Ethane
Taking Control of the Enterprise
SDN Seminar
“Eighty percent of IT budgets is used to maintain the status quo.”

“Most of network outages are caused by operators errors rather than equipment failure.”

Kerravala, Zeus
How to do better?

- proprietary middleboxes
- add functionality to existing networks
- new protocols, scripts, applications

Hide the complexity instead of reducing it!
The network should be governed by policies declared over highlevel names.
Policy should determine the path that packets follow.
The network should enforce a strong binding between a packet and its origin.
Ethane
Let’s look at it in more detail
Switches

- simpler than Ethernet
- keep track of flows in progress
Switches

- Flow Table and Flow Entries
  - managed by Controller
  - entries contain Header, Action, Per-Flow Data

- Local Switch Manager
  - secure channel
  - relays link status to Controller
Controller

- brain of the network
- replicated, distributed
- different components
Controller

- Registration
  - hosts, protocols, switches, users, ac's
  - LDAP / AD

- Authentication
  - MAC, SSL, Kerberos

- Tracking Bindings
  - describe policies in terms of users and hosts
Controller

- Namespace Interface
  - track bindings
  - interface for information

- Permission Check and Access Granting
  - policy check
  - route computation component
Controller

- Enforcing Resource Limits
  - restrict flow rate, flow setup
  - counter resource exhaustion attacks
  - limit on flow, port, user etc.
What is there more?

- Fault-Tolerance and Scalability
  - cold-standby
  - warm-standby
  - fully-replicated

- Link Failures
What is there not?

- Service discovery

- Application-layer traffic
  - proxy
  - tunneling
# Groups —
server = ["http_server","nfs_server"];  
private = ["desktops","laptops"];  
computers = ["private","server"];  
students = ["bob","bill","pete"];  

# Rules —
[(hsrc=in("server") ∧ (hdst=in("private"))) : deny;  
    # Do not allow phones and private computers to communicate  
[(hsrc=in("phones") ∧ (hdst=in("computers"))) : deny;  
[(hsrc=in("computers") ∧ (hdst=in("phones"))) : deny;  

Questions and Discussion