AWS re:Invent

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MFG304

Building Arm's cloud-native engineering platform

Zhifeng Yun
Technical Director
Arm

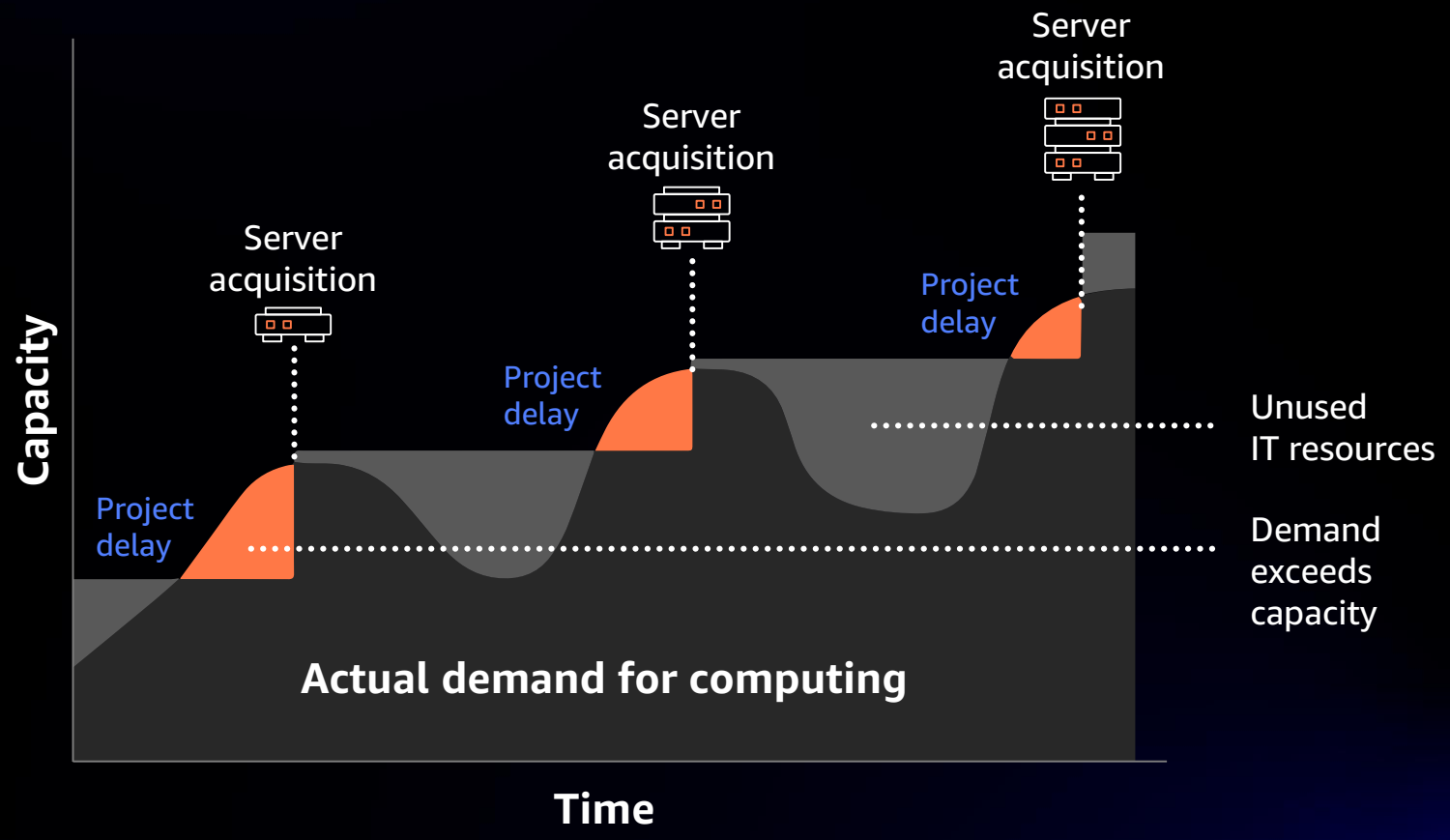
Ludvig Nordstrom
Principal Solutions Architect
AWS

Allan Carter
Specialist Solutions Architect
AWS

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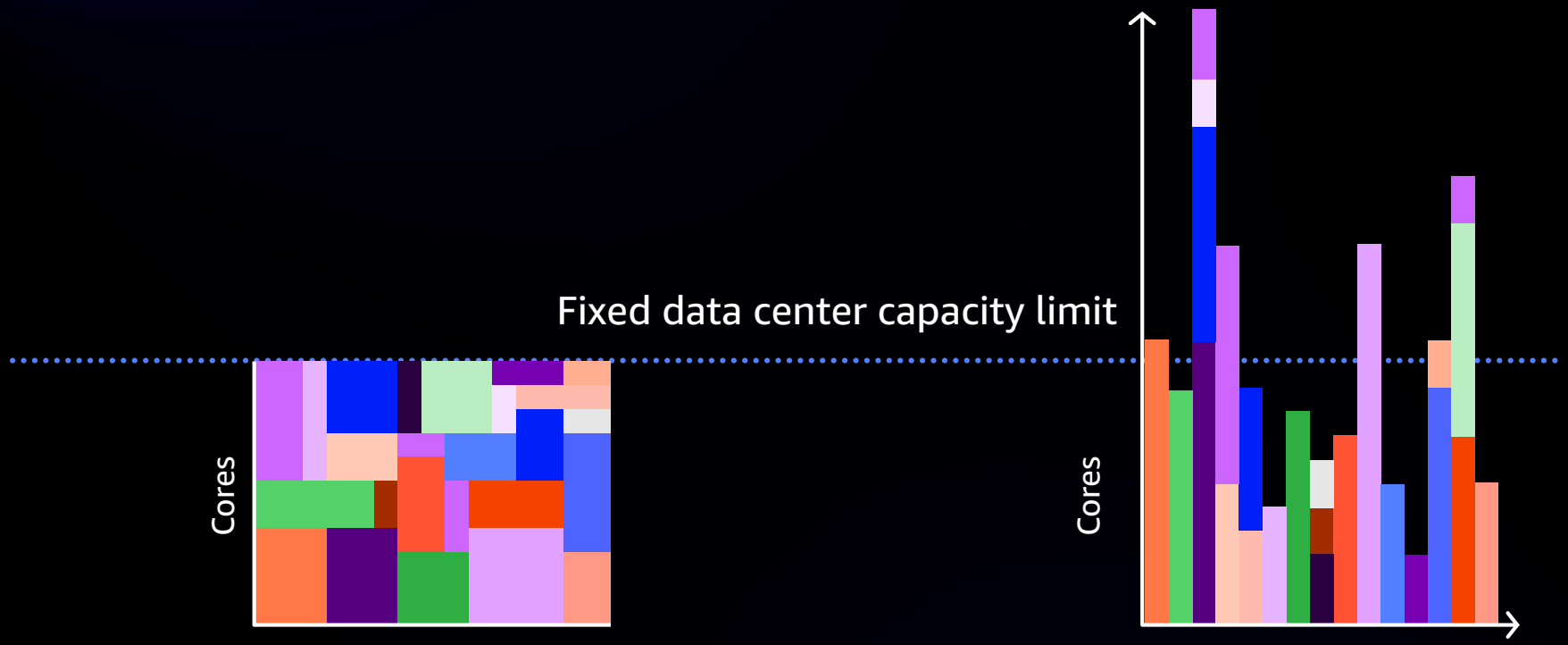
Matching demand to capacity is challenging

Attempting to match variable computing demand to static on-premise compute grids is extremely difficult, and adding capacity is time- and capital-intensive



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Cloud is a natural fit for EDA



Finite capacity
Queues
Engineering bottlenecks

Elasticity
Agility
Evolving ecosystem of services (e.g. AI/ML)

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Case Study: Arm Reduces Characterization Turnaround Time and Costs by Using AWS Arm-Based Graviton2 Instances

> "Using AWS, our EDA workload characterization turnaround time was reduced from a few months to a few weeks."

Philippe Moyer, Vice President of Design Enablement, Arm

https://aws.amazon.com/solutions/case-studies/arm-case-study/

About Arm

Based in Cambridge, United Kingdom, Arm designs and manufactures silicon IP for intelligent systems-on-chip. The company's processors have enabled intelligent computing in more than 190 billion chips, powering products from sensors to smartphones to supercomputers.

Industry: Semiconductor IP

Headquarters: Cambridge, United Kingdom

Website: www.arm.com

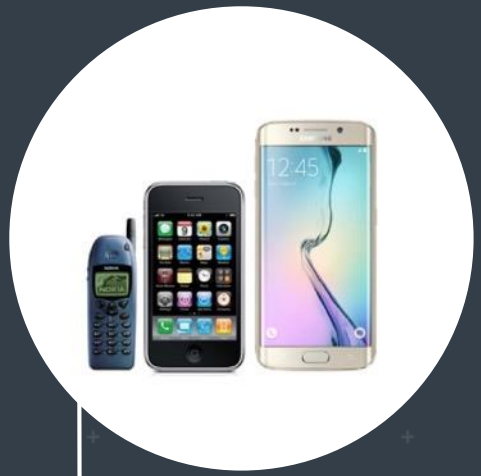
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Arm: From inception to now

1990

Joint venture between Acorn Computers, Apple, and VLSI Technology





Designed into first mobile phones and then smartphones

1993 onward

Today

All electronic devices can use intelligent Arm technology



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Agenda

- Business challenges
- Approach to cloud
- Achievements
- Summary

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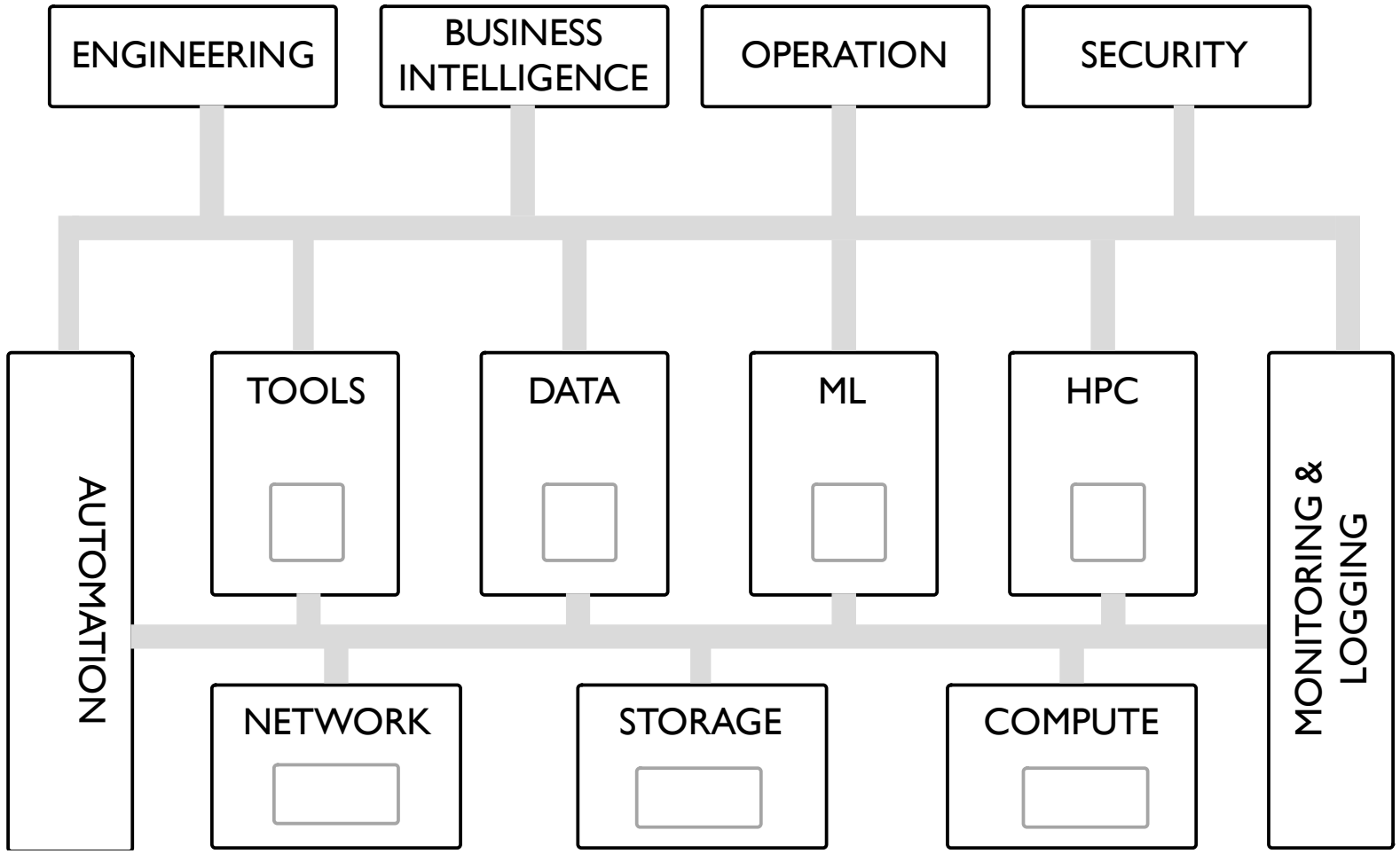
Challenges

Business requirements

- Innovate faster
- Agility
- Business intelligence
- Reduced TCO

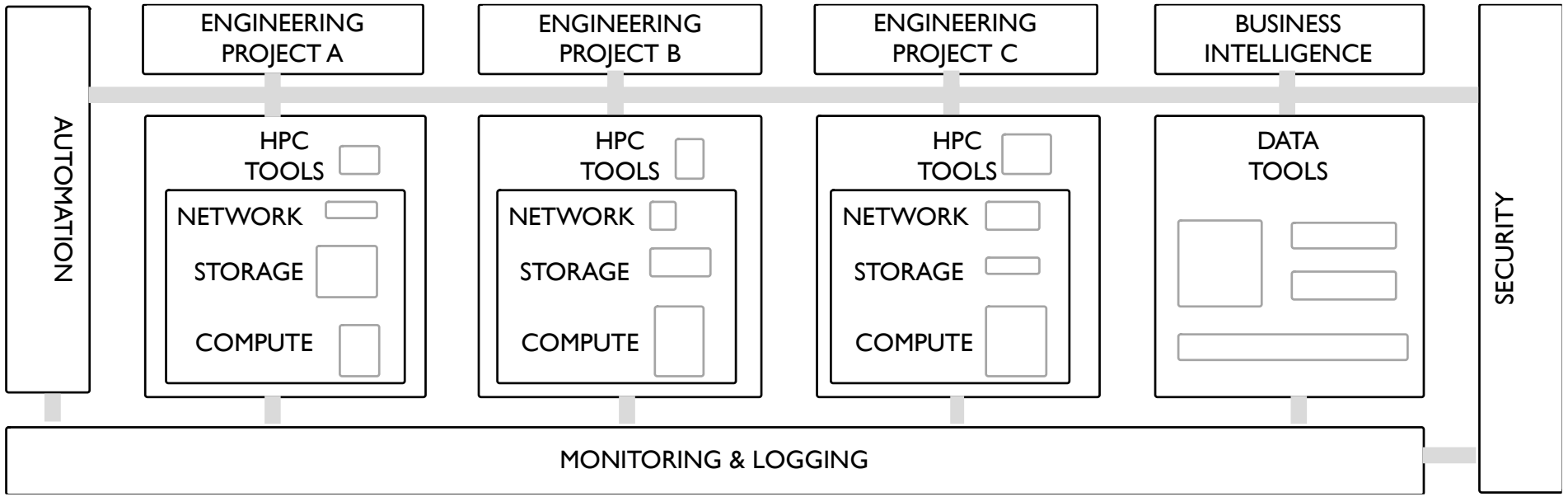
Platform challenges

- Never right-sized
- Limited capacity
- One size fits no one
- Data proliferation



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Cloud is the opportunity



Bridge the gap on

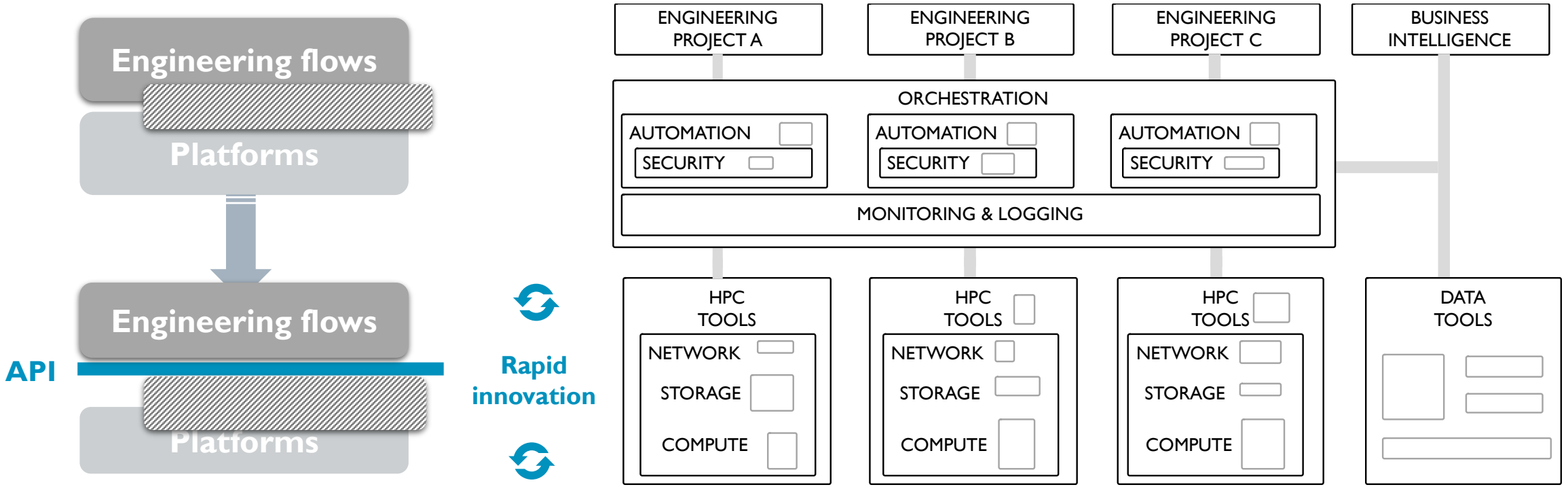
- Scalability
- Agility

Provide the opportunity to

- Tailor solutions for engineering
- Promote data ownership and DLM
- Enhance the security
- Increase engineering productivity

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Intelligence-driven platform



Governed, managed, hands-off environment

- Autonomous by design
- Secure by design
- Controlled by design
- Automated by design

Decoupled cloud / platform from engineering design

- Encourages broader applicability and reuse attributes
- Enables flexibility for future innovation

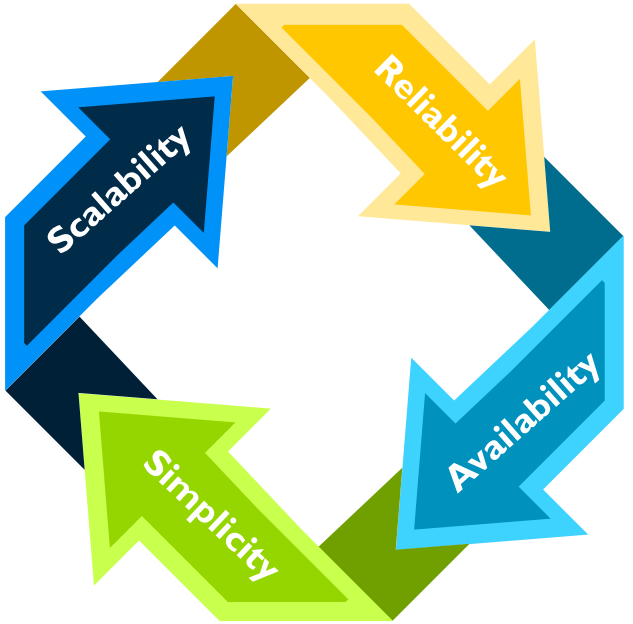
Intelligence exists in this abstraction

- Business priority rules
- Cost controls
- Efficiency / effectiveness improvement

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Design principles

- API centric
  - Define engineering stack based on contract between services
  - Clear operation boundary
- Let the cloud providers manage scale
  - Use cloud-native and managed services as much as possible
- FaaS and usage-charged services first
  - To reduce running cost and scale based on request



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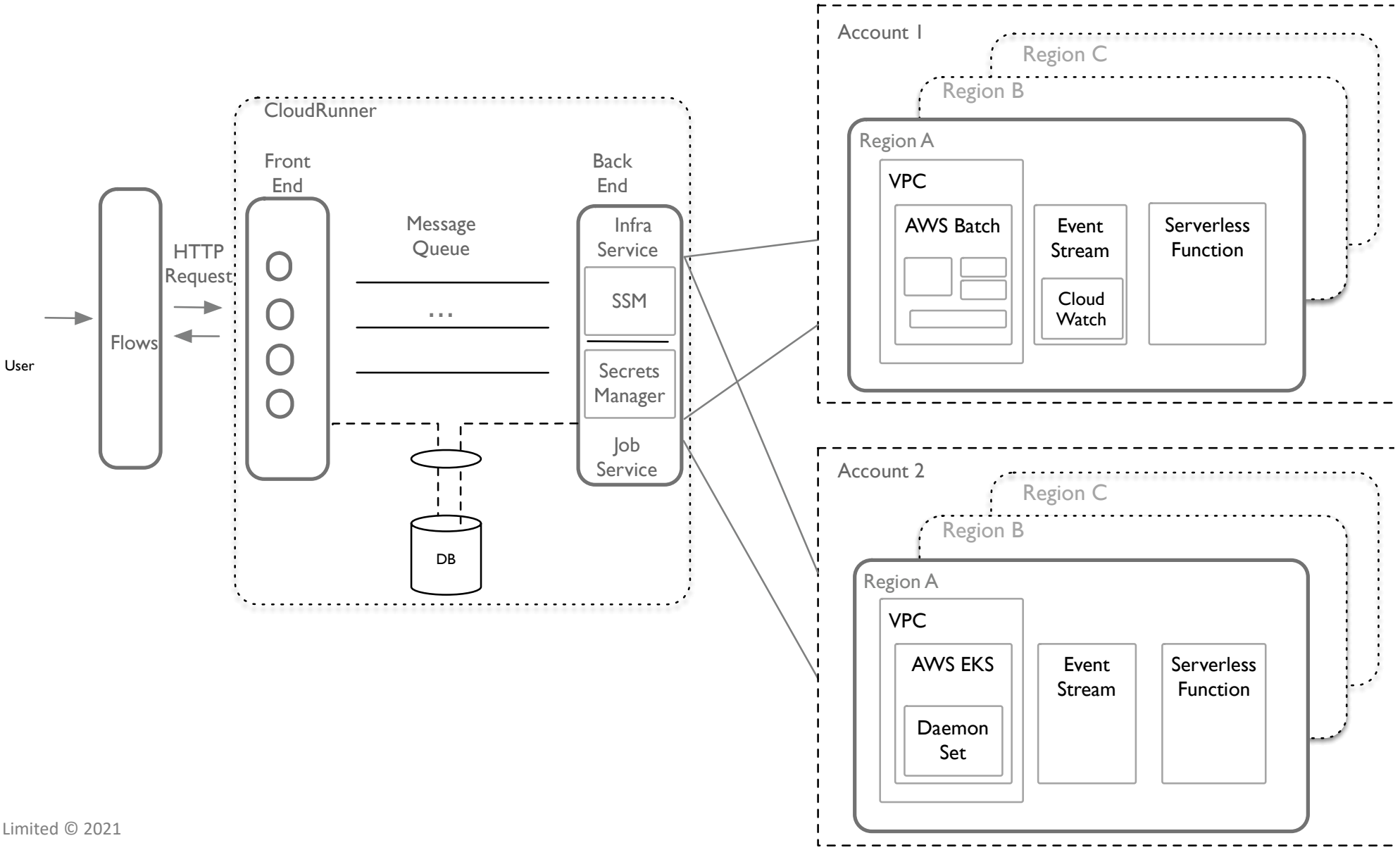
Workloads

Workload	Cluster usage ratio
Simulation	**75%**
Formal	**12%**
Implementation	**8%**
Perf and others	**5%**

* Based on data averaged over one-year period

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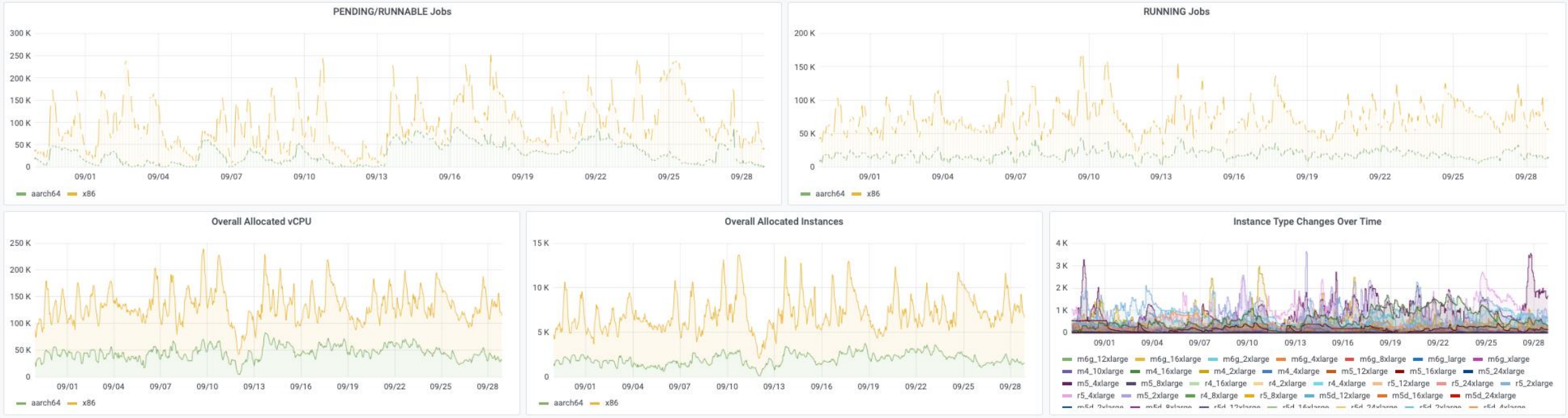
Modularized recipes



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Current capacity and performance

Max no. jobs per week	Max no. jobs per day	Ave. job runtime	Max no. vCPUs	Max no. instances
53 M	9 M	33 Mins	240 K*	13 K*



* all running on spot instances

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Performance on AWS Graviton2

Tools	Runtime reduction*	Cost saving**
Front-end tool	**>20%**	**>36%**
Back-end tool	**>6%**	**>25%**

* Compared M6g with M5 on per vCPU performance

** Based on on-demand list price

Performance on AWS Graviton3 (C7g)

Graviton3 uplift further over Graviton2 of about 20% for most tools

Graviton3 offers at least 20% and up to 50% cost savings over any tested x86 variant

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Summary

Developed orchestration layer to enable engineering flows to leverage cloud resources

- Abstract the complexity of cloud from flows
- Embrace cloud-native approach for orchestration and management
- Built-in intelligence
- Security through automation
- Provide full observability of cloud tasks and resources

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Thank You
Danke
Gracias
谢谢
ありがとう
Asante
Merci
감사합니다
धन्यवाद
Kiitos
شكرًا
ধন্যবাদ
תודה

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