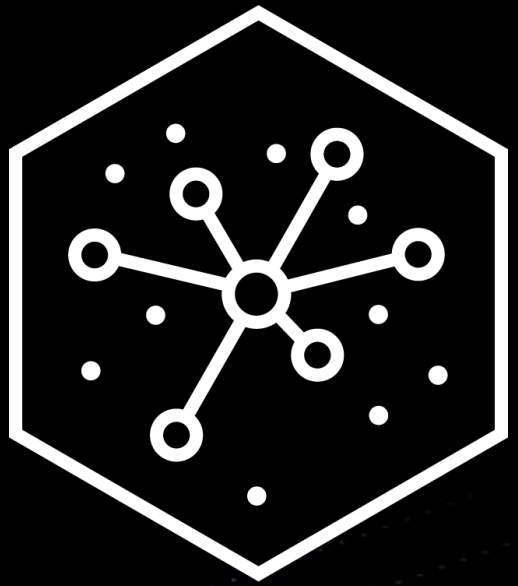
IBM Journey to Cloud and AI Analytics Modernization Workshop



Featuring: Cloud Pak for Data 3.0.1

Session starts at 9 AM

Presentation by: Burt Vialpando and Kent Rubin - IBM

September 10th, 2020

Welcome to the IBM® Briefing Center

Location logistics

- ✓ Access restrictions
- ✓ Restrooms
- ✓ Emergency exits
- ✓ Smoking policy
- ✓ Breakfast / Lunch / Snacks
- ✓ Special meal requirements

Introductions

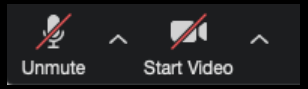
- ✓ IBM Speakers
- ✓ IBM Proctors
- ✓ IBM Sales Reps
- ✓ Attendees (optional)

IBM Analytics Modernization Workshop
Agenda

Part 1	• Introduction • Business Use Case	• Lab 01 • Lab 02
Part 2	• Collect: Connect • Organize – Deep Dive • Collect: Virtualize	• Lab 03 • Lab 13 • Lab 05
Part 3	• Analyze • Deploy • Infuse – OpenScale • Infuse – Cognos Analytics • Wrap up	• Lab 06 • Lab 07 • Lab 08 • Lab 09 • Lab 10

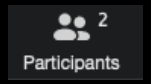
Zoom tips for today's session

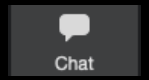
The Zoom Tool Bar

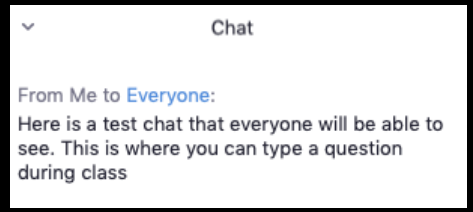


We will stay on mute during the main sessions. You may unmute yourself during breakouts.

We will not use video to preserve bandwidth during our class today.

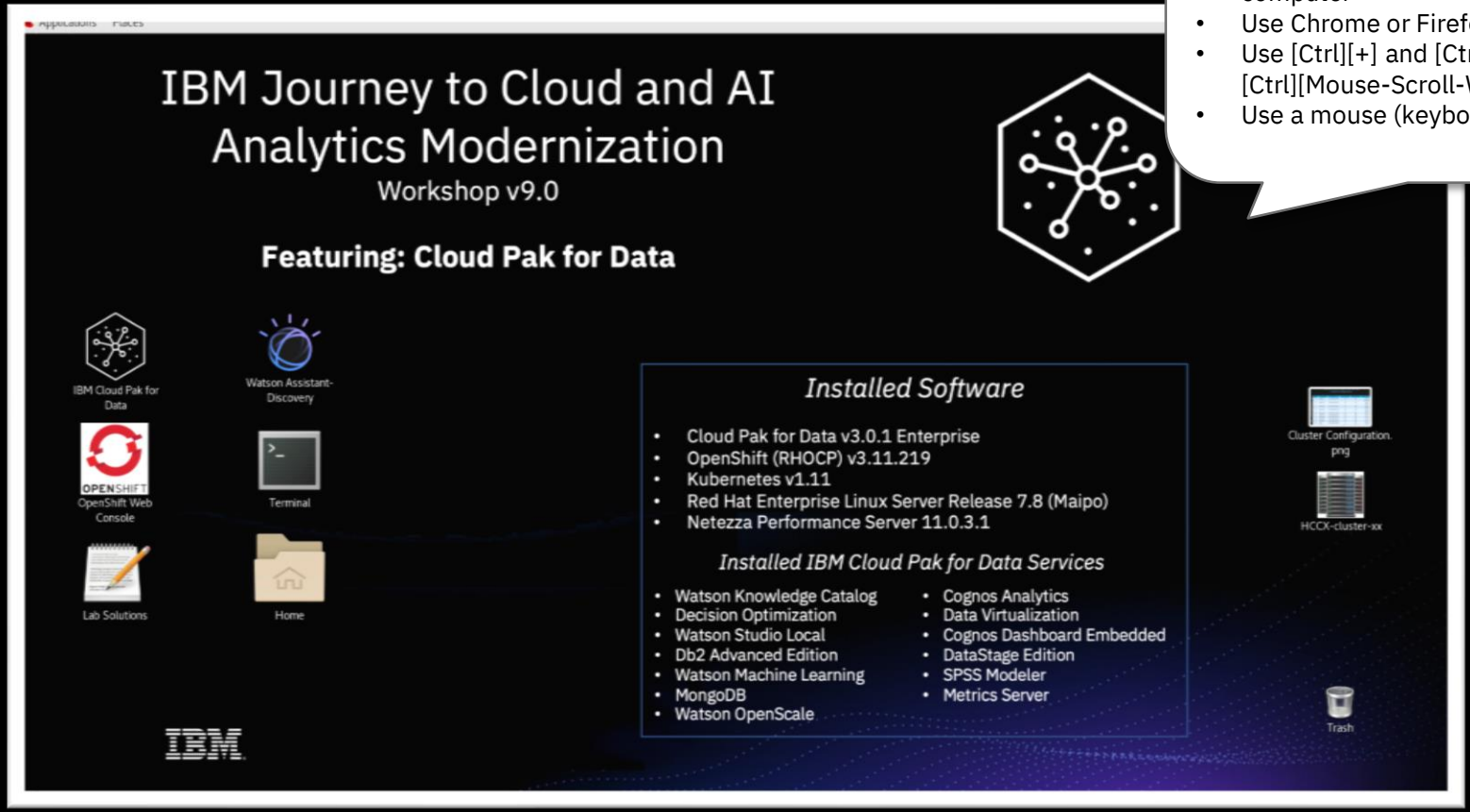






The Share Screen function has been deactivated during the lectures

IBM Analytics Modernization Workshop
The workshop Unified Desktop



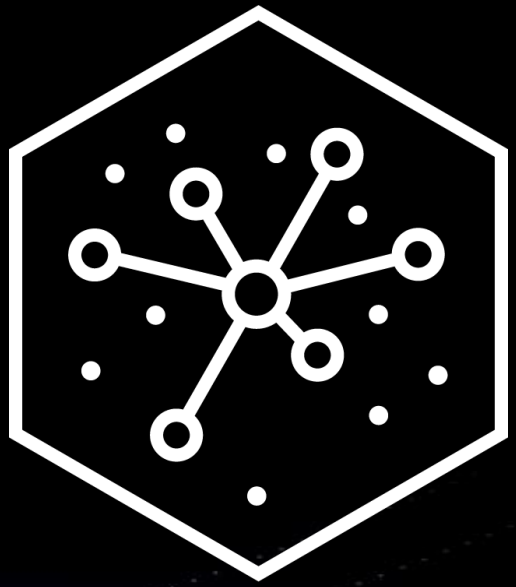
Workshop lab exercise tips

- Use full screen with a large screen computer
- Use Chrome or Firefox browsers
- Use [Ctrl][+] and [Ctrl][-] or [Ctrl][Mouse-Scroll-Wheel] to zoom
- Use a mouse (keyboard alone is difficult)

IBM Analytics Modernization Workshop

Part 1

• Introduction • Business Use Case	• Lab 01 • Lab 02
• Collect: Connect • Organize – Deeper Dive • Collect: Virtualize	• Lab 03 • Lab 13 • Lab 05
• Analyze • Deploy • Infuse – OpenScale • Infuse – Cognos Analytics • Wrap up	• Lab 06 • Lab 07 • Lab 08 • Lab 09 • Lab 10



Introduction

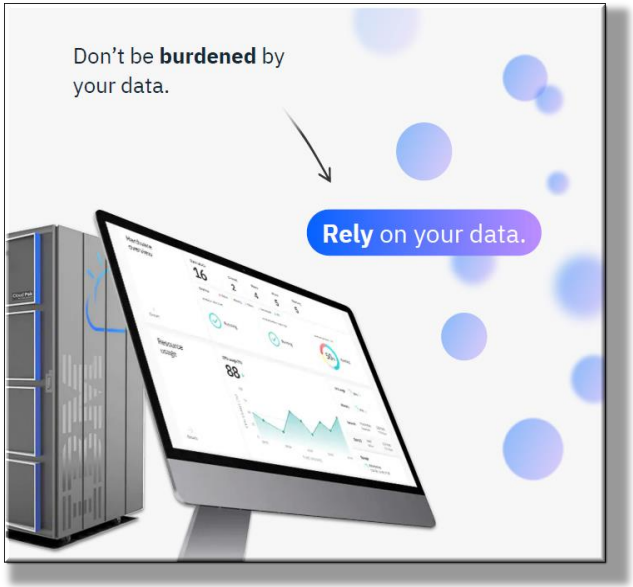
Lab 01 – Getting Started

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.

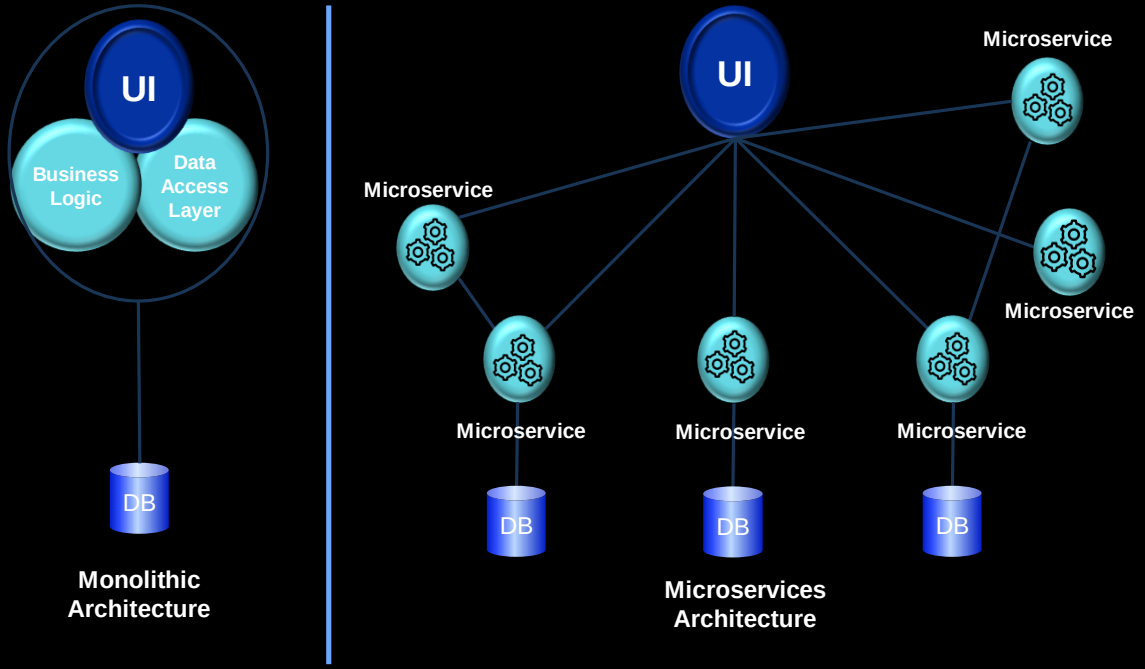
With it, enterprises can turn data into insights through an integrated cloud-native architecture.

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.



Microservices – the first key to cloud native applications

Making development & deployment more efficient



Microservices benefits *

- ***Improved fault isolation:***

  Larger applications can remain largely unaffected by the failure of a single module

- ***Technological flexibility:***

  Try out a new technology stack on an individual service and roll it back if required

- ***Easier development:***

  A new developer can more easily understand the functionality of a service

- ***Optimized deployment:***

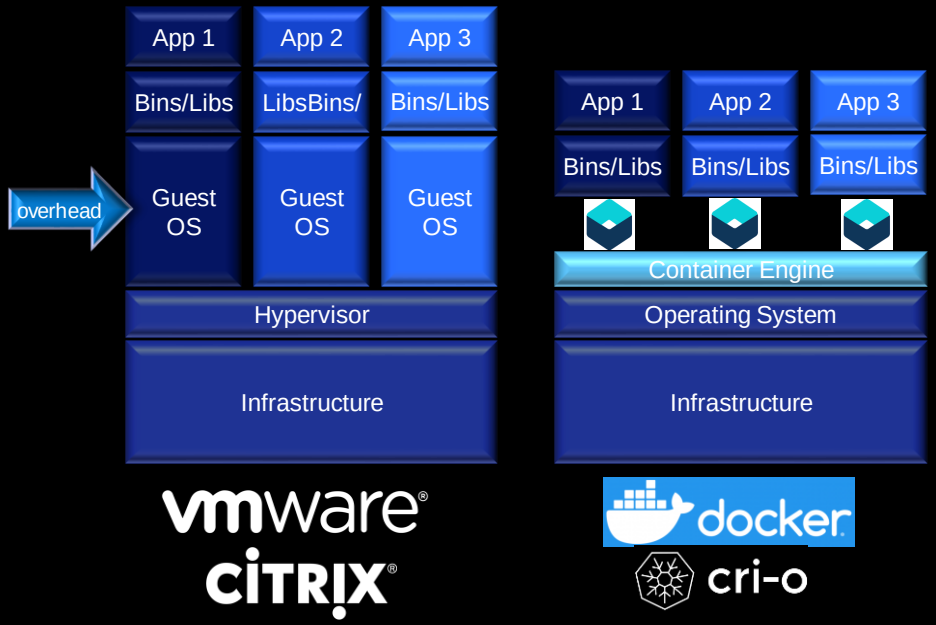
  Auto provision, auto scale and provide auto-redundancy

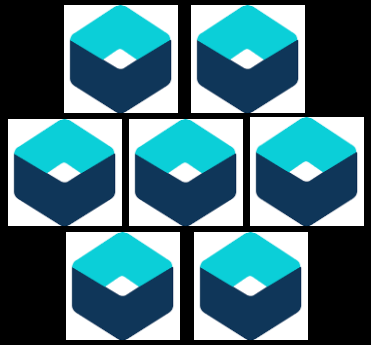
* This is not a claim that a microservice-based application approach is always better for every use case scenario

Containers – the second key to cloud native applications

Reducing operational and development costs

Virtual machines vs. containers *





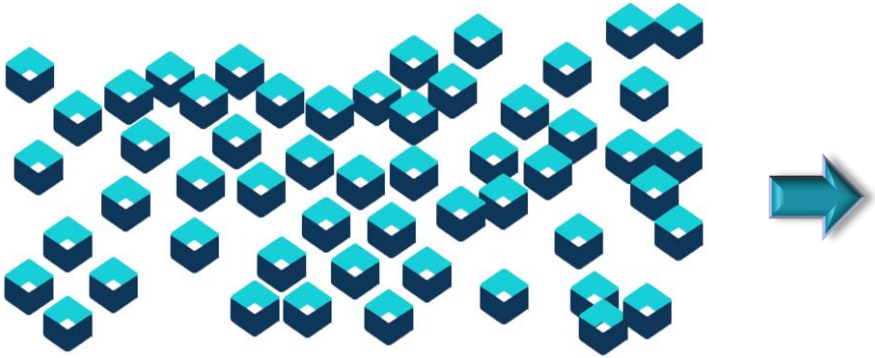
Containers can be 2 – 3 times more resource efficient than virtual machines

On average Docker developers ship software 7x more frequently

* Containers virtual software in the way that virtual machines have virtualized hardware

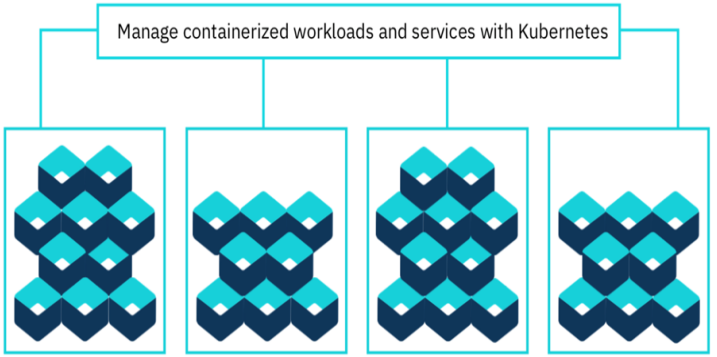
Container automation and orchestration is essential
Enter: Kubernetes

Containers are revolutionizing IT
But they require orchestration

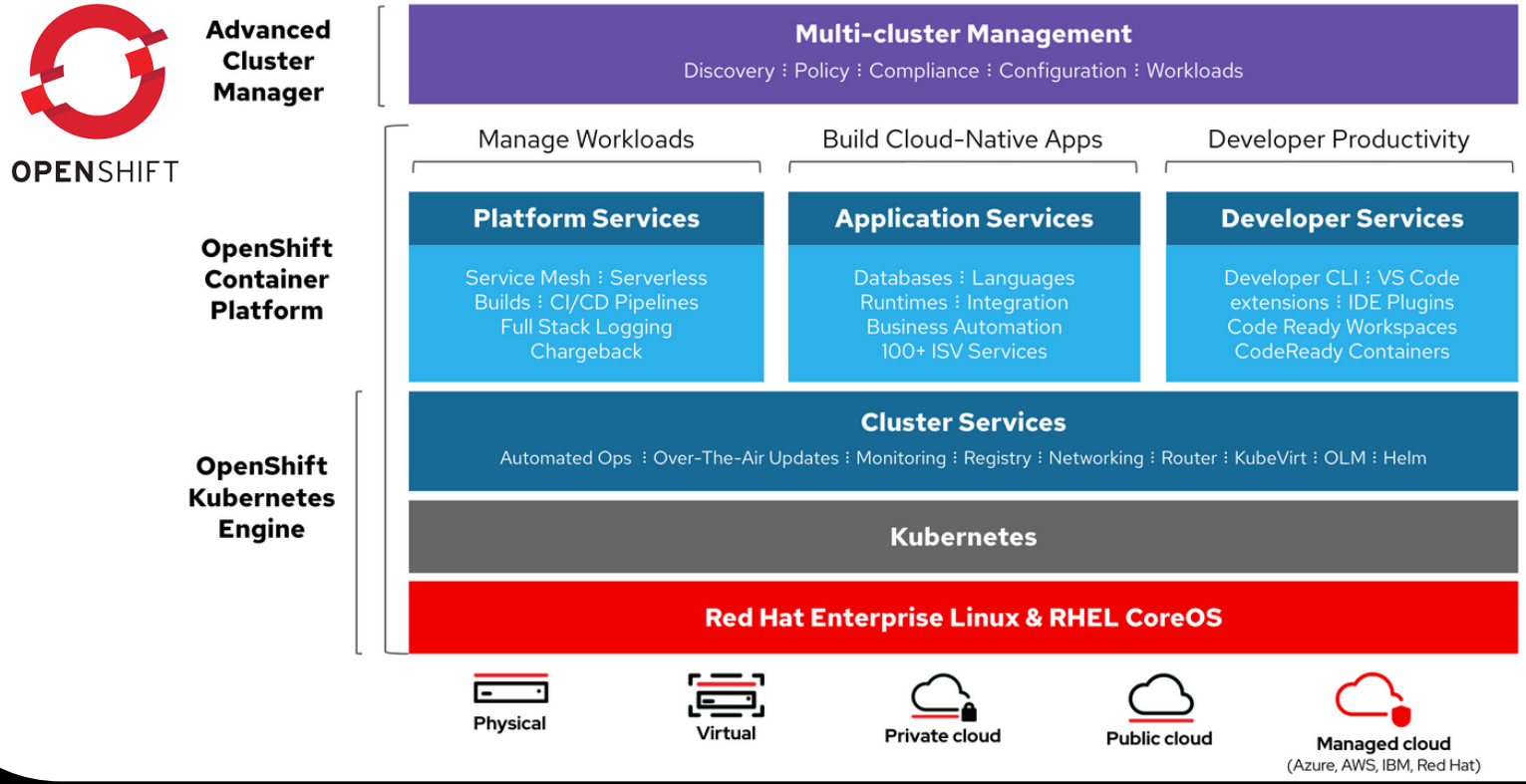


kubernetes

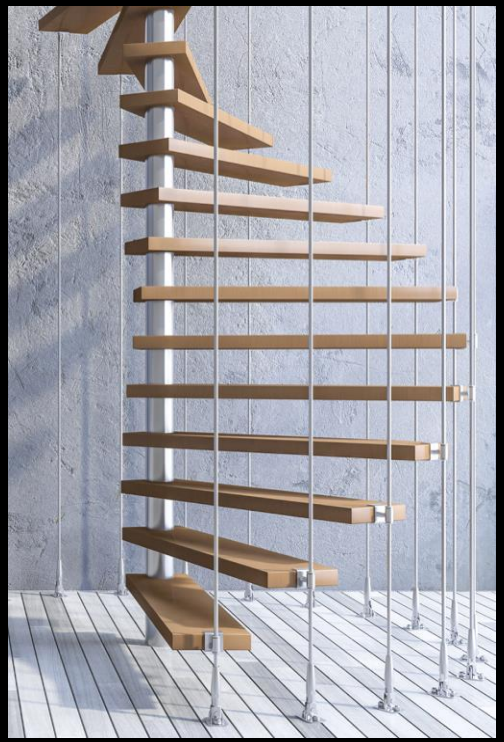
Kubernetes - κυβερνήτης
Means “helmsman” or “pilot”



Red Hat OpenShift
Enterprise Kubernetes Platform



Cloud Pak for Data (CPD)
Make your data ready for AI



There is no **AI** without **IA**

Infuse – Deploy trusted AI-driven business processes

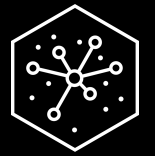
Analyze – Scale insights with ML everywhere

Organize – Create a trusted analytics foundation

Collect – Make data simple & accessible

Strong Foundation – Built on "Cloud native architecture"

CPD Services Ecosystem



1. Cloud Pak for Data Base Services

Collect	Organize	Analyze	Deploy / Infuse
Data Virtualization	Watson Knowledge Catalog (With IA, IGC, Refinery, InstaScan)	Watson Studio, Analytics Engine	Data Science: Model Design & Deployment
Db2 Warehouse, PostgreSQL	Open Source Management	Dashboards, IBM Streams	Watson OpenScale
Db2 Event Store, IBM Streams		Industry Accelerators (many)	
Db2 Big SQL, NPS		Watson Machine Learning	

OpenShift / Control Plane (Lite)

2. Premium Services *(purchase license or BYOL)*

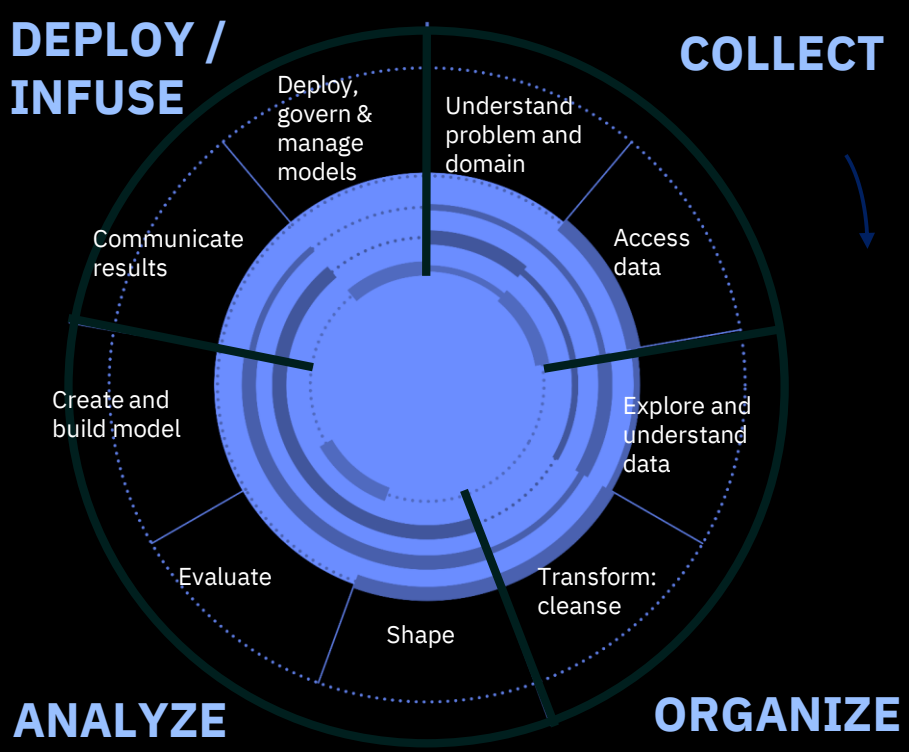
Collect	Organize	Analyze	Deploy / Infuse
Db2 AESE Virtual Data Pipeline	Infosphere DataStage Edition Infosphere Regulatory Accelerator Infosphere multi-cloud Data Mvmnt Infosphere Entity Resolution Master Data Management	Cognos Analytics SPSS Modeler Decision Optimization Watson Explorer Planning Analytics	Watson Assistant / Discovery Watson API Kit (Speech to Text, Text to Speech, Natural Language Understanding) Watson Financial Crimes Insights Planning Analytics

3. Third Party Extension Services

mongoDB. · Datameer · accelerite · Prolifics · figure eight · Lightbend · Cockroach LAB · NetApp portworx · EDB POSTGRES · wand · OA4ERP · PlanetScale · DR · Senzing · knowis · ANALYTICS ZOO · OA4ERP

Cloud Pak for Data (CPD)

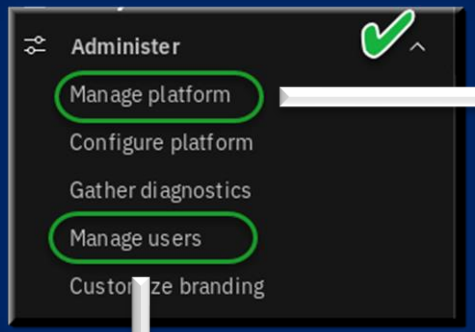
Increases workforce productivity across the analytics lifecycle



Administrator / Architect	Data Engineer	Data Steward
Ensures the usability of the compute, network, storage, etc.	Architects data pipelines & ensures operability	Governs data and ensures regulatory compliance
		

Business Analyst	Data Scientist	Application Developer
Works with data to apply insights to business strategy	Dives deep into the data to draw insights for the business	Plugs into analysis and code to build applications
		

CPD Administration
Administer and manage the platform



Deployments

See the deployments running in each Red Hat OpenShift project on the platform. You can see how many resources each deployment is currently using compared to the number of resources that the deployment has reserved.

Filter by: All types | Clear all

Find deployments

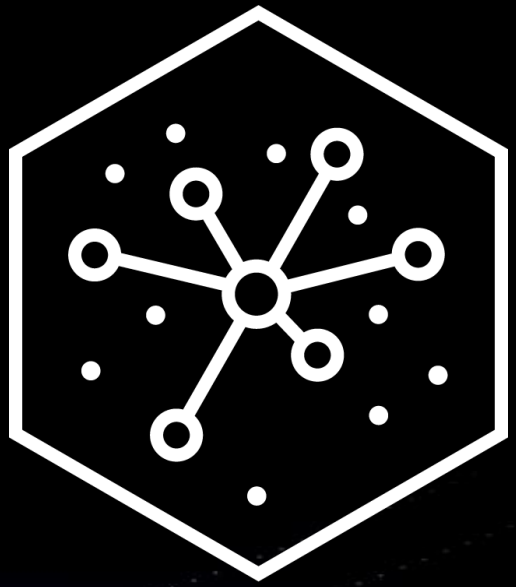
Name	Type	Installed on	Service instances	vCPU	Memory (GB)
Total			2	6.01 of 75.08	101.20 of 201.70
IBM Cloud Pak for Data Cognos Analytics Advanced	Premium	5/28/2020 4:32 PM	0	0.00 of 0.60	0.11 of 0.11
SPSS Modeler for Watson Studio	Premium	5/28/2020 4:32 PM	0	1.45 of 2.10	0.42 of 8.40
Db2 Warehouse	Base	5/28/2020 4:32 PM	1	0.67 of 10.15	16.80 of 44.10

Name	User ID	Username
admin	1000330999	admin
Business Analyst	1000331009	businessanalyst
CPD User	1000331002	cpduser
Data Engineer	1000331003	dataengineer

Name	Pods	vCPU	Memory (GB)
Total	8	0.14 of 1.65	1.50 of 2.80
db2wh-1590588027600-ibm-unified-console-api	5	0.10 of 1.00	1.30 of 2.00
db2wh-1590588027600-ibm-unified-console-influxdb	1	0.00 of 0.10	0.08 of 0.25
db2wh-1590588027600-ibm-unified-console-ucgoapi	1	0.00 of 0.25	0.07 of 0.10

Business Use Case

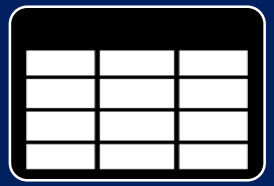
Lab 02 – Business Use Case: Customer Churn



Trade Co. Challenges

- Customer retention problem leading to declining revenue
- Underperforming rules-based system to identify separation (churn) risk
- Lack of centralized, vetted, and reliable data to ensure accuracy of analytics
- Disparate analytical tools for reporting and model development
- No simple way to infuse machine learning models into the customer facing Stock Trader Application

Separation (Churn) Risk: Current Rules Based System



Built Using Limited Data

Rules are developed using a single source of data that contains customer demographic information.

Manual Process to Develop Rules

Rules are manually developed based on the past experience of the marketing team. Rules are only updated once a year.

Low Overall Predictive Accuracy

Low overall predictive accuracy. We are both missing identifying customers who ultimately separate and incorrectly assigning high risk to customers who ultimately stay.

Separation (Churn) Risk: New Data Driven Approach

Incorporate Multiple Data Sources

Use vetted centralized transactional data along with customer demographics to understand separation behavior. Also, include the outcomes of the rules-based system for each customer where an accurate prediction was rendered.

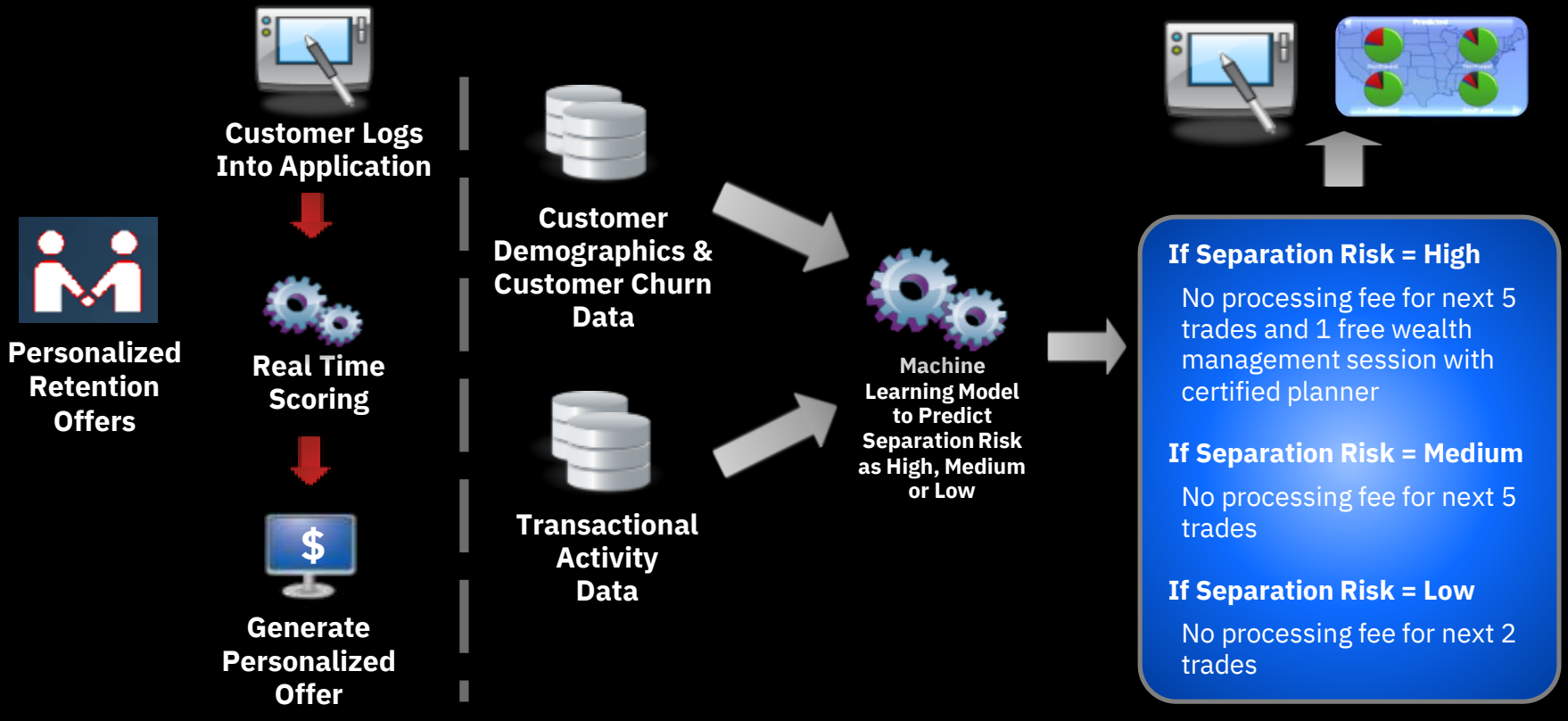
Data Driven Process to Develop Machine Learning Models

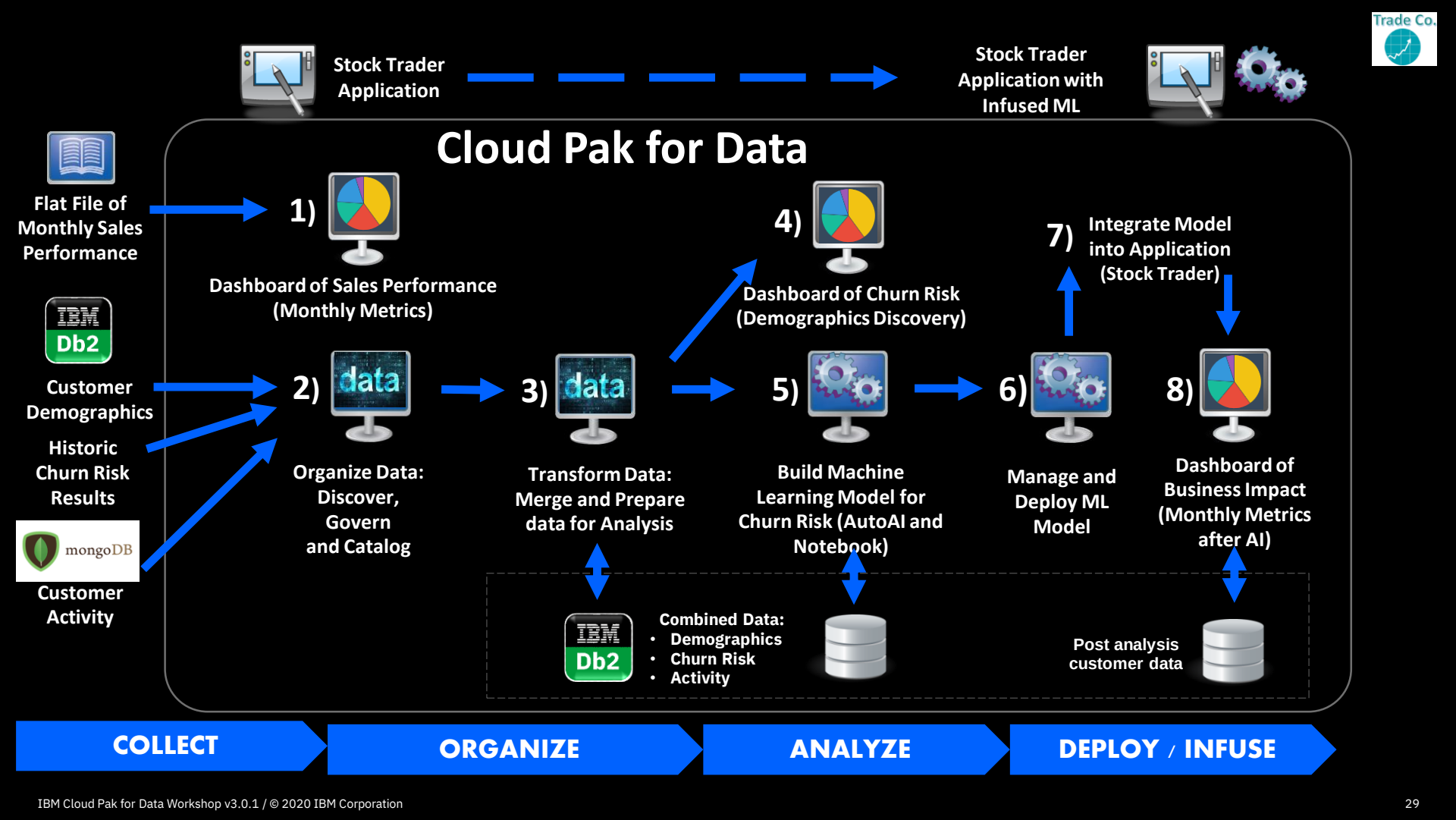
Develop predictive models for separation risk that automatically discover and incorporate all the patterns in the data including interactions and contingencies.

High Accuracy from Adaptive Machine Learning

Models will classify separation risk with a higher overall accuracy and will adapt to changing patterns in risk to maintain that accuracy. Machine Learning models will incorporate all the understanding from the rules-based system and build on that to develop highly complex set of predictive conditions.

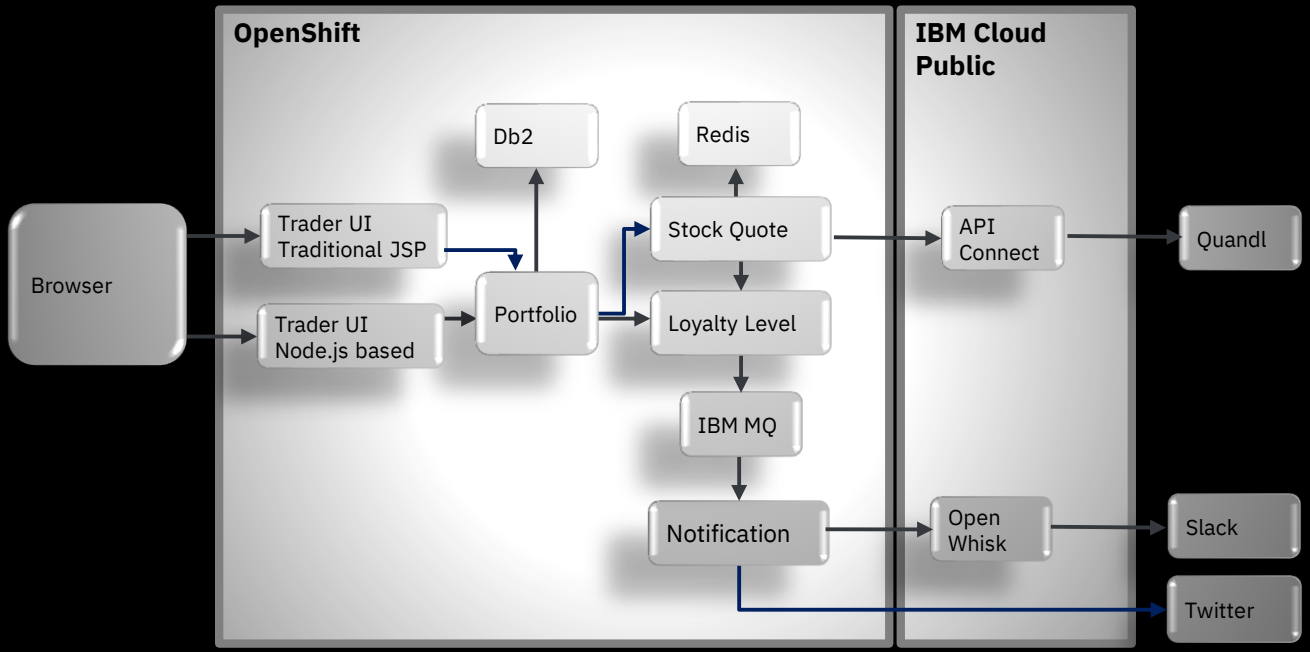
Deployment: Stock Trader App. Integrated with AI




Trade Co.
Stock Trader Application
Stock Trader Application with Infused ML
Cloud Pak for Data
Flat File of Monthly Sales Performance
IBM Db2
Customer Demographics
Historic Churn Risk Results
mongoDB
Customer Activity
1)
Dashboard of Sales Performance (Monthly Metrics)
2)
data
Organize Data: Discover, Govern and Catalog
3)
data
Transform Data: Merge and Prepare data for Analysis
4)
Dashboard of Churn Risk (Demographics Discovery)
5)
Build Machine Learning Model for Churn Risk (AutoAI and Notebook)
6)
Manage and Deploy ML Model
7)
Integrate Model into Application (Stock Trader)
8)
Dashboard of Business Impact (Monthly Metrics after AI)
IBM Db2
Combined Data:
• Demographics
• Churn Risk
• Activity
Post analysis customer data
COLLECT
ORGANIZE
ANALYZE
DEPLOY / INFUSE

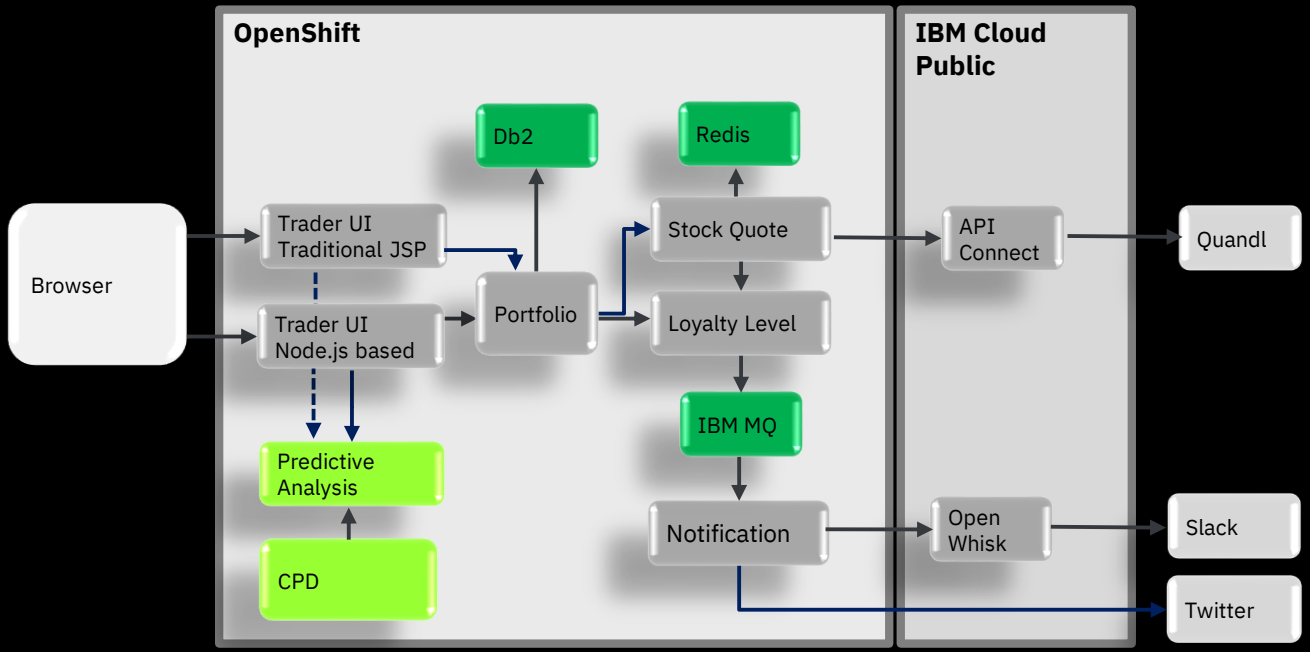
Trade Co. Application “Stock Trader” – Before
Microservices Application

Stock Trader
as a modern microservice application

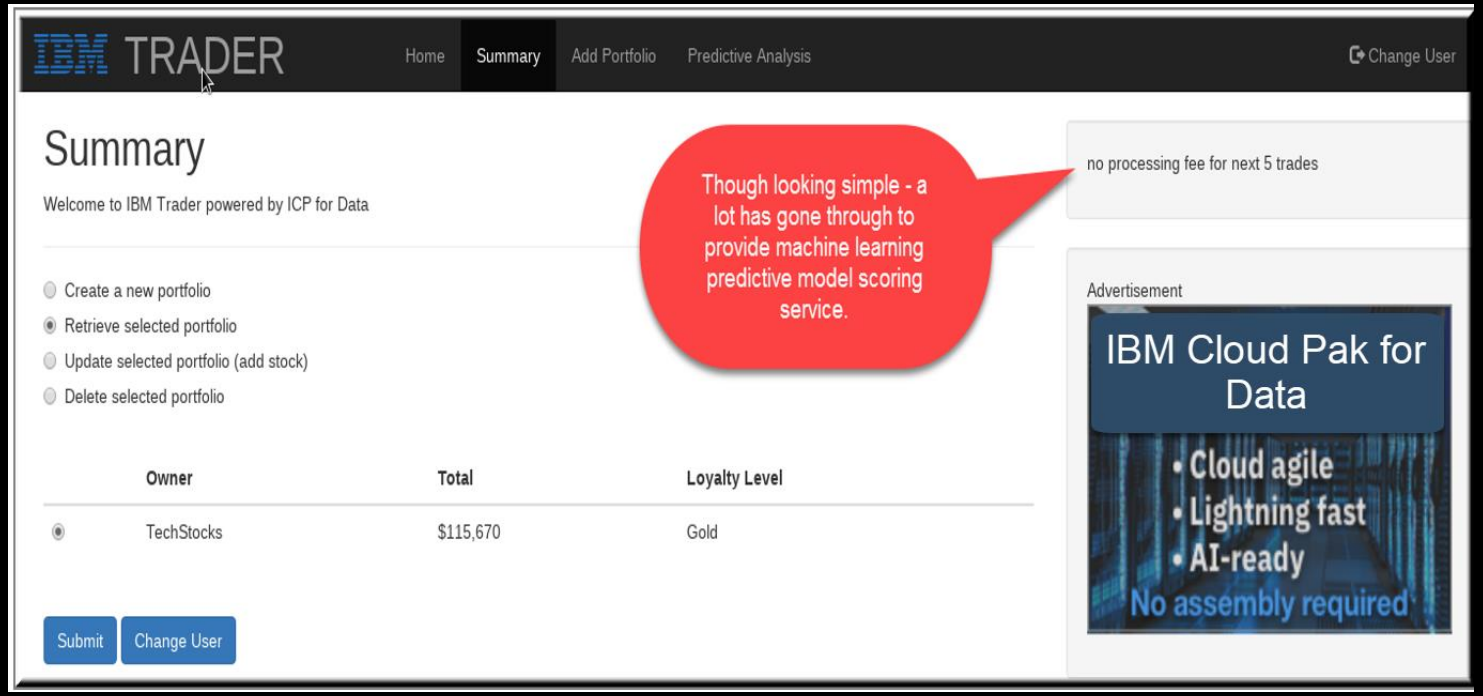


Trade Co. Application “Stock Trader” – After: Infused with ML
Microservices Application

Stock Trader (enhanced)
as a modern microservice application



Stock Trader – After
Monetizing the ML model

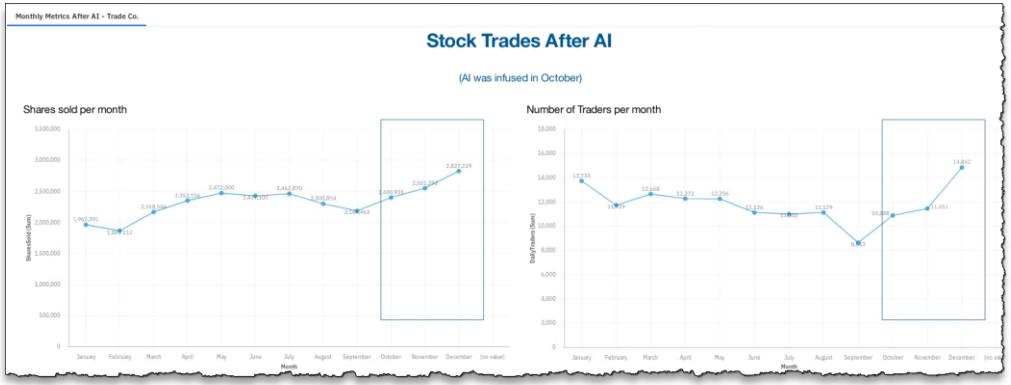


Trade Co. Dashboards

Before and After deploying the CPD developed ML model

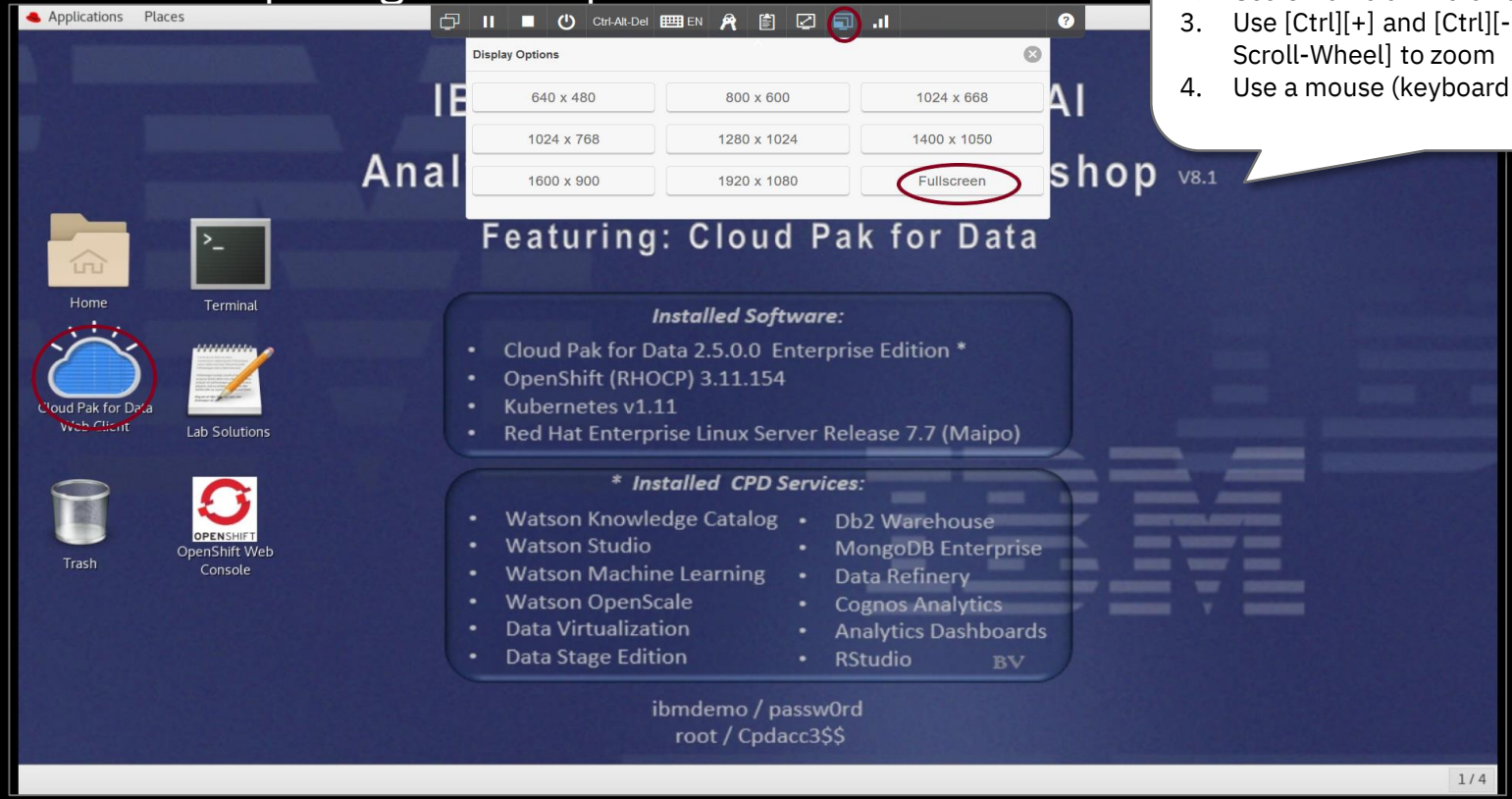
Before AI

After AI



IBM Analytics Modernization Workshop

The workshop image desktop



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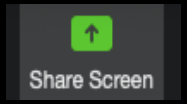
4. Use a mouse (keyboard alone is difficult)

Zoom Breakout Rooms



Lab-01: Getting Started Case

Lab-02: Business

IBM Analytics Modernization Workshop

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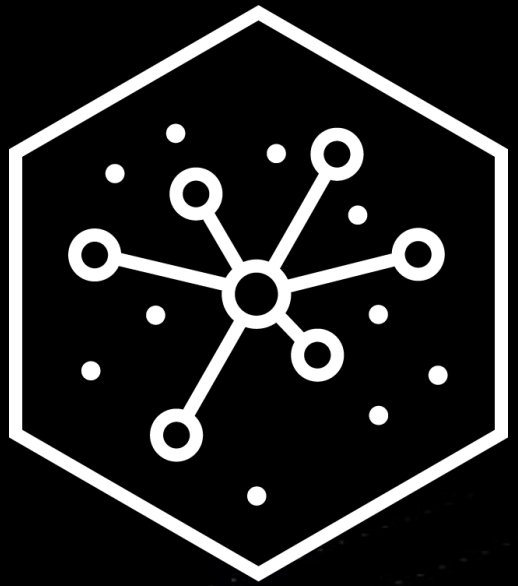
Cloud Pak for Data 3.0.1



Work on Lab 1 and 2

Session restarts at xx AM

IBM Analytics Modernization Workshop

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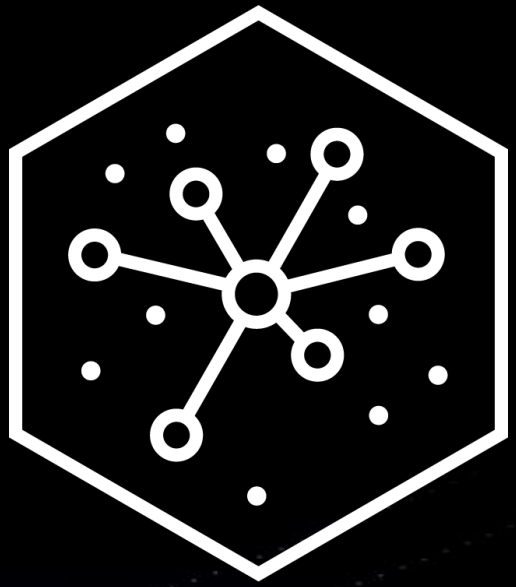
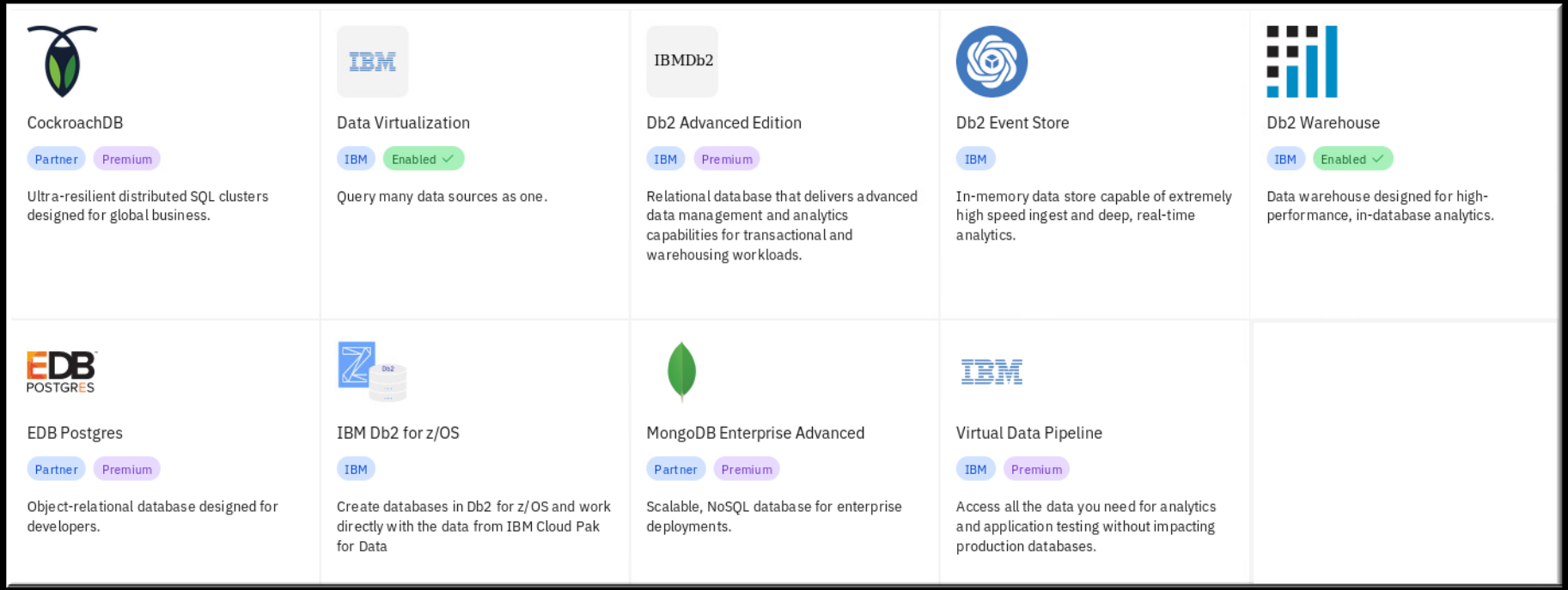


Collect

Lab 03 – Collect: Connections
Lab 05 – Collect: Virtualize

CPD Collect
1. Provision in-cluster databases

Provision, host, and manage these data sources directly on the CPD cluster



CPD Collect

2. Connect to existing data sources: IBM *

* Note: This list is constantly updated and shows what exists as of August 27, 2020.

Connect directly to these data sources and perform the CPD component functionality shown

IBM Data Sources	Cognos Dashboards	DataStage Edition	Data Virtualization	WKC	Watson Studio
Analytics Engine HDFS				✔	✔
Classic Federation		✔			
Cloud object storage (IBM)		✔		✔	✔
Cloud object storage (infra)				✔	✔
Cloudant				✔	✔
Cognos Analytics				✔	✔
Compose for MySQL				✔	✔
Data Set		✔			
Data Virtualization	✔			✔	✔
Data Virtualization Mgr z/OS			✔		
PostgreSQL databases				✔	✔
Db2		✔	✔	✔	✔
Db2 Big SQL			✔	✔	✔
Db2 Event Store			✔	✔	
Db2 for i			✔	✔	✔
Db2 for z/OS		✔	✔	✔	✔
Db2 Hosted				✔	✔
Db2 on Cloud		✔	✔	✔	✔
Db2 Warehouse	✔	✔	✔	✔	✔
Db2 Warehouse on Cloud	✔	✔	✔	✔	✔
Distributed Transactions		✔			
DRS		✔			

IBM Data Sources	Cognos Dashboards	DataStage Edition	Data Virtualization	WKC	Watson Studio
External Source		✔			
External Target		✔			
HDFS via Hadoop				✔	✔
Hierarchical		✔			
Hive via Hadoop				✔	✔
Impala via Engine for Hadoop				✔	✔
Informix		✔	✔	✔	✔
Informix Enterprise / Load		✔			
ISD Input / Output		✔			
Java Integration		✔			
Lookup File Set		✔			
Netezza		✔	✔		
Planning Analytics				✔	✔
Obj. Strg. OpenStack Swift				✔	✔
PureData for Analytics				✔	✔
WebSphere MQ		✔			
Z/os DVM sources (VSAM, IMS, Adabas, etc.)			✔		

CPD Collect

2. Connect to existing data sources: Third-party *

* Note: This list is constantly updated and shows what exists as of August 27, 2020.

Connect directly to these data sources and perform the CPD component functionality shown

Third-party Data Sources	Cognos Dashboards	DataStage Edition	Data Virtualization	WKC	Watson Studio
Amazon Redshift			✔	✔	✔
Amazon S3		✔		✔	✔
Apache Cassandra		✔			
Apache Derby			✔		
Apache Hbase		✔			
Apache HDFS				✔	✔
Apache Hive			✔	✔	✔
Apache Kafka		✔			
Azure Storage		✔			
BDFS		✔			
Cloudera Impala			✔	✔	✔
Dropbox				✔	✔
Filesystem		✔		✔	✔
FTP Enterprise		✔			
FTP		✔		✔	✔
Generic JDBC				✔	✔
Google BigQuery		✔	✔	✔	✔
Google Cloud Storage		✔		✔	✔
HDFS Generic web-HDFS				✔	
HDFS HttpFS				✔	
Hive JDBC		✔	✔		
Hive JDBC CDH		✔		✔	
Hive JDBC HDP		✔		✔	
Hortonworks HDFS				✔	✔

Third-party Data Sources	Cognos Dashboards	DataStage Edition	Data Virtualization	WKC	Watson Studio
Looker				✔	✔
MariaDB			✔		
MSFT Azure Blob and File		✔			
MSFT Azure Lake Store				✔	✔
MSFT Azure SQL DB				✔	✔
MSFT SQL Server	✔	✔	✔	✔	✔
Minio				✔	✔
Mongo			✔	✔	
MySQL			✔	✔	✔
ODBC		✔			
OData				✔	✔
Oracle		✔	✔	✔	✔
Pivotal Greenplum		✔		✔	✔
PostgreSQL	✔		✔	✔	✔
Salesforce.com		✔		✔	✔
SAP HANA			✔		
SAP Data Object		✔		✔	✔
Snowflake		✔	✔	✔	✔
Sybase Enterprise		✔	✔	✔	✔
Sybase IQ / OC		✔		✔	✔
Tableau				✔	✔
Teradata		✔	✔	✔	✔

CPD Collect

2. Connect to existing data sources: Data Files

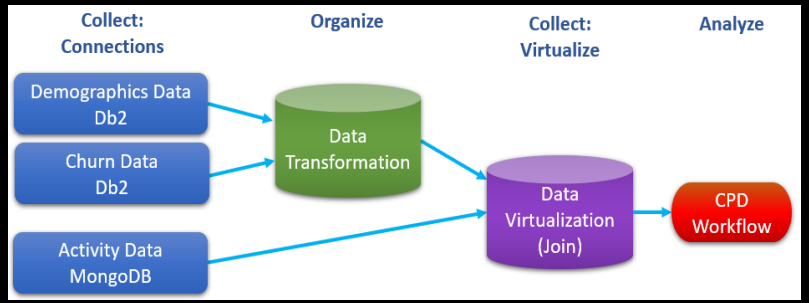
Connect directly to these data sources and perform the CPD component functionality shown

Other Data Sources	Cognos Dashboards	DataStage Edition	Data Virtualization	WKC	Watson Studio
Comma Separated Value (CSV) files	✔	✔	✔		✔
Microsoft Excel Spreadsheets			✔		✔
Sequential File		✔			
Tab Separated Value (TSV) files			✔		

Connecting to any of the data sources by service:

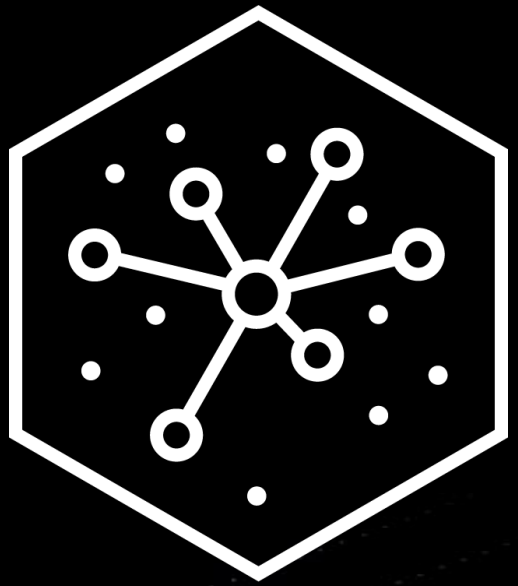
Service	Comment
Cognos Dashboards	You can use the local and remote data sets that already exist in your analytics projects. You can create connections by selecting *Add data* source from the analytics dashboard menu.
DataStage Edition	You can transform data that is in a catalog by searching for the data that you want to use and selecting *Transform*.
Data Virtualization	You can create connections that can be used to virtualize data from the following locations: 1) *Connections* page, 2) *Data Sources* page in the Data Virtualization service
Watson Knowledge Center	You can create connections that can be used in the catalog and connections that can be used to curate data.
Watson Studio	Ideally, you should use data that is already in a catalog by searching for the data you want there and add it to an analytics project. Alternatively, you can create connections that can be used in analytics projects from the following locations: 1) *Connections* page, 2) *Assets* page of the analytics project. You can also *Add data* from files.

Lab-3 Collect: Connect



- Review DB2 Data
  - Customer Demographics
  - Customer Churn
  - Credentials
- Review DB2 Connection
  - Connection Parameters
- Review MongoDB Data
  - Customer Activity
  - Credentials
- Review MongoDB Connection
  - Connection Parameters

Cloud Pak for Data 3.0.1

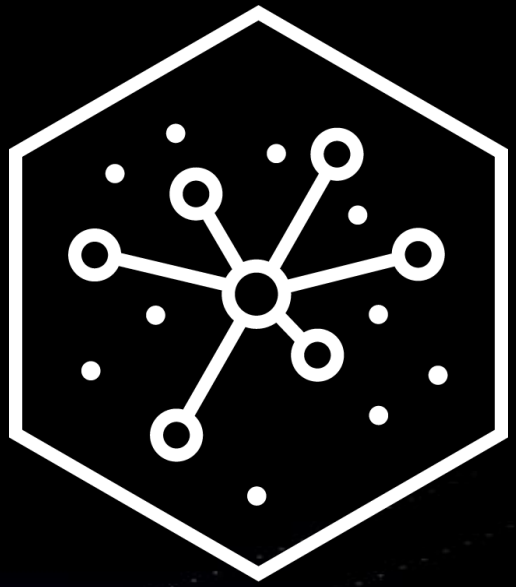


Work on Lab 3

Session restarts at xx AM

Organize – Deeper Dive

Lab 13 – Organize



CPD Organize
Watson Knowledge Catalog (WKC)

Data Scientists
Data Analysts
Business Analysts

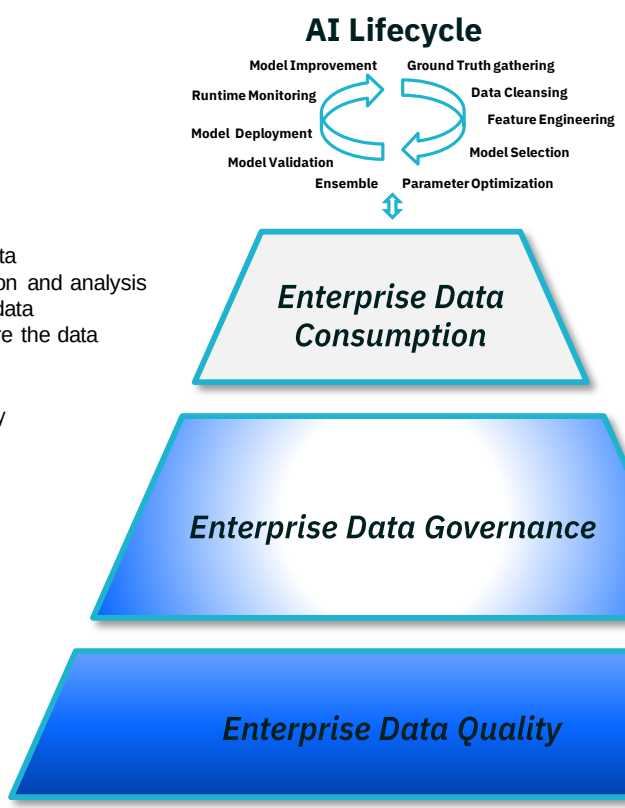
- Search and find relevant data
- Prepare data for consumption and analysis
- Consume and analyze the data
- Rate, comment on and share the data

Data Stewards
CDO
LOB Risk
LOB Product

- Manage metadata repository
- Manage Reference Data
- Data governance workflow
- Discover metadata assets
- Classify data assets
- Data stewardship
- Build data glossary
- Data ownership
- Data lineage

Quality Analysts

- Profile data
- Understand, monitor and remediate data quality
- Apply validation rules



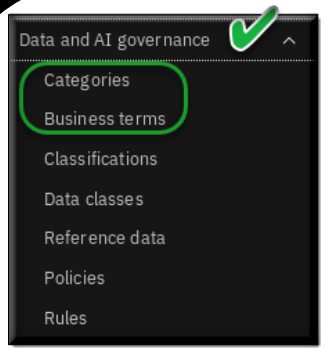
WKC is installed when you install any of the following services:

Watson Studio, Watson Machine Learning, Watson OpenScale

IBM Watson Knowledge Catalog on Cloud Pak for Data

End-to-End Platform for Business-Ready Data

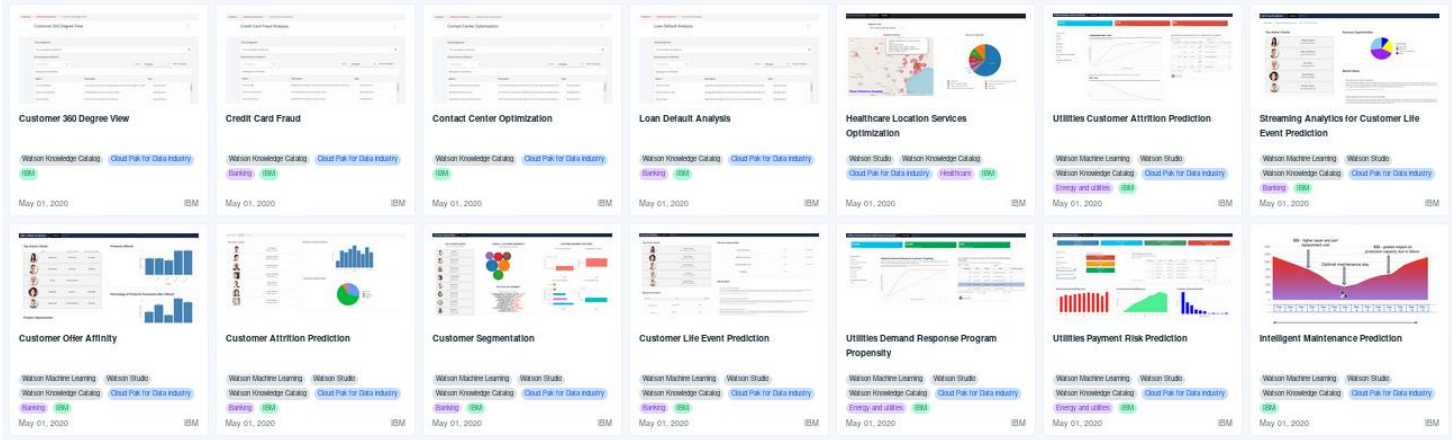
CPD Organize
Data and AI governance: Categories and Business terms



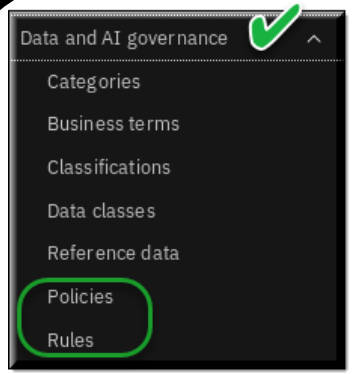
Categories provide logical structure to a business glossary

Business terms standardize definitions of business concepts

1. Manually create Categories and Business Terms
2. Import Categories and Business Terms from CSV or XML files
3. Import a Glossary from an **industry accelerator**

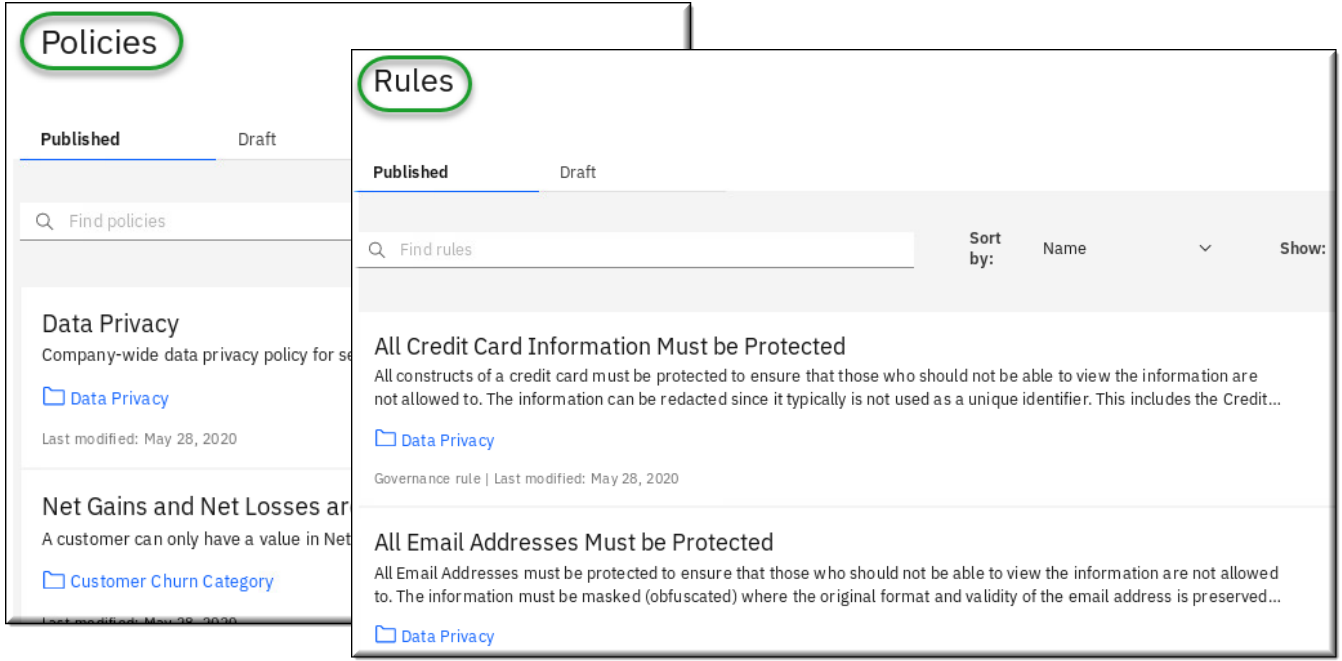


CPD Organize
Data and AI governance: Policies and Rules

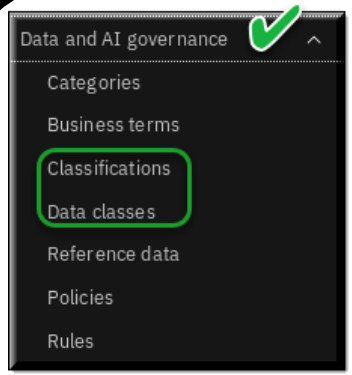


Policies describe how to control data and consist of one or more rules

Rules describe the criteria for compliance with business objectives

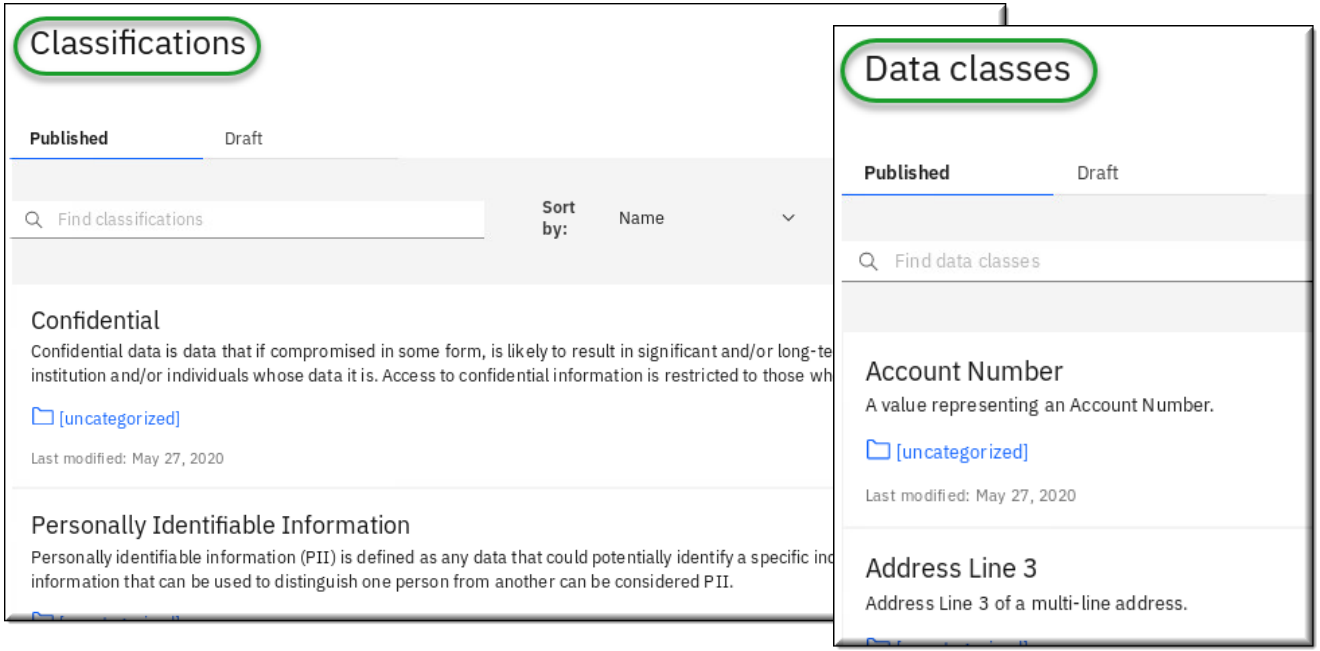


CPD Organize
Data and AI governance: Classifications and Data classes

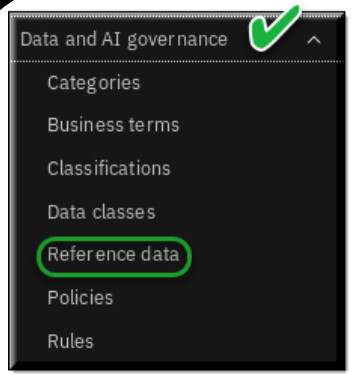


Classifications describes the sensitivity level of data

Data classes describe the contents of data in a column in a structured data set

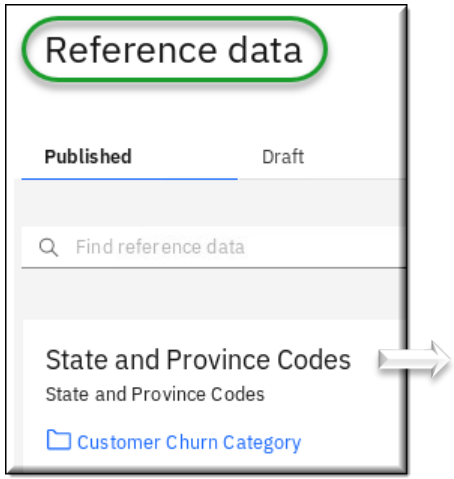


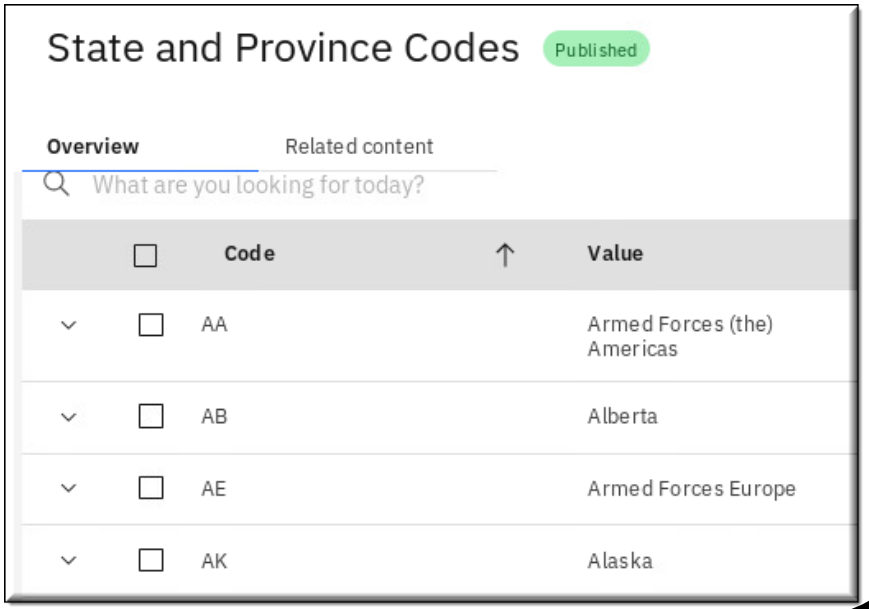
CPD Organize
Data and AI governance: Reference Data



Reference Data Sets define list of permissible values that are allowed for use within a data field.

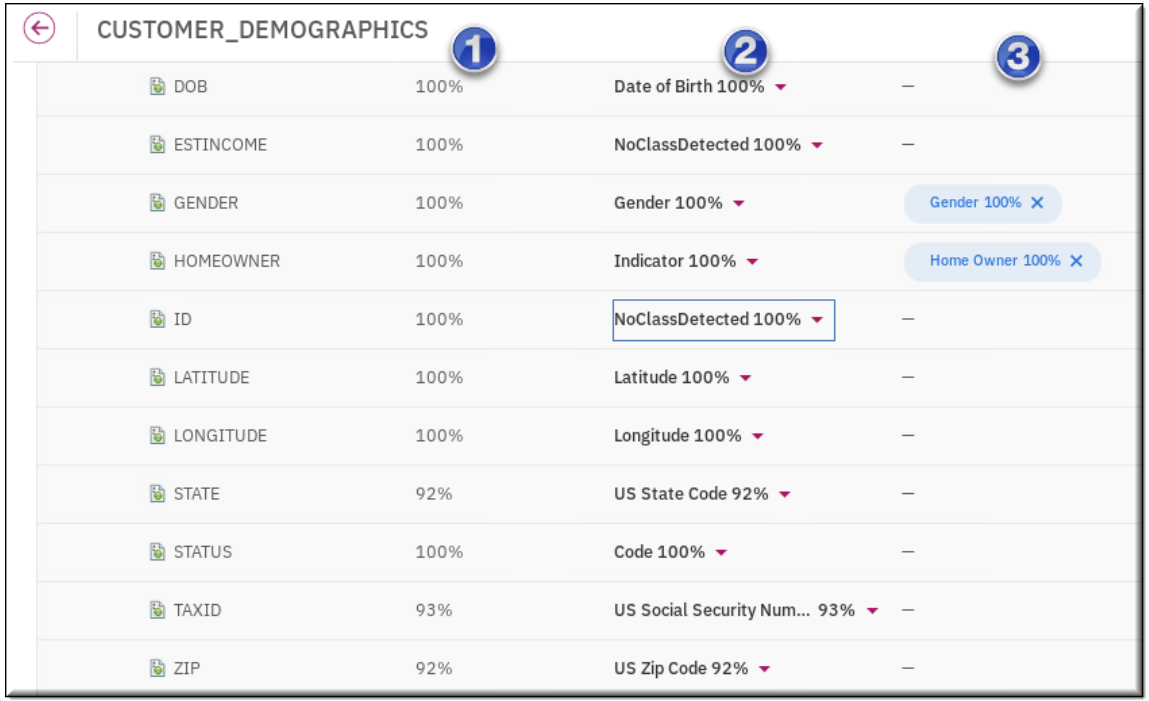
May be referenced by Business Terms, Policies, Rules and Data Classes





CPD Organize
Auto-discover assets

Data Discovery



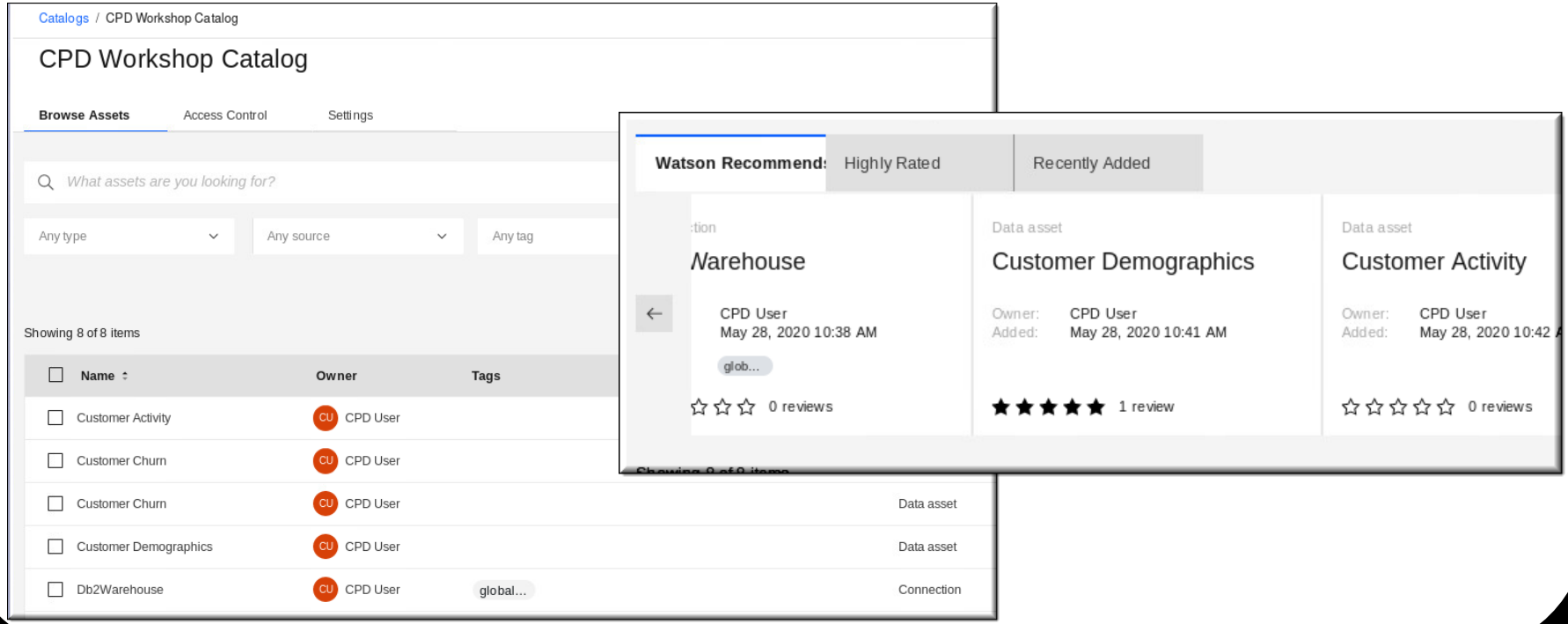
Use machine learning based auto-discovery to:

1. Analyze data quality
2. Analyze columns (Classify data)
3. Assign Business terms

You can perform discovery with data sampling to allow for self-service data access with a search.

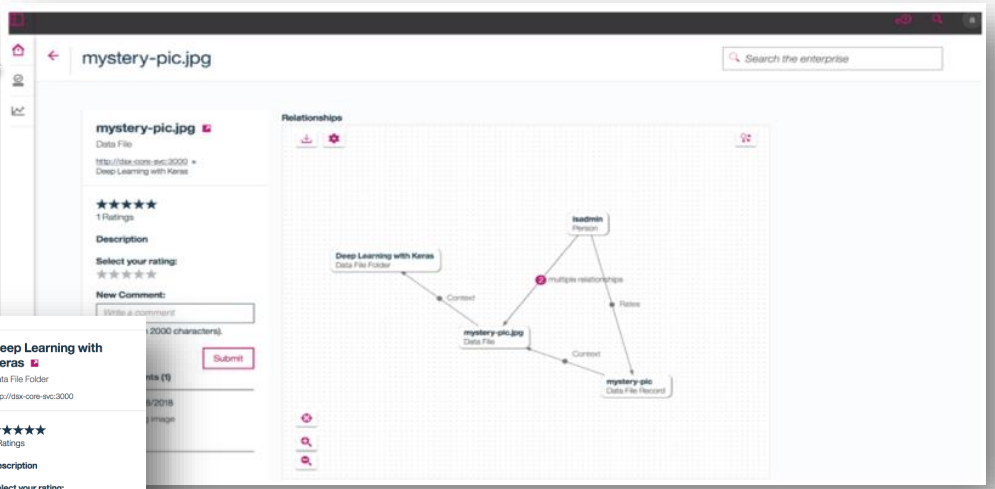
CPD Organize
Publish to a catalog

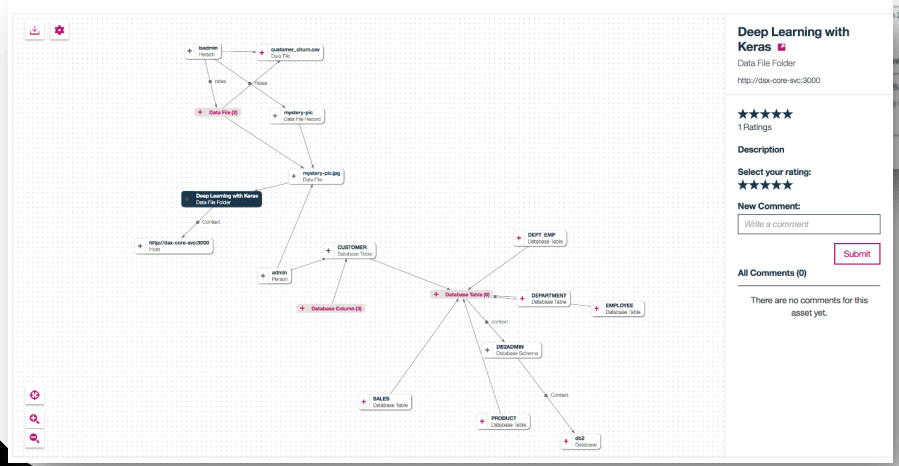
Catalog and govern your assets



CPD Organize
Relationship graph with explorer

- Explore relationships between data assets, terms, analytic assets, users, etc.
- Gain in-depth understanding of metadata through crowdsourcing (e.g., ratings, comments) and machine learning





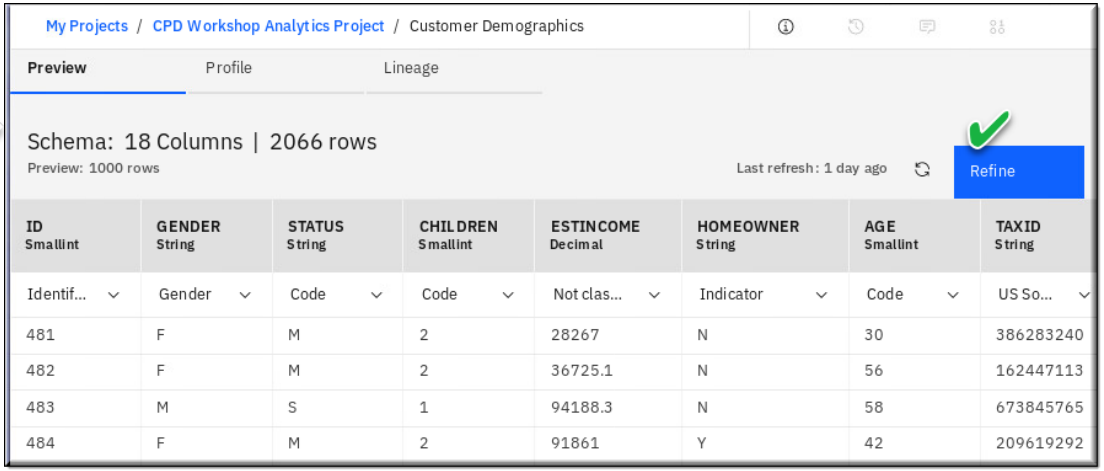
Explore deeper to understand context and usage patterns

CPD Organize
Refine data with visualizations

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

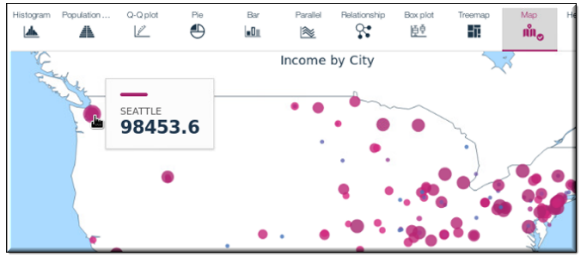
Use it to remove data that is incorrect, incomplete, improperly formatted, etc.

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.



CPD Organize
Profile data

The **Profile** of a data asset includes generated metadata and statistics about the textual content of the data.

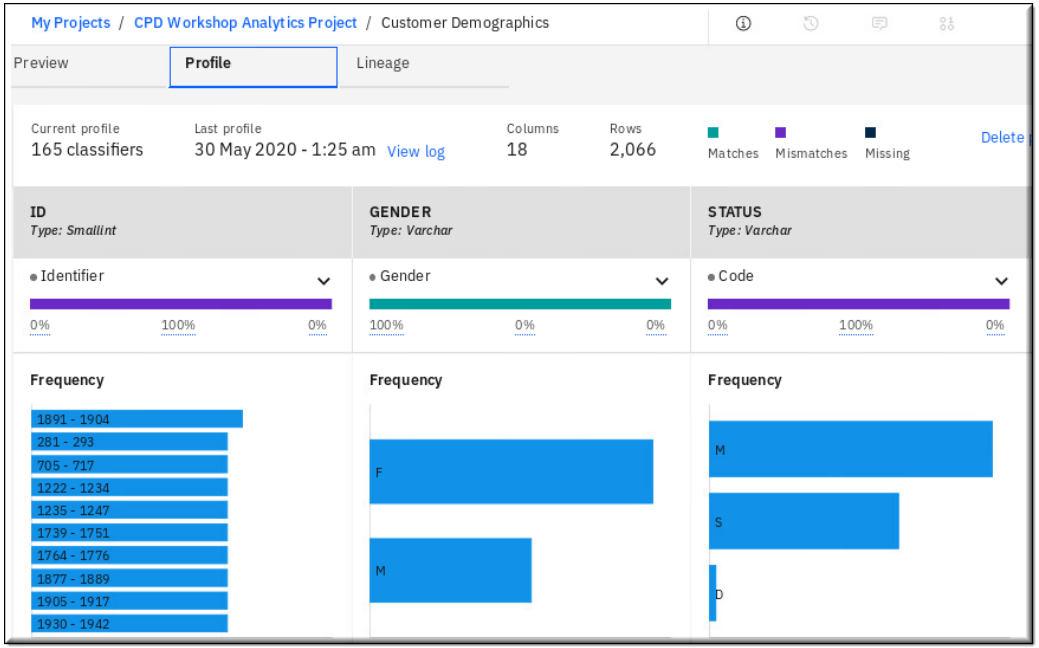
All catalog or project members can see data asset profiles.

Profiles are automatically created:

- In catalogs, profiles for unstructured data assets are created automatically, regardless of whether policies are enforced
- In governed catalogs, profiles for structured data assets are created automatically

Profiles can be manually created:

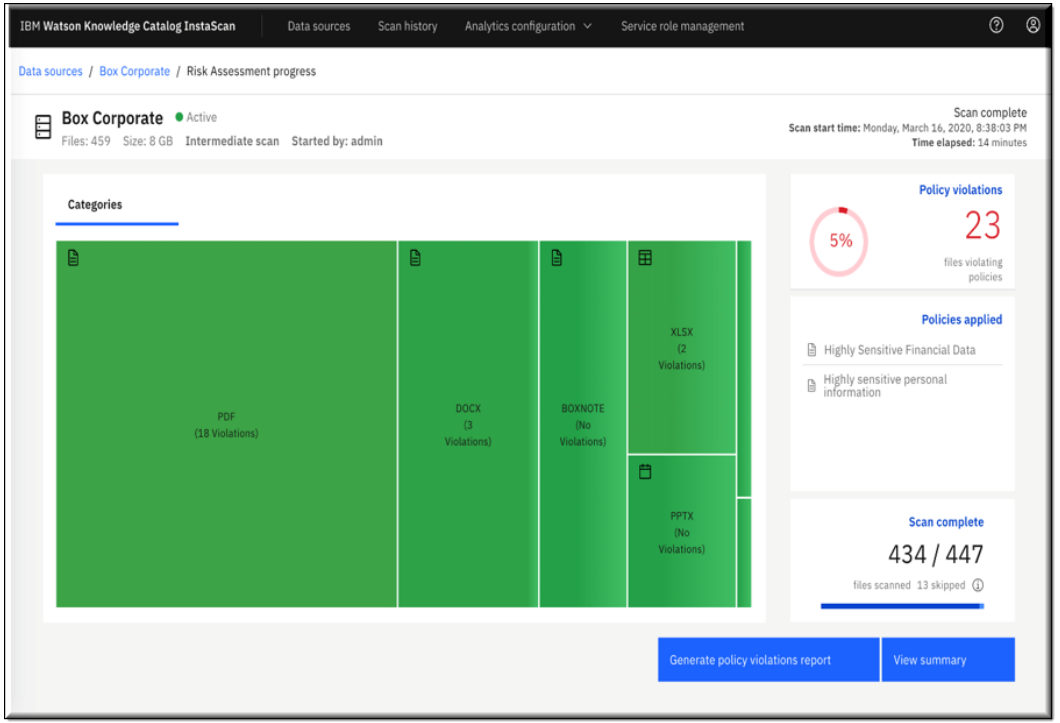
- In ungoverned catalogs for structured data assets
- In projects for both structured and unstructured data assets



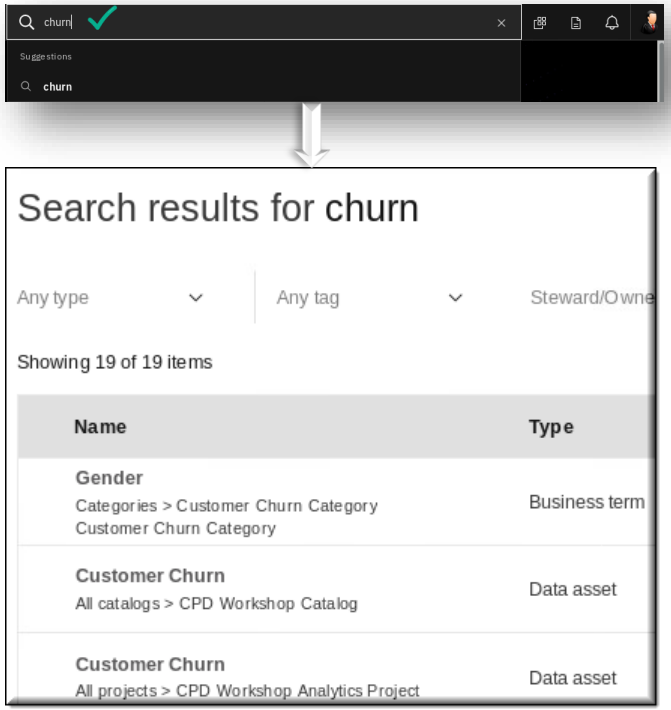
CPD Organize
InstaScan

InstaScan can perform risk assessments and compliance checks of unstructured data

- Scan email, PDFs, word processor documents and images
- Quickly determine which areas have high concentration of sensitive information and prioritize hot spots
- Automatically apply classification labels to data that violates corporate policies
- Create and share ongoing compliance reports with CISO or regulators
- Integrates with Box Shield to provides a comprehensive data privacy solution for unstructured data in Box



CPD Organize
Search for data

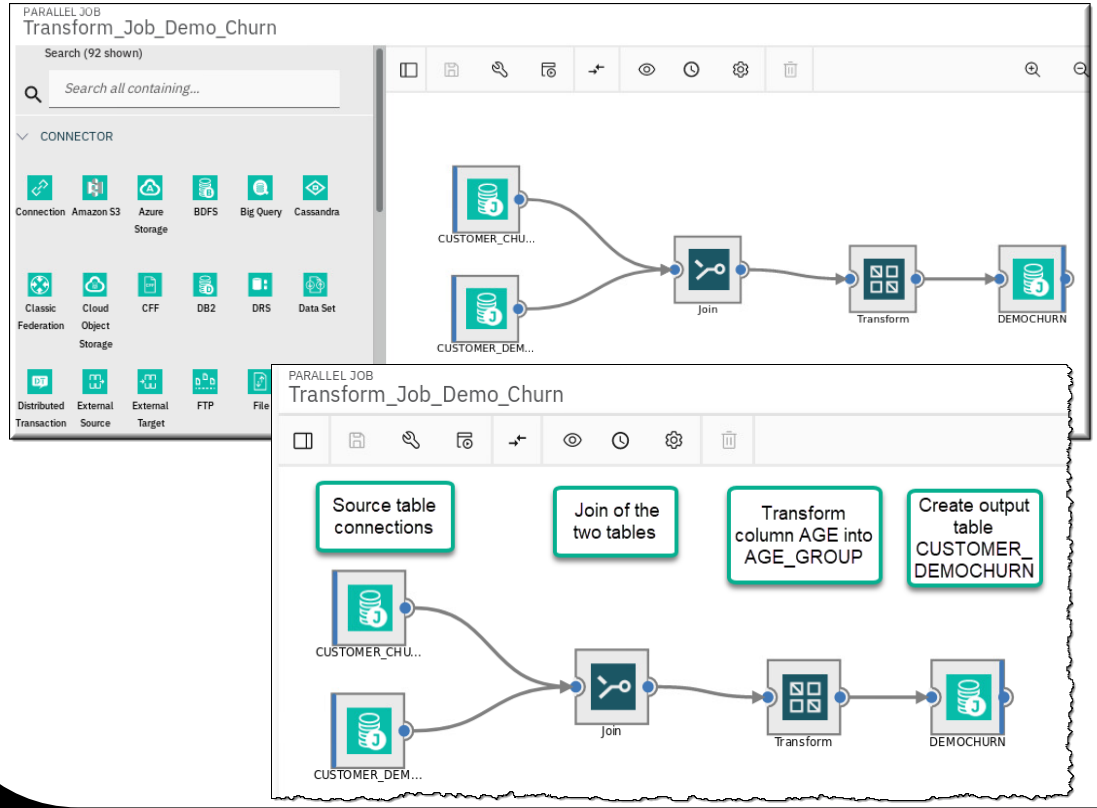


Relevancy of search results factors:

Text match	The provided text is searched in the asset name & description, where name contributes more to the higher place in the result list.
Asset rating	The higher the average rating the asset has, the higher it is on the results list.
Comments	The higher the number of comments, the higher the asset is on the results list.
Context match	The search results list might contain the closest neighbors of assets that are returned based on the text match.
Modification date	The assets that were modified recently are more likely to be returned in the search results.
Quality score	The higher the score, the higher the asset is on the results list. Quality score applies to database tables, views & columns, design tables, views & columns, data file records & fields.
Usage	The more relationships of type uses an asset has, the higher it is on the results list.

CPD Organize

DataStage - Transform and migrate data, build and execute ETL jobs at scale

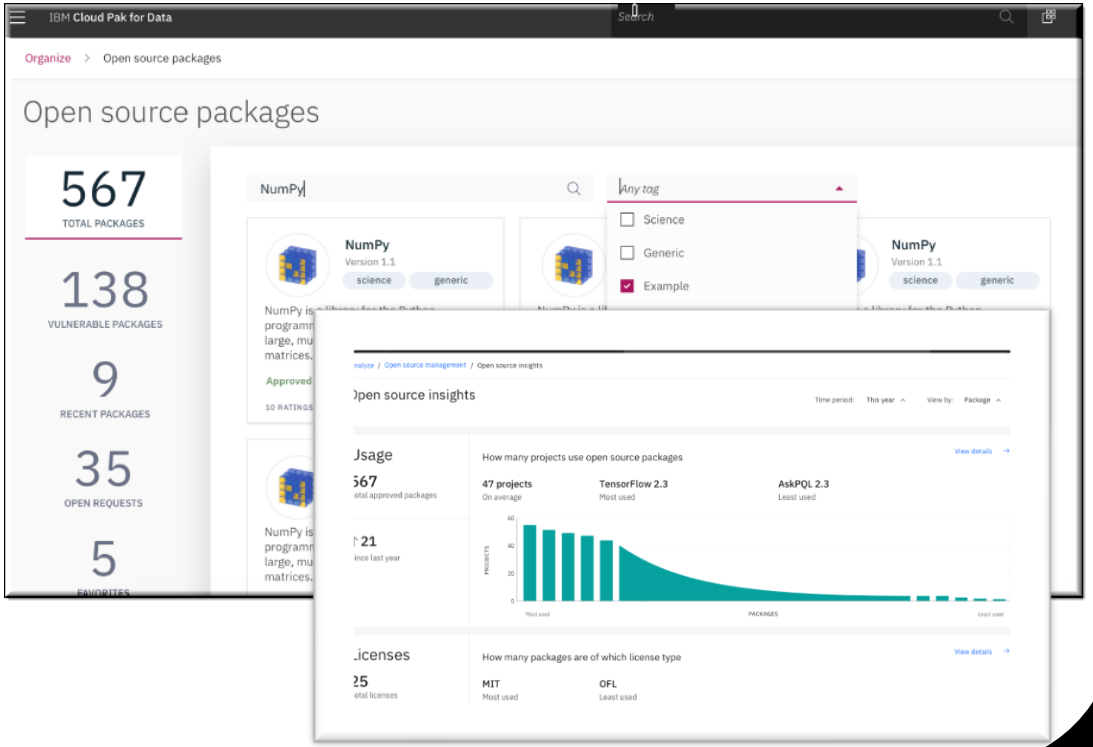


- Use powerful data transformation capabilities
- ML infused Smart Job Clustering, Smart Job Assist and automated job sequencing
- Design once, run on any-cloud using Kafka
- Remotely execute job for co-located access to data, satisfy geo-political requirements and save costs
- In-line data quality and governance to build trusted data when the data is being delivered to a target environment such as a data lake
- Create CI/CD pipelines with GitHub

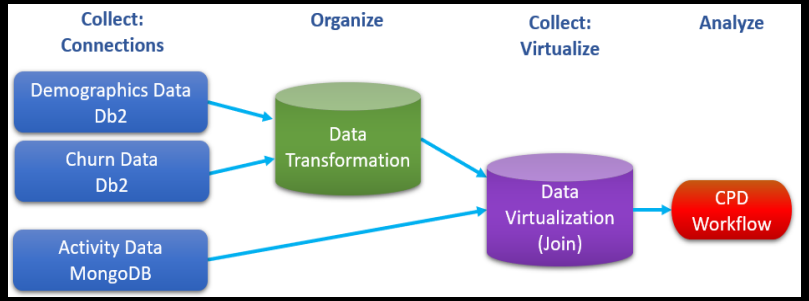
CPD Organize
Open Source Software Management

Open Source Software Management is:

- A *centralized inventory* of approved open source packages to ensure code quality & security
- A vehicle for *self-service open source consumption* and workflow requests for developers
- A *correlation of vulnerabilities* across open source portfolio: highlight security risks
- *An infusion of collaboration* by allowing developers to rate and comment on opensource packages
- *A set of dashboards* for CIOs to manage risks and accelerate innovation with OSS



Lab 13 – Organize- Deeper Dive



Create a Project
- ✓ Add a Global DB2 Connection
- ✓ Add Connected Data
  - ✓ Customer Demographics Table
  - ✓ Customer Activity Table
- ✓ Preview Customer Demographics
- ✓ Profile Customer Demographics
  - ✓ Data Column Frequencies
  - ✓ Data Column Classification (e.g. TaxID-> US SSN)
- ✓ Refine Customer Demographics
  - ✓ Data Visualization
  - ✓ Data Shaping (Zip Code Padding)
  - ✓ Run Data Refinery Job

Review Governance Artifacts
- ✓ Categories and Business Terms
- ✓ Classifications
- ✓ Data Classes
- ✓ Reference Data

Data Protection Rules and Masking
- ✓ Create Policy
- ✓ Define Protection Rule
  - ✓ Data Class DOB masked for user==‘developer’
- ✓ Assign the rule to the policy
- ✓ Demonstrate masked DOB on display for ‘developer’

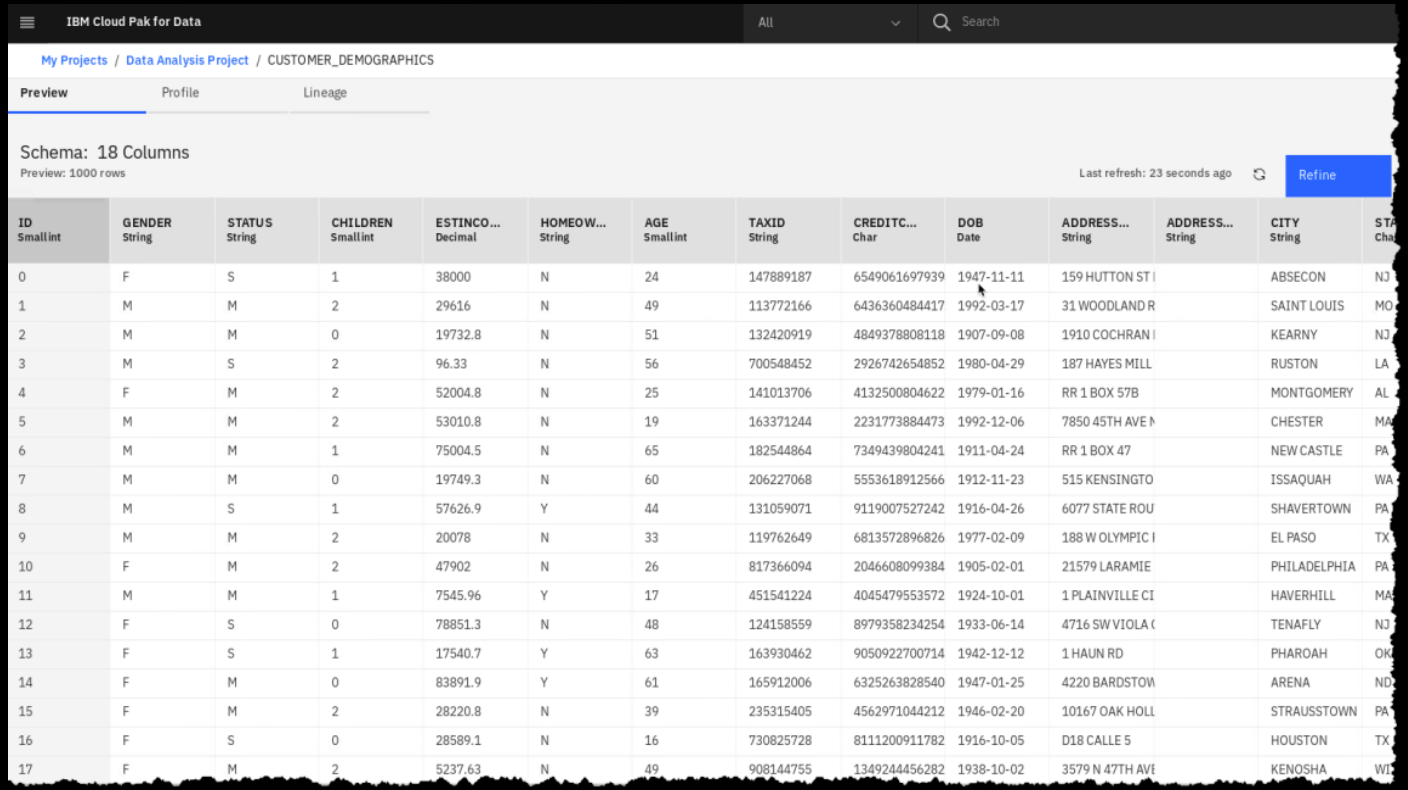
Data Discovery Automation
- ✓ Crawl 2 DB2 Tables
- ✓ Classify Data Columns
- ✓ Score Data Columns, Data Table
- ✓ Map Business Terms to Data Columns
- ✓ Analysis Results in Workspace

Data Transformation
- ✓ Review a Transformation Job
- ✓ Create a Transformation Job
- ✓ Use the Visual Palette
- ✓ Compile, Run Job, View Output

Data Lineage
- ✓ Information Assets
- ✓ View Customer Demographics Data Lineage

Lab 13 – Organize – Deeper Dive – Review

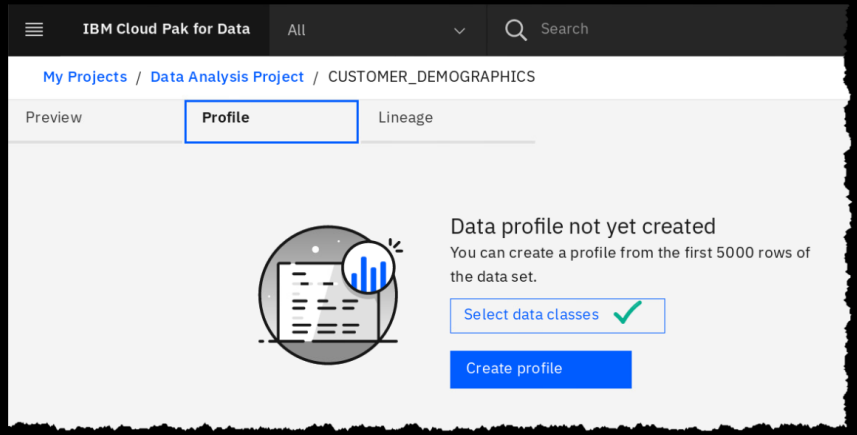
Preview Data – Ensure that you are looking at the correct (and useful) data

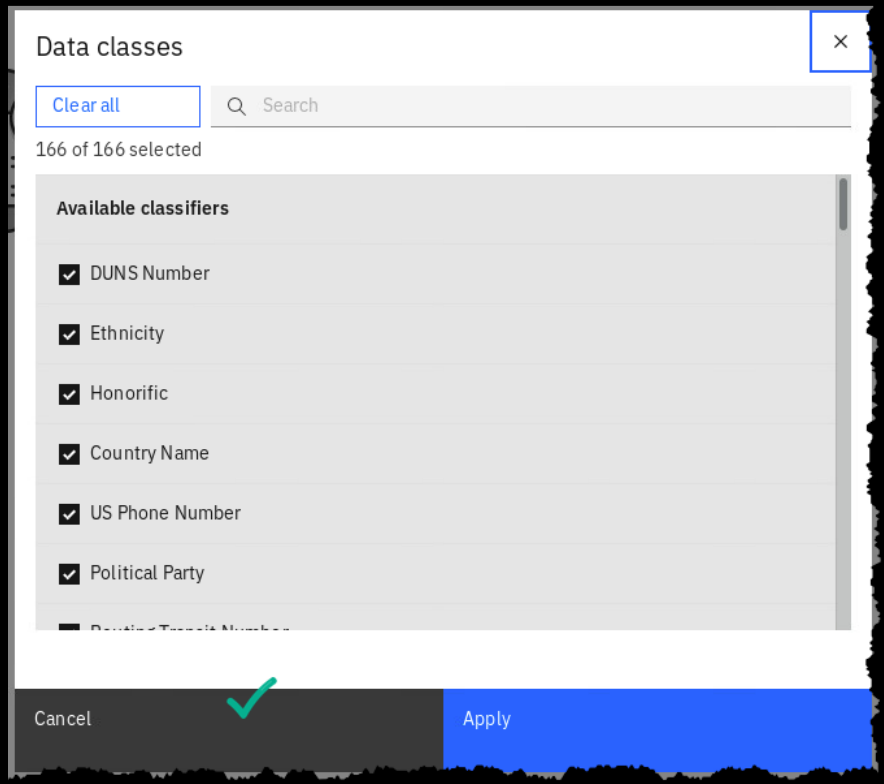


ID Smallint	GENDER String	STATUS String	CHILDREN Smallint	ESTINCO... Decimal	HOMEOW... String	AGE Smallint	TAXID String	CREDITC... Char	DOB Date	ADDRESS... String	ADDRESS... String	CITY String	STA Cha
0	F	S	1	38000	N	24	147889187	6549061697939	1947-11-11	159 HUTTON ST I		ABSECON	NJ
1	M	M	2	29616	N	49	113772166	6436360484417	1992-03-17	31 WOODLAND R		SAINT LOUIS	MO
2	M	M	0	19732.8	N	51	132420919	4849378808118	1907-09-08	1910 COCHRAN I		KEARNY	NJ
3	M	S	2	96.33	N	56	700548452	2926742654852	1980-04-29	187 HAYES MILL		RUSTON	LA
4	F	M	2	52004.8	N	25	141013706	4132500804622	1979-01-16	RR 1 BOX 57B		MONTGOMERY	AL
5	M	M	2	53010.8	N	19	163371244	2231773884473	1992-12-06	7850 45TH AVE N		CHESTER	MA
6	M	M	1	75004.5	N	65	182544864	7349439804241	1911-04-24	RR 1 BOX 47		NEW CASTLE	PA
7	M	M	0	19749.3	N	60	206227068	5553618912566	1912-11-23	515 KENSINGTO		ISSAQUAH	WA
8	M	S	1	57626.9	Y	44	131059071	9119007527242	1916-04-26	6077 STATE ROU		SHAVERTOWN	PA
9	M	M	2	20078	N	33	119762649	6813572896826	1977-02-09	188 W OLYMPIC I		EL PASO	TX
10	F	M	2	47902	N	26	817366094	2046608099384	1905-02-01	21579 LARAMIE		PHILADELPHIA	PA
11	M	M	1	7545.96	Y	17	451541224	4045479553572	1924-10-01	1 PLAINVILLE CI		HAVERHILL	MA
12	F	S	0	78851.3	N	48	124158559	8979358234254	1933-06-14	4716 SW VIOLA (		TENAFLY	NJ
13	F	S	1	17540.7	Y	63	163930462	9050922700714	1942-12-12	1 HAUN RD		PHAROAH	OK
14	F	M	0	83891.9	Y	61	165912006	6325263828540	1947-01-25	4220 BARDSTOW		ARENA	ND
15	F	M	2	28220.8	N	39	235315405	4562971044212	1946-02-20	10167 OAK HOLL		STRAUSSTOWN	PA
16	F	S	0	28589.1	N	16	730825728	8111200911782	1916-10-05	D18 CALLE 5		HOUSTON	TX
17	F	M	2	5237.63	N	49	908144755	1349244456282	1938-10-02	3579 N 47TH AVE		KENOSHA	WI

Lab 13 – Organize – Deeper Dive – Review

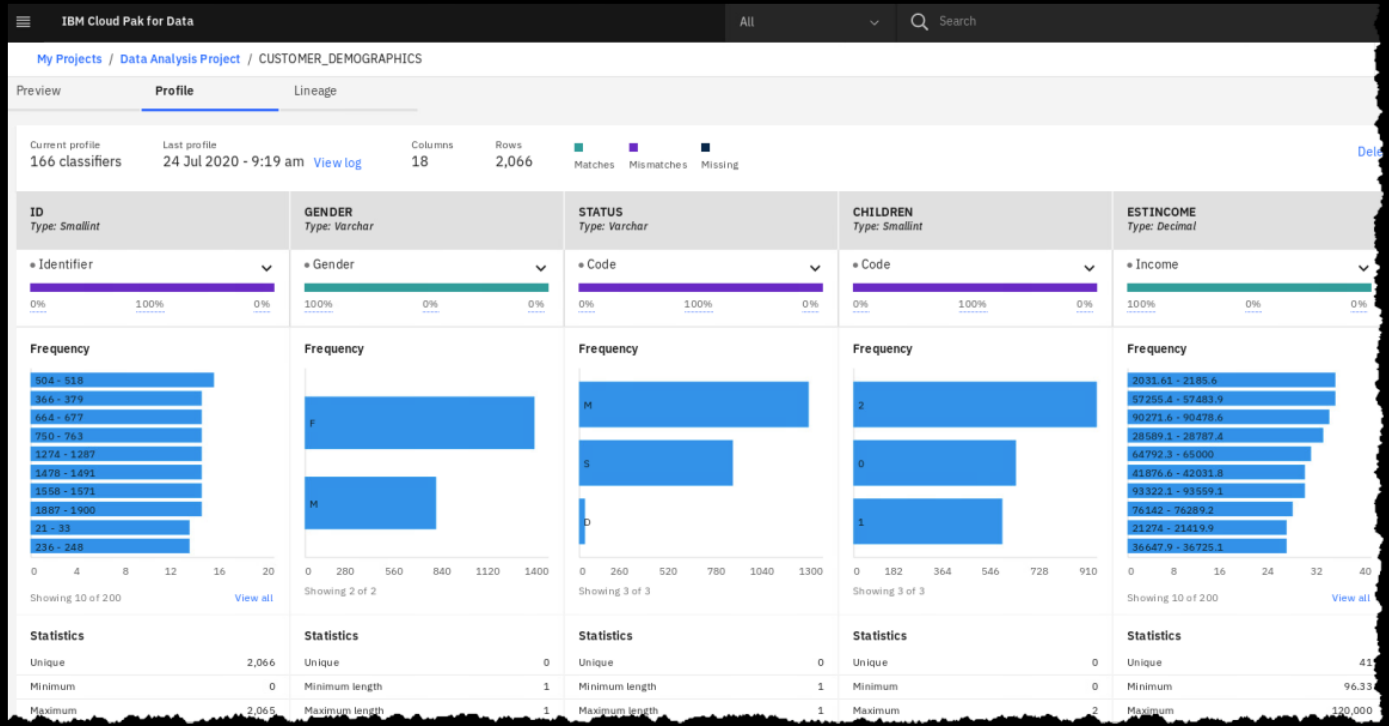
Data Classes – Classifiers for data. Many “out of the box”, but you can also create your own





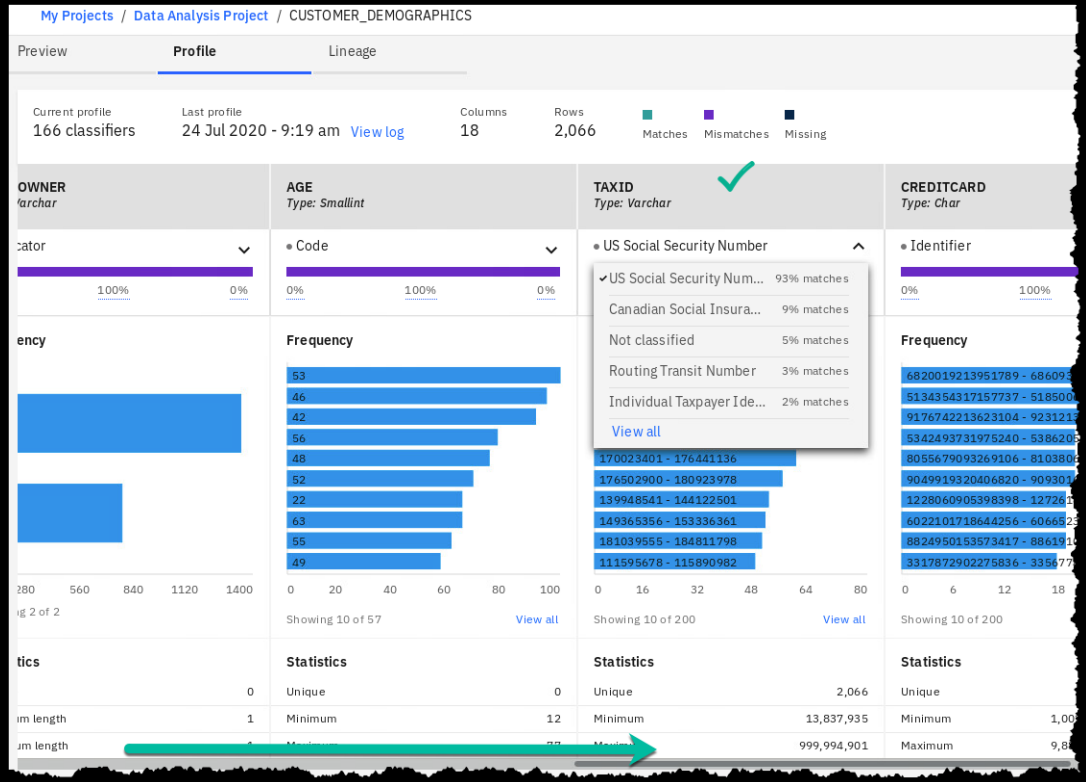
Lab 13 – Organize – Deeper Dive – Review

Data Profiling – Quick view of data anomalies, quality, frequency…



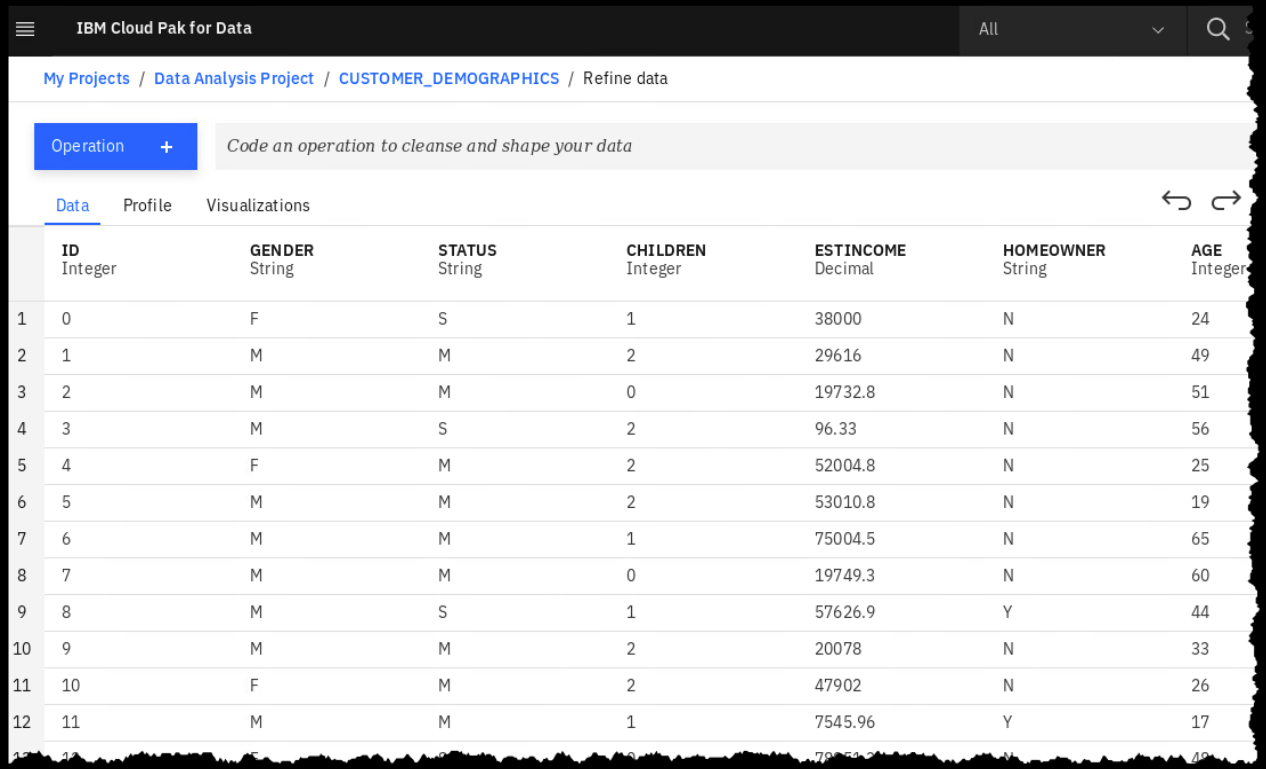
Lab 13 – Organize – Deeper Dive – Review

Data Profiling – …and ‘automatic’ linkage to different data classes (even in same field)



Lab 13 – Organize – Deeper Dive – Review

Data Shaping – can be used for ‘self service’ data shaping operations…

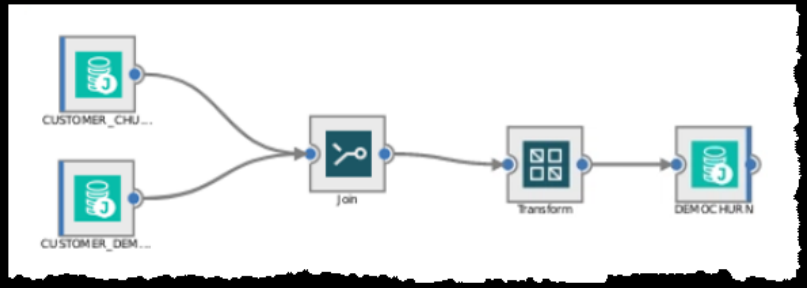


	ID Integer	GENDER String	STATUS String	CHILDREN Integer	ESTINCOME Decimal	HOMEOWNER String	AGE Integer
1	0	F	S	1	38000	N	24
2	1	M	M	2	29616	N	49
3	2	M	M	0	19732.8	N	51
4	3	M	S	2	96.33	N	56
5	4	F	M	2	52004.8	N	25
6	5	M	M	2	53010.8	N	19
7	6	M	M	1	75004.5	N	65
8	7	M	M	0	19749.3	N	60
9	8	M	S	1	57626.9	Y	44
10	9	M	M	2	20078	N	33
11	10	F	M	2	47902	N	26
12	11	M	M	1	7545.96	Y	17

Lab 13 – Organize – Deeper Dive – Review

Note that you are switching between capabilities seamlessly because they are on the same platform…

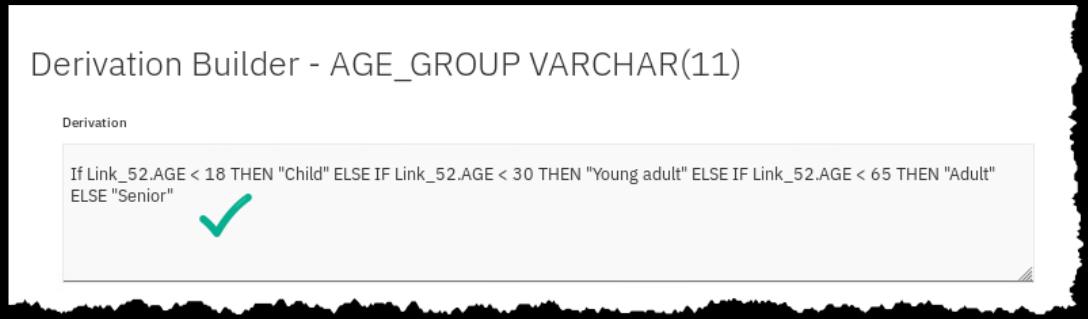
No need to spend time/effort “integrating the integration tools together”, more time working with the data and result sets



Lab 13 – Organize – Deeper Dive – Review

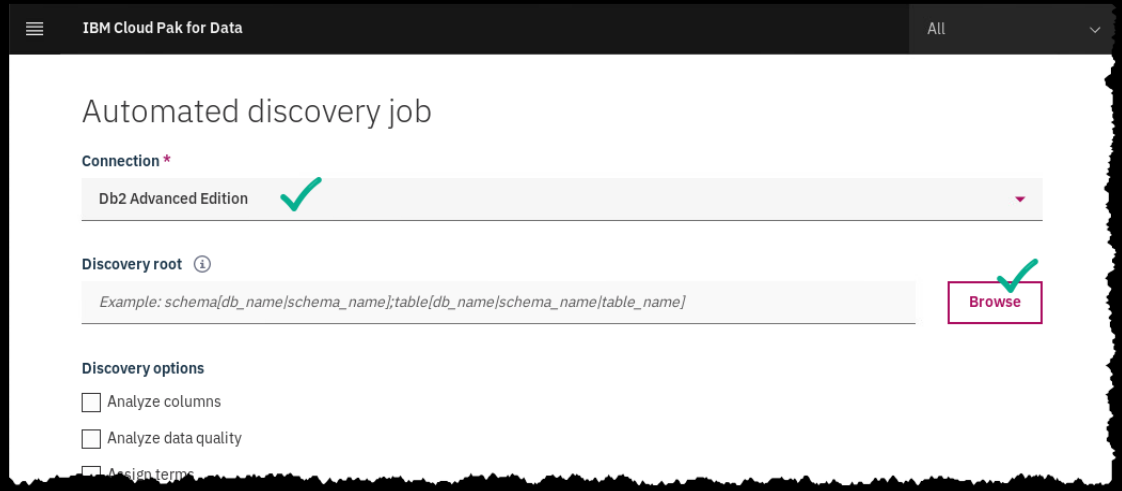
There can be several methods to transform the data for a use case.

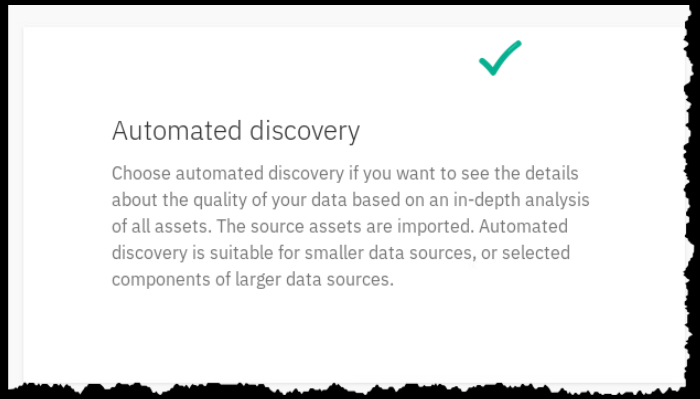
The Transformer stage contains a derivation builder - one way to create logic to your use case.

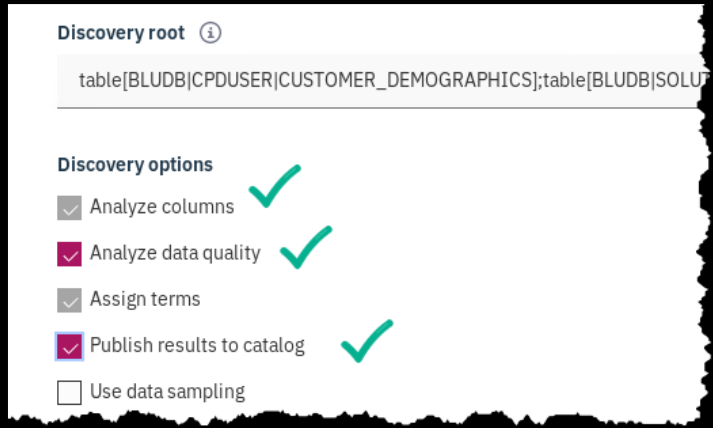


Lab 13 – Organize – Deeper Dive – Review

Automated Discovery –
Assess quality of data

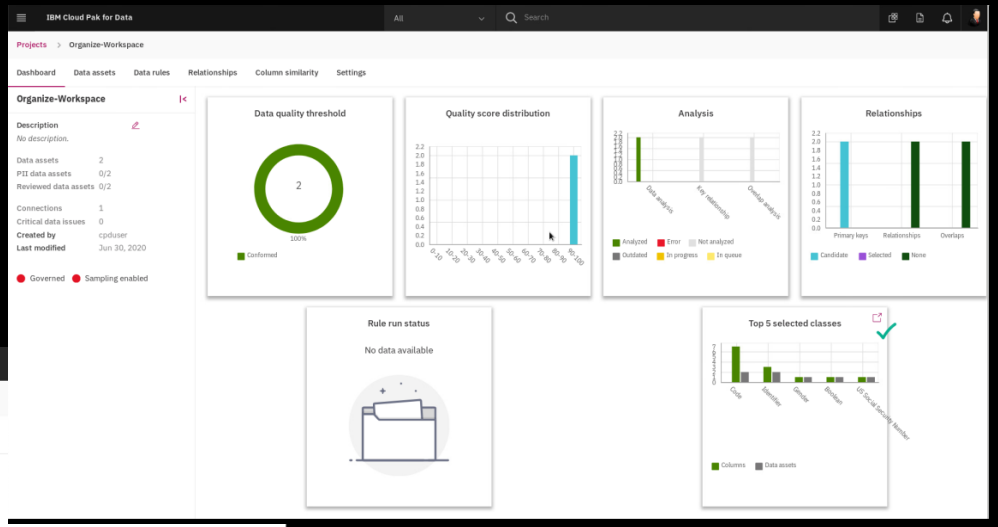


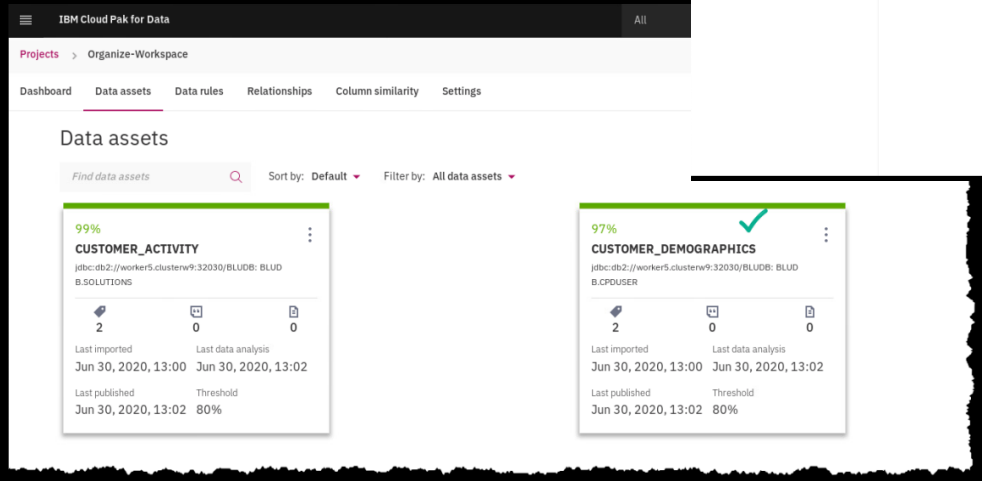




Lab 13 – Organize – Deeper Dive – Review

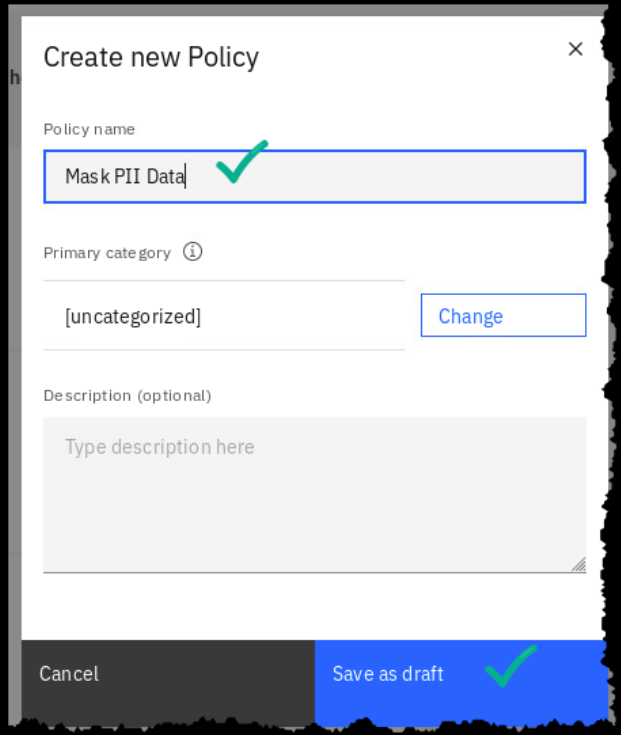
Automated Discovery –
Assess quality of data

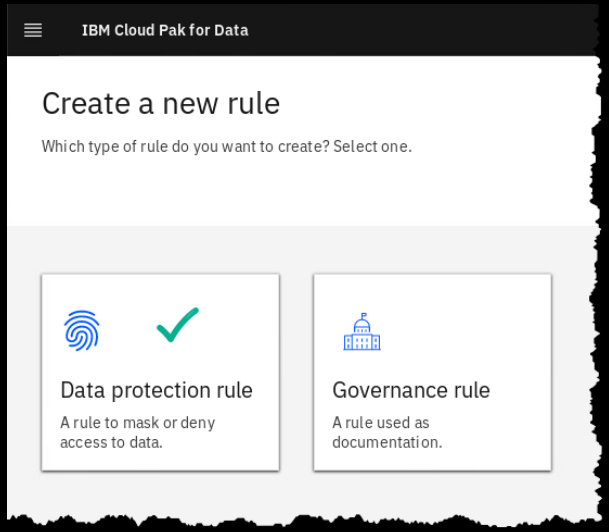




Lab 13 – Organize – Deeper Dive – Review

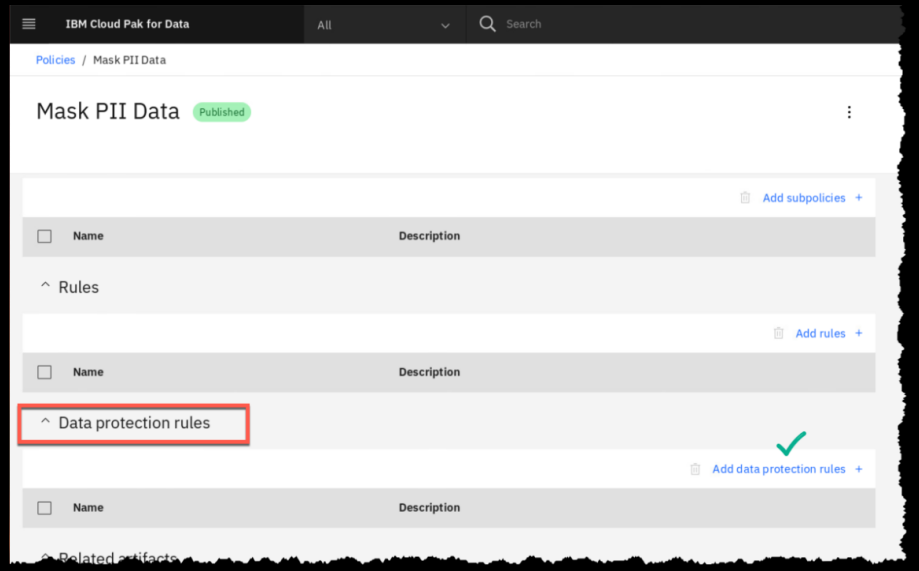
Data Protection rules
are tied to Policy

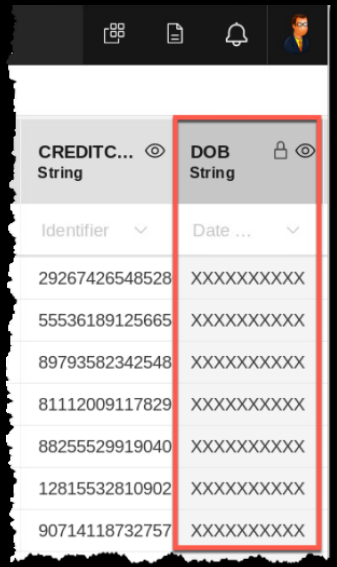




Lab 13 – Organize – Deeper Dive – Review

Note: This is ‘masking on the glass’.

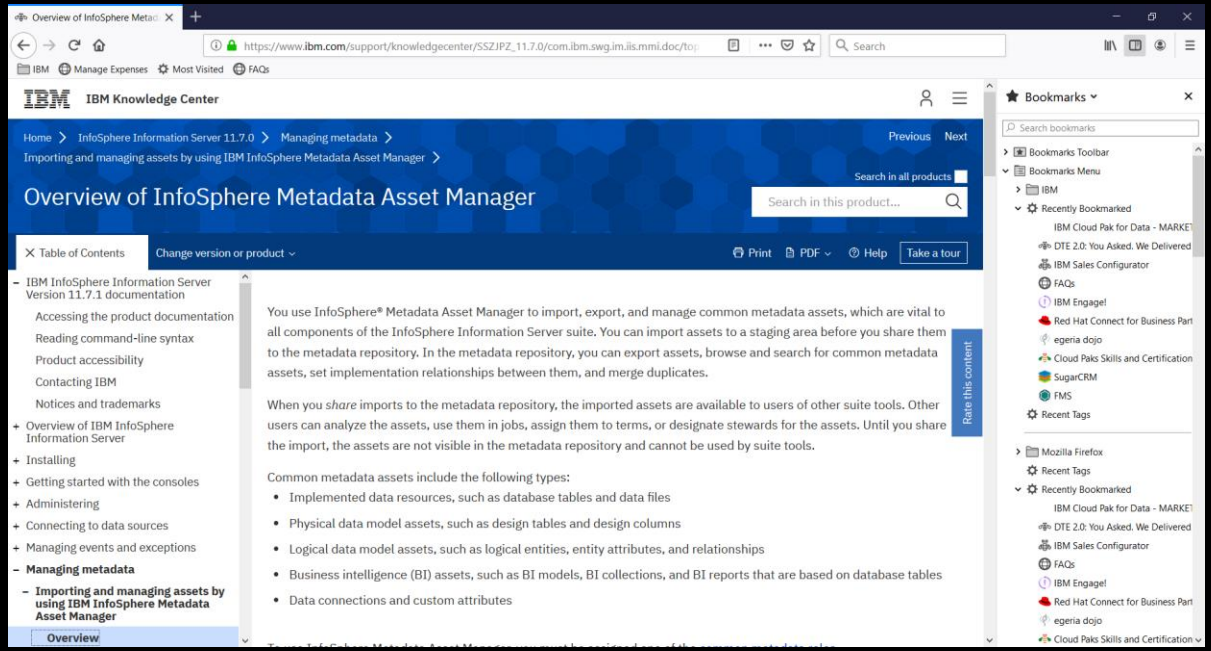




Lab 13 – Items of note (outside the labs)

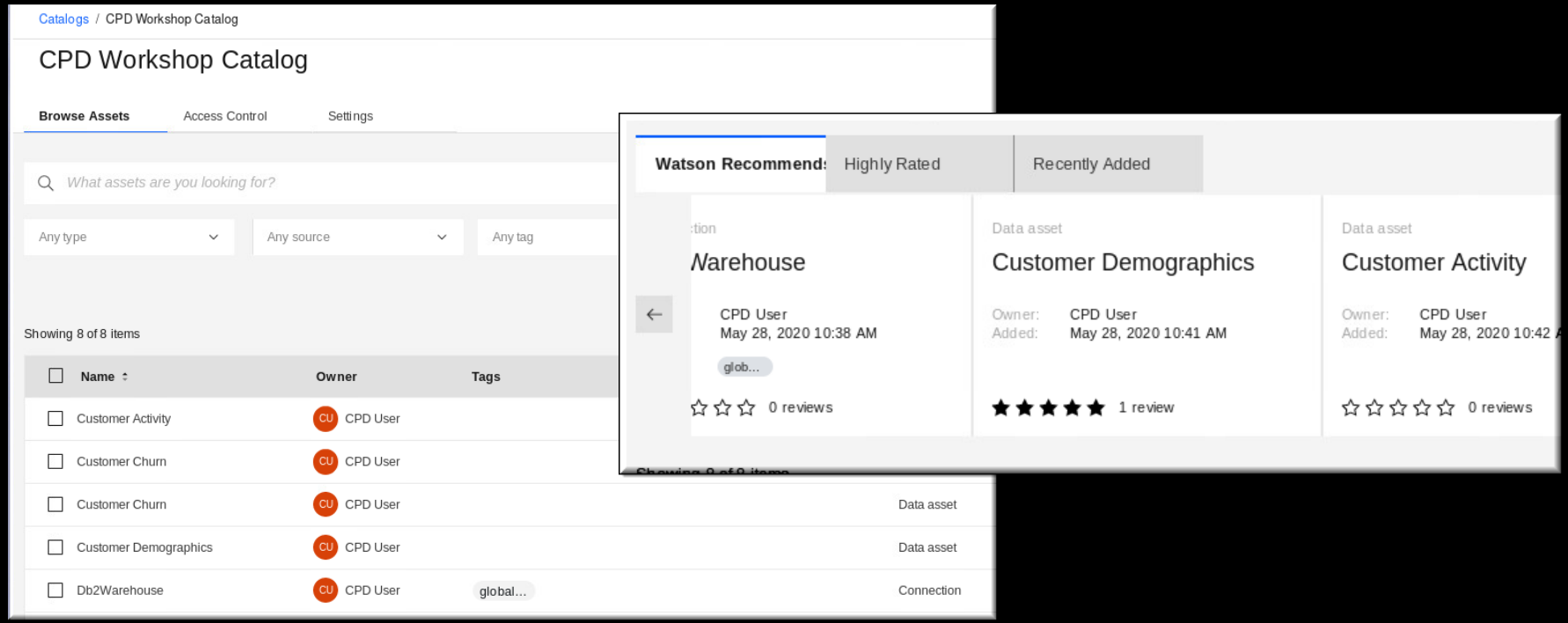
Metadata Asset Manager is used to import certain types of metadata assets into the metadata repository (such as logical or physical data models, Business Intelligence models, etc).

Provides a managed process for comparing assets and ensuring you are not re-ingesting structures



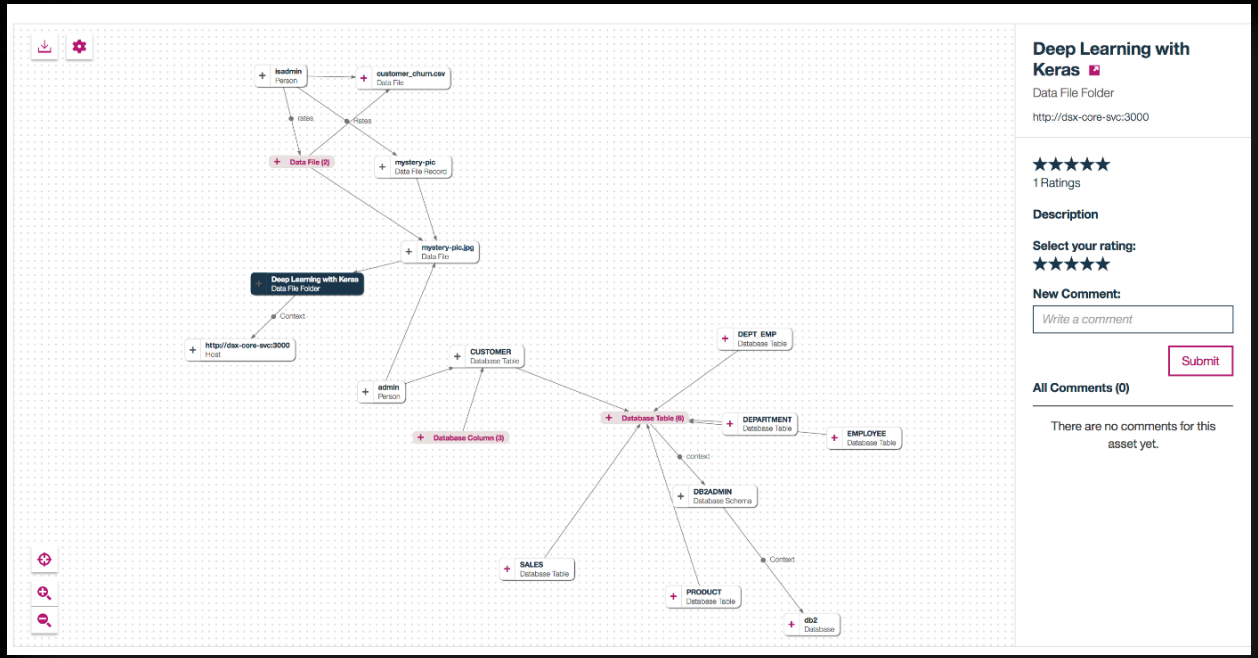
Lab 13 – Items of note (outside the labs)

You can ‘rate’ and ‘comment’ on assets

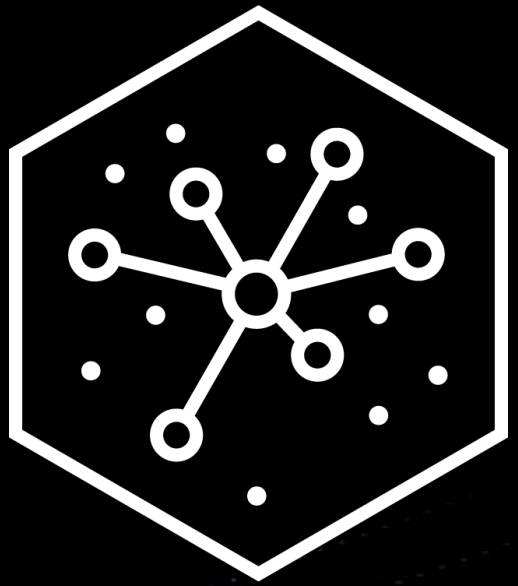


Lab 13 – Items of note (outside the labs)

Relationship/Graph viewer allows you to graphically explore relationships between artifacts in your catalog



Cloud Pak for Data 3.0.1



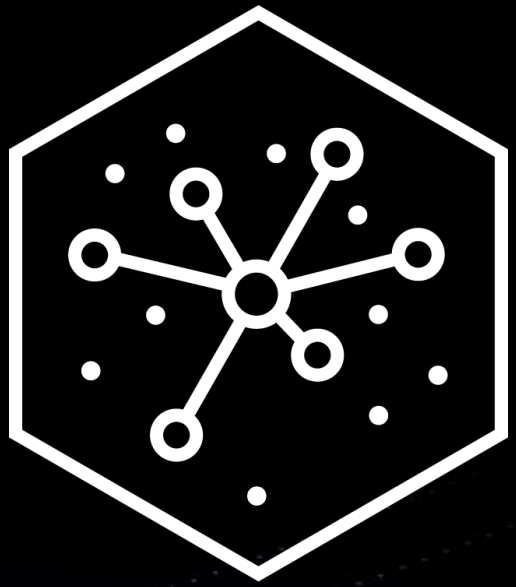
Work on Lab 13

Session restarts at 2 PM

IBM Analytics Modernization Workshop

Part 2

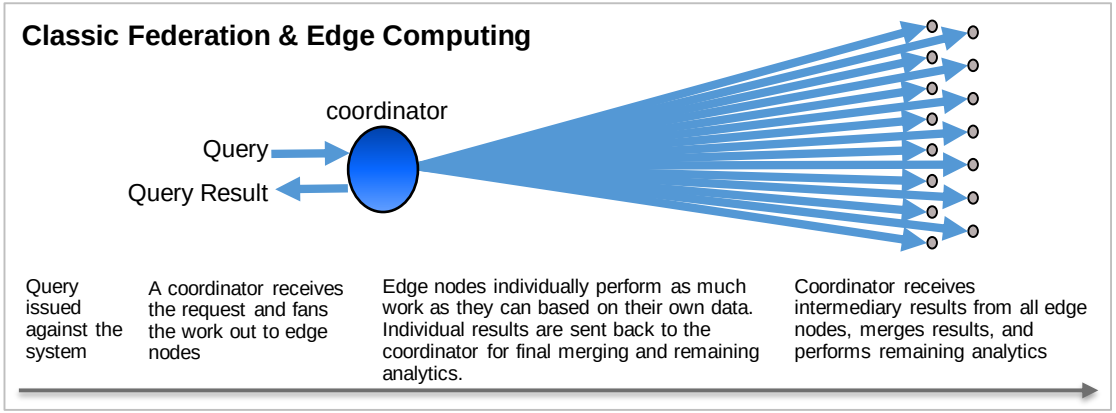
• Introduction • Business Use Case	• Lab 01 • Lab 02
• Collect: Connect • Organize – Deeper Dive • Collect: Virtualize	• Lab 03 • Lab 13 • Lab 05
• Analyze • Deploy • Infuse – OpenScale • Infuse – Cognos Analytics • Wrap up	• Lab 06 • Lab 07 • Lab 08 • Lab 09 • Lab 10



Collect

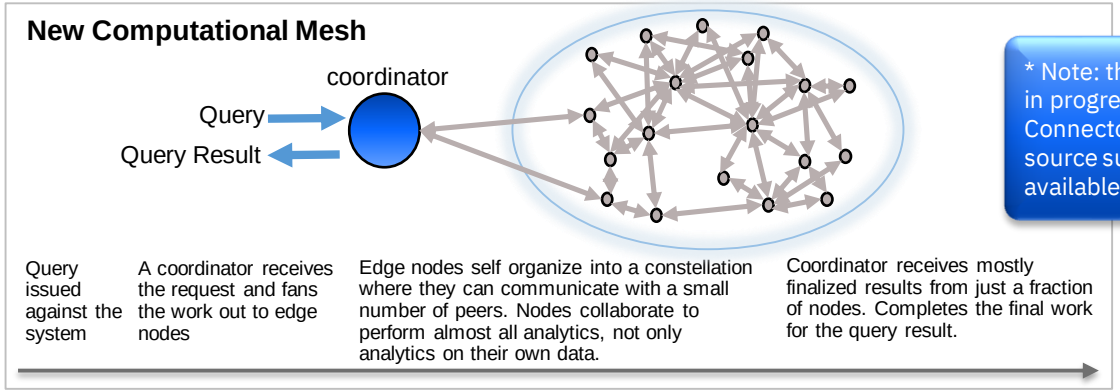
Lab 05 – Collect: Virtualize

CPD Data Virtualization
Constellation “Computational Mesh” benefit



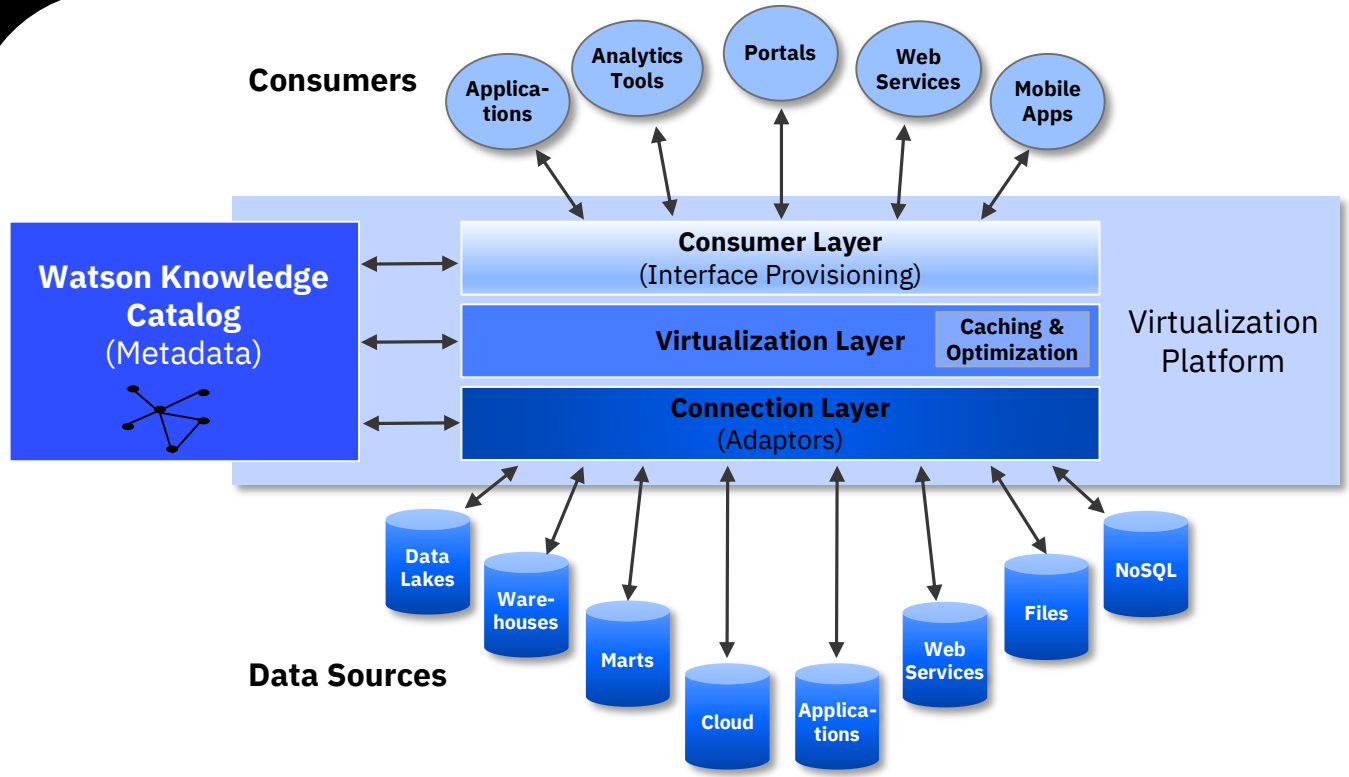
To be clear: Federation is a form of Data Virtualization and has been used successfully for many years in IBM products like Db2

CPD Data Virtualization uses a new Computational Mesh * approach which meets the performance demands of today’s modern data access requirements



* Note: this is a work in progress. Remote Connectors with data source support is available today.

CPD Data Virtualization
With Watson Knowledge Catalog (WKC) built in



- **Provides the ability to search, view, access, manipulate, and analyze data**
- **No need to know or understand its physical format or location**
- **No need to move or copy it**

CPD Data Virtualization
Benefits and use cases

Benefits

Simple:
- Self-discovering, self-organizing cluster
- Joins provide a one source input to analytics

Flexible:
- Once established, it is easy to add new sources to the constellation
- Integrates disparate data assets with simple automation, providing seamless access to data as one

Scalable:
- Can access thousands of sources, IOT and edge devices

Cost Effective:
- Leverages the compute resources of source systems to execute the SQL

Secure:
- Inherits privileges & masking policies of the data sources
- Built in governance, security, and access control

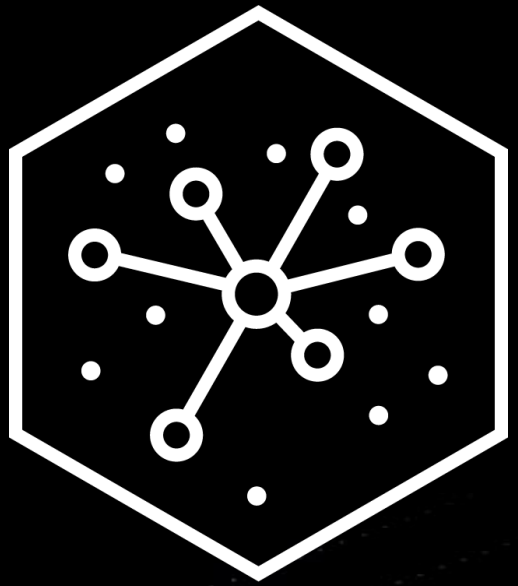
Use Cases

Data Scientists:
- Significant productivity increase getting access to sources discovery and assembly of data sets

Current State answer requirement:
- Current state required for up-to-date analytics
- One time access to data, then throw it away
  - e.g. “How much cash is ‘on hand’ across our branches worldwide?” “What is our current ‘claims’ liability?”

ETL and/or Data Governance saturation
- Self-service – In the event that Data Engineers cannot keep up with business demands for access to data

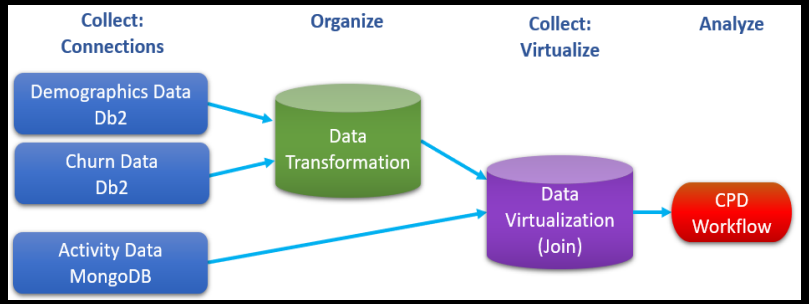
Cloud Pak for Data 3.0.1



Work on Lab 5

Session restarts at xx AM

Lab-5 Collect: Virtualize Review



Add Data Sources to Virtualization Facility
- ✓ DB2, MongoDB

Virtualize CUSTOMER_DEMOCHURN
- ✓ Select Table
- ✓ Add to Cart
- ✓ Virtualize in Project

Virtualize ACTIVITY01
- ✓ Select Table
- ✓ Add to Cart
- ✓ Virtualize in Project

Join Virtual Tables
- ✓ Based on ID Field
- ✓ Create View
- ✓ Preview View in Project

IBM Analytics Modernization Workshop

Part 3

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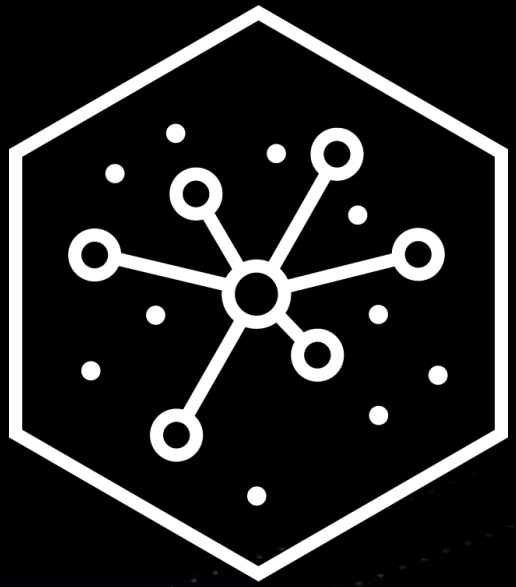
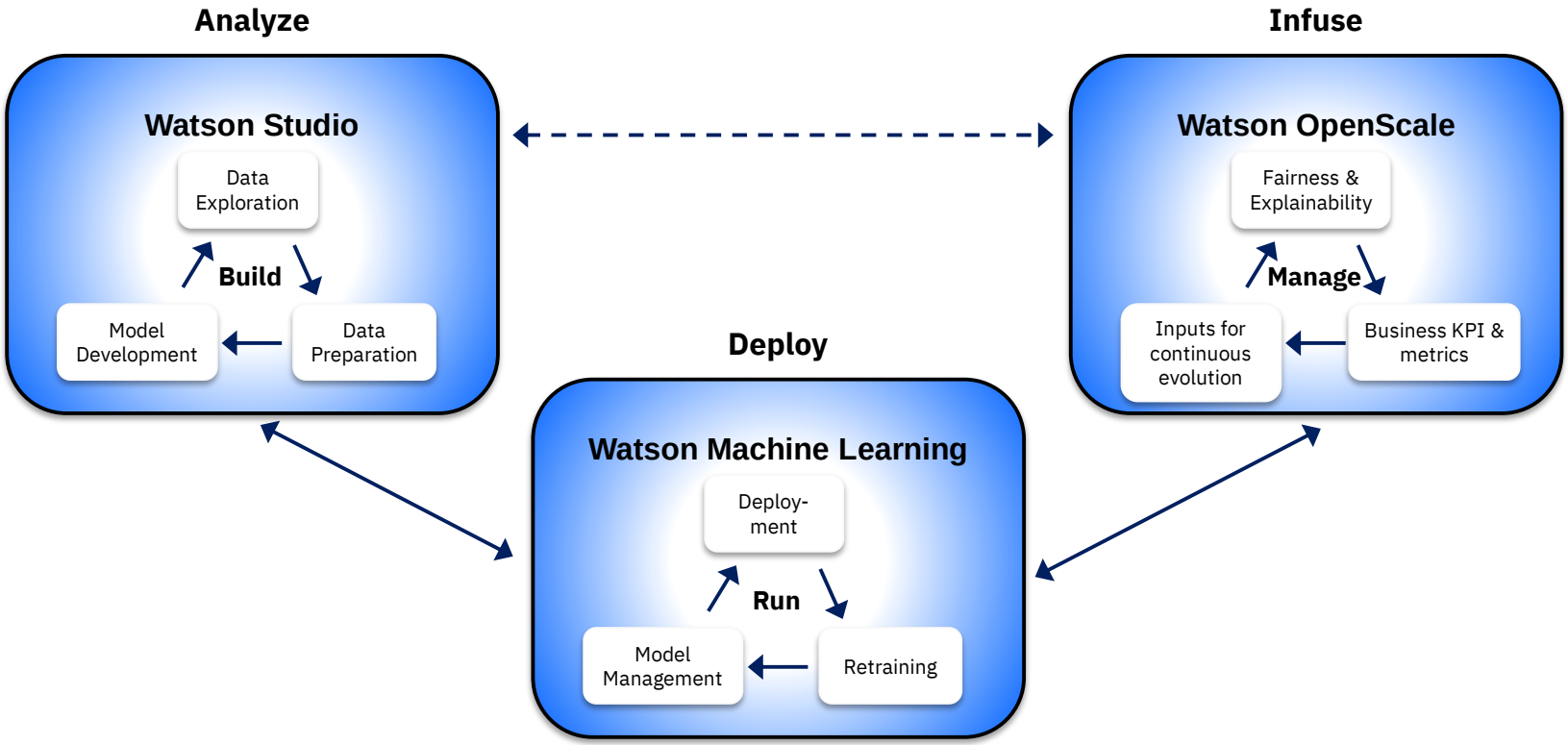


Analyze

Lab 06 – Analyze: AutoAI & Notebooks

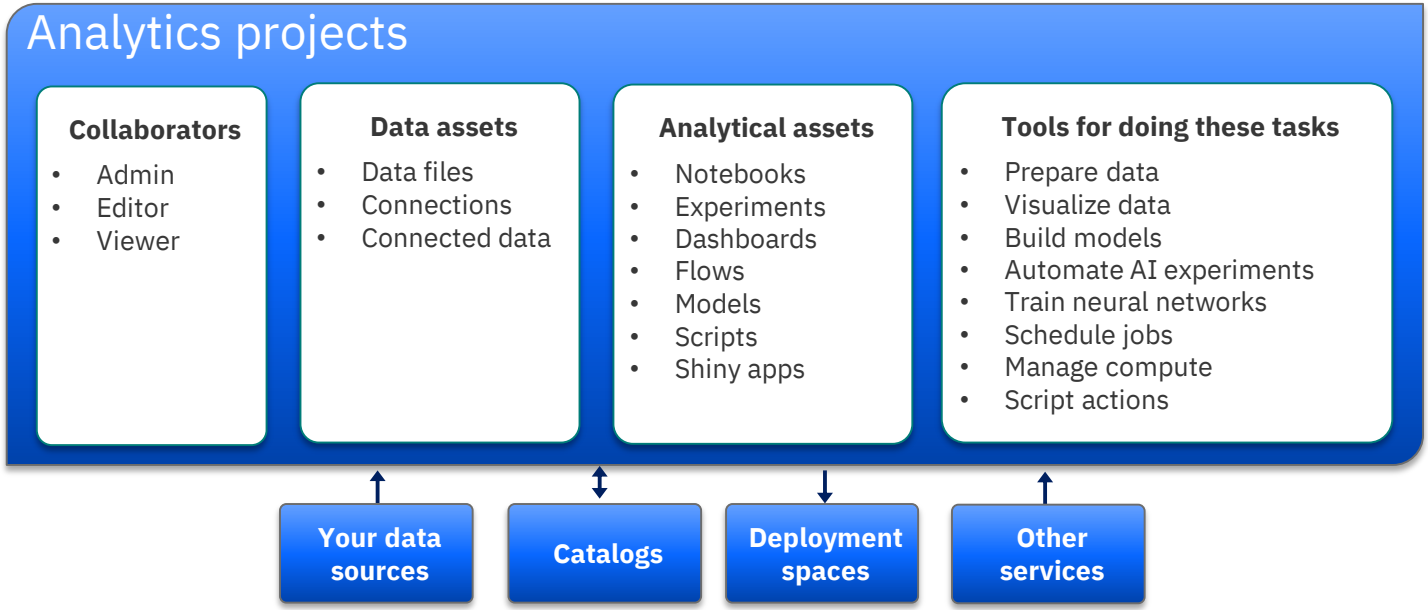
Analyze
The Data Science Lifecycle: Overview



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

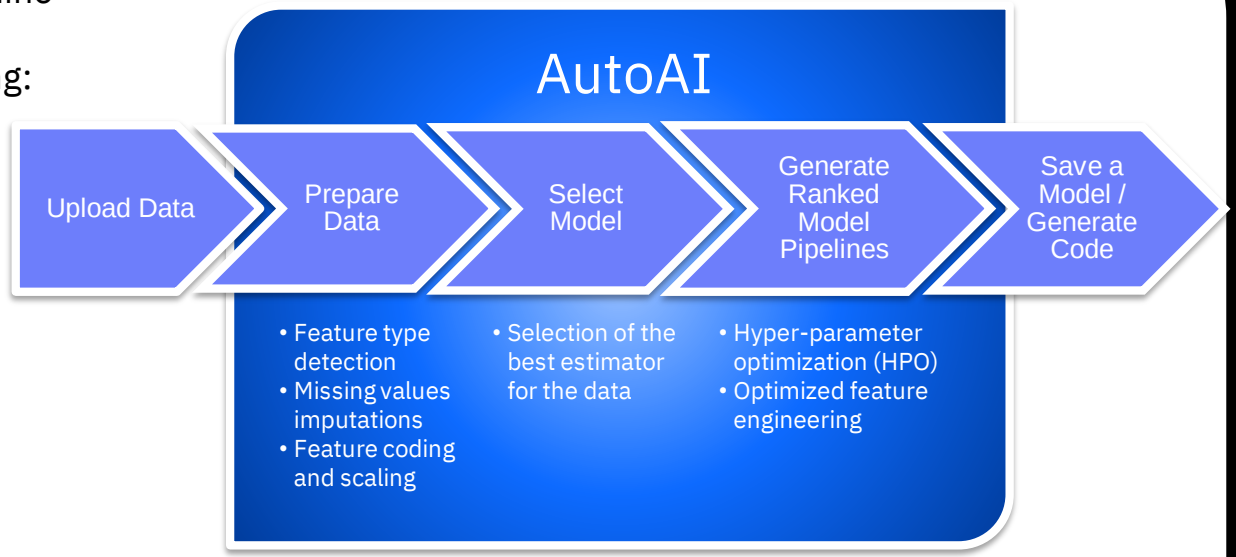
Analyze
AutoAI * – Overview

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**

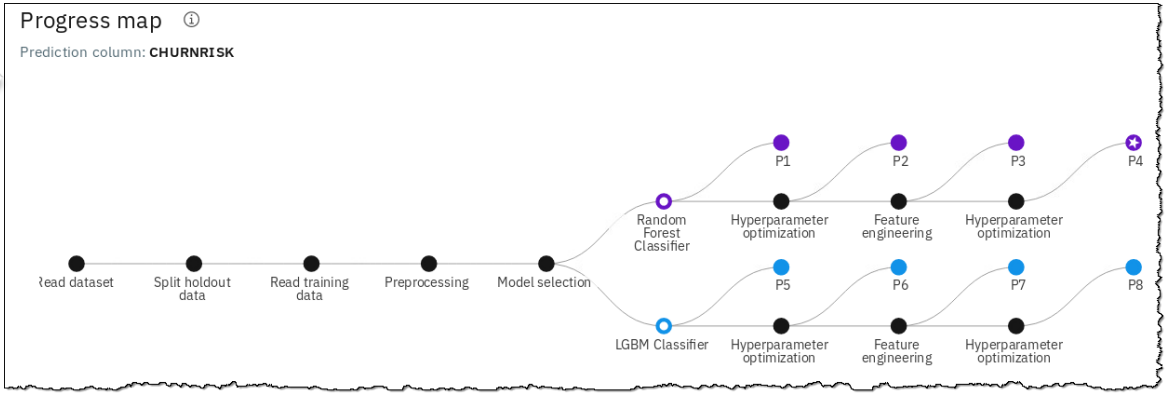


* AutoAI is enabled with the Watson Machine Learning service install, but it is driven through a Watson Studio Analytics Project

Analyze
AutoAI – Infographics

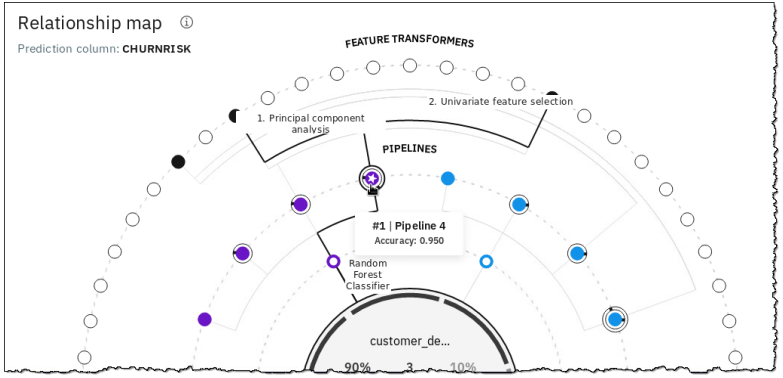
AutoAI Progress map

Displays a progress each step as it creates the best model for your data.



AutoAI Relationship map

Interactive infographic that shows the relationship of the pipelines, algorithms and the feature transformers.



Analyze
AutoAI – Pipelines

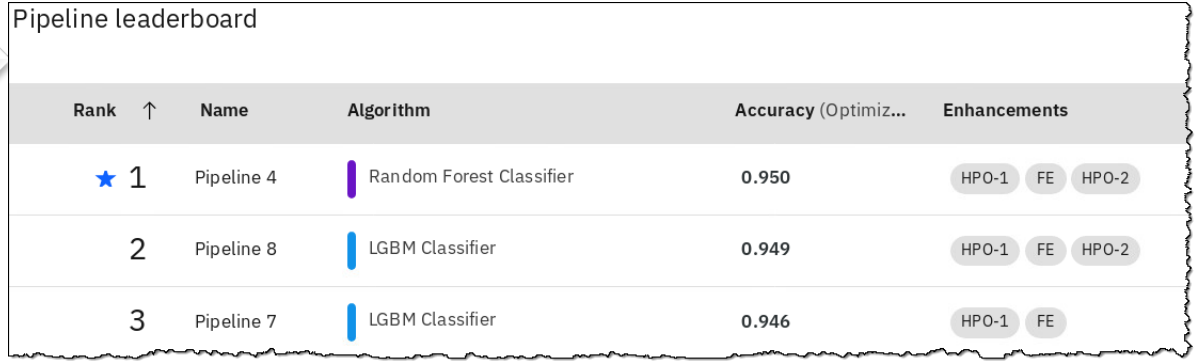
AutoAI pipeline leaderboard

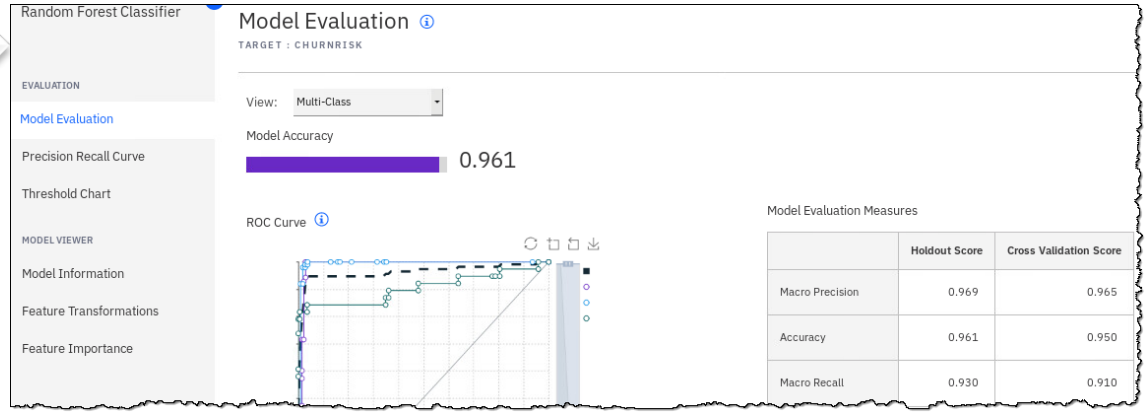
Shows the ranking of the pipelines for each potential model, the higher the better.

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
AutoAI – Benefits

1 Speed Model Selection

Shortlist top performing models in minutes instead of days/weeks

Drastically reduce neural network search time

2 Jump the Skills Gap

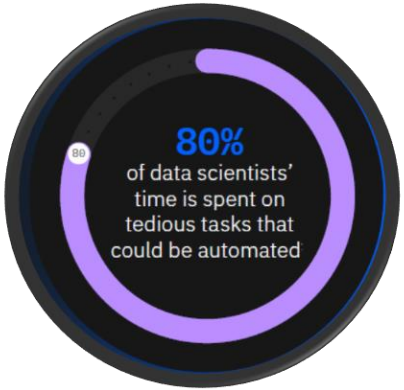
Go live with better models using the skill sets you have

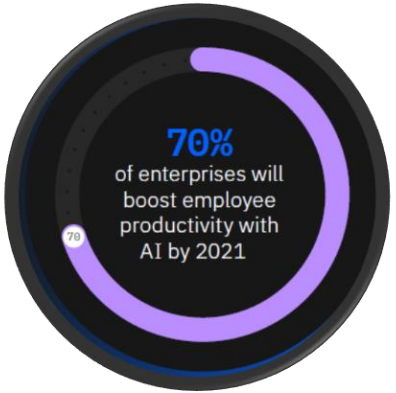
Increase repeatability and minimize human intervention

3 Drive Productivity

Get started with AI experiments without knowing how to code

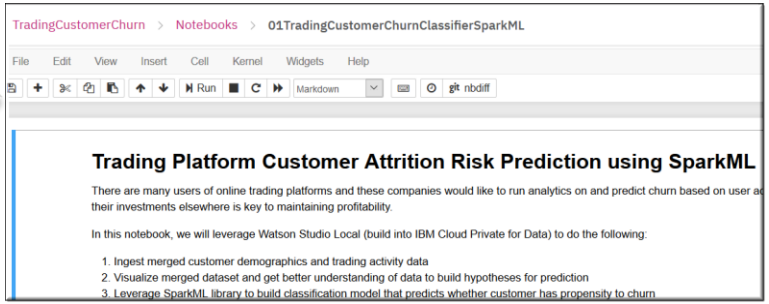
Do more innovative work instead of mundane tasks (e.g. lengthy feature selection process)



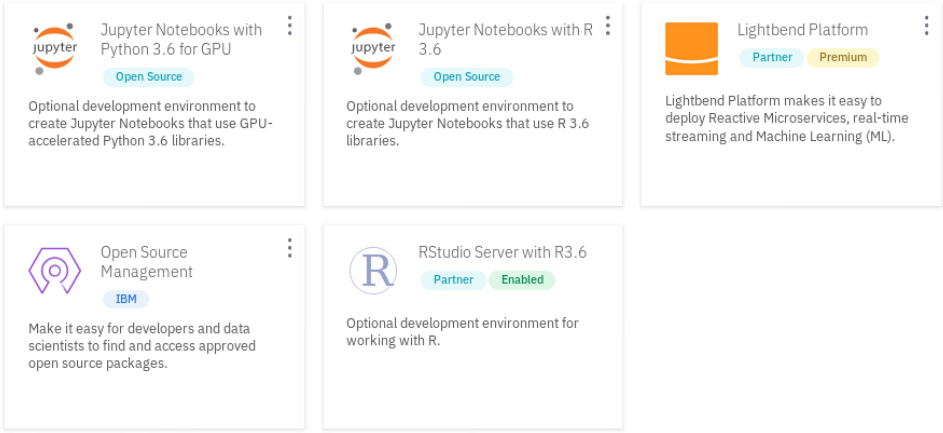


Analyze
Notebooks, RStudio and other tools

The default notebook environment:
Jupyter Notebook with Python 3.6

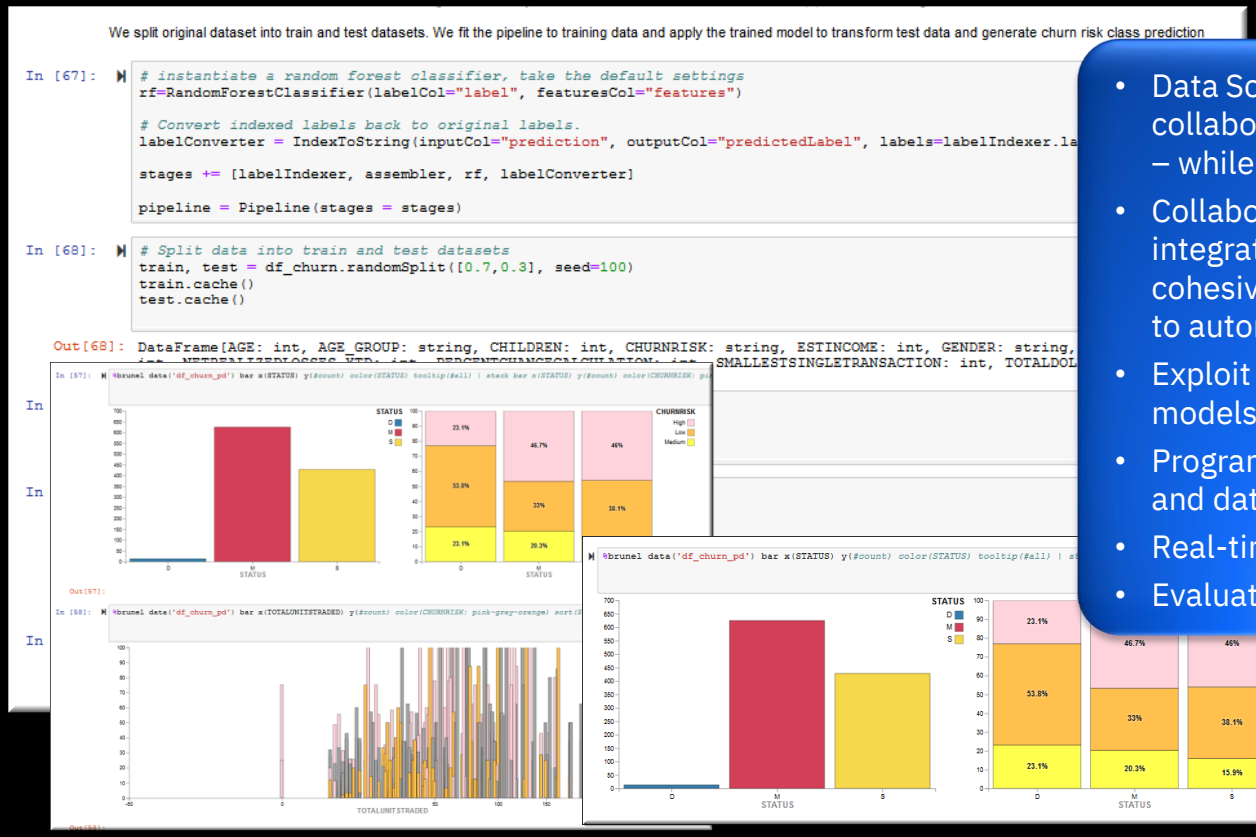


Developer tool services available:
- Jupyter Notebooks with Python 3.6 for GPU
- Jupyter Notebooks with R 3.6
- RStudio Server with R3.6
- Lightbend Platform
- OpenSource Management



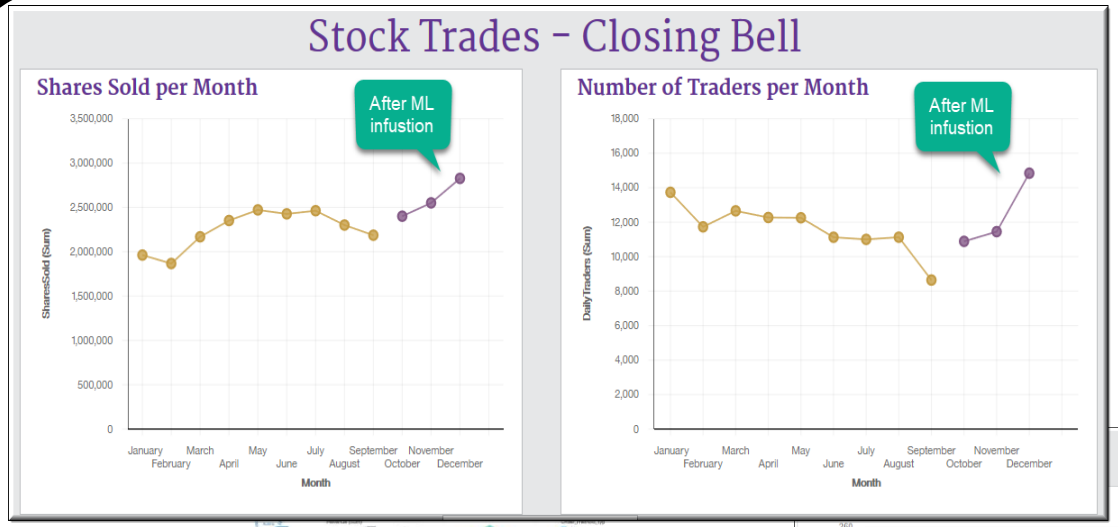
Analyze

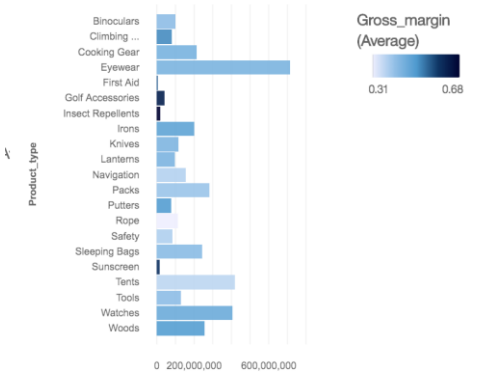
Watson Studio notebooks: Build Data Science & Machine Learning models

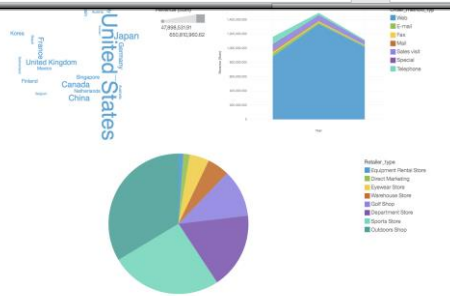


- Data Scientists and Data Engineers collaborate with each other in CPD platform – while still maintaining data governance
- Collaboration using GitHub or BitBucket is integrated into the platform, which brings a cohesiveness to the work culture and helps to automate CI/CD pipe line
- Exploit GPUs for 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
IBM Streams

IBM Streams has built-in streaming analytics

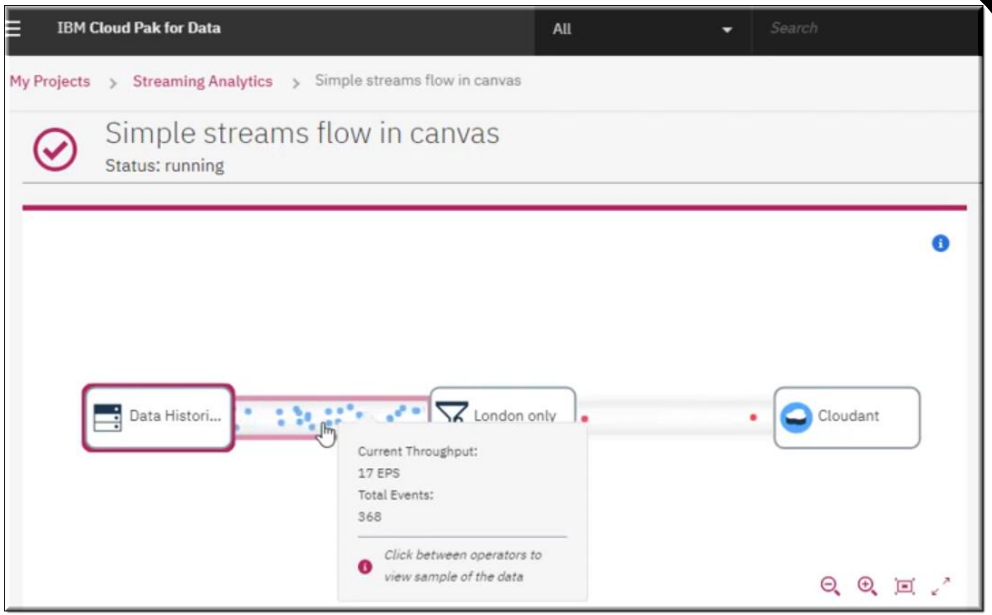
- No business disruption—run, score & update models continuously
- Machine learning, natural language, spatial-temporal, acoustic time series, etc.

Open architecture built for speed

- Millions of events per second for massive amounts of data analytics support
- Ultra-low latency clustered runtime
- Integrate via Kafka, JSON SQL/NoSQL & more

Rapid development

- Wizards, drag/drop development, performance dashboards, debugger
- Python, Java, Scala, PMML, R, C/C++ support
- VS Code and Atom plug-ins
- Export flows to a Python notebook



A streams flow consists of *operators*.

Every node on the streams flow canvas is an operator.

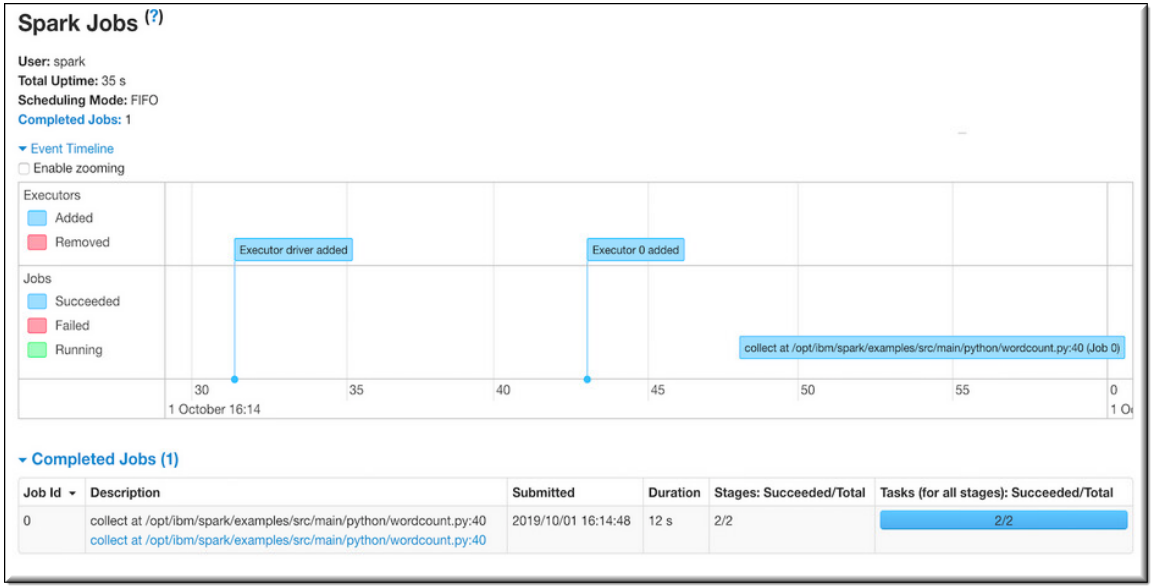
Operator types include: **sources, targets, data processing, alerts and real-time analytics**

Analyze
Analytics Engine - powered by Apache Spark

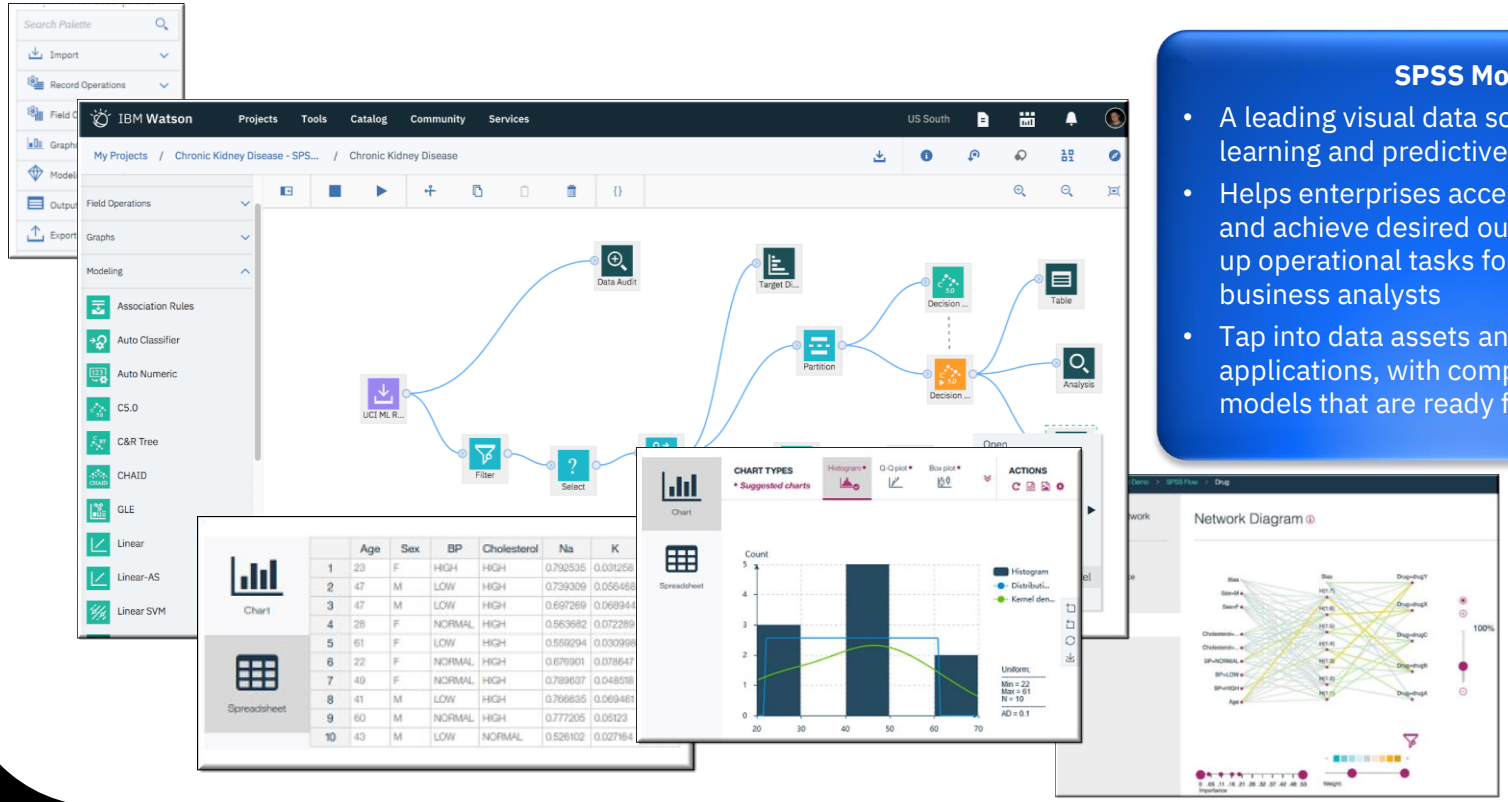
Analytics Engine is a serverless, performant, customizable and dedicated Spark engine that is available in seconds.

100% open source, Analytics Engine can run a variety of workloads on the CPD cluster:

- **Watson Studio notebooks that call Apache Spark APIs**
- **Spark application that run Spark SQL**
- **Data transformation jobs**
- **Data Science jobs**
- **Machine Learning jobs**



Analyze
Premium Service: SPSS Modeler



SPSS Modeler

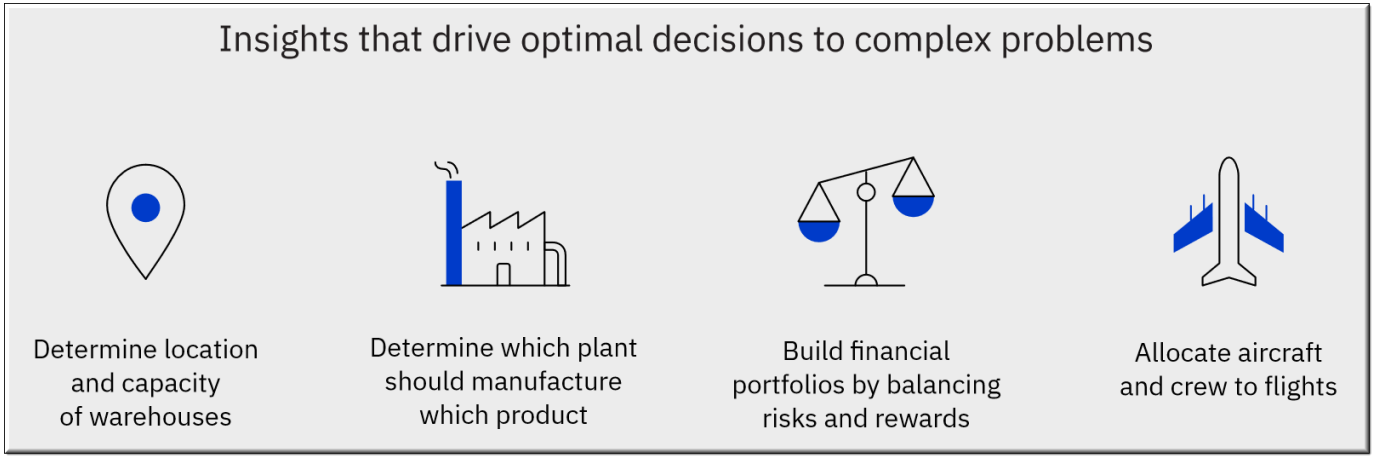
- A leading visual data science and machine-learning and predictive analytics solution
- Helps enterprises accelerate time to value and achieve desired outcomes by speeding up operational tasks for data scientists and business analysts
- Tap into data assets and modern applications, with complete algorithms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



Analyze
Watson Machine Learning : WML Accelerator for Deep Learning

The **Experiment Builder** GUI interface is available from a WML project when you install the **WML Accelerator**. It is the simplest method to perform Deep Learning experiments.

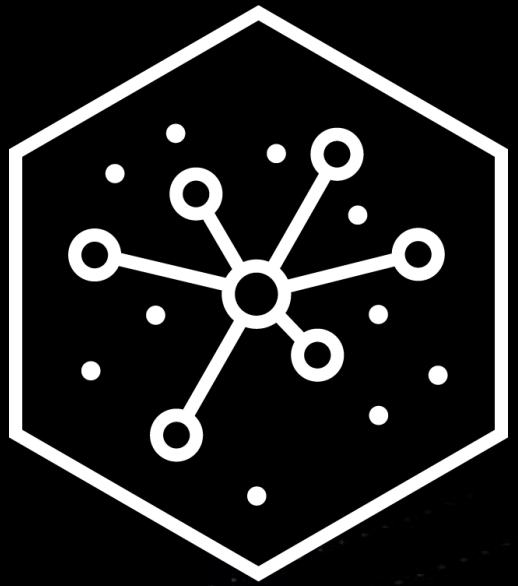
The Watson Machine Learning Accelerator has the following components:

- **IBM Spectrum Conductor Deep Learning Impact version 2.1.0:**
  Provides robust, end-to-end workflow support for deep learning application logic for the complete lifecycle management from data ingest and preparation to building, optimizing, training and testing the model.
- **IBM Spectrum Conductor version 2.4.0:**
  A *highly available* and resilient *multitenant distributed* framework, providing deep learning application lifecycle support, centralized management and monitoring, and end-to-end security.
- **Deep Learning Frameworks:**
  TensorFlow, PyTorch, Keras, and Caffe
- **Deep Learning Rest API**

Key Features

- Supported AI frameworks with performance optimizations for GPU acceleration
- Transparent GPU Topology for Distributed Training
- Auto Hyper Parameter Optimization (HPO)
- Multi-Tenancy for Training and Inference
- Elastic Distributed Training (EDT)
- Resource Utilization, Monitoring, and Reporting
- Elastic Distributed Inference (EDI)
- Secure Deployment Model
- Role Based Access Control / Kerberos Authentication

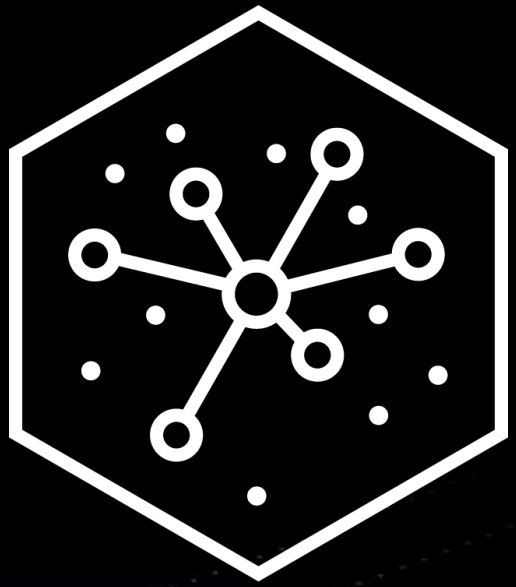
Cloud Pak for Data 3.0.1



Work on Lab 6

Session restarts at xx PM

Wrap up



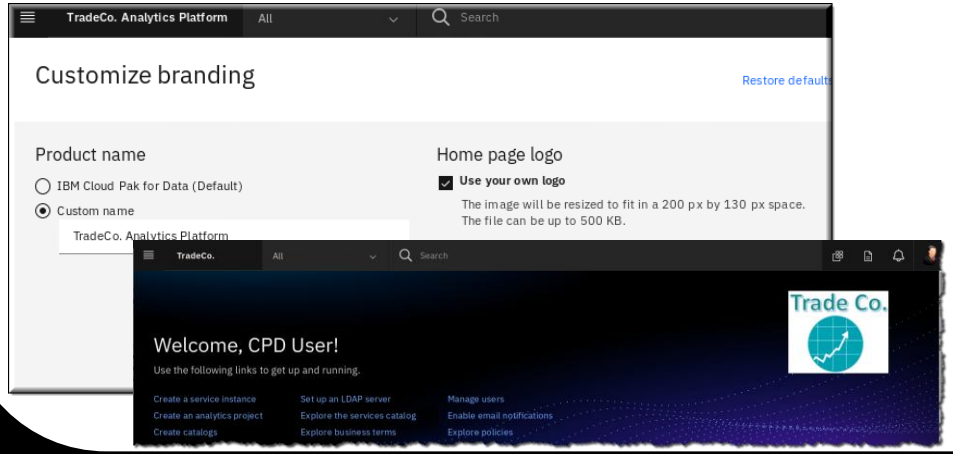
Cloud Pak for Data
Unified Experience

Customized Logo and Branding

Example: Customize the web client interface per tenant.

Customizable components in the Home Page:

- **Product name**
- **Home page logo**



Group 1 language support

All services in Cloud Pak for Data are translated for the following languages:

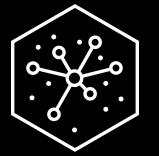
- **Simplified Chinese**
- **Traditional Chinese**
- **Japanese**
- **French**
- **German**
- **Italian**
- **Spanish**
- **Brazilian Portuguese**

Carbon 10

Modernized, modular and flexible open source design framework

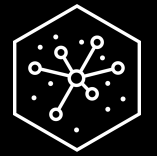
- Consistent look and feel
- Reusable components

Cloud Pak for Data
Version 3.0.1 notable updates



Update	Comment
Support for POWER systems	Build an AI foundation for speed and scale with the premier, built-in GPU acceleration platform for faster time to AI.
OpenShift Container Storage	Software-defined Storage automated for quicker and efficient hybrid multi-cloud deployments and optimized for Red Hat OpenShift Platform.
Red Hat OpenShift 4.x support	Or continue to run on RHOCP 3.11.
IAM Integration	IBM Cloud Platform Common Services (CPCS) IAM for all Cloud Paks provides authentication support via the OpenID Connect (OIDC) specification for SSO capability.
Fine-grained permissions	4 New fine-grained permissions: • Configure authentication • Configure platform • Manage users • Monitor platform
Operations Management	New utilities for upgrade, backup and restore, import and export

Cloud Pak for Data
Security Considerations



Security Features
- ✓ Security Architecture and Design
- ✓ Access Control, Authentication and Authorization (e.g. integrates with leading LDAPs)
- ✓ Data Protection
- ✓ Security Logging

Security Engineering
- ✓ Development trained in Secure Coding Practices
- ✓ Secure Engineering Development Practices: threat modeling, risk assessment, static and dynamic code analysis, penetration testing, container scanning, etc.

Security Operations
- ✓ Audit Log consolidation and analysis
- ✓ User access management
- ✓ Security Incident Management

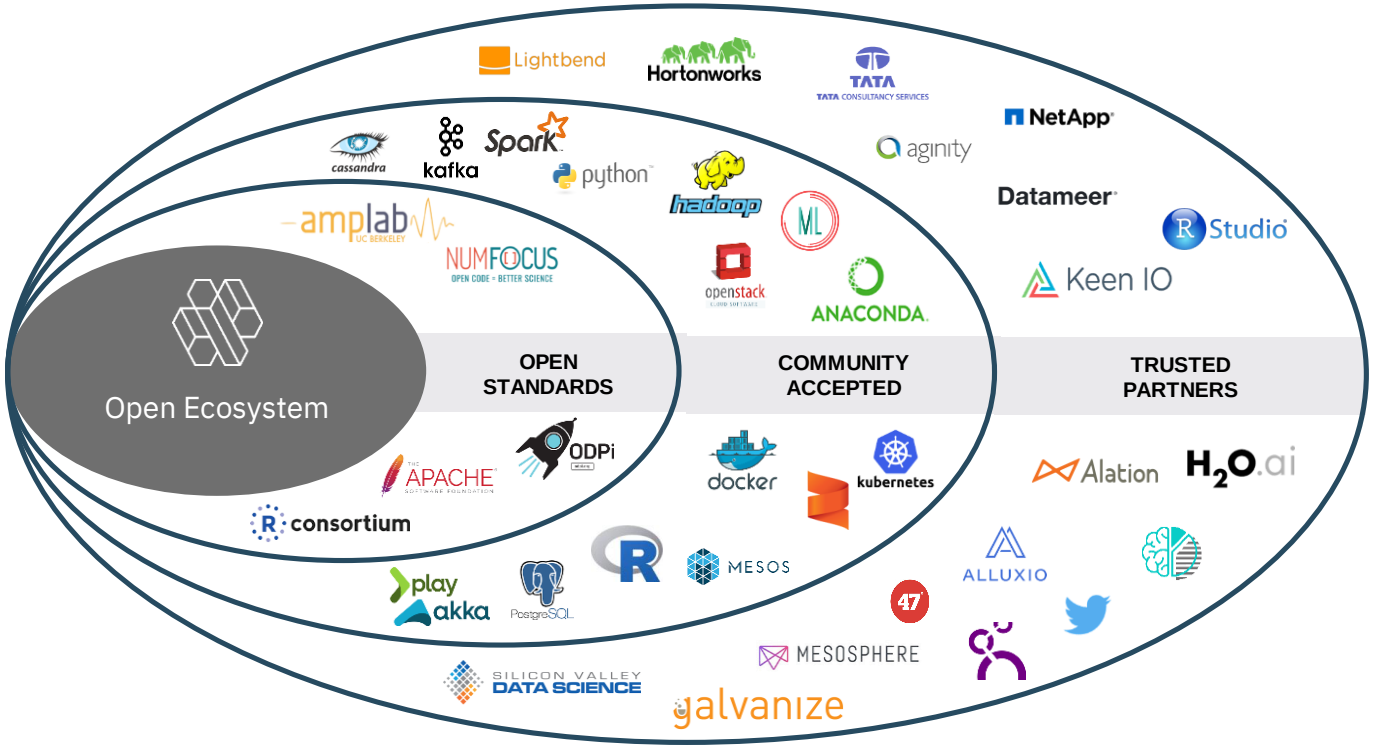
Governance & Compliance
- ✓ Compliance Controls defined by Outside Agencies
- ✓ System Security Plans for maintaining compliance security postures

Compliance Best Practices:

FISMA High *"ready"* with System Security Plans, spanning 350 controls:
- Risk Assessment
- Certification, Accreditation and Security Assessments
- System Services and Acquisition
- Security Planning
- Configuration Management
- System and Communications Protection
- Personnel Security
- Awareness and Training
- Physical and Environmental Protection
- Media Protection
- Contingency Planning
- System and Information Integrity
- Incident Response
- Identification and Authentication
- Access Control, Accountability and Audit

GDPR *"readiness"* considerations

CPD built on an open Ecosystem
Where IBM leads, partners and co-creates



IBM's approach to Open technology: https://developer.ibm.com/articles/cl-open-architecture-update/

CPD Multi-cloud support

Build Once - Run anywhere
In your own data center
Or the cloud infrastructure of your choice

Your Data Center

IBM Cloud

OPENSHIFT

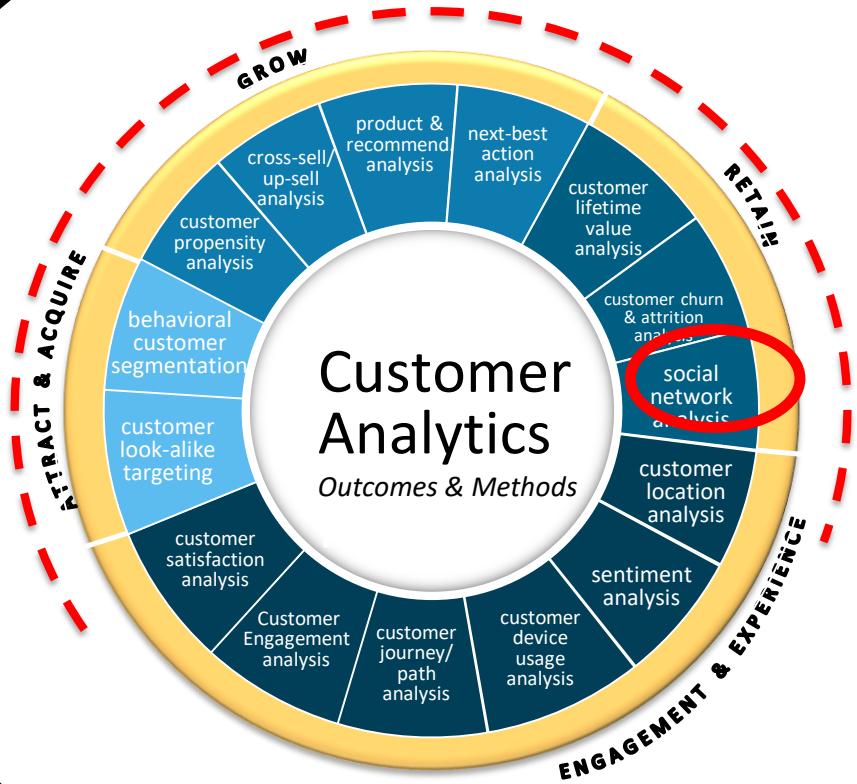
openstack™

amazon web services™

Microsoft Azure

Helps avoid vendor lock in

CPD Use Cases
Industry agnostic



Create a Customer Focused Enterprise

- Rich profile for every customer kept up to date in real time as new customer behaviour is collected (360 view)
  - Spending Patterns
  - Behaviour
- Deliver tailored offerings based on segmentation
- Provide “next best action” in real-time

These use cases apply to most industry verticals

CPD Use Cases
Industry specific

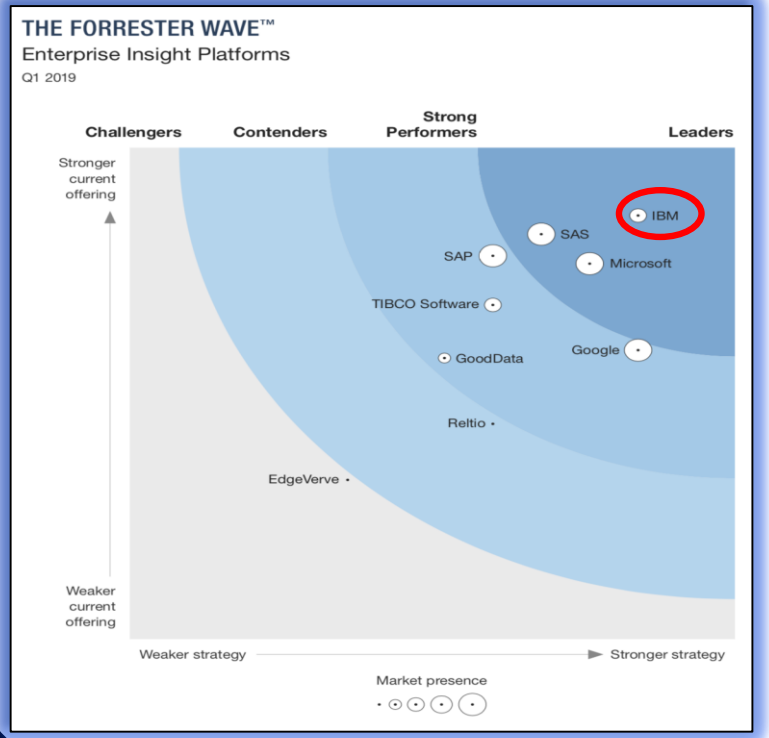
Over 24 Data Science & AI use-cases across 15 industry verticals (*applicability varies by customer*)

Cloud Pak for Data differentiation :

- Operationalize models in a matter of minutes (Deploy, scale & manage models with minimum effort)
- Model governance (Lineage and provenance – Who created, when, what data was used, comments, ratings etc.)

Use Case(s)	Aerospace & Defense	Automotive	Banking	Chemicals & Petroleum	Consumer	Education	Electronics	Energy, Environmental & Utilities	Financial Markets	Government	Healthcare & Life Services	Insurance	Industrial Products	Telco, Media & Entertainment	Travel & Transportation
Predictive Maintenance	X							X							X
Real time analytics (IOT)	X	X		X										X	
Customer Churn / Retention		X	X											X	
Anomaly Detection	X	X					X						X		
Regulatory Compliance			X						X			X			
Anti-Money Laundering (AML)			X												
Cross Sell / Up-Sell			X		X										
Demand Forecasting				X			X	X							
Inventory Optimization					X										
Retention & Time to Degree						X									
Application modernization						X									
Student Safety						X									
Predictive Customer Insights			X					X							
Counter Fraud & Payments									X		X				
Clounter Party Credit-risk									X						
Client Insights for Wealth Management									X						
Threat Prediction & Prevention										X					
Patient Diagnosis											X				
Data Privacy											X				
Client Risk Scoring			X									X			
Targeted Ads														X	
Intrusion Detection	X													X	
Route Optimization															X

Cloud Pak for Data
Ranked #1 by Forrester for “Enterprise Insight Platforms”



Enterprise Insight Platforms - Definition

- Enterprise insight platforms pre-integrate most — or all — of the technology required to build systems of insight and thus help business move faster. The need to move faster and change more easily is the driving force behind customer demand for these platforms.
- Vendors that can better support all the personas of an insight team with unified experiences that feature governance and can creatively enable hybrid cloud and multi-cloud delivery will win.

Forrester on “ICP for Data”

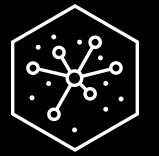
IBM has an impressive portfolio of individual data management and analytics capabilities that have consistently scored well on individual component Forrester Waves. With ICP for Data, IBM has pre-integrated capabilities that allow clients to be productive in a week or less. We were also impressed with its ML-assisted data cataloging and governance tools. IBM’s platform uses Kubernetes to deploy on-premises or into the public cloud. Lastly, IBM’s support for different insight team personas through tailored but unified experiences is commendable. Firms looking to unify the work of insight teams will do well on this platform.

Forrester on Microsoft’s Perceived Weakness – Azure Cloud Platform

While Microsoft offers AI services, its multimodal predictive analytics and machine learning (PAML) tools scored poorly in previous Forrester Waves. Finally, we found this offering to be too light on data governance capabilities and self-service data preparation tooling, both of which are critical insight team capabilities.

Report Preview : https://ibm.box.com/s/bry68nm9alduszvrffo105cvjhmde7pn

CPD Packaging
Edition Overview



Cloud Pak for Data Editions

Make your data ready for AI – Cloud Agility, Lightning Fast & AI-ready

Standard Edition

- Beginning with a minimum of 24 VPCs
- Expands in increments of 1 VPC
- Up to a *maximum* of 64 VPCs
- You cannot use separately priced premium services with this edition
- 50% Enterprise Edition list price

Enterprise Edition

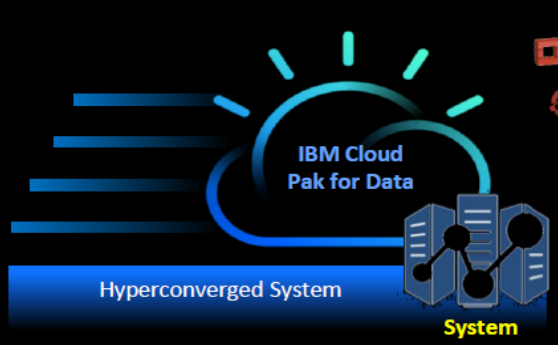
- Deploy in any form: on premises, on public cloud or CPD System
- Beginning w/ recommended minimum of 48 VPCs
- Select 24 VPC configurations supported
- Expands in increments of 1 VPC
- No maximum

Non-Prod Edition

- Can only be used for non-production scenarios
- No restriction in terms capabilities or VPC quantities
- Needs to be in separate namespace from production licenses
- Need parallel and appropriately sized Standard or Enterprise Edition licenses for production use
- 50% of Enterprise Edition list price

IBM Cloud Pak for Data System

True plug-and-play enterprise data & AI in hours right out of the box



- Brings the elasticity & scalability of public clouds securely behind the firewall
- Connect all your data for self-service analytics
- Operationalize AI with trust & transparency
- Deploy dynamic cloud native data workloads

An **all-in-one** data & AI system with all the necessary systems and software components pre-integrated

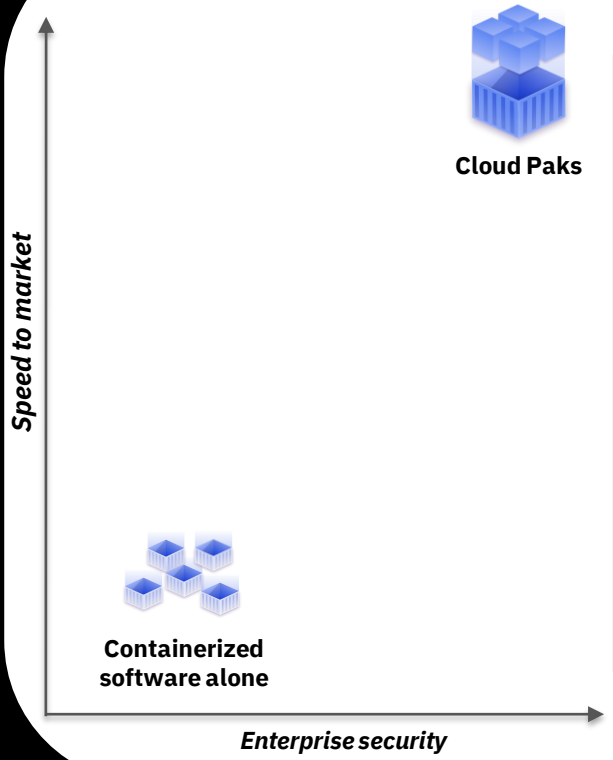
Deploy a complete private cloud in under 4 hours, with no assembly required

Dynamically scale compute, storage and networking resources with plug and play of new hardware nodes

Simplify management and optimization with a unified and intuitive dashboard

Cloud Pak for Data vs. Containers Alone

IBM Certified and production ready



	Containers Alone Client creates containers or receives software as standalone container(s)	IBM Cloud Paks Complete solutions certified for enterprise use cases
Runs anywhere	Yes	Yes
Vulnerability scanned	Yes	Yes
Red Hat container certification	Depends on product	Yes
Complete solution w/ container platform	No	Yes
Flexible & modular	No	Yes
IBM certified/orchestrated for production (Built for Kubernetes by experts; certified against 200+ criteria)	No	Yes
Multicloud validation	No	Yes
Integrated deployment experience	No	Yes
Full stack support by IBM (Base OS, software, and container platform)	No	Yes
License metering integration	No	Yes
Scalable and resilient	No	Yes
Encrypted secrets / limited privileges	Do it yourself	Yes
Management and operations	Build your own	Yes
Lifecycle Management	Manage it yourself	Yes

Cloud Pak for Data
IBM Kubernetes Certified

http://ibm.biz/cp-certify

Production Grade

- Multi-cloud
- Storage
- Networking
- Resiliency
- Scalability
- Self Healing
- Recoverable

Security

- Vulnerability Management
- Limited Security Privilege
- Secure Access, Keys, Certs
- Network & Data Protection
- Secrets and SPI
- Security and Privacy by Design

Quality Assurance

- Comprehensive Testing
- Architectures
- OCP Versions
- Currency
- Airgap
- Upgrades

Lifecycle Management

- Patch
- Upgradeability
- Rollback/Restore
- Backup/Recovery
- OCP Version Alignment
- Kubernetes Currency

Consistency and Standards

- Consistent Packaging / Publishing
- Supporting Operators and Helm
- Consistent Entitlement management
- Common management of OSS elements

- UBI and Red Hat Certified
- Consistent use of OCP and IBM Services
- ~200 Code Standards enforced
- Governed Best Practice / Anti Practices

Red Hat OpenShift

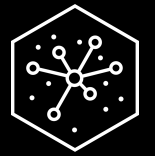
OPERATOR FRAMEWORK

redhat CERTIFIED

- Managed Image CVEs
- Packaging
- Publishing

- Trusted Source
- E2E Support

Cloud Pak for Data
Key differentiators (vs. Microsoft, AWS and Google)



Data virtualization	• Query all of your data sources as one • Governance, security, and scalability by design • 400X faster than federation • *Unmatched by Microsoft, AWS, or Google (may only have simple federation at best)*
Data governance	• Data privacy & governance by design: data discovery & curation, with policy & rules management • Metadata management and shopping for data • Smarter compliance: Regulatory ML, industry accelerators, FISMA HIGH certification, etc. • *Unmatched by Microsoft, AWS, or Google*
Model bias and drift detections w/ explainability	• Detect and mitigate model bias and drift • Explainability of a model prediction for a single transaction • *Unmatched by Microsoft, AWS, or Google (none have all three)*
Governing and operationalizing AI	• Governed AI lifecycle management • CI/CD style pipelines for AI DevOps • AI model trust and transparency • *Unmatched by Microsoft, AWS, or Google*
Open source based hyperconverged system	• Query all of your data sources as one • Governance, security, and scalability by design • 40X faster than federation • *Unmatched by Microsoft, AWS, or Google*

Cloud Pak for Data

Industry: Telecommunications
Geography: North America

Turbocharged digital transformation

Facing its own path toward digital transformation, Sprint started preparing its data for artificial intelligence (AI) with the goal of using machine learning algorithms to gain quicker insights and increase responsiveness to customers.

Sprint chose Cloud Pak for Data because it enables AI projects in weeks rather than months through unifying and simplifying three critical stages in the journey to AI: the collection, organization and analysis of data.

Simplify and automate how your organization turns data into insights within a unified, all-in-one design.

"Cloud Pak for Data enabled Sprint to digest high volumes of data for near real-time ML/AI analysis, and the trial results have shown potential to take Sprint to the next phase of digital transformation."

Michelle Gehl
VP Networks OSS Applications and Operations, Sprint

Read the story in any of these magazines:

Business Chief US
(front cover, story pages 12-23, Cloud Pak for Data pages 16-17)

Business Chief Canada
(story pages 144-153, Cloud Pak for Data pages 146-147)

Gigabit Magazine
(front cover, story pages 12-23, Cloud Pak for Data pages 16-17)

Is AI your priority? Start with a data strategy

[Read the blog and watch the video]

Cloud Pak for Data

Industry: Technology
Geography: North America

Intel and IBM are great partners and closely aligned in becoming more data-centric.

Intel's participation and contribution is meaningful because customers can run Cloud Pak for Data at speed on their Intel-based infrastructure. The union between IBM and Intel is supercharging the ability of data scientists to drive better insight and better business outcomes in a way that has never been seen before.

Simplify and automate how your organization turns data into insights within a unified, all-in-one design.

"Cloud Pak for Data is really important because it helps to do a couple of things that are mind blowing for data scientists — auto discovery of data and rapid integration of hyper-relevant data."

Melvin Greer

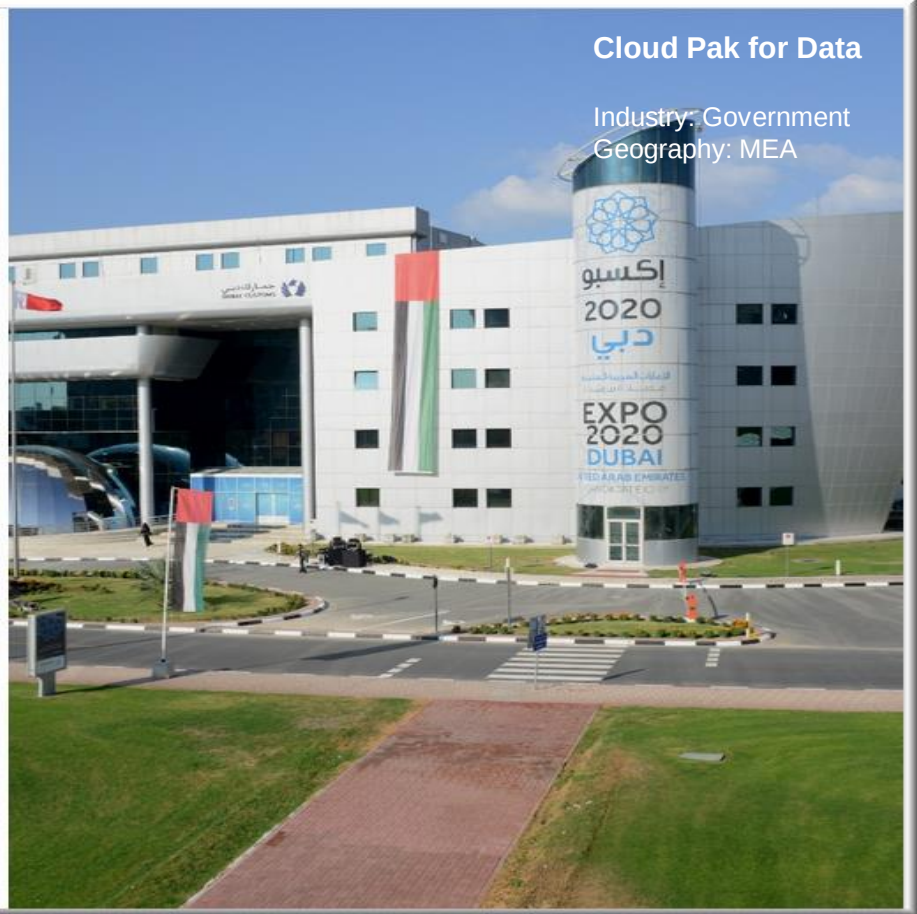
Senior Principal Engineer and Chief Data Scientist - Americas, Intel Corporation

Government | MEA (United Arab Emirates)

Accelerating the Customs Process

With Cloud Pak for Data's end-to-end platform, Dubai Customs is building trusted AI models to help identify risky goods entering the country and reduce the number of false positives.

- **When:** Current | **Duration:** 3 months
- **Product:** Cloud Pak for Data, Watson OpenScale
- **Pillars:** DSAI



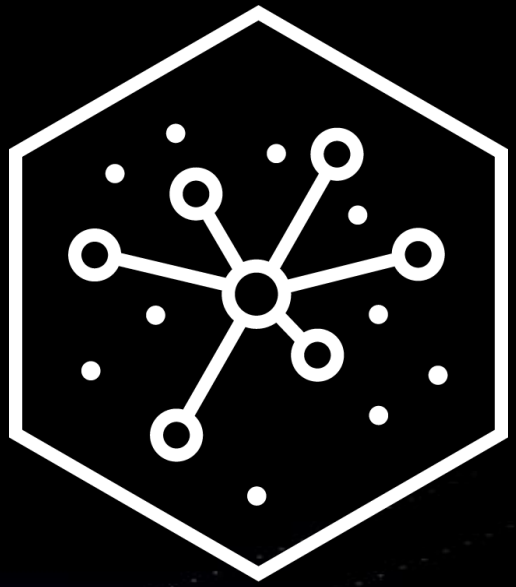
IBM Analytics Modernization Workshop

Part 3

• Introduction • Business Use Case	• Lab 01 • Lab 02
• Collect: Connect • Organize – Deeper Dive • Collect: Virtualize	• Lab 03 • Lab 13 • Lab 05
• Analyze	• Lab 06
• Deploy • Infuse – OpenScale • Infuse – Cognos Analytics • Wrap up	• Lab 07 • Lab 08 • Lab 09 • Lab 10

Thank you for your time!

Begin your journey now on the IBM Platform built for AI...



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