

Welcome!
(First) NSF AiTF
Workshop on Algorithms
for Software-Defined Networking

Michael Dinitz
JHU

Vyas Sekar
CMU

Context for this workshop

- Software-defined Networking taking off!
 - E.g., Google Software-defined WAN
 - E.g., AT&T Domain 2.0 initiative
- Exposes rich connection to many disciplines
 - Distributed Systems
 - Programming Languages
 - Formal Verifications
- Somewhat untapped area: Algorithms!

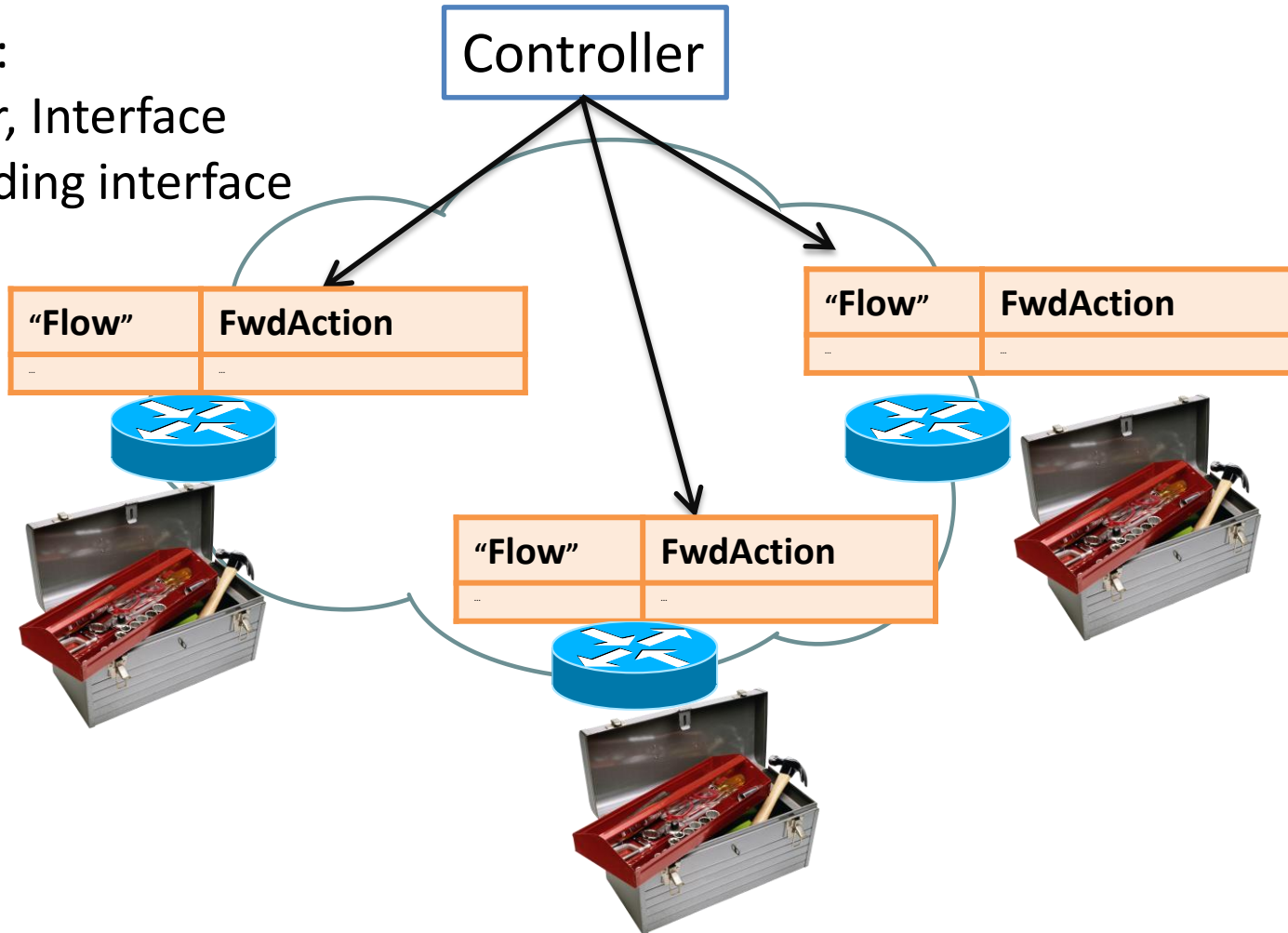
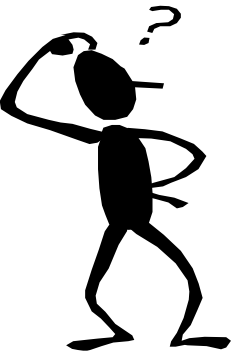
A 20000 feet view of Software-Defined Networking (SDN)

Centralized management + Open programmable APIs

OpenFlow:

Pkt header, Interface

→ Forwarding interface



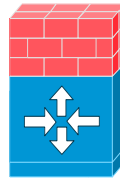
A 20000 feet view of Network Functions Virtualization (NFV)

Today: Standalone and Specialized

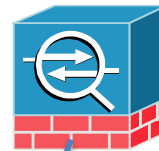
Proxy



Firewall



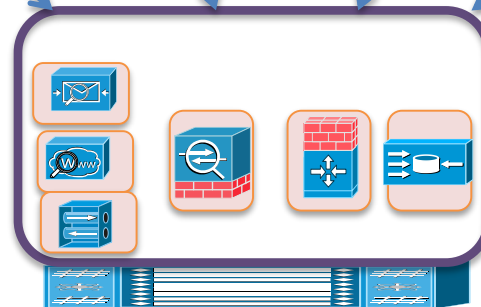
IDS/IPS



AppFilter



Decouple
Hardware and
Software



Commodity hardware

Rich/Exciting Problem Space

- Routing and Traffic Engineering
 - E.g., Fault correction, oblivious/robust routing
- Network Design
 - E.g., Datacenters, Tunnel config
- Managing Advanced Functions
 - E.g., Placement, Chaining, State Management
- Managing Forwarding Tables
 - E.g., Rule Compilation
- Monitoring
 - E.g., Sketching
- Correctness and Consistency
 - E.g., Updates, Failure handling
- Scheduling
 - E.g., congestion control, universal queuing
- ...

Workshop Goals

Bring together researchers working at the intersection of the theory and practice of networking

New opportunities and challenges to revisit classical algorithmic problems in networking in light of the new capabilities and deployment constraints entailed by SDN

Create new opportunities for interdisciplinary collaborations between the theoretical computer science and SDN communities

Concrete output: Open problems, ideas, new directions

Agenda

- 2 days
- Mix of short and long talks
- Please ask lots of questions!
- Plenty of time for discussions

Logistics

- Talks will be posted online
- Speakers:
 - Please email slides
 - Please sign video release
- Any questions/comments:
 - vsekar@andrew.cmu.edu
 - mdinitz@cs.jhu.edu

Many thanks for making this happen!

- NSF: Thyaga Nandagopal, Tracy Kimbrel
- DIMACS:
 - Rebecca Wright
 - Tami Carpenter, Linda Casals, Nicole Clark
- CMU: Toni Fox
- You!