CLOUDERA

CLOUDERA HANDS-ON EXPERIENCE

Data Lifecycle

AGENDA

- 08:30 Accueil & Petit Déjeuner
- 09:00 Introduction
- 09:30 Data Ingestion
- 10:00 Data Engineering
- 10:30 Coffee Break
- 10:45 Machine Learning
- 11:15 Data Warehouse
- 11:45 Q&A et Labs Optionnels
- 12:20 Clôture et debrief

INTRO DUCTION

WHO YOU ARE

NAME
COMPANY
ROLE

Users

user001	
user002	
user003	
user004	
user005	
user006	
user007	
user008	
user009	
user010	

user011	
user012	
user013	
user014	
user015	
user016	
user017	
user018	
user019	
user020	

WHO WE ARE

CLOUDERA TEAM

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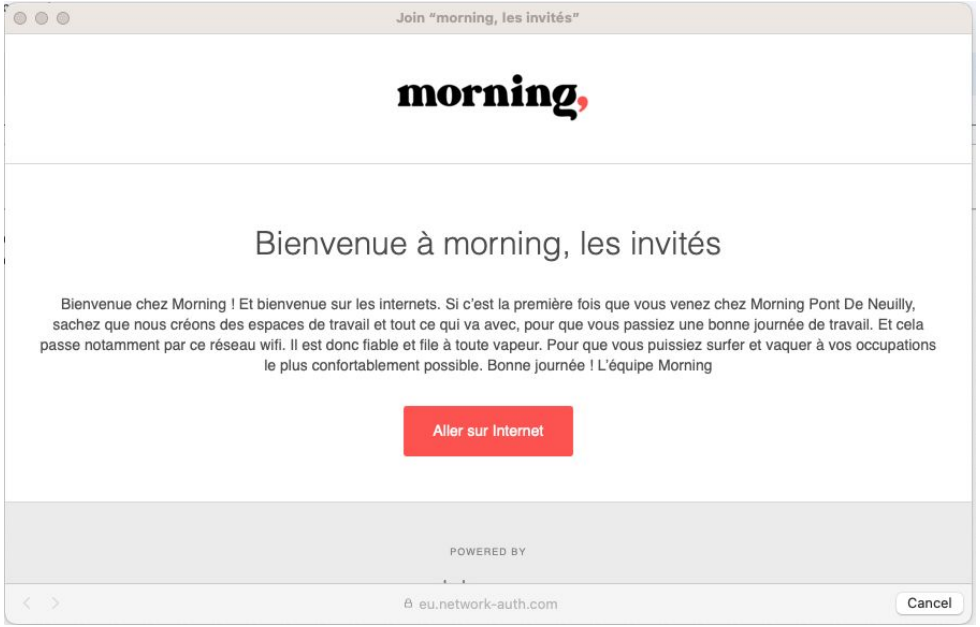
Why this hands on lab?

- 18 octobre - Paris présentiel
  - Atelier de modernisation de workloads dans le cloud publique
  - https://rb.gy/k172s
- 19 octobre - Webinaire virtuel
  - Comment traiter vos flux en temps réel?
  - https://rb.gy/rwi66
- 9 novembre - Webinaire virtuel
  - Open Data Lakehouse
  - https://rb.gy/va04f
- 16 Novembre - Paris présentiel
  - Atelier flux de données
  - https://rb.gy/bj4ip

LOGISTICS

Wifi



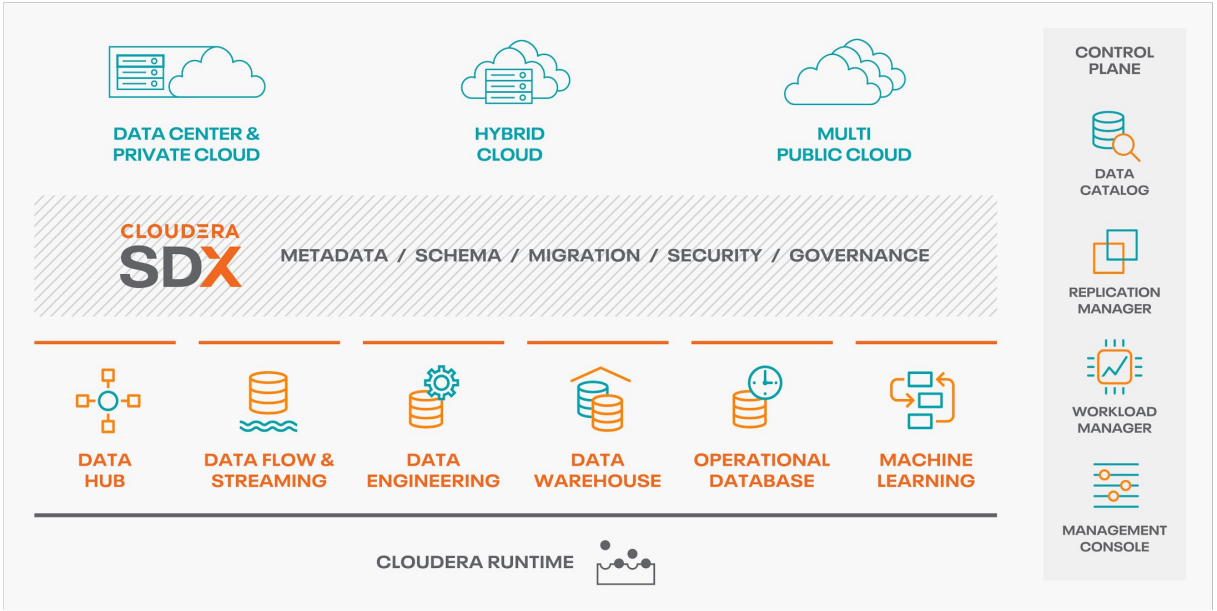
Other

- Toilettes
- Break
- Questions/answers

CLOUDERA PUBLIC CLOUD

CLOUDERA DATA PLATFORM

- View one pane of glass across **hybrid** and multi-clouds
- Scale to petabytes of data and 1,000s of diverse users
- Control cloud costs with auto scale, suspend and resume
- Optimize workloads based on analytics and machine learning
- Inspect data lineage across clouds and clusters

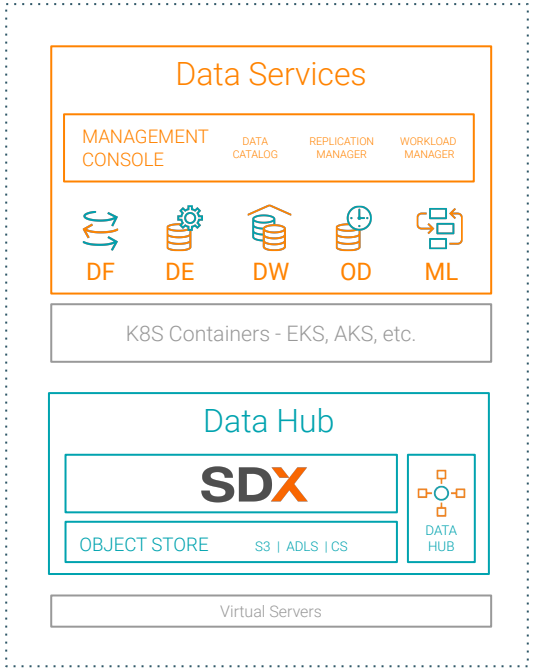


CDP PUBLIC CLOUD

Cloud-native architecture with containerized Experiences and Base cluster foundation

Admin and user experience is consistent across CDP Private & CDP Public for true hybrid cloud

CDP Public Cloud



Analytic Experiences

- Ideal for new apps, bursty workloads and demanding users
- Easier to operate, 10x faster
- Auto scale, suspend and resume
- Better analytics user experience, outperforms shadow IT

Data Hub

- Storage management and SDX for Analytic Experiences
- Supports existing apps and traditional workloads with Data Hub
- Data Hub offers cluster management for Flow, Streaming, Data Engineering, Data Warehouse & Operational Database

KEY TECHNOLOGIES FOR THE DATA LIFECYCLE

Machine Learning

Collaborative ML workspaces for data scientists to develop, experiment and deploy models into production with secure, self-service enterprise data access

Data Engineering

Schedule, monitor, and debug data pipelines to streamline ETL processes quickly and securely with built-in job scheduling and troubleshooting

Data Visualization

Curate fast, self-service dashboards, reports and charts to easily and quickly develop and share agile analytical insight across your business

Data Hub

Easily manage data clusters across the data lifecycle running Apache Spark, Hive, Impala, HBase, Phoenix, NiFi, Kafka, Flink, and more

DataFlow & Streaming

Scalable, real-time streaming platform to ingest, curate, and analyze data with an easy no-code approach to developing sophisticated streaming applications easily

Data Warehouse

Deploy easy-to-use data warehouses with high performance SQL engines for teams of business analysts that need sub-second query response times on petabyte scale data

Operational Database

High-performance NoSQL database with unparalleled scale and performance for business critical operational applications

Shared Data Experience

Security, governance and metadata technologies that reduce security risks and operational costs through central policy controls that are automatically enforced across analytics in public and private clouds

BENEFITS OF CDP PUBLIC CLOUD

Simplify Data Analytics

You Own Your Data

First Class Security

Hybrid Flexibility

Common Skill Set

Data Lifecycle

Easy and Portable

WORKSHOP ENVIRONMENT

Users

user001	
user002	
user003	
user004	
user005	
user006	
user007	
user008	
user009	
user010	

user011	
user012	
user013	
user014	
user015	
user016	
user017	
user018	
user019	
user020	

Data Services


DataFlow


Data Engineering


Data Warehouse


Operational Database


Machine Learning

Data Management


Data Hub Clusters


Data Catalog


Replication Manager

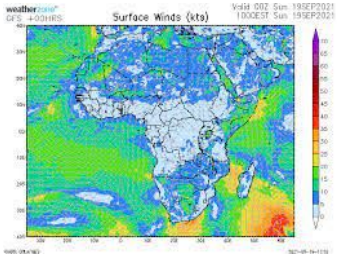

Workload Manager

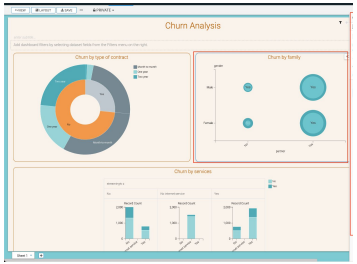

Management Console

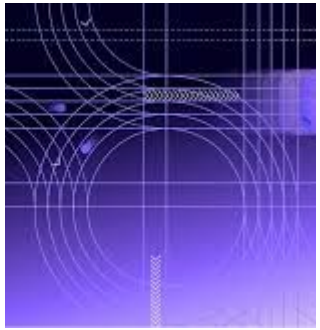
LAB INTRODUCTION

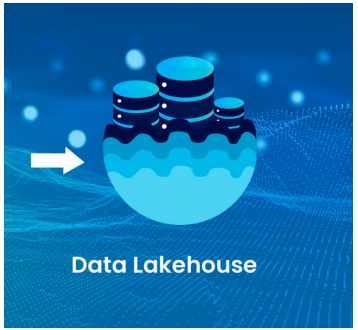
3000 Feet Use Case Description

Customer Churn

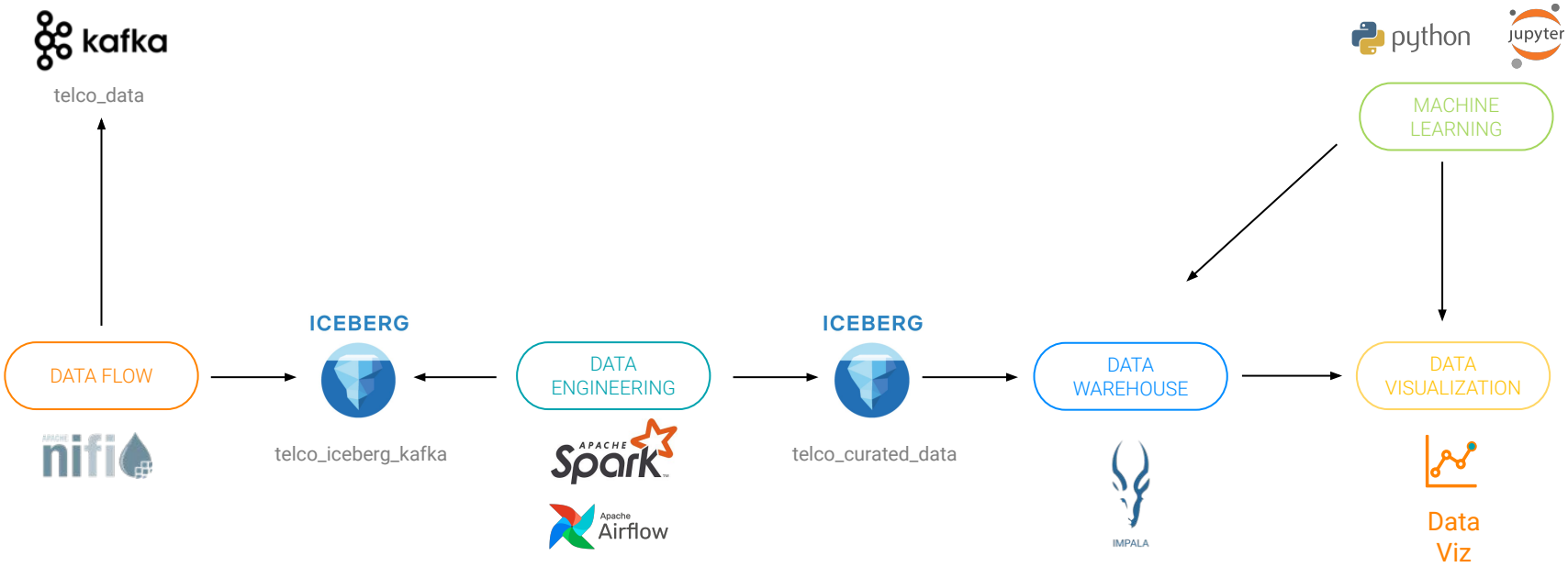








ANALYTICS ACROSS THE DATA LIFECYCLE



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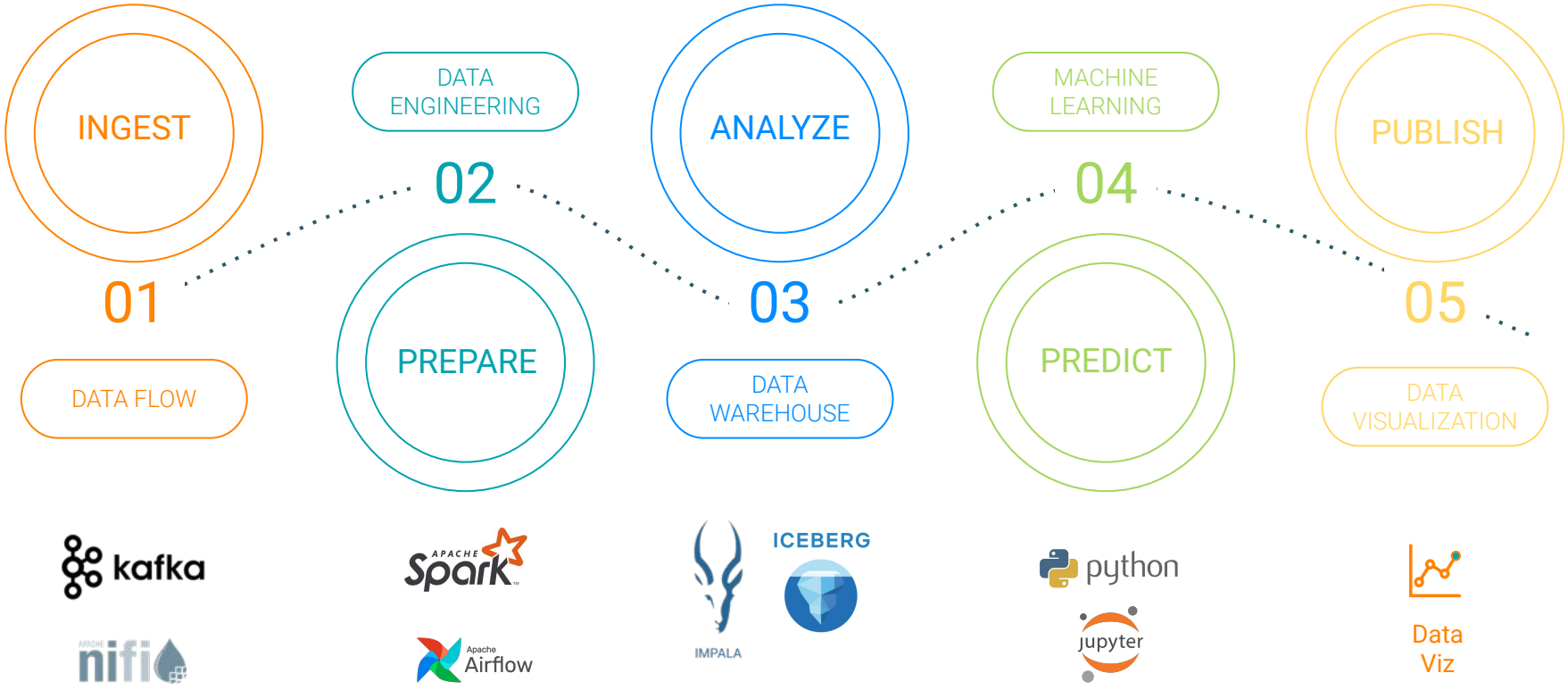


TODAY'S EXPECTATIONS

Data Lifecycle

1. Ingest real time data to an Open Lakehouse
2. Run Data Engineering transformation
3. Query/explore data and build Data Viz applications
4. Train and deploy a ML model to predict customer churn
5. Enrich data analytics with real time scoring

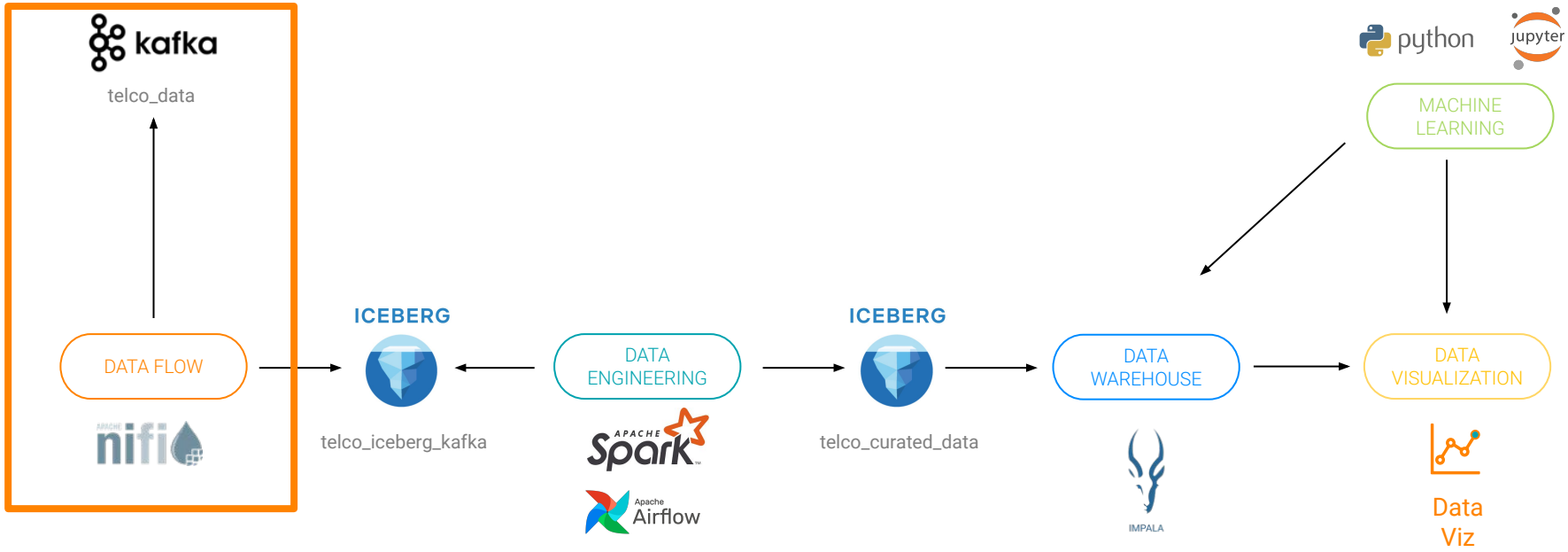
DATA SOURCE

customerID	7590-VHVEG	5575-GNVDE	3668-QPYBK	7795-CFOCW	9237-HQITU	9305-CDSKC
gender *	F	M	M	M	F	F
SeniorCitizen	0	0	0	0	0	0
Partner *	Y	N	N	N	N	N
Dependents *	0	0	1	0	0	0
tenure	1	34	2	45	2	8
PhoneService	No	Yes	Yes	No	Yes	Yes
MultipleLines	No phone service	No	No	No phone service	No	Yes
InternetService	DSL	DSL	DSL	DSL	Fiber optic	Fiber optic
OnlineSecurity	No	Yes	Yes	Yes	No	No
OnlineBackup	Yes	No	Yes	No	No	No
DeviceProtection	No	Yes	No	Yes	No	Yes
TechSupport	No	No	No	Yes	No	No
StreamingTV	No	No	No	No	No	Yes
StreamingMovies	No	No	No	No	No	Yes
Contract *	1	2	1	0	1	1
PaperlessBilling	Yes	No	Yes	No	Yes	Yes
PaymentMethod	Electronic check	Mailed check	Mailed check	Bank transfer (automatic)	Electronic check	Electronic check
MonthlyCharges	29,85	56,95	53,85	42,3	70,7	99,65
TotalCharges	29,85	1889,5	108,15	1840,75	151,65	820,5
Churn	No	No	Yes	No	Yes	Yes

* Attributes to be enriched

LAB 1:
Data Flow

ANALYTICS ACROSS THE DATA LIFECYCLE



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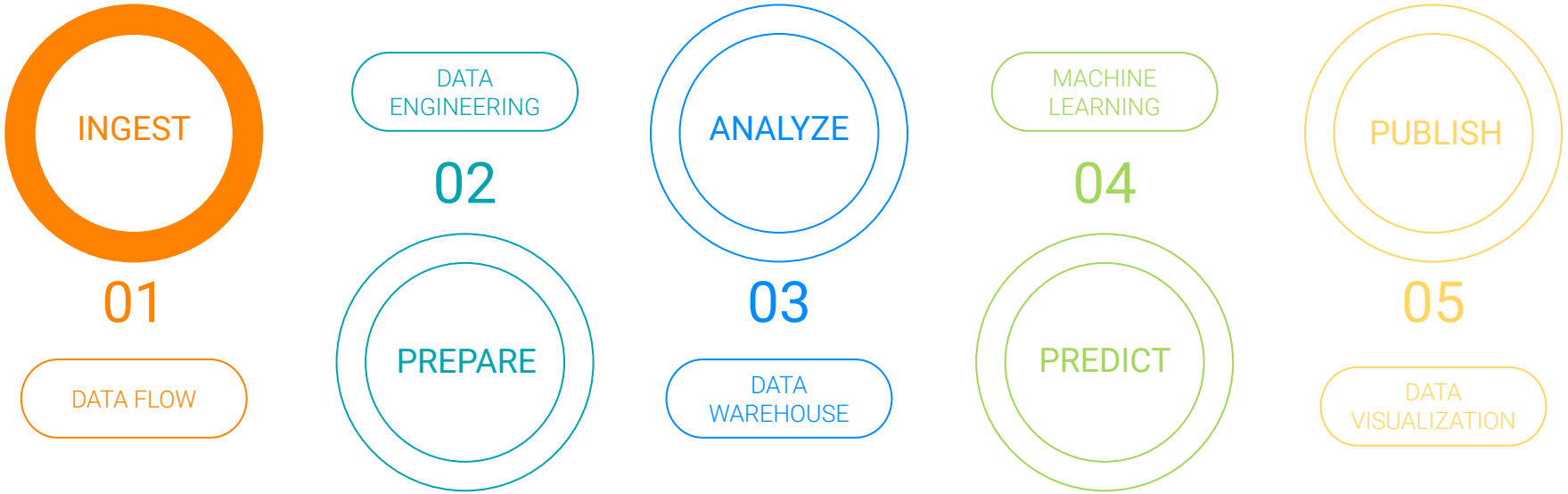


CLOUDERA SDX

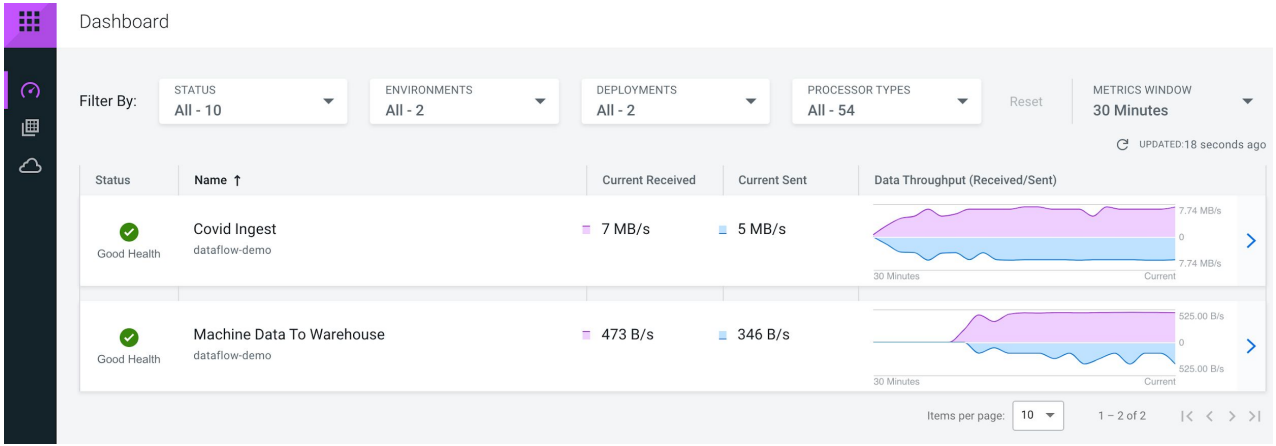
SECURITY | GOVERNANCE | LINEAGE | MANAGEMENT | AUTOMATION

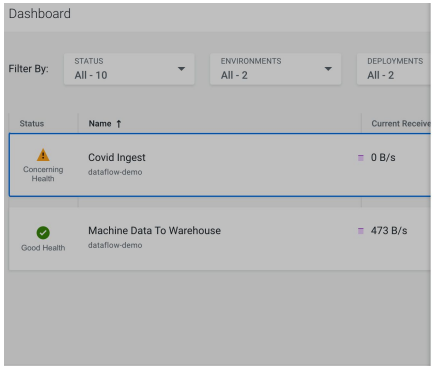
LAB 1 – OVERVIEW

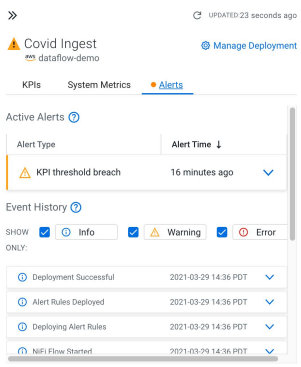
- CDF tour (5min)
- Configure and deploy a NiFi Flow from Catalog, to ingest data from Kafka topic to Open Lakehouse
- Execute the Flow pipeline

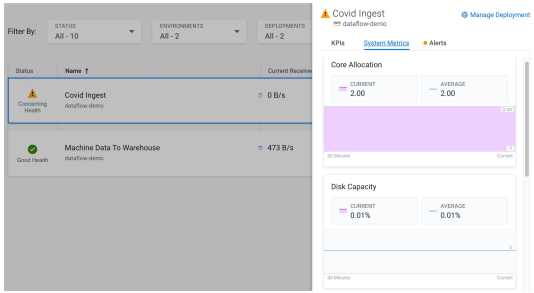
DATA FLOW

- Easy Flow **deployment**
- **Auto-scaling**, resource isolation and cost-optimization
- **Flow Catalog**, central repository for flow definitions
- **ReadyFlow Gallery**, cover most common data flow use cases
- **Easy maintenance/upgrades**
- Advance **monitoring** capabilities
- Multiple data sources and sink operations









LAB 1 – COMPONENTS

A streaming message platform. It is designed to be high performance, highly available, and redundant, ideal for real-time and streaming applications

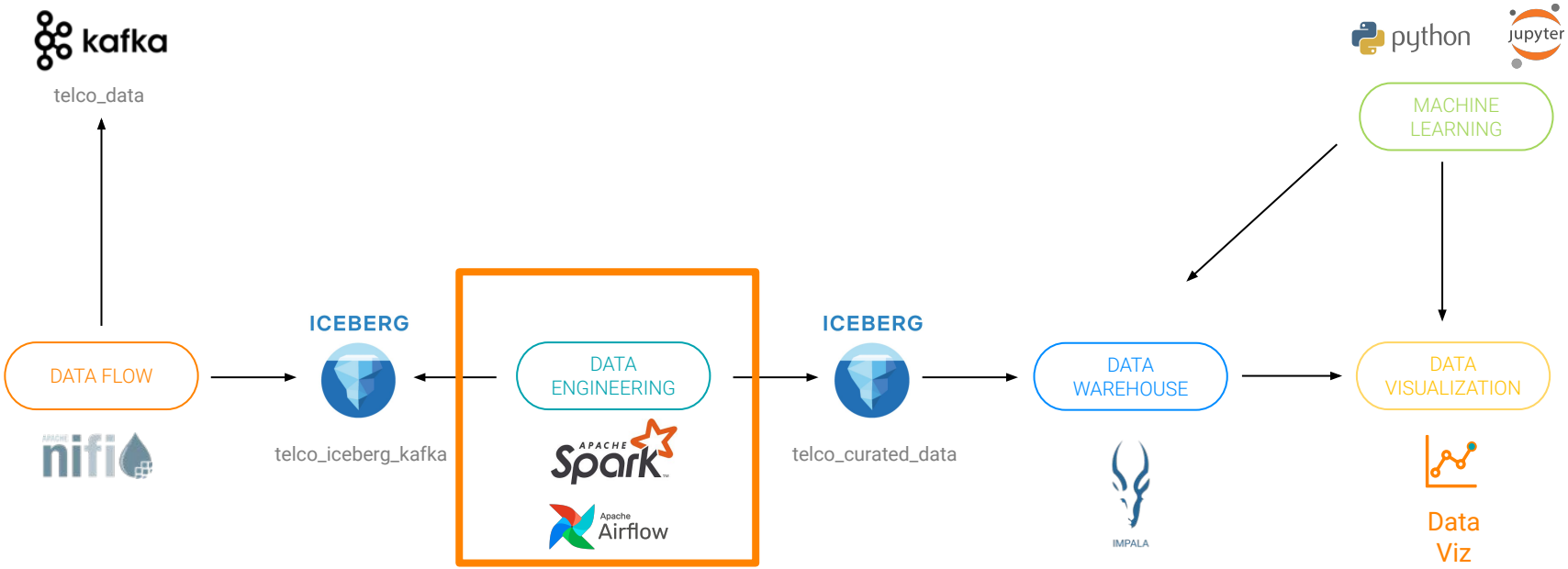
LAB 1 – COMPONENTS

Apache NiFi is an open source software for automating and managing the flow of data between systems. It is a powerful and reliable system to process and distribute data. It provides a web-based User Interface for creating, monitoring, & controlling data flows.

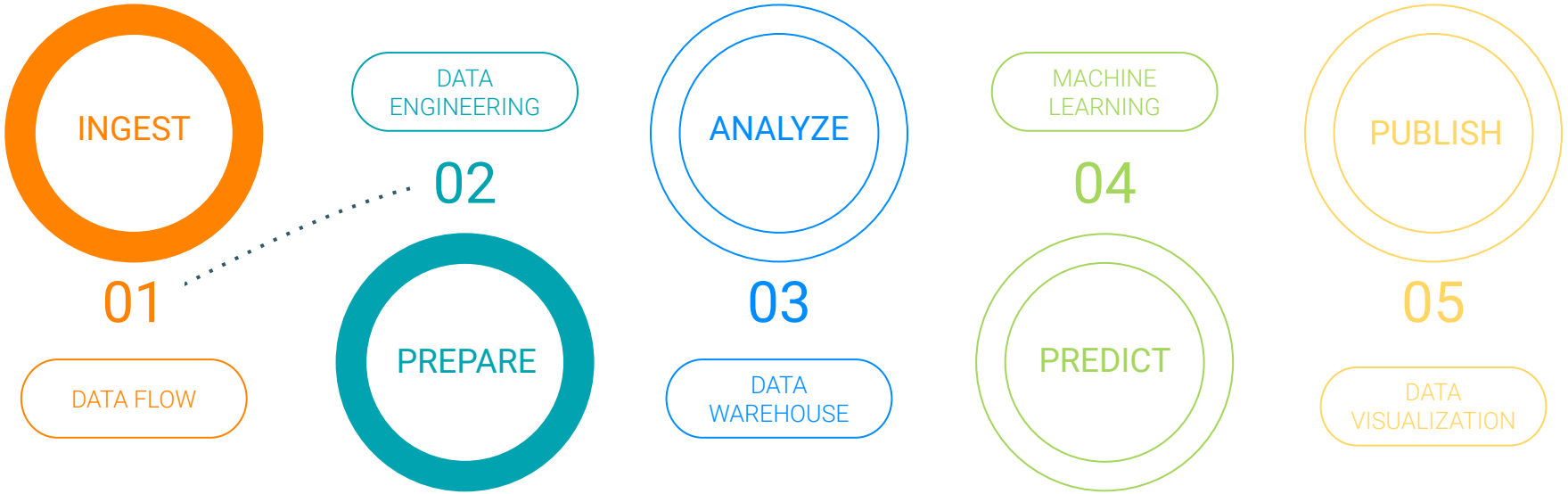
Some of the features includes **data provenance**, **extensible**, **secure** and others.

LAB 2:
Data Engineering

ANALYTICS ACROSS THE DATA LIFECYCLE



ANALYTICS ACROSS THE DATA LIFECYCLE



CLOUDERA SDX

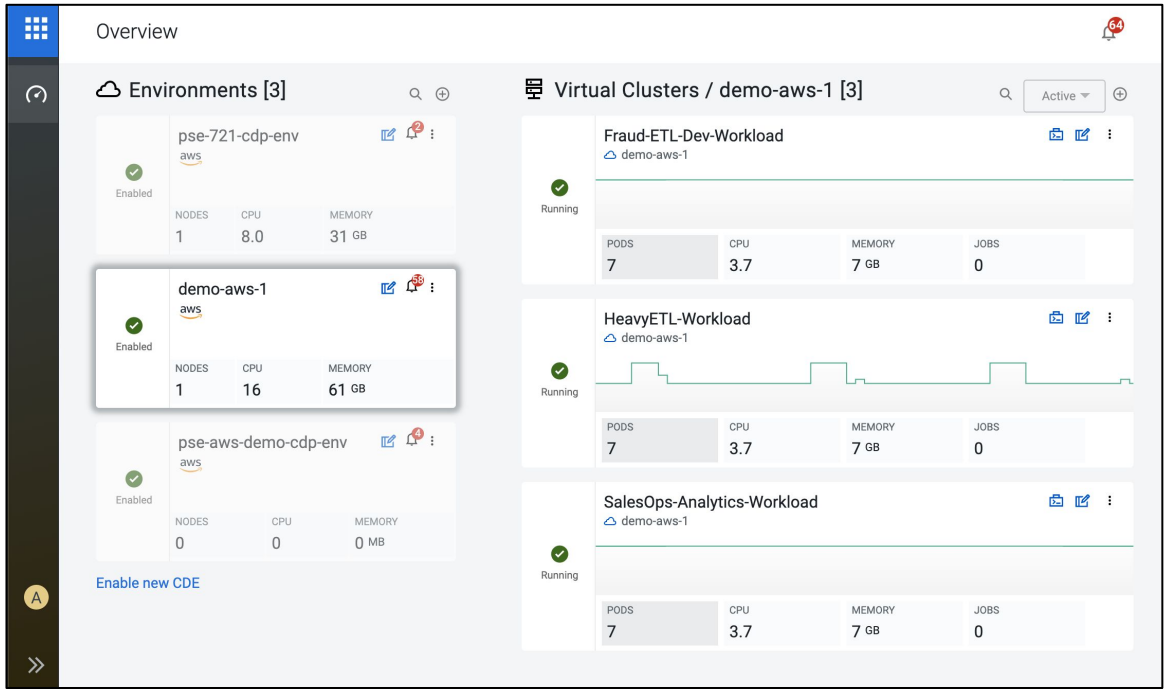
SECURITY | GOVERNANCE | LINEAGE | MANAGEMENT | AUTOMATION

LAB 2 – OVERVIEW

- CDE tour (5min)
- Configure and deploy Spark jobs with Editor
- Airflow to orchestrate the jobs
- Run data enrichment

DATA ENGINEERING

- Streamlined service for scheduling, monitoring, debugging, and promoting data pipelines quickly & securely
- Inherited governance
- Deliver data pipelines to other CDP services (CDW, CML, etc)
- Portable and flexible
- Complete Data pipeline management



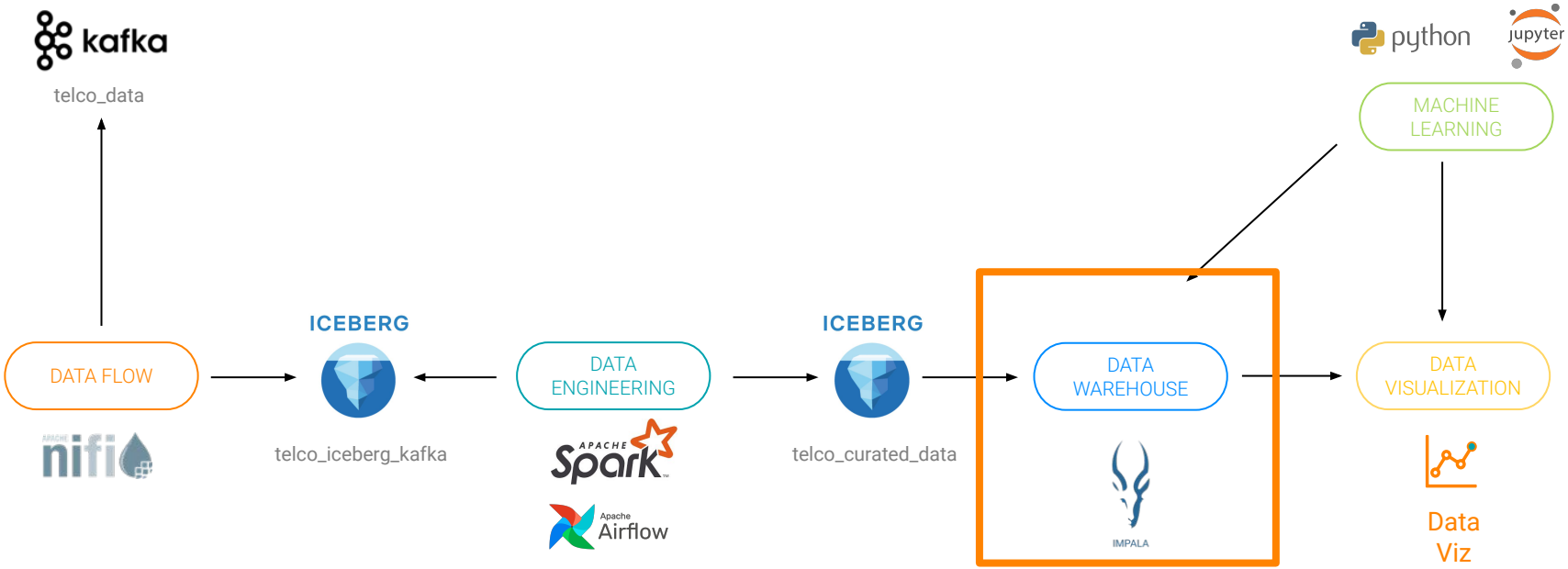
LAB 2 – COMPONENTS

Apache Spark is an open-source, distributed processing system used for big data workloads. It utilizes in-memory caching, and optimized query execution for fast analytic queries against data of any size. It provides development APIs in Java, Scala, Python and R, and supports code reuse across multiple workloads—batch processing, interactive queries, real-time analytics, machine learning, and graph processing.

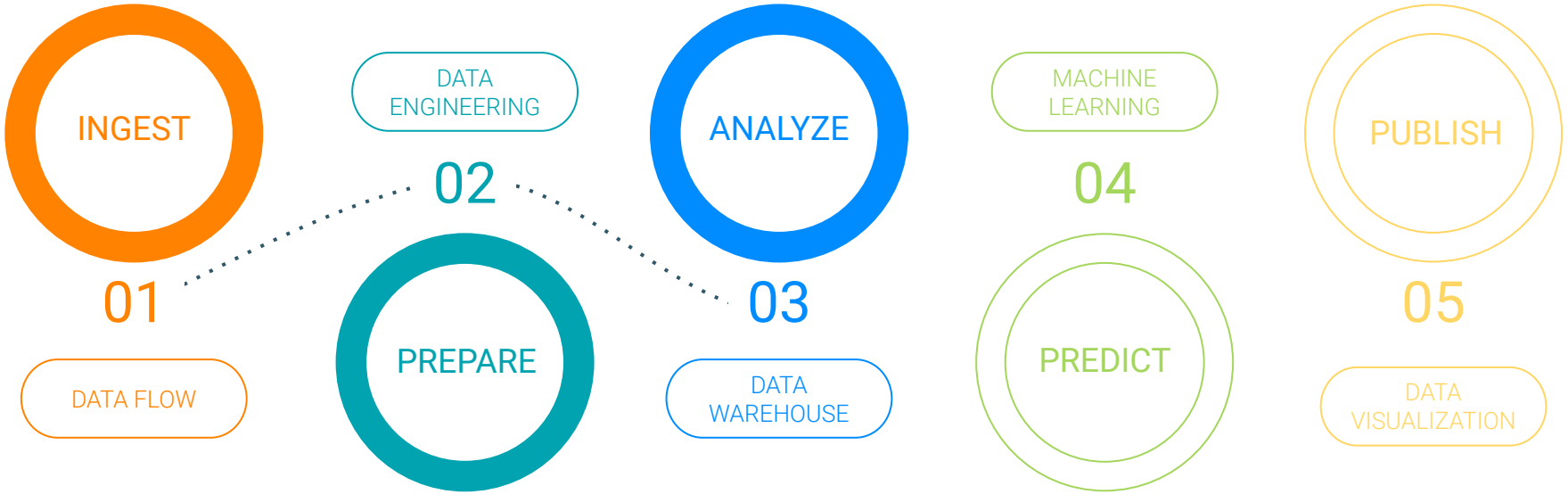
Open-source platform for developing, scheduling, and monitoring batch-oriented workflows. Airflow's extensible Python framework enables you to build workflows connecting with virtually any technology. A web interface helps manage the state of your workflows.

LAB 3:
Data Warehouse

ANALYTICS ACROSS THE DATA LIFECYCLE



ANALYTICS ACROSS THE DATA LIFECYCLE



CLOUDERA SDX

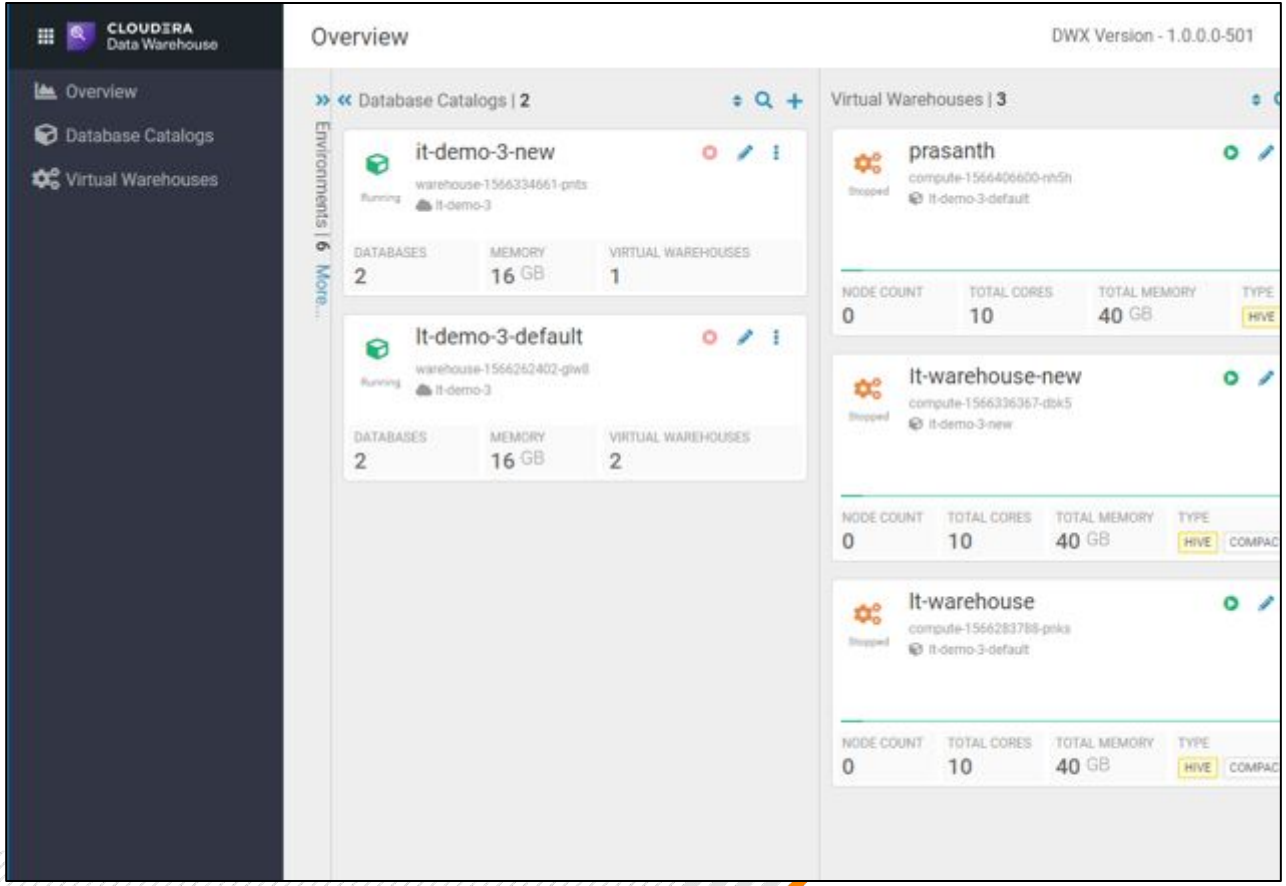
SECURITY | GOVERNANCE | LINEAGE | MANAGEMENT | AUTOMATION

LAB 3 – OVERVIEW

- CDW tour
- Query data from Open Lakehouse
- Build a dashboard

DATA WAREHOUSE

- Automated Capacity Planning
- Ease of Provisioning
- Auto-Scaling
- Resource Isolation
- High Concurrency
- Infrastructure optimized for Performance
- Choice of two DW engines: Hive and Impala, now Unified Analytics
- Fully integrated with Iceberg



LAB 3 – COMPONENTS

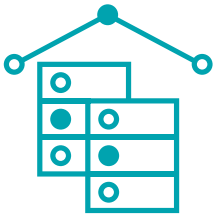
Hue is the open-source analytics workbench designed for fast data discovery, intelligent query assistance, and seamless collaboration. Bridge the gap between IT and the business for trusted self-service analytics.

Impala provides high-performance, low-latency SQL queries on data storage layer. The fast response for queries enables interactive exploration and fine-tuning of analytic queries.

LAB 3 – COMPONENTS

ICEBERG

DATA WAREHOUSE



Highly curated
Precise
Complete
Well governed

DATA LAKE

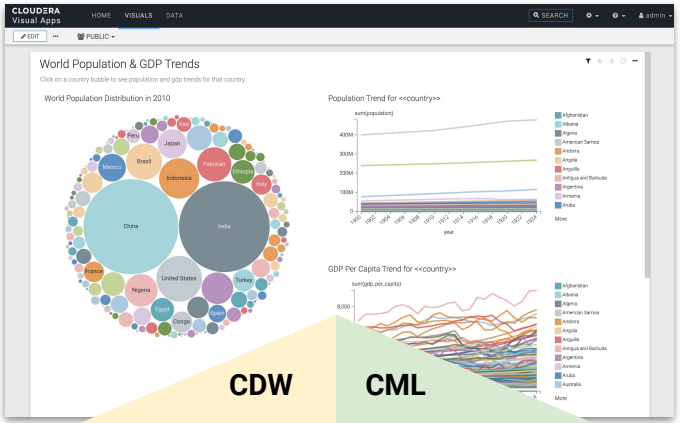
Varying curation
Degrees of accuracy
Semi, unstructured
High granularity

LAKEHOUSE

Explore and discover
Trends and statistics
Predict and learn
Rapid time to insight

LAB 3 – COMPONENTS

ICEBERG



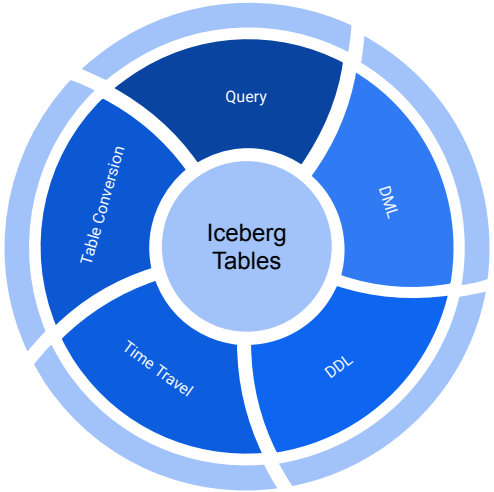
LAB 3 – COMPONENTS

BI Tools	Ad Hoc SQL	Data Science	Machine Learning	Streaming Analytics	Powerful engines for multifunction analytics
SDX Metadata | Schema | Migration | Security | Governance					Security, Governance, Metadata, Performance
Open Table Format - Iceberg Tables		**Open Table Format -** Hive ACID Tables			Structured Transaction Layer
File Formats Parquet | AVRO | ORC | JSON					
Storage HDFS | Ozone | AWS S3 | Azure ADLS Gen 2 | Google Cloud Storage | AliCloud OSS					Data lake for all your data, wherever you run

* JSON is not supported by iceberg

LAB 3 – COMPONENTS

ICEBERG



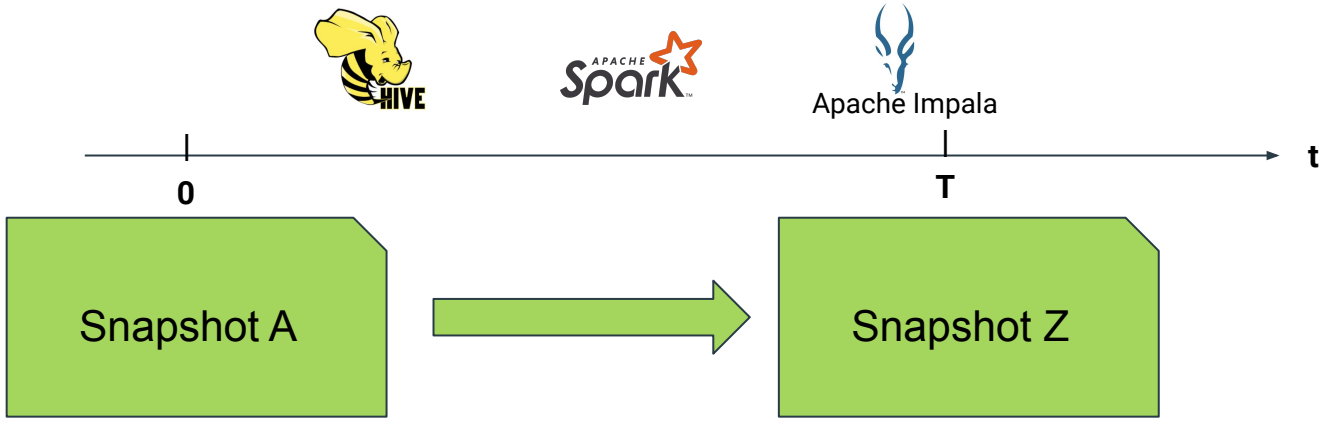
Rich set of SQL commands are developed for **Hive**, **Impala** and **Spark** to

- Create and manipulate database objects
- Run Queries
- Load data into tables
- Modify data in tables
- Perform Time Travel operations
- Convert to Iceberg tables

LAB 3 – COMPONENTS

ICEBERG

Time Travel



Standard SQL operations:

- Queries
- DDL
- DML

Time Travel operations:

- SELECT … AS OF …

LAB 3 – COMPONENTS

ICEBERG

Easy
conversion/adoption

1. **Hive table migration**:

```
ALTER TABLE tbl SET TBLPROPERTIES
('storage_handler'='org.apache.iceberg.mr.hive.Hiv
eIcebergStorageHandler')
```

2. **Spark 3:**

   a. **Import Hive tables into Iceberg**

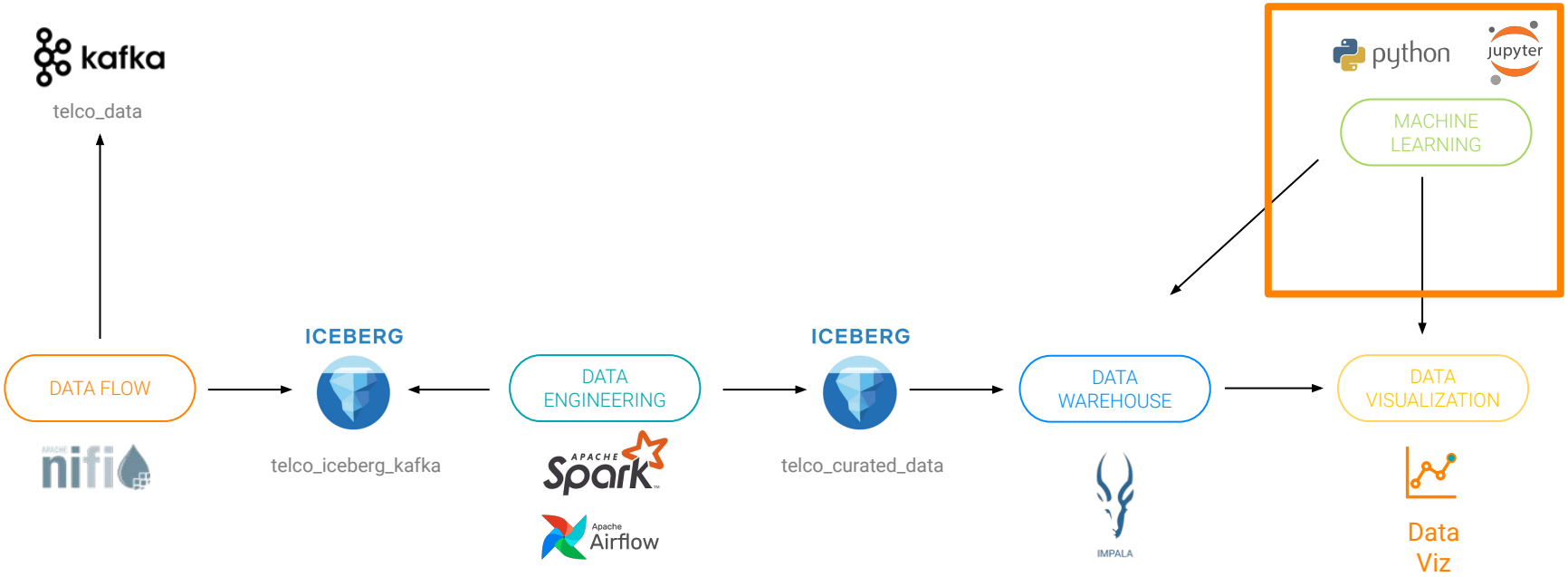
```
spark.sql("CALL
<catalog>.system.snapshot('<src>', '<dest>')")
```

   b. **Migrate Hive tables to Iceberg tables**

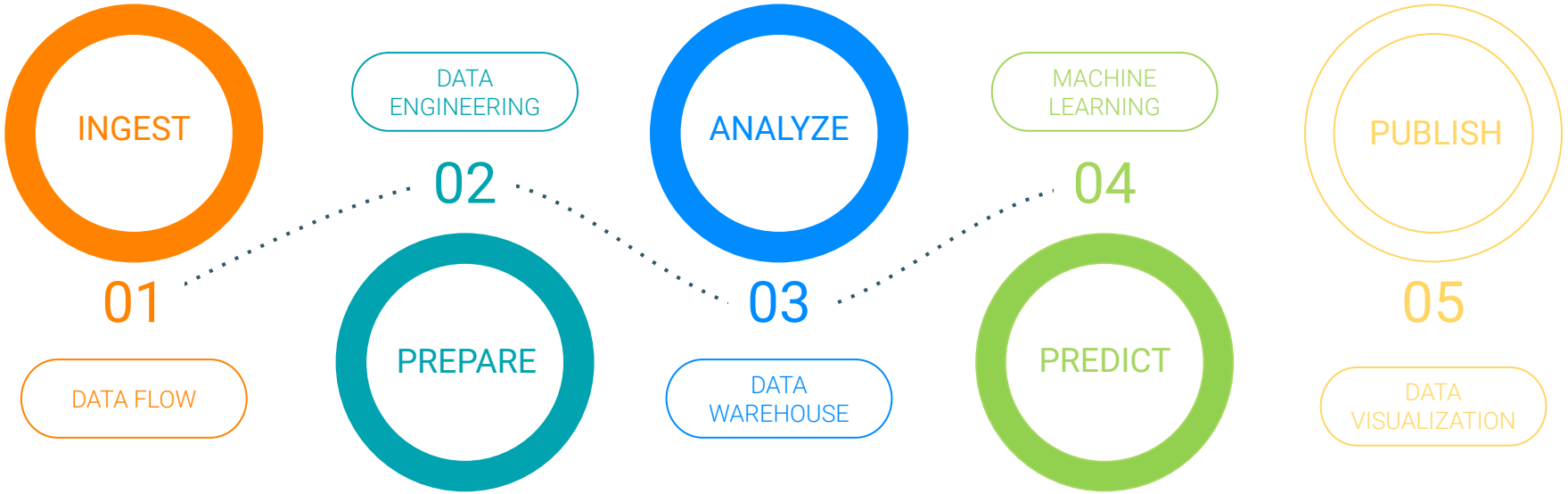
```
spark.sql("CALL
<catalog>.system.migrate('<src>')")
```

LAB 4:
Machine Learning

ANALYTICS ACROSS THE DATA LIFECYCLE



ANALYTICS ACROSS THE DATA LIFECYCLE



CLOUDERA SDX

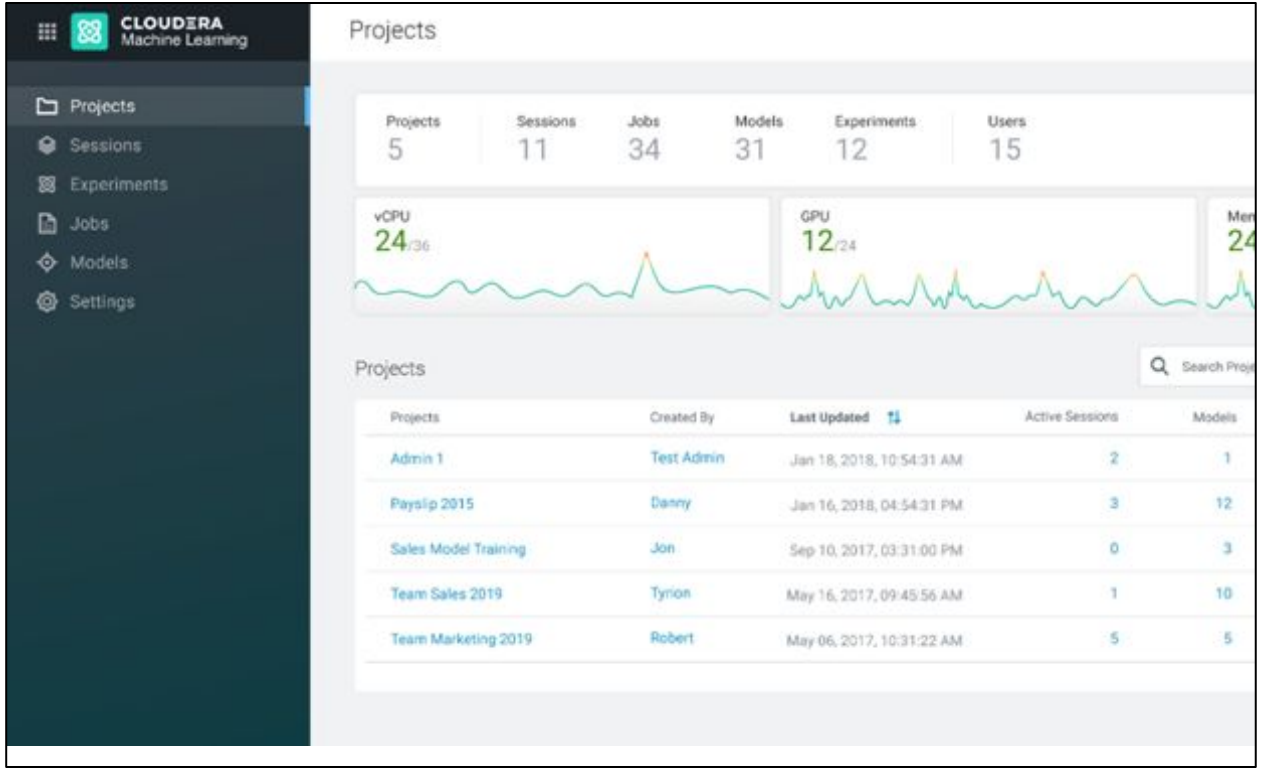
SECURITY | GOVERNANCE | LINEAGE | MANAGEMENT | AUTOMATION

LAB 4 – OVERVIEW

- CML tour
- Train a ML model to predict customer churn
- Deploy the trained model for real time scoring/prediction

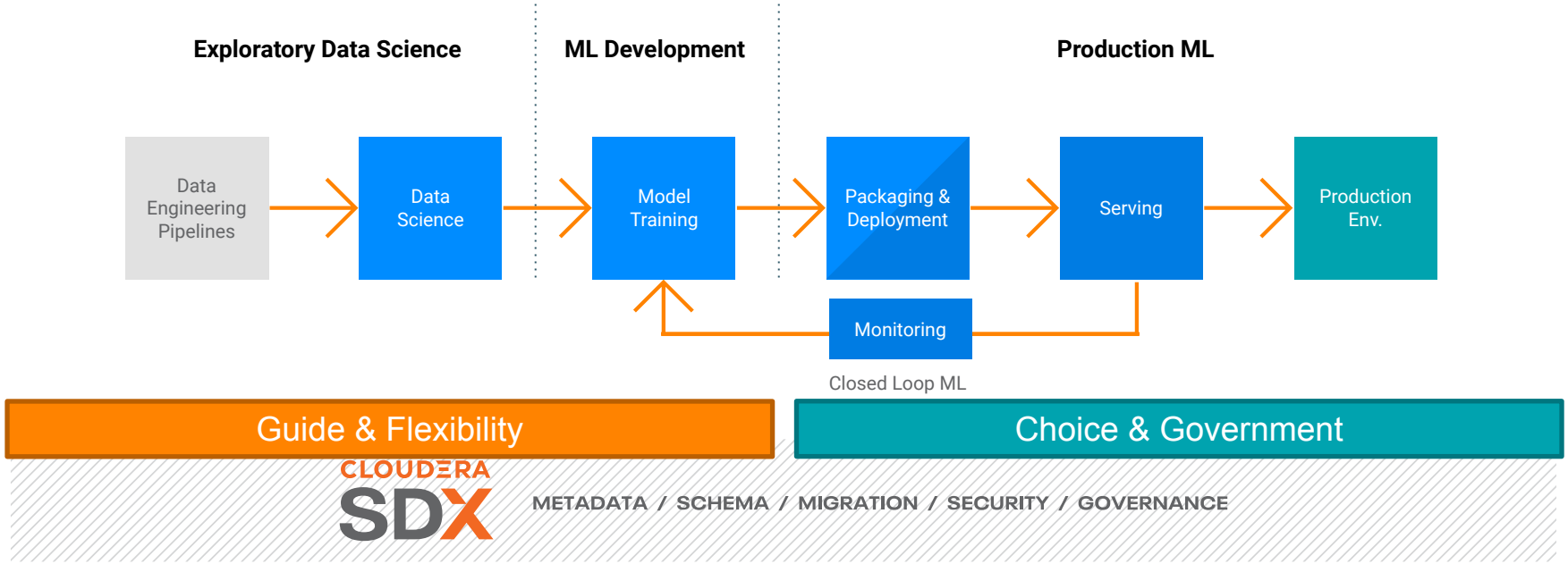
MACHINE LEARNING

- ML Workspaces for teams without waiting
- Self-service governed data access
- Data scientists' preferred, open tools
- Elastic, auto-suspending resources
- Comprehensive, cohesive UX for end-to-end ML including DE
- Portable and consistent

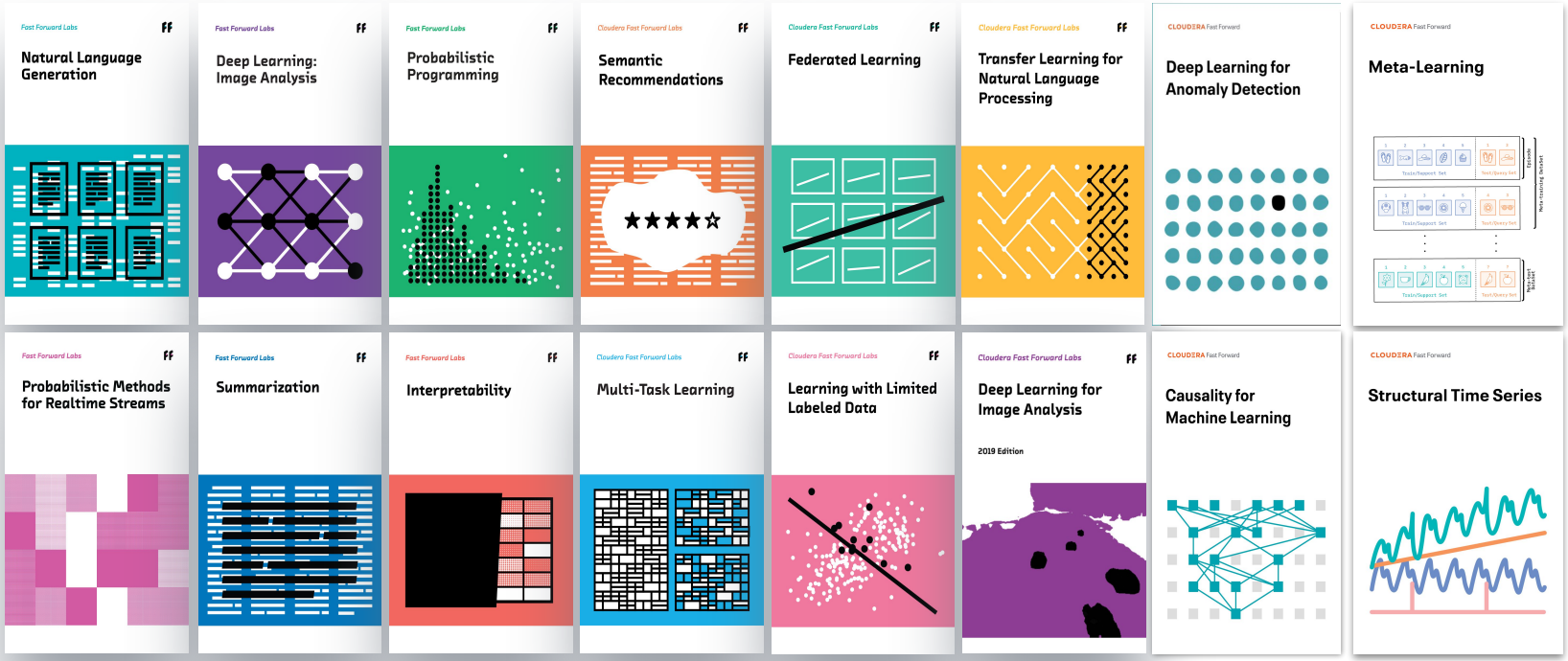


CML and Model Lifecycle

CML follows the 3 phases of the ML lifecycle



AMPs Seeded with Applied ML Research from Cloudera Fast Forward



[Preview all of our research here]

MLOps – Model Governance

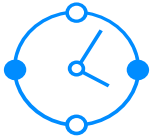
Functional requirements

Repository

Registry of the models, versions, when it was deployed, data dependencies, how to run it…

Deploy

Get easily insights from the model in production, without re-writing the model



Monitorization

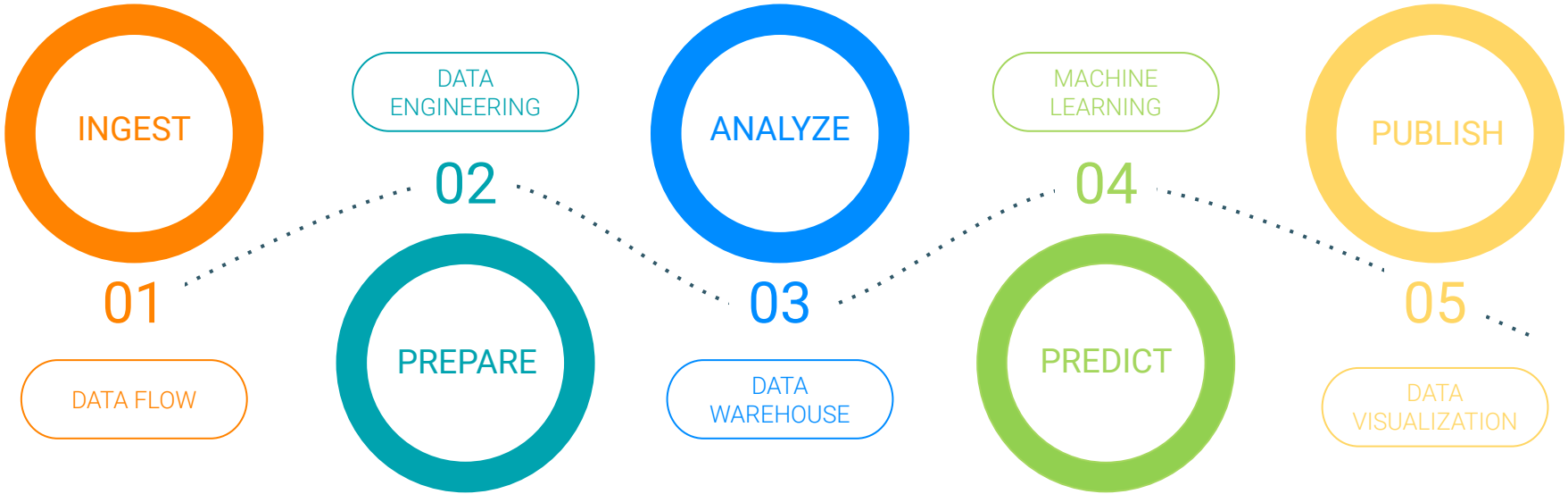
Getting the behaviour of the model according with defined business and statistical metrics with a certain periodicity

Automatization

The automatic accomplishment of the previous requirements would lead to a robust mlops methodology but with capability of define different strategies for the different projects

LAB 5:
Optional

ANALYTICS ACROSS THE DATA LIFECYCLE



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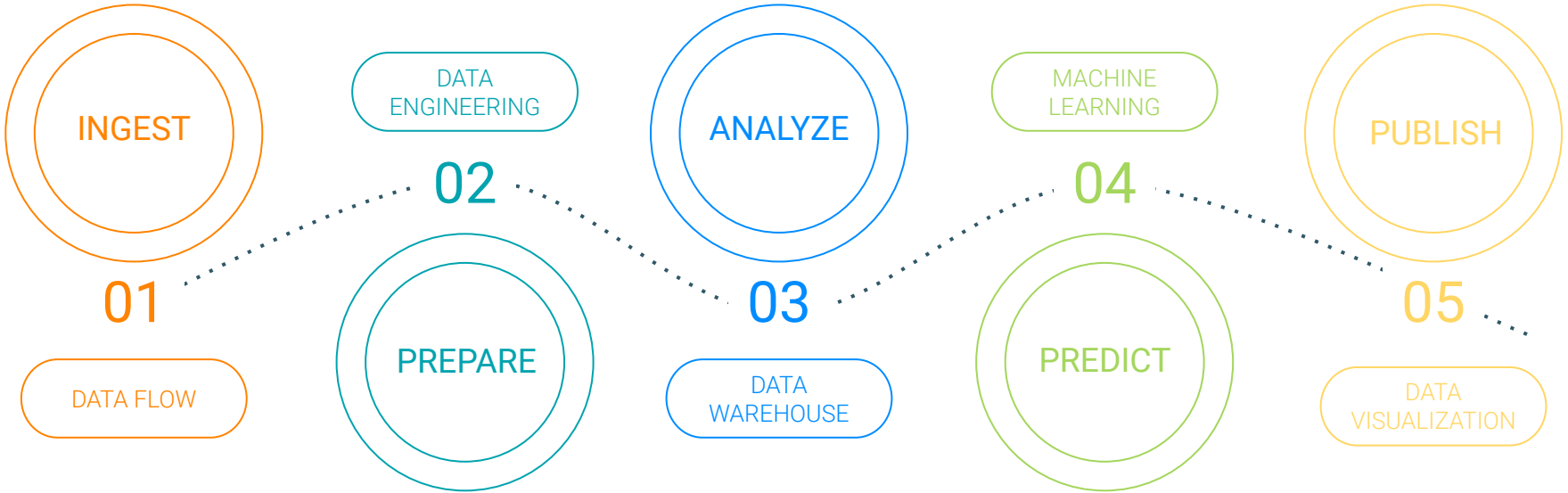
LAB 5 – OVERVIEW

- Build customer 360 visuals with prediction model
- Connect to Data using Hue
- Iceberg
- Enrich Data Viz application with real time model scoring

WRAP UP

ANALYTICS ACROSS THE DATA LIFECYCLE



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Next Step

- 18 octobre - Paris présentiel
  - Atelier de modernisation de workloads dans le cloud publique
  - https://rb.gy/k172s
- 19 octobre - Webinaire virtuel
  - Comment traiter vos flux en temps réel?
  - https://rb.gy/rwi66
- 9 novembre - Webinaire virtuel
  - Open Data Lakehouse
  - https://rb.gy/va04f
- 16 Novembre - Paris présentiel
  - Atelier flux de données
  - https://rb.gy/bj4ip

IoT

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REAL-TIME MONITORING
OF YOUR HEART'S HEALTH,
THANKS DATA.

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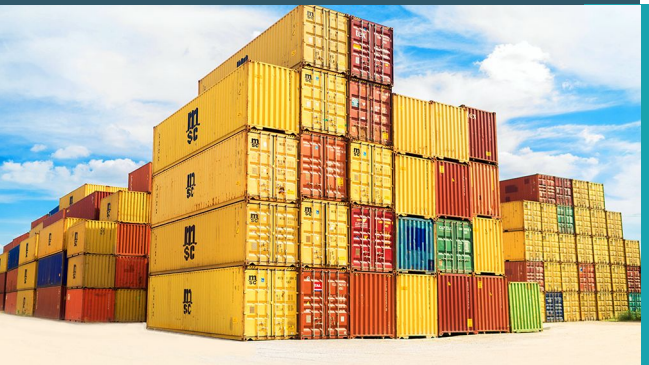

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Thank you!