University POLITEHNICA of Bucharest

Faculty of Automatic Control and Computers

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Graphical Packet Generator

Bachelor Project – July 2014

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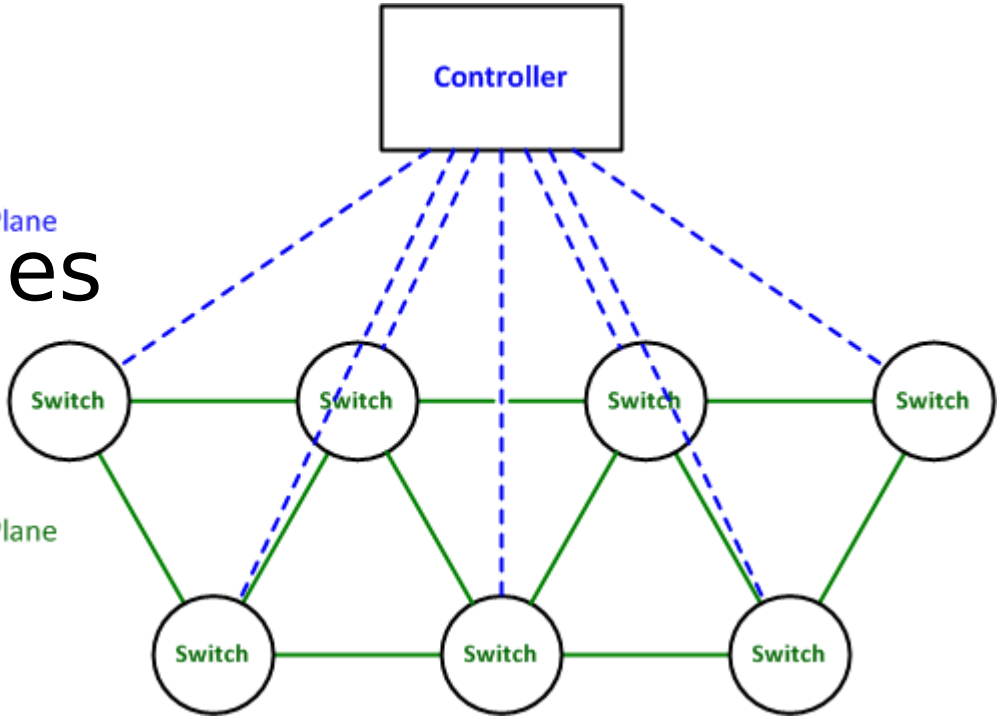
Thesis objective

- GPG application consistent with SDN principles, onePK testing
- automatically discover the topology
- packet generation inside a network from a central point

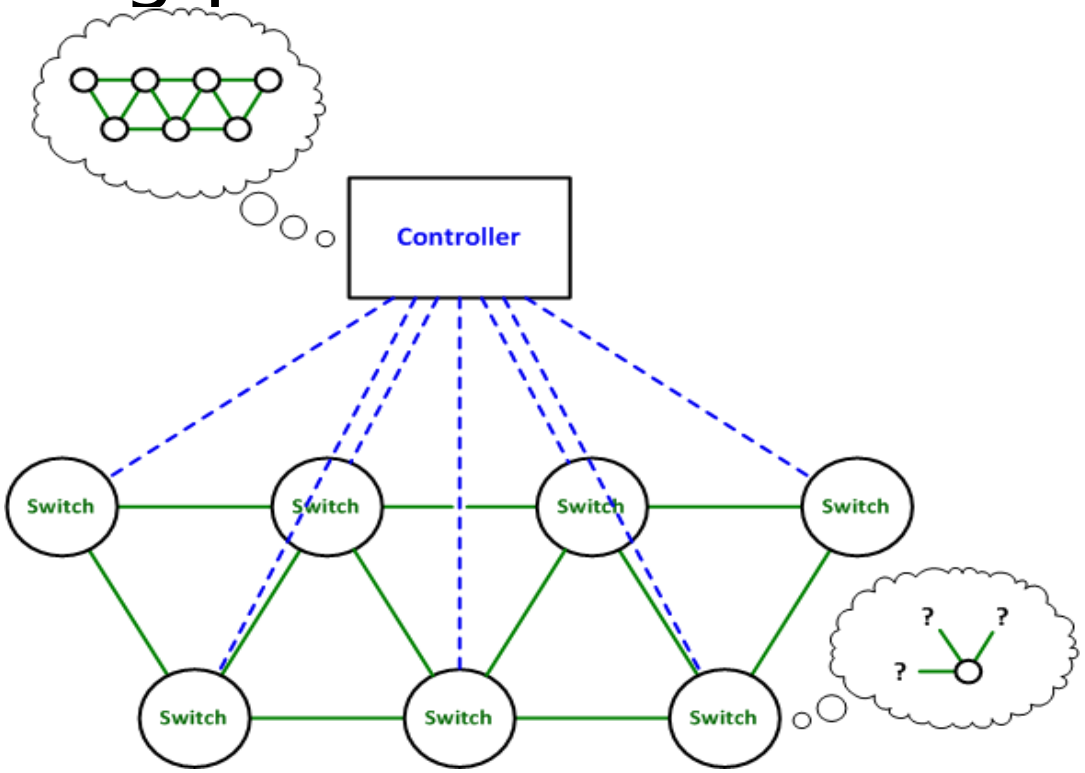
Classic Networking

- 3 conceptual planes of operation:
  - management plane
  - control plane
  - forwarding plane



Software Defined Networking

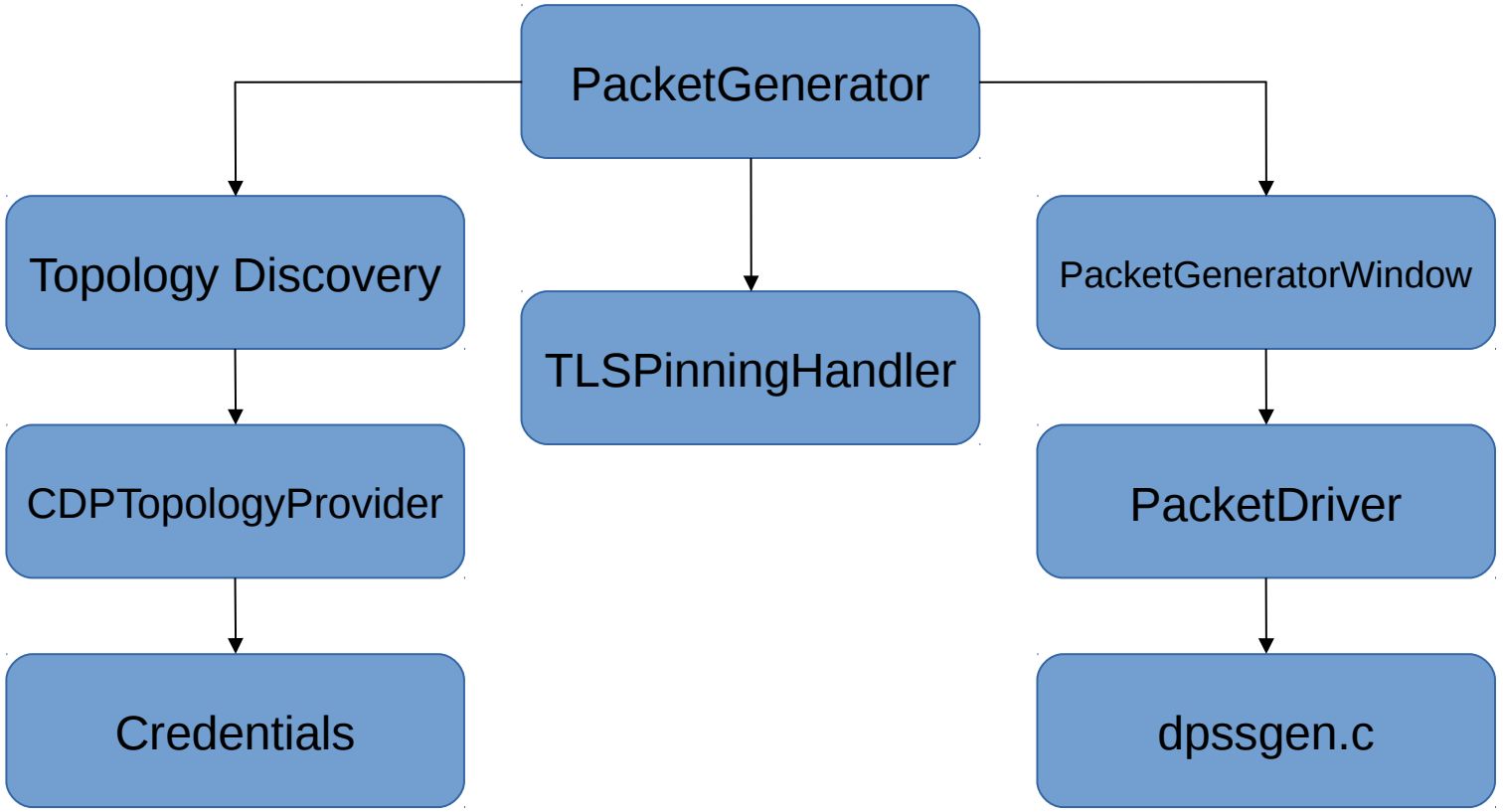
- separation of control and forwarding planes
- onePK



Motivation for GPG

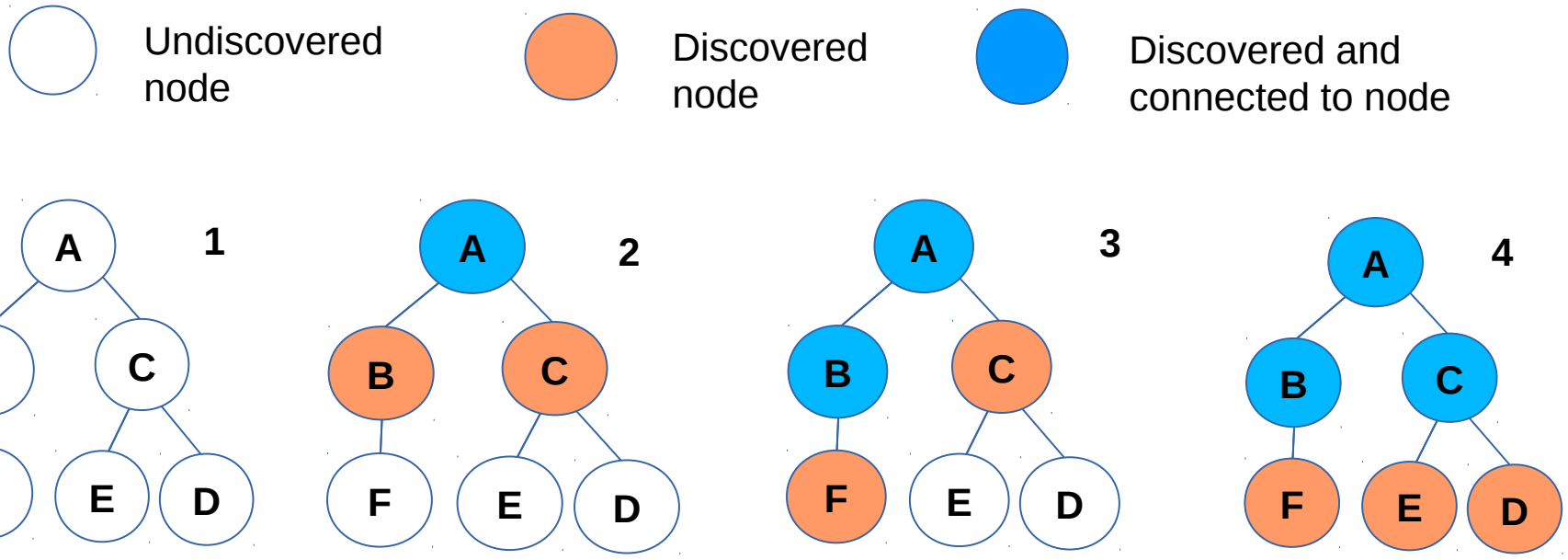
- eliminate box-by-box configuration
- gain end-to-end traffic control
- manage the network by policy, programmatically

GPG Design Overview



Automatic Topology Discovery

- Discovery Service Set – Topology Discovery
  - CDP protocol discovery



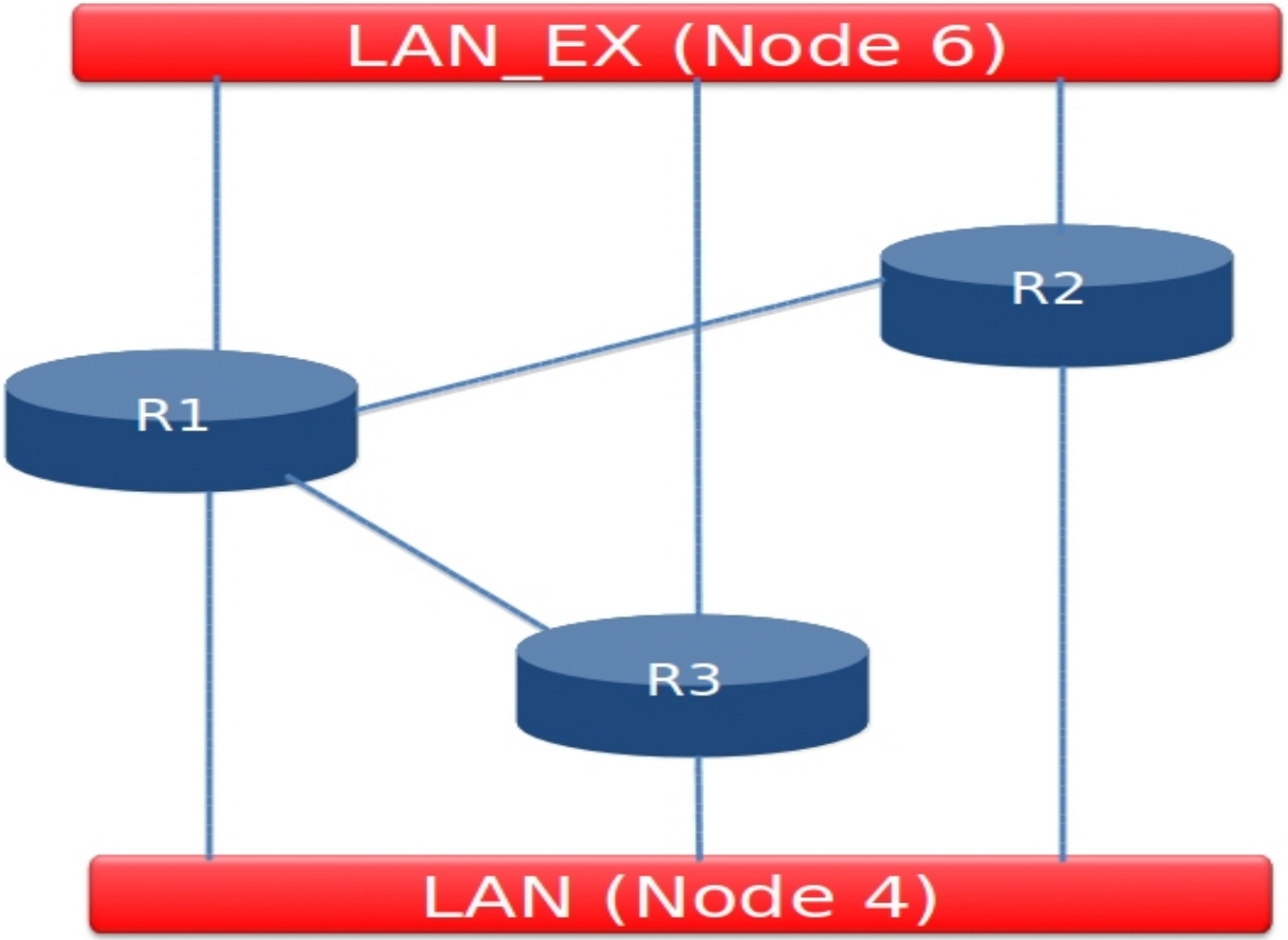
Packet Generation

- Data Path Service Set
- onep_dpss_inject_raw_packet:
  - next hop action – explicit next hop IP
  - divert action – original packet and location set at PREROUTING
  - divert action – original packet and location set at OUTPUT

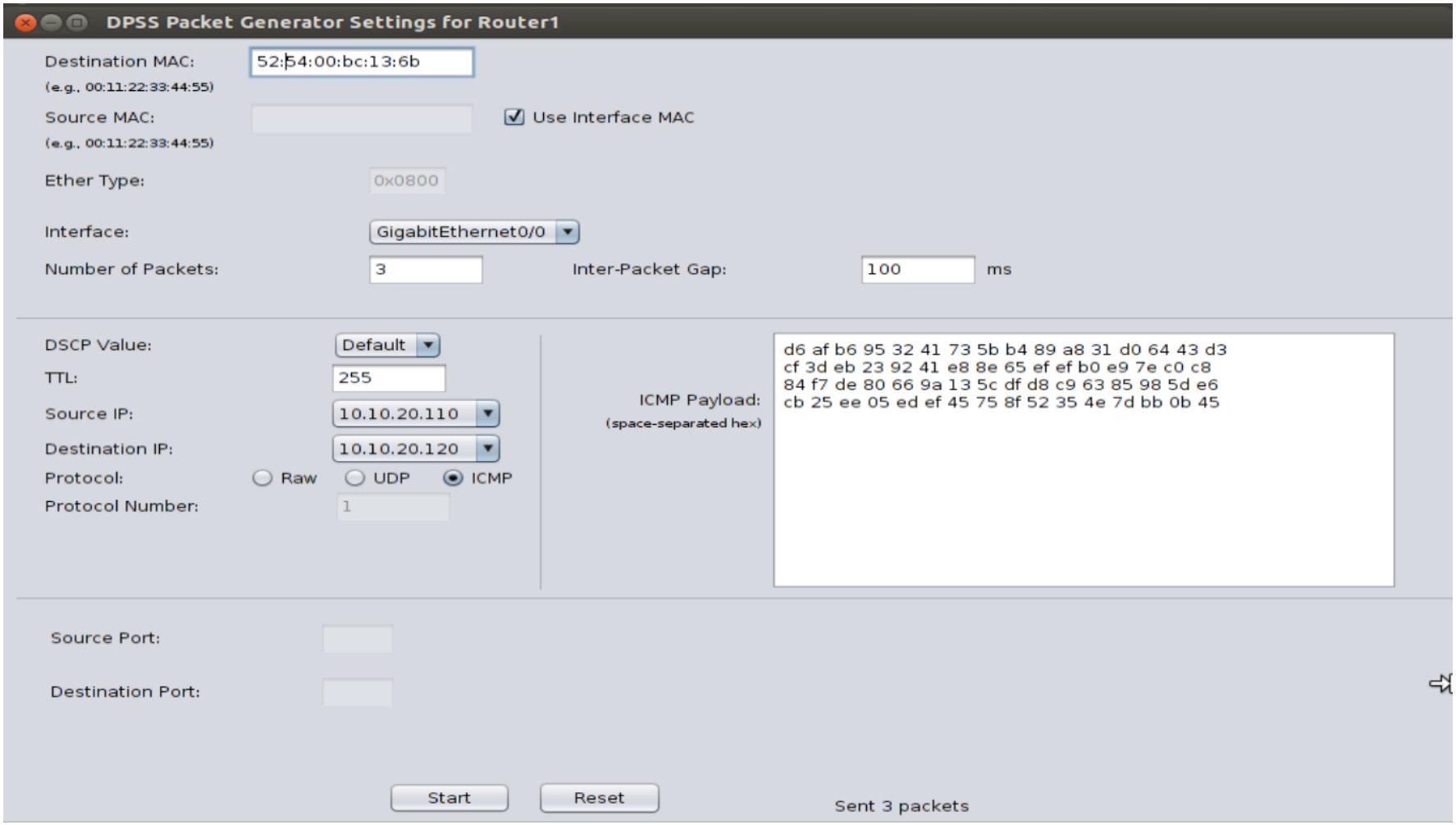
Implementation Results

- a common interface
- automatic topology discovery, consistent view of the network
- packet generation from a central point

Testing Topology



The Interface & Packet Generation



Testing Results & API Limits

- only level 2 protocols supported for network discovery
- no neat way to get the MAC address
- only level 2 packets can be created inside the API
- feedback for the generated flows

Future Work

- a more efficient way to discover the topology
- use of an external tool to create packets inside the API (libnet)

Conclusion

- Graphical Packet Generator
- automatic network discovery
- packet generation from a central point
- testing the application and the restrictions of the API