Monitoring at RNP: Small, Cheap Computers in Network Operations

Session: Applications Of Small, Cheap Computers In Network Operations

2014 Technology Exchange
October 26–30, 2014
Indianapolis, IN
“The correct operation and performance of computer networks are fundamental for efficiency of communications and applications”
“With technologies like perfSONAR embedded in small, cheap devices, it became affordable to offer end to end performance monitoring between networks in large scale”
MonIPÊ: RNP’s monitoring service

Service goals

- Network "last mile" and end to end multidomain performance accurate measurement
  - Last mile, NREN backbone domain, between NRENs
- Effective, low cost, instrumentation for end users
- Storage / retrieval of periodic measurements
  - On demand, defined period,
- Distributed, web-based graphical UI portal
  - Configurations, measurements definitions and scheduling, results visualizations
MonIPÊ Components

Interface (GUI)
- Measurement Portal

Infrastructure
- Measurement Points (MPs)
  - VMs + Low-cost kits: up to ~1Gbps
  - Dedicated servers: up to ~10Gbps

Virtualization
- Low-cost MPs
- Kit: 1 Mini PC or 2 SBCs* + GPS Adafruit
  - 1st Gen. Raspberry Pi + CuBox
  - CPU: ARM, RAM: 512MB, NIC: 1GbE
  - 2nd Gen. Mini PC: Blue Appliance 847
    - CPU: Intel Dual Core 847 | RAM: 2G | NIC: 2x 1GbE

10Gbps MP
- 1st Gen.: Dell R620 - CPU: Intel Xeon 2GHz
  - RAM: 16GB, HDD: 2x 500GB (RAID-1),
  - NIC: 2x 10GbE + 2x 1GbE (BCM57800)
## Low-cost Kits: versions 1.0 and 2.0

### 1st Generation Hardware (2013) - Total approximate cost: \(~$805.00\) (~R$ 2,000.00)

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raspberry Pi</td>
<td>One Way Delay</td>
</tr>
<tr>
<td>Adafruit GPS + antenna</td>
<td>Clock synchronization</td>
</tr>
<tr>
<td>CuBox Pro</td>
<td>TCP/UDP Throughput</td>
</tr>
</tbody>
</table>

### 2nd Generation Hardware (2014) - Total approximate cost: \(~$482.50\) (~R$ 1,200.00)

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Appliance 847</td>
<td>Throughput + latency</td>
</tr>
<tr>
<td>Adafruit GPS + antenna</td>
<td>Sincronização dos relógios</td>
</tr>
</tbody>
</table>

40% reduction in total cost between 1st and 2nd version kits

MonIPE Service: results and 2014 roadmap

- Prototypes built and tested:
  - 2013: up to 1Gbps | 2014: up to 10Gbps
- Test pilot with 4 client institutions (late 2013)
- Production service being deployed in RNP backbone
- Deployment planned:
  - VM MPs (in all PoPs)
  - 10G MPs (in 11 PoPs)
  - Low cost kits: ~100 client institutions
- Service in production measuring last mile as a value added service (late 2014)
- Permanent measurements with NREN in Latam., North America and Europe
For more information

(Note the content below is in Brazilian Portuguese language. The links point to automatic translated versions)

MonIPE

- Service Wiki: http://goo.gl/5teC6y
- Specifications: http://goo.gl/xbYHuD
- Low-cost Kit Installation Guides:
  - Generation 1: http://goo.gl/HAb9H6
  - Generation 2: http://goo.gl/zEWlzf
- Technical platforms comparison: http://goo.gl/m38E3n

User list: monipe@listas.rnp.br
Thank You!

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