2020 Winter Review
Thank You, Sponsors!
Lab mission:

define new hardware/software platforms

that enable exciting new classes of applications
How We Work

- All work is open, freely accessible
- Goal: results not just interesting, but actually useful
- We love industrial collaboration
  - Interested in your ideas and feedback
  - Looking for opportunities to transfer technology
State of the Lab

- 11 affiliate companies: welcome, Intel!
- 12 faculty in CS, EE, and Aero/Astro
- Dozens of research projects
- This is our fifth year
  - A good time to look backward and forward
Driving Themes

● Self-Programming Networks
  ▪ Raise the level of network programming
  ▪ Describe desired behavior declaratively, at a high level
  ▪ Compute low-level control actions automatically

● Granular Computing
  ▪ Building large-scale datacenter applications out of large numbers of very short-lived tasks
  ▪ We have explored both infrastructure and applications
Unplanned Surprise

High-accuracy clock synchronization

- Originally envisioned for self-programming networks
- Realization: can impact applications also
  - Immediate impact in Financial Technology
  - Change the way we think about distributed systems?
Where We Are

- Research continues in all these areas
- Clock sync/Fintech still at an early stage
- We will review successes and challenges at the Spring Retreat
- But, this is a good time to think about new driving themes for the next five years
- Initial discussions have started among faculty
Possible Future Themes

- **Candidate #1: Platform for Any-Scale Applications**
  - Developers write applications in a scale-independent way
  - Applications can run on a variety of platforms and scales:
    - Laptop
    - Public cloud (with/without lambdas?)
    - Hybrid cloud: enterprise, edge cloud, public cloud

- **Candidate #2: Platform for Post-Moore’s Law Computing**
  - System architecture is undergoing radical changes:
    - Special-purpose accelerators
    - New system architectures (disaggregation?)
  - Is there a platform that makes it easy to write applications for these new architectures?

If you have thoughts, let us know (more discussion at Spring Retreat)
Today’s Technical Talks

8:30 Session 1
Update and Future Directions of the Platform Lab  John Ousterhout
Efficient Systems for Machine Learning  Matei Zaharia
Tock Operating System: Security Model and Implications  Phil Levis

10:30 Session 2
On-demand Film-scale Raytracing on a Mesh Network of 10,000  Keith Winstein
Granular Microservice Workers
On Designing Real-Time Communication Frameworks for Cloud Inference  Pan Hu
Distributed Inference and Learning Between Robots and the Cloud  Sandeep Chinchali

2:00 It’s About Time: New Approaches to Network Control and Financial Trading
Overview  Balaji Prabhakar
Edge-Pause  Shiyu Liu
Cloud Exchange  Vinay Sriram

4:00 Virtualizing Financial Trading: Opportunities and Challenges
Overview/Moderator: Balaji Prabhakar
Panel: Mendel Rosenblum, Stanford, Nikolai Larbalastier SVP, Nasdaq, Greg Lavender CTO, VMware, Ravi Radhakrishnan CIO, Wells Fargo
Questions/Discussion