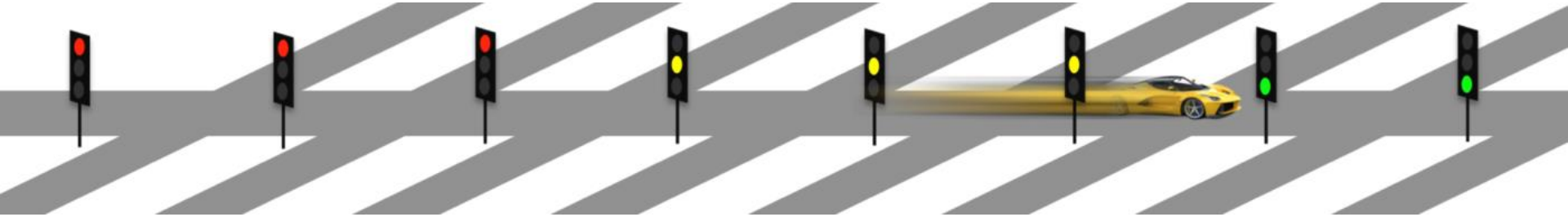


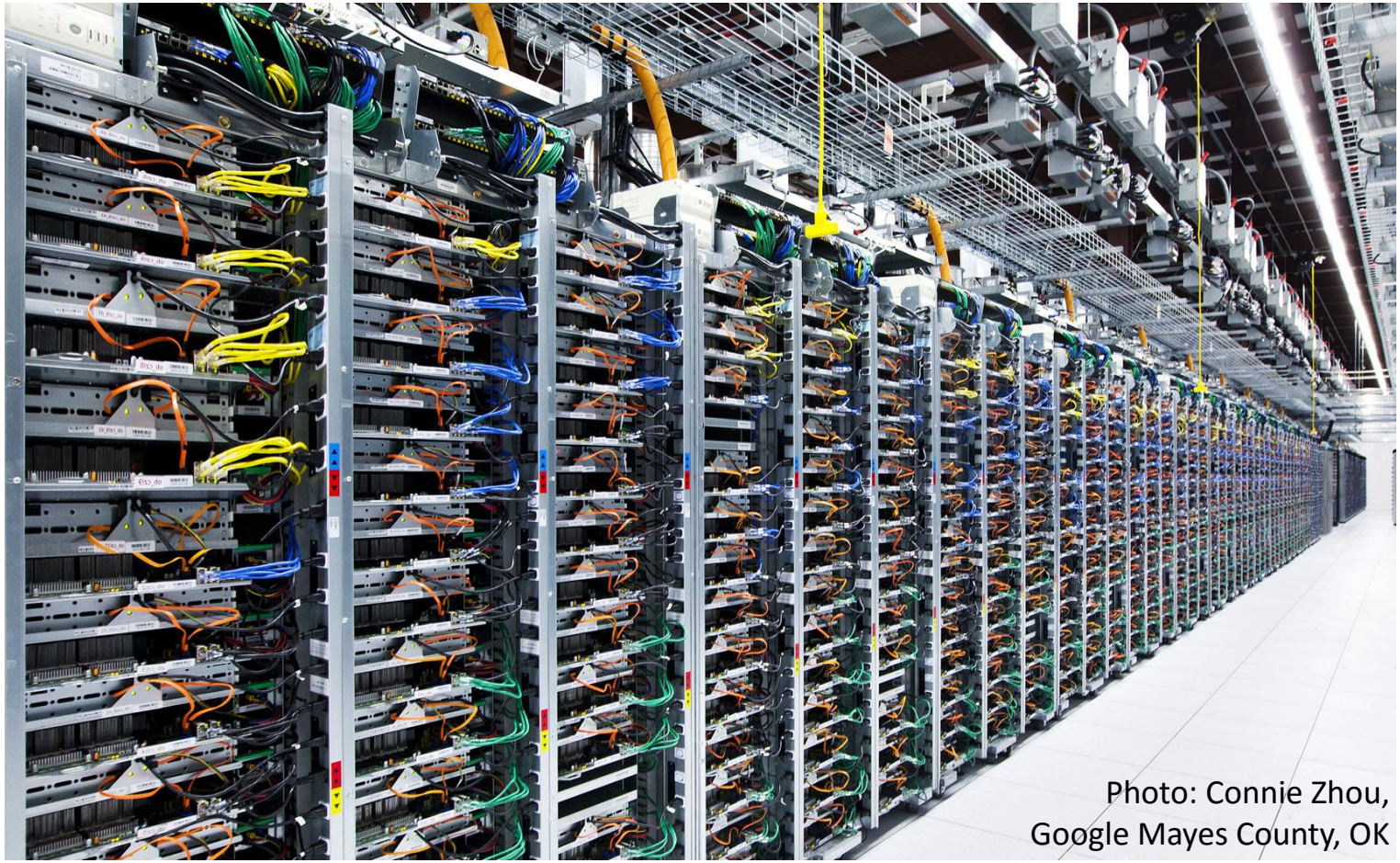
Scheduling the Datacenter Network

Jonathan Perry

Joint work with Hari Balakrishnan,

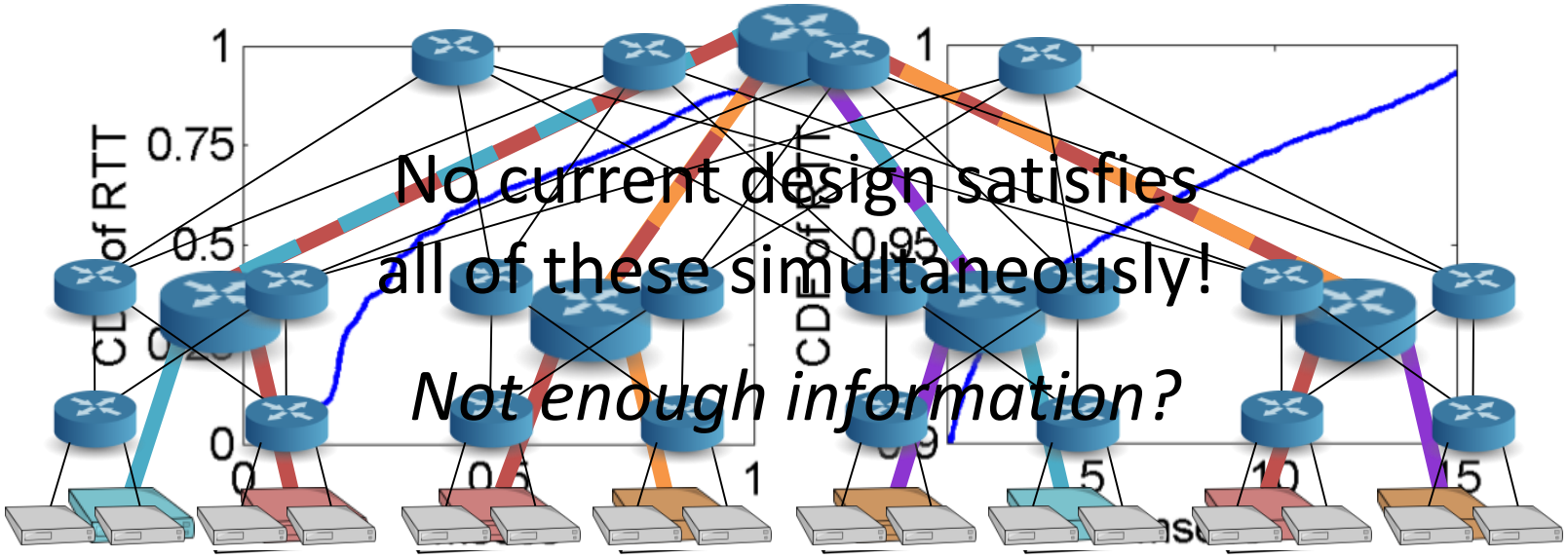
Devavrat Shah, Amy Ousterhout, Hans Fugal

Datacenters have changed computing



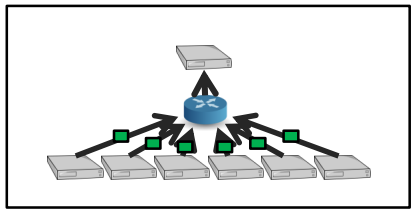
Large web/mobile properties, cloud providers, enterprises, universities

Ideal datacenter properties

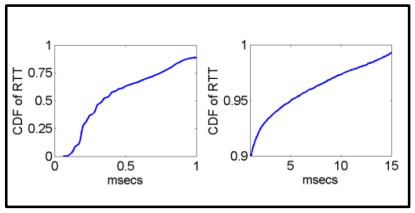


Alizadeh et al, "DCTCP", SIGCOMM'10

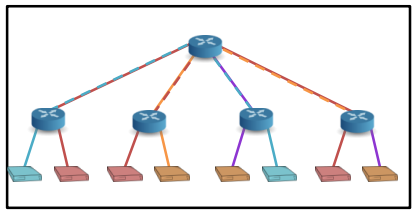
Multiple Objectives



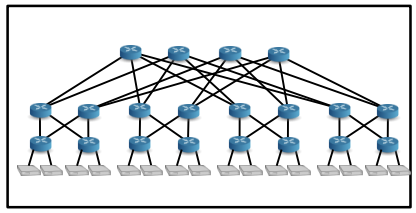
Burst Control



Predictable



Multiple Objectives



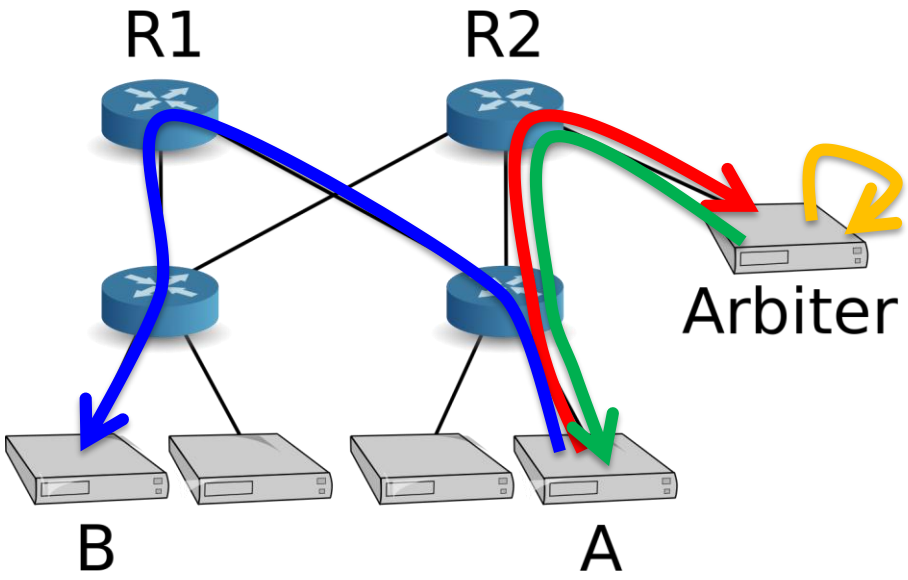
Load Balancing

Chuck Norris doesn't wait in queues.

He schedules every packet in the datacenter!

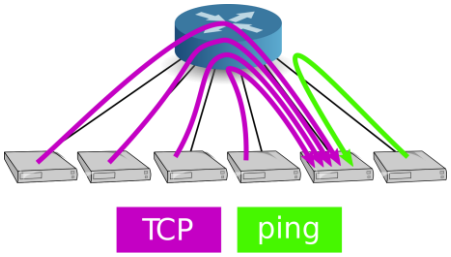
Example: packet from A to B

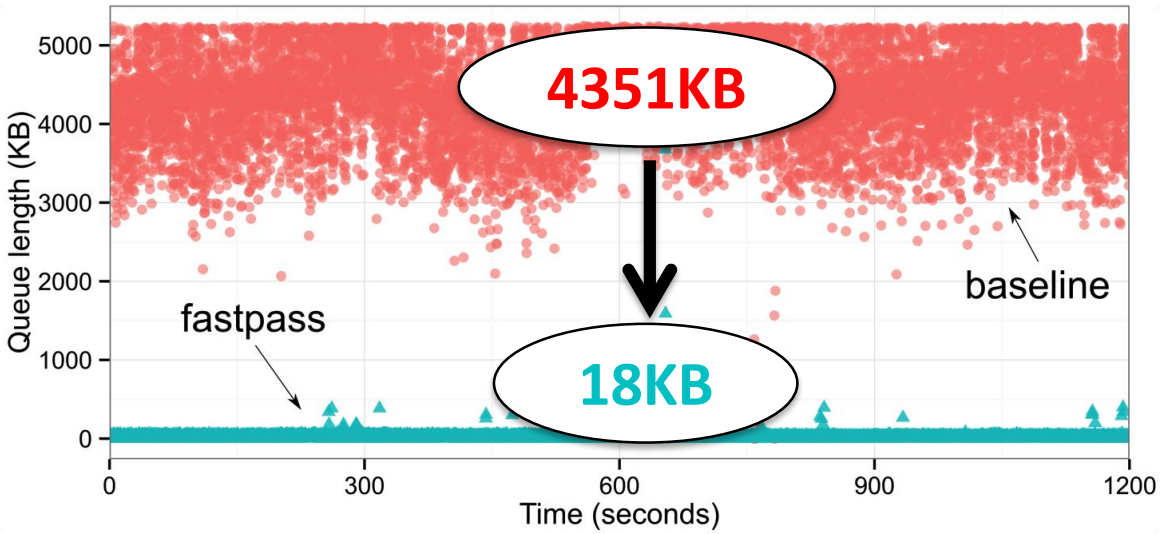
5 µs	A → Arbiter	"A has packet for B"
1-20 µs	Arbiter	timeslot allocation & path selection
15 µs	Arbiter → A	"@t=107: A → B through R1"
no queuing	A → B	sends data



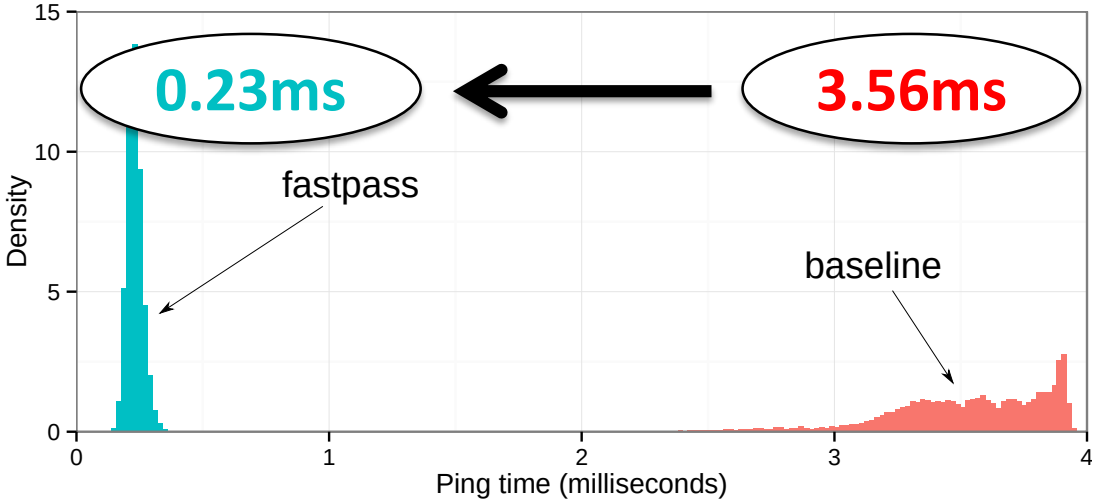
Timeslot allocation

Experiments@Facebook: Queues & delays





- **Software-only**
- **1.6% overhead**



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MIT invention to speed up data centers should cheer developers

Fastpass uses parallel processing to eliminate the need for complicated network queues, researchers say

Stephen Lawson (IDG News Service) on 19 July, 2014 06:23

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Viernes, 18 julio 2014

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Data Center ▸ Data Networking

Kill queues for fast data centres: MIT boffins

Arbitration for in-DC network traffic

Resources / IT Management /

This could be the data centre breakthrough network admins have craved

Experts at MIT have published a paper describing a "Fastpass" system that could eliminate queues that congest enterprise IT

By Vawn Himmelsbach / August 27, 2014 / 0 Comment

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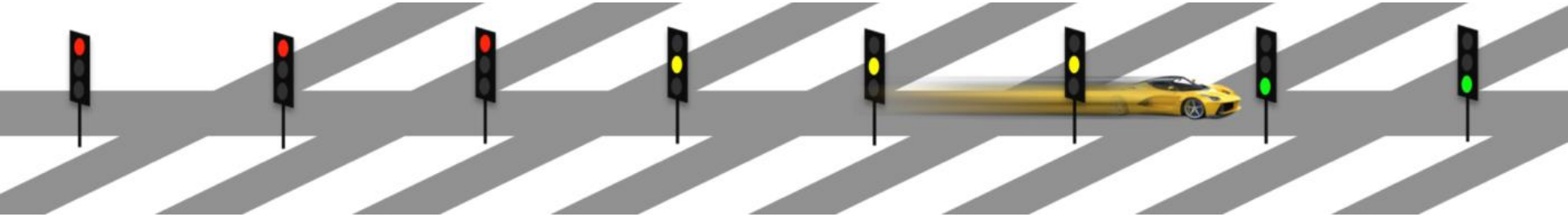
MIT, Facebook Create Low-Latency Fastpass TCP Replacement



Schedule the Datacenter Network

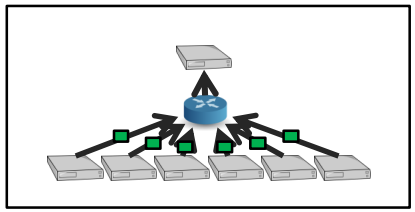
A: "Now I can see pictures of other's people's food and children so much more quickly... can't wait. >>"

B: "You forgot about [...] cats. I will say, faster pics of cats is probably worth some merit."

Lower User Service Time

Better Developer Productivity

Lower Infrastructure Cost



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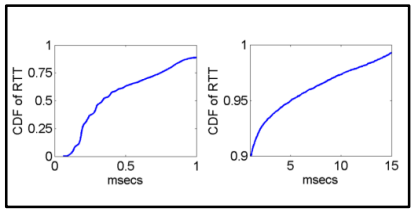

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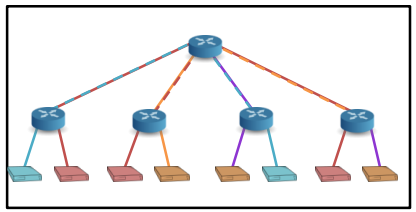
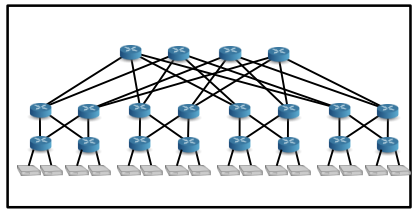
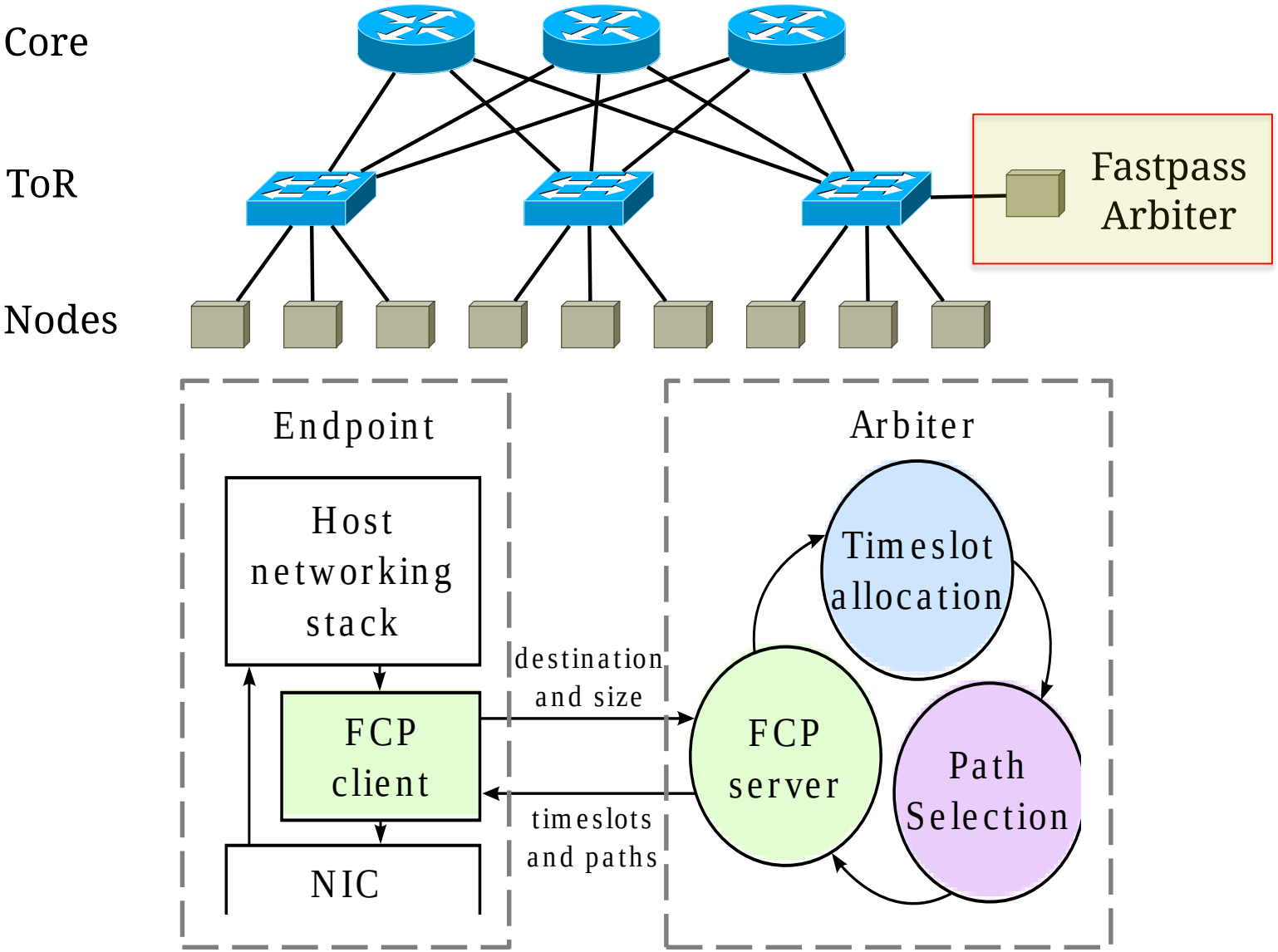


Multiple Objectives



Load Balancing

Background

- Networks & Mobile Systems group at CSAIL (nms.csail.mit.edu)
- Datacenter/cloud systems, mobile/sensor computing, Internet architecture
- Jonathan: PhD student near completion, previous industry experience
- Hari: multiple startups from projects – Cambridge Mobile Telematics, Meraki (Cisco), StreamBase (TIBCO), Sandburst (Broadcom)

Fastpass: Treat network as a BIG switch!