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Operational Transformation

Using AI in network planning and operations forecasting

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2021 Fall Technical Forum
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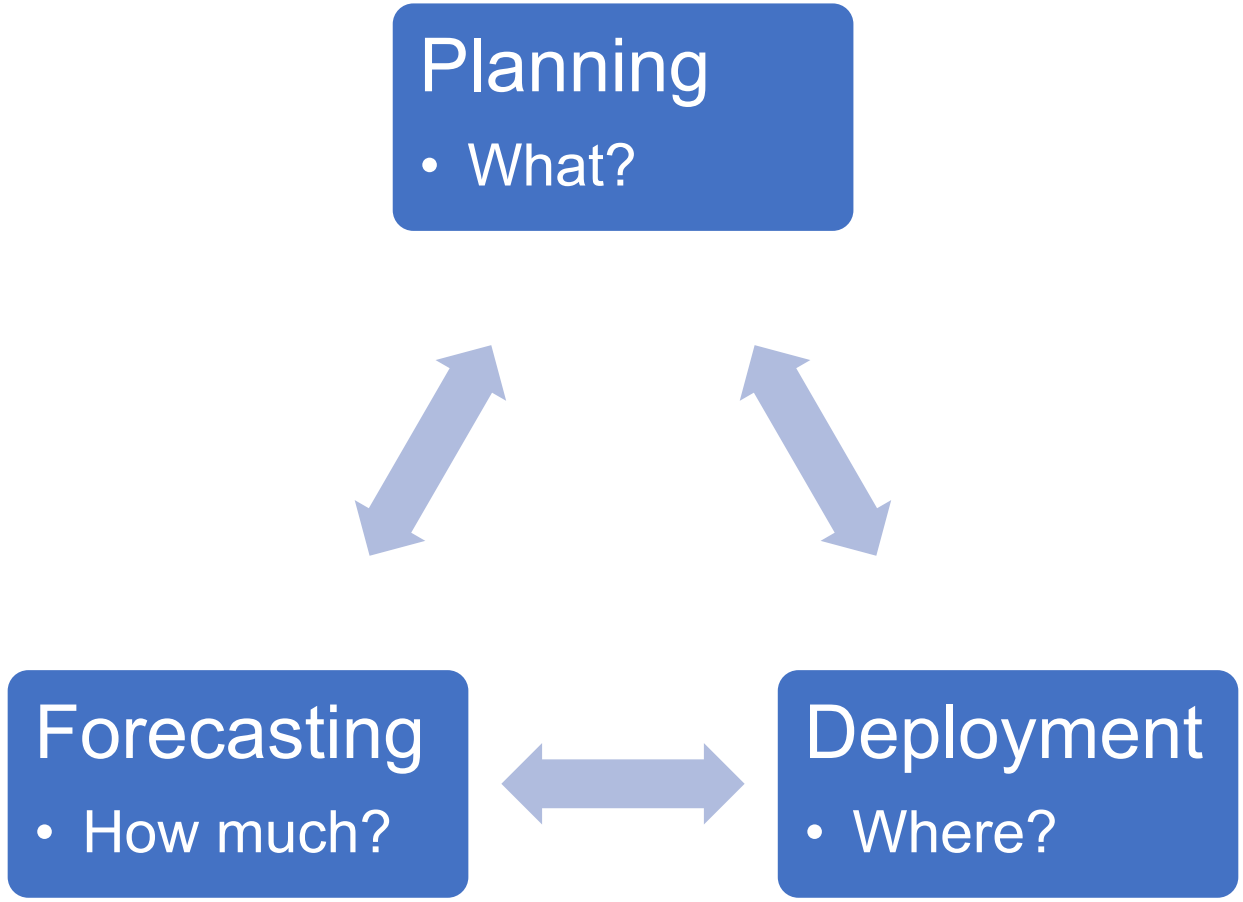
High quality predictions lead to more automated decision making

Observe and Store → Analyze and Predict → Decide and Act

Inventory & Measurements	Big Data & AI	Network Control & Planning
• Equipment • Connectivity • Services • Packet measurements • Physical layer measurements	• Data engineering • Data selection • High capacity ML models • Data imputation/compression • AI Ops • Automatic ML/AI	• Fixed, best effort algorithms • Static policy • Adaptable algorithms • Dynamic policy

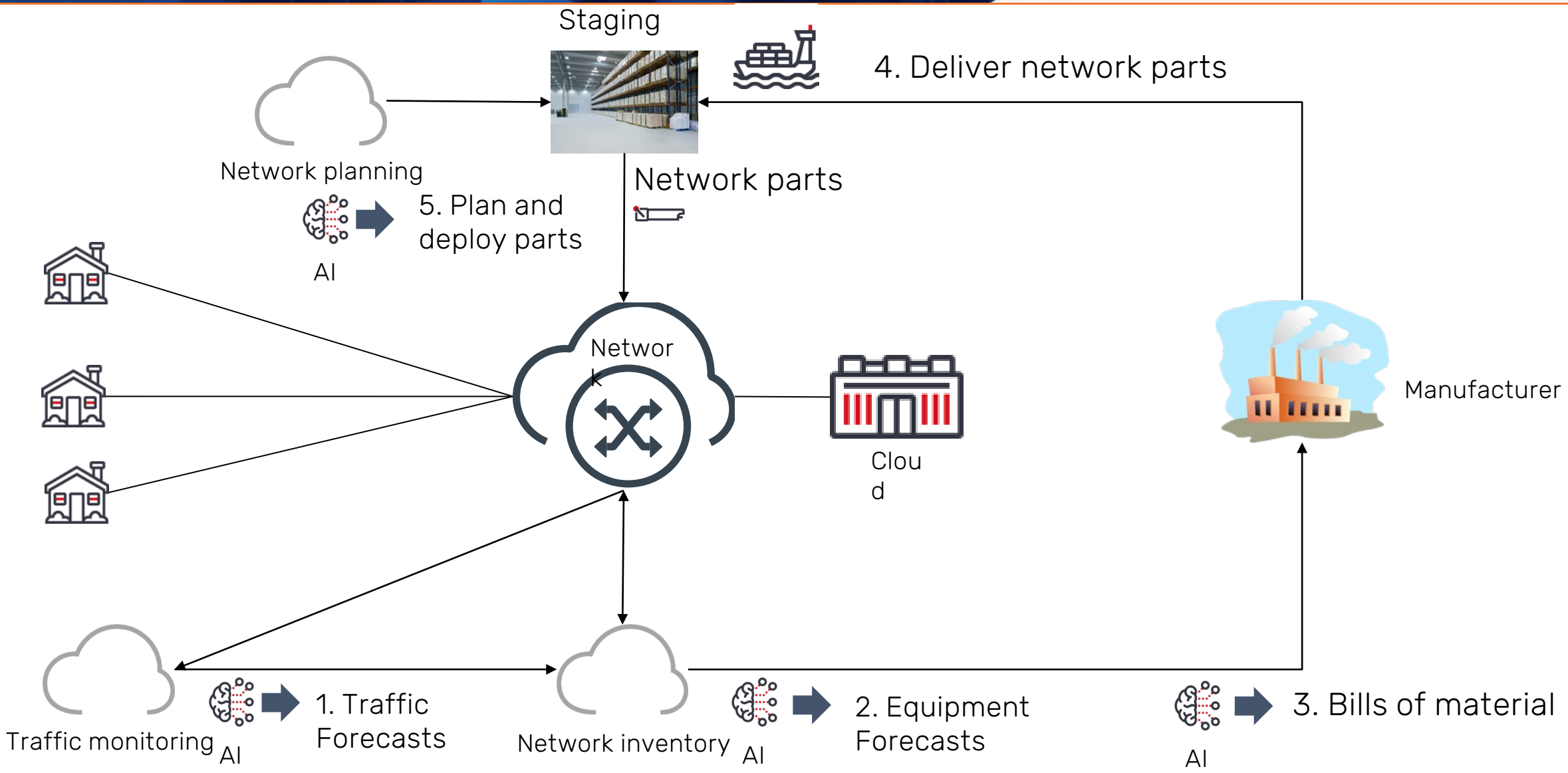
As predictions get better, the role of human judgment changes and more and more decision making can be automated

The network planning problem is an automation problem

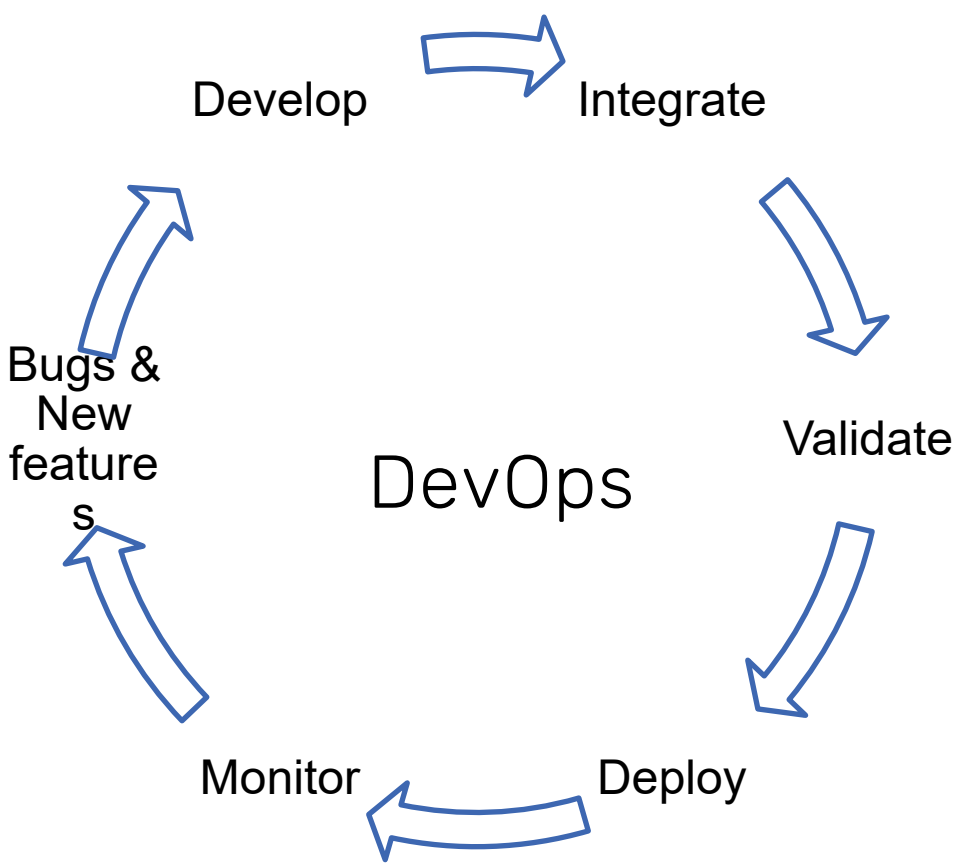


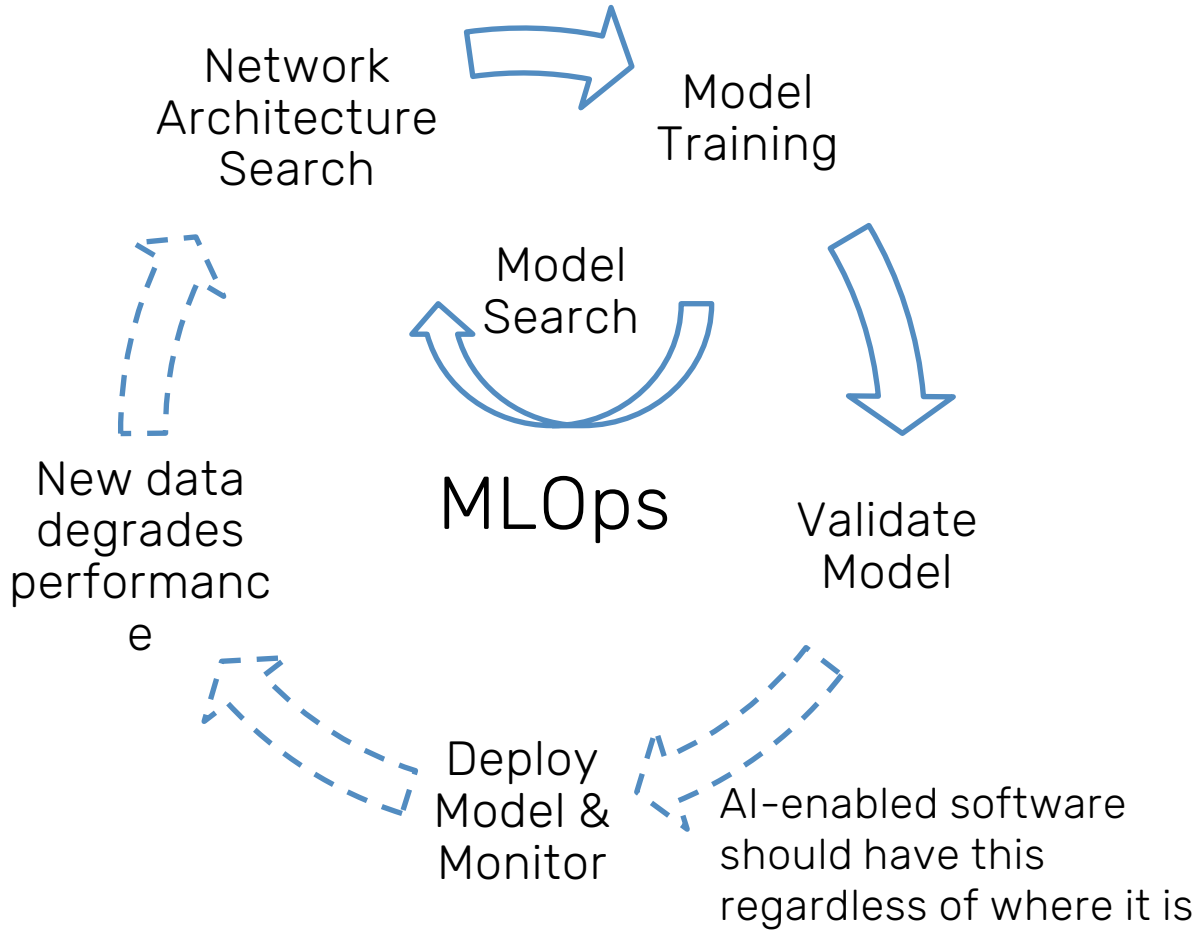
To achieve full automation, all parts of the process need to be automated.
Forecasting is essential to prevent over/under provisioning of equipment.

High quality predictions lead to more automated decision making



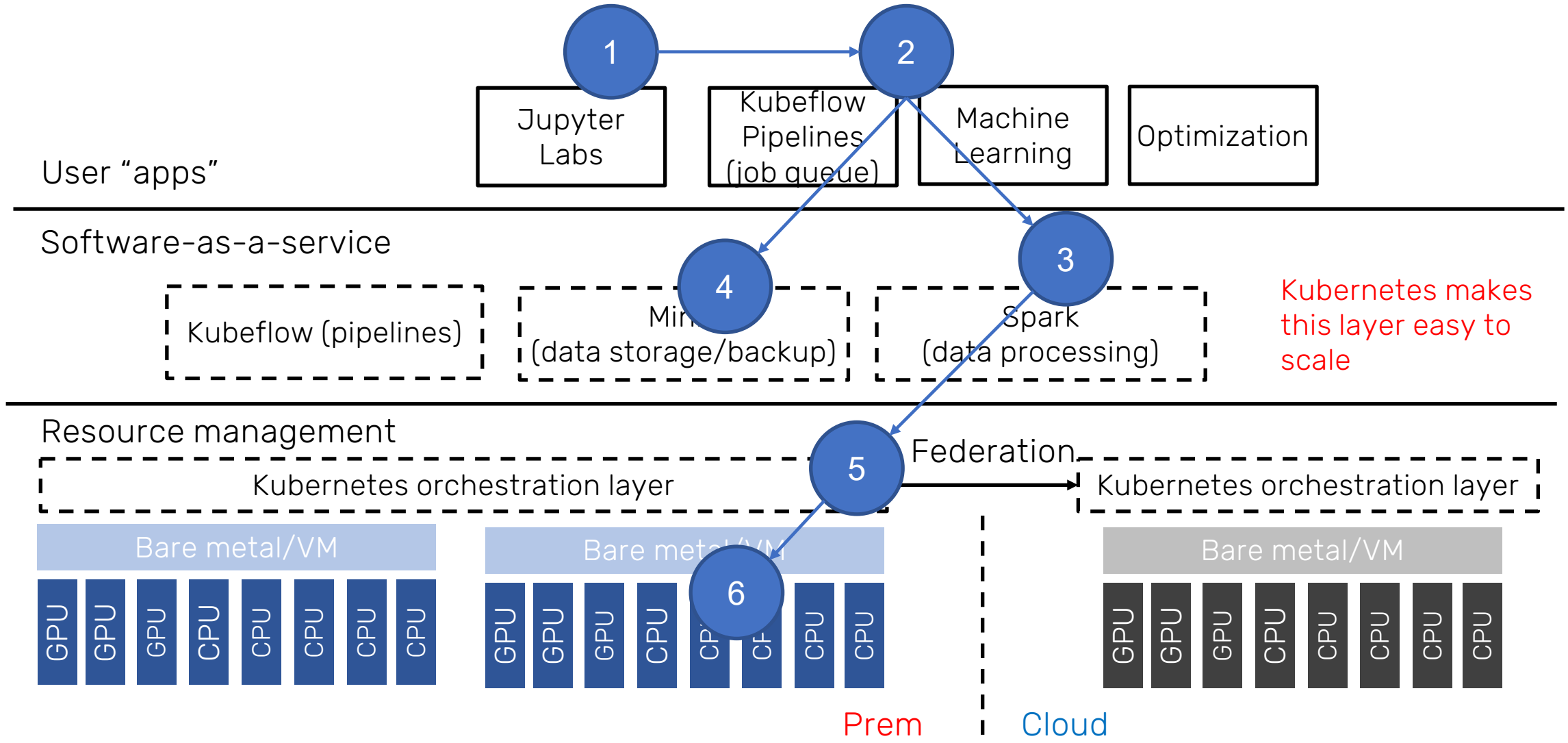
MLOps is DevOps for AI



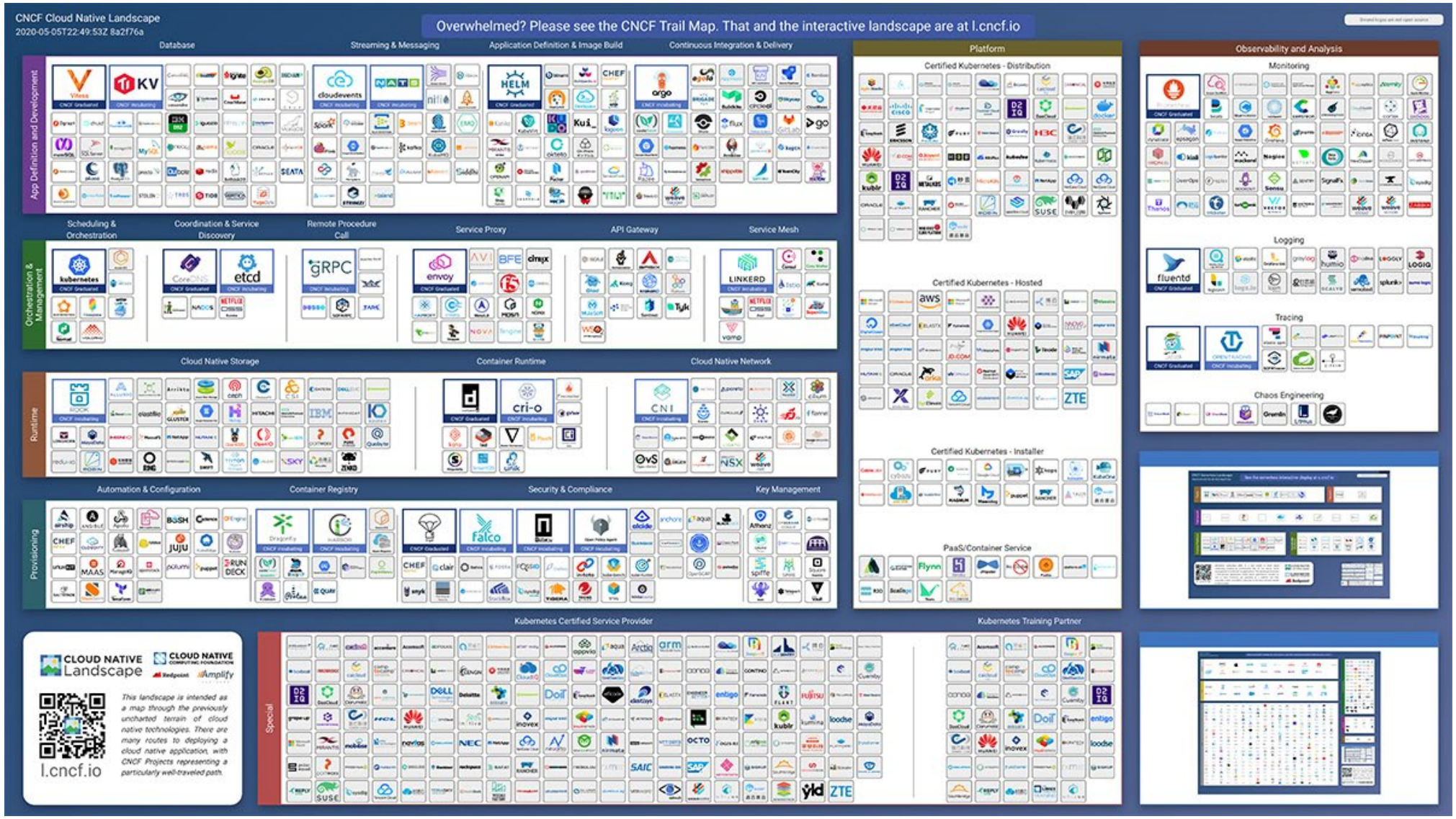


The DevOps cycle is daily, hourly, monthly. It is enabled in the cloud with Software-as-a-Service. MlOps cycle is triggered by data changes if model efficacy decreases sufficiently.

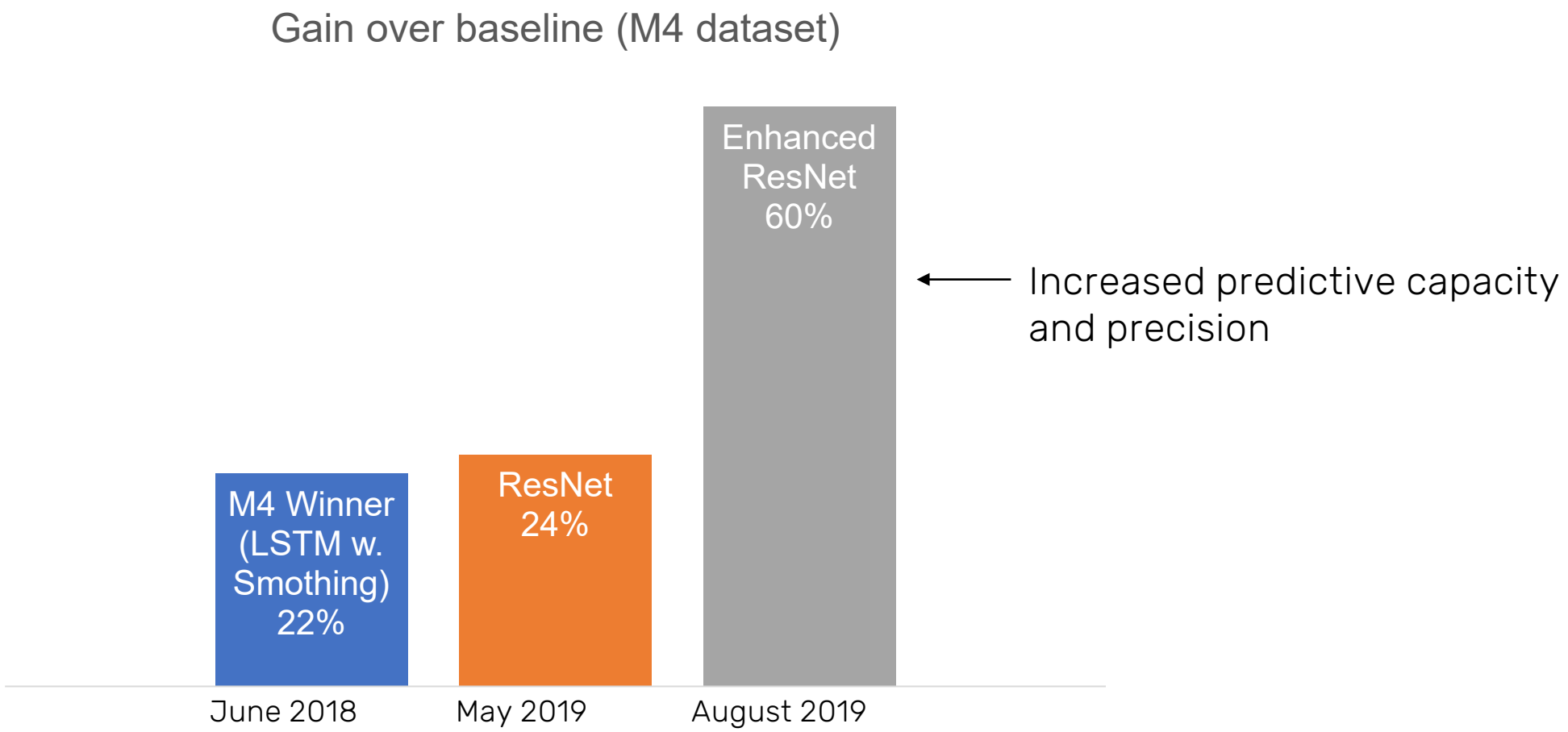
The technology is here and needs widespread adoption by network operators



There is a lot of software coming out of CNCF that can be used to implement a modern AI platform

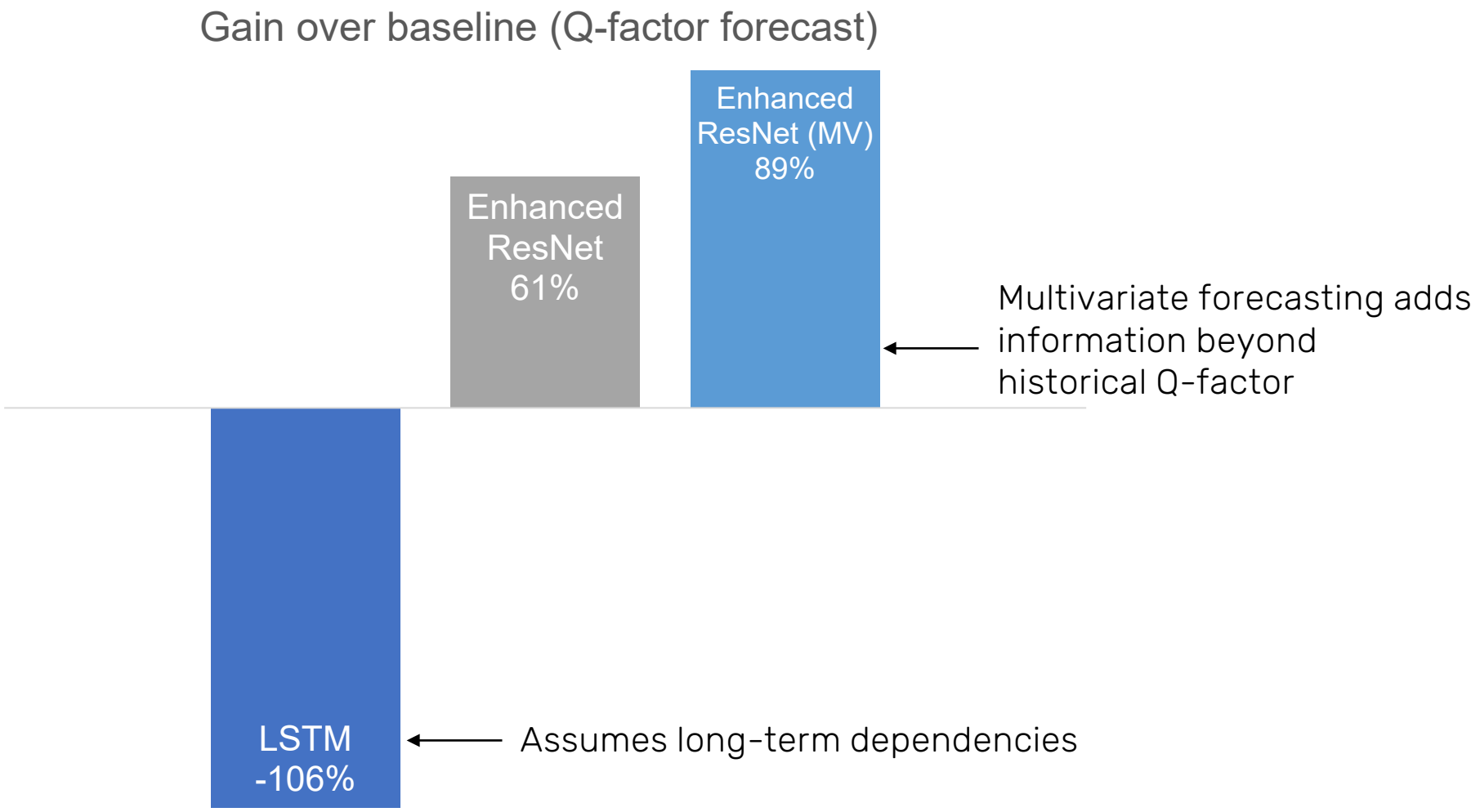


Forecasting is getting better and improvements are accelerating



In about a year DNNs have allowed us to make a leap that wasn't possible for almost 40 years. Forecasting baselines have been hard to beat in competitions until now. We can now routinely get improvements in accuracy of over 50%,

Forecasting in an optical network needs a fresh approach



Classical forecasting algorithms (including DNN-based algorithms) do not work well on network data. New approaches have been developed using both single measurement and multiple measurements as inputs.

AI is an advanced prediction technology with many network applications

Key Takeaways

1	AI is a prediction technology. Prediction is the process of filling missing information.
2	There are many uses cases where filling missing information can reduce optical network costs or improve network performance.
3	Network planning can be automated with the use of AI technologies for forecasting and optimization.

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Thank You!

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