Implementing a mobility scenario using SDN and Ryu Framework

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Outline

Scenario Caracterization

- Proposed mobility scenario
- A stream video server
- Clients play the video streamed by the server
- Hosts can disconnect and connect from switches / access points

Scenario Diagram

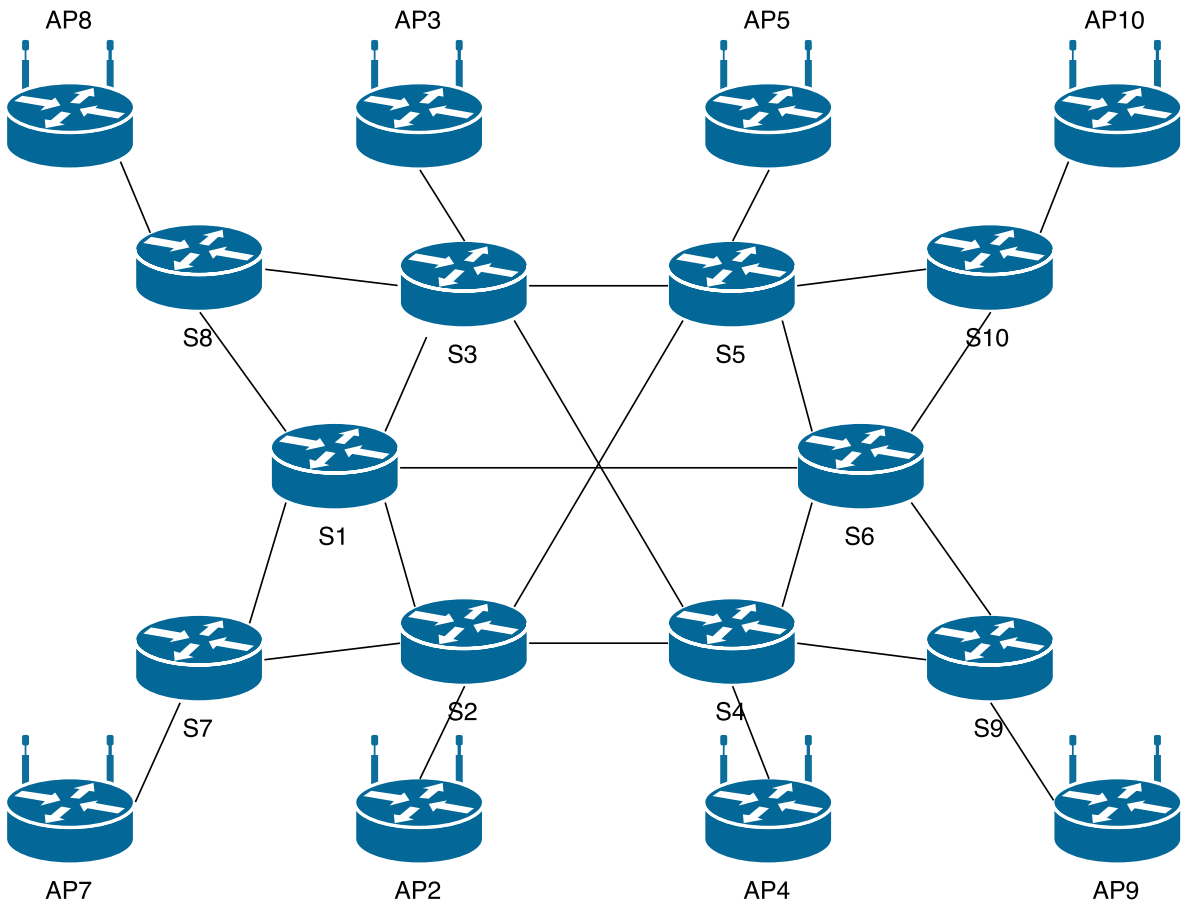

Figure: Overview of proposed scenario

Challenges in Scenario

- Link loop
- ARP messages propagation
- Mobility of nodes (dynamic behaviour)

Flow Diagram of Topology Discover

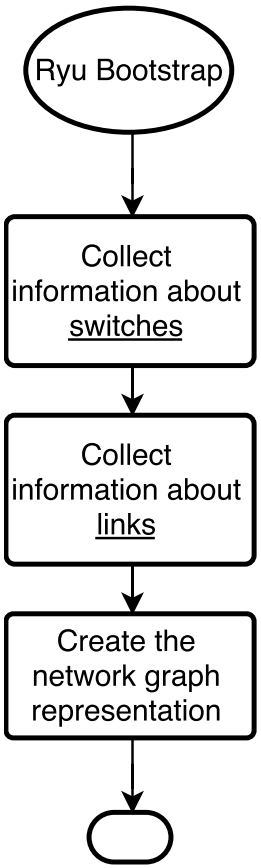

Figure: Topology discovering process

Flow Diagram of Packet In

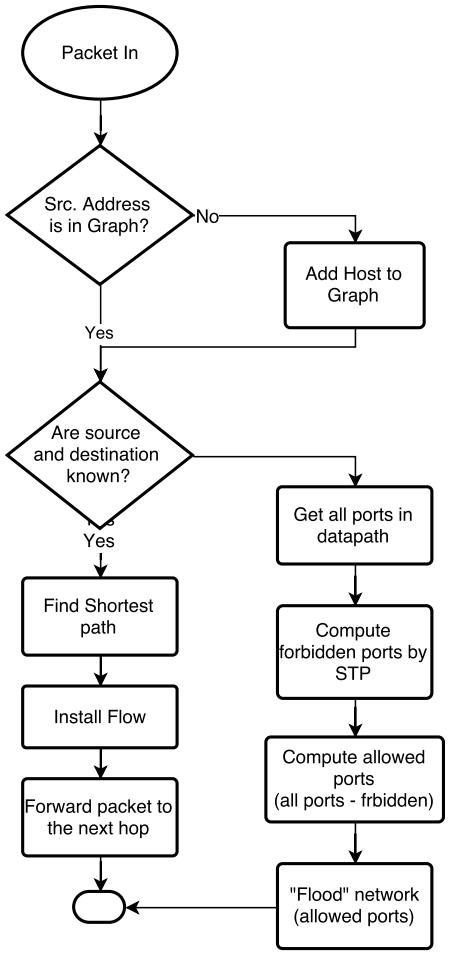

Figure: Packet-in process (for each datapath)

Flow Diagram of Port Status Change

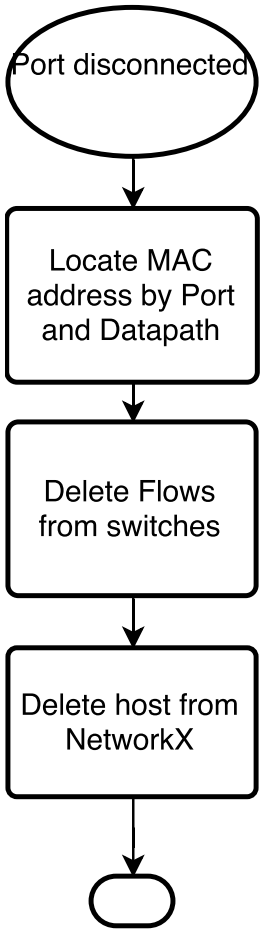

Figure: Port status change process

Tools and Libraries Employed

- "Mininet" used to simulate networks, hosts and topology
- Controller developed using Ryu Framework (v: 4.3)
- OpenFlow (v: 1.3.x) and Open vSwitch
- Video playback and metrics using VLC Media Player
- NetworkX library for graph manipulation

Modeling the interaction

First Principle: The cell state

Second Principle: The rules

How state changes are modeled?

State change dynamics

- Influence dynamics
  - Agents do not change their location but change their state
- Migration dynamics
  - Agent may move to another place in the world, depending on the current state of the neighborhood

Conclusion

- Mobility simulation using Mininet offer some challanges
- Open vSwitch is not fully compatible with OpenFlow 1.3
- Traditional Spanning Tree Protocol (IEEE 802.1D) is not suitable for high mobility scenario

References


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