Deployment and Orchestration of Analytics at Scale

Project Federated AI

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BDM for IoT Edge Compute

Oct 2019

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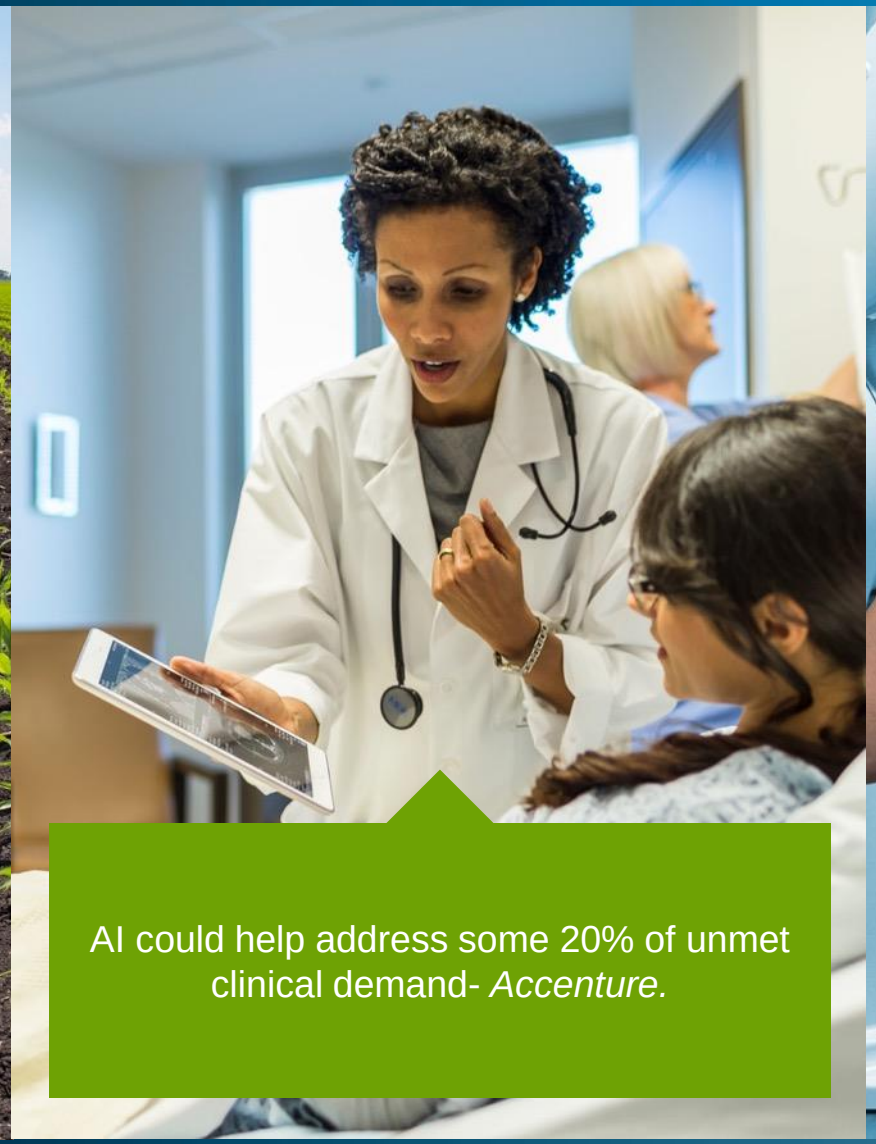
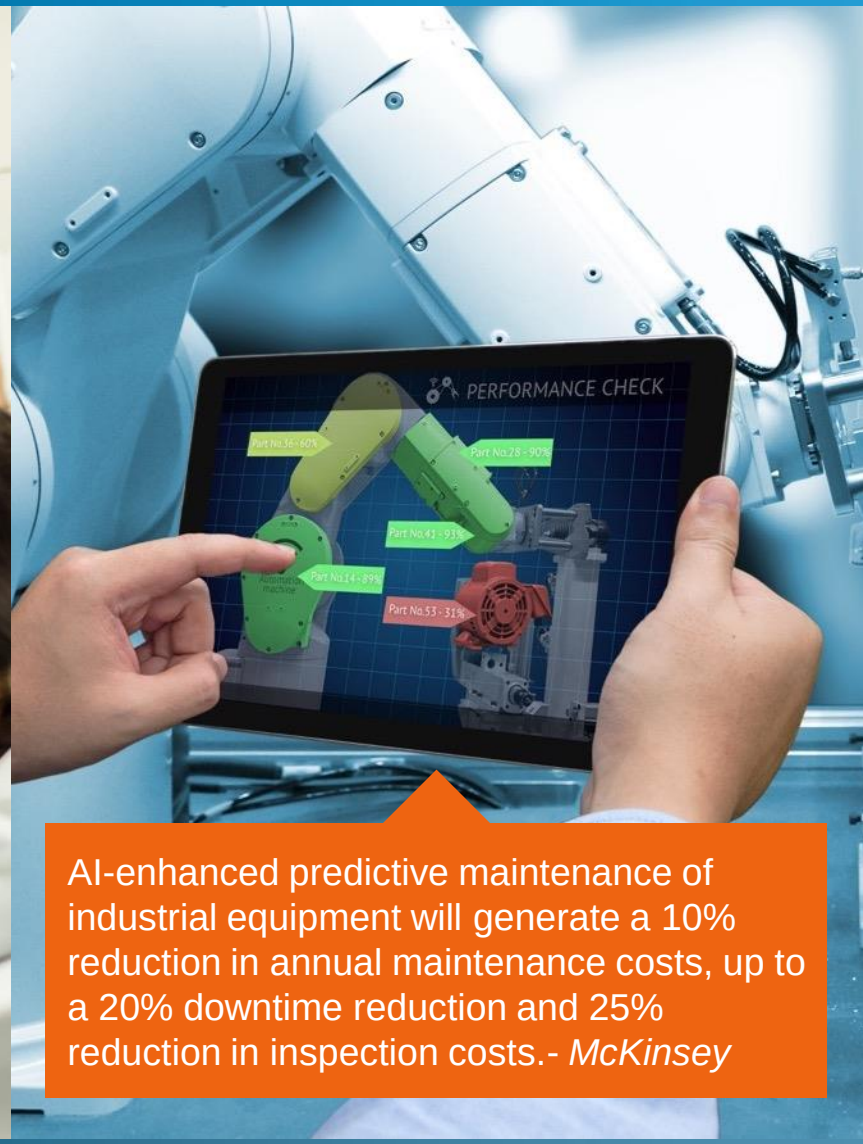
AI is here today and will change the world

By 2019, 45% of data will be stored, analyzed, and acted on at the edge.- *Gartner*



AI could help address some 20% of unmet clinical demand- *Accenture.*



AI-enhanced predictive maintenance of industrial equipment will generate a 10% reduction in annual maintenance costs, up to a 20% downtime reduction and 25% reduction in inspection costs.- *McKinsey*

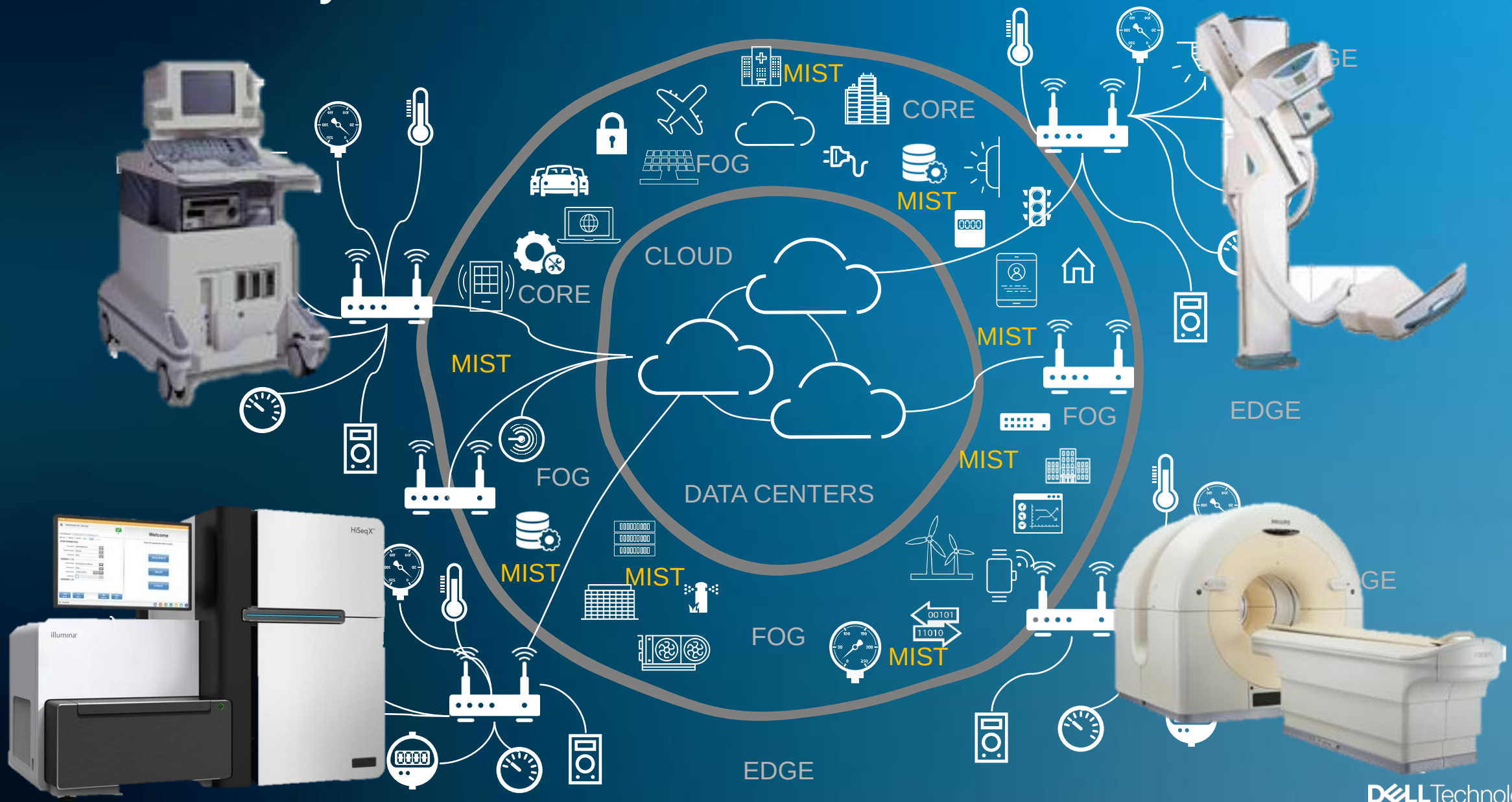
Challenges with Implementing
AI/ML at Scale

Continuous learning nature of AI

Data is scattered, silo-ed or stranded

Privacy and security is paramount

Data are Everywhere



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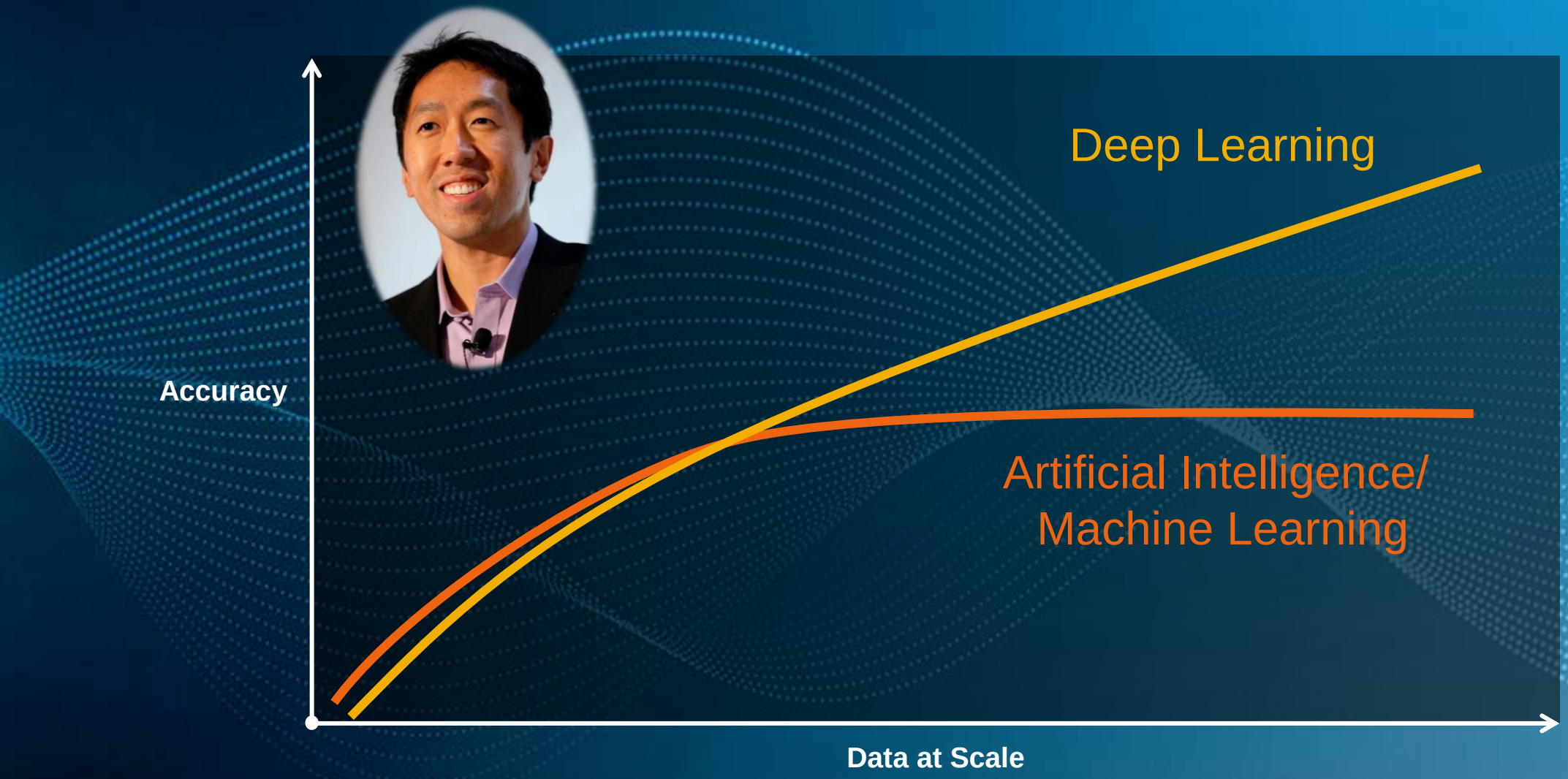
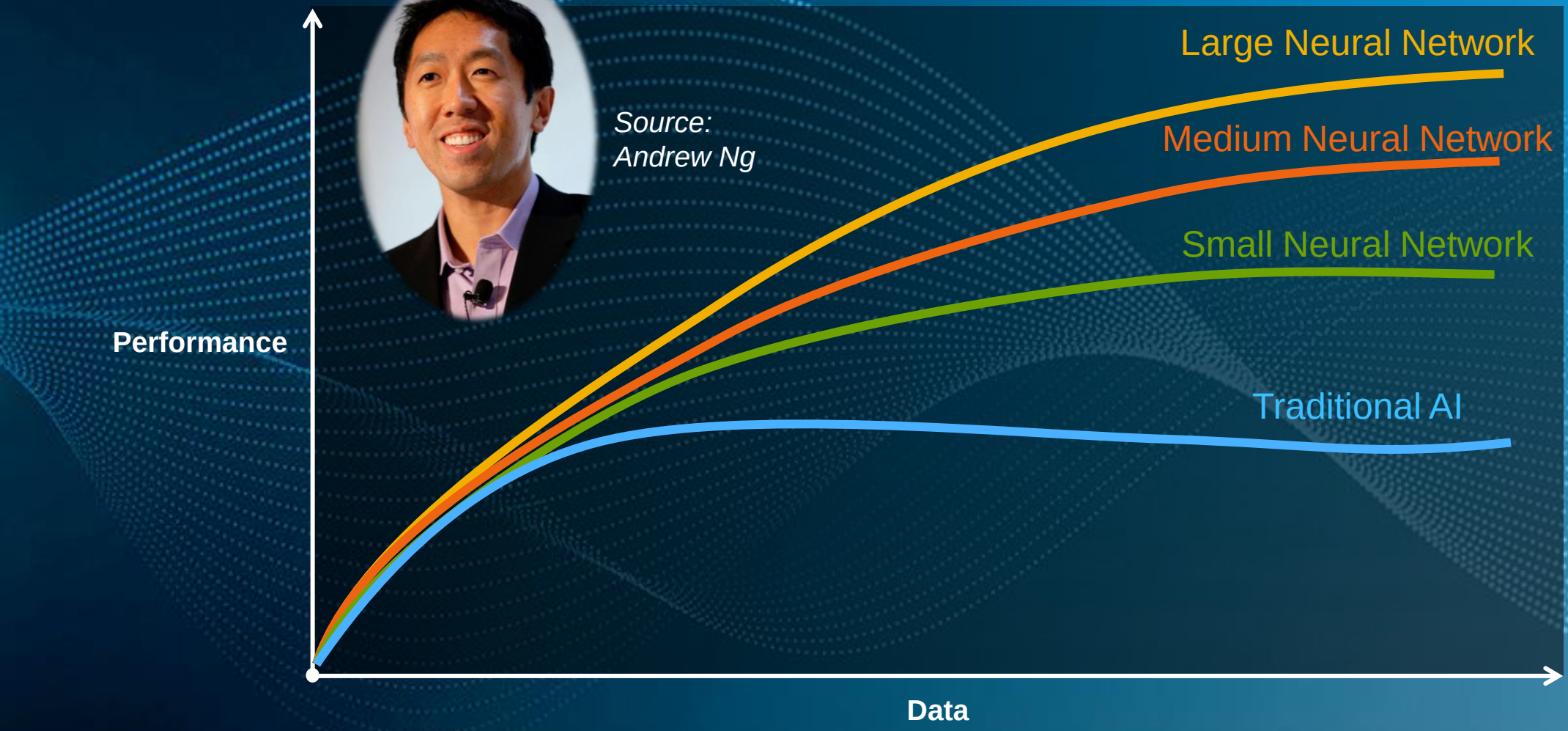
Complexity in AI at *Scale*

The unreasonable effectiveness of data for DL



https://www.youtube.com/watch?v=NKpuX_yzdYs

Supervised learning



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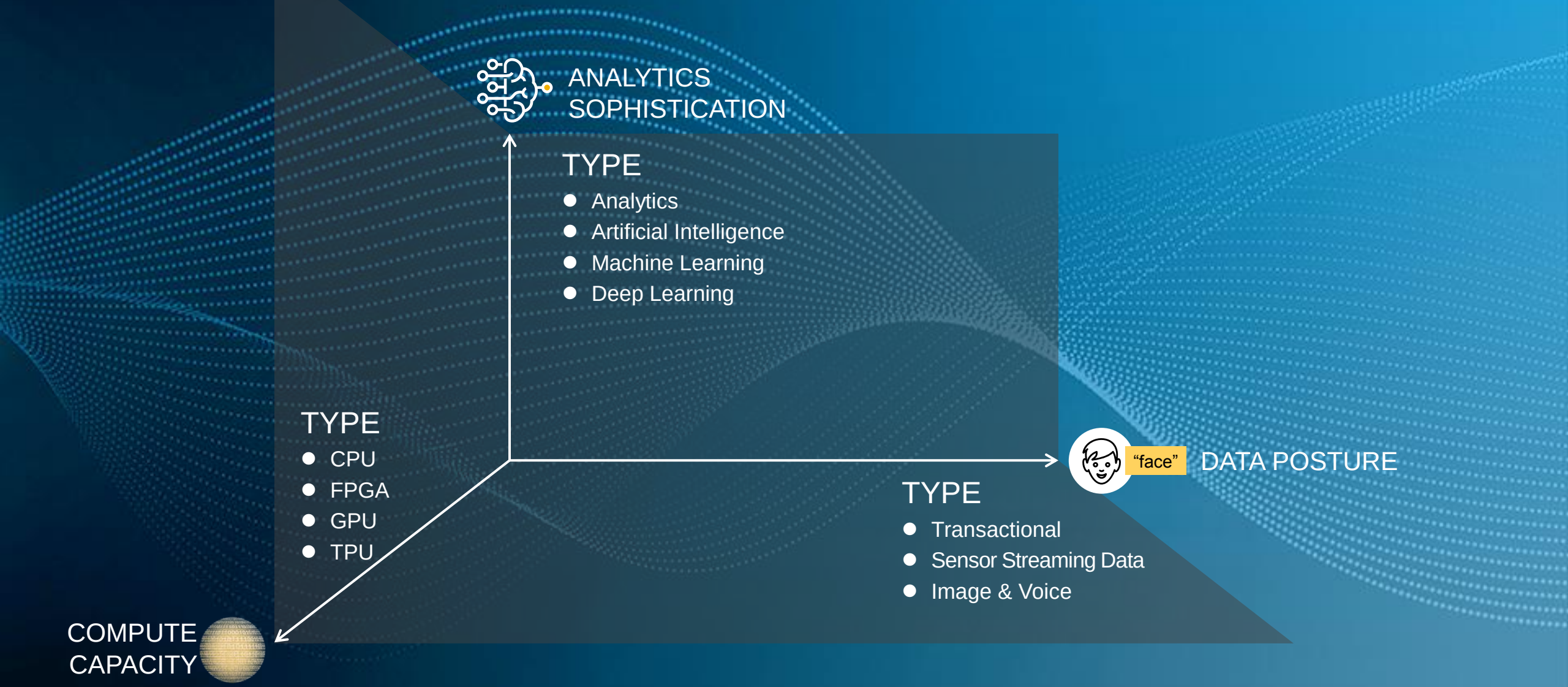
Dimensions of scale



Meta-data Fabric abstracts data addresses

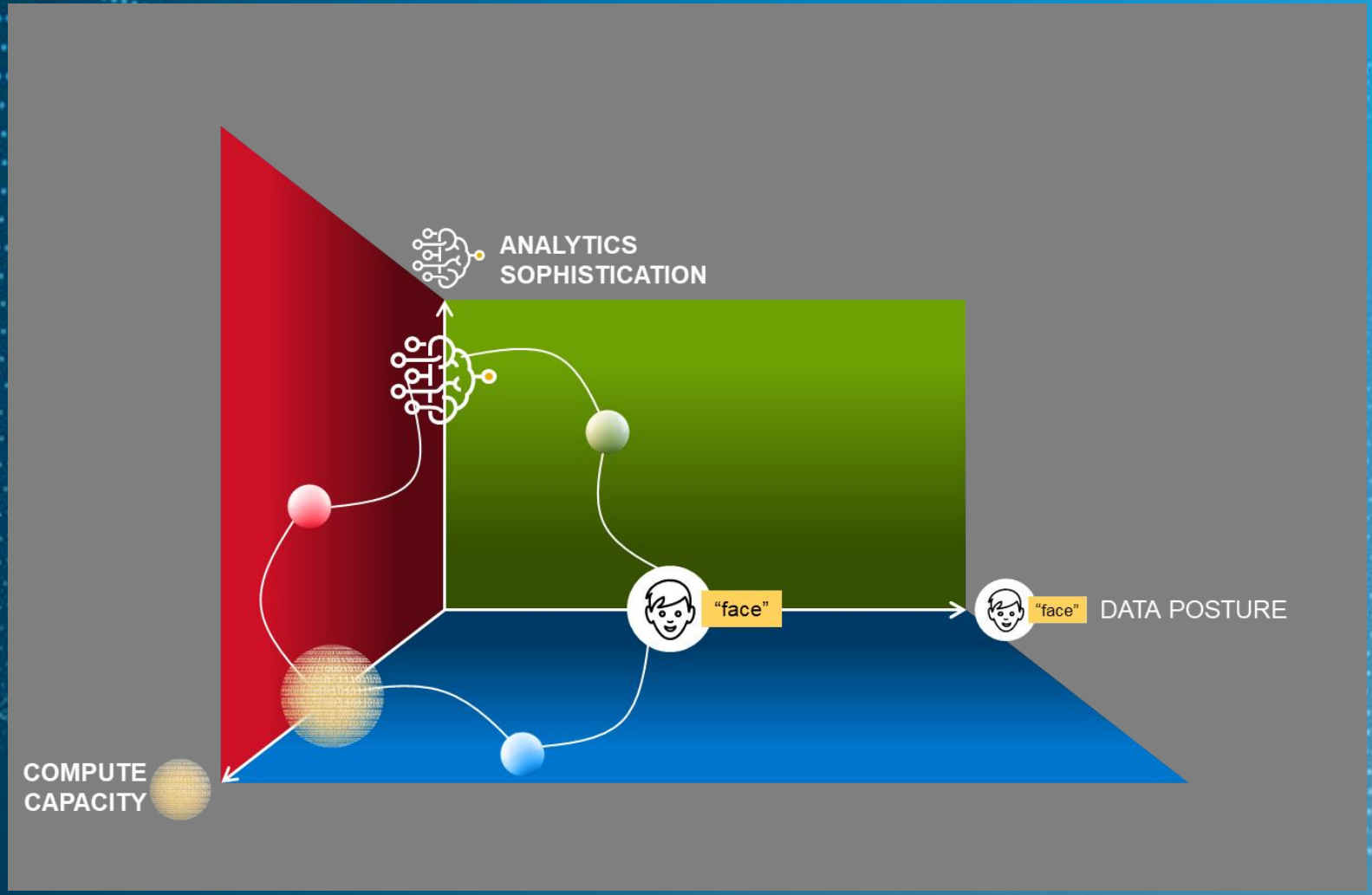
Advance Analytics uses meta-data to automate:

(a) location of data sources across the continuum;

(b) movement of analytics code close to data sources, and;

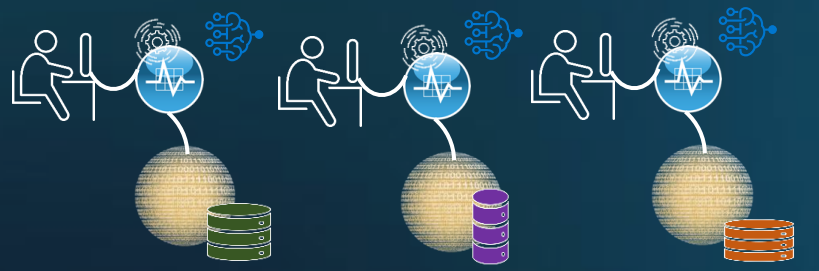
(c) creation of analytics workloads in-place, binding computation to data at execution time, against the latest version of the data.

Free data scientists from the burden of knowing the exact location of the data, allowing easy of use and scale across the continuum.



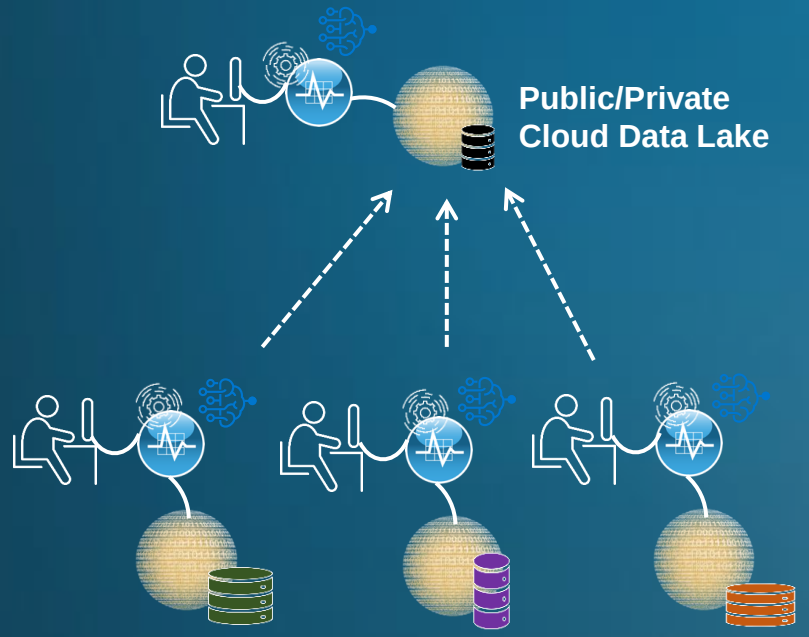
Which one is best? Do you need all three?

Distributed



Hospital A Hospital B Hospital C

Centralized



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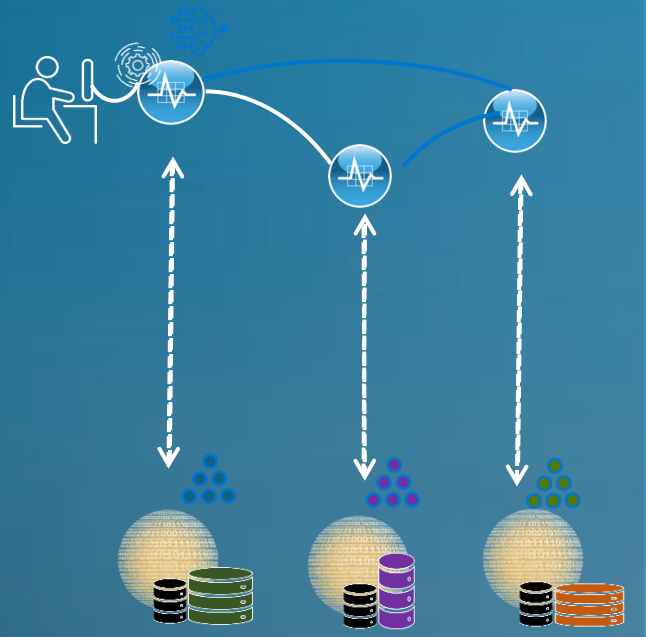
Federated



Hospital A Hospital B Hospital C

Federated learning of predictive models

ScienceDirect – International Journal of Medical Informatics

Volume 112, April 2018, Page 59-67

Highlights

- A new federated learning framework is proposed that can learn predictive models through peer-to-peer collaboration without raw data exchanges.
- Using the EHR, it is possible to accurately predict heart-related hospitalizations.
- The predictive model derived improves prediction accuracy over existing risk metrics.
- The predictive model is sparse, identifying the most informative EHR variables for hospitalization prediction.

https://www.sciencedirect.com/science/article/abs/pii/S138650561830008X?via%3Dihub

Introducing Advance Analytic Platform

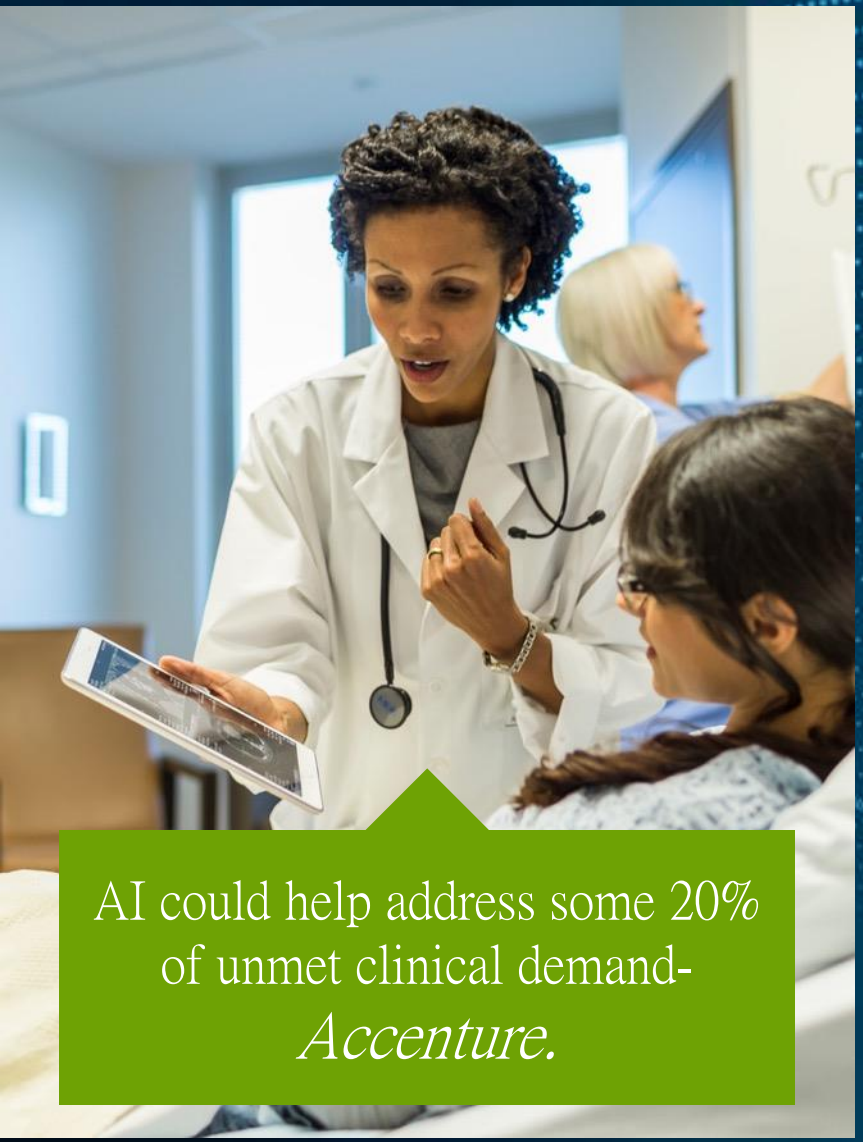
This is a software platform that enables organizations to train, test, deploy and orchestrate analytics workloads in a scalable and agile manner, across the edge-telco-private-public cloud continuum. The analytics workloads supported range the full spectrum from traditional business intelligence such as statistical analysis and benchmarking, to more advanced analytics including Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL), and these workloads can be executed on any of the three computing paradigms: centralized, distributed and federated.

Deploy and orchestrate analytics

Across edge-core-cloud continuum

Secure, simple & scalable

Health Science with Federated Analytics



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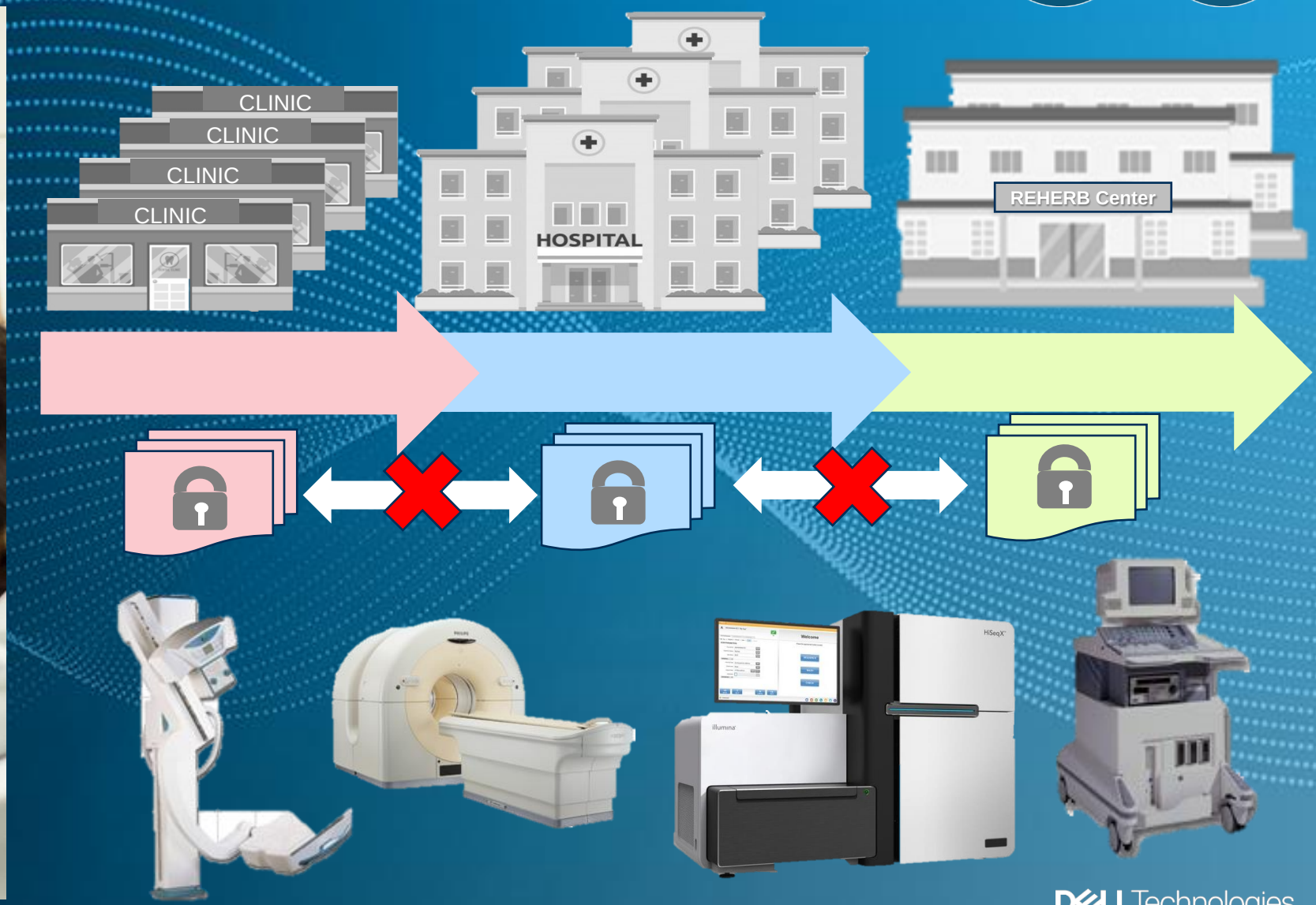
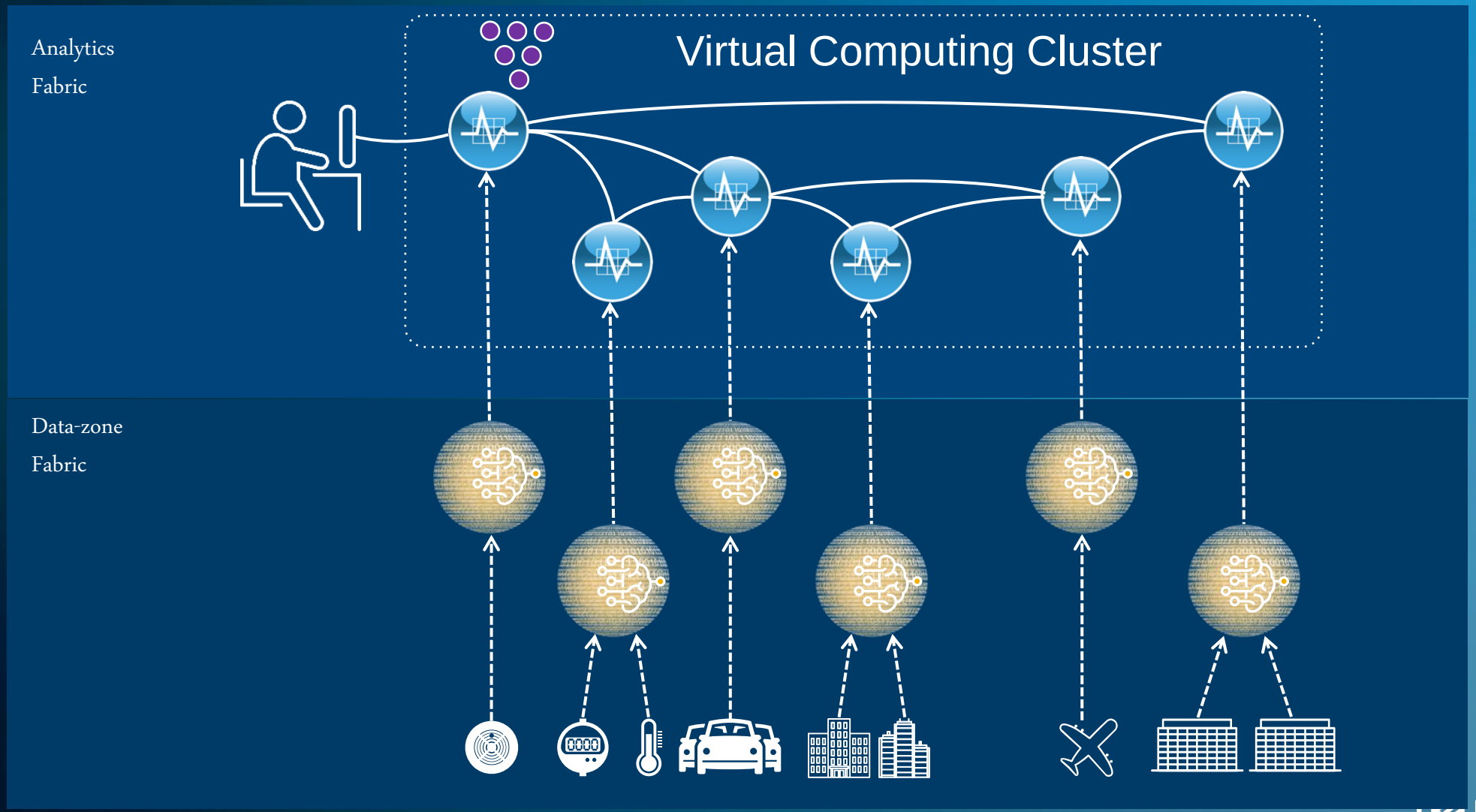


Promote Compliance with Privacy Preserving Results

By Using the Federated Computing Paradigm



Future Proof Architecture

Build a future proof architecture which is open stack and agnostic of cloud/core architecture and analytics platform used.

Any Device

Any Data

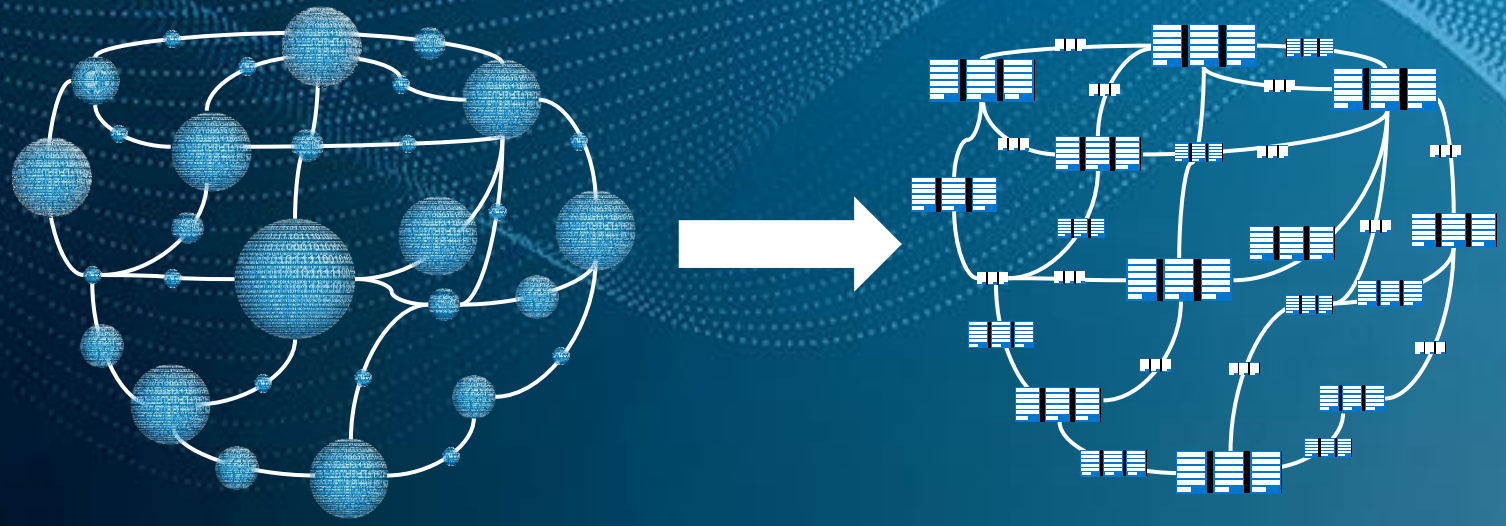
Any Analytics

Any Cloud

Trust, Transparency, and Traceability with Blockchain

Integration with Blockchain

- Each computation becomes and entry in a block
- Binding of analytics, data, and compute gets reported into a ledger
- Keeps track of where all transactions have happened



BLOCKCHAIN

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Statistics & Benchmarking/Machine Learning/Deep Learning

Accelerate Identification of Infectious Diseases

Industry: Healthcare, Academia, Pharmaceuticals

Challenge:

The outbreak of infectious diseases is one of the biggest threats to public health, taking millions of lives and costing billions of dollars every year. To manage outbreaks more effectively, a better understanding of the genomic composition of pathogens is urgently required and can be achieved by conduction ongoing research and developments across different regions.

How Federated AI helps:

- **Address the challenge of regulatory compliance** issues since the model acts on personally identifiable information (PII) across geographical borders.
- **Create more accurate AI model** by harnessing larger volume , dispersed data sets in real time with in-place computation.
- **Save bandwidth costs** by reducing the need of transferring raw data across the multi-edge, multi-core, multi-cloud continuum.
- **Offer total traceability** of the AI model's path and what data sets it accessed with blockchain integration
- **Preserve privacy** by sharing only the results of the computation without revealed actual identities or point data


Thank You!
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