



Will HPC Move to the Cloud?

Gabriel Broner, VP & GM of HPC, Rescale
HPC User Forum, September 2017



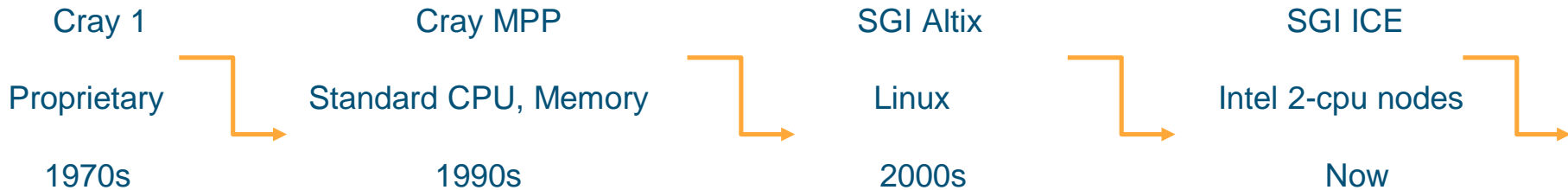
Agenda

- Evolution of High Performance Computing
- Disruptions and Challenges
- HPC in the Cloud
- Use Cases
- What is needed in the Cloud
- Incorporating Cloud into HPC
- The Future



High Performance Computing

A History of Disruptions



HPC in the Cloud

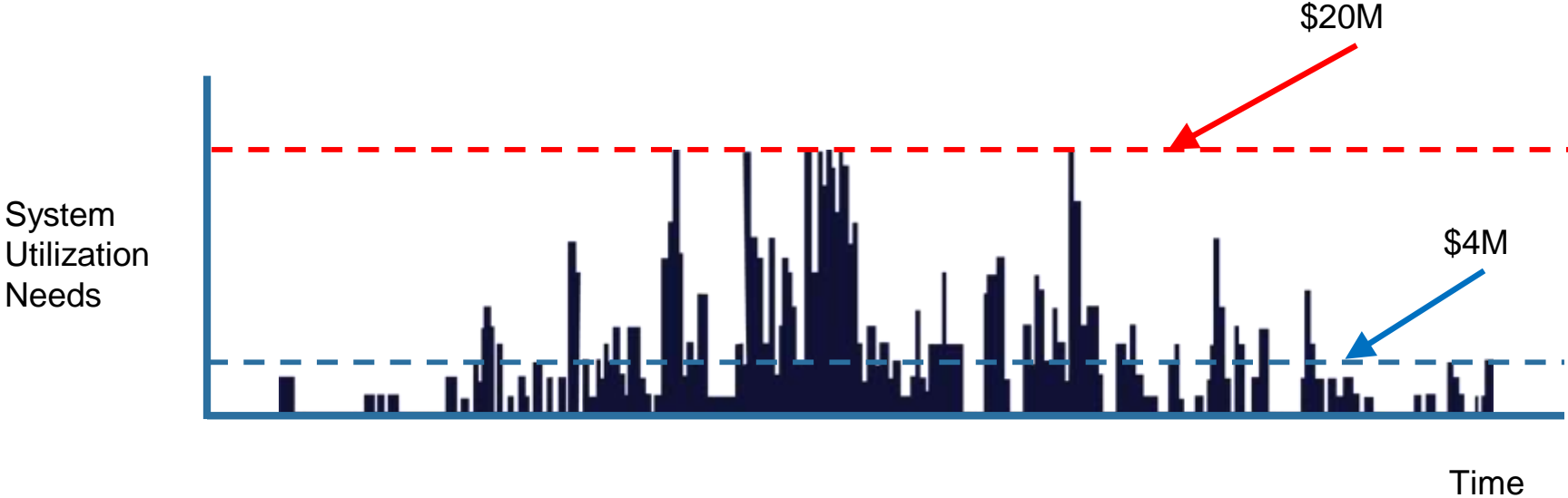
- Instant access to unlimited resources
- Choice of architectures
- Applications available and tuned
- Application runs on best suited architecture
- Jobs run with no wait
- Engineers not constrained by the size of a system

- Faster innovation, shorter cycles, improved time to market
- Immediate provision, variable size, no capital investment
- System utilization, job queues, schedulers, are a thing of the past



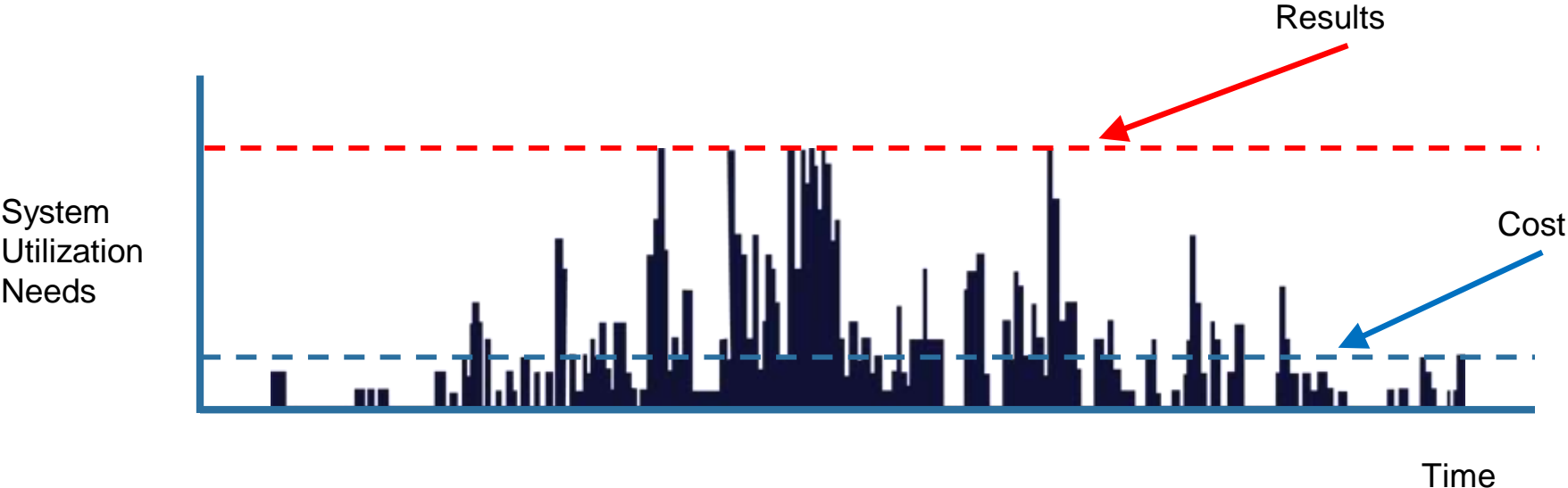
Automotive Supplier Challenge

What size on-premise system should I buy?



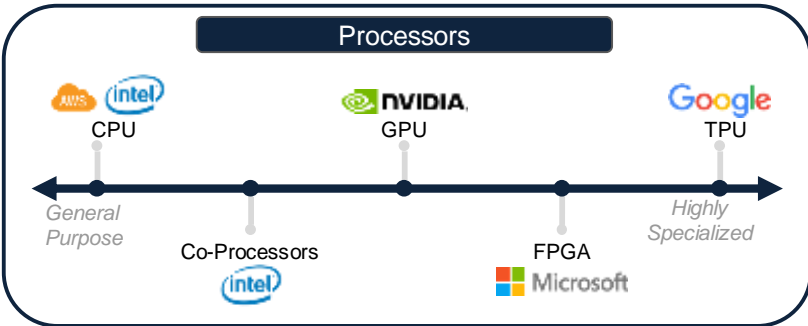
Automotive Supplier

With Cloud HPC

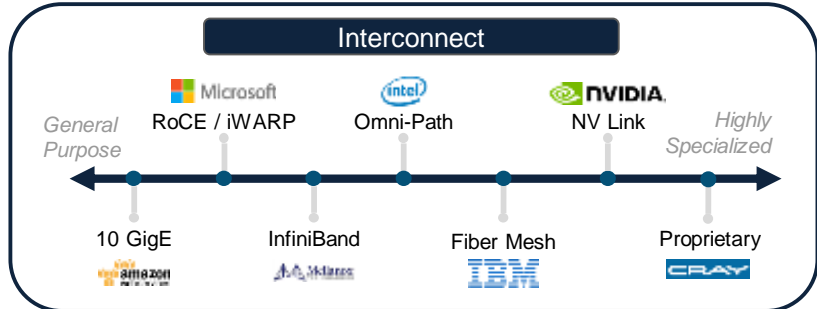


Multiple Architectures

Makes it more difficult



“What architecture should I buy?”



Wing Design

With Cloud HPC

- Instant access to a large system
- 3 month development in 24 hours
- 787 wing lighter by 150 pounds
- Cost savings of \$180M



Rocket Design

With Cloud HPC

- Instant access to 1000 cpus
- Development speedup of 24x
- Tens of thousands of simulations validate design before launch



Formula 1 Racing

With Cloud HPC

- Real world sensor data
- Trackside simulation
- 3000 simulations per lap
- F1 team adjusts race strategy



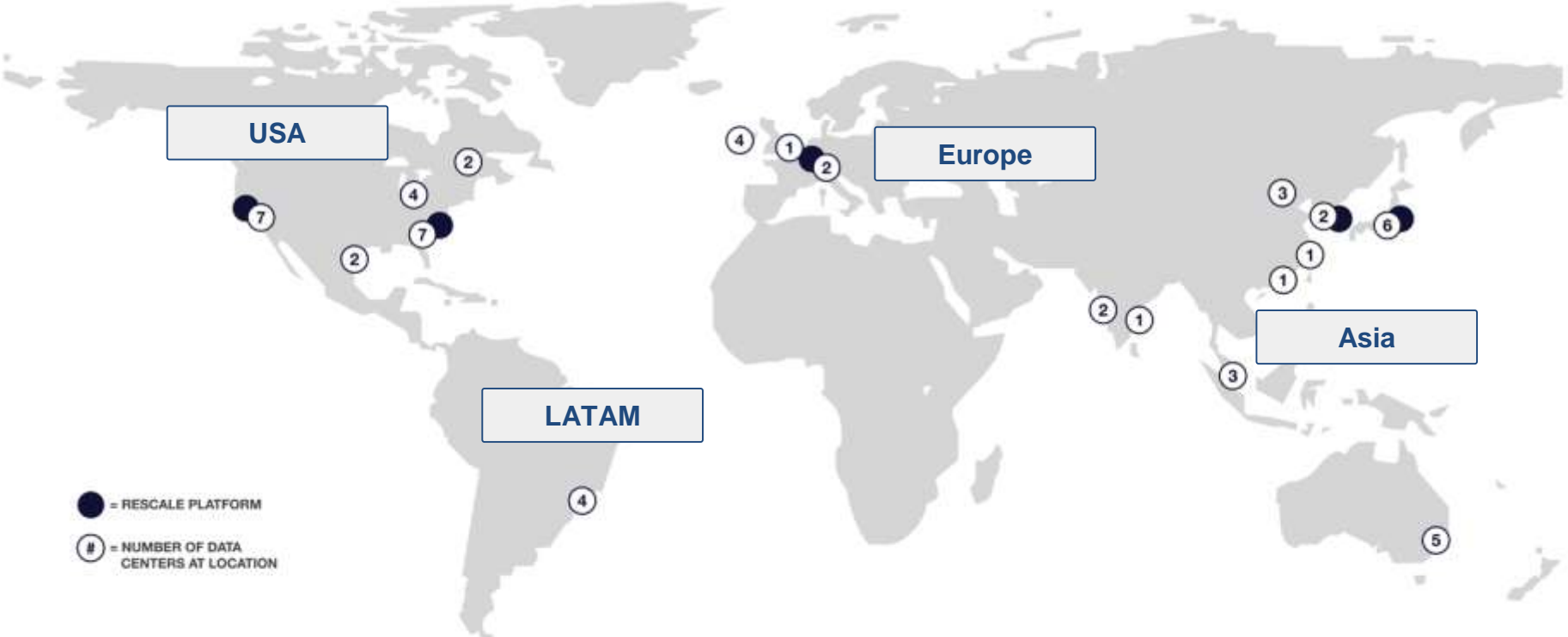
Designing and Flying a Supersonic Virtual Plane

With Cloud HPC

- Pilots fly in the simulator the model of the plane being designed



Challenge: Accessing Diverse Data Centers



Challenge: Availability of Applications



Challenge: Run on the best suited architecture

Abaqus/Standard

LS-DYNA

TensorFlow

On demand cluster provisioning



10 GigE Network

31GB SSD Storage

3.3 GB Memory

16 K80 GPU & 32 CPU

SERVER TUNING

Up to **5X speed up** over standard hardware



Infiniband Network

50 GB Storage

8 GB Memory

256 CPU

SERVER TUNING

Up to **2X speed up** over standard hardware



10 GigE Networking

Storage

Memory

TPU

SERVER TUNING

Up to **30X speed up** over standard GPUs



Challenge: Reliability and Security



SOC 2 Type 2 Certified



ISO 27001 Certified



CSA Certified



ITAR Compliant



Challenge: Simple User Interface



Incorporating Cloud in HPC

10 Things to Do

1. Start testing cloud next week
2. Start small
3. Pick a few projects that will benefit from cloud HPC
4. Test the future experience
5. Don't try to solve all the problems before you start
6. Use the cloud directly
7. Learn from the experience
8. Iterate
9. Address uncovered issues
10. Select more projects, of bigger scope, add more people

Cloud isn't all or nothing



Cloud: The Next Disruption in HPC

Gabriel Broner - August 11, 2017

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In 1991, I joined Cray and had the opportunity to work on the machines Seymour Cray designed.

[Read more](#)

Gabriel Broner on Why Cloud is the Next Disruption in HPC

 August 22, 2017 by [staff](#)  [Leave a Comment](#) 

"Like the previous disruptions of clusters vs. monolithic systems or Linux vs. proprietary operating systems, cloud changes the status quo, takes us out of our comfort zone, and gives us a sense of lack of control. But the effect of price, the flexibility to dynamically change your system size and choose the best architecture for the job, the availability of applications, the ability to select system cost based on the needs of a particular workload, and the ability to provision and run immediately, will prove very attractive for HPC users."

[Read the Full Story](#)





blog.rescale.com

