover insights

Clean and normalize through an automated processing of NLP results, improving data quality

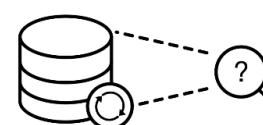
| Storage

Normalized data is indexed into a collection as part of your environment in the cloud



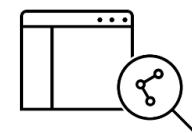
| Query

Understand data faster, create better hypothesis and deliver better outcomes



| Output

Actionable insights into your app



Watson Assistant

Solution

- Enables callers to converse in natural language to address questions or complete tasks in real-time via phone
- Leverages Watson Assistant, Watson Speech, and IBM Voice Agent with Watson

Assistant / Skills

- Assistant maintains session context and can connect to a number of managed integrations
- Assistant references “skills” which contain reasoning logic and responses
- Preview link integration allows you to quickly share your bot internally before launching

Benefits

- Reduce cost of resolving customer query (deflection)
- Improve customer satisfaction by answer & resolve calls more quickly

The screenshot shows the Watson Assistant interface. At the top, there are tabs for Home, Skills, and Assistants. The Assistants tab is selected, showing an instance named "Watson Assistant (formerly Conversation)-b4". Below the tabs, there's a section for "TW Bank Bot" with the subtitle "TW bank's banking assistant!". It includes links to "View API Details", "Rename", and "Delete".

The "Skill" section displays the bot's details: LANGUAGE: English (US), TRAINED DATA: 22 Intents | 5 Entities | 53 Dialog Nodes, DATE CREATED: Wed Dec 05 2018, and DATE MODIFIED: Wed Dec 05 2018. It also lists "LINKED ASSISTANTS": grnnejwkgnewjkl, TW Bank Bot.

The "Integrations" section allows choosing a channel to deploy the assistant, with an "Add integration" button. It shows a "Preview Link" button and a small icon.

The "Add Integration" dialog box is open, showing "Managed|Built-in integrations" like Facebook Messenger, Preview Link, and Slack. It also lists "Other integrations" such as Custom application and WordPress plug-in.

To the right, a preview window shows a simulated chat interaction:

```

i want to transfer money
How much you want to transfer?
$1000
Got it! $1000
And when are you looking to make this transfer?
Send a message...

```

AutoDesk - Watson Assistant Use Case



For more than 34 years, software giant Autodesk sold its popular 3D design, engineering and entertainment software under perpetual desktop licensing agreements. However, the way customers wanted to buy and access products changed. Recognizing that shifting to a subscription business model requires real-time customer service and support, Autodesk developed a virtual agent to interact with customers and improve their experiences.

100 , 000

Supports 100,000 conversations per month, easing the burden on call center staff

99%

Improvements in customer response times for Autodesk by implementing Watson

5 – 10 min

Resolves cases in five to 10 minutes as opposed to a day and a half. And the only reason it takes five to 10 minutes is because that's how long a customer needs to type in or find specific information, such as matching a serial number to an entitlement or contract

14M

Analyzes a total of 14 million sentences for keywords, entities, phrases, clusters, and other speech and language patterns



60

Different use cases recognized to quickly resolve easy requests so that agents can focus on helping customer with complex issues

5 . 4 min

Drastically reduces resolutions time from 1.5 days to just 5.4 minutes for most inquiries

Connect

With IBM and Salesforce, you'll have the capability to seamlessly connect real-time insights found in unstructured data to discovery within customer data.

↑ 10pt

10-point increase in customer satisfaction levels because customers don't have to wait as long to have their questions answered



Learn more
[Read the full case study](#)
Contact Us
<https://www.ibm.com/watson/partnerships/>

What is Project Debater?

- A grand challenge IBM Research project which demonstrated:
 - A computer system that successfully participated in a verbal, competitive debate against a human opponent
 - Our advancement and integration of Natural Language Understanding, Natural Language Generation and the emerging field of computational argumentation

- Try Project Debater at
<https://ui.debater.res.ibm.com/domain/public>



- Project Debater Applications



Voice of the people - qualitative and quantitative assessment of the views of customers, constituents, employees etc., as expressed in free text responses to surveys or implicit information in social media, conversation logs, interviews, etc.

Potential users: *Marketeers, Sellers, Executives, HR*



Corpus-wide mining: detect relevant information that can impact your business decision-making process pro-actively and usefully.

Potential users: *financial analysts, intelligence analysts, risk officers, journalists, marketeers*

Project Debater Capabilities

Speech writing and delivery

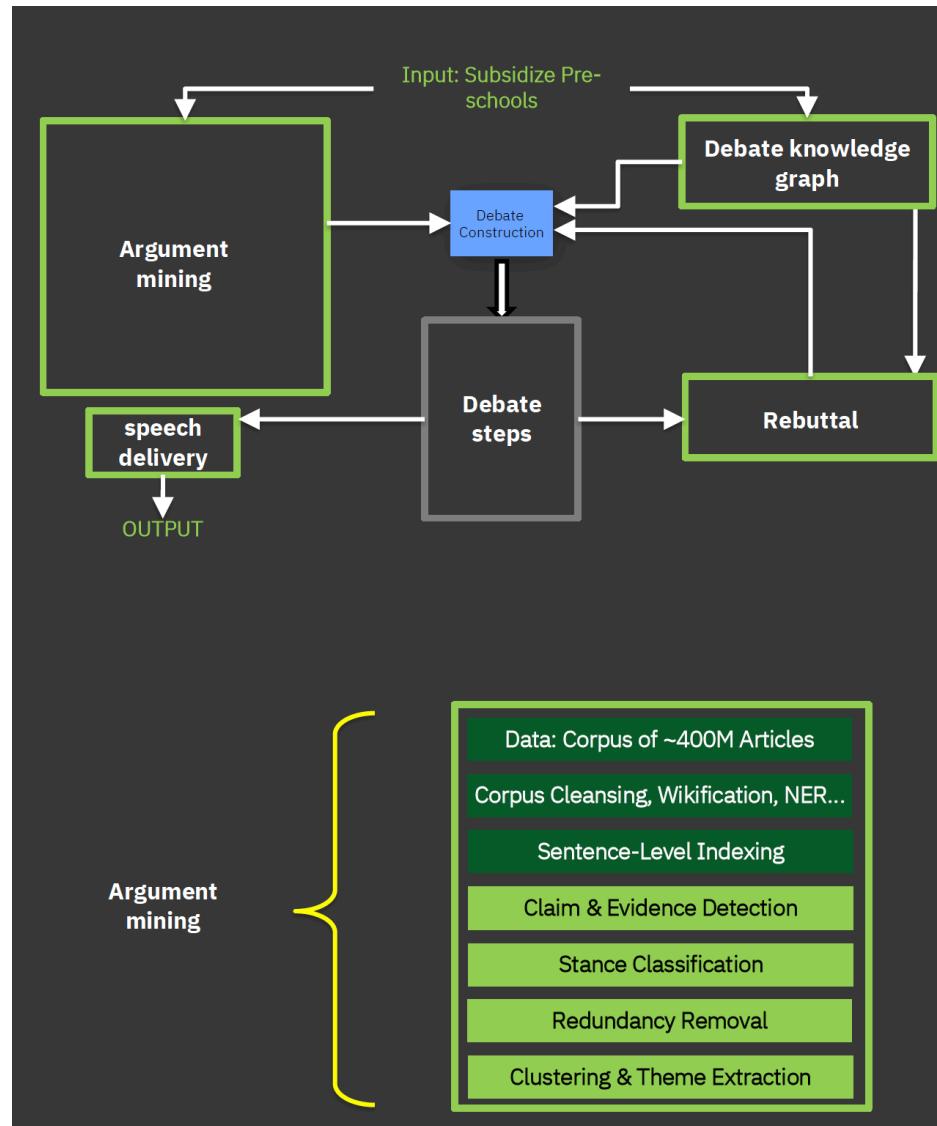
- Digest massive corpora
- Create a well-structured narrative
- Deliver with clarity and purpose

Listening with Comprehension

- Identify key arguments in long continuous spoken language

Modeling Human Dilemmas

- Model controversy
- Propose principled arguments

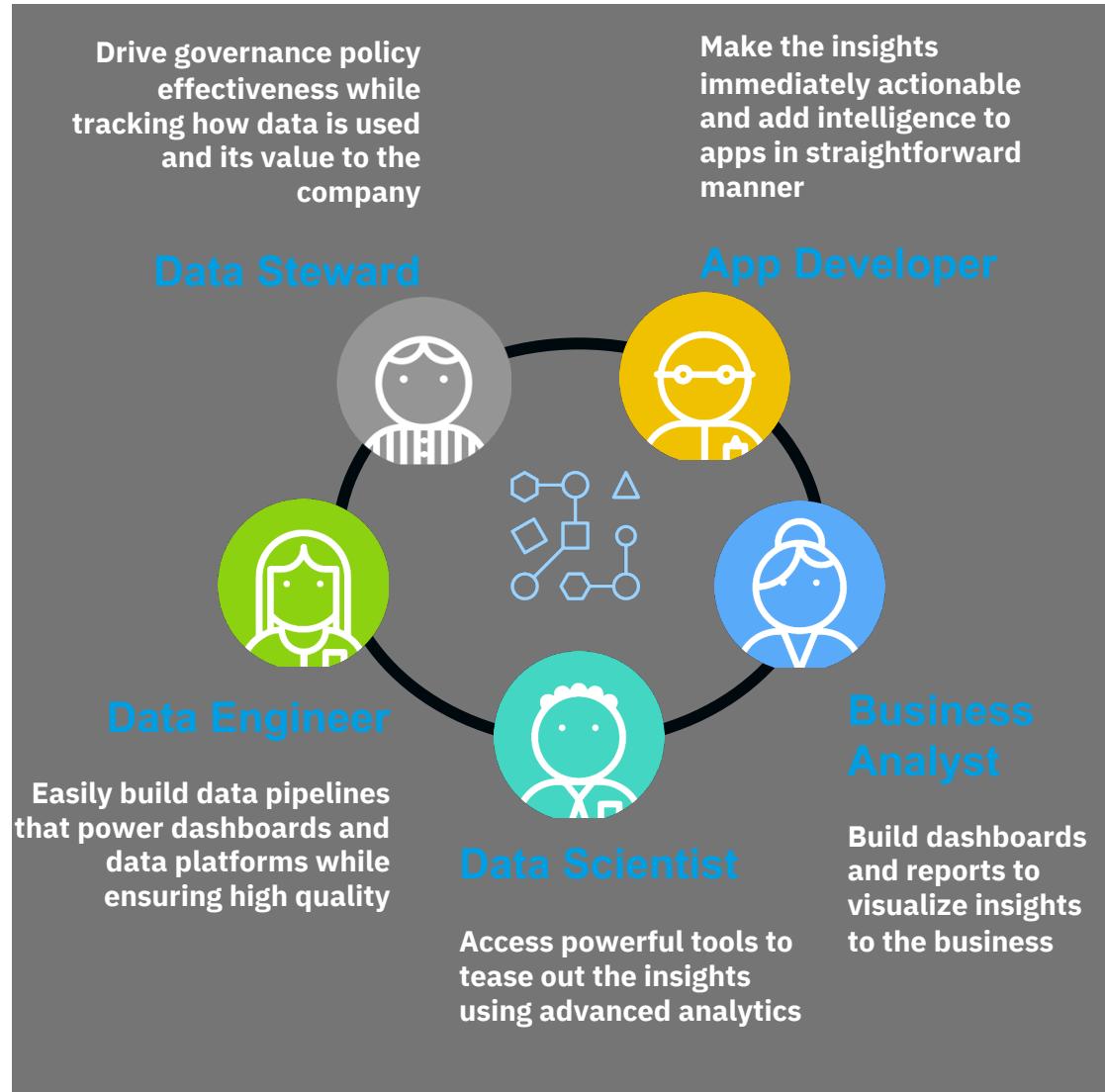


Outline

- IBM Cloud Overview
- Watson Services Overview
- Watson Studio Overview 
- Labs

IBM Watson Studio Platform

An integrated platform of tools, services, data, and metadata that help companies or agencies accelerate their shift to be data-driven organizations.

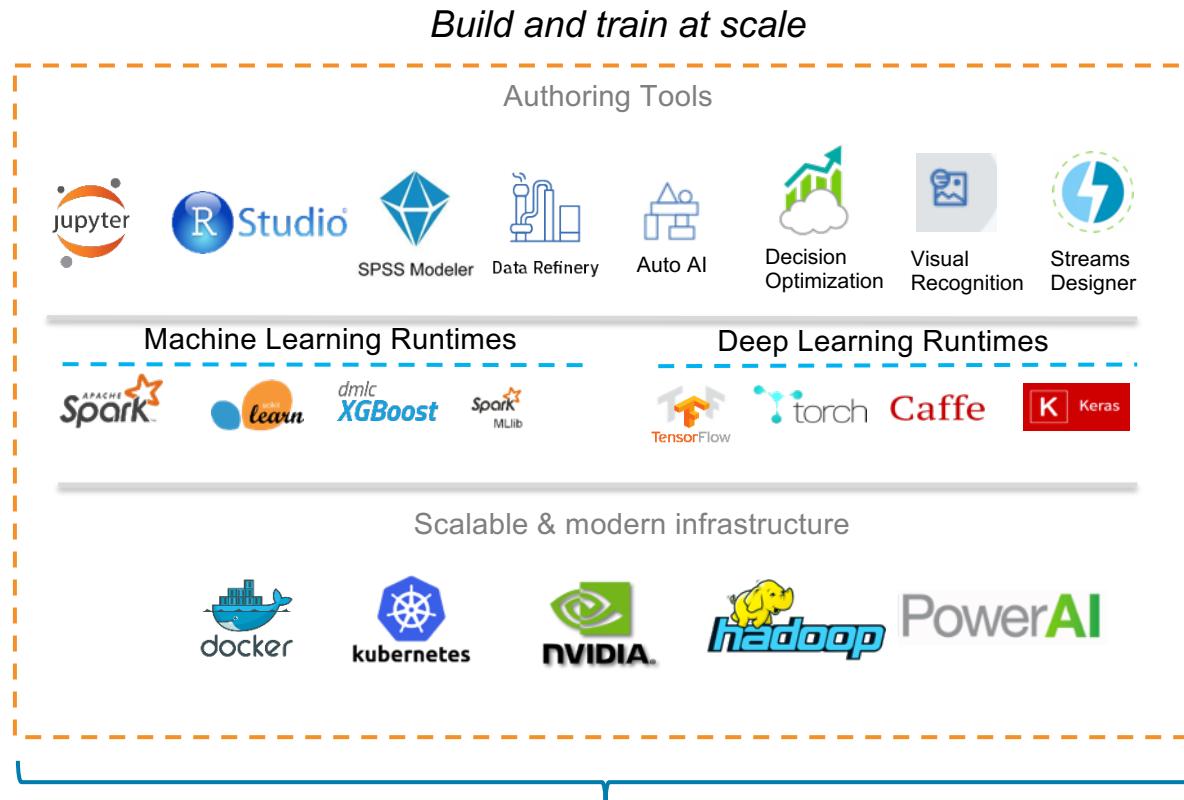


Watson Studio Tools

- Using best of breed - Open source & IBM tools
- Code (R, Python or Scala) and no-code/visual modeling tools

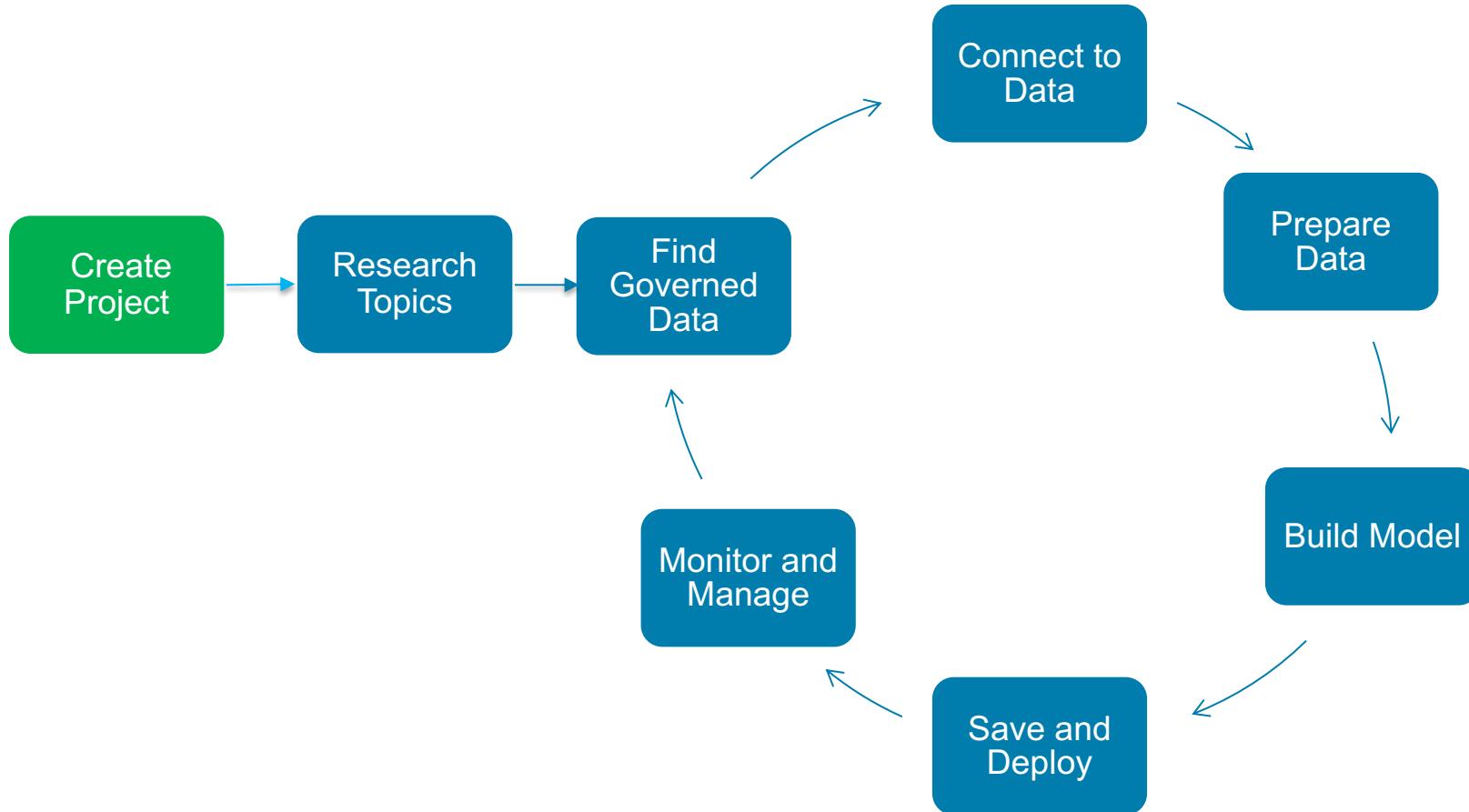
- Container-based resource management
- Elastic cpu/gpu power
- Run on x86, Power, zLinux
- Integrate with Hadoop/Spark Infrastructure

- Train and deploy where your data lives



Watson Studio supports the Data Science Lifecycle

Build, train, deploy, and monitor at scale ML/DL workflows to infuse AI into the enterprise to drive innovation.



Watson Studio Project Features

Making Data Science a Team Sport

Create
Project

- Organizes resources to achieve a particular data analysis goal
- Support role-based collaboration (Admin, Editor, Viewer)
- Assets from all IDEs can be included in one Watson Studio project: notebooks, data sources, flows, models, etc.
- Export/Import Projects

Add to Project

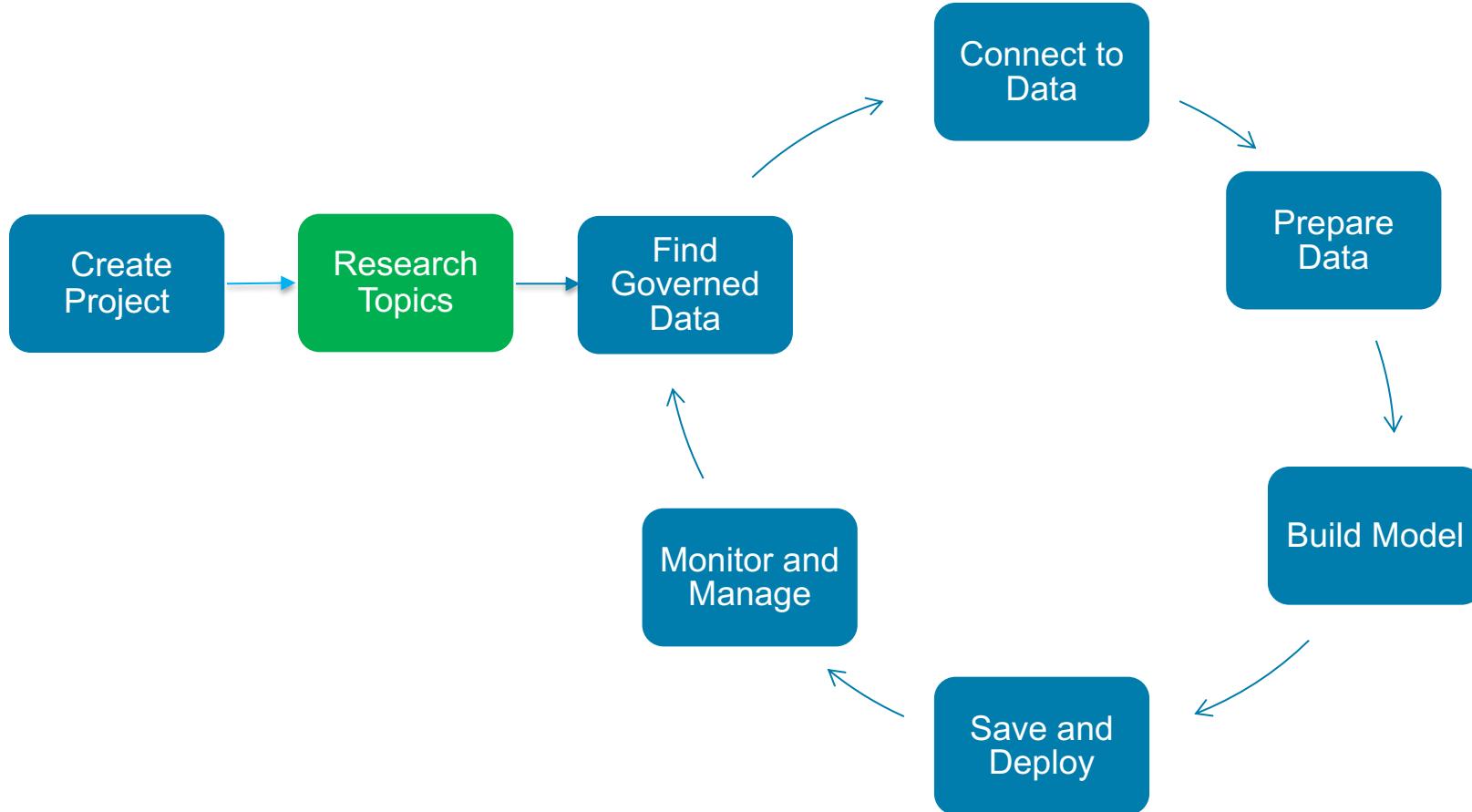
Choose asset type

Available asset types

 Data	 Connection	 Connected data
 AutoAI experiment	 Notebook	 Dashboard
 Visual Recognition ...	 Natural Language Cl...	 Watson Machine Lea...
 Deep learning exper...	 Modeler flow	 Data Refinery flow
 Streams flow	 Decision Optimizatio... NEW	

Watson Studio supports the Data Science Lifecycle

Build, train, deploy, and monitor at scale ML/DL workflows to infuse AI into the enterprise to drive innovation.



Watson Studio Gallery

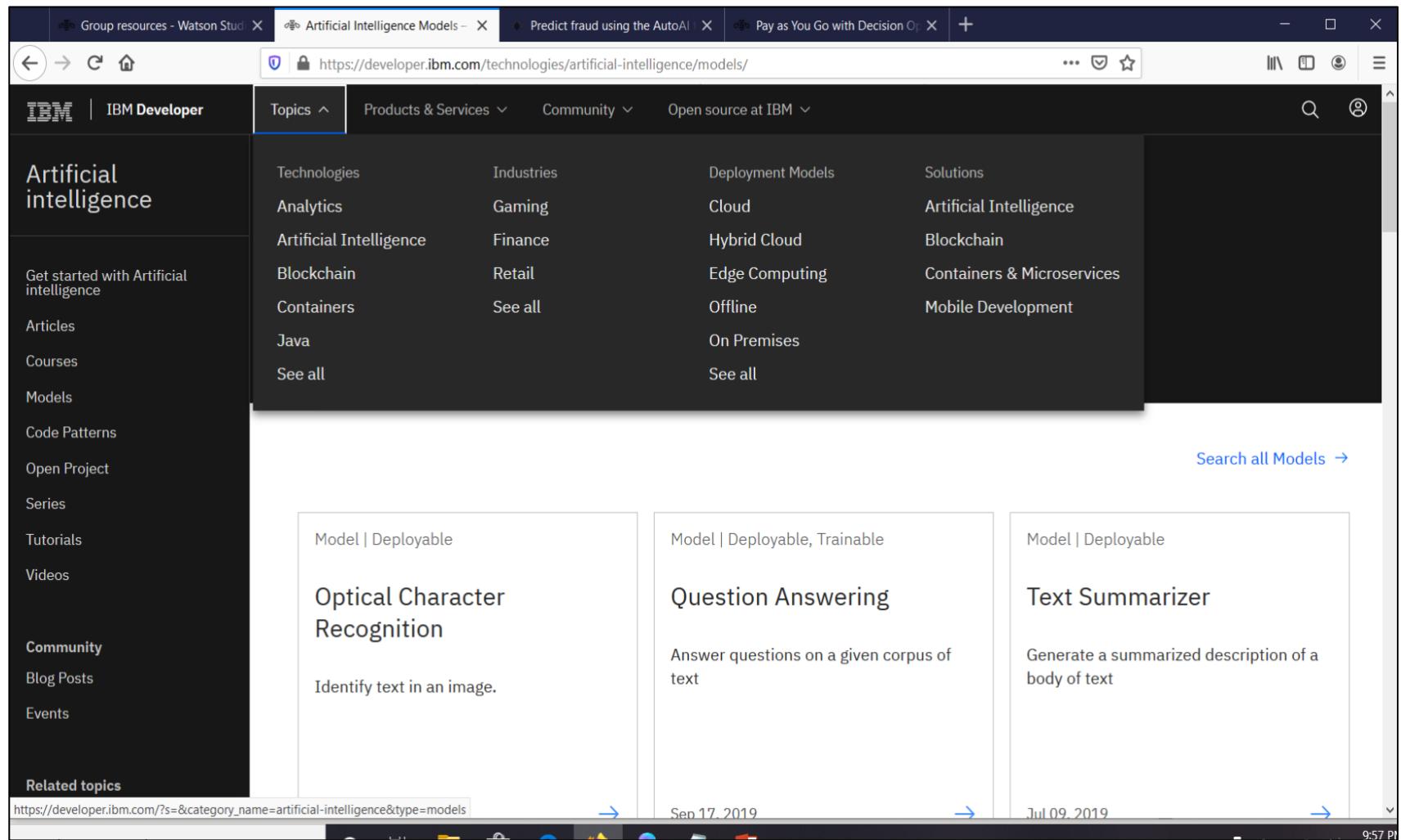
Built-in learning to get started

Research
Topics

- The Gallery includes notebooks, and data sets
- Copy notebooks or Data Sets into projects
- Continuously updated in IBM's managed service

developer.ibm.com

Research
Topics



The screenshot shows the IBM Developer website at <https://developer.ibm.com/technologies/artificial-intelligence/models/>. The page is titled "Artificial intelligence" and displays various categories and models.

Left sidebar:

- Get started with Artificial intelligence
- Articles
- Courses
- Models
- Code Patterns
- Open Project
- Series
- Tutorials
- Videos
- Community
- Blog Posts
- Events
- Related topics

Top navigation:

- Topics
- Products & Services
- Community
- Open source at IBM

Content area:

Technologies	Industries	Deployment Models	Solutions
Analytics	Gaming	Cloud	Artificial Intelligence
Artificial Intelligence	Finance	Hybrid Cloud	Blockchain
Blockchain	Retail	Edge Computing	Containers & Microservices
Containers	See all	Offline	Mobile Development
Java		On Premises	
See all		See all	

[Search all Models →](#)

Model cards:

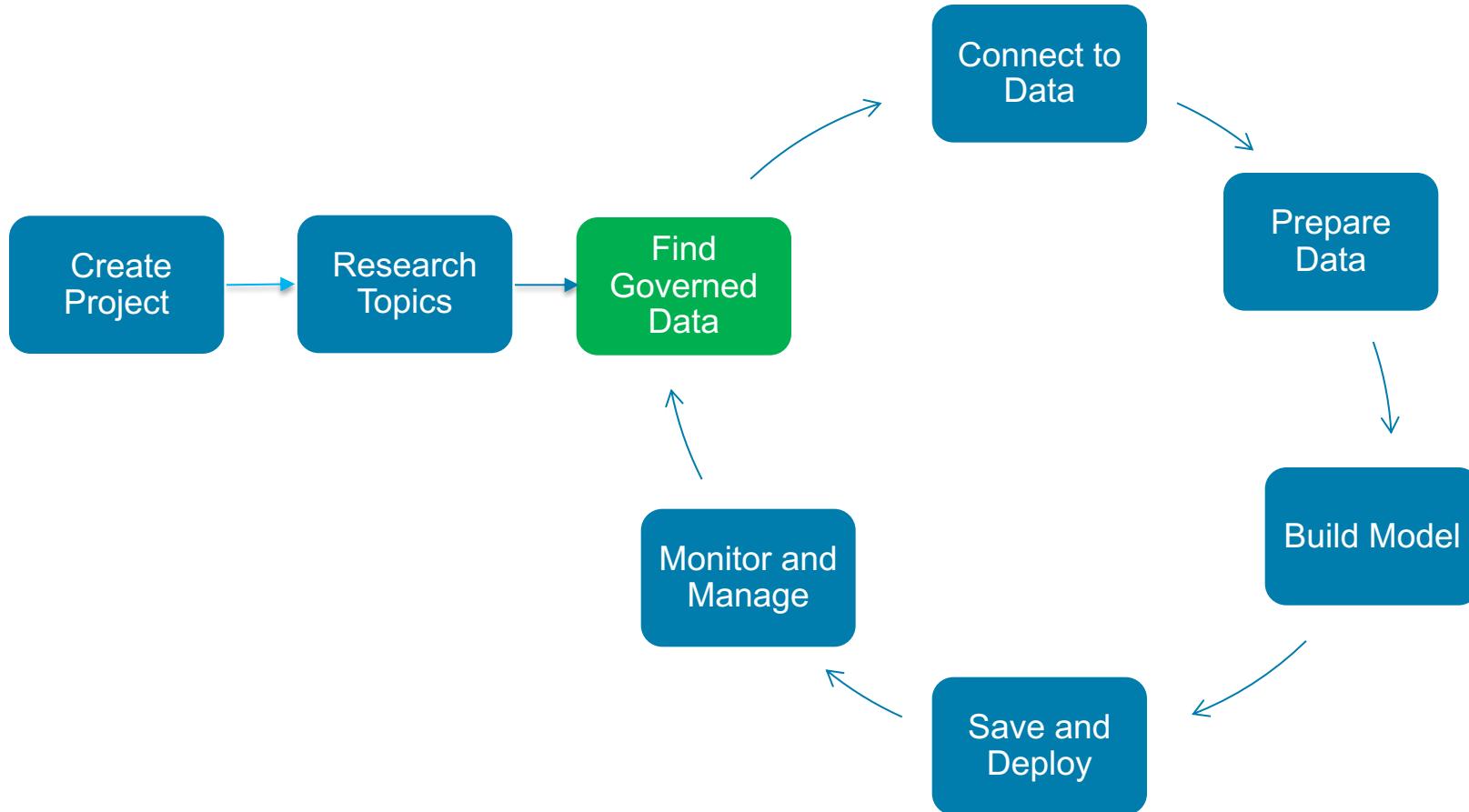
- Optical Character Recognition**
Model | Deployable
Identify text in an image.
- Question Answering**
Model | Deployable, Trainable
Answer questions on a given corpus of text
- Text Summarizer**
Model | Deployable
Generate a summarized description of a body of text

Page footer:

https://developer.ibm.com/?s=&category_name=artificial-intelligence&type=models

Watson Studio supports the Data Science Lifecycle

Build, train, deploy, and monitor at scale ML/DL workflows to infuse AI into the enterprise to drive innovation.



Find
Governed
Data

Watson Knowledge Catalog Features

Unlock tribal knowledge and unleash knowledge workers

- **Find** data (structured, unstructured) and AI assets (e.g., ML/DL models, notebooks, Watson Data Kits) in the **Knowledge Catalog** with intelligent search and giving the right access to the right users.
- Discover assets, profiling, classification
- Policy, rule authoring
- Policy, rule enforcement
- Asset Usage Statistics

[Find
Governed
Data](#)

Watson Knowledge Catalog Features

 Data Asset

female_human_trafficking

Description

There is no description available for this asset.

Added: Jan 31, 2019 10:02 AM

Format: application/octet-stream

Size: 347 KB

Tags

trafficking | female human trafficking

Reviews

 0 reviews

Connection

Source: Watson Studio Labs_DataCatalog

Source type: Cloud Object Storage

Classification

Personally Identifiable Information

Personally identifiable information (PII) is defined as any data that could potentially identify a specific individual. Any information that can be used to distinguish one person from another can be considered PII.

Schema: 26 Columns | 1085 Rows |  2 Columns anonymized 

Preview: 1000 rows | Last refresh: 22 seconds ago | 

	BIRTH_DATE	BIRTH_COUNTRY_CODE	OCCUPATION	ADDRESS
	Type: String	Type: String	Type: String	Type: String

	Country Name	Country Code	Text	Text
	th	Country Name	Country Code	Text

15	Ghana	GH	Engineer, land	824 Kristin Grv, A
----	-------	----	----------------	--------------------

19	Ghana	GH	Editor, commissi	1148 Wang Fall S
----	-------	----	------------------	------------------

16	Ghana	GH	Merchant navy of	9486 Pratt Wall,
----	-------	----	------------------	------------------

17	Ghana	GH	Paramedic	0890 Johnson Tr
----	-------	----	-----------	-----------------

18	Ghana	GH	Surveyor, buildin	2315 Brittany Cr
----	-------	----	-------------------	------------------

24	Ghana	GH	Waste managem	88811 Donald Pa
----	-------	----	---------------	-----------------

23	Ghana	GH	Doctor, general p	9150 Donald Rp
----	-------	----	-------------------	----------------

02	Ghana	GH	Forest/woodland	1355 Lopez Villa
----	-------	----	-----------------	------------------

12	Ghana	GH	Land/geomatics :	86792 Amy Vlgs,
----	-------	----	------------------	-----------------

10	Ghana	GH	Oncologist	108 Erin Via, Nev
----	-------	----	------------	-------------------

07	Ghana	GH	Veterinary surge	79572 Schmidt E
----	-------	----	------------------	-----------------

SSN	 PASSPORT_NUMBER	
Type: String	Type: String	Type: String

US Social ...	Passport Number	
---------------	-----------------	--

afe55d1d355c3:	1c9da91e1e20863dd850	
----------------	----------------------	--

77a0daa42ec7d	12d38855ed107e7cc5dd	
---------------	----------------------	--

669061087d6d1	c43ed0283a3def7031d8:	
---------------	-----------------------	--

997b59e501b2e	179abee5ba608418154d	
---------------	----------------------	--

70329b83b40ct	84524ccc3c5c6590600e!	
---------------	-----------------------	--

d2f2236f52407:	a730ae13f5ed96f71e904	
----------------	-----------------------	--

d2c2d41163d8f:	ced1617be1d70e44421c	
----------------	----------------------	--

62007942c2b0c	8c8debda401b6b6d954b	
---------------	----------------------	--

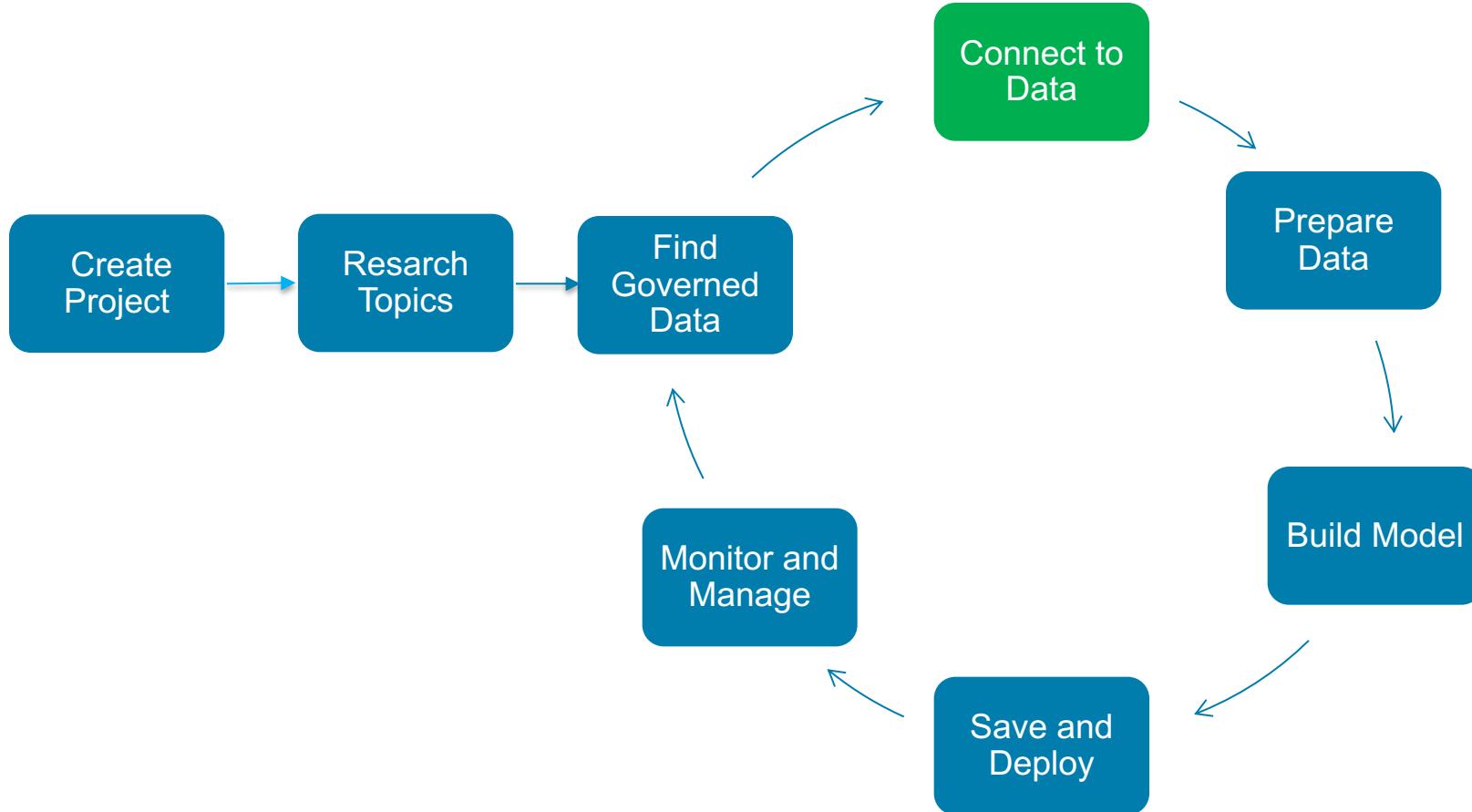
08f8dd9f9ba89t	a43f1d6c9cacfdaf82a1a1	
----------------	------------------------	--

f8b871f6e058e2	f289be62078ebbe457c6:	
----------------	-----------------------	--

f2006c1d30df33	624a9605774a0cf98aa	
----------------	---------------------	--

Watson Studio supports the Data Science Lifecycle

Build, train, deploy, and monitor at scale ML/DL workflows to infuse AI into the enterprise to drive innovation.



Watson Studio Connection Features

Connect to
Data

- Upload files
- Connectors to Structured and Unstructured, On-prem and Cloud data sources.
- Wizard based connection definition and code generation

Connection Options

Connect to
Data

New connection

IBM services

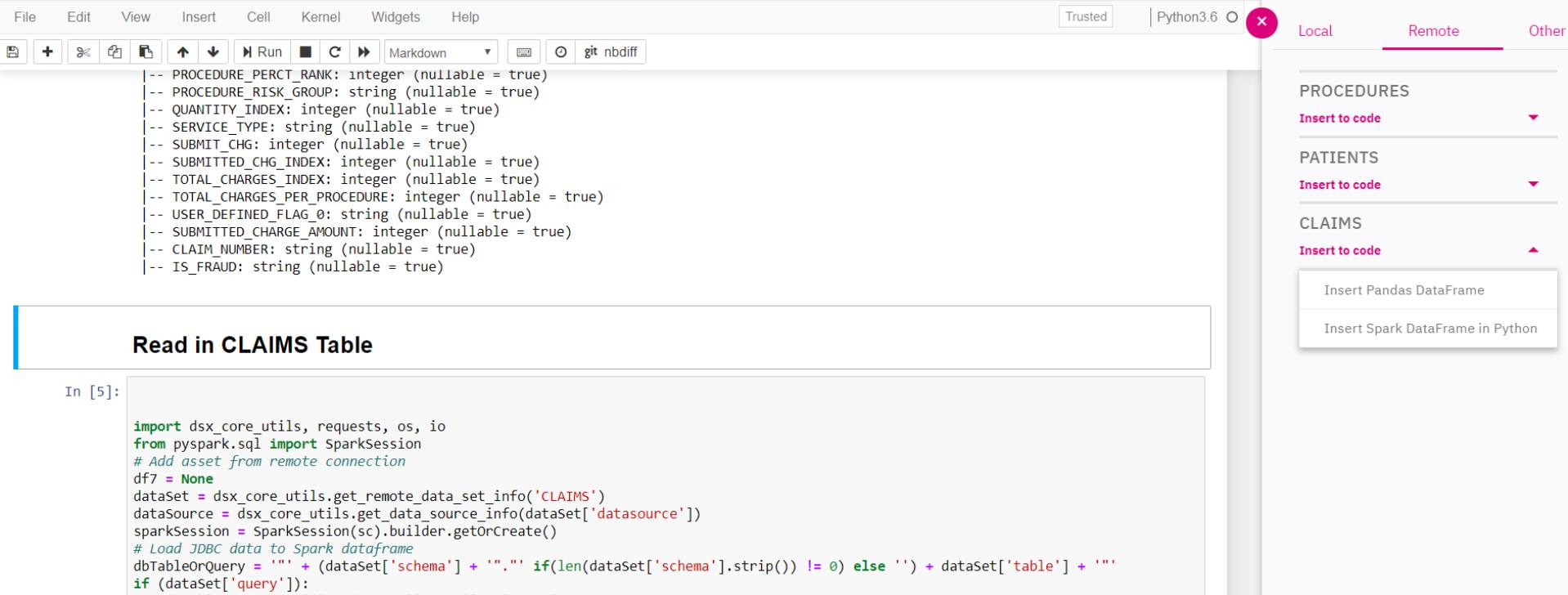
 BigInsights HDFS	 Cloud Object Storage	 Cloud Object Storage (infrastructure)	 Cloudant
 Cognos Analytics	 Compose for MySQL	 Compose for PostgreSQL	 Db2
 Db2 Big SQL	 Db2 for i	 Db2 for z/OS	 Db2 Hosted
 Db2 on Cloud	 Db2 Warehouse	 Informix	 Object Storage OpenStack Swift (infrastructure)
 PureData for Analytics	 Watson Analytics		

Third-party services

 Amazon Redshift	 Amazon S3	 Apache Hive	 Cloudera Impala
 Dropbox	 FTP	 Google BigQuery	 Google Cloud Storage
 Hortonworks HDFS	 Looker	 Microsoft Azure Data Lake Store	 Microsoft Azure SQL Database
 Microsoft SQL Server	 MySQL	 Oracle	 Pivotal Greenplum
 PostgreSQL	 Salesforce.com	 Sybase	 Sybase IQ
 Tableau	 Teradata		

Connect to
Data

Notebook Screenshot



The screenshot shows a Jupyter-style notebook interface with the following elements:

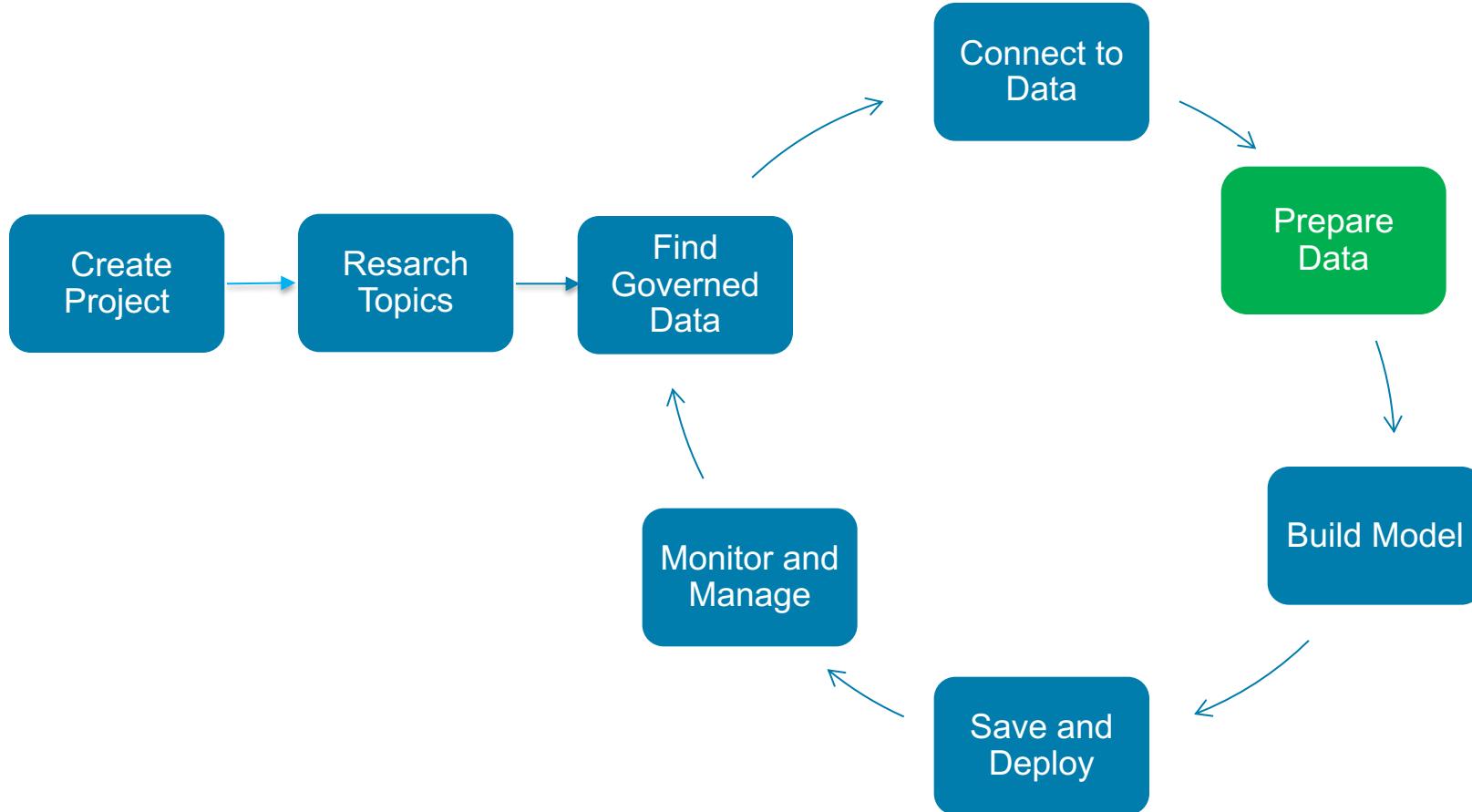
- Top Bar:** File, Edit, View, Insert, Cell, Kernel, Widgets, Help, Trusted, Python3.6, Local (selected), Remote, Other.
- Toolbar:** Standard notebook controls (File, Edit, View, Insert, Cell, Kernel, Widgets, Help, Trusted, Python3.6, Local, Remote, Other).
- Code Cell:** Contains schema definitions for a table:

```
-- PROCEDURE_PERCT_RANK: integer (nullable = true)
-- PROCEDURE_RISK_GROUP: string (nullable = true)
-- QUANTITY_INDEX: integer (nullable = true)
-- SERVICE_TYPE: string (nullable = true)
-- SUBMIT_CHG: integer (nullable = true)
-- SUBMITTED_CHG_INDEX: integer (nullable = true)
-- TOTAL_CHARGES_INDEX: integer (nullable = true)
-- TOTAL_CHARGES_PER_PROCEDURE: integer (nullable = true)
-- USER_DEFINED_FLAG_0: string (nullable = true)
-- SUBMITTED_CHARGE_AMOUNT: integer (nullable = true)
-- CLAIM_NUMBER: string (nullable = true)
-- IS_FRAUD: string (nullable = true)
```
- Section Header:** Read in CLAIMS Table
- Code Cell:** In [5]:

```
import dsx_core_utils, requests, os, io
from pyspark.sql import SparkSession
# Add asset from remote connection
df7 = None
dataSet = dsx_core_utils.get_remote_data_set_info('CLAIMS')
dataSource = dsx_core_utils.get_data_source_info(dataSet['datasource'])
sparkSession = SparkSession(sc).builder.getOrCreate()
# Load JDBC data to Spark dataframe
dbTableOrQuery = '"' + (dataSet['schema'] + "." if(len(dataSet['schema'].strip()) != 0) else '') + dataSet['table'] + '"'
if (dataSet['query']):
    dbTableOrQuery += dataSet['query']
```
- Right Panel:** PROCEDURES, PATIENTS, CLAIMS sections with "Insert to code" dropdowns. Buttons for "Insert Pandas DataFrame" and "Insert Spark DataFrame in Python".

Watson Studio supports the Data Science Lifecycle

Build, train, deploy, and monitor at scale ML/DL workflows to infuse AI into the enterprise to drive innovation.



Watson Studio Data Refinery Features

Making Data fit for use

Prepare
Data

- Data Refinery tool to profile, visualize, and shape data.
- Create data preparation pipelines via point and click capability on subset of data
 - ✓ Cleanse the data: fixing or removing data that is incorrect, incomplete, improperly formatted, or duplicated
 - ✓ Shape the data: customize data by filtering, sorting, combining, or removing columns, and performing operations
- Run the pipeline on all the data
 - Manually (on demand)
 - Automated (scheduled)

Data Refinery

Operation + *Code an operation to cleanse and shape your data*

Data **Profile** **Visualizations**

pclass	survived	name	sex	sibsp	parch	ticket
Integer	Integer	String	String	Integer	Integer	String
1	1	Allen, Miss. Elisabeth Walton	female		0	24160
2	1	Allison, Master. Hudson Trevor	male		2	113781
3	1	Allison, Miss. Helen Loraine	female		2	113781
4	1	Allison, Mr. Hudson Joshua Creighton	male		2	113781
5	1	Allison, Mrs. Hudson J C (Bessie Waldo Daniels)	female		2	113781
6	1	Anderson, Mr. Harry	male		0	19952
7	1	Andrews, Miss. Kornelia Theodosia	female		0	13502
8	1	Andrews, Mr. Thomas Jr	male		0	112050
9	1	Appleton, Mrs. Edward Dale (Charlotte Lamson)	female		0	11769
10	1	Artagaveytia, Mr. Ramon	male		0	PC 17609
11	1	Astor, Col. John Jacob	male	1	0	PC 17757
12	1	Astor, Mrs. John Jacob (Madeleine Talmadge Force)	female	1	0	PC 17757
13	1	Aubart, Mme. Leontine Pauline	female	0	0	PC 17477
14	1	Barber, Miss. Ellen "Nellie"	female	0	0	19877
15	1	Barkworth, Mr. Algernon Henry Wilson	male	0	0	27042
16	0	Baxter, Mr. Quigg Edmond	male	0	1	PC 17558
17	1	Baxter, Mrs. James (Helene DeLaudeniere Chaput)	female	0	1	PC 17558
18	1	Bazzani, Miss. Albina	female	0	0	11813
19	0	Beattie, Mr. Thomson	male	0	0	13050
20	1	Beckwith, Mr. Richard Leonard	male	1	1	11751
21	1	Beckwith, Mrs. Richard Leonard (Sallie Monypeny)	female	1	1	11751
22	1	Behr, Mr. Karl Howell	male	0	0	111369

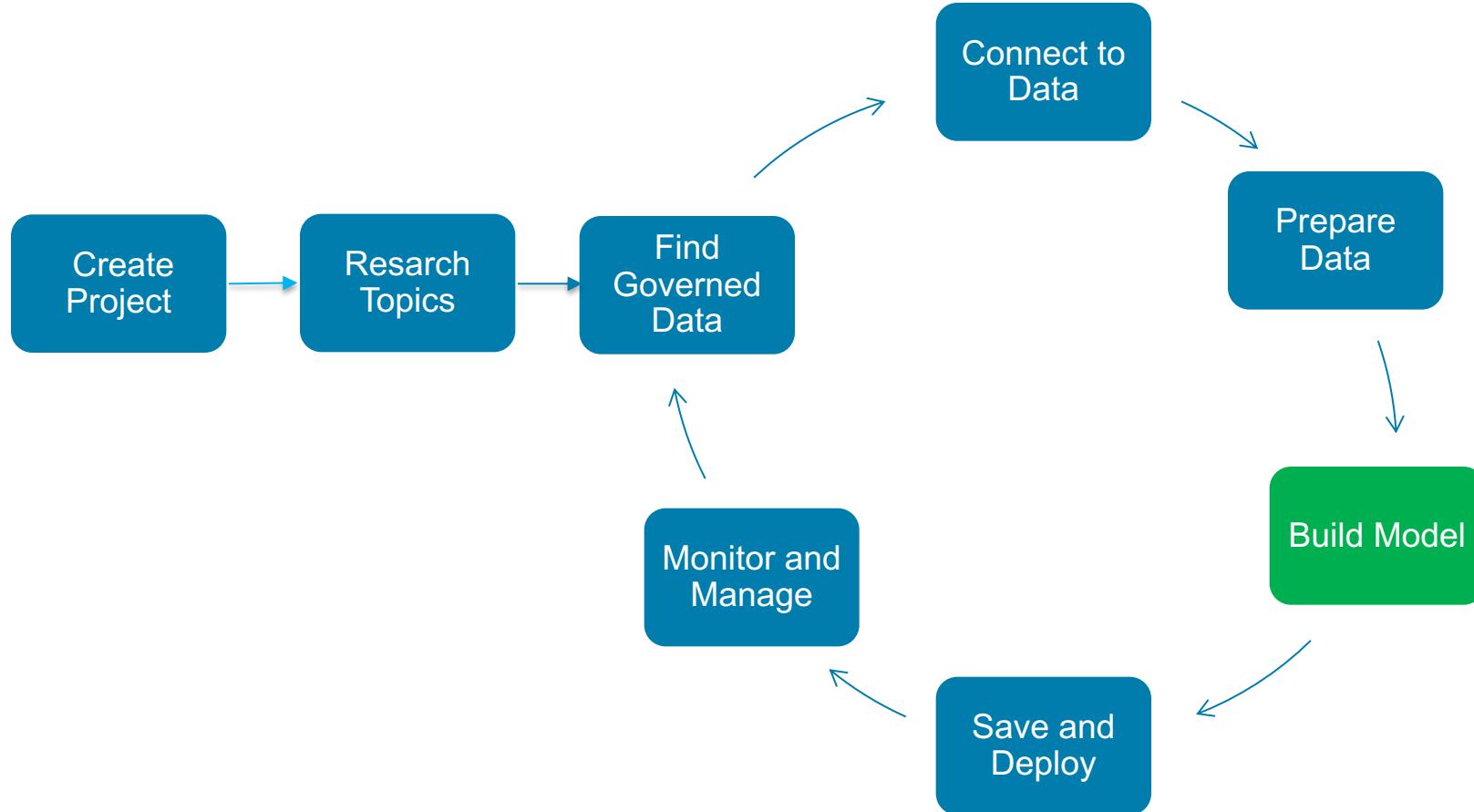
SOURCE FILE: titanic.csv FULL DATA SET: 1044 rows

Steps

- 16 Steps
- Convert column type
- Automatically converted one or more columns to inferred data types. Strings that are converted to decimal use a dot (.) for the decimal symbol.
- Custom code
- ```
mutate(survived_value=ifelse(survived ==1, "Y", "N"))
```
- Custom code
- ```
mutate(pclass_value=ifelse(pclass==1 , "first", ifelse(pclass==2, "second", "third ")))
```
- Remove
- Removed cabin
- Remove
- Removed boat
- Remove
- Removed body
- Remove
- Removed home_dest

Watson Studio supports the Data Science Lifecycle

Build, train, deploy, and monitor at scale ML/DL workflows to infuse AI into the enterprise to drive innovation.



Watson Studio Model Building Features

The best of open source and IBM Watson tools to create start-of-the-art data products

[Build Model](#)

Open Source Tools

- Jupyter Notebooks **
- RStudio and Shiny
- Libraries- scikit-learn, XGBoost, Spark, TensorFlow, Caffe, Keras, PyTorch

IBM Tools

- AutoAI
- SPSS Modeler
- Experiment Builder
- Decision Optimization **
- Natural Language Classifier Model
- Visual Recognition Model

** in hands-on labs

Jupyter Notebook

[Build Model](#)

My Projects / Watson Studio Labs / Machine Learning with SparkML



File Edit View Insert Cell Kernel Help

Not Trusted | Python 3.6 with Spark 0



Read Data Asset - female_human_trafficking - See Lab Instructions

```
In [ ]: # Insert SparkSession DataFrame code in this cell after the comments.  
# make CERTAIN to rename the default dataframe name (df_data_1 or df_data_2 or df_data_3, etc) to trafficking_df  
# Put cursor on the next line to Insert to code.
```

Read Data Asset - Occupations - See Lab Instructions

The occupations listed in the female human trafficking file are too numerous to use as input to a machine learning model. We will categorize these occupations into 15 categories by joining with two other files. The Occupation.csv file contains a mapping of the occupations in the female human trafficking table to a category code. The Categories.csv file contains each code followed by the category name. This information needs to be joined to the female human trafficking table.

Follow the same procedure as above to insert a SparkDataFrame for Occupations

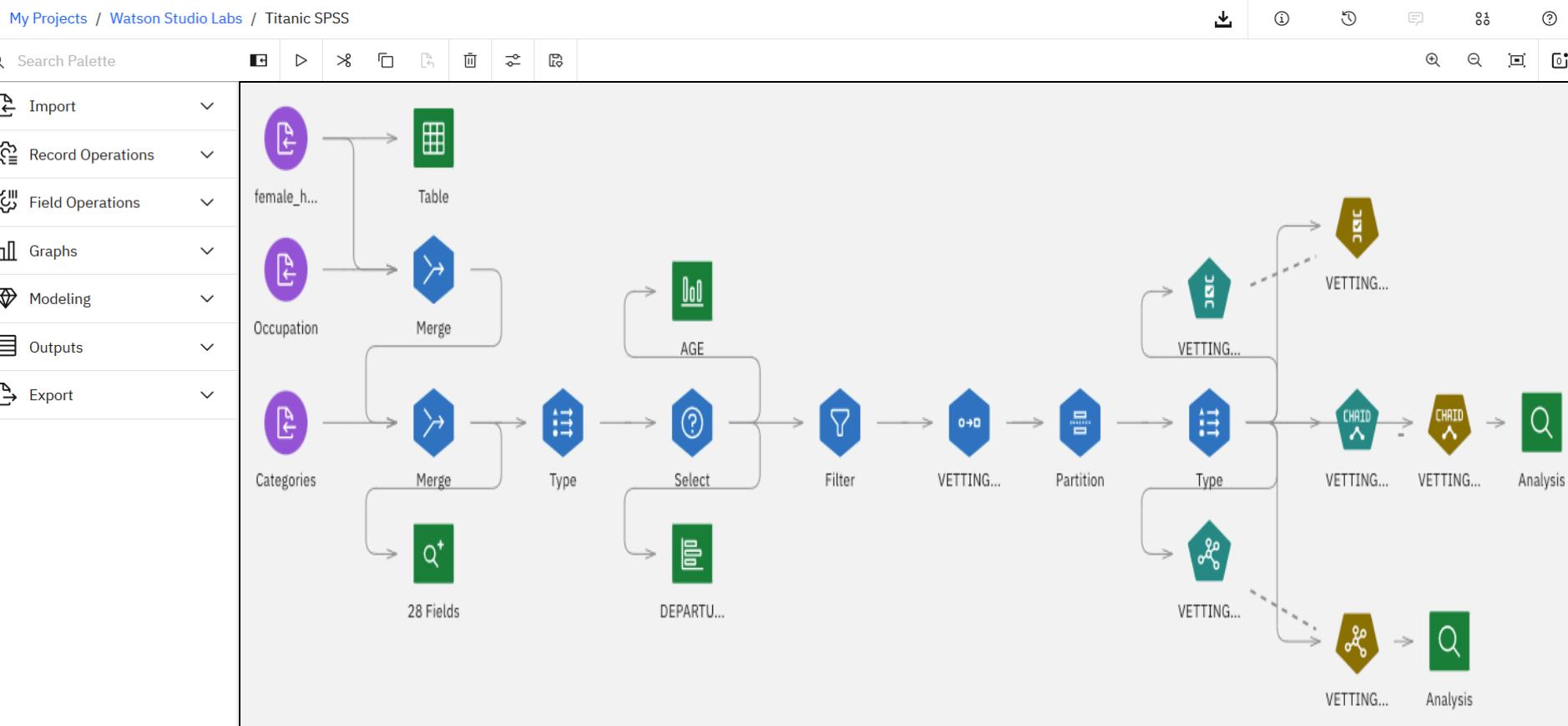
```
In [ ]: # Insert SparkSession DataFrame code in this cell after the comments  
# make CERTAIN to rename the default dataframe name (df_data_1 or df_data_2 or df_data_3,etc) to occupations  
#Put cursor on the next line to Insert to code
```

Read Data Asset - Categories - See Lab Instructions

Follow the same procedure as above to insert a SparkDataFrame for Categories

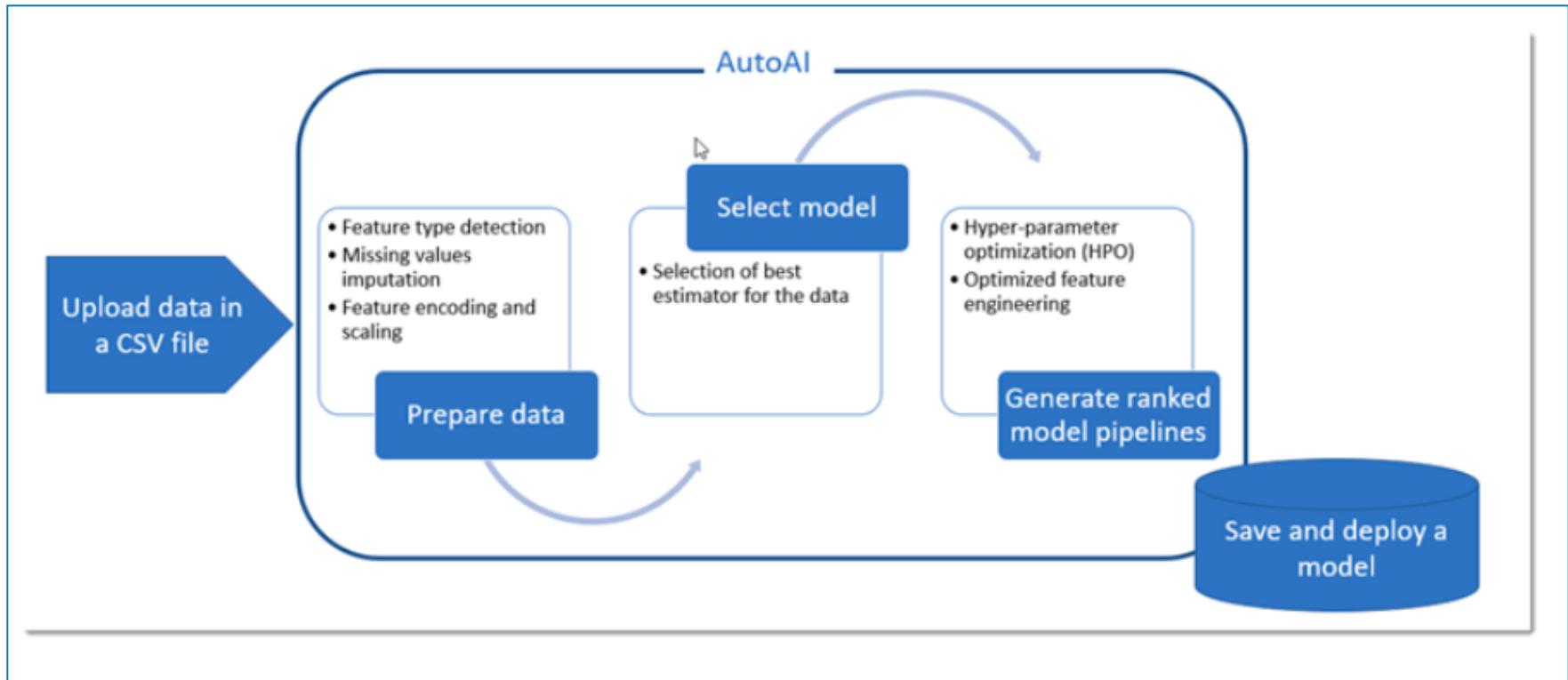
```
In [ ]: # Insert SparkSession DataFrame code in this cell after the comments  
# make CERTAIN to rename the default dataframe name (df_data_1 or df_data_2 or df_data_3,etc) to categories  
#Put cursor on the next line to Insert to code
```

SPSS Modeler

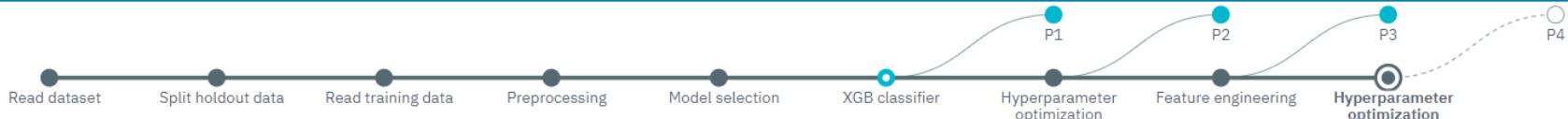
[Build Model](#)

AutoAI

Build Model



AutoAI

[Build Model](#)

Pipeline leaderboard

[Compare pipelines](#)

Ranking based on:

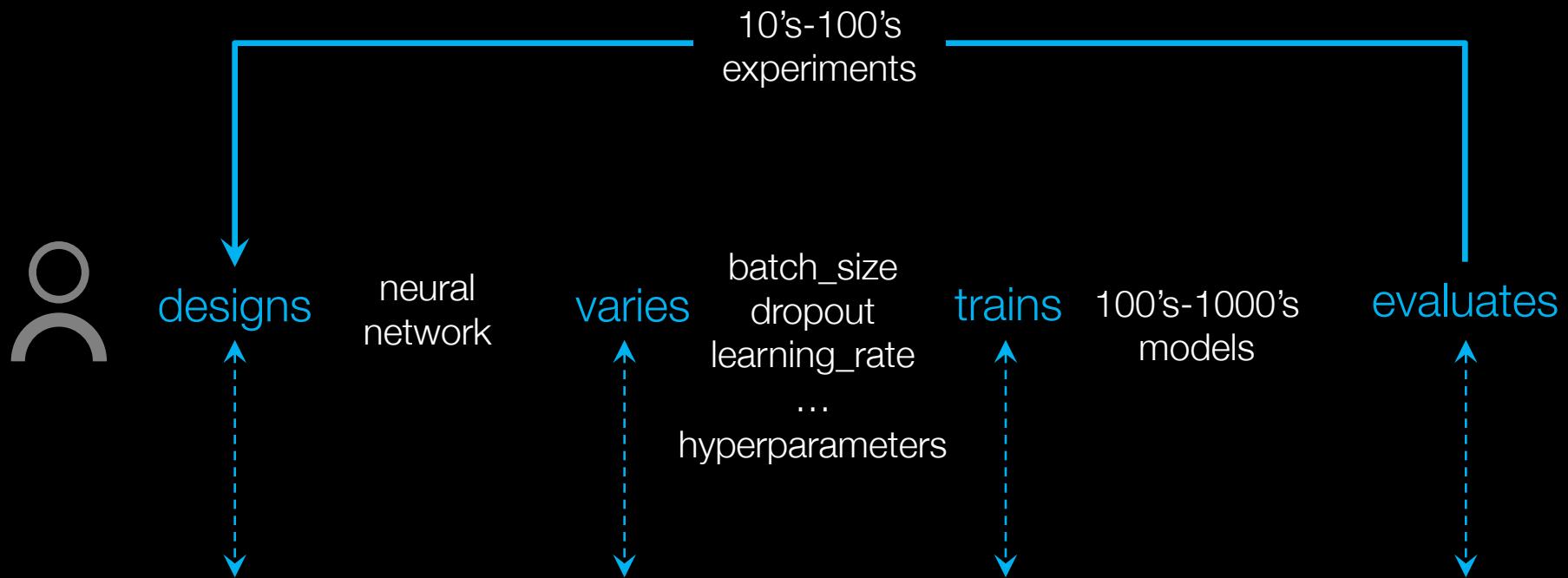
Accuracy



RANK	ACCURACY	PIPELINE INFORMATION	View details	Save as model
> 1	0.897	P3 - XGB classifier estimator Transformers (8): Preprocessing > Standard scaler > Univariate feature selection > Sine > Univariate feature selection > Tangent > ...	View details	Save as model
> 2	0.884	P1 - XGB classifier estimator Transformers (2): Preprocessing > XGB classifier estimator	View details	Save as model
> 3	0.884	P2 - XGB classifier estimator Transformers (2): Preprocessing > XGB classifier estimator	View details	Save as model

Experiment Builder

Build Model



Experiment Builder
supports the end-to-end workflow

Decision Optimization

[Build Model](#)

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.

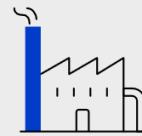
Integrated with Watson Studio, Decision Optimization can combine optimization techniques with coding and non-coding tools, model management and deployment – as well as other data science capabilities.

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



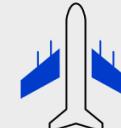
Determine location
and capacity
of warehouses



Determine which plant
should manufacture
which product



Build financial
portfolios by balancing
risks and rewards

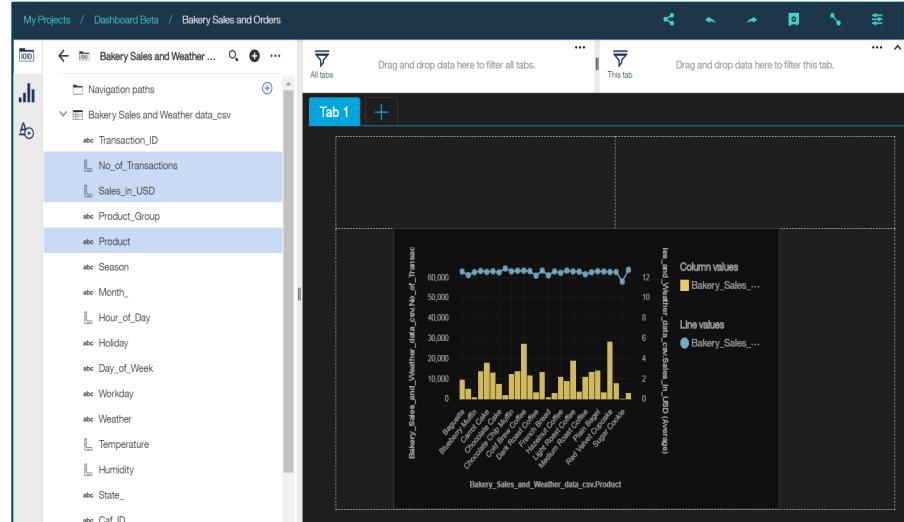
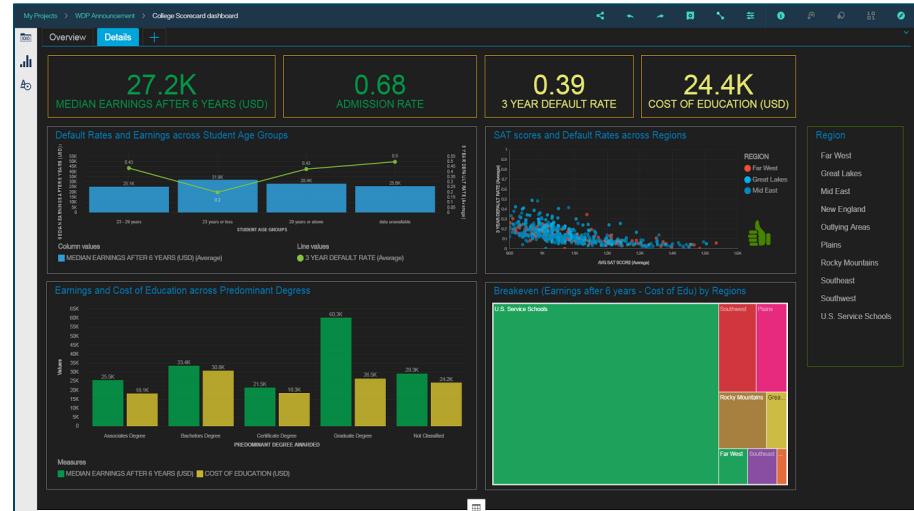


Allocate aircraft
and crew to flights

Watson Studio Dynamic Dashboards

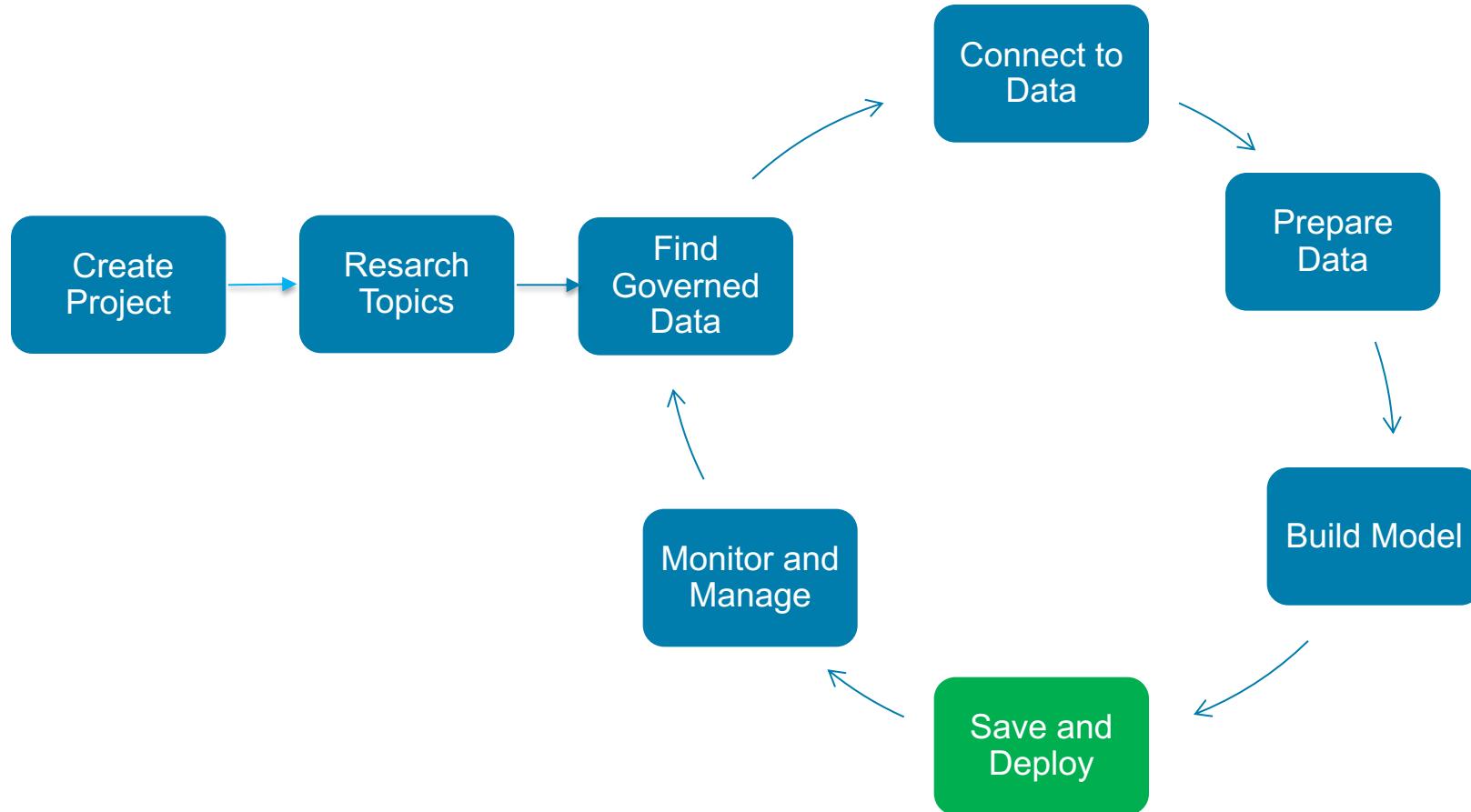
Making insights available to all

Build Model

Watson Studio supports the Data Science Lifecycle

Build, train, deploy, and monitor at scale ML/DL workflows to infuse AI into the enterprise to drive innovation.



Watson Studio Save and Deploy Models

Save and Deploy Models with Watson Machine Learning

Save and Deploy

Create a deployment

Associated asset
Titanic AutoAI - P4 XGBClassifierEstimator

Deployment type

Online
Run the model on data in real-time, as data is received by a web service.

Batch
Run the model against data as a batch process.

Name

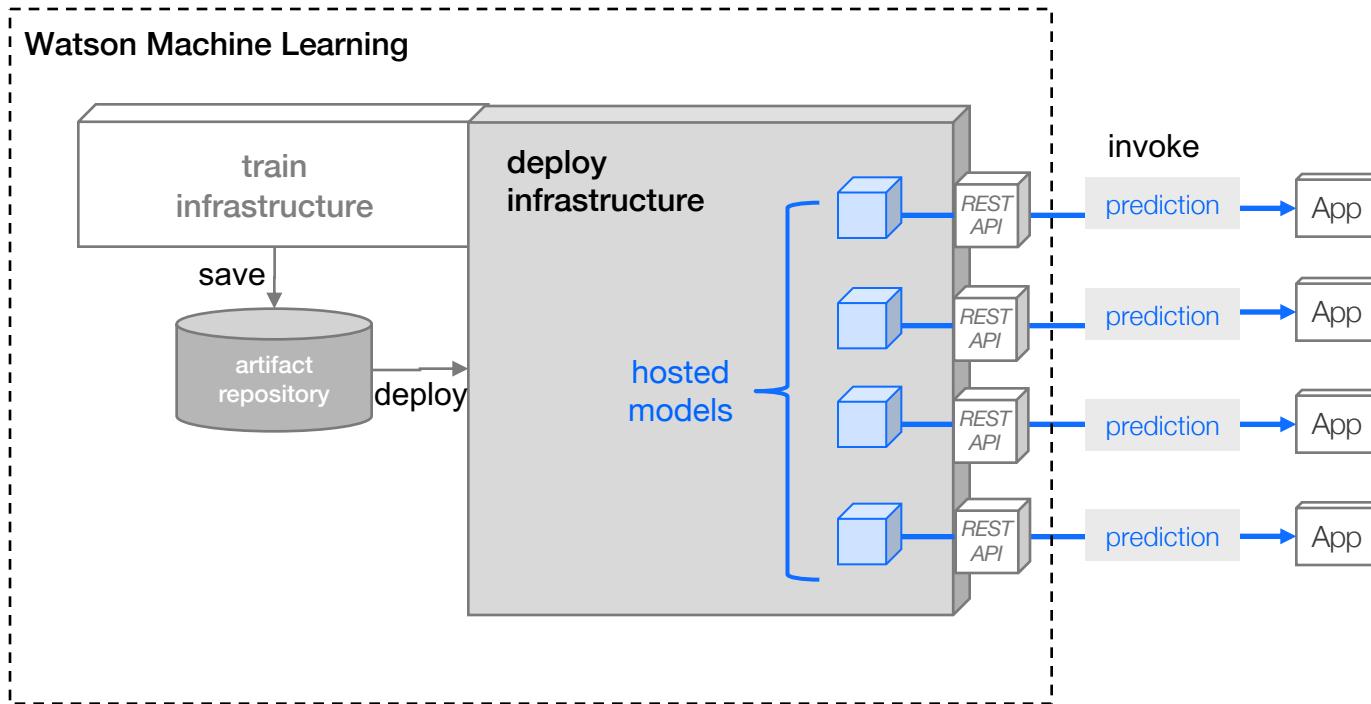
Deployment name

Description

Deployment description

Watson Studio Save and Deploy Trained Models

Save and Deploy Models with Watson Machine Learning



Watson Studio Save and Deploy Features

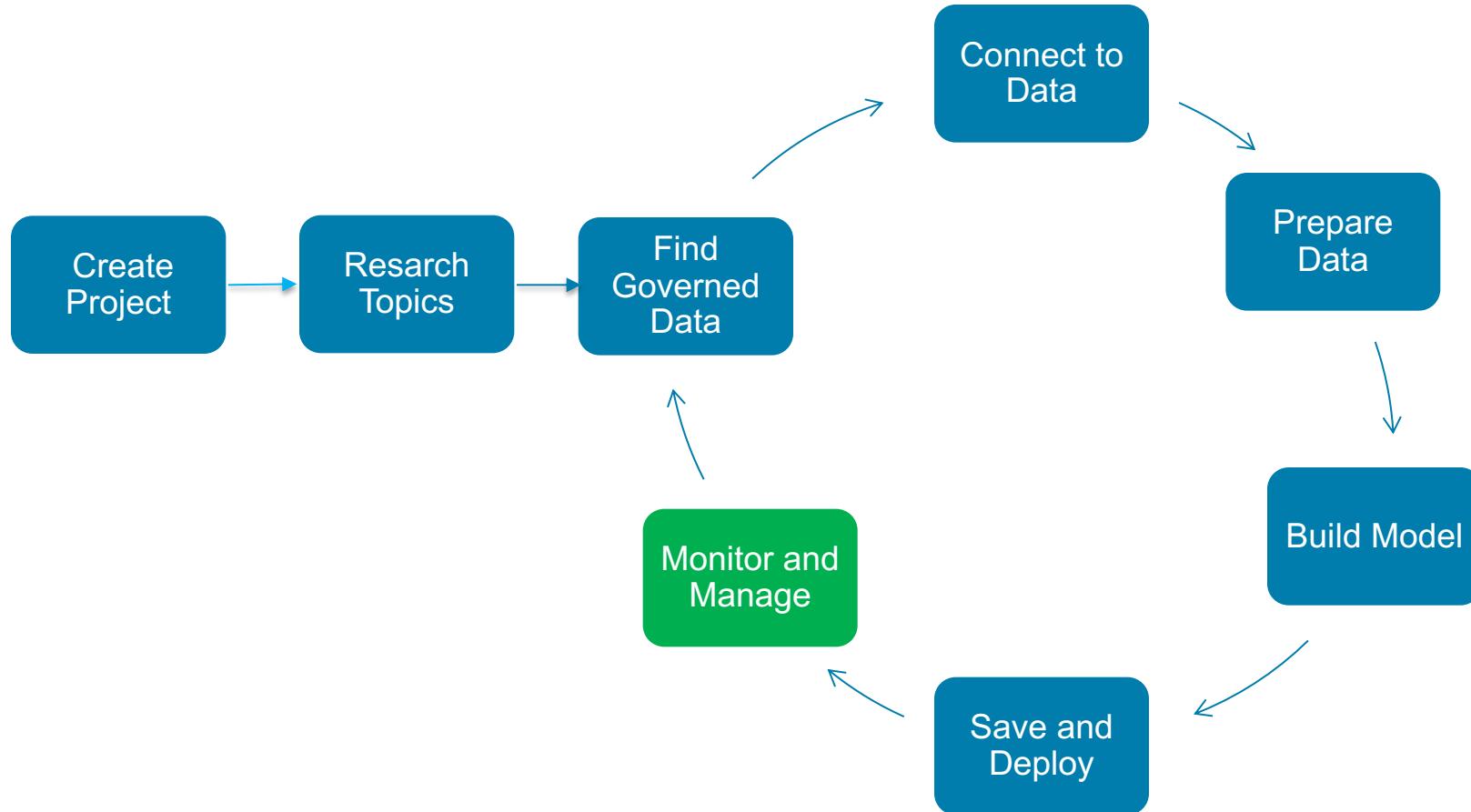
Save and Deploy Models with Watson Machine Learning

Save and
Deploy

- Watson Machine Learning API to save/load models to/from repository
- Watson Machine Learning API to deploy saved models easily and have them scale automatically.
- Watson Machine Learning API to invoke deployed models

Watson Studio supports the Data Science Lifecycle

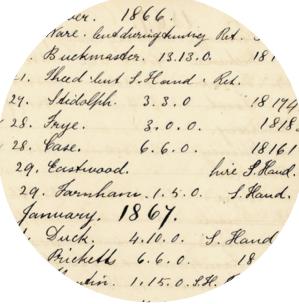
Build, train, deploy, and monitor at scale ML/DL workflows to infuse AI into the enterprise to drive innovation.



Our vision for Trusted AI

Pillars of trust, woven into the lifecycle of an AI application

Monitor and
Manage



**Is it
accurate?**



**Is it
fair?**



**Is it easy to
understand
?**



**Did anyone
tamper
with it?**

Watson OpenScale

Monitor and
Manage

Trust and Transparency

- Intelligently delivers bias mitigation help
- Provides traceability & auditability of AI predictions made in production applications
- Tracks AI accuracy in applications
- Explains an outcome in business terms
- Drift Detection

Automation

- Automatically detects and mitigates bias in model output, without affecting currently deployed model or outcomes

Open By Design

- Monitor models deployed on third party model server engines
- Deploy behind enterprise firewall or on IaaS provider

Watson Studio Takeaways

Integrated Collaboration Environment

- Data Scientists, Subject Matter experts, Business Analysts & Developers all in one environment to accelerate innovation, collaboration and productivity
- Built-in learning to get started or go the distance with advanced tutorials

Multiple Deployment Options

- Watson Studio on IBM Cloud – Managed offering
- Watson Studio Local – Private Cloud, Public Cloud-(IBM, Azure, AWS)
- Watson Studio Desktop

Choice of Tools for the full AI lifecycle

- Best in-breed open source and IBM tools that support the end-to-end AI lifecycle
- Choice of code or no-code tools to build and train your own ML/DL models or easily train and customize pre-trained Watson APIs

Support for all levels of expertise

- Use Watson smarts and recommendations for the best algorithms to use given your data, OR
- Use the rich capabilities and controls to fine tune your models

Model lifecycle & management

- Deploy models into production then monitor them to evaluate performance.
- Capture new data for continuous learning and retrain models so they continually adapt to changing conditions.

Integrated with Knowledge Catalog

- Intelligent discovery of data and AI assets that enables reuse & improves productivity
- Seamlessly integrated for productive use with Machine Learning and Data science
- Powerful governance tools to control and protect access to data

Outline

- IBM Cloud Overview
- Watson Services Overview
- Watson Studio Overview
- Labs 

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

Applying AI, NLP, and Optimization to COVID-19

Lab 1 in progress.

We will return to the main room at 11:30 am.

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

Applying AI, NLP, and Optimization to COVID-19

Lab 2 in progress. We will return to the main room at 12 pm break for lunch.

Continue working lab 2 at 12:30 pm

We will return to the main room at 1 pm

Watson Assistant

is the **AI**-powered foundation of **smart** customer experiences.

Centralize your customer communication and problem resolution

Get started fast with your existing logs and web content

Go live without needing a developer

Dynamically manage vague questions





Watson Assistant

Market Differentiation

Low-code platform

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

Deploys anywhere

One of the only vendors in the market that allows you to deploy and run a virtual assistant on premises or on *any* public cloud.

Powered by best in class NLU

Best in class AI powers the underlying language models, so you can build the smartest assistant your business.

Seamlessly hands off to your agents

Connect to your existing service desk to transfer conversations to human agents

Connects to any channel

You have channels, applications, and content in place. Make the most of them. We make it possible to connect to (almost) *anything*.

Scales effortlessly

An enterprise can go from a single user to supporting millions of conversations across its organization with a single product.

Watson Assistant

Driven by intents, not rules

Watson Assistant
understands
the user's intent

- Handcrafted rules unable to scale and do not benefit from data
- State of the art NLU to derive intent
- Learns over time based on usage

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? ”

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

Extract other key information from a question

Intent

Password Reset

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

Extract other key information from a question

Intent

Password Reset

Entities

Online Billing System

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

Extract other key information from a question

Intent

Password Reset

Entities

Online Billing System

Emotional Tone

Anger → Leverages Watson Tone Analyzer

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

Extract other key information from a question

Intent

Password Reset

Entities

Online Billing System

Emotional Tone

Anger → Leverages Watson Tone Analyzer

Context

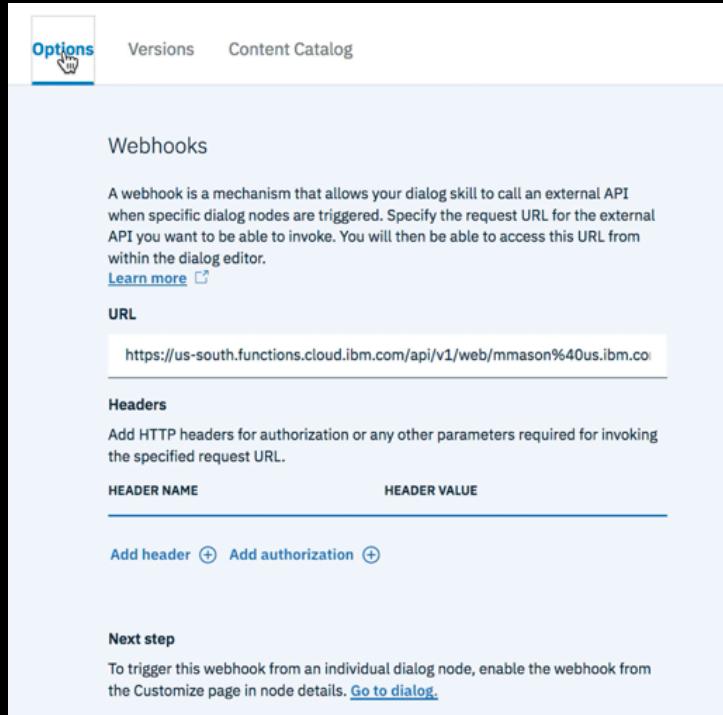
Bill Smith, 47 / Gold Member

Context

Mobile

Webhooks

Webhooks let you pull in user information to personalize answers, post transactions to internal systems, check other systems for answers to questions, you name it—all in-line within your dialog.



The screenshot shows the IBM Watson Assistant Dialog Editor interface. At the top, there are three tabs: 'Options' (which is active), 'Versions', and 'Content Catalog'. Below the tabs, the title 'Webhooks' is displayed. A descriptive text block explains what a webhook is: 'A webhook is a mechanism that allows your dialog skill to call an external API when specific dialog nodes are triggered. Specify the request URL for the external API you want to be able to invoke. You will then be able to access this URL from within the dialog editor.' It includes a 'Learn more' link. The 'URL' field contains the value 'https://us-south.functions.cloud.ibm.com/api/v1/web/mmason%40us.ibm.co'. There is a 'Headers' section with a note about adding HTTP headers for authorization. Below that is a table for adding headers, with columns 'HEADER NAME' and 'HEADER VALUE'. At the bottom, there are buttons for 'Add header' and 'Add authorization'. A 'Next step' section at the very bottom provides instructions: 'To trigger this webhook from an individual dialog node, enable the webhook from the Customize page in node details. [Go to dialog](#)'.

Lab-3: Watson Assistant – COVID-19 Chatbot

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 Plus 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

Applying AI, NLP, and Optimization to COVID-19

Lab 3 in progress.

We will return to the main room at 2:30 pm.

IBM Watson Studio

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



Analyze any data, no matter where it lives

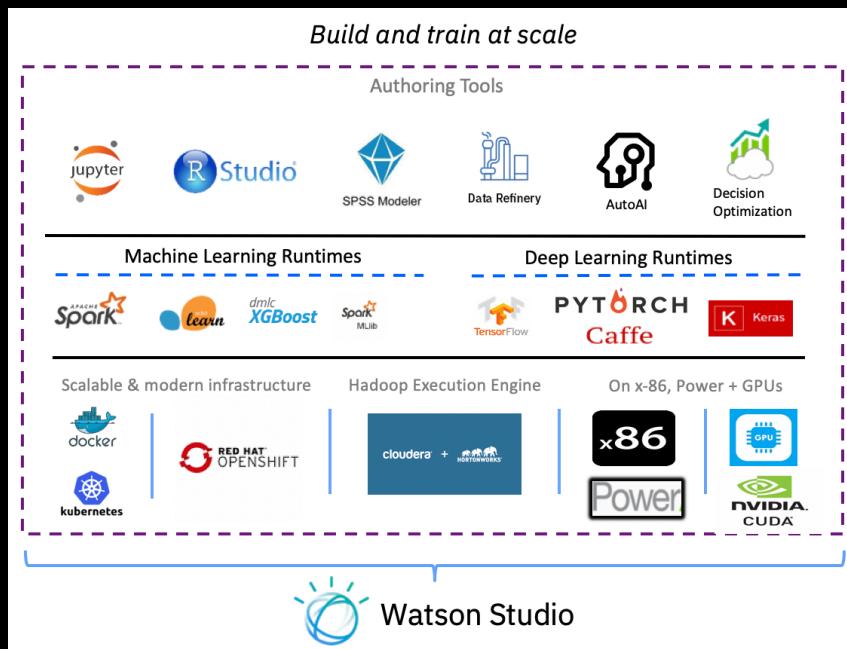
Connect to and analyze your data without moving a single byte through dozens of connectors and multiple deployment options

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

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

One platform to rule them all from discovery to production

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



IBM Watson Machine Learning

Embed Machine Learning and Deep Learning
in your Business

Deploy and Manage Models

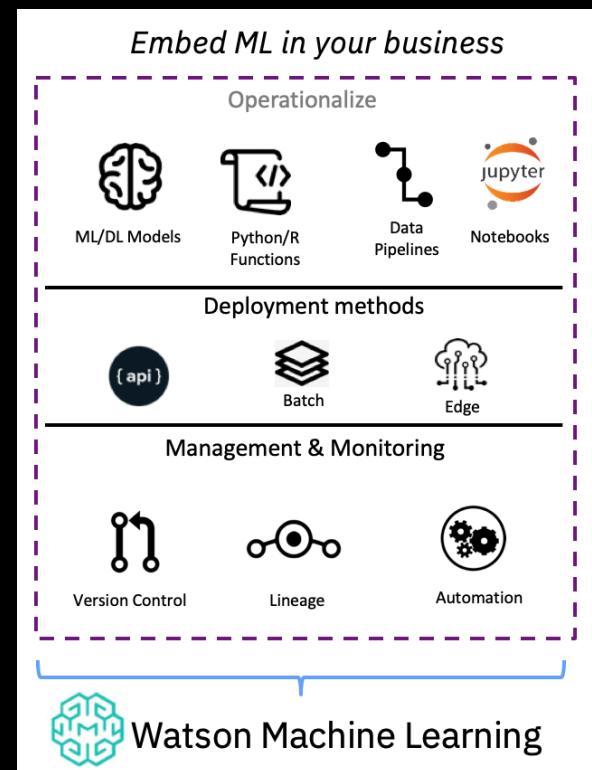
Move models to production, in an easy, secure, and compliant way

Intelligent Model Operations

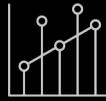
Embed intelligent training services, with feedback loops that constantly learn from new data, regardless where it resides

Accelerate Compute Intensive Workloads

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

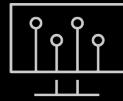


Machine learning and optimization: better together



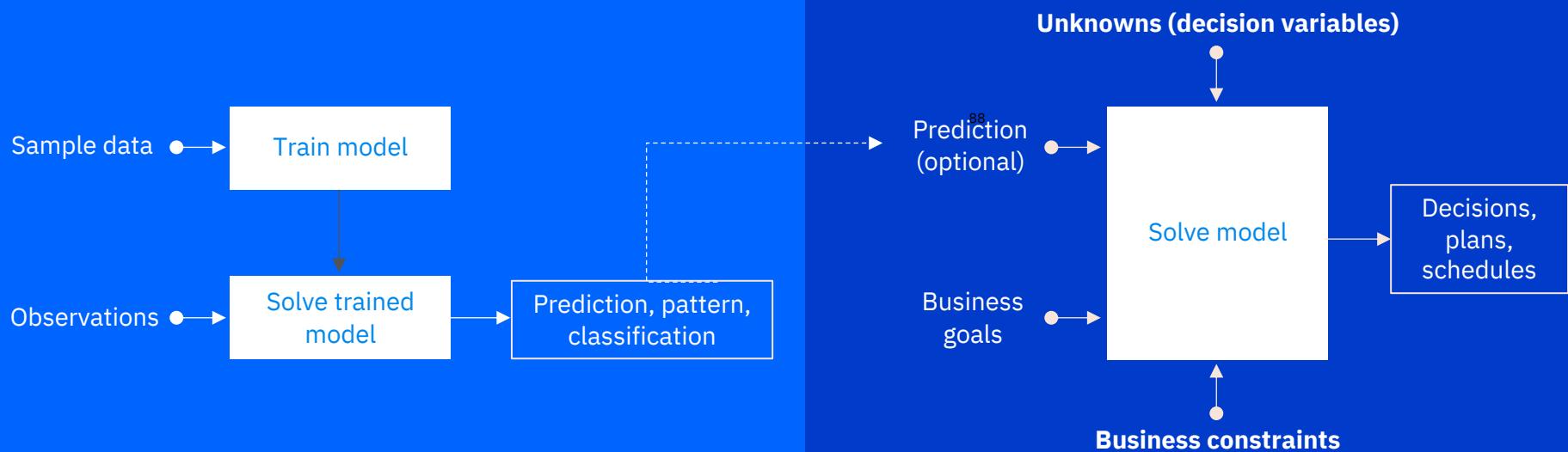
Predictive analytics

- 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



Capitalize on the power of prescriptive analytics with **Decision Optimization**

Create innovative solutions

Combine optimization technology with data science techniques such as machine learning

Improve productivity

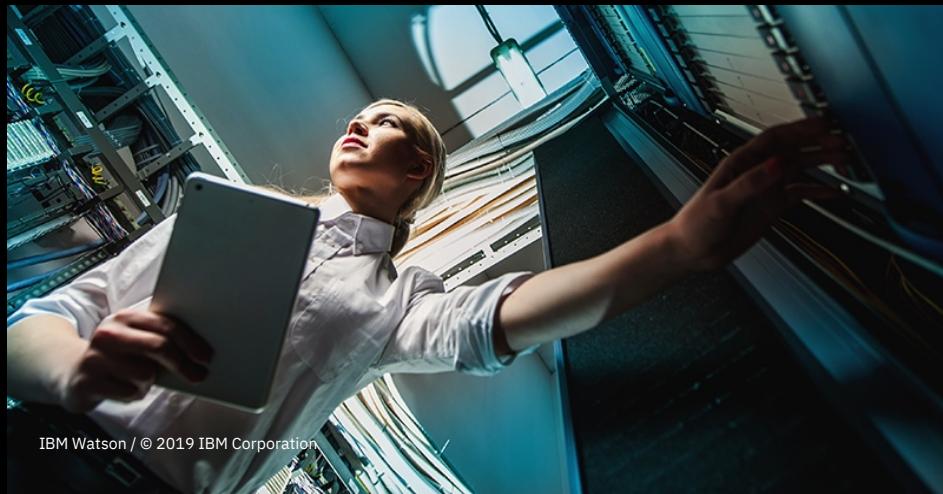
Validate optimization models more quickly and easily using visual dashboards

Experience fast time to value

Solve optimization models quickly across domains using powerful solvers

Operationalize your projects

Deploy optimization models in production to drive business impact around real use cases



Lab-4: Watson Studio – Forecast COVID-19 Outbreaks

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 form different places to be used for analysis
- Represent the current situation on a map using folium
- Use a LinearRegression 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

Lab-4 Overview

The Lab contains these parts:

- Upload data into your project
 - Use WS data import function (departements.csv)
- Create/import a notebook ([FranceCovid19.ipynb](#))
- Load the data from different places (departements, current situation, etc)
 - We use data from the French government [data.gouv.fr](#) site in addition to some imported data on the different French administrative “departments” (GPS coordinates)
- Represent the current COVID-19 infection situation on a map
 - Circles show the number of reanimation cases in each department
- Predict new cases to come for each department
 - Illustrative purposes - train a simplistic predictive LinearRegression model (epidemy is not linear)
- Develop a plan transfers optimization model
 - Our hypothesis for the optimization model is that two different types of transfers can be done:
 - long distance transfers (planes, trains) with the number of transfers limited over the whole country, several people can be transferred at a time.
 - Short distance transfers (ambulances) with the number of transfers limited per area, and with just one person at a time
- Display all the transfers from the optimized patient transfer solution



Applying AI, NLP, and Optimization to COVID-19

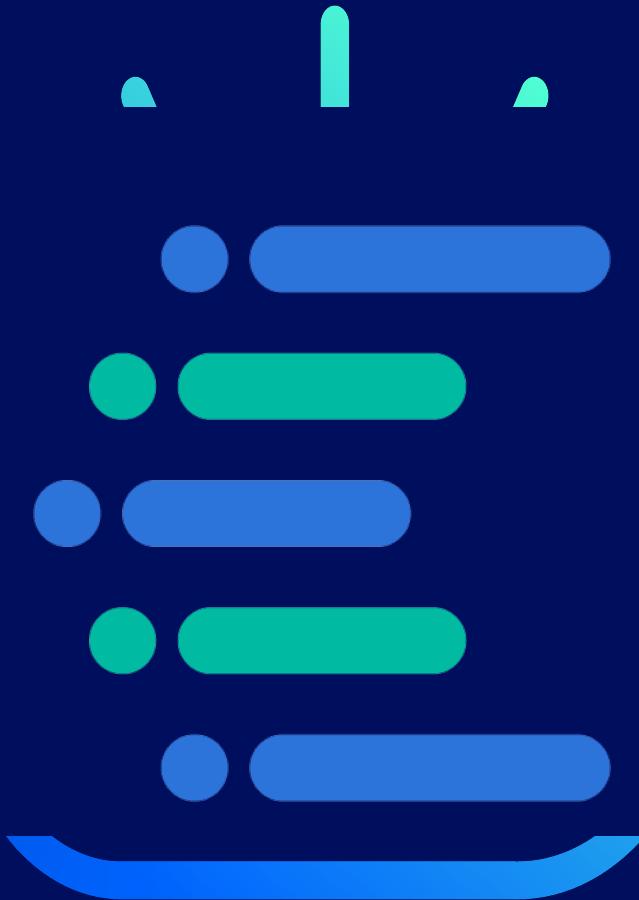
Lab 4 in progress.

We will return to the main room at 3:30 pm.

Cognos Analytics

COVID-19 Dashboard

--

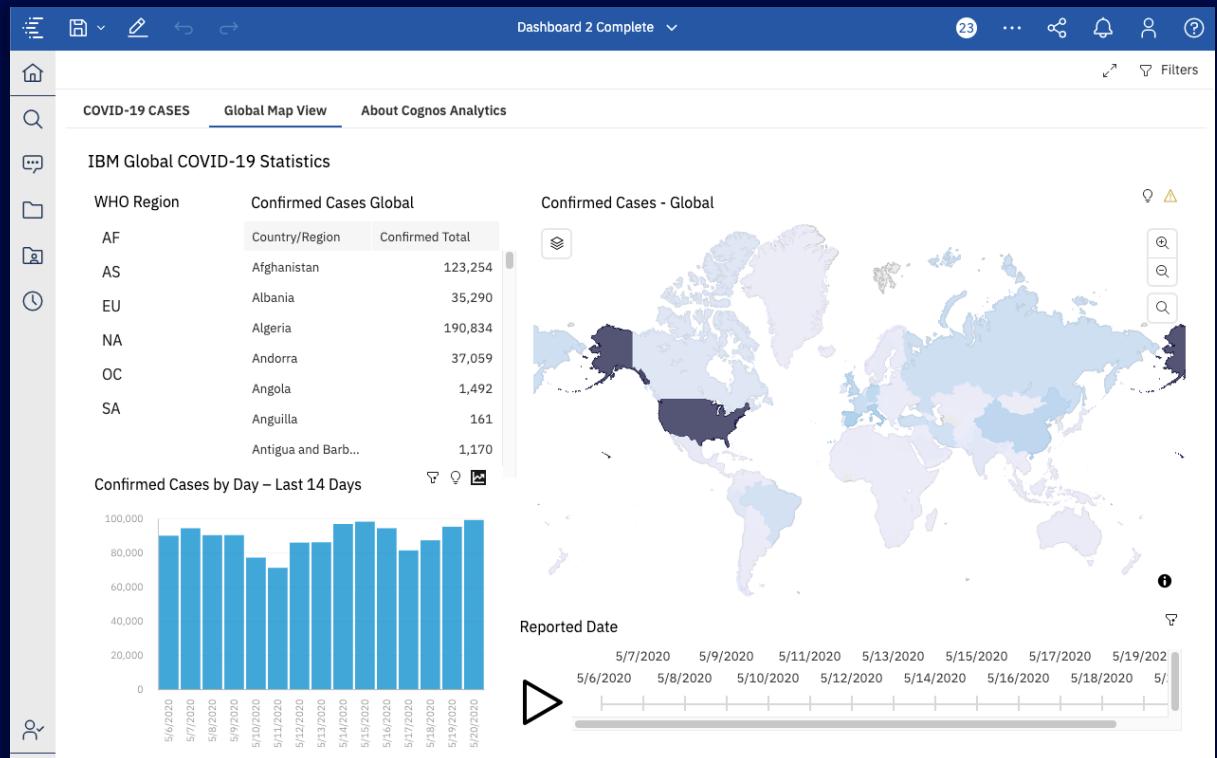


Workflow

Prepare – Select and combine data sources using a drag and drop interface.

Visualize – Create a series of interactive dashboards and reports.

Share – Export reports or embed Cognos dashboards in 3rd party applications and websites.



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

Introduction:

In this lab, you will use Cognos Analytics to develop a series of dashboards to display COVID-19 data pulled from the IBM & Weather Channel COVID-19 data fabric. IBM Cognos Analytics is an integrated toolset for reporting, analytics, and visualization.

Objectives:

Upon completing the lab, you will know how to:

- 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

Cognos Analytics

Workflow

Prepare

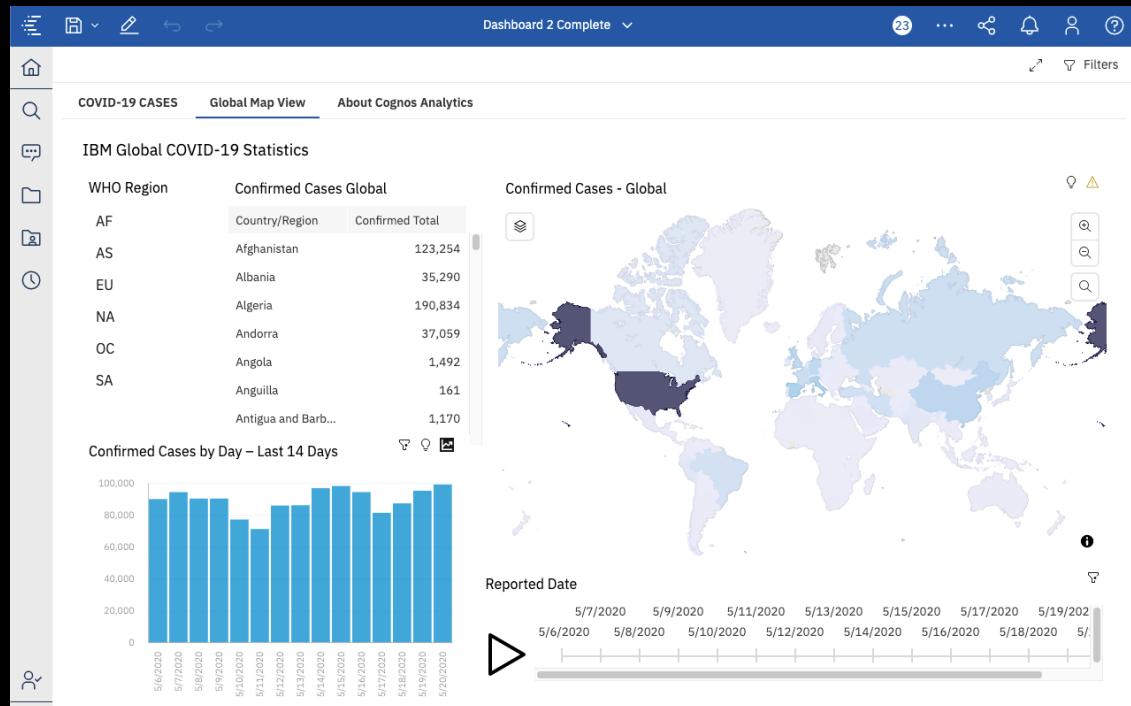
Select and combine data sources using a drag and drop interface.

Visualize

Create a series of interactive dashboards and reports.

Share

Export reports or embed Cognos dashboards in 3rd party applications and websites.



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 - 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. IBM created a data fabric pulled from state and local governments as well as the World Health Organization. Where the public dashboard updates dynamically based on daily data pulls, we will use extracted data tables for the lab to build visualizations for a specific set of dates.

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

Applying AI, NLP, and Optimization to COVID-19

Lab 5 in progress.

We will return to the main room at 4:45 pm.