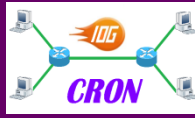# Federating CRON with ProtoGENI
Status Report

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CRON
Cyber-infrastructure for Reconfigurable Optical Networks

❑ Objective
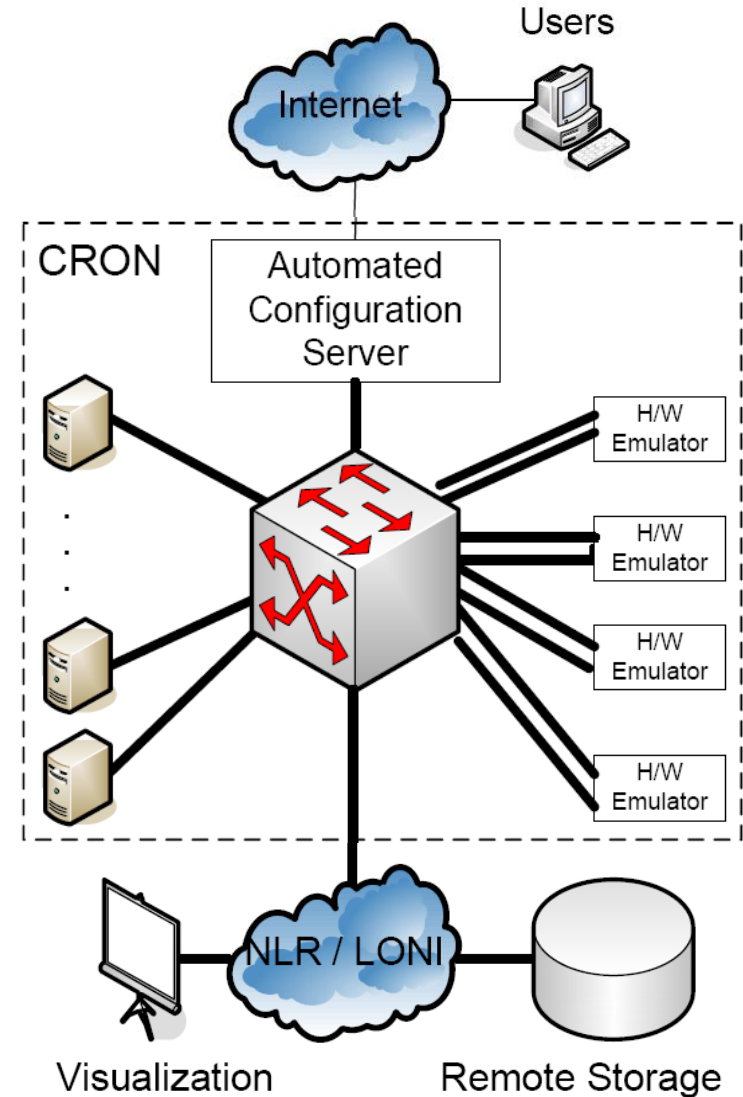 ➢ Developing virtual 10Gbps networking and high-end computing cyberinfrastructure

❑ Components
 ➢ Hardwares
  • Cisco N5000 switch
   – With 48 X 10Gbps ports
  • High-end servers with 10GE NICs
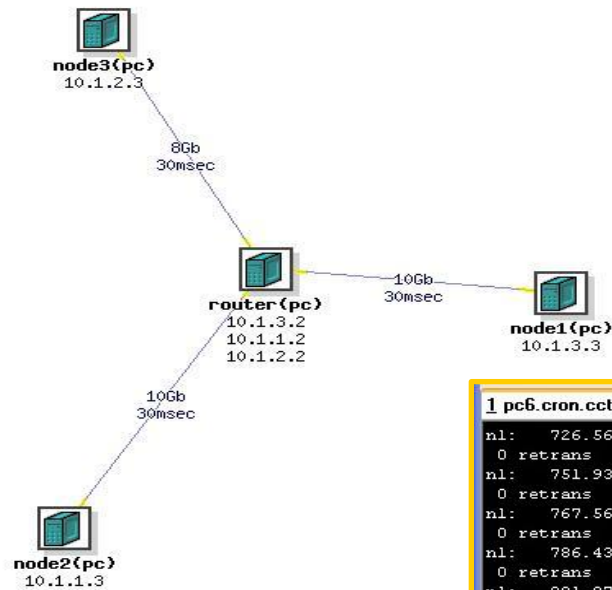 • 10Gbps hardware emulators
 ➢ Softwares
  • Emulab-based GUI interfaces
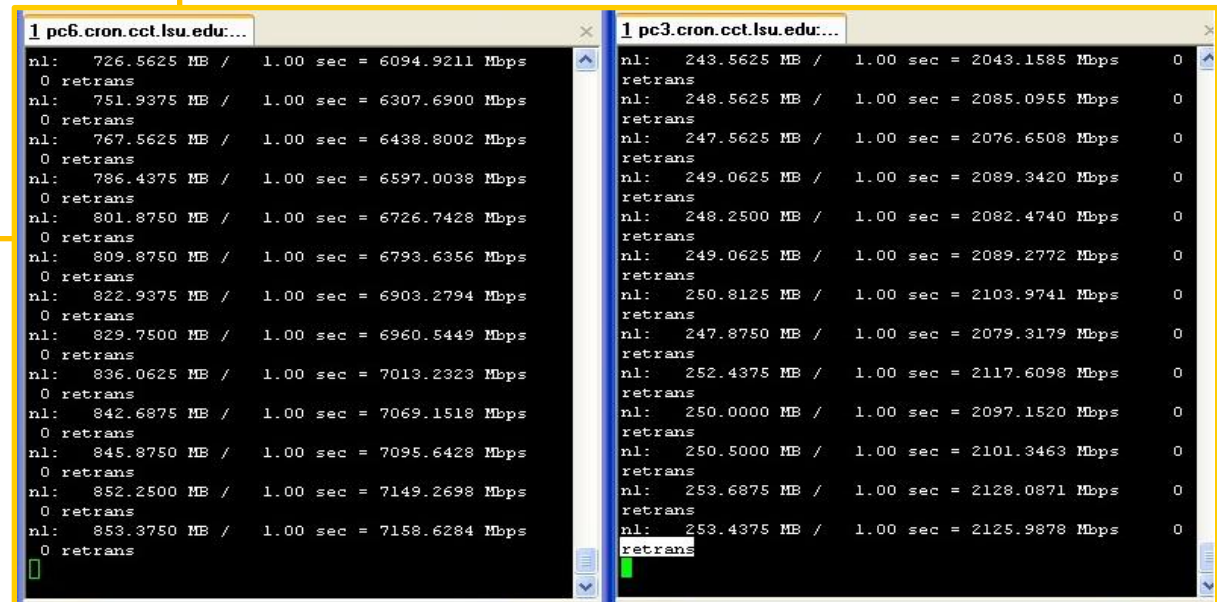 • 10Gbps software emulators
   – Dummynet

CRON Experiment

Visualization, NS File, and Details
Experiment CRONtest/Test

- ❑ Emulab GUI and interface
  - ➢ WWW.CRON.CCT.LSU.EDU
- ❑ Resource Allocation to GENI
  - ➢ Up to 20 Servers
    - Quad-cores with 10GE NIC
    - 64bit Ubuntu and 64bit FreeBSD
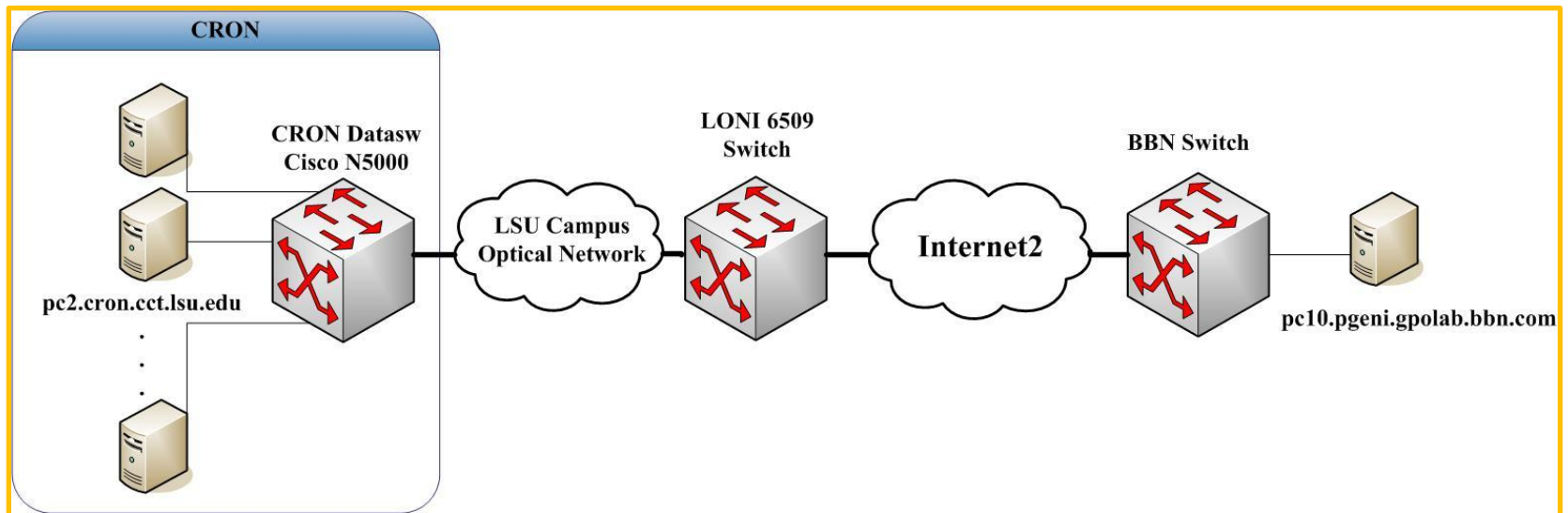- ❑ Measurement services available
  - ➢ OnTimeMeasure

❑ Network Connections

  ➢ Vlan through Internet2 ION between CRON and ProtoGENI@BBN

❑ Emulab-based Component Manager & Slice Authority

  ➢ Receive user credentials

  ➢ Register a slice at the Clearinghouse@Utah

❑ Resource reservation between component managers

  ➢ Creating slivers

  ➢ Exchanging Rspec

Currently, GRE tunnel is used to setup a link between two CMs, but it can only support traffic through Internet:

❑ **Rspec:**

<rspec xmlns="http://www.protogeni.net/resources/rspec/0.1"

……

<link virtual_id="link0"

    link_type="tunnel">

  <interface_ref virtual_node_id="pc10"

        virtual_interface_id="control"
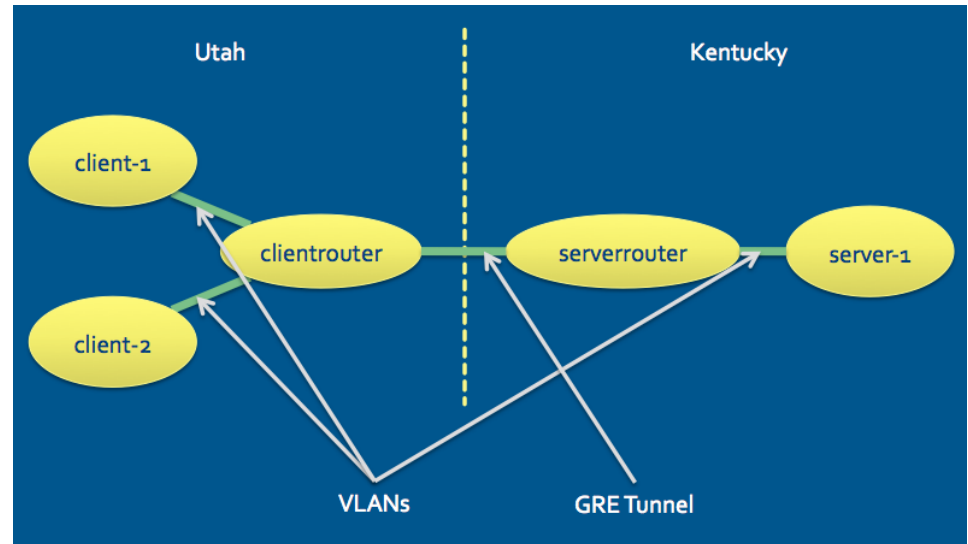
        tunnel_ip="192.168.0.1" />

  <interface_ref virtual_node_id="pc4"

        virtual_interface_id="control"

        tunnel_ip="192.168.0.2" />

 </link>

</rspec>

❑ **NS file:**

tb-set-link-encap $routerlink gre

Add layer2 tunnel to support Internet2 links between different CMs.
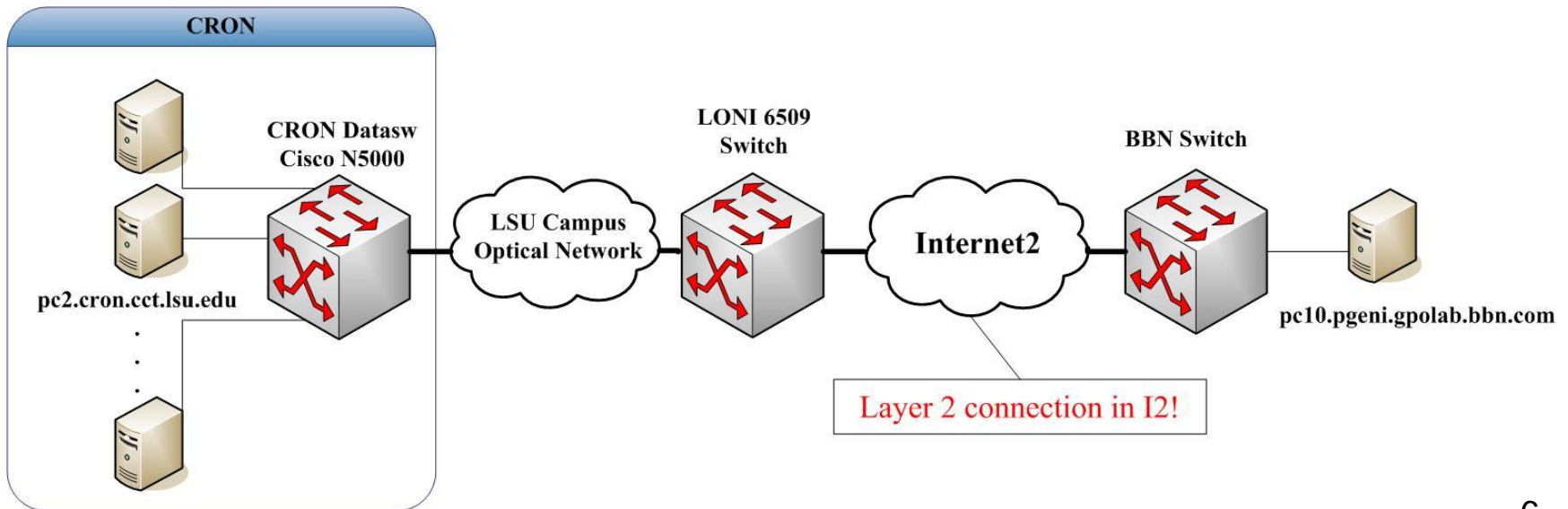Suppose to support the Internet2 ION circuit creation and vlan setup at both sides of CMs.

```
<rspec…
…
<link virtual_id="link0"
      link_type="layer2_tunnel">
…
</rspec>
```
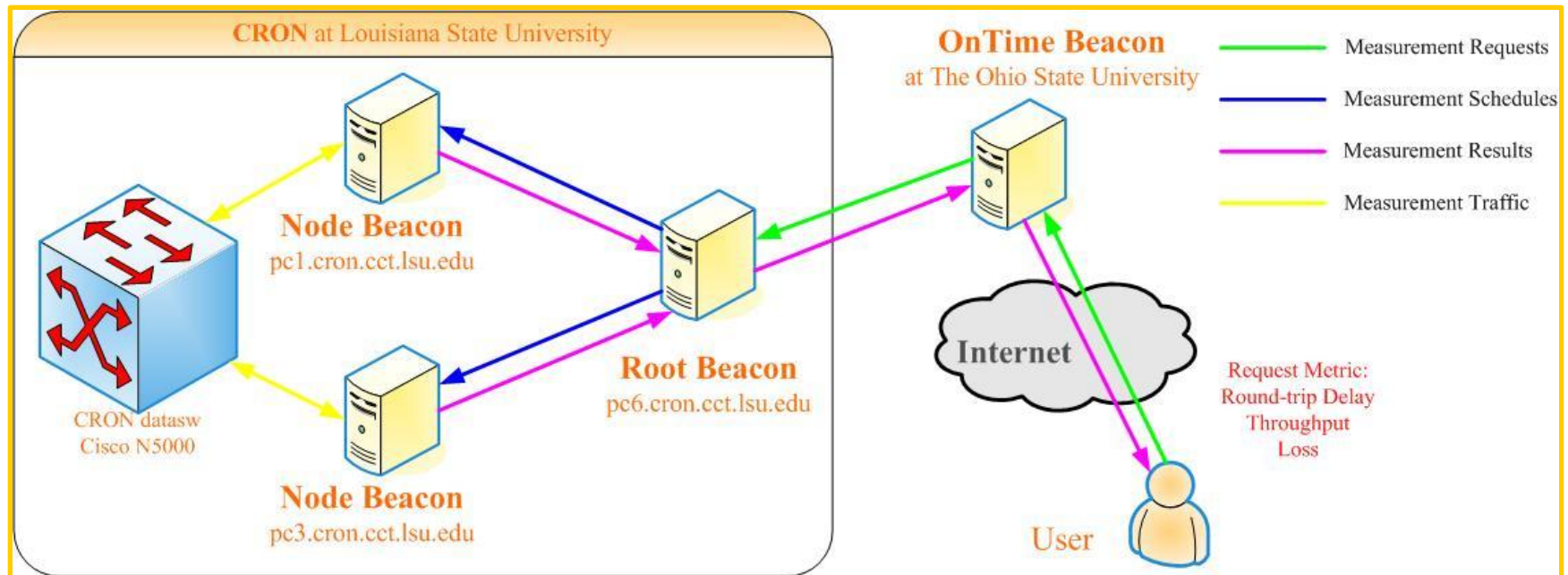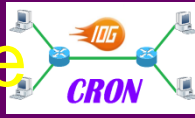

Layer 2 connection in I2!

❑ Procedure

➢ Install a beacon at each node after loading OS image

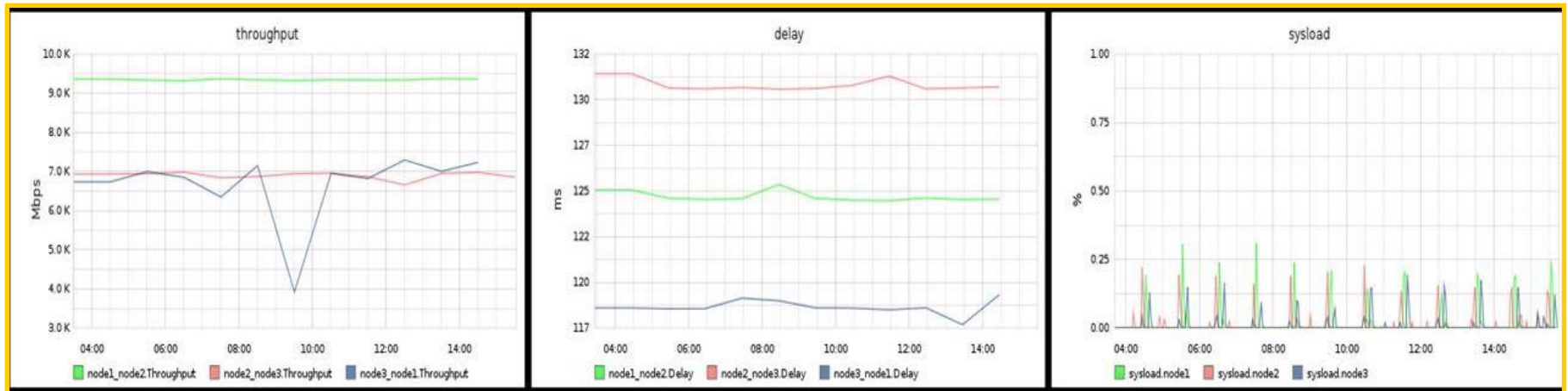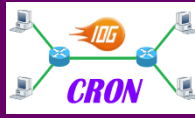➢ Collect measurement date from each beacon and send to OnTime Beacon at OSU

❑ Measurement data

    ❑ Throughput, delay, jitter, etc., from each link

    ❑ CPU load from each node

Spiral 3

❑ Aggregating with other control framework groups (e.g., PlanetLab) with GENI API

❑ Aggregating with other monitoring services, such as perfSONAR and GMOC

❑ Integrating an openflow switch an a virtual router over 10Gbps NetFPGA board

❑ Workshop and demos about CRON federation