Does Anybody Really Need Open Routers?

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Good News and Bad News

Good news – good hardware is available

» ATCA has made world-class router hardware available
  • can buy all the parts needed for 120 Gb/s router today
  • sure, the parts cost $150K but commercial routers in this class aren’t cheap either

» tools for NP-based forwarding engines are very good, making software development straightforward

Bad news – it takes software too

» nobody wants them badly enough to invest effort
» system vendors definitely don’t want them
» research community would like them, but not badly enough to learn to program NPs
» network operators would like them, but not if they have to pay for open software development
Shifting the Playing Field

- IP ossification is not a technical problem
  » >10,000 ISPs with competing interests who must cooperate to enable change

- Overlay approach offers only credible way to overcome IP limitations
  » solid commercial examples of successful use
  » single organization can make change happen

- To enable rapid deployment of new overlays, need commercial overlay hosting services
  » allows small organization with bright idea to deploy service globally without huge infrastructure investments
  » Planetlab has shown us the potential
  » need more capable platforms that can handle internet-scale traffic with router-like performance
Overlay Hosting Service

- Flexible platforms shared by multiple overlays
- Provisioned backbone, internet for access
Overlay Hosting Platform

- Processing Engines (PEs) implement overlay nodes
  - GPE – conventional server blade
  - NPE – network processor blade
    - nearly 4 Mp/s per NP vs 50 Kp/s
    - 100 μs latency vs. 1-300 ms
  - shared or dedicated
- IO Cards terminate external links, mux/demux streams
- Shared PEs managed by *substrate*
- Dedicated PEs may be fully controlled by overlay
  - switch and IO Cards provide protection and isolation
- PEs in larger overlay nodes linked by logical switch
  - allows scaling up for higher throughput
Current Development Platform

- Scale up using 14 slot chassis
- Multi-chassis configurations also possible
ATCA Boards

- **Intel server blades**
  - for CP and GPE
  - dual Xeons (2 GHz)
  - 4x1GbE
  - on-board disk
  - Advanced Mezzanine Card slot

- **Radisys NP blades**
  - for LC and NPE
  - dual IXP 2850 NPs
    - 3xRDRAM
    - 4xSRAM
    - shared TCAM
  - 2x10GbE to backplane
  - 10x1GbE external IO (or 1x10GbE)

- **Radisys switch blade**
  - up to 16 slot chassis
  - 10 GbE fabric switch
  - 1 GbE control switch
  - full VLAN support

- **Scaling up**
  - 5x10 GbE to front
  - 2 more to back
## What You Need to Build Your Own

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Supplier</th>
<th>Model</th>
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<tbody>
<tr>
<td>1</td>
<td>Dual Network Processor Module with IO</td>
<td>Radisys</td>
<td>A7K-PPM10-CFG002</td>
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<tr>
<td>2</td>
<td>Dual Network Processor Module</td>
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<td>A7010-BASE-2855</td>
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<td>2</td>
<td>18 MB IDT TCAM Module</td>
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<td>A7010-TCAM-01-R</td>
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<td>3</td>
<td>10 Gb/s Fabric Interface Card</td>
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<td>A7010-FIC-2X10G</td>
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<tr>
<td>1</td>
<td>10 GE/1GE Switch &amp; Control Module</td>
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<td>A2210-SWH-CFG-01</td>
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<td>1</td>
<td>RTM with extra IO ports</td>
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<td>A5010-SPM-01</td>
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<tr>
<td>5</td>
<td>1GE plugin modules (4 per kit)</td>
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<td>A2K-SFP-C</td>
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<td>2</td>
<td>Server blade with 2 dual-core Xeon processors</td>
<td>Intel</td>
<td>MPCBL004N01Q</td>
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<td>Zephyr 6 Slot ATCA Shelf</td>
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<td>Unipower</td>
<td>TPCPR1U3B</td>
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<td>TPCP7000</td>
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