Data Curation

Class 4 | 6th July 2024

Electronic Health Records and Data Structures

Stephen Blackwelder, PhD

Welcome Back!

Questions or Concerns?

Course Topic Outline

Getting Data In

1. EHRs and Clinical Records

   Origin and relevant history of the medical record; contemporary promise and problems

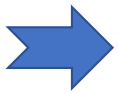
2. Clinical Decision Support

   Uses of medical record data to drive patient care

Storing, Finding, Retrieving

1. Data Structures and Liquidity

   Relational database structures and effective use of EHR data



2. Data Curation

   Raw data, refined data, and patient data from non-EHR sources

Turning Data into Insight

1. Leading Innovation

   Analytics strategy in healthcare organizations

2. Systemic Analytical Decision Making

   Designing an environment compatible with data-driven decision making

Individual Essay - What Did You Learn?

Taking a Practical Approach…

- How does business get ”done”?
- Your most persuasive statements are supported by *all the things you know, but do not say.*
- Leadership in technical fields requires *stronger* communication skills than in “pure” business fields.
- Capturing and holding audience attention is as important as your message.

Group Data Analytics Project

- Dataset has been provided
- Due July 31st; 30% of final grade
- Teams will share or divide up among yourselves these "research publication project" tasks:

  - Research question identification
  - Study design
  - Data management
  - Data analysis
  - Written Findings (2-5 pages)

- Should have begun data management already
- Email instructor if questions/concerns

Data Curation

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Class 4 Learning Objectives

- Understand how data benefit from transformation, and where data management practices come from
- Understand the difference between structured and unstructured data, and why the difference matters.
- Consider how healthcare differs from other industries in the ability to use analytics on the data available (different challenges?)
- Explore motivations behind Quantified Self and understand how this movement has influenced healthcare, and vice-versa. Understand the challenges encountered in leveraging IoT data.
- Be able to speak to several challenges in data management along the continuum from "raw" EHR data to "live" IoT data to highly curated claims and data warehouse datasets.

Raw vs Curated Data

- *Understand how data benefit from transformation, and where data management practices come from*

❖ What insights have you gained from working with the synthetic data for your group project?

Structured vs Unstructured

- *Understand the difference between structured and unstructured data, and why the difference matters.*

❖ Any group adding in structured or unstructured data to their project?

❖ Other experience with unstructured data outside class?

- *Consider how healthcare differs from other industries in the ability to use analytics*

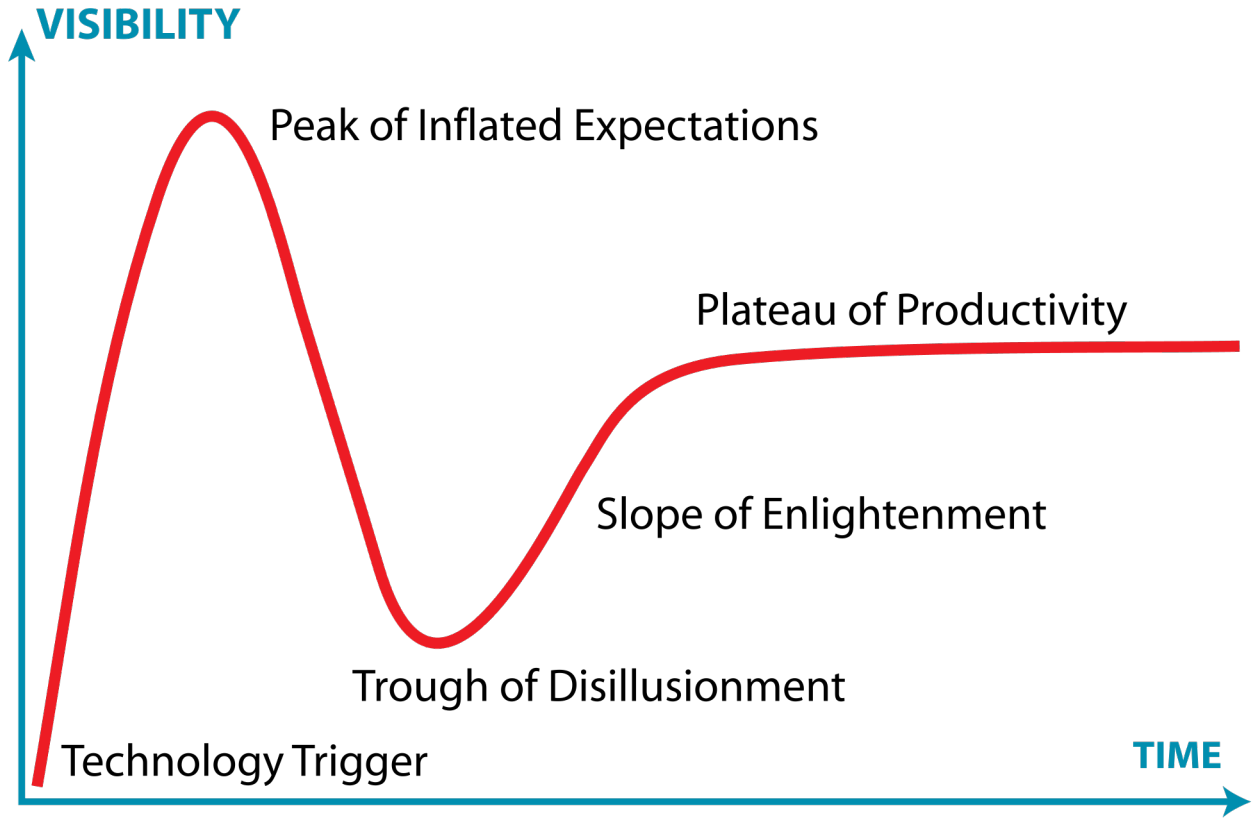
”Patient Wearables” and Other IOT-Generated Data

- Explore motivations behind Quantified Self and understand how this movement has influenced healthcare, and vice-versa.

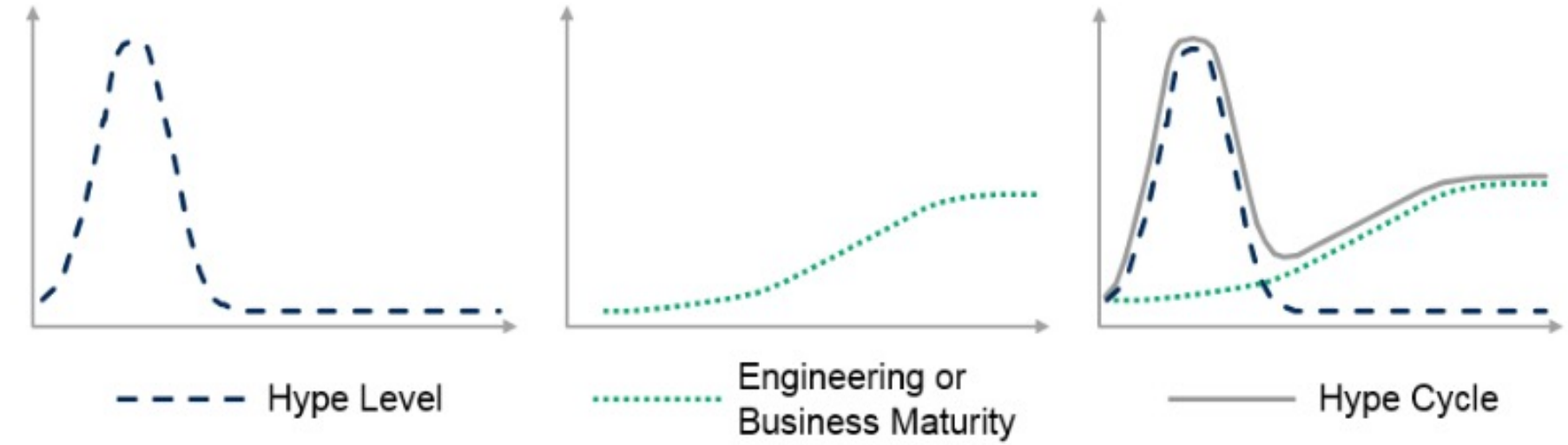
❖ What challenges are encountered in leveraging IoT data?

❖ Is the Mayo Data Trust a persuasive solution to these challenges?

The Hype Cycle



Hype Cycle Components



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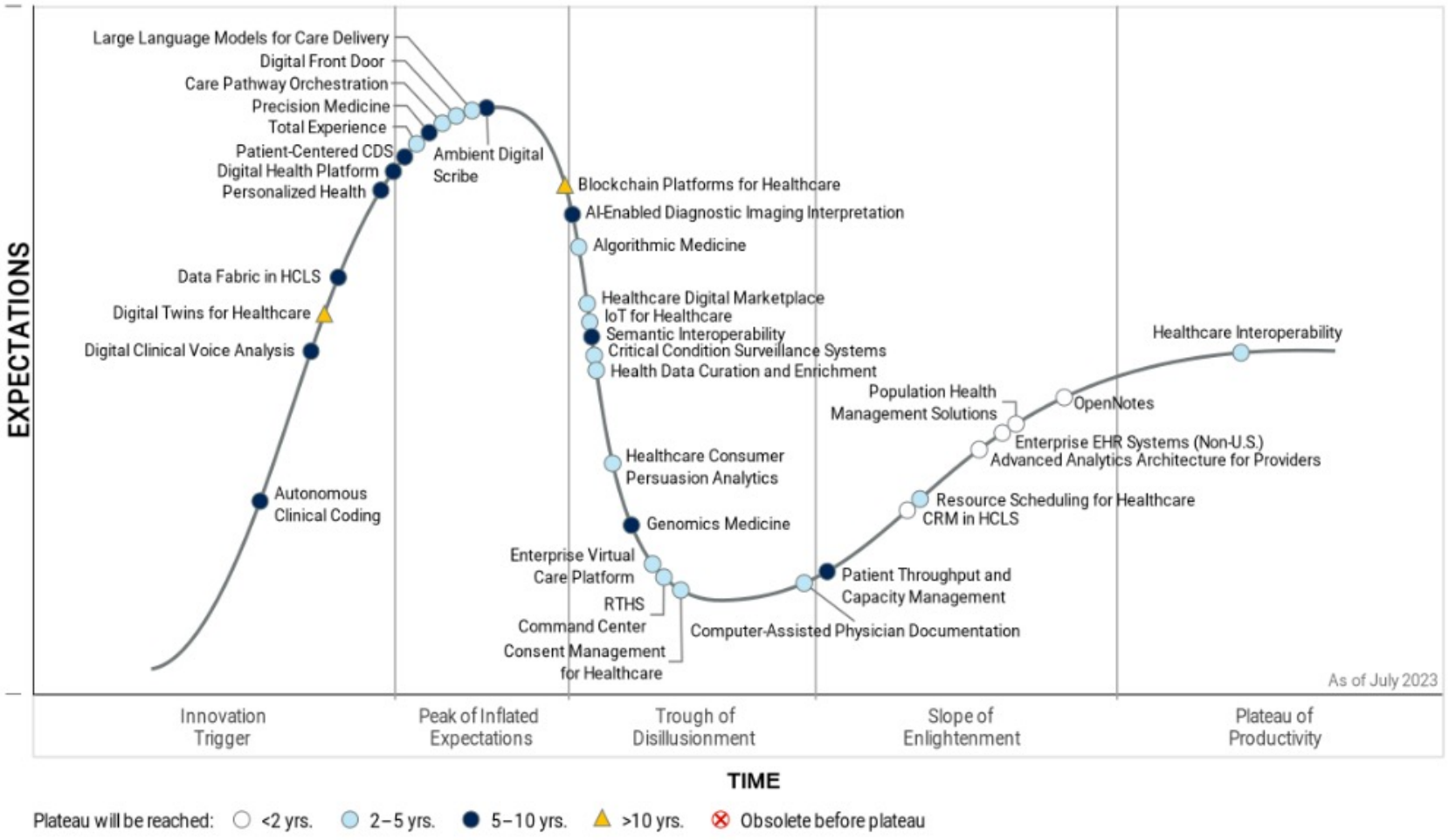
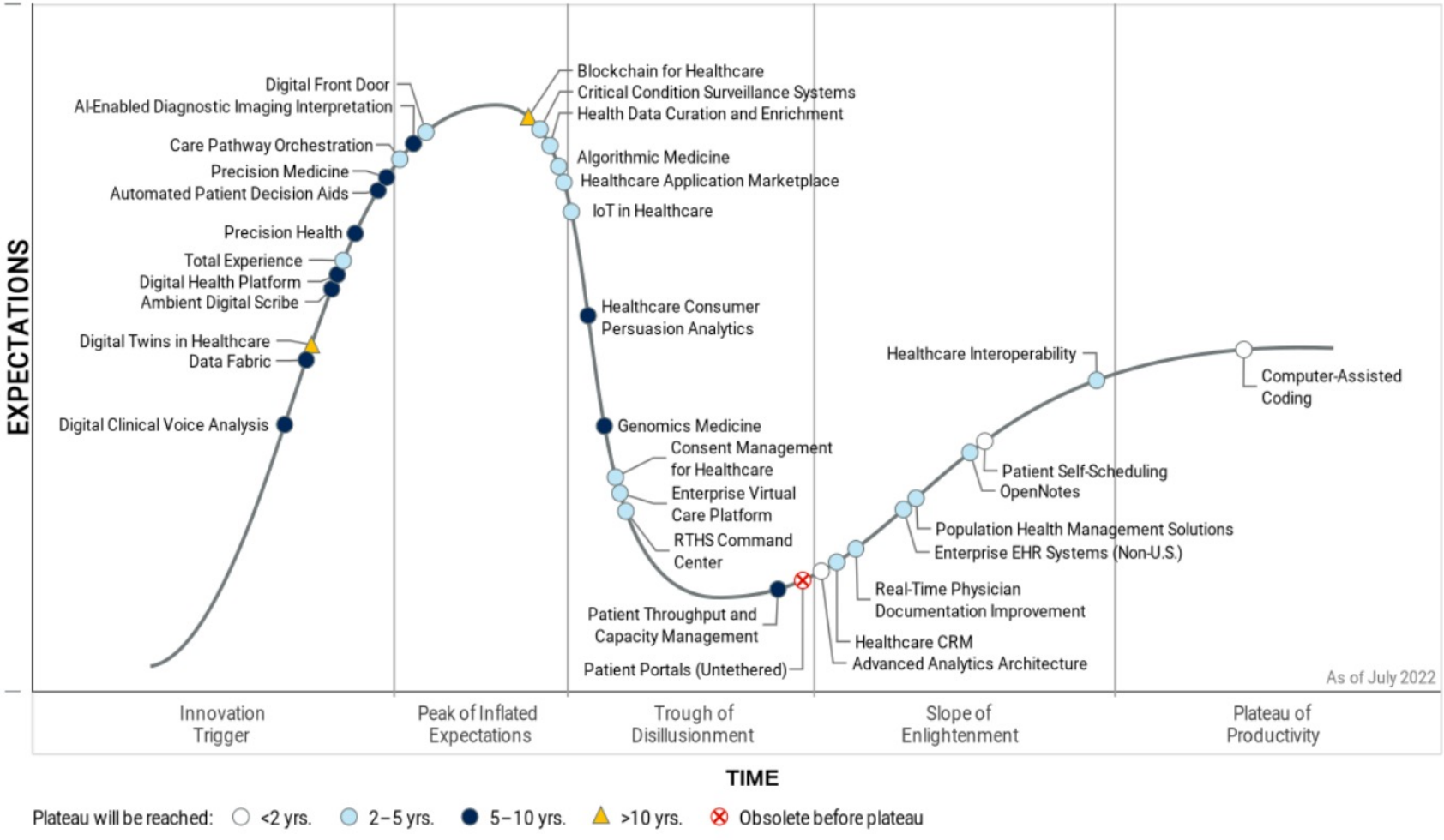
Hype Cycle for Healthcare Providers, 2023



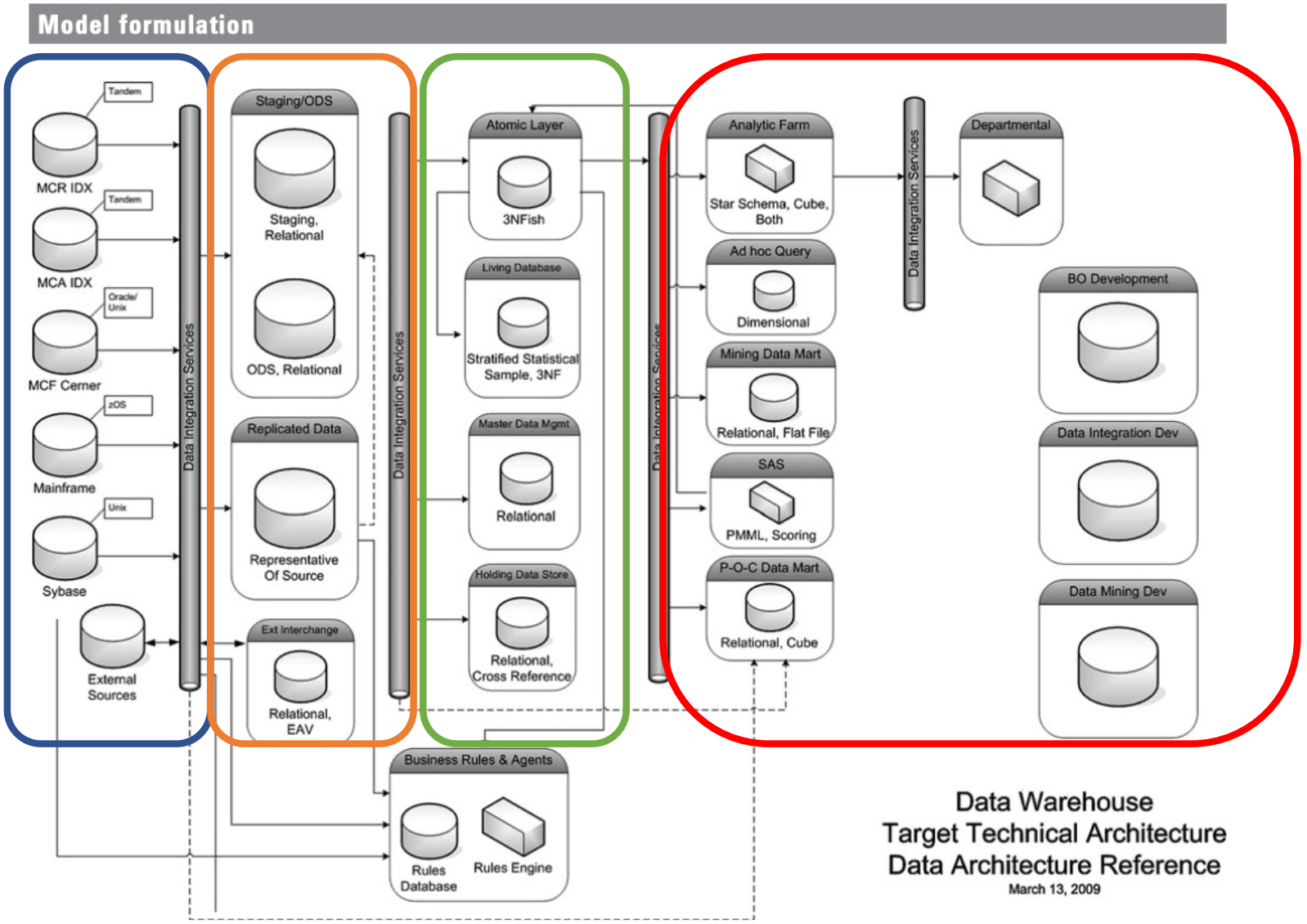
Gartner

Hype Cycle for Healthcare Providers, 2022



Gartner

Chute CG, Beck SA, Fisk TB, Mohr DN. The Enterprise Data Trust at Mayo Clinic: a semantically integrated warehouse of biomedical data. *Journal of the American Medical Informatics Association*. 2010;17(2):131-135. doi:10.1136/jamia.2009.002691



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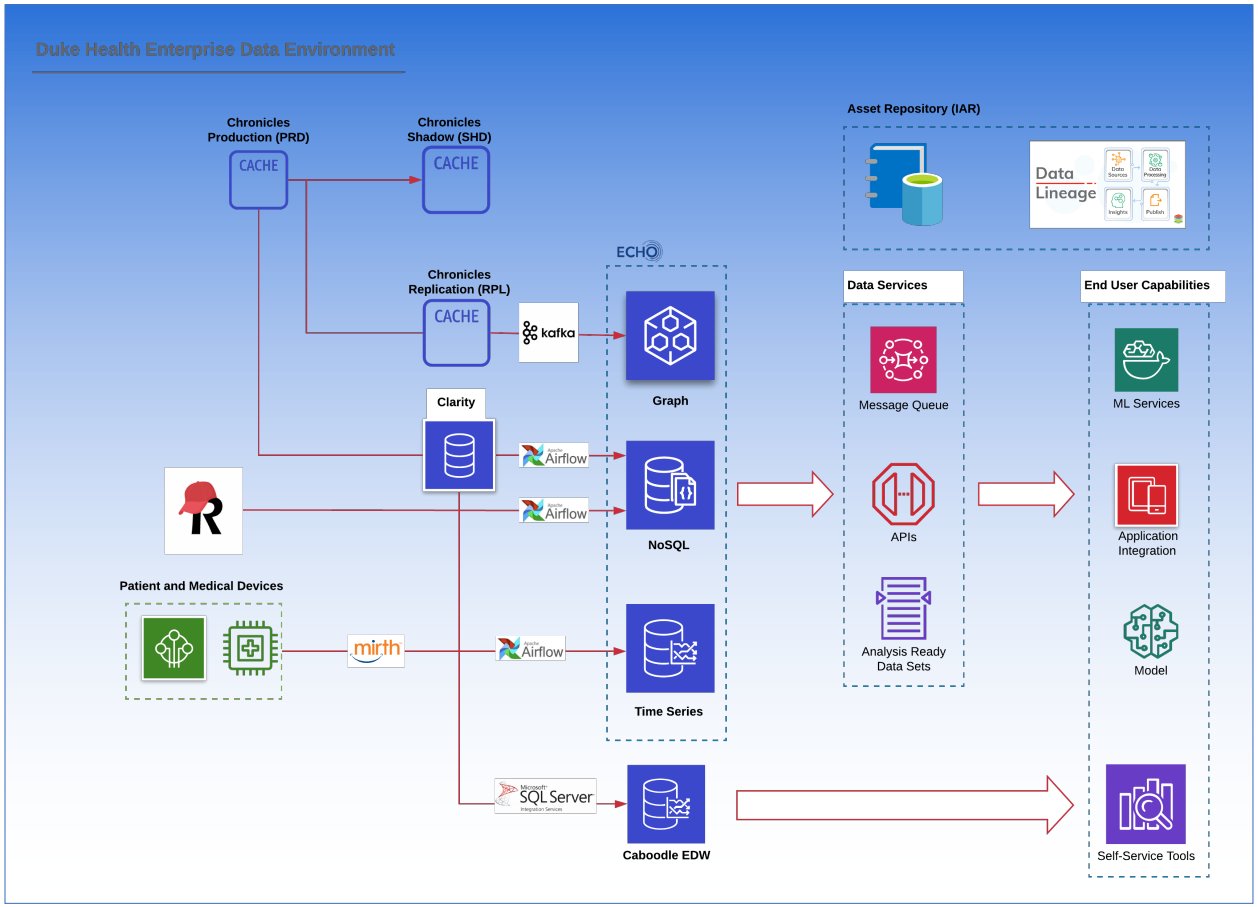

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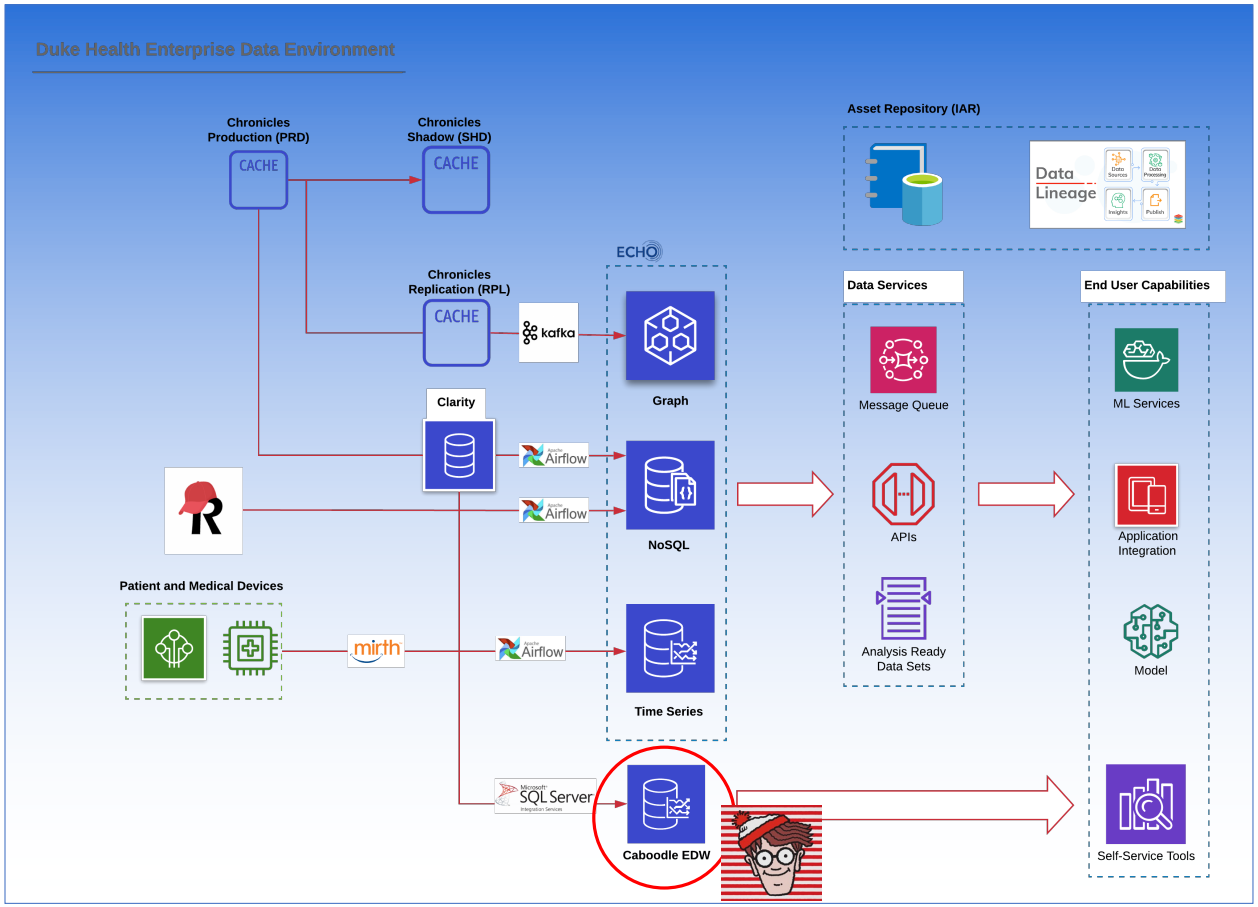

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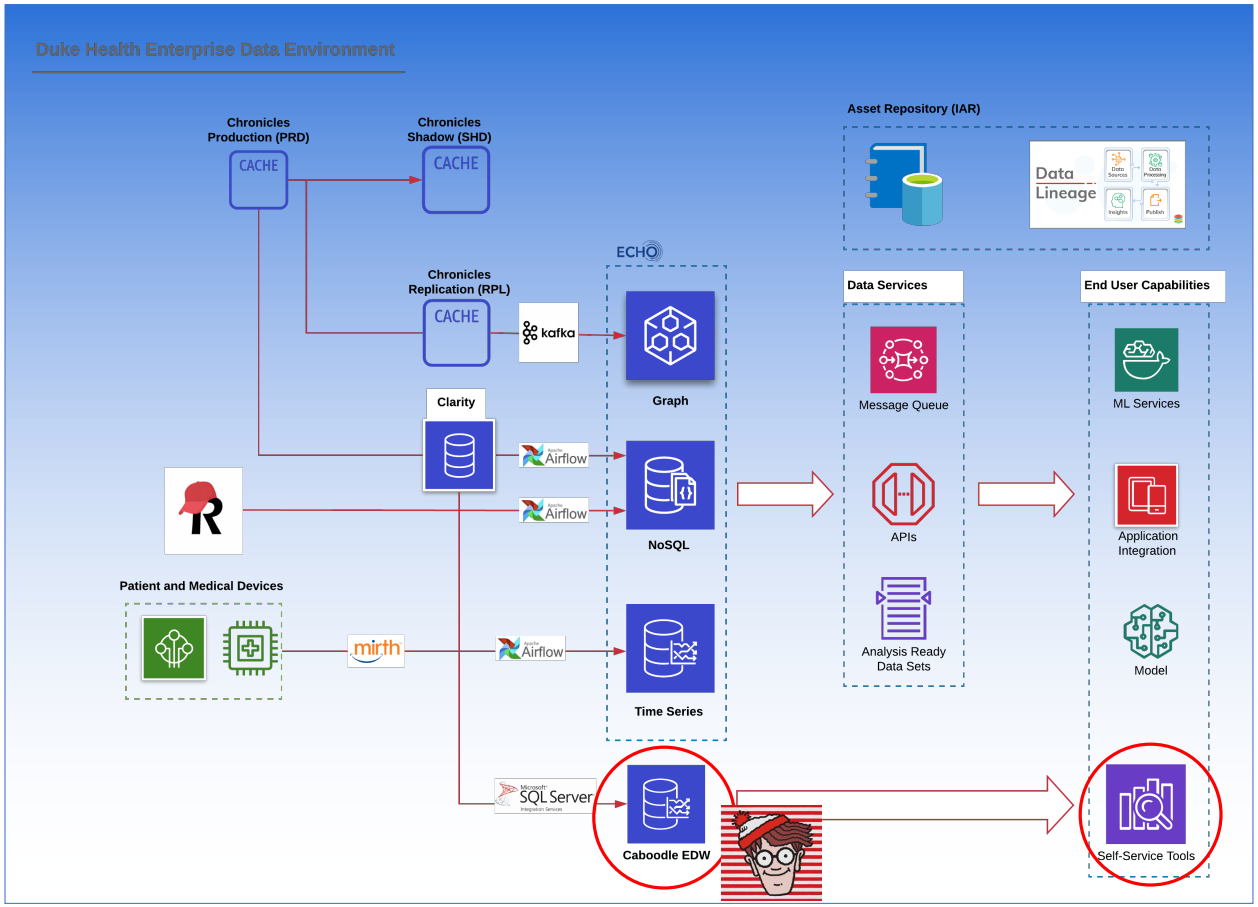

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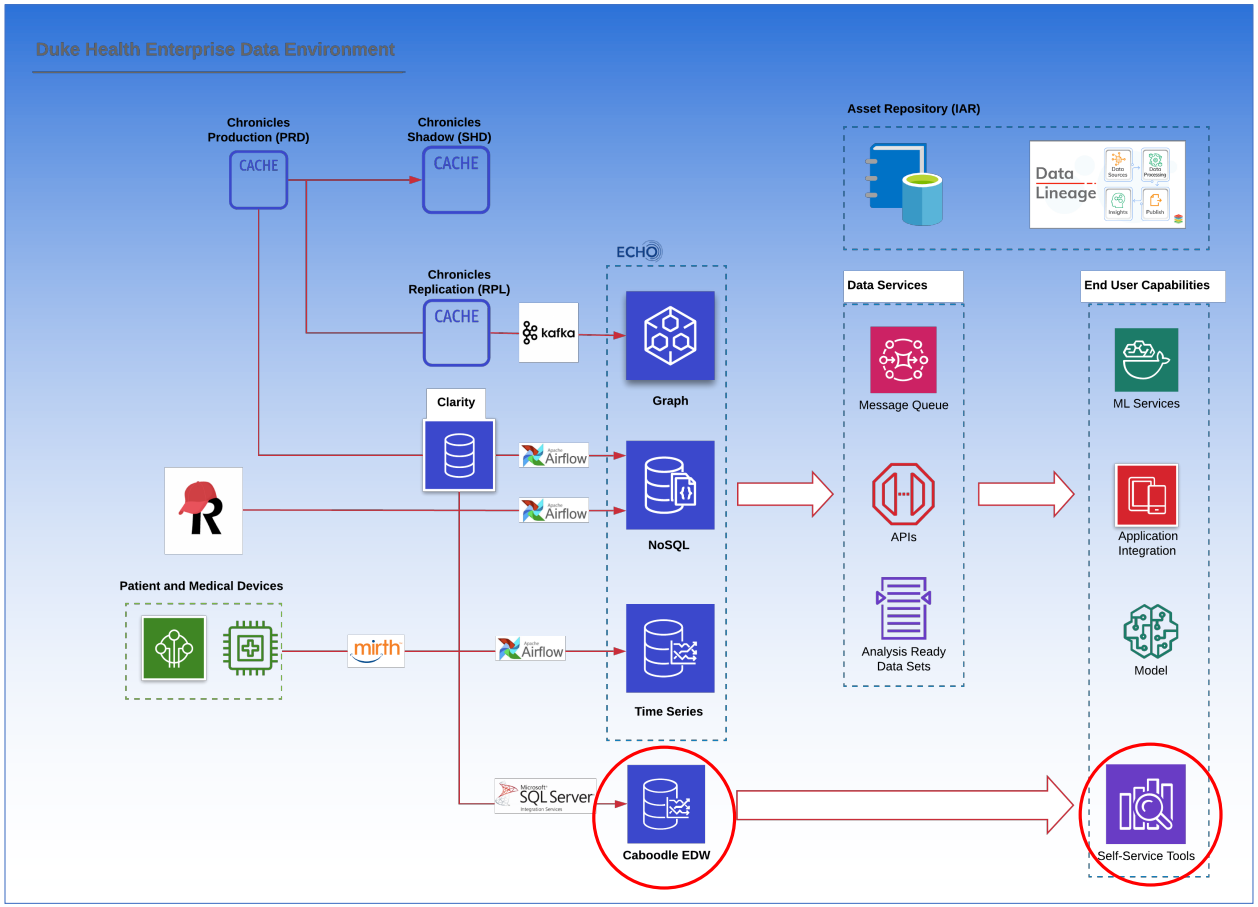

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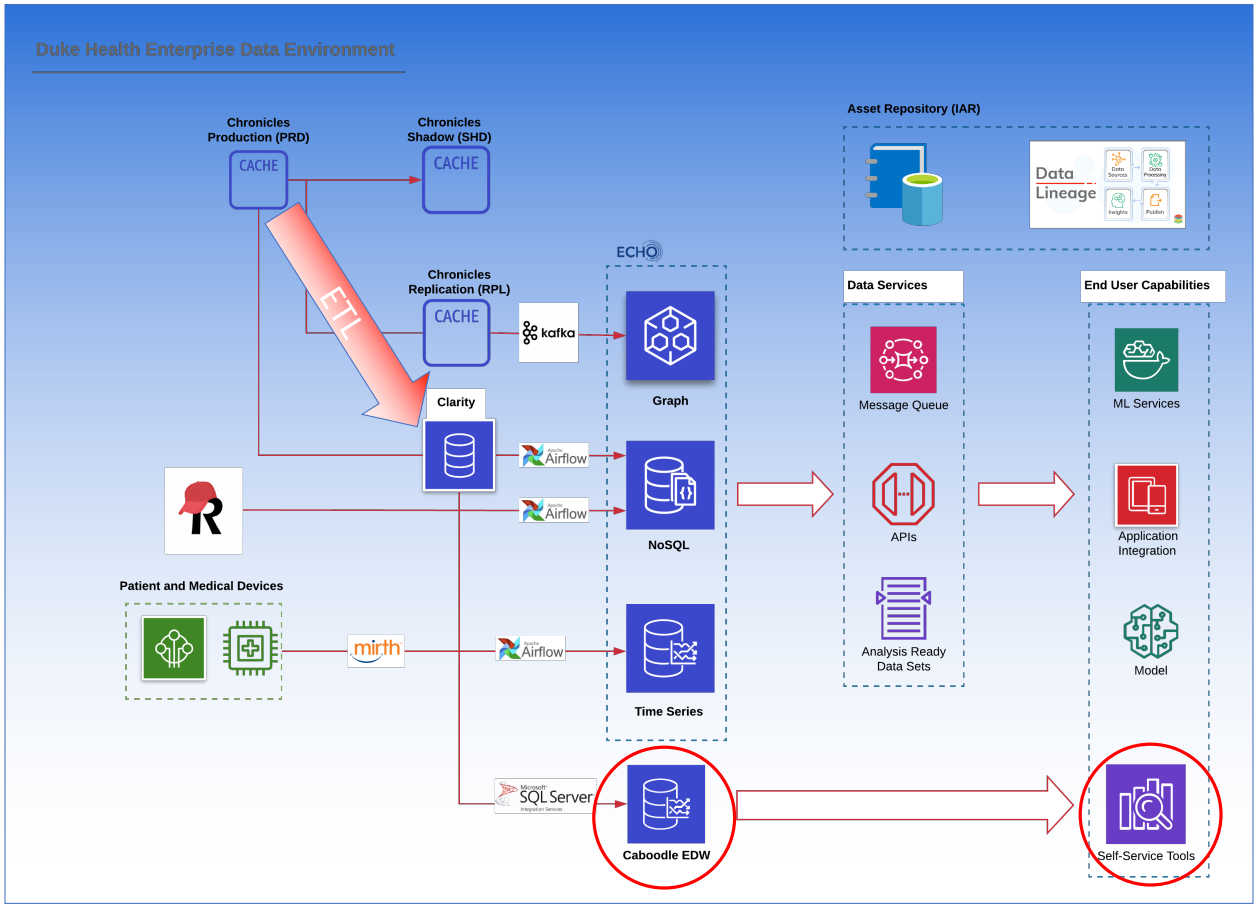

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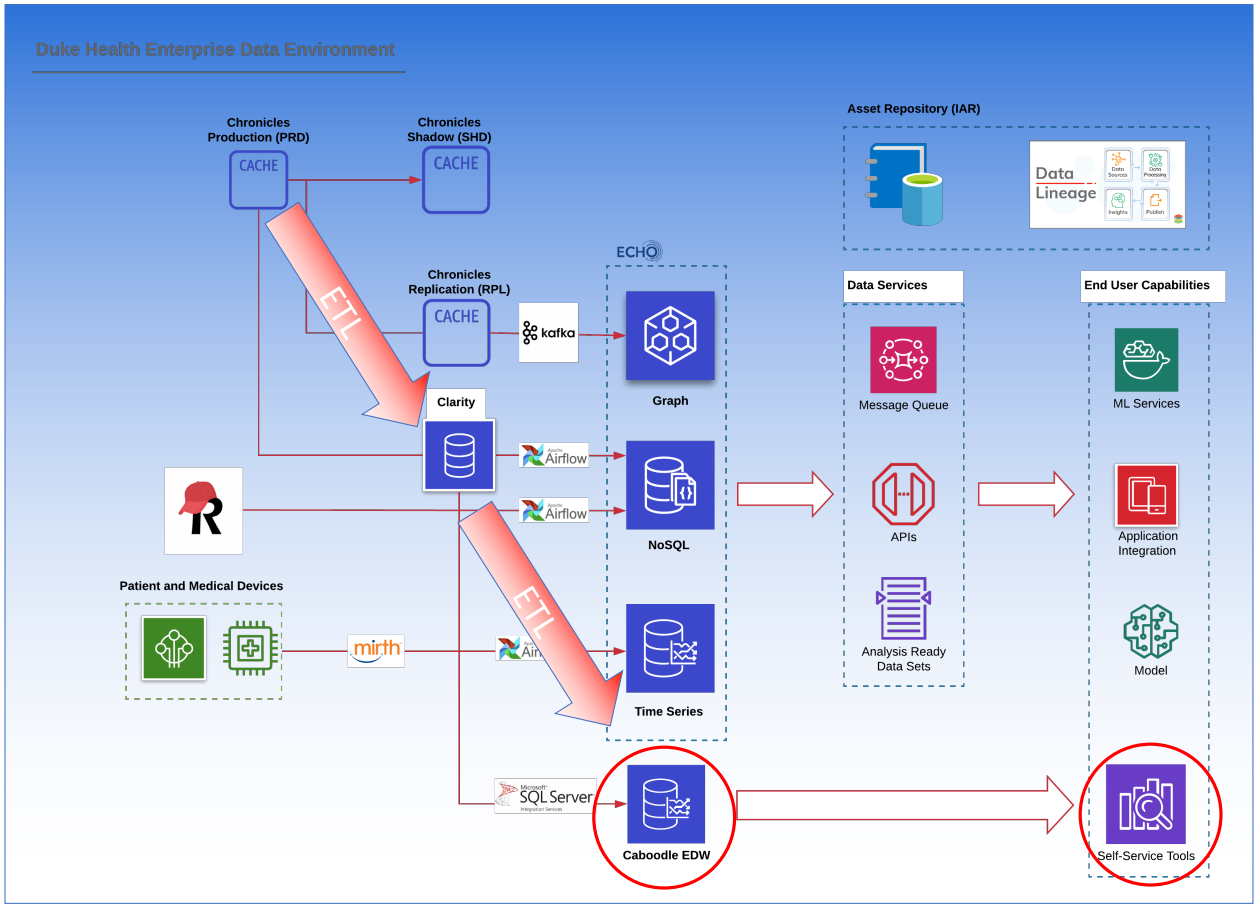

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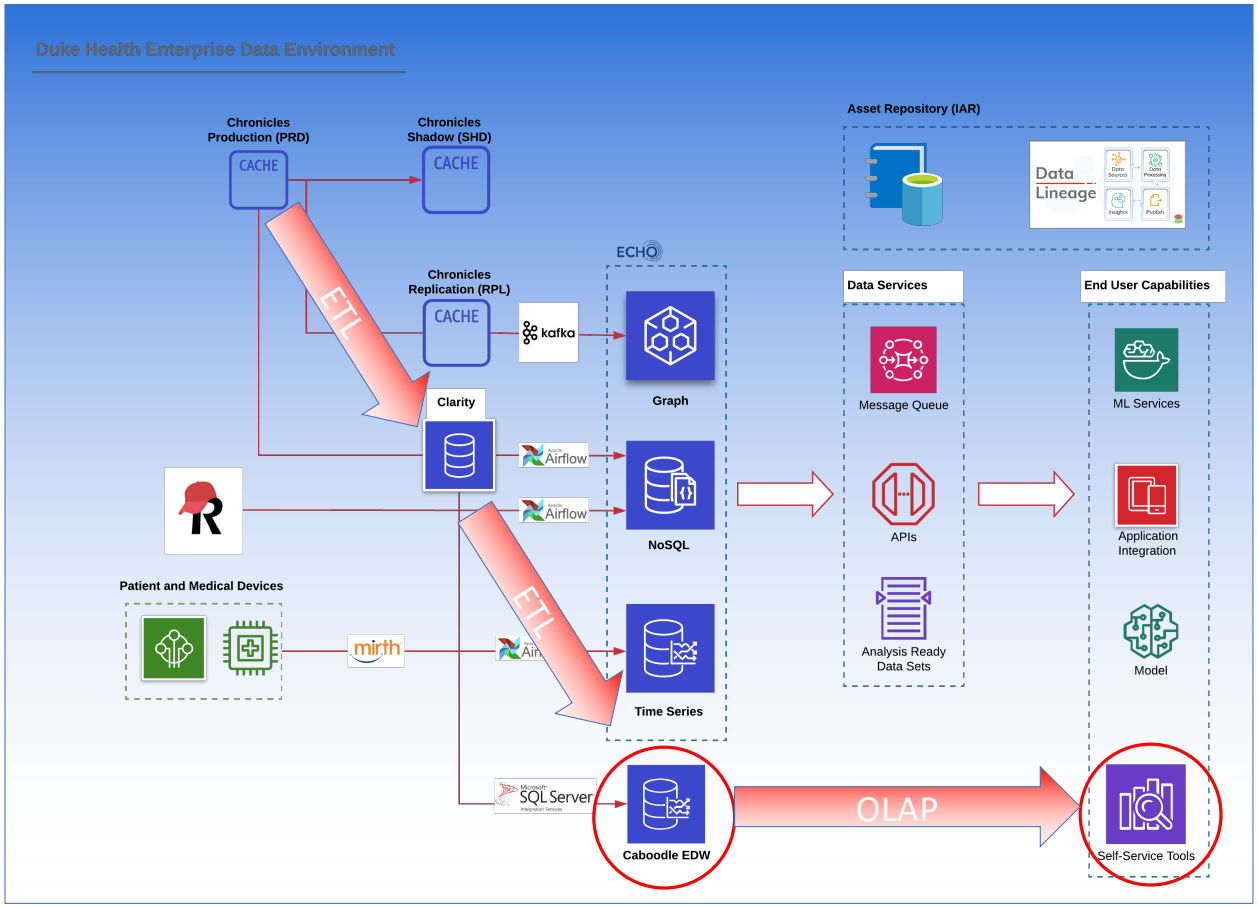

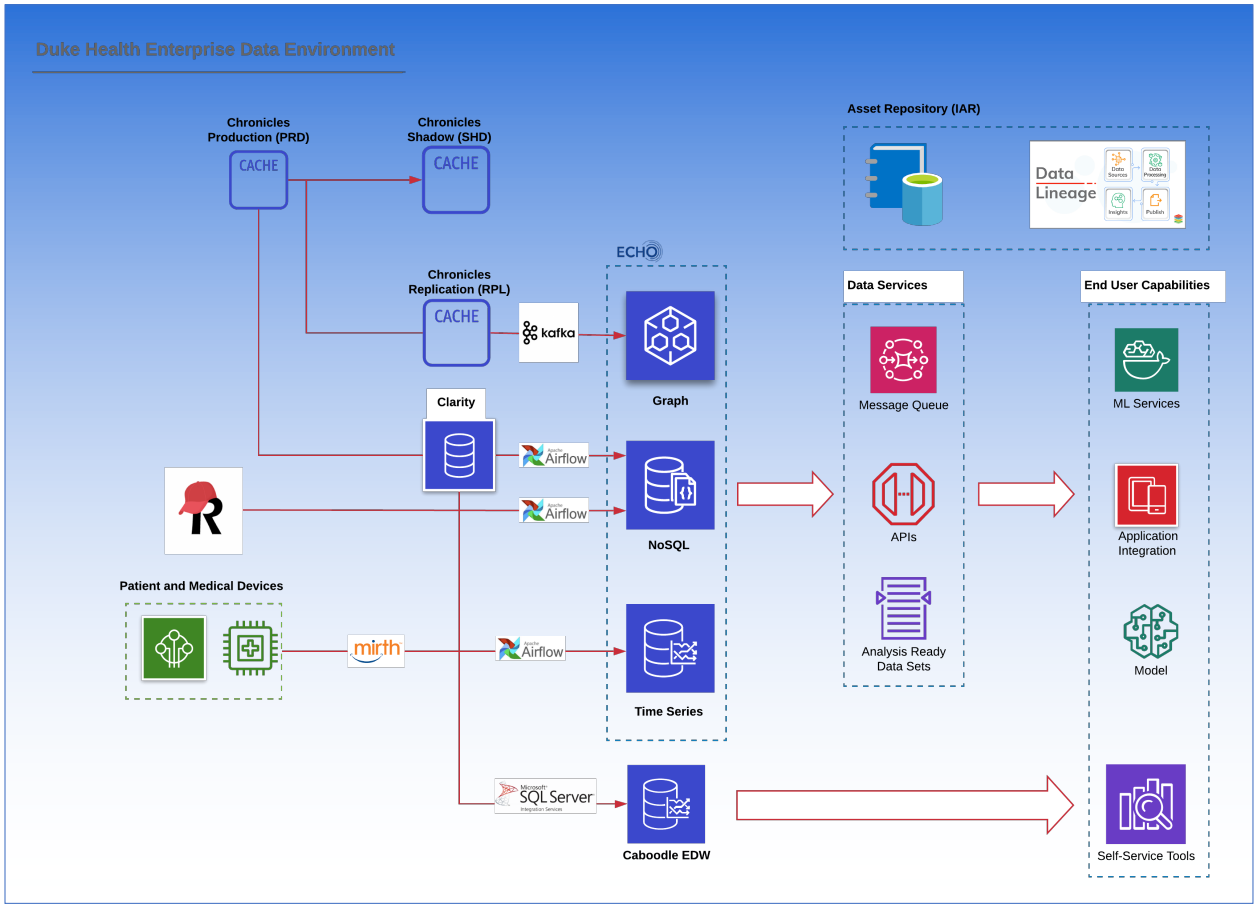
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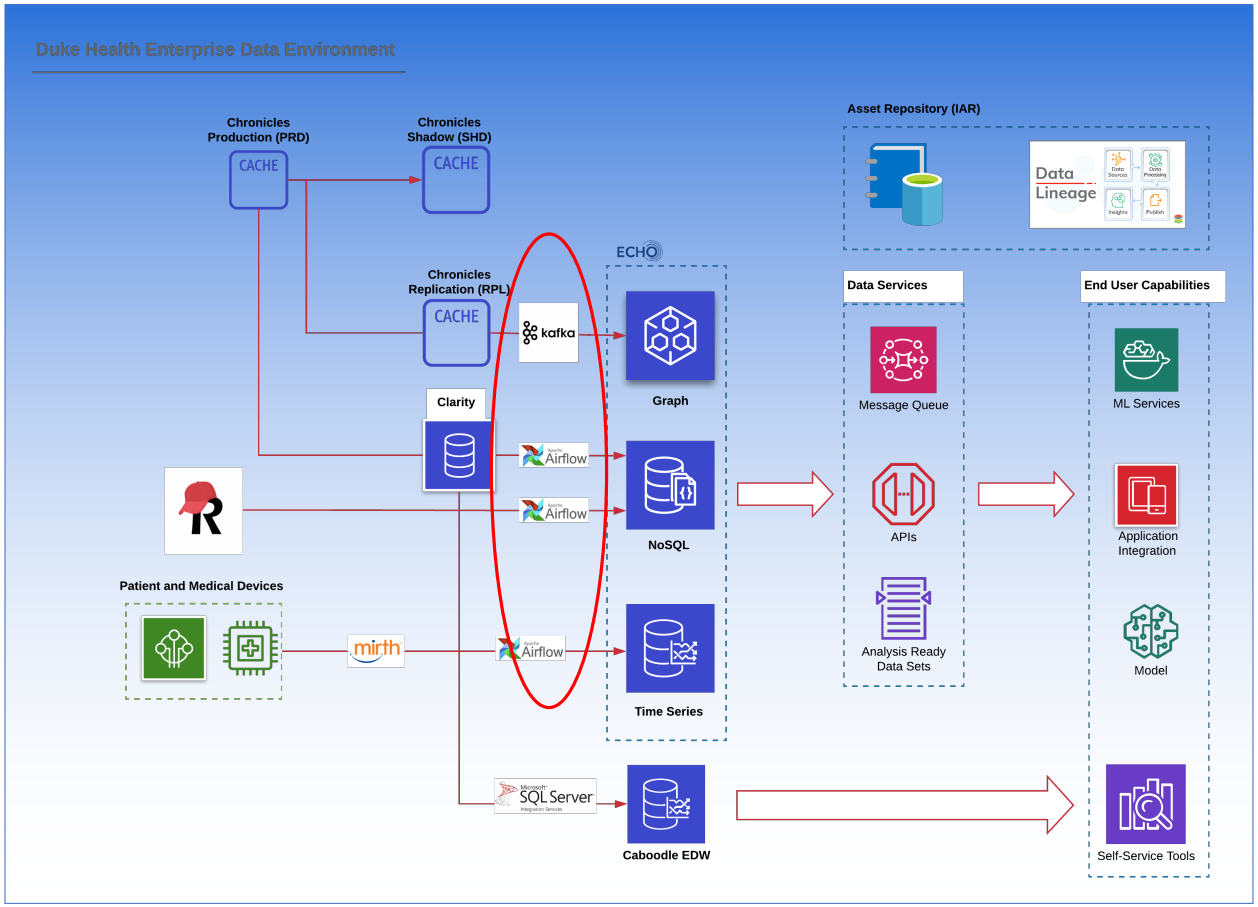
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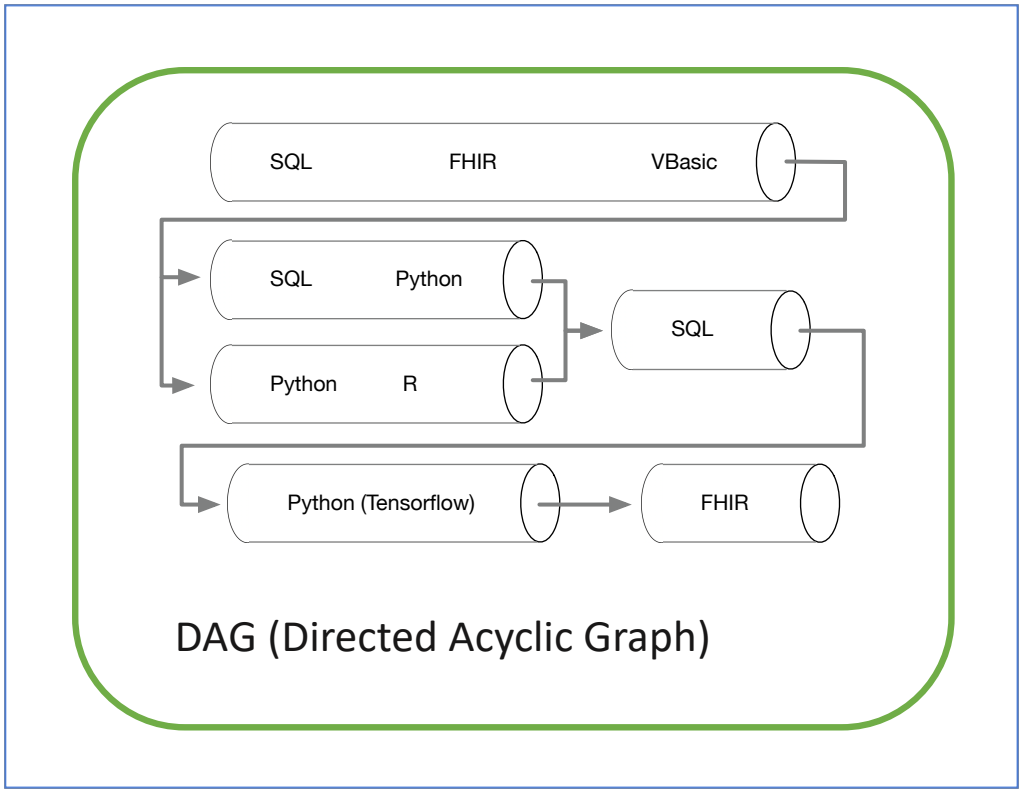

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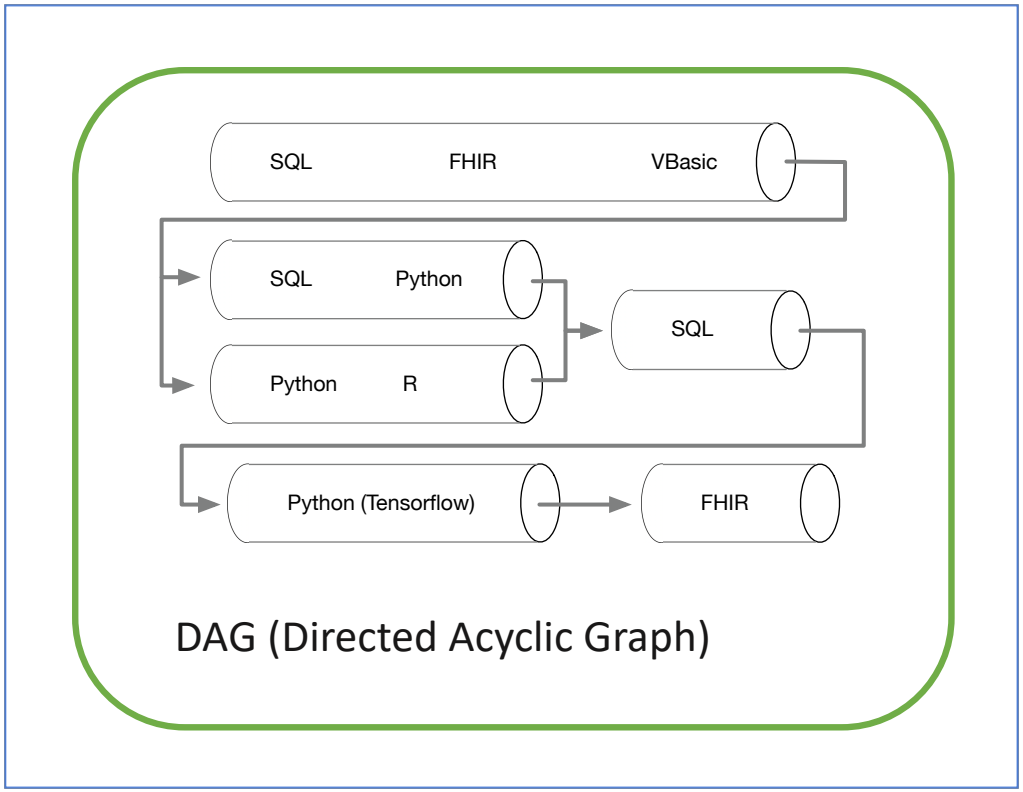
Airflow



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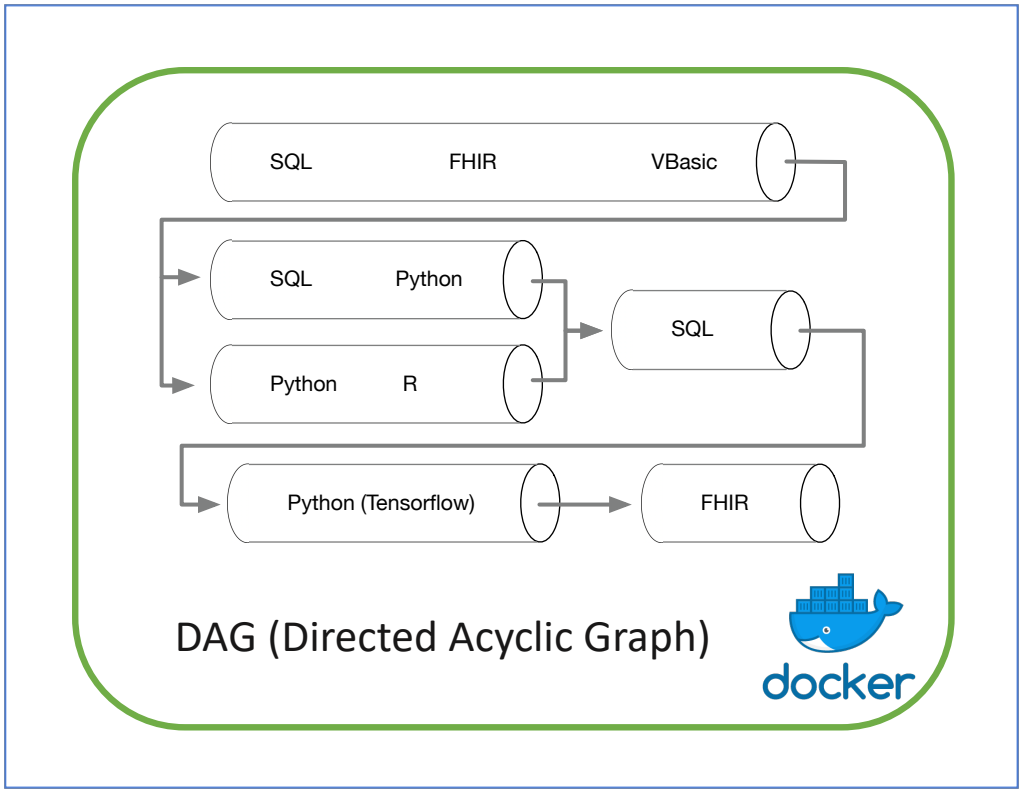

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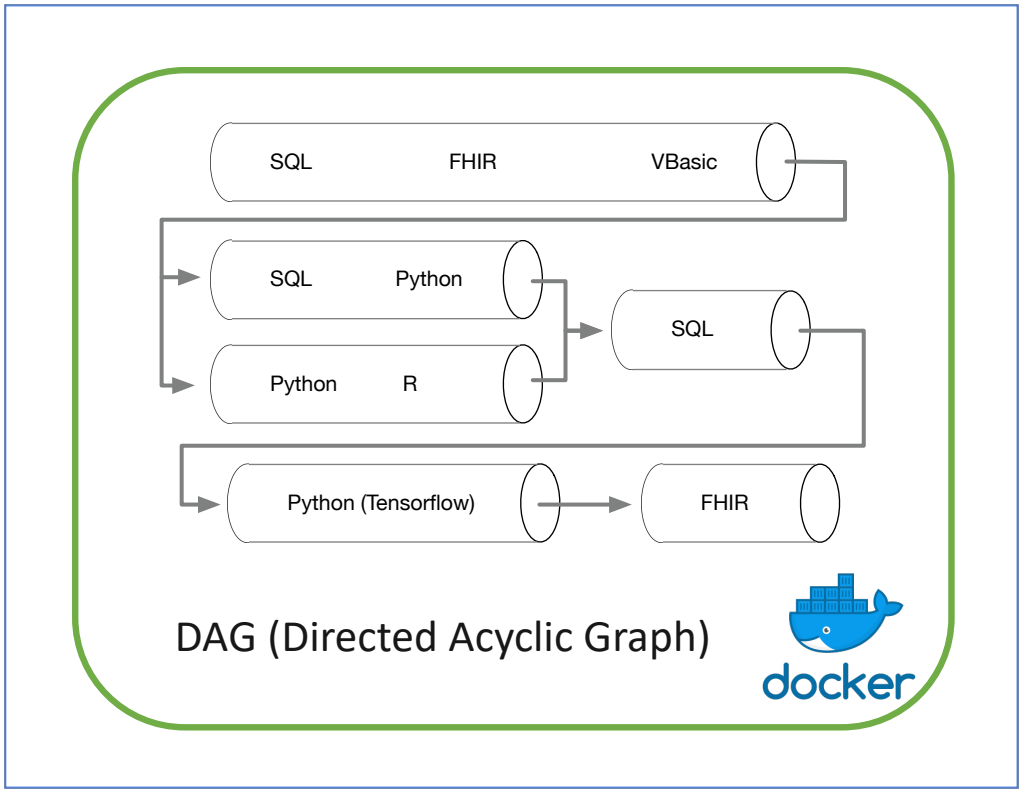

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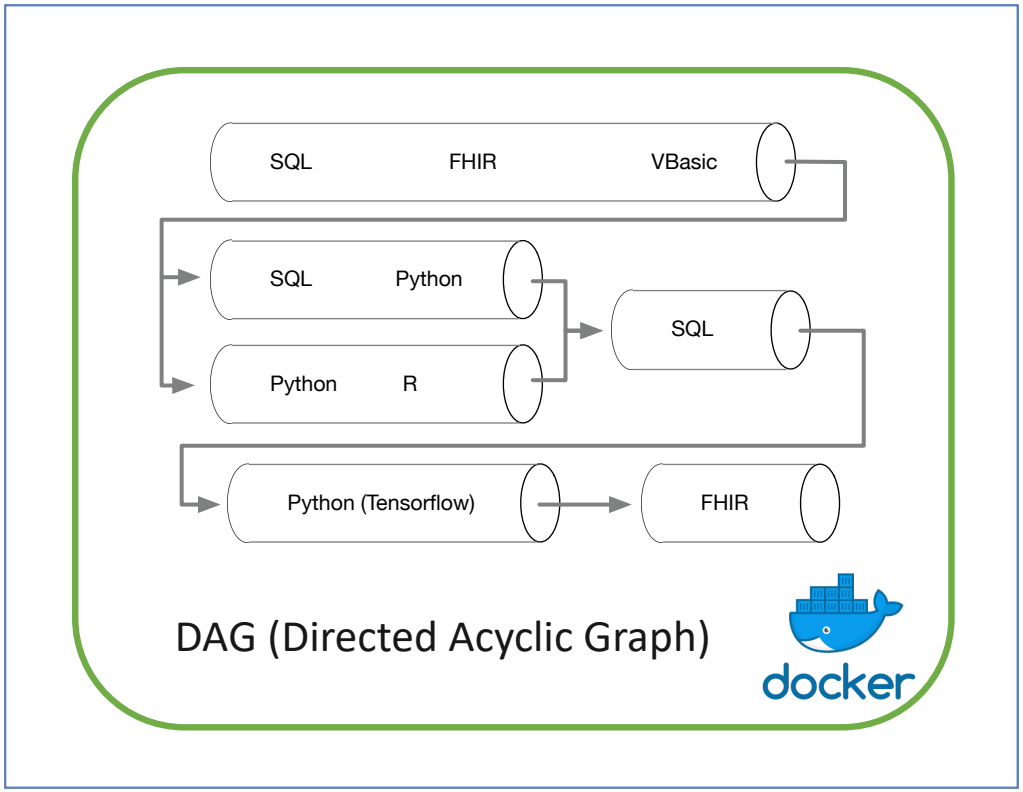

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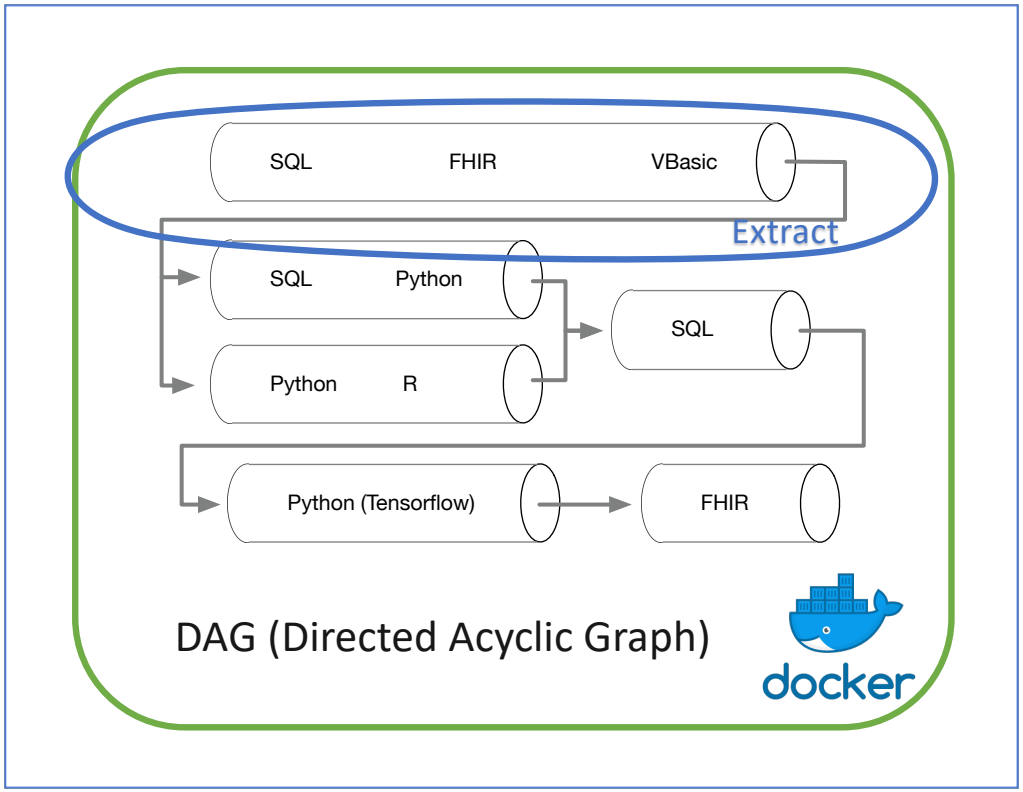

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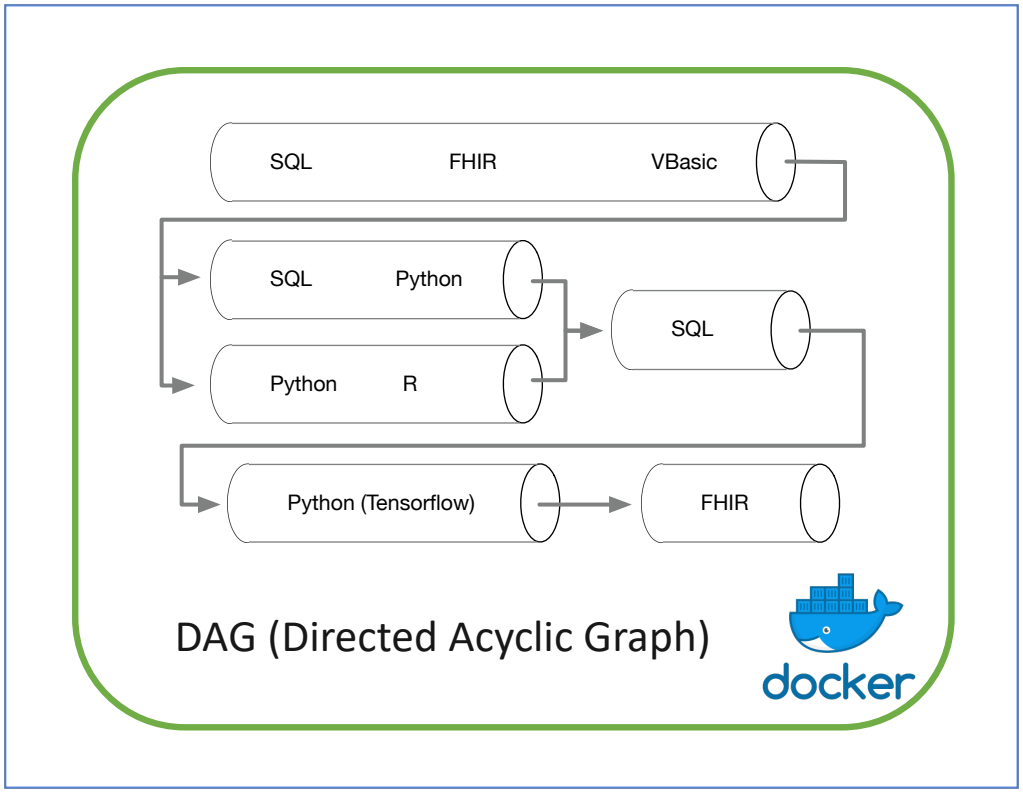

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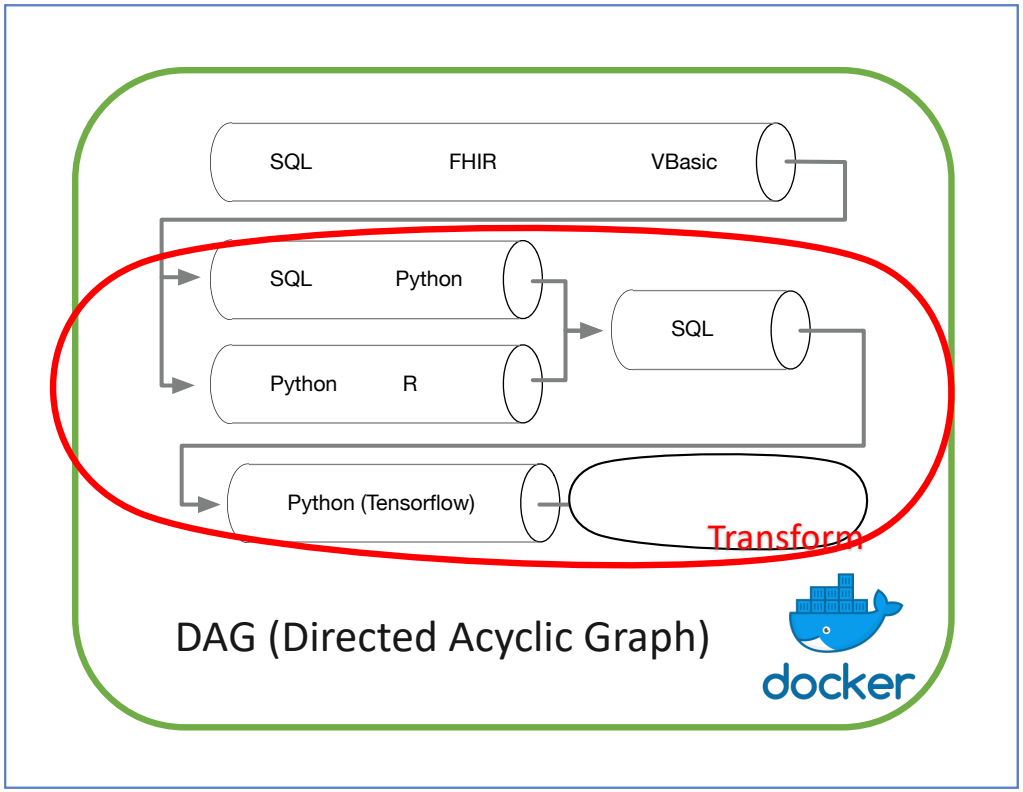

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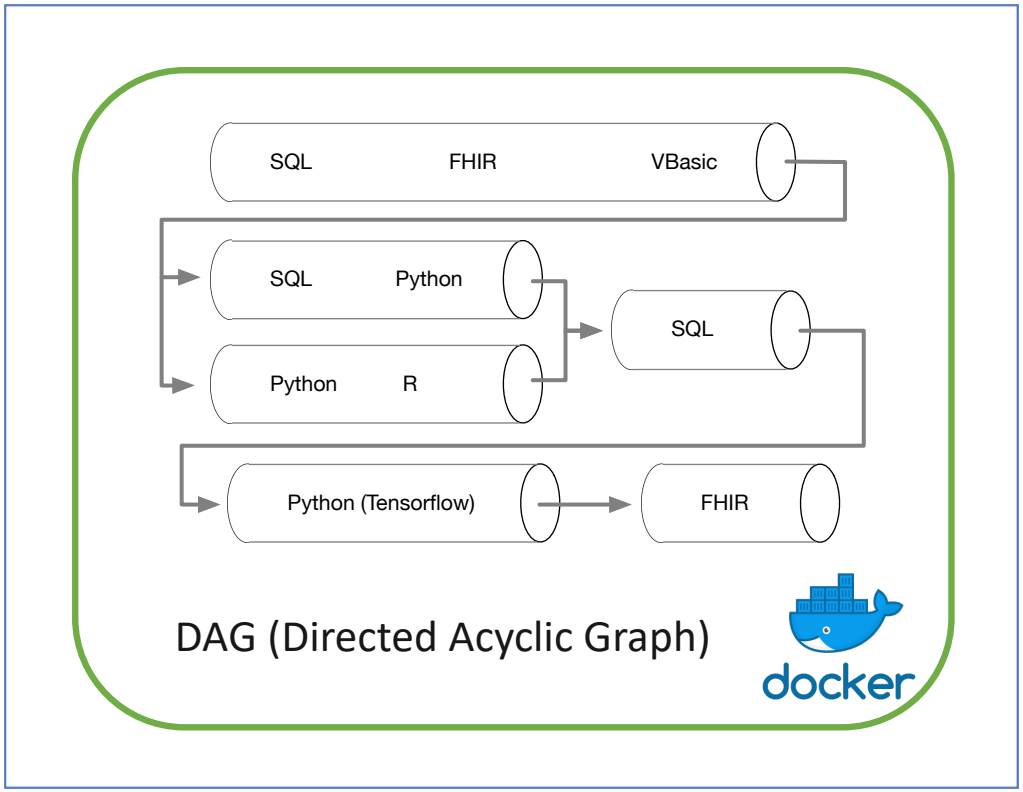

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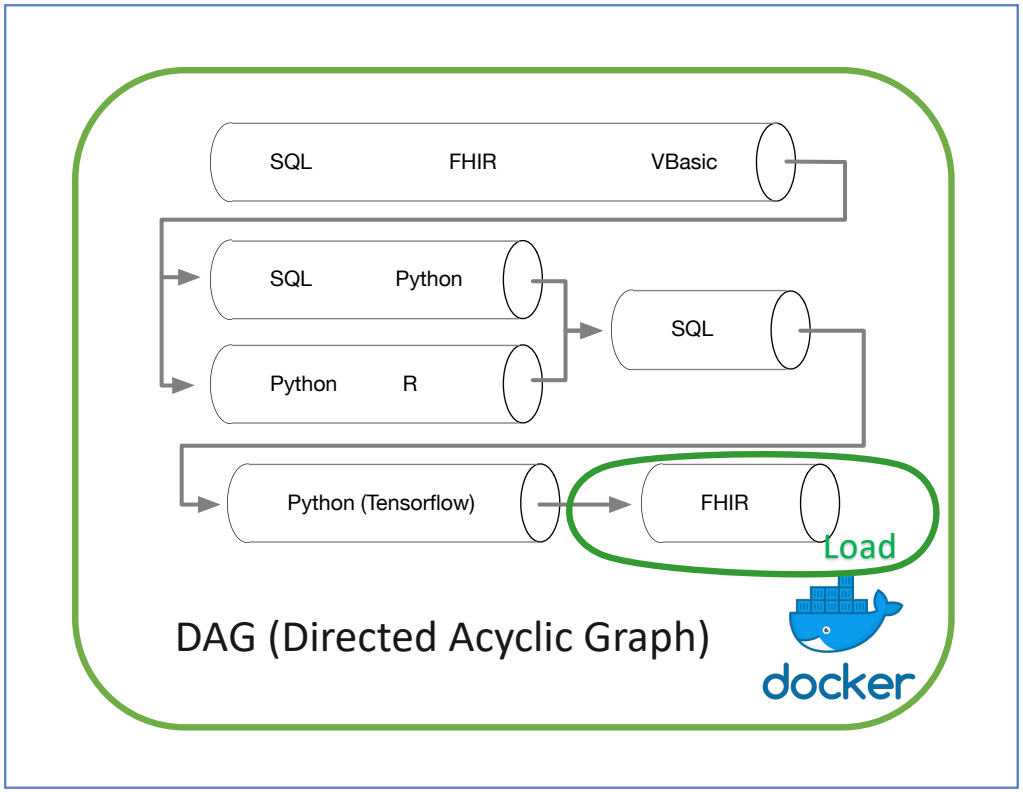

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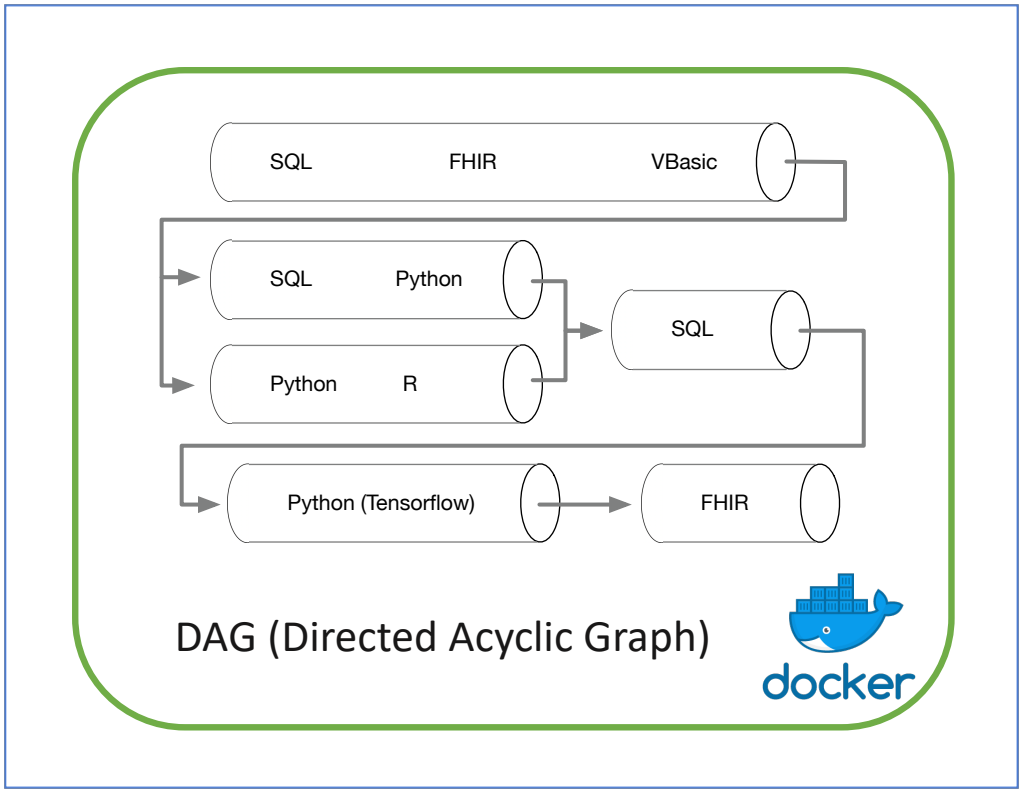

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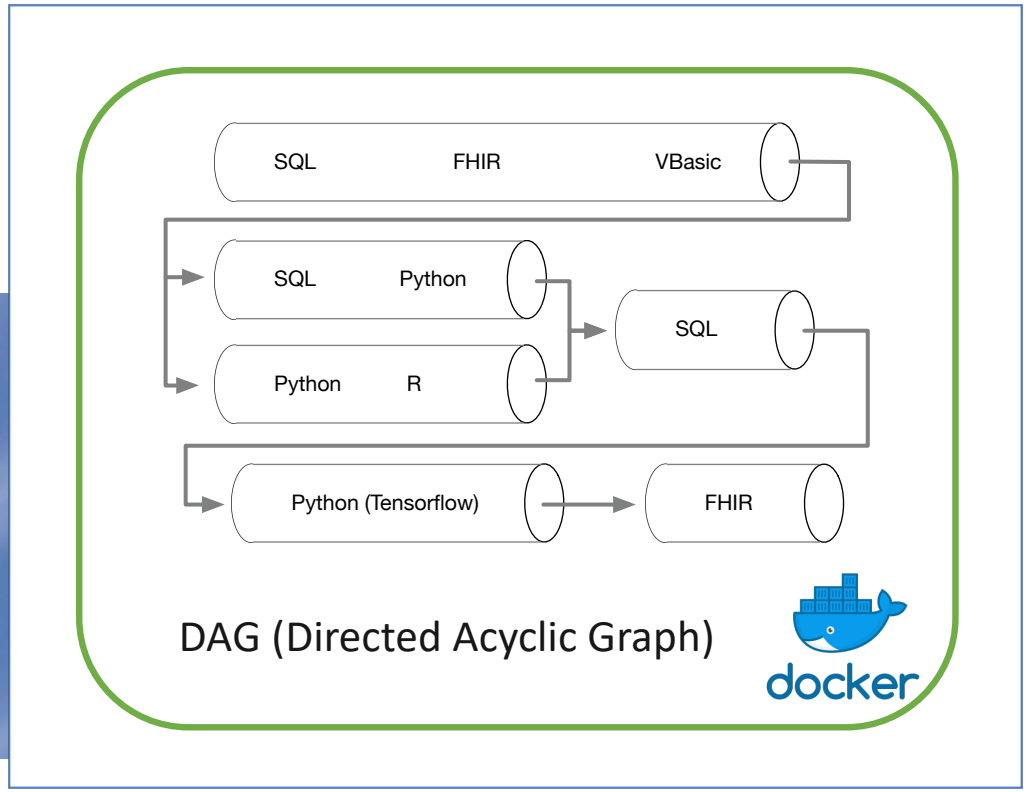

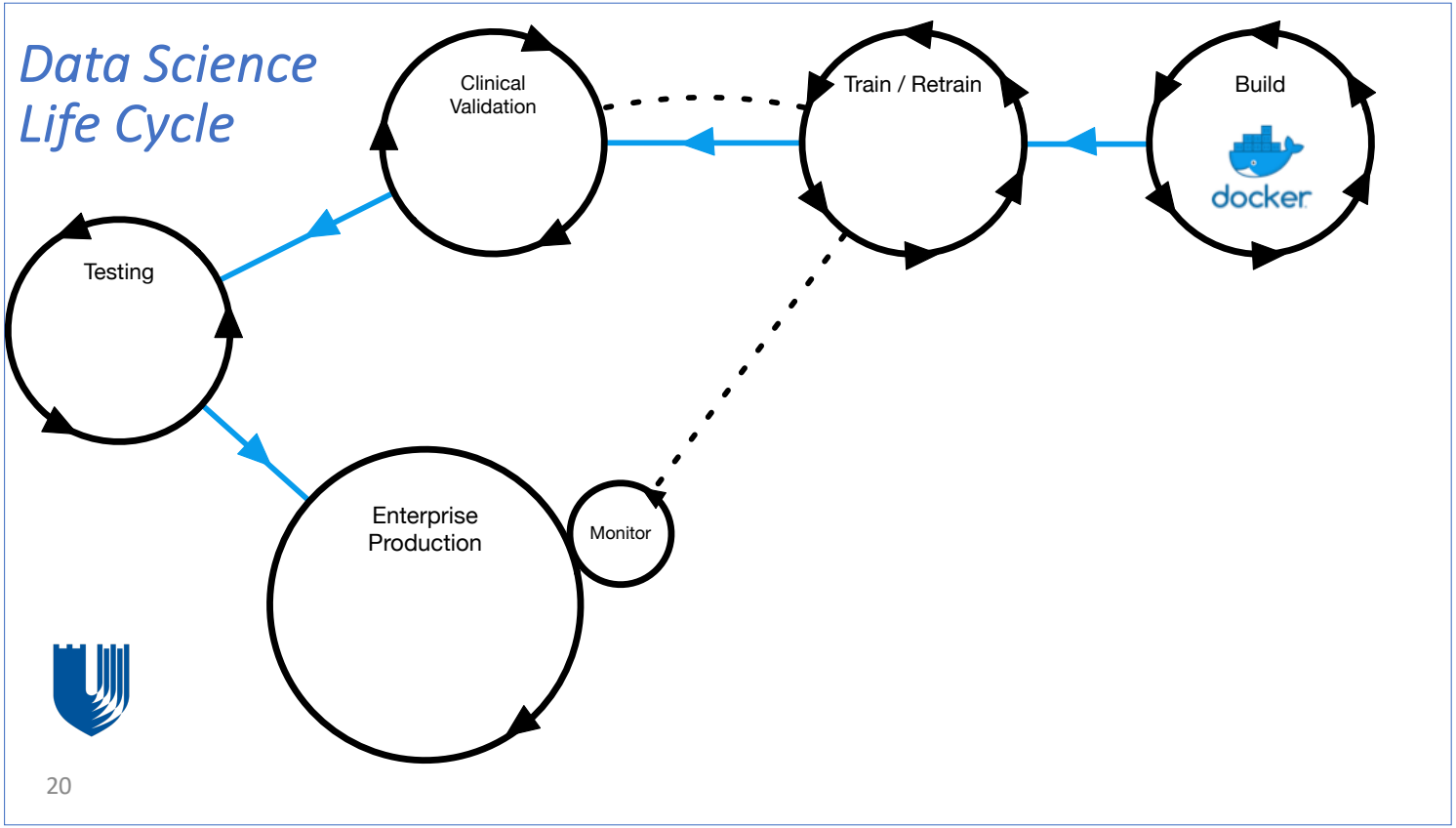
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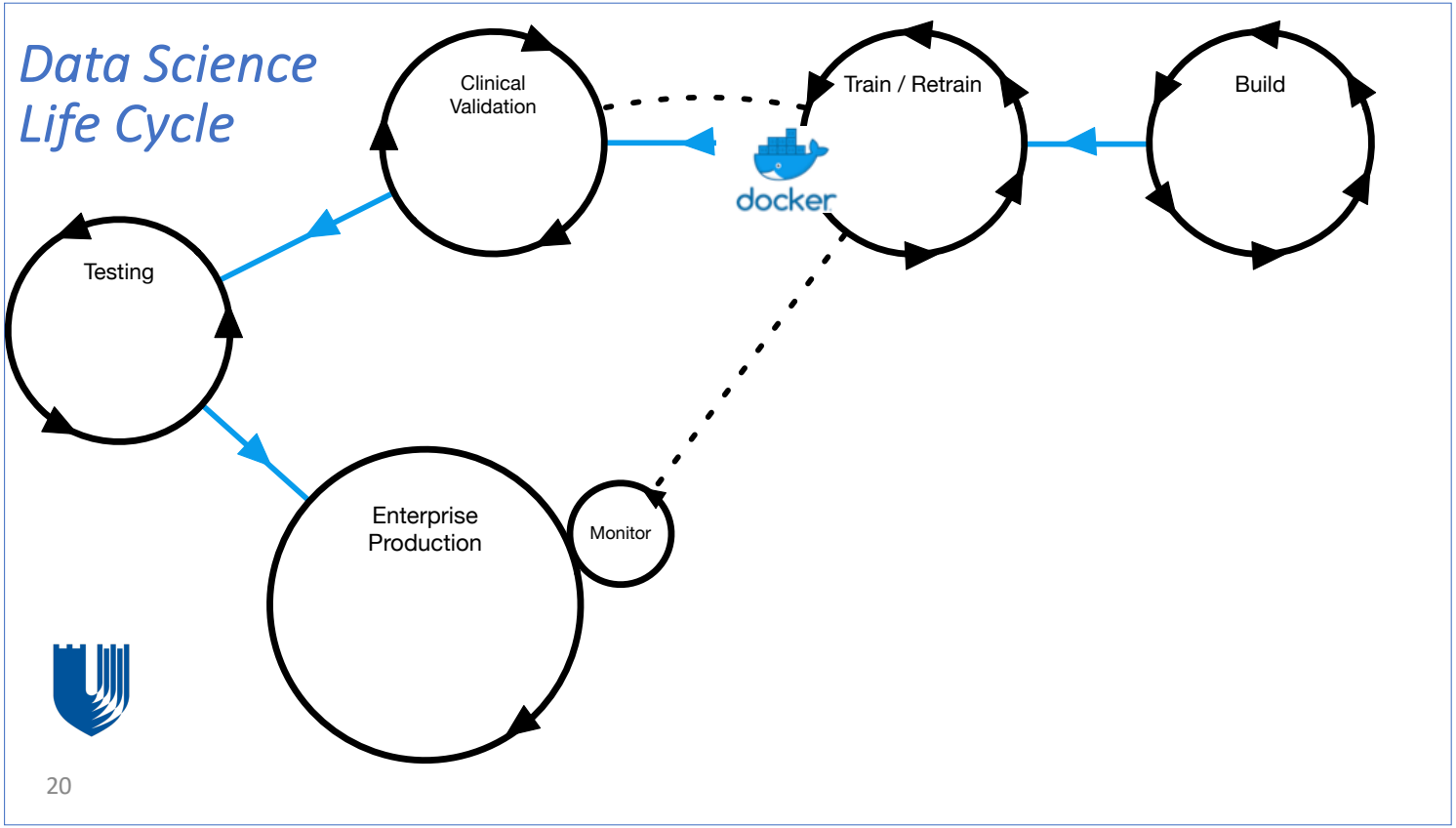
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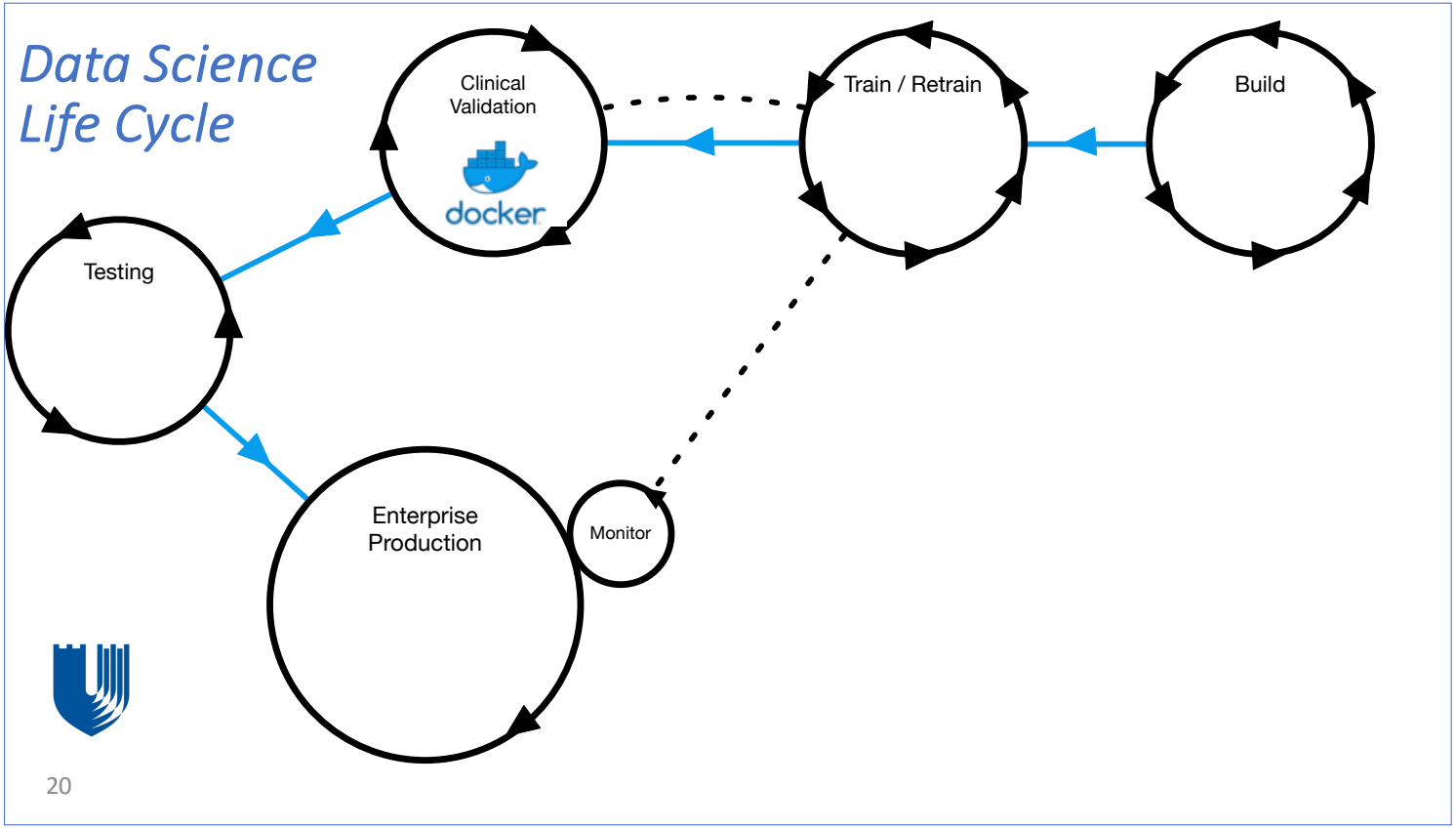
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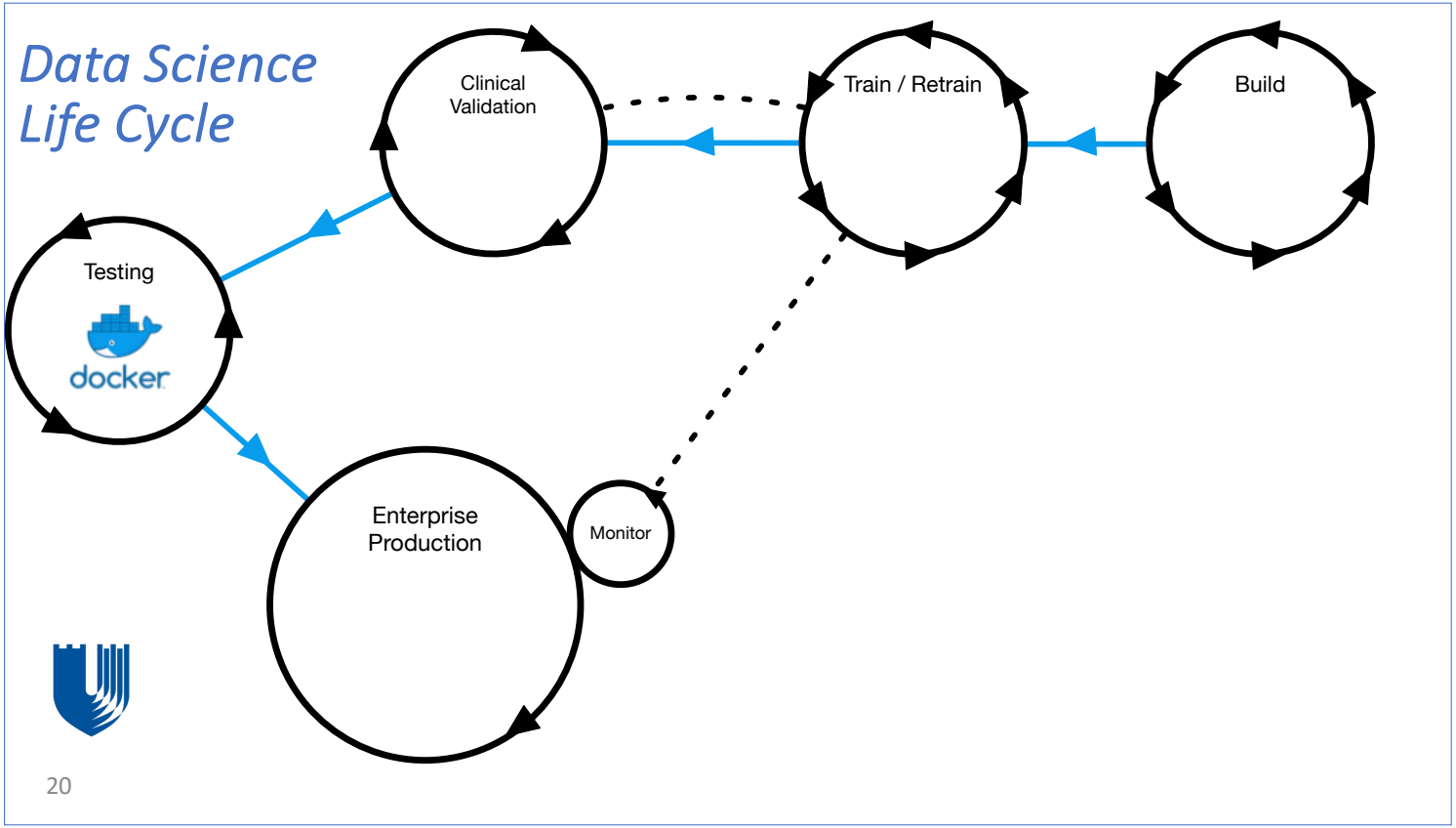
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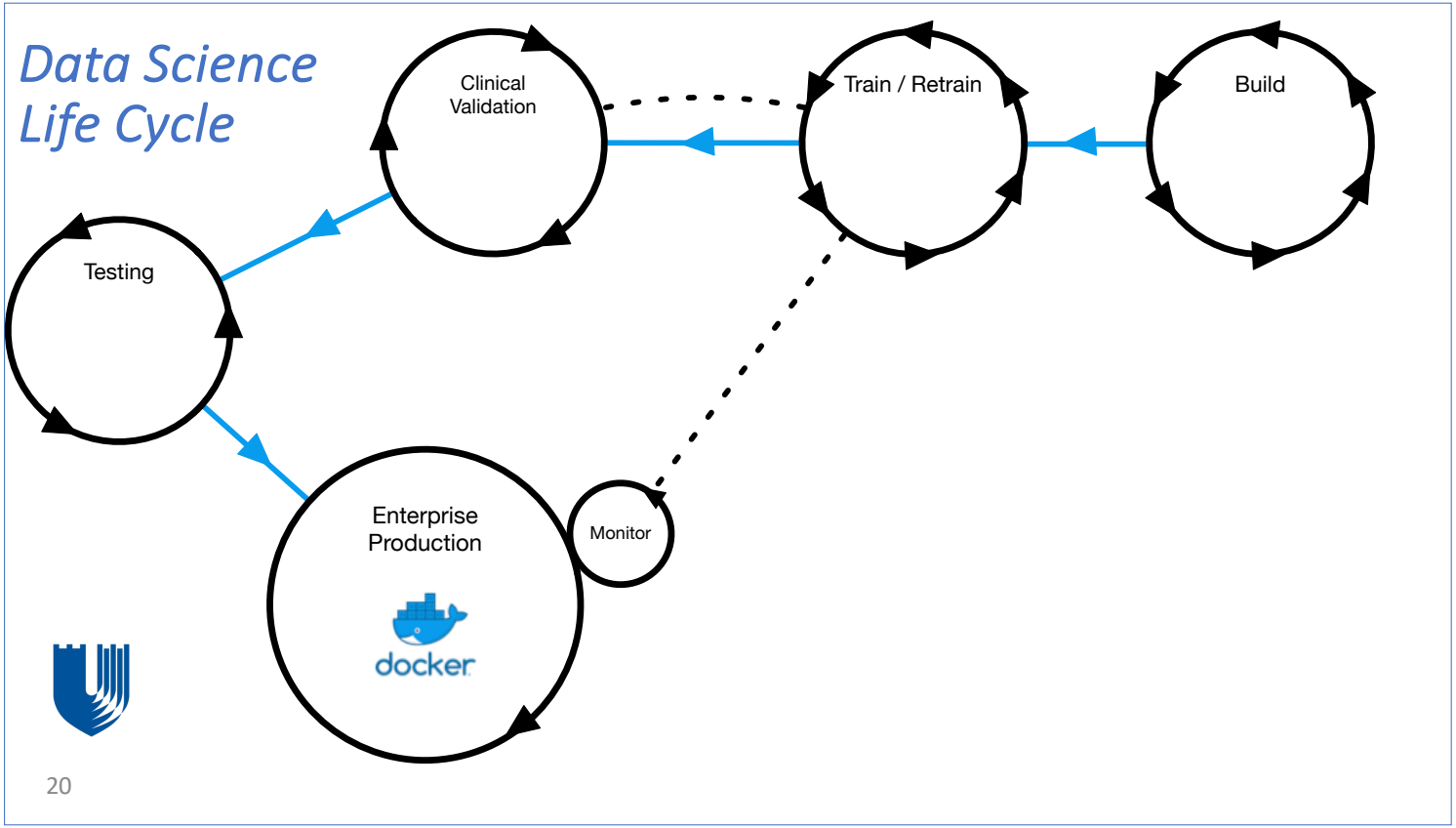
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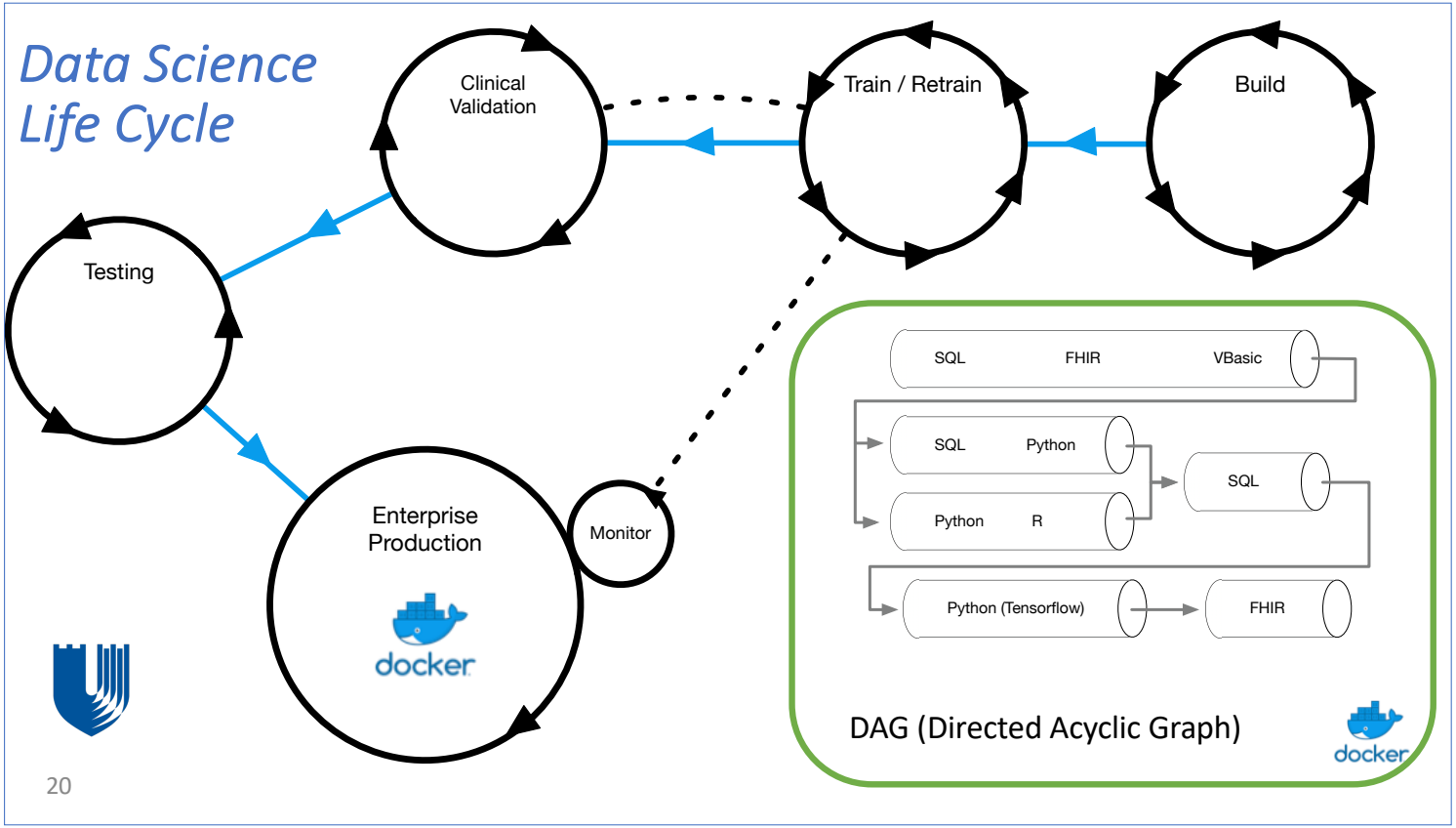
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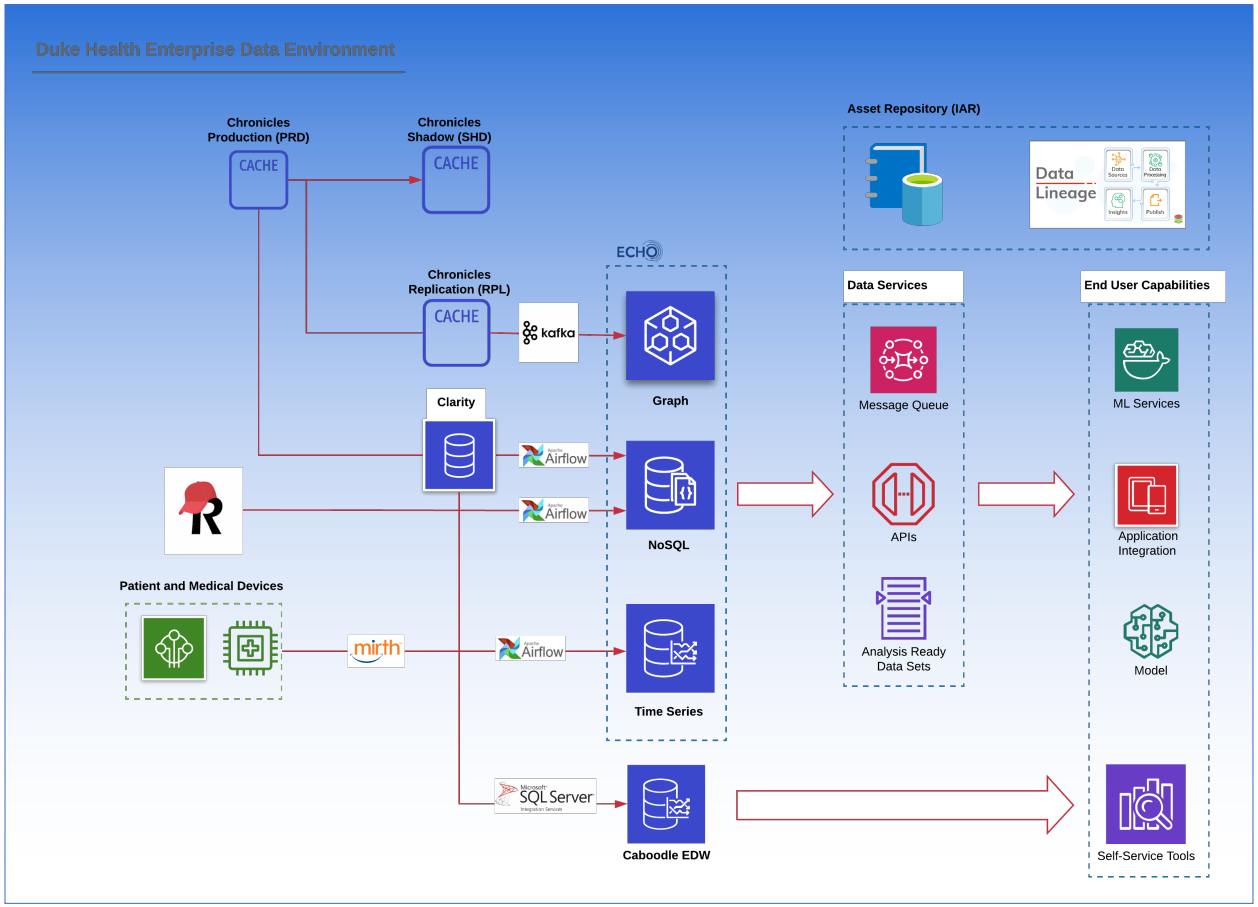
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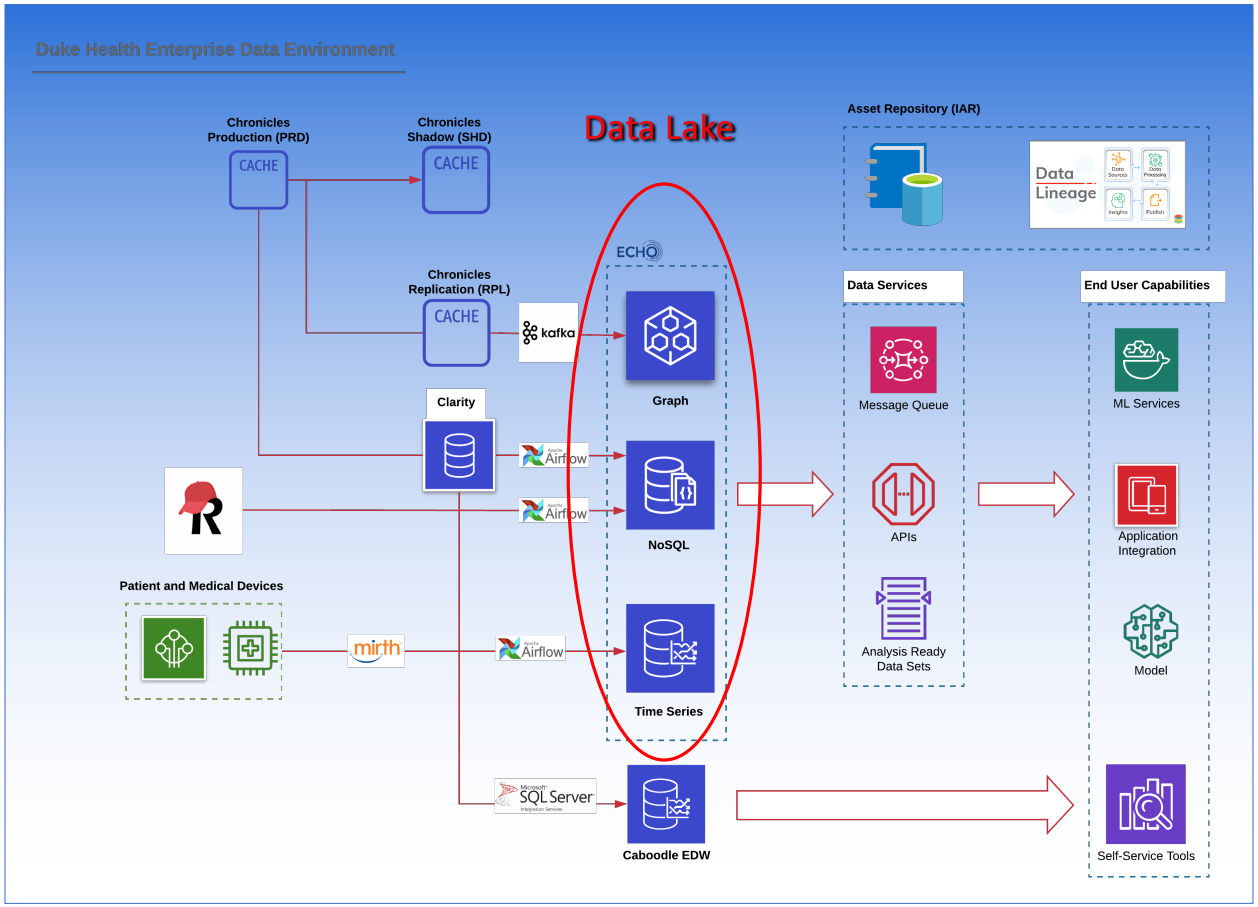
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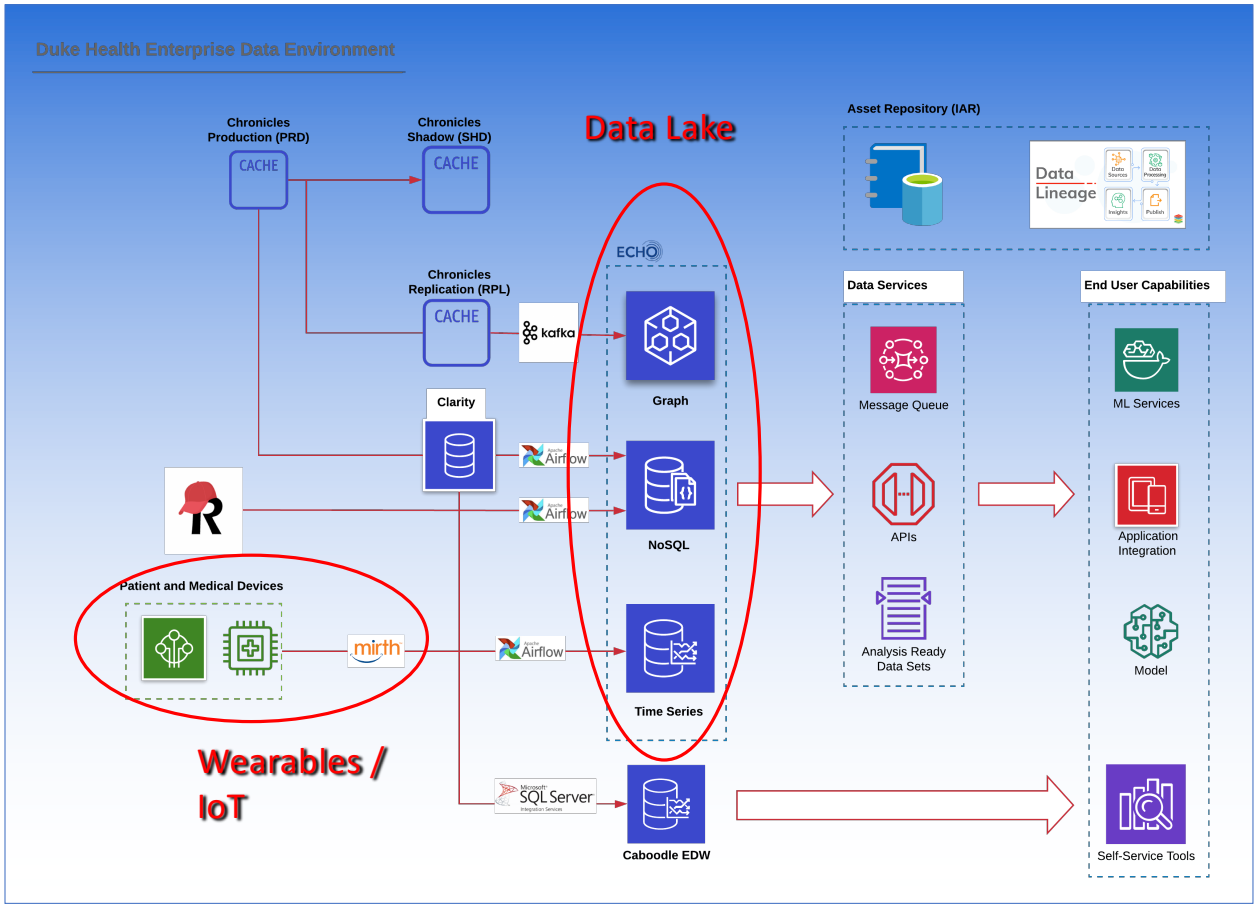
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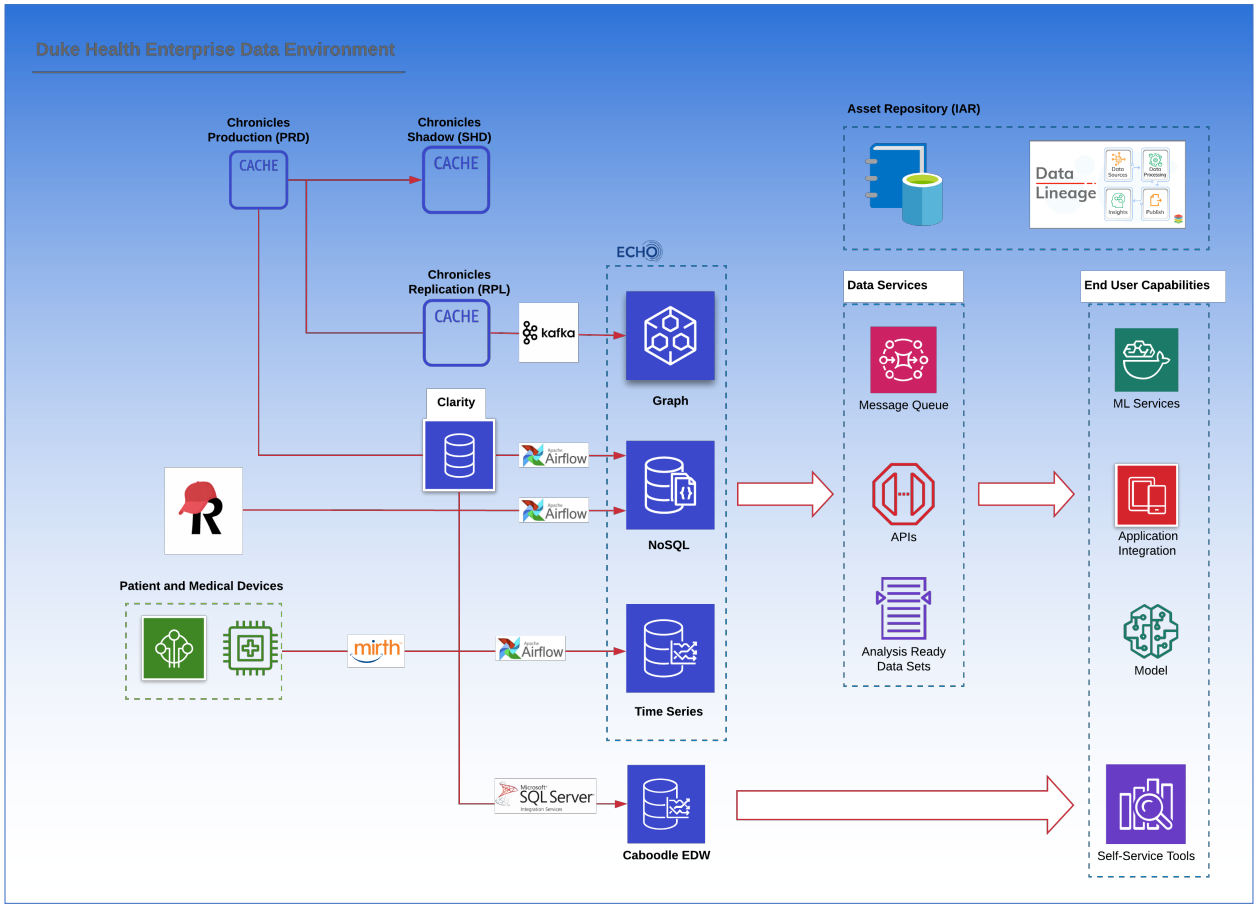
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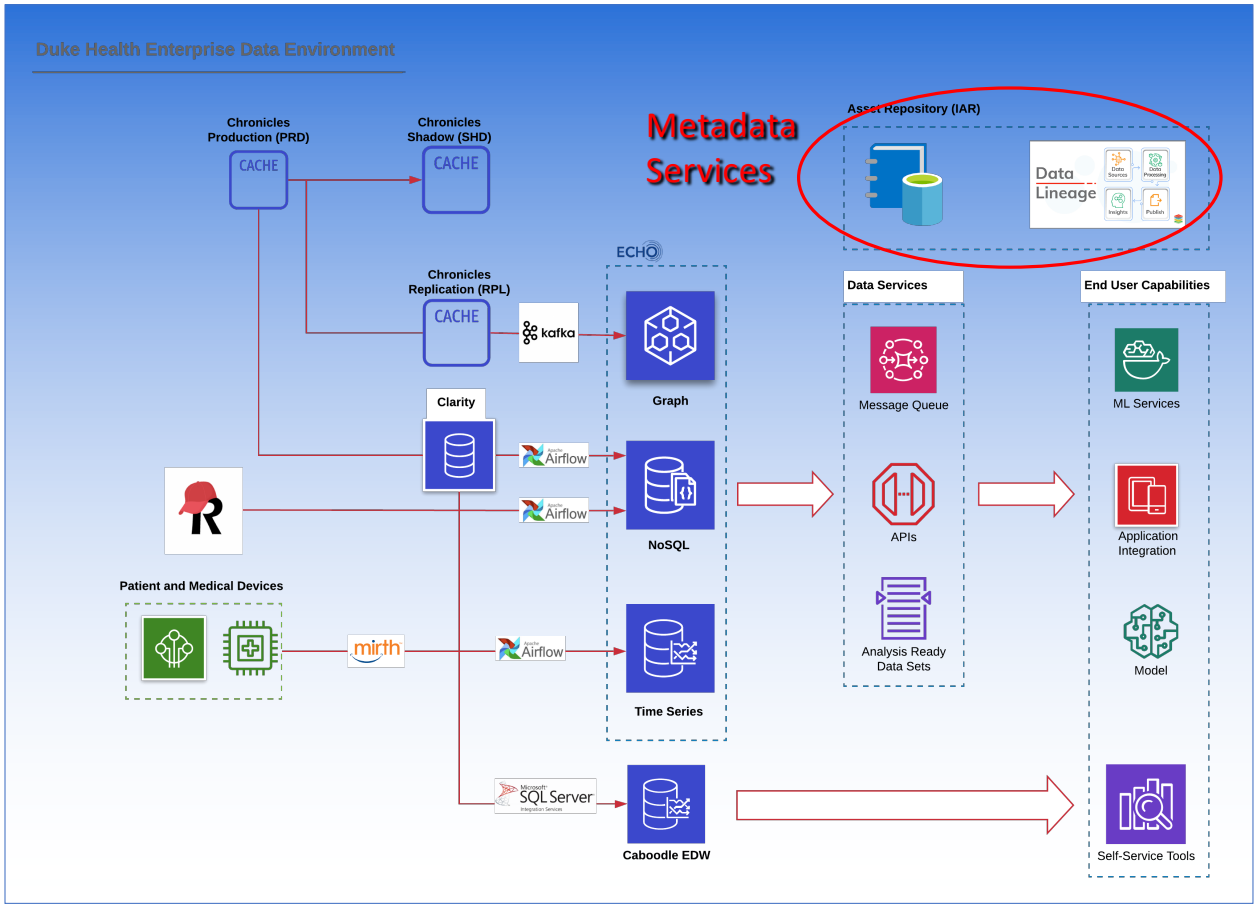
APIs
Analysis Ready Data Sets
End User Capabilities
ML Services
Application Integration
Model
Self-Service Tools


Duke Health Enterprise Data Environment
Chronicles Production (PRD)
CACHE
Chronicles Shadow (SHD)
CACHE
Metadata Services
Asset Repository (IAR)
Data Lineage
ECHO
Chronicles Replication (RPL)
CACHE
kafka
Graph
Clarity
Airflow
Airflow
NoSQL
Patient and Medical Devices
mirth
Airflow
Time Series
Microsoft SQL Server
Caboodle EDW
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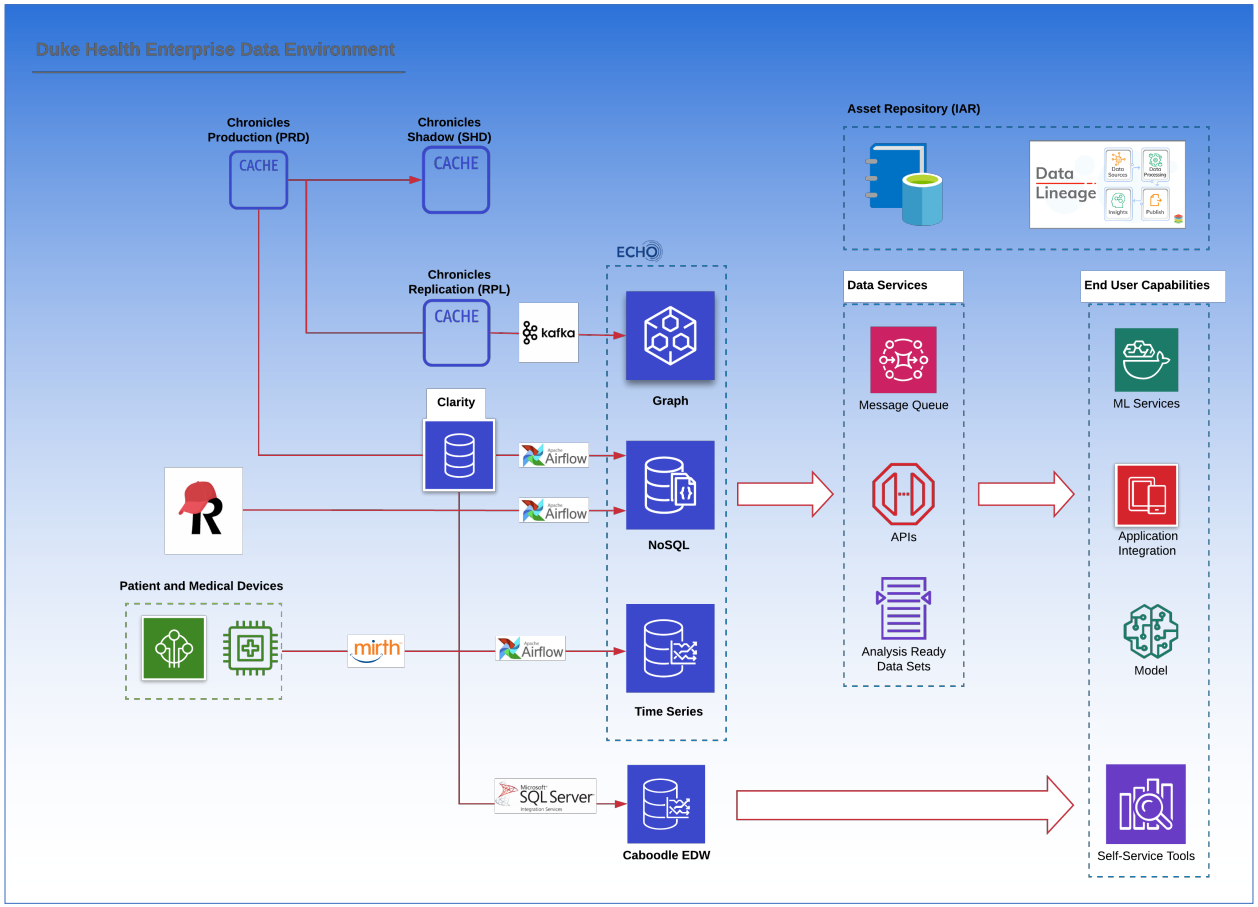
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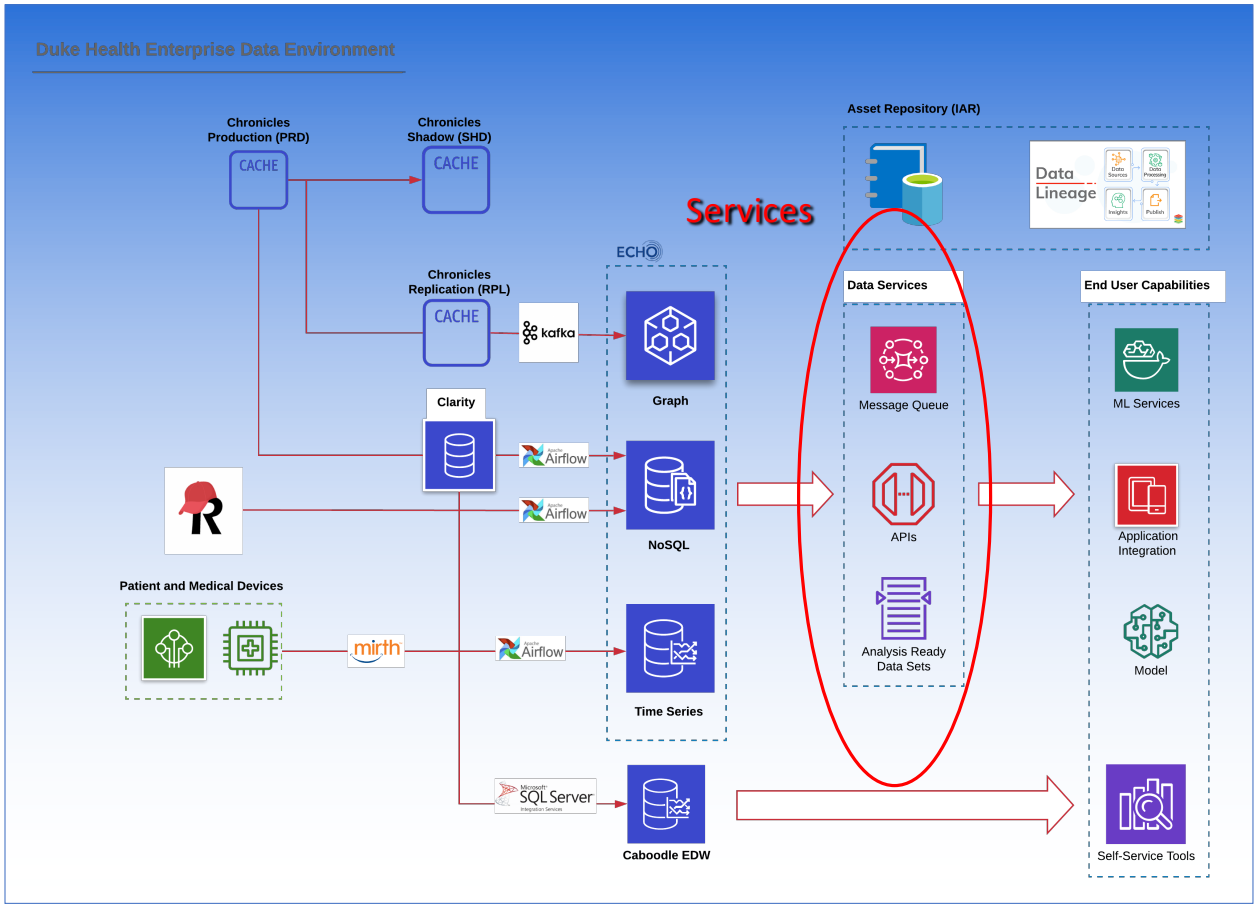
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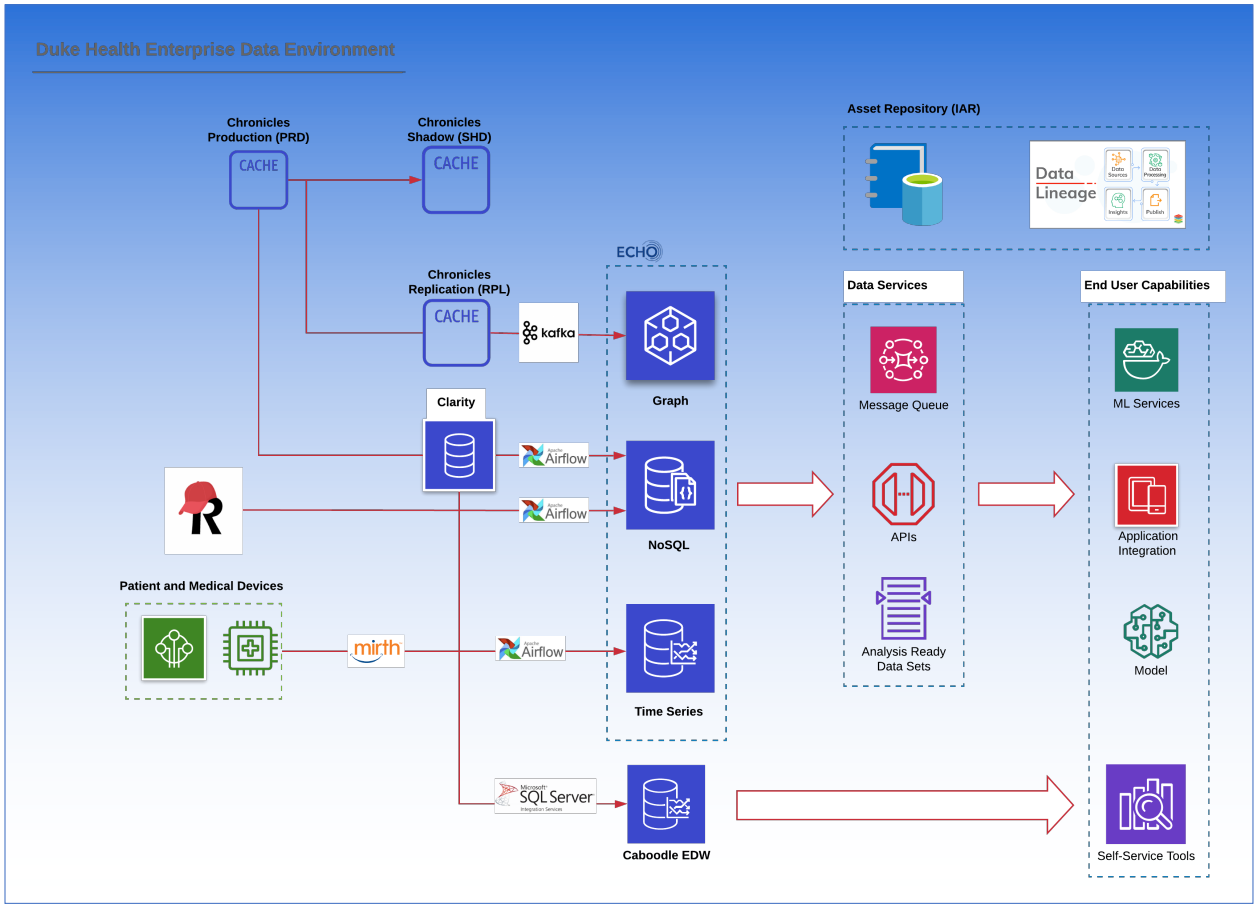
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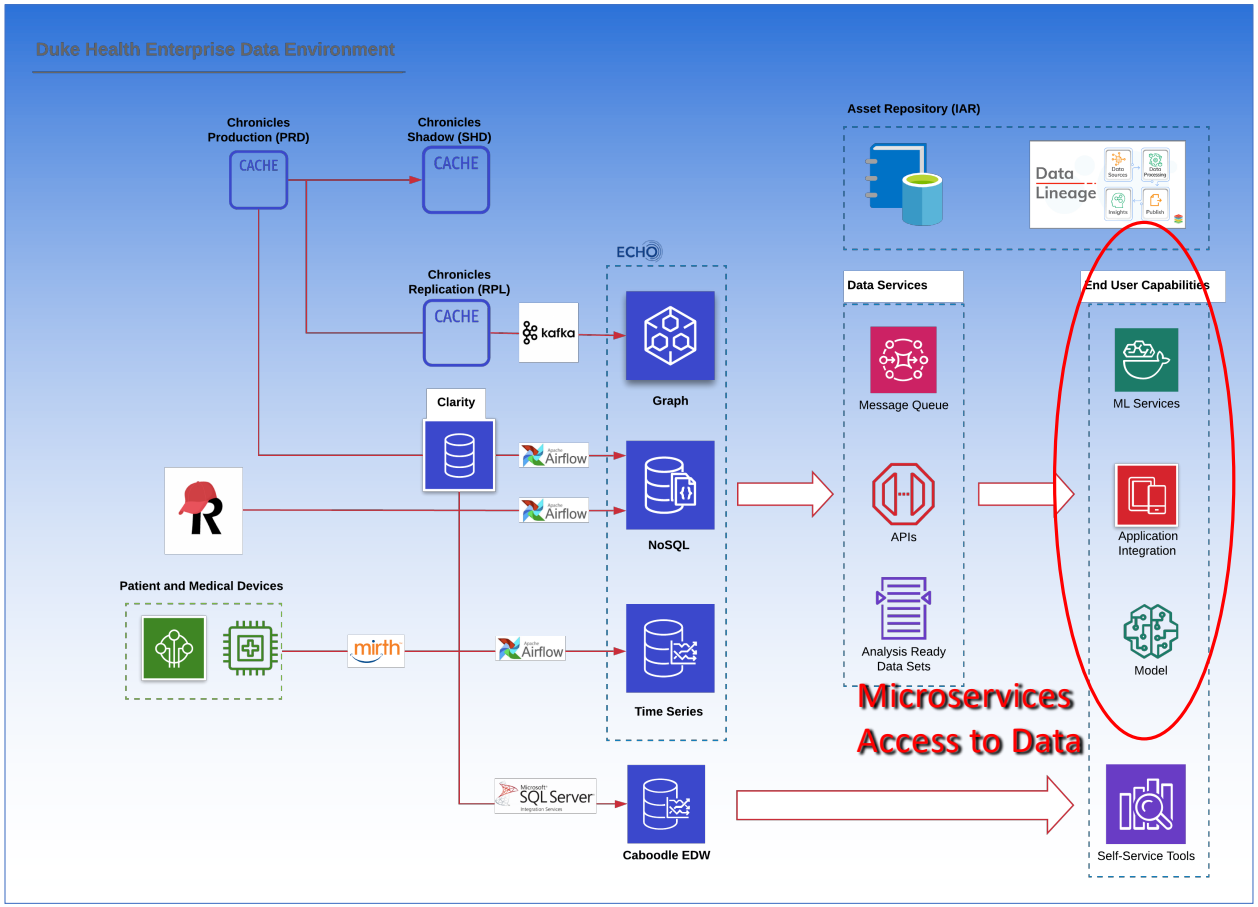
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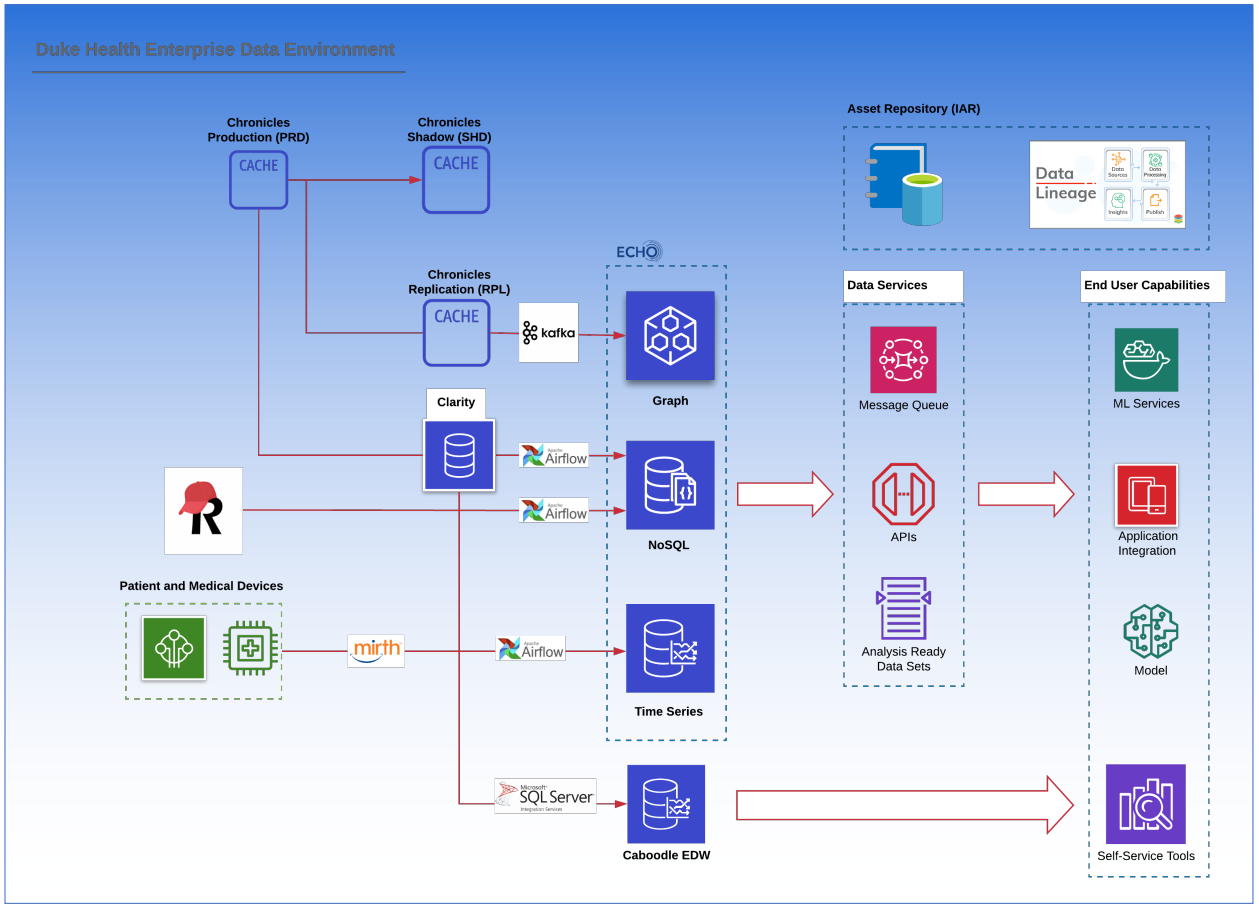
Microservices Access to Data

Where *Will* the Warehouse Be?



Where *Will* the Warehouse Be?