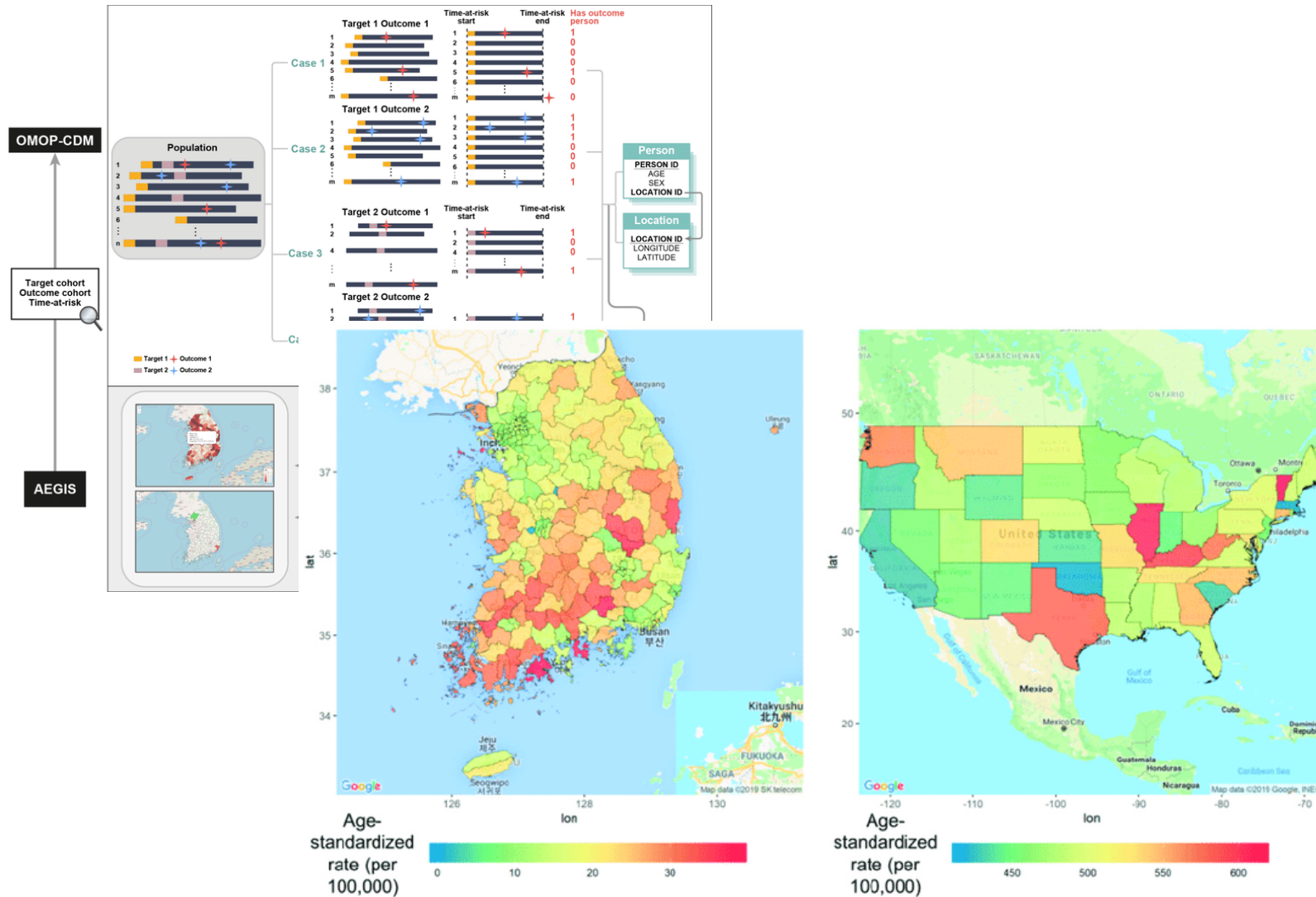


The Open, Federated Platform

Scale, Resiliency and Availability for the Global
Data Enterprise

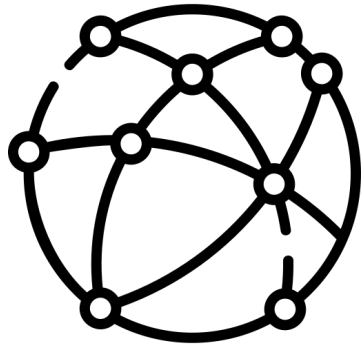


Agenda

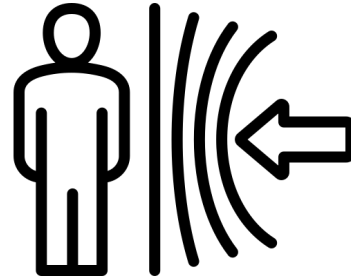
- The Problem
- Federated Data
- Federated Learning
- Streaming and Event Driven Architectures
- AI/ML
- Outcomes

The Problem

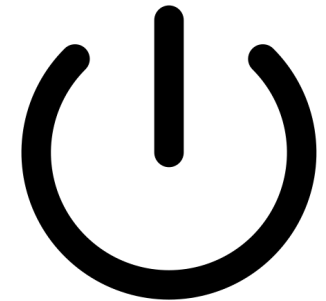
Scale



Resiliency



Availability

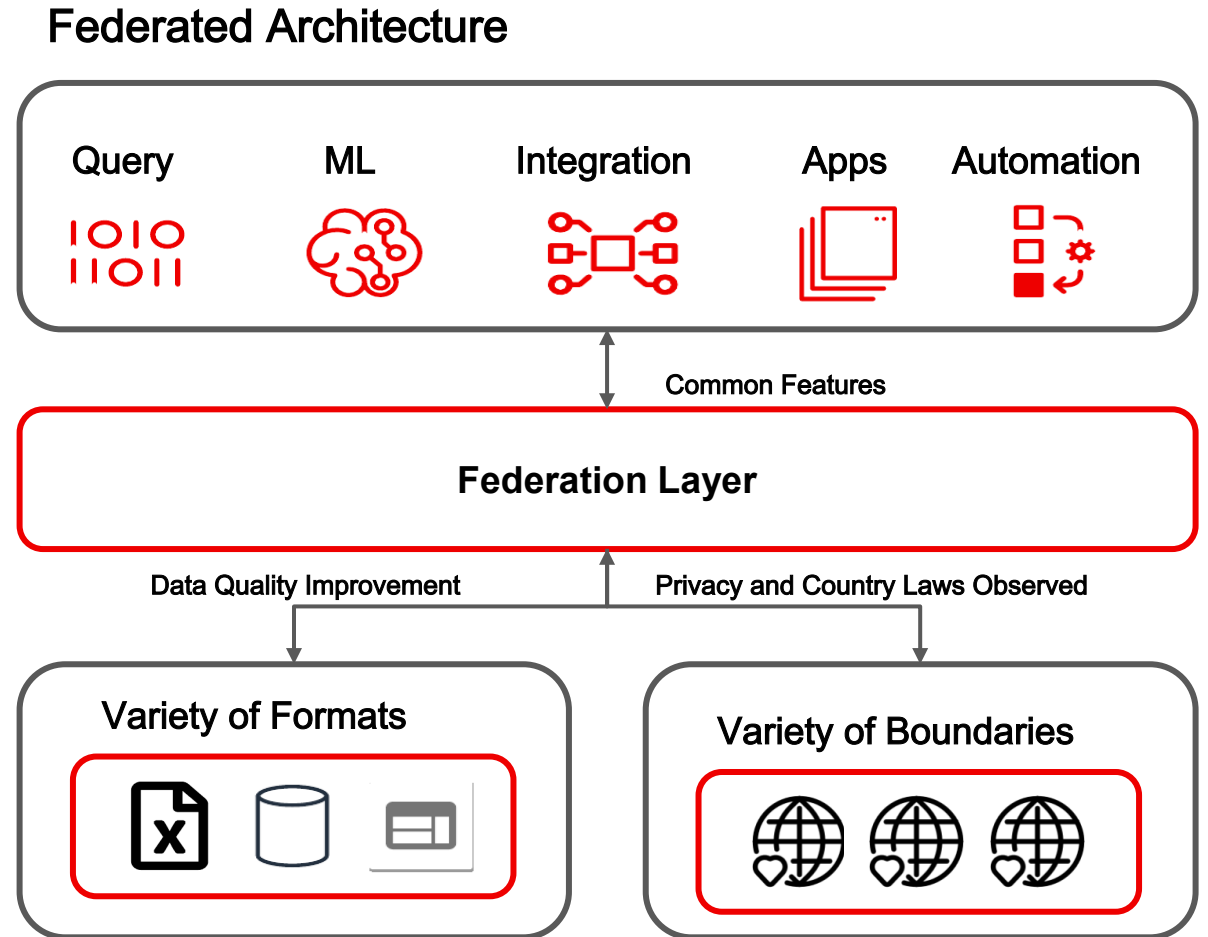
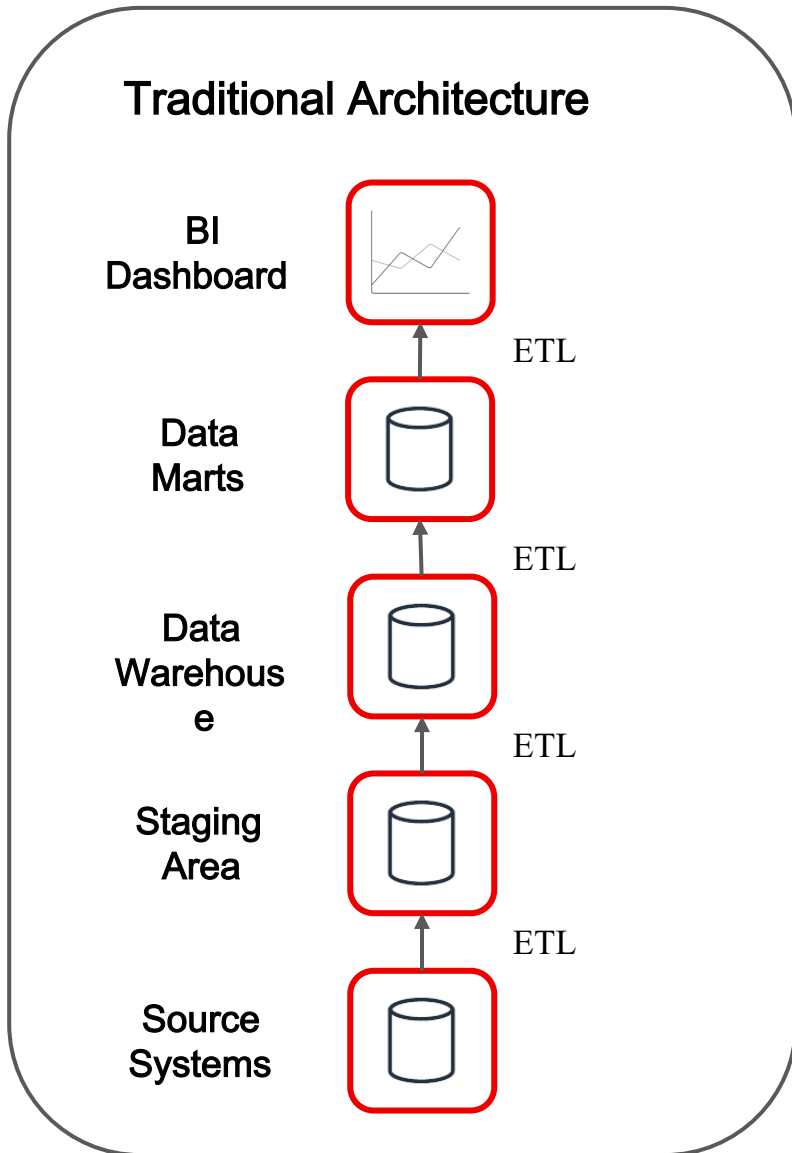


The Problem - Different Place, Different Data



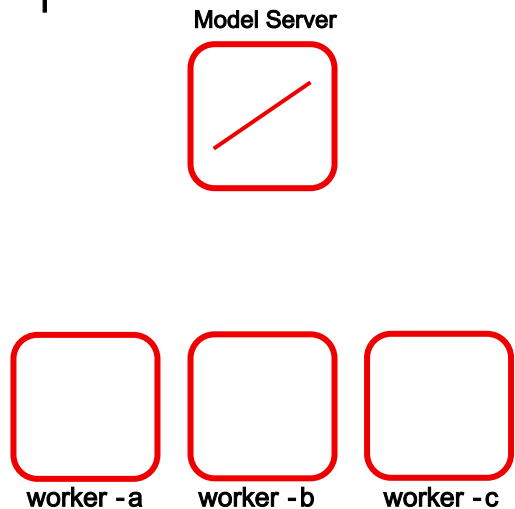
Solving this will require a fresh way of thinking . . .

Federated Data Frameworks: Distributed Data, Global Usability



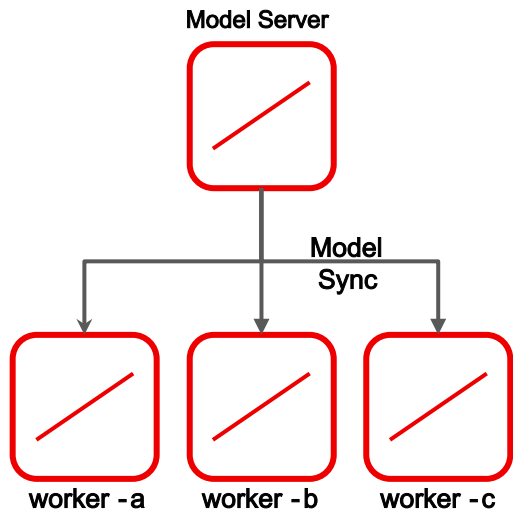
Federated Learning: Local Data, Global Training

Step 1



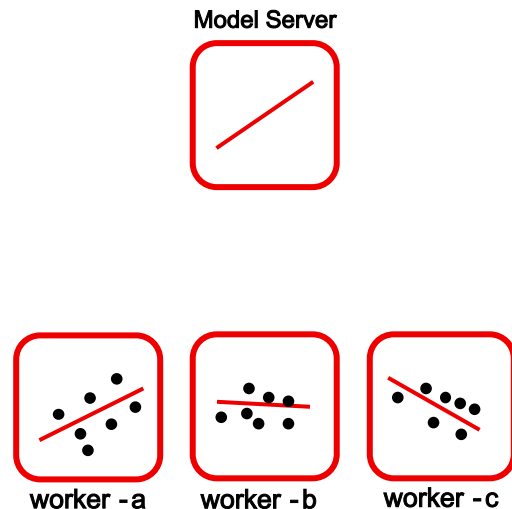
- ▶ Central server chooses a model to be trained

Step 2



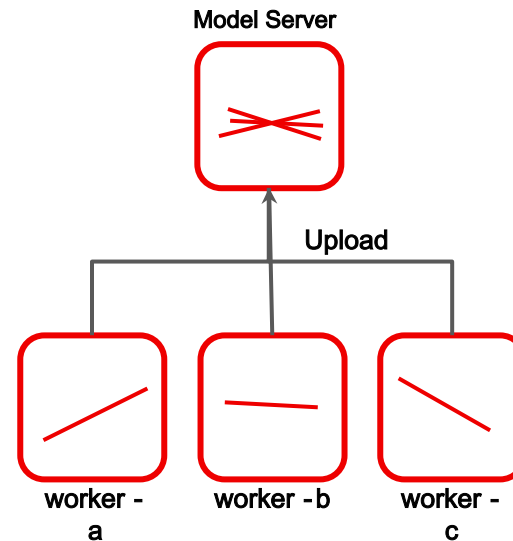
- ▶ Central server distributes the model to distributed nodes

Step 3



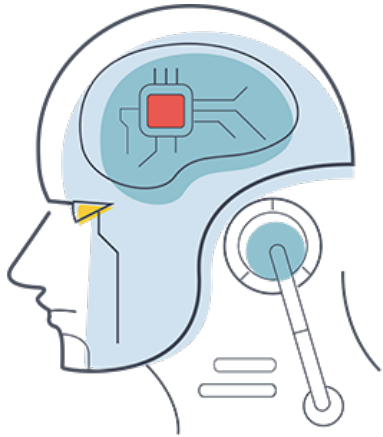
- ▶ Nodes train the model locally with their own data

Step 4

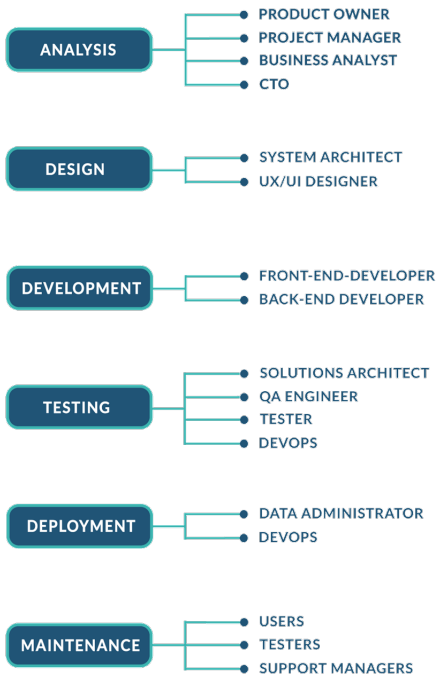


- ▶ Central server pools model results and generates one global model without accessing any data

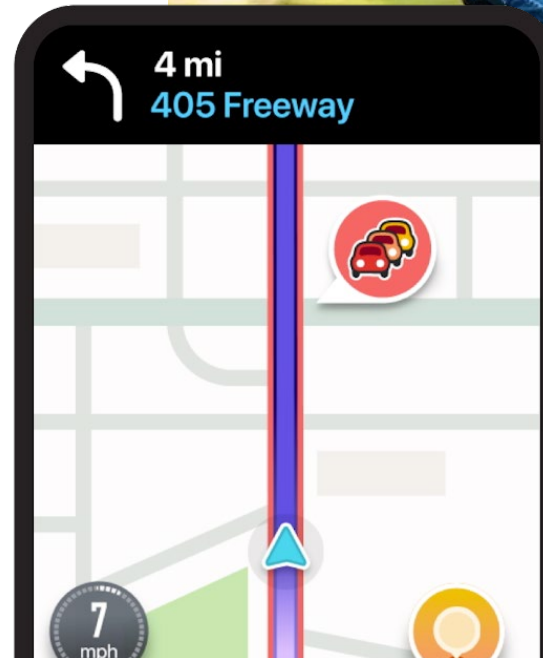
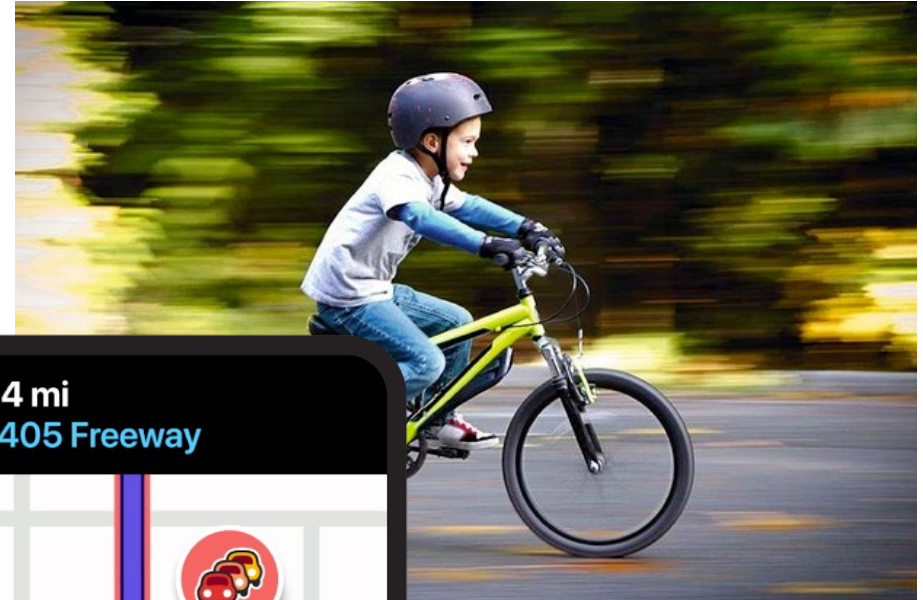
System Design vs. Natural Way of Working



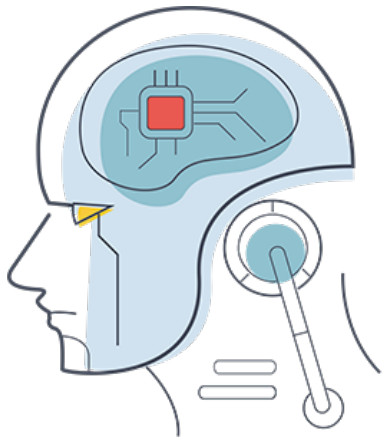
SDLC Phases



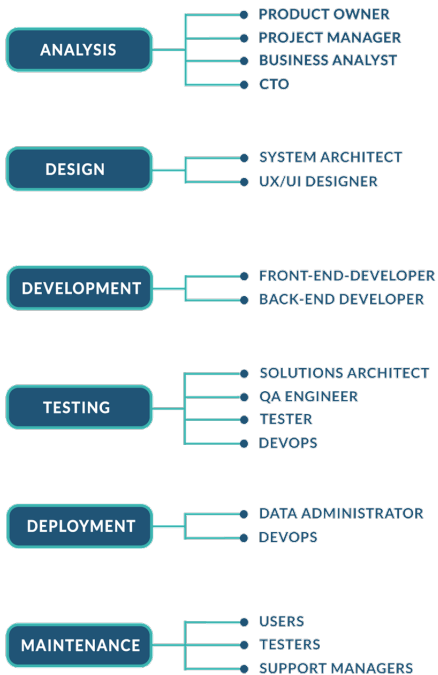
VS



System Design vs. Natural Way of Working

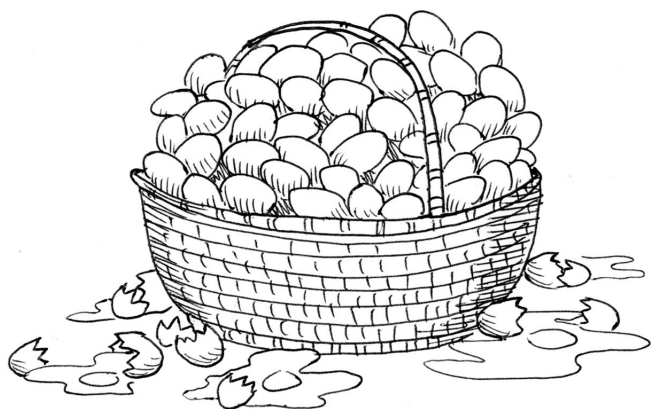


SDLC Phases



Tradeoffs

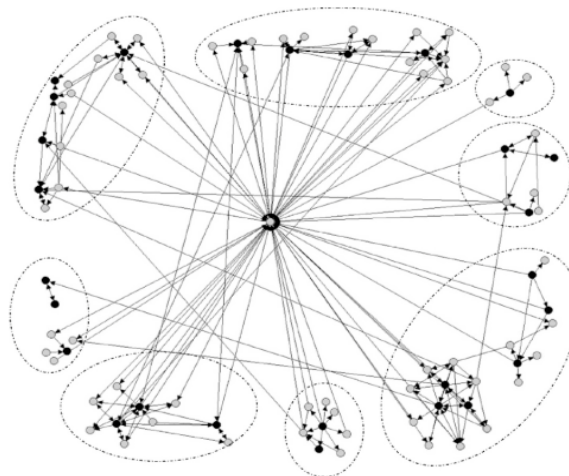
DATA



All In One Place:

- Data, but also
- Risk
- Regulations

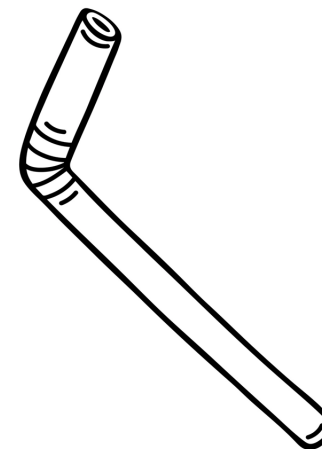
NETWORK



Network Always:

- Accessible, but also
- Vulnerable
- Billing

LEARNING

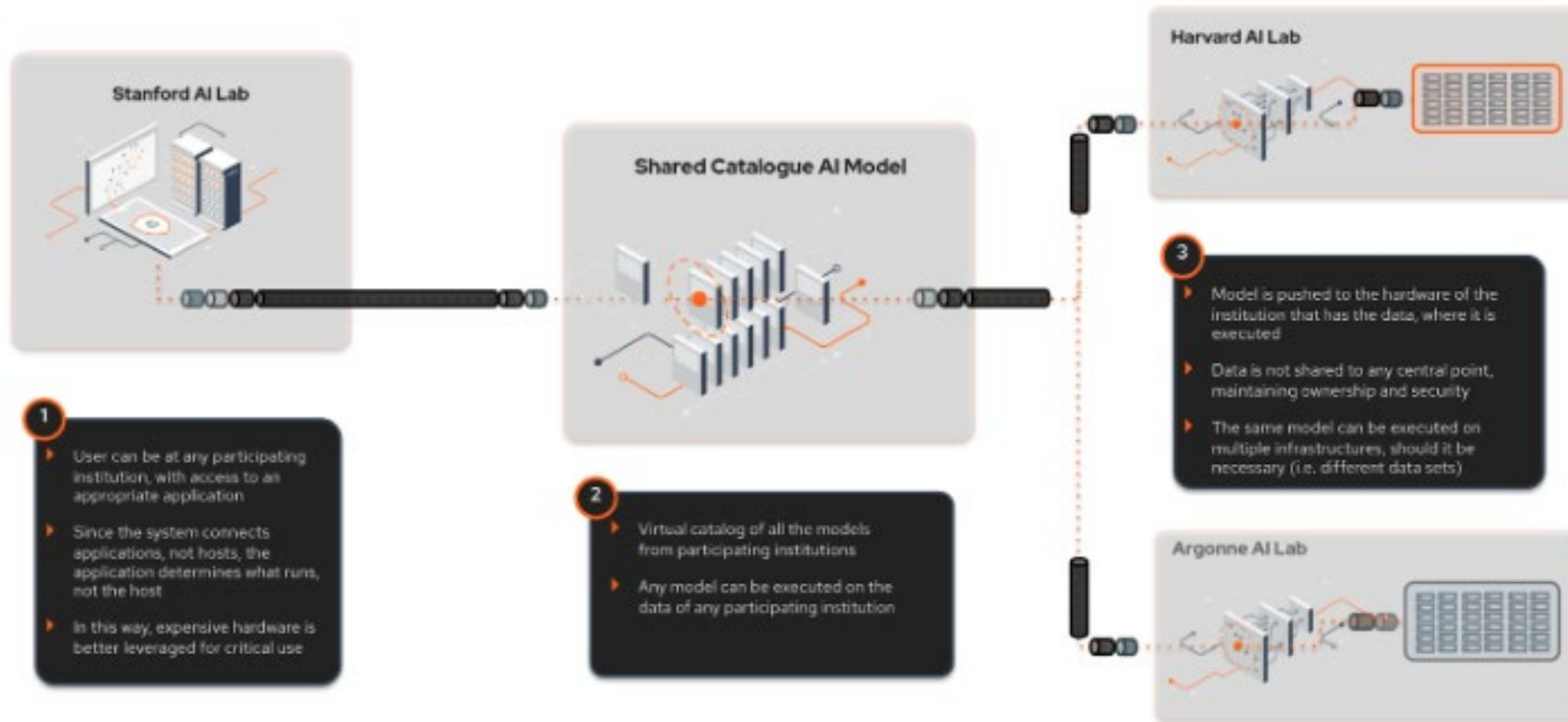


We can see:

- A sharp picture, but also
- Limited Scope, so
- Possibly Misleading

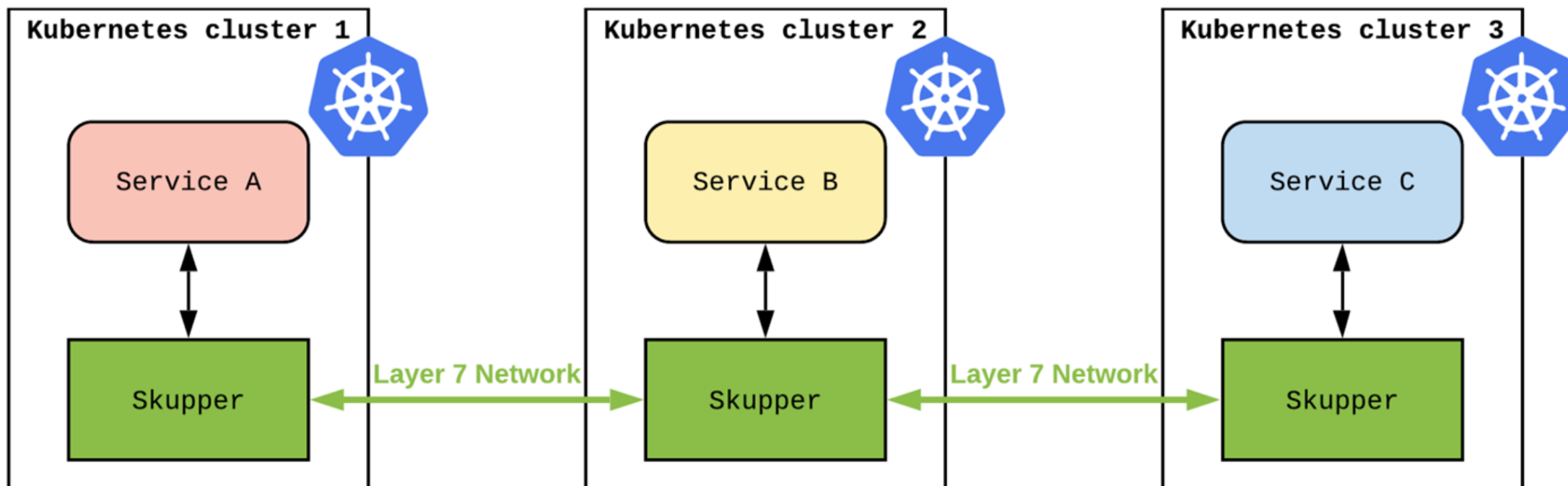
DATA: Break the Silos

Collaboratively Create Models Across Institutions



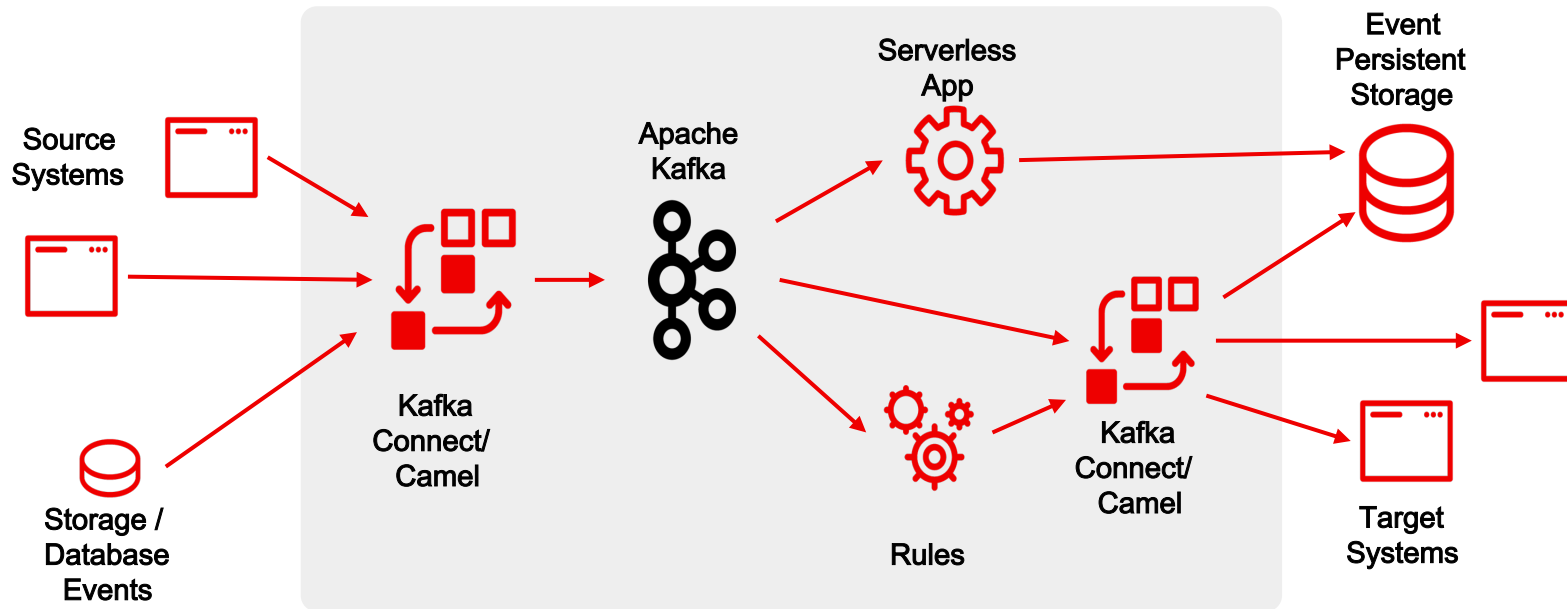
NETWORK: Software - Defined and Ephemeral

Layer 7 Interconnect to Enable Inter-Cluster Applications (skupper.io)

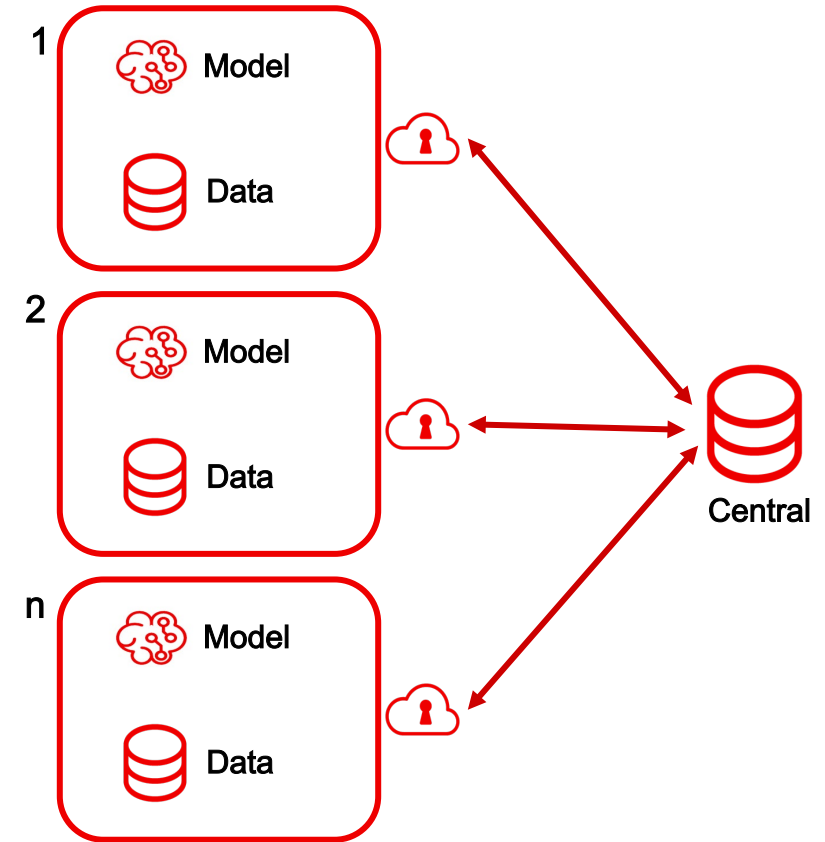


LEARNING: Local Data, Global Models

Broaden the horizon to incorporate any data from any institution



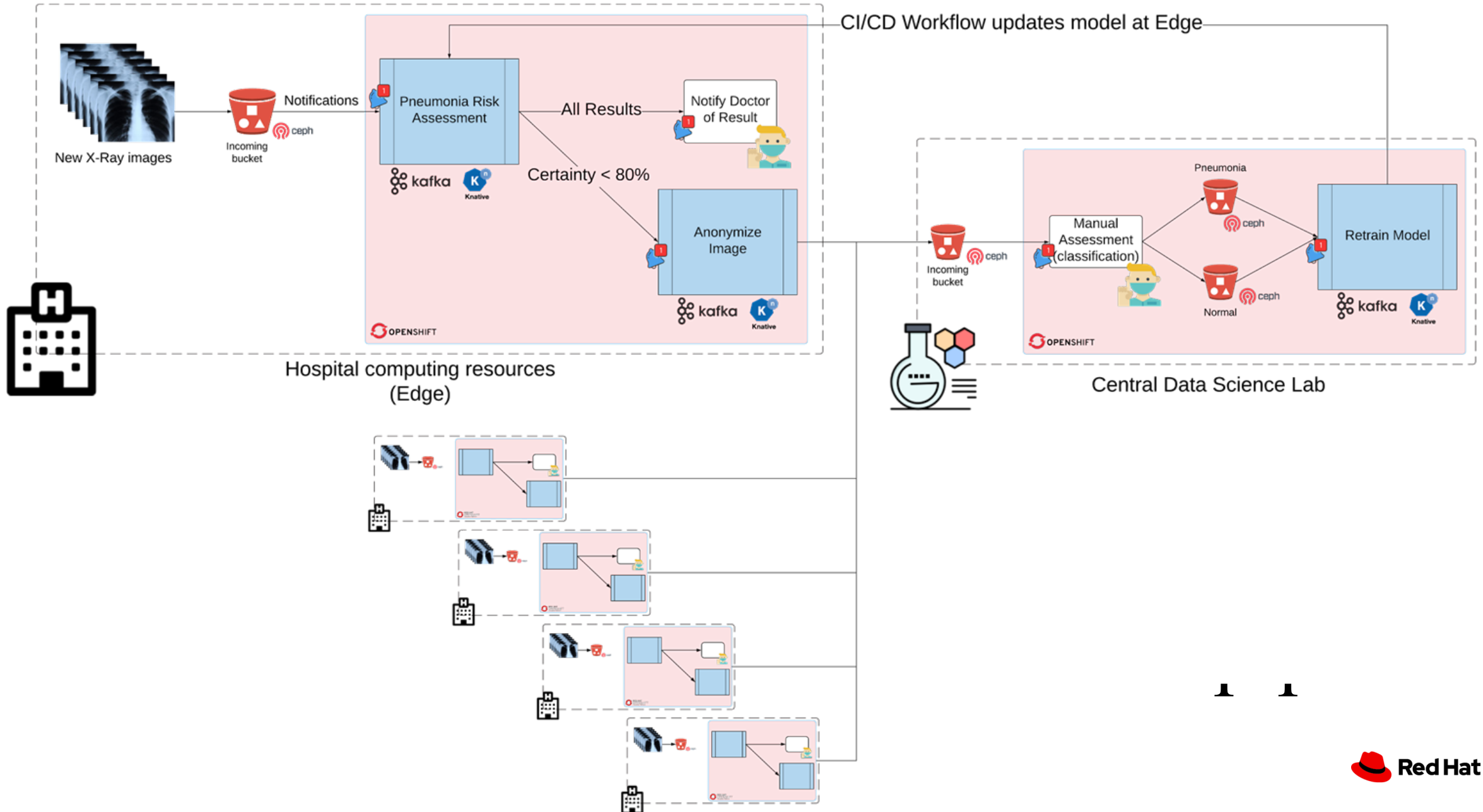
Event - Driven Framework at Each Site



Replicate This At Scale

AI/ML Use Case: Data Transformation

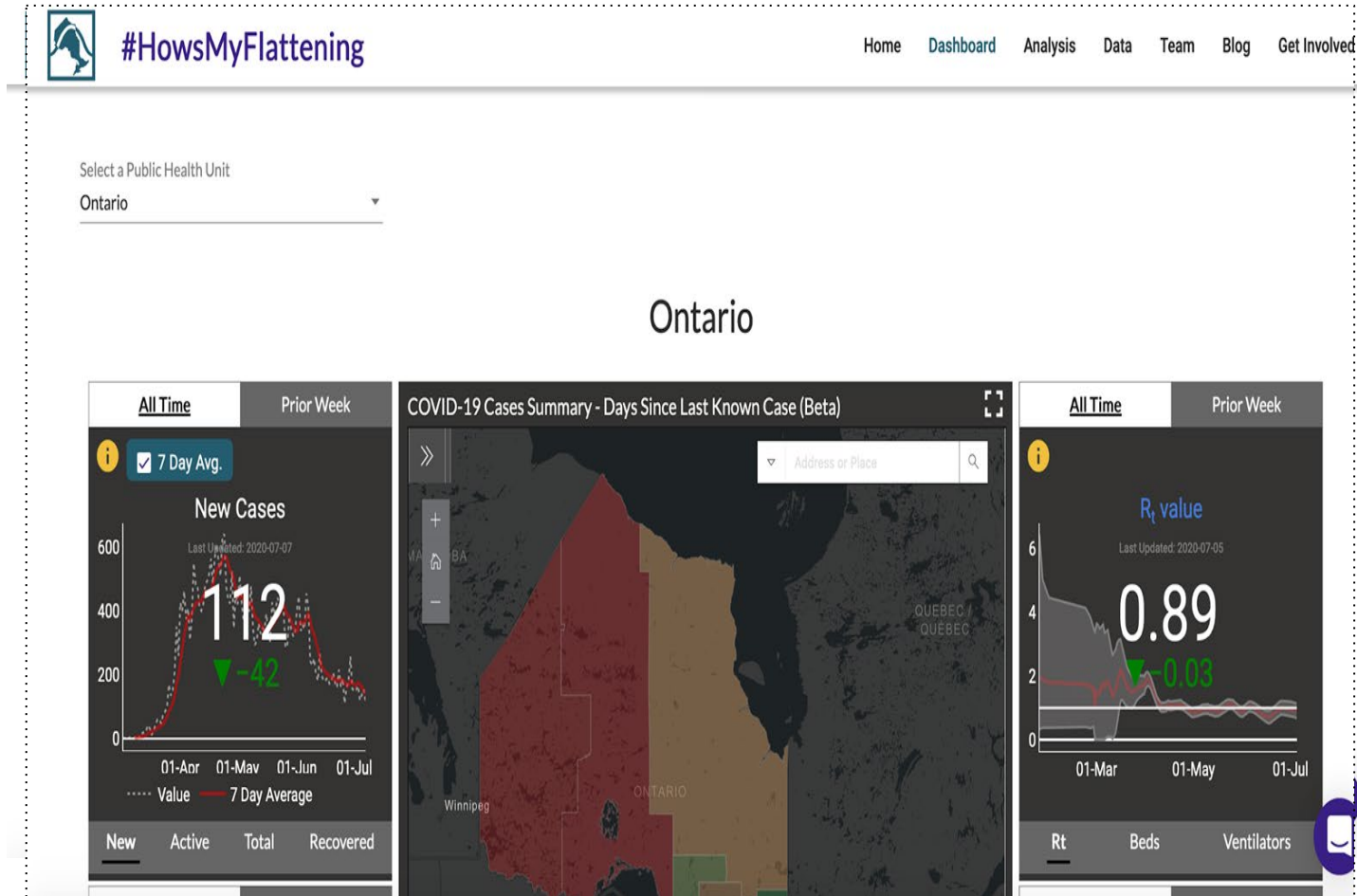
The Open, Federated Platform





What is #HowsMyFlattening?

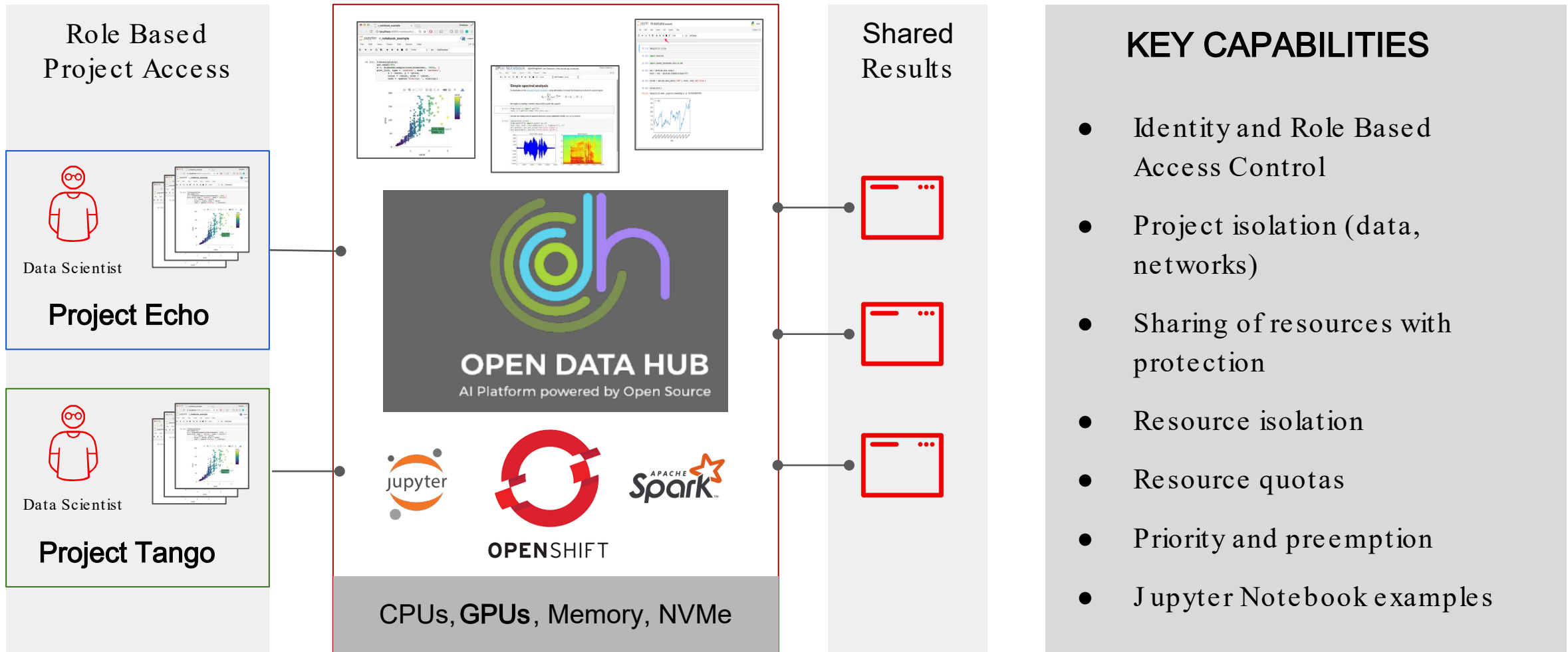
- A community powered, volunteer group that analyzes, visualizes and shares COVID-19 related data and interventions; (c. March 14/2020)
- More than 275 clinicians, health informaticists, data scientists and developers are working on this project
- Leveraged by citizens, other clinicians, public health officials, politicians, military command
- Now also focused on return to work metrics and economic challenges for the province of Ontario



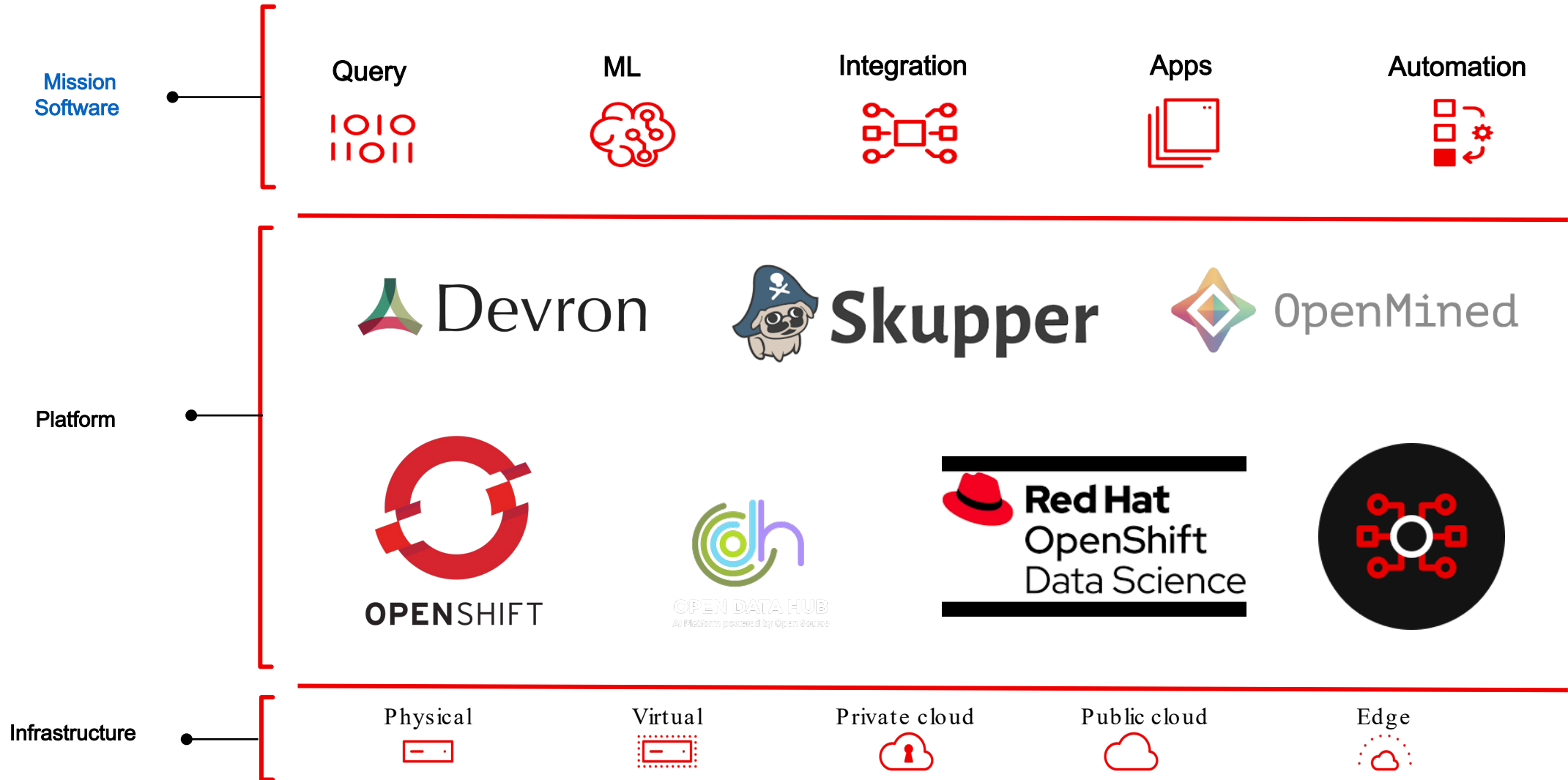
HMF Data Science Solution Pattern

Shared, Secured, Automated Research Environment

howsmyflattening.ca

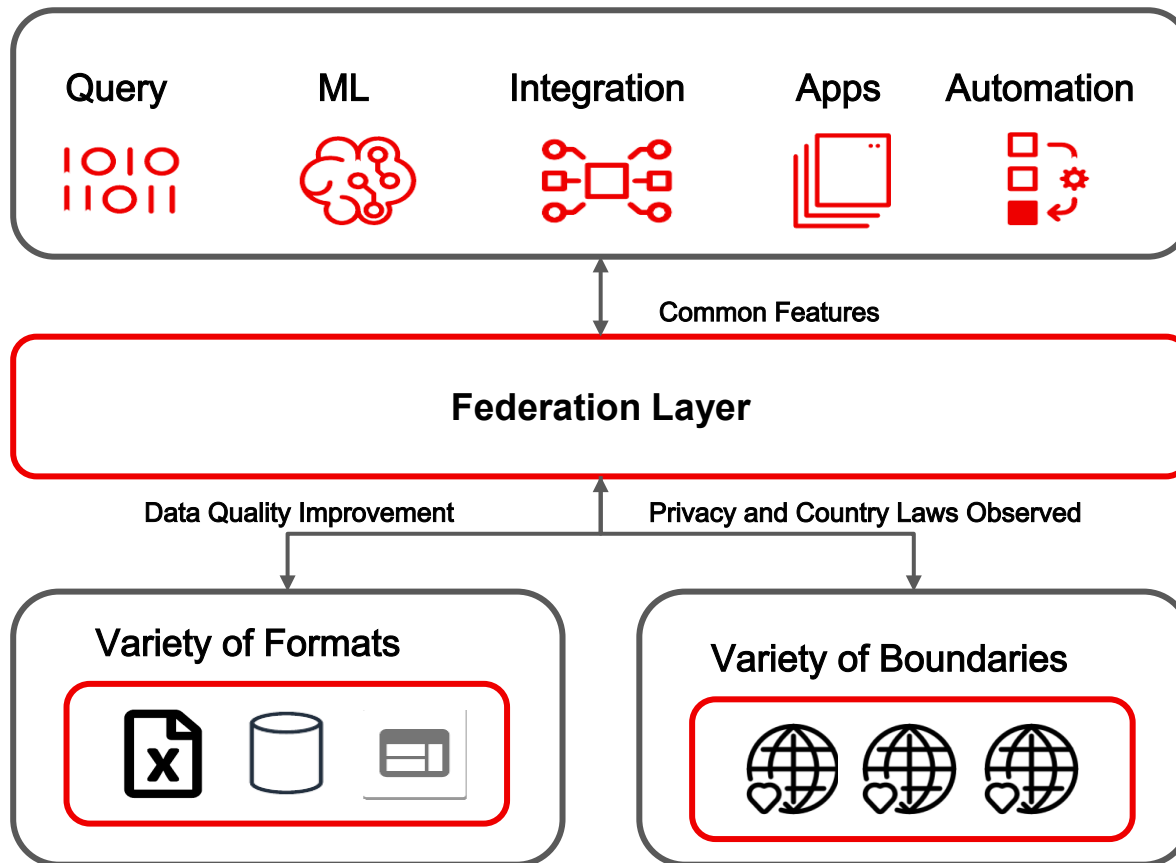


Build Modern Workloads On Trusted Standard Architecture



Conclusion: Federation on a Flexible Platform Leads To Faster Innovation and Response

Federated Architecture





NEXT STEPS

STRICTLY INTERNAL ONLY

Contact Us!

katsmith@redhat.com

Technical overview session

Lets meet with you to discuss how Red Hat is accelerating AI/ML workflows & delivery of intelligent apps.

Visit our websites

Learn more about our AI/ML capabilities, and see success stories from existing customers.

[openshift.com/ai - ml](https://openshift.com/ai-ml), opendatahub.io

Watch our videos

Visit our [YouTube channel](#) to discover a wide range of videos answering all your AI/ML questions.




A vertical decorative graphic on the left side of the slide, rendered in various shades of red. It features a collage of icons representing technology and infrastructure: a cloud with a keyhole, a database cylinder, a server rack, a computer monitor, a network diagram with nodes and arrows, and a person's silhouette. The background of the entire slide is white.

Thank You

 [linkedin.com/company/red-hat](https://www.linkedin.com/company/red-hat)

 [facebook.com/redhatinc](https://www.facebook.com/redhatinc)

 [youtube.com/user/RedHatVideos](https://www.youtube.com/user/RedHatVideos)

 twitter.com/RedHat



Resources

| RESOURCE | LINK |
|---|--|
| skupper.io | https://skupper.io/index.html |
| NIH Federated Learning paper | https://pubmed.ncbi.nlm.nih.gov/35731757/ |
| Federated Analytics paper | https://www.frontiersin.org/articles/10.3389/fbloc.2022.893747/full |
| Federated Learning with Data Focus | https://thenewstack.io/federated-learning-lets-data-stay-distributed/ |
| Open Data Hub | https://opendatahub.io/ |
| Red Hat OpenShift Data Science | https://www.redhat.com/en/technologies/cloud-computing/openshift/openshift-data-science |
| Enterprise Neurosystem | https://www.vanillaplus.com/2021/12/10/65978-the-enterprise-neurosystem-business-intelligence-meets-aiops/ https://github.com/Enterprise-Neurosystem/Secure-AI-Connectivity-Fabric/wiki/whitepaper-202206 |
| Federated Learning and Differential Privacy applied to epidemic forecasting | https://arxiv.org/pdf/2207.09370.pdf |
| UN PET Lab | https://unstats.un.org/bigdata/events/2022/unsc-un-pet-lab/index.cshtml |
| OpenMined | https://www.openmined.org/ |