

New Node Types

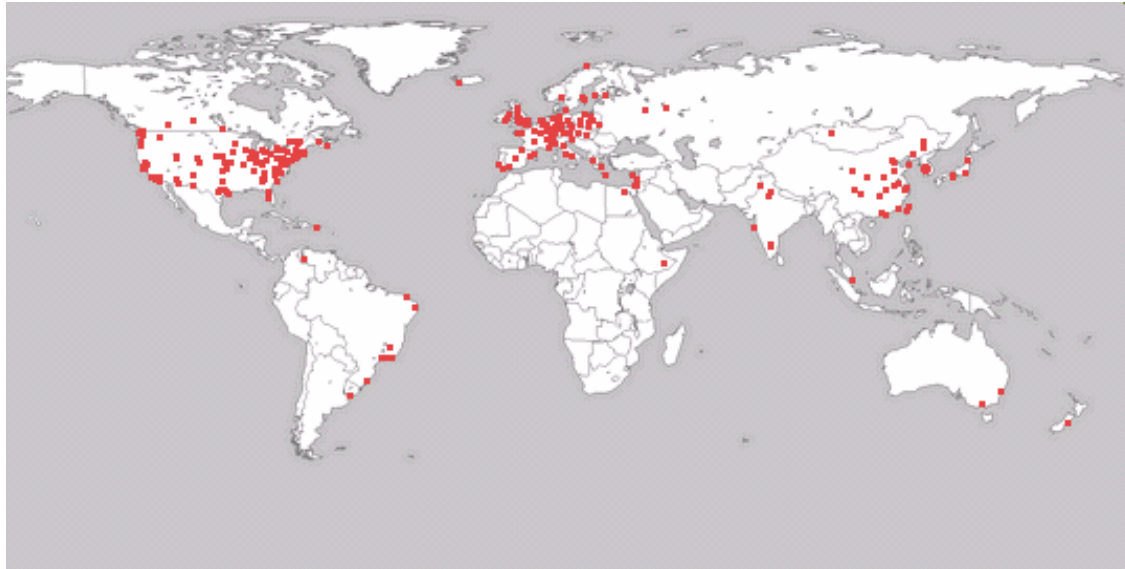
Marc E. Fiuczynski

PlanetLab Developer's Meeting

May 13-14, 2008

Princeton, NJ

PlanetLab



- 800+ servers spanning 400+ sites and 40+ countries
- Intel x86z
- 1+GB RAM
- 100+GB Disk
- 1 Ethernet NIC
- Remote Management



At least 2 directions for new nodes types

- Scale up & down
- Diversify network hardware
 - Internal devices (PCI, ...)
 - External devices

Scale UP & DOWN

- Intel x86
 - 1+GB (flat) RAM
 - 100+GB Disk
 - 1 Ethernet Nic
 - x86_64, i586, non-x86?
 - NUMA, <100MB RAM
 - <1GB disk
 - Multi-homed Ethernet
non-802.3
- How to capture (and expose) configuration diversity?
 - Rspec definition of the node's hardware?
 - Bootmanager + BootImage changes?
 - NodeGroup Configuration? BootstrapFS? VserverRef?

Diversify Attached Network Hardware



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NetFPGA



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Network Processor
IXP



+



Openflow
switch



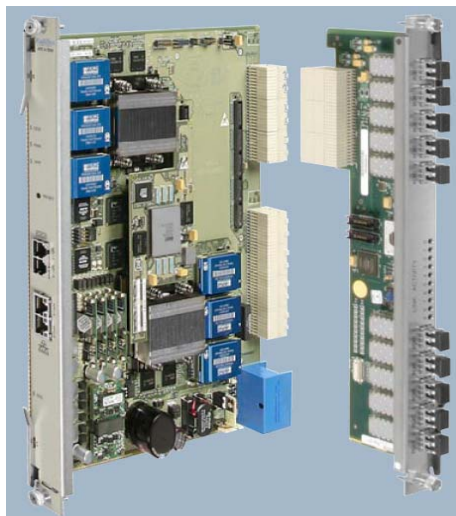
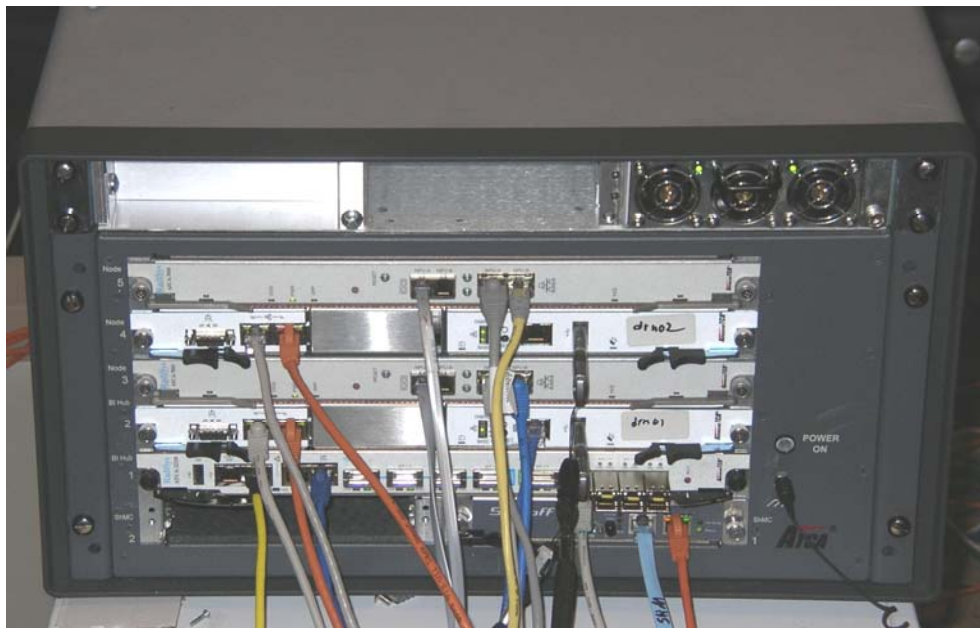
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Anagran
flowrouter

WUSTL PlanetLab SuperCharged Node

- Network Processor blades
 - dual IXP 2850 NPs
 - 3xRDRAM, 3xSRAM, TCAM
 - dual 10GE interfaces
 - 10x1GE IO interfaces
- General purpose blades
 - dual Xeons, 4xGigE, disk
- 10 Gb/s Ethernet switch
 - VLANs for traffic isolation



“Edge” Router

Home



or



or



freebox

Neighborhood/
Community



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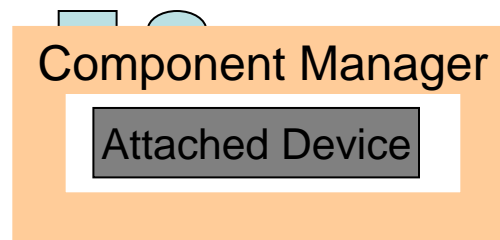
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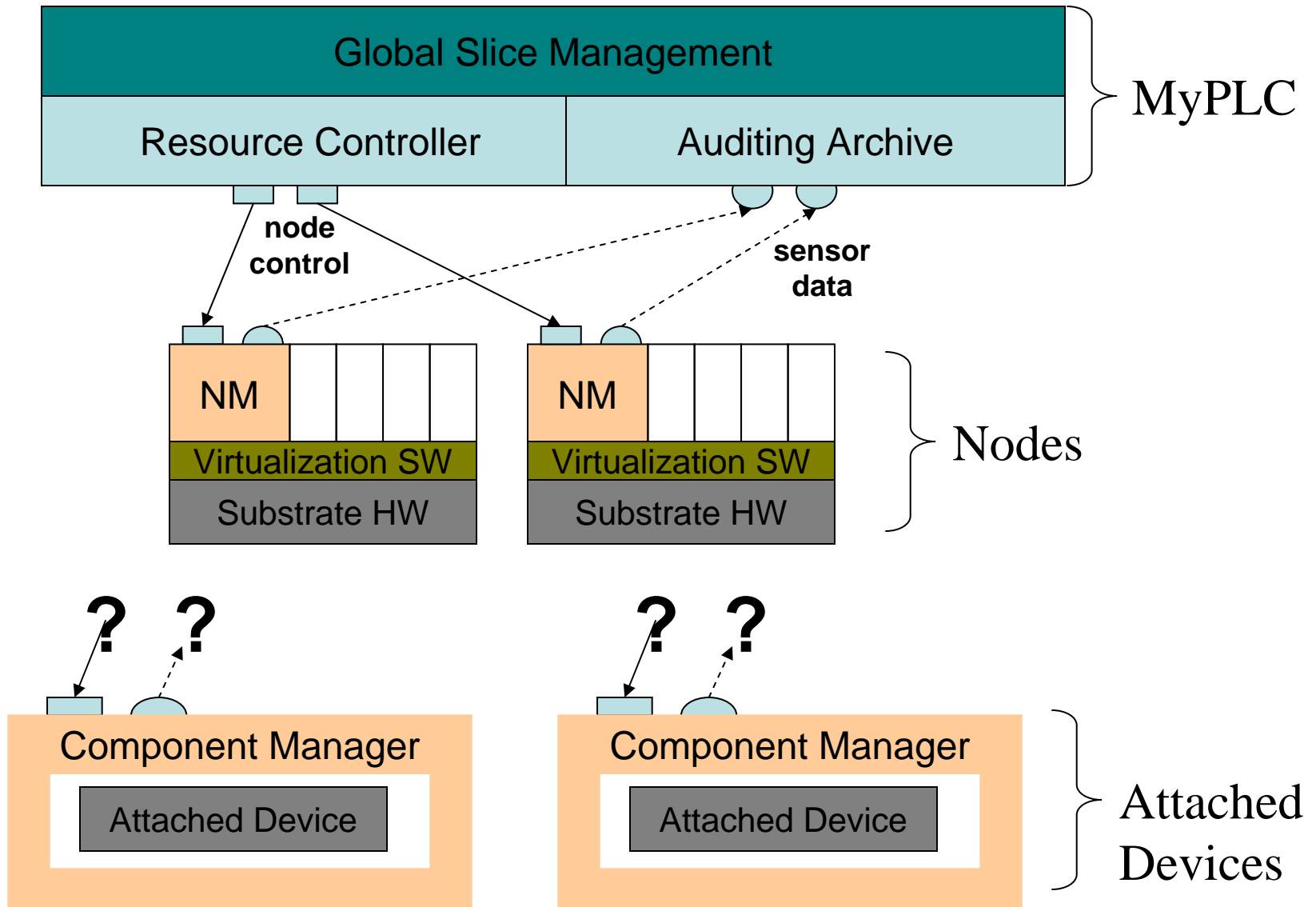
wifi mesh

Diversify Attached Network Hardware

- Intel x86
 - 1+GB (flat) RAM
 - 100+GB Disk
 - 1 Ethernet NIC
 - x86_64, i586, non-x86?
 - NUMA, <100MB RAM
 - <100MB disk, flash
 - Multi-homed
 - network accelerators
 - “attached” devices
- How to capture (and expose) configuration diversity?
 - How to bootstrap, virtualize, manage, and monitor devices?



PlanetLab Management Architecture



How to...

- Capture (and expose) configuration diversity?
 - Multiple networks, non-802.3, ...
- Bootstrap (bootmanager)
 - open box, black box (firmware blob), ...
- Manage (component manager)
 - allocate resources,
- Monitor
 - availability, accountability, ...
- Virtualize
 - Wifi, mesh, netfpga, ...
- Scale (federate?)