# Security Requirements for Software Defined Networks

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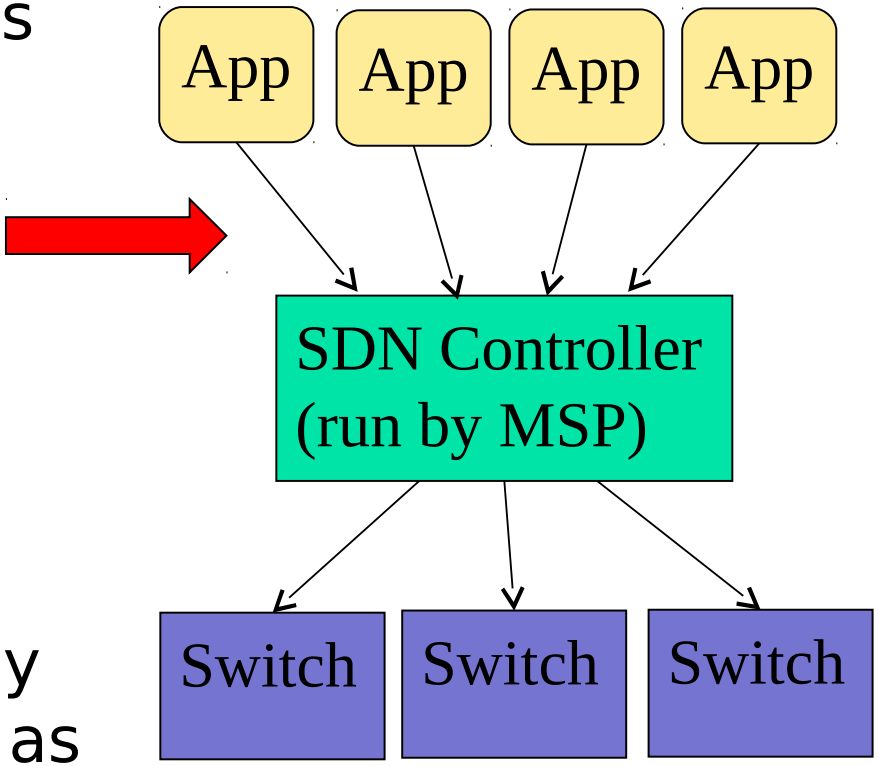
# SDN Security Requirements Draft

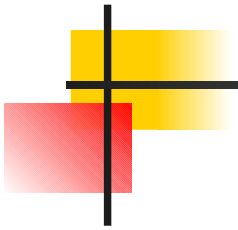
- Security Requirements in the SDN Model
  - http://tools.ietf.org/html/draft-hartman-sdnsec-requi
- Currently designed to cover part of SDN space. Proposal to expand to include I2RS

# Security Requirements for SDN

- Discusses requirements for an SDN protocol running between “applications” and an SDN controller
- Describes security requirements for three classes of applications
- Apps may not be run by the same organization as the Managed Service Provider (MSP)

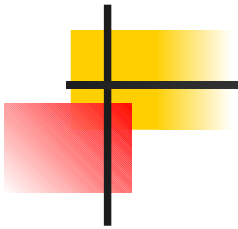


# Three Classes of Applications (1)



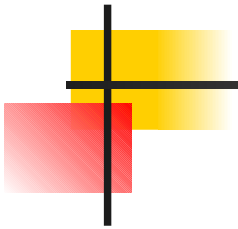
- Class 1: Network Sensitive Applications
- Applications that require particular network characteristics
  - Needs access to ports in particular VLAN
  - Requires specific path characteristics
    - Traffic stays within a specific jurisdiction
    - Traffic travels only over certain equipment
  - Wants to monitor costs of traffic/flows
  - May want to reject or accept certain flows

# Three Classes of Applications (2)



- Class 2: Services for the Network
- Application provides a service for the network
  - e.g. Firewall, content inspection or intrusion detection

# Three Classes of Applications (3)



- Class 3: Packaged Network Services
- Combines previous two classes
  - e.g. Application of Class 1 that wishes for all traffic to be sent through a border firewall service
- Application is requesting instantiation of another application as a virtual element in the network
- Permits abstraction and re-use of network applications

# Authentication & Authorization

- Need for authentication and authorization across multiple organizations

# Adapting to I2RS

- Also examine relationship between controller and managed device
- Remove references to Openflow
- Add assumptions about controller
- Add section on security reqs between controller and managed device

# Controller Assumptions

- Controller may not exist; the interesting question for security is whether multiple applications talk to an entity, not whether an entity is the managed device or some controller.
- Need to expand because of multiple I2RS deployments

# Questions

# Security Requirements (1)

- REQ1: Authentication is REQUIRED to the controller.  Authentication SHOULD support existing credentials that are likely to be used in the datacenter.
- REQ2: The interface to the SDN controller MUST support authorizing specific network resources to applications and manipulating the authorizations of applications.
- REQ3: The SDN controller MUST provide facilities to isolate one application from another.

# Security Requirements (2)

- REQ 4: The SDN controller interface MUST support a controller acting as a proxy on behalf of applications.
  - REQ 4a: The SDN interface SHOULD support a way of associating an audit ID or other tracking ID so that requests can be correlated with an original application when a proxy acts on behalf of an application.
- REQ 5: The SDN controller interface MUST provide mechanisms for operators and applications to enforce privacy.

# Security Requirements (3)

- REQ 6: The SDN controller interface MUST support delegating access to a subset of resources; as part of delegation new authorization and privacy constraints MAY be supplied. This supports the security needs of the debugging use case, aspects of the nested application use case, and facilitates other inter-organization uses.

# Nested Application Security (1)

- REQ N1: The SDN controller interface MUST support controlling authorization for what nested applications an outer application can nest.
- REQ N2: The controller MUST separate authorizations held by one instance of a nested application from authorizations help by other instances of the same nested application.

# Nested Application Security (2)

- REQ N3: The SDN controller interface SHOULD provide outer applications a way to learn a nested application's policy for sharing information between instances.
- REQ N4: Nested applications MUST be able to authenticate on behalf of a specific outer application.  This facilitates authorization, accounting and auditing.

# Nested Application Security (3)

- REQ N5: Nested applications MUST be able to specify privacy policy for what resources are visible to the outer application.
- REQ N6: Outer applications MUST be able to specify privacy policy and authorizations with regard to what outer resources the nested application can interact with.

# Questions? Feedback?

- Send questions of feedback to the draft authors
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- Or, discuss these drafts on saag@ietf.org