

Bifrost/Linux Introduction

KTH/CSD course kick-off
Fall 2013

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What is Bifrost/Linux?

Small Linux suited for USB

For infrastructure

For research & education

Name of human network and collaboration

Why Linux?

What about Red Hat, Debian or Ubuntu etc?

Consider Desktop, Server, Router

For who?

Networking people

Needing a small flexible distro

Research & Education

Objectives infrastructure?

Hardware “selection” – Crucial

Software “selection” - Crucial

Testing - Crucial

Bug Fixes/Support Crucial

Development - Crucial

Basic functions?

Routing

Firewalling

Login services

Traffic logging

Gateways etc

Virtualization and/or Namespaces (New)

Ipv4, ipv6

Environmental monitoring, data collection,
WSN

Unix/Linux command line interface (CLI)

Typical access via ssh

Example use



Router upgrade in Nata/Serengit spring 2012

Routing

Routing uses tested versions of quagga
Bgp, OSPF both Ipv4, ipv6
Cisco API

Of course other software can be used
BIRD , XORP etc

Test with BFD. No feedback yet.

R & D related to Bifrost/Linux

Close collaboration with Linux networking
Developers and networking industry.

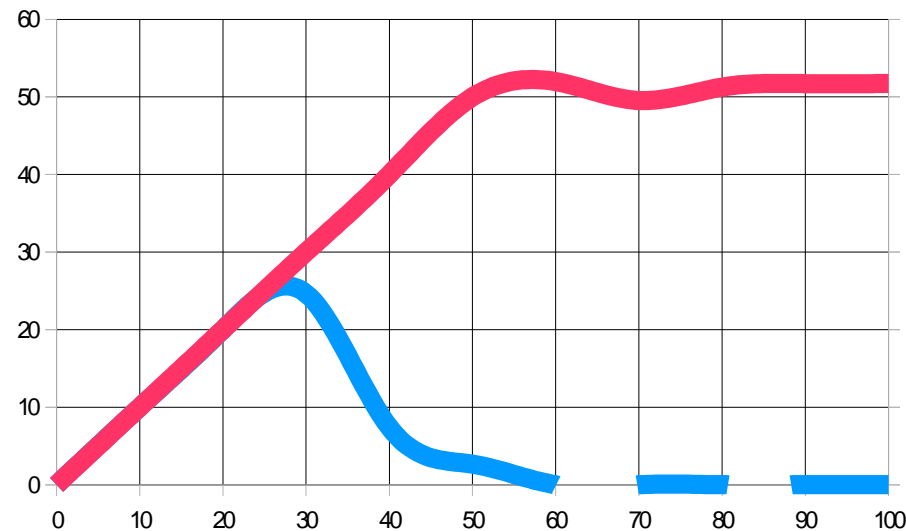
- NAPI (3 years) now in most network drivers
- Pktgen testing in linux,
- fib_trie, (routing algo) Intel Academic Award.
- routing stats to monitor and understand Network Etc, etc

Also Zebra/Quagga routing daemon work,
MBGP, IRDP, PIM-SM etc

Overall Effect

- Inelegant handling of heavy net loads
 - System collapse
- Scalabiity affected
 - System and number of NICS
 - A single hogger netdev can bring the system to its knees and deny service to others

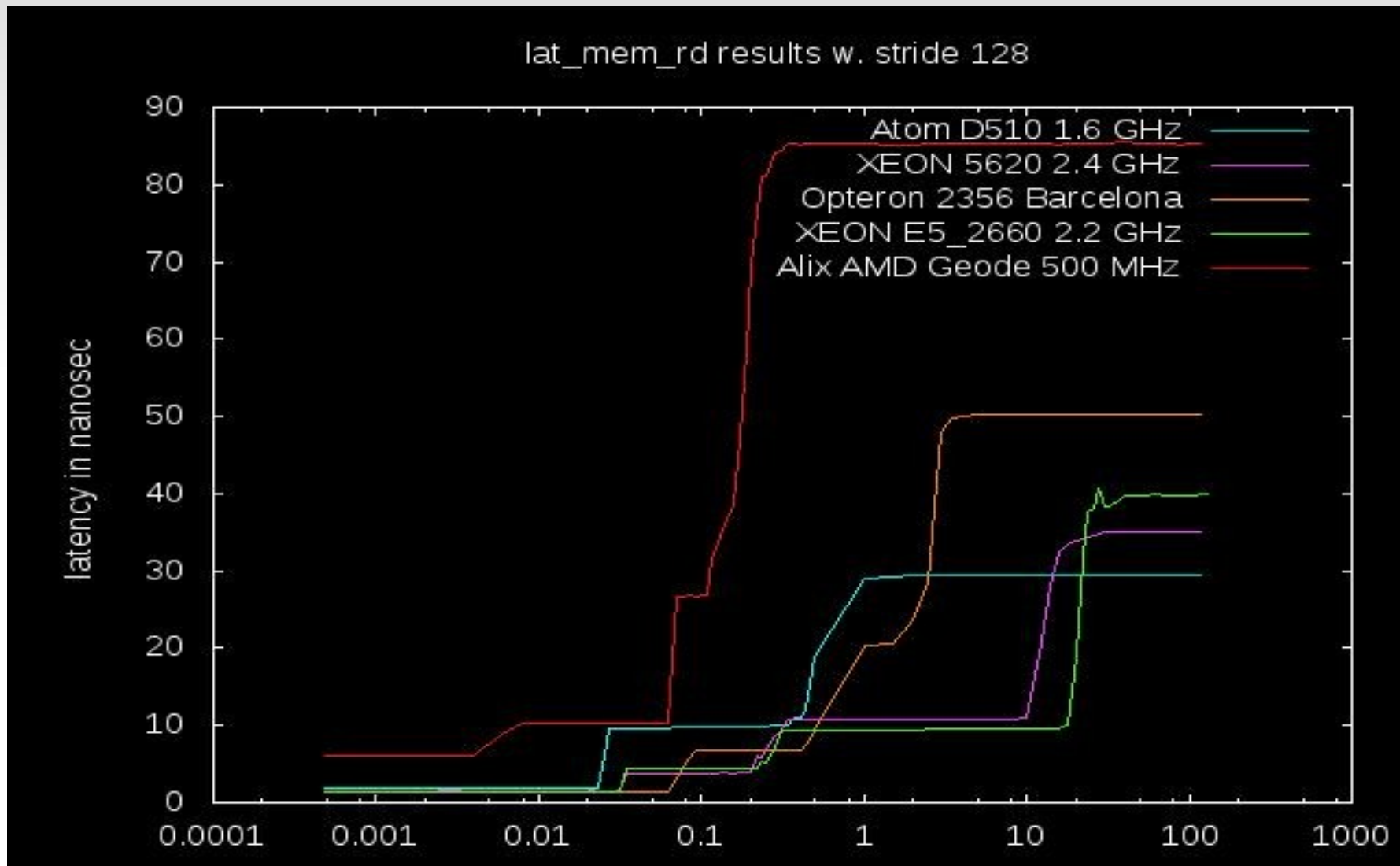
Summary 2.4 vs feedback



March 15 report on lkml

Thread: "How to optimize routing performance"
reported by Marten.Wikstron@framsfab.se
- Linux 2.4 peaks at 27Kpps
- Pentium Pro 200, 64MB RAM

Cache effect/Performance



Lab is simple innovative testing



Not all were selected...

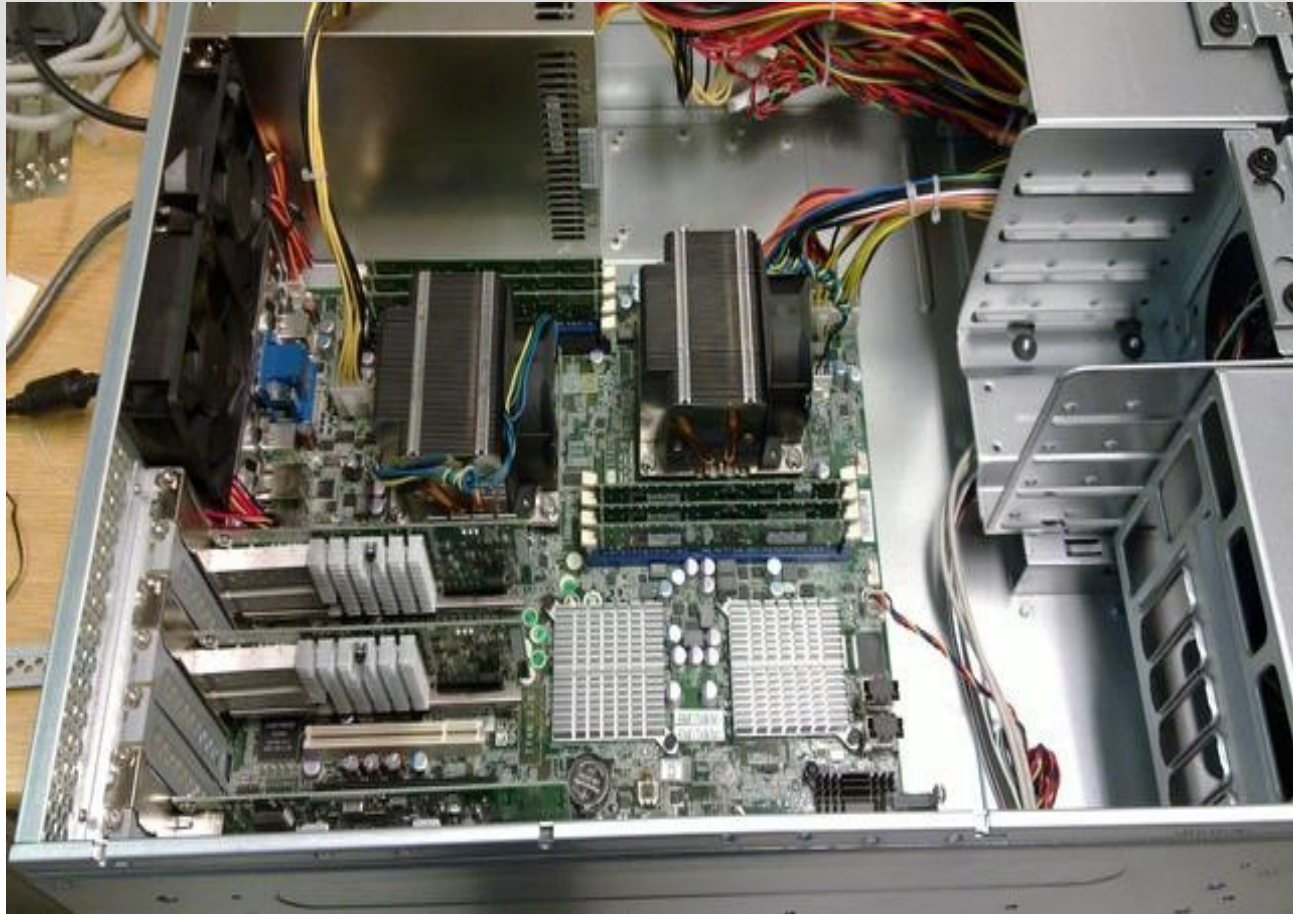


Low-Power Hardware



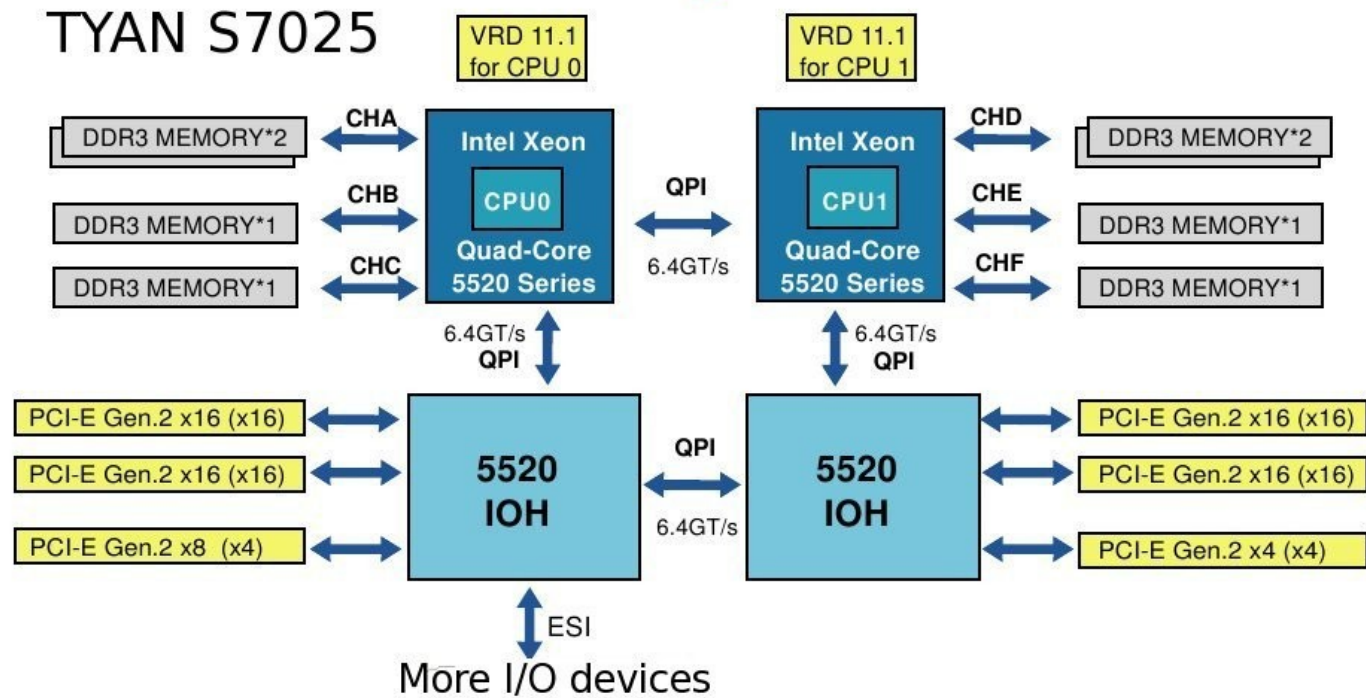
Intel ATOM based, High Performance
SuperMicro Motherboard, Intel 82580 Network Card/Optical
DC-powered with Integrated power controller
Rugged design and Passive Cooling- No moving parts

Hi-End Hardware

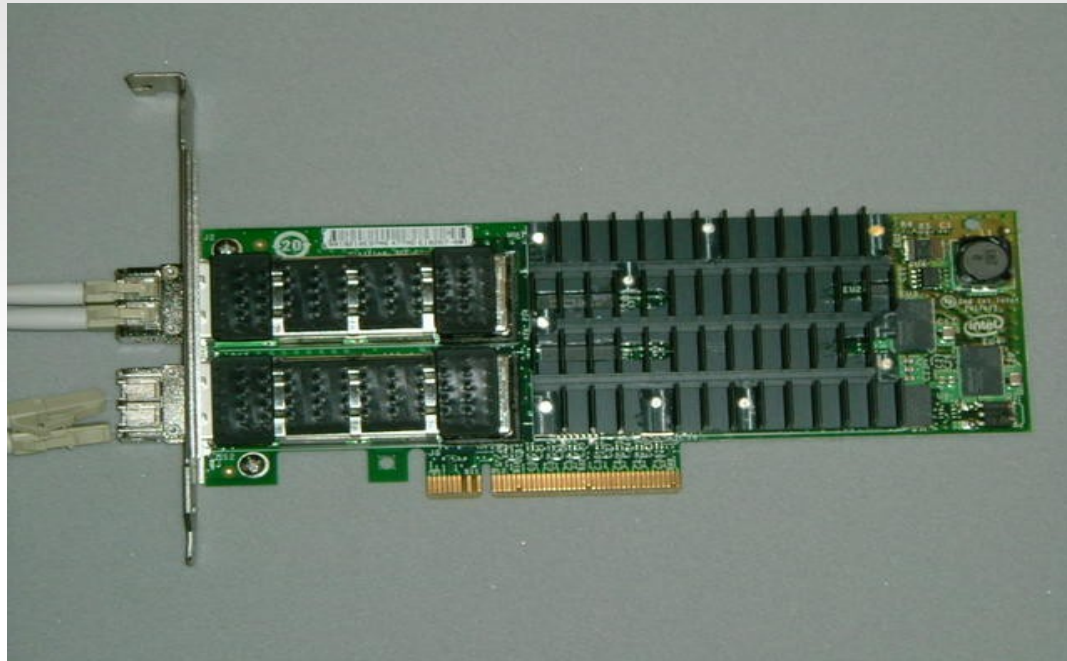


XEON 2 x E5630
TYAN S7025 Motherboard
Intel 82599

Block hw structure



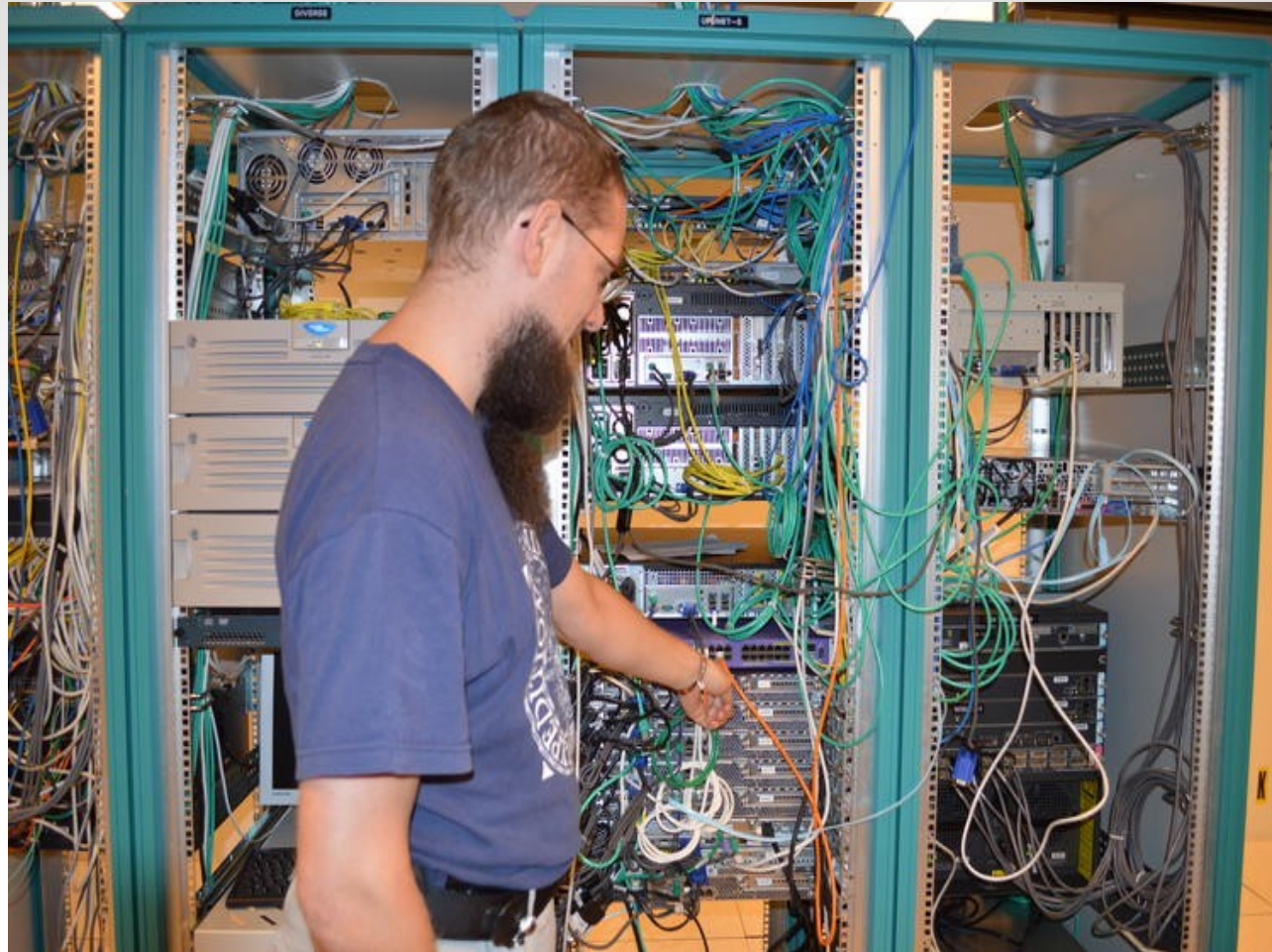
Hardware - NIC



Intel 10g board Chipset 82599

Open chip specs. Thanks Intel!

Over 10 years in high-speed production



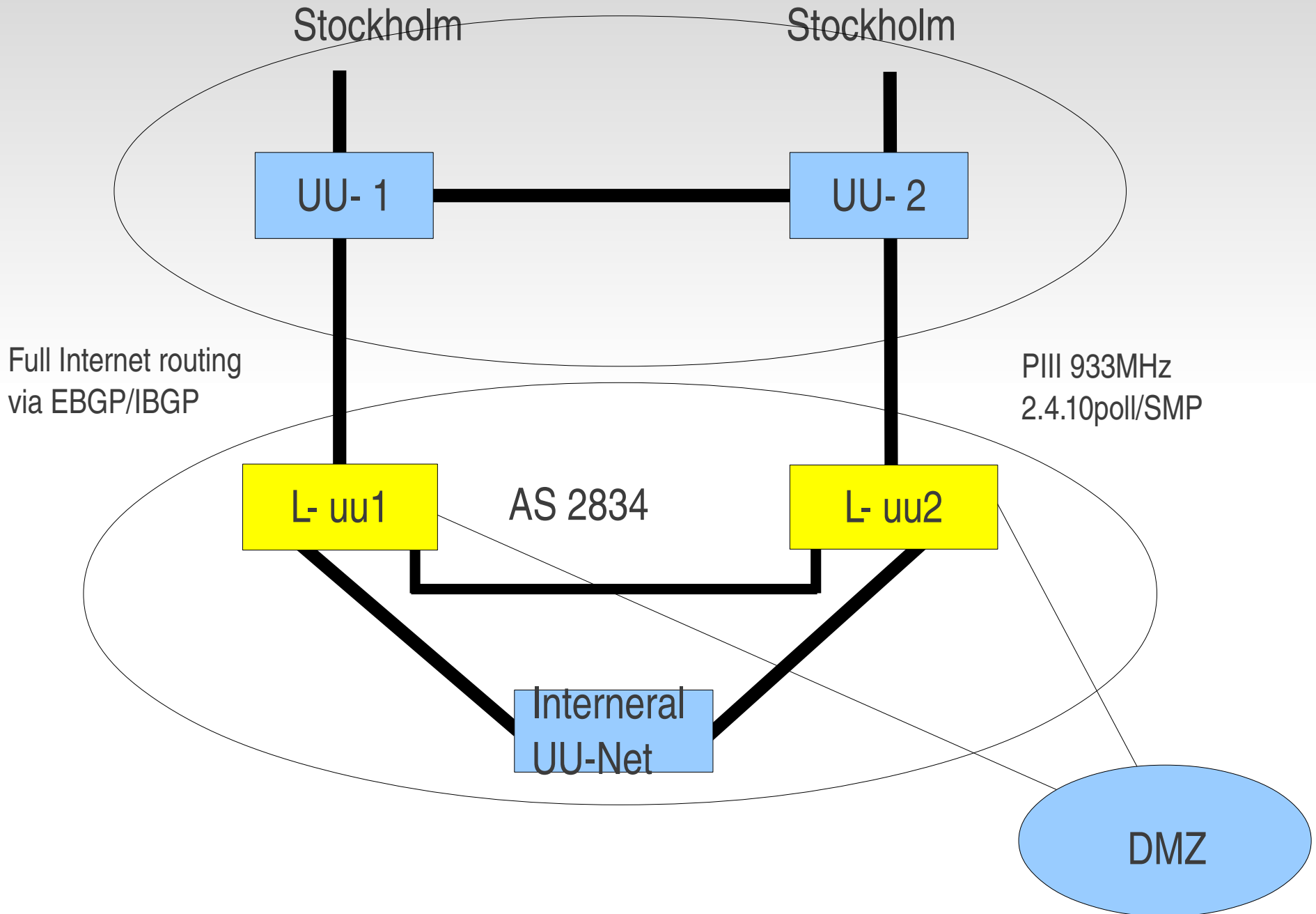
Emil manages Uppsala student network. Own AS BGP
And netlogon on many campuses

Over 10 years in high-speed production



Emil showing Uppsala Universitet core BGP routers
Many BGP peers local DMZ. 10G

10 year in production at Uppsala University



KTH/CSD

Current focus

Optical to Open Source Router
Low-Power & Renewable Energy
Virtualization/Namespaces
Performance
Cost

With current V7 release

Unique building environment. github

All binaries w. musl, ulibc or dietlibc.

Small static binaries. Run on most other distros.

Latest kernel from Linux tree branch

Own patches DOM, pktgen-RX etc

Tested and tuned for robustness and performance

V7 links

The core distro

<ftp://ftp.sunet.se/pub/Linux/distributions/bifrost/download/distro/>

Packages

<ftp://ftp.sunet.se/pub/Linux/distributions/bifrost/opt>

The building environment

<https://github.com/jelaas/bifrost-build/blob/master/README>

Bifrost/Linux 7.1 Install/Boot

Example:

```
make_bifrost sdb 0 /boot/boot_image.gz bifrost-beta-7.1-1.tar.gz
```

sdb is device of media to write to. Normally USB

Check w. dmesg.

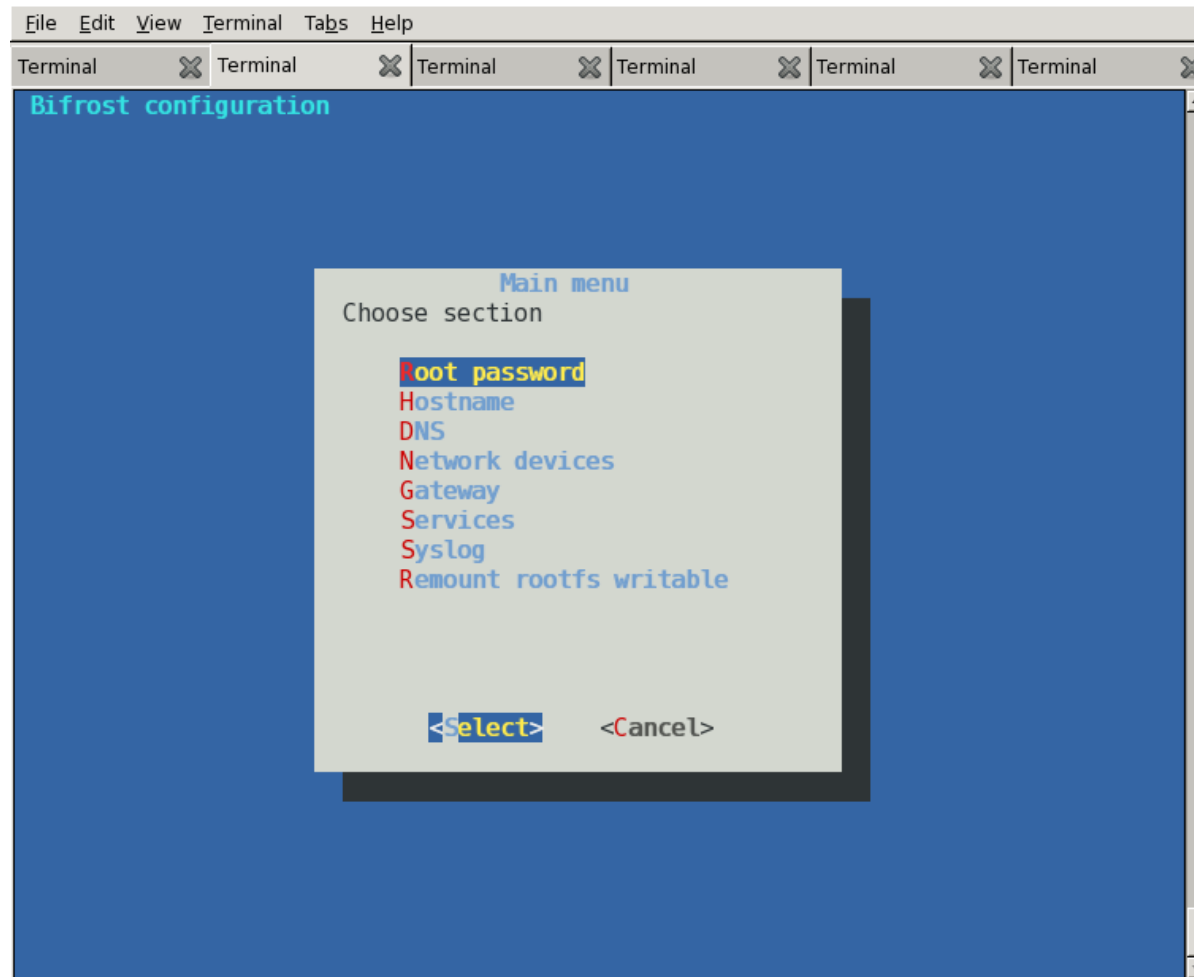
0 is the size of swap parttion (normally not needed)

boot_image.gz is small bootable image w. grub

bifrost-beta-7.1.1.tar.gz is the full distro.

Bifrost/Linux 7.0 configure

Basic setup after boot



Bifrost/Linux 7.0 unique util apps

remount

eth-detect

device-detect

linfo

lstat2

eth-affinity

ns

cpu_pkts

rtstat

Bifrost/Linux 7.0 config files

Take a look at:

`/etc/config.data`

`/etc/config.flags`

`/etc/rc.d`

`/opt`

Bifrost/Linux 7.0 projects

ARM port typically RPi

With static linking for WSN gateways etc.

That's all

Questions?

Project ideas

- Lightweight package handler
- Wiki
- Improve configure script, look at what openwrt are using?
- pktgen curses interface??