Overview	CPU/Architecture	Compression	Cache	QoS	

wireless mesh networks

10 steps to speedup your mesh-network by factor 5

Bastian Bittorf

http://www.bittorf-wireless.com

berlin, c-base, 4. june 2011

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Overview	CPU/Architecture	Compression	Cache	QoS	

Agenda

- CPU/Architecture
 - efficient use of CPU
 - rate-selection

3 Airtime

- avoid slow rates
- separate channels

Compression

- Iike modem: V.42bis
- iproute2/policy-routing
- compress data to inet-gateway
- slow DSL-lines?
- 5 Cache
 - Iocal HTTP-Proxy
 - Gateway HTTP-Proxy

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use modern software

• Kernel 2.6.39

- better scheduler
- better memory management
- swapon /dev/ramszwap0
- fast links needs fast hardware
- Q: what power is needed to route 30mbit/s from LAN to WIFI?

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mesh networking

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rate-selection

use a better rate-selection-algorithm

minstrel_ht

- mac80211
- needs kernel 2.6

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Safe a	irtimo					

• help your routing-protocol by throwing away slow links

- avoid air pollution
 - option beacon_int 10000
- avoid slow rates
 - option mcast_rate 6000
- also affects management frames (by accident?)
- maybe: list basic_rate 6000
- Iater: ETT-metric

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Split transport-network from access-network

Channel A: adhoc-network

- Channel B: ap-network
- both devices are LAN/LAN wired
- olsr-tweaks:
 - option LinkQualityAlgorithm etx_ffeth
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Overview	CPU/Architecture	Compression	Cache	QoS	
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Compressed tunnel to inet-gateway

one tunnel for all clients on one router

- vtund / Izo
- openvpn / lzo
- ipip-tunnel / compression ???
- internal network traffic is not compressed
- needs dynamic tunnels (end-2-end)

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Overview	CPU/Architecture	Compression	Cache	QoS	
iproute2/policy-r	outina				

• use policy-routing:

echo 50 XY »/etc/iproute2/rt_tables ip rule add from \$HNA/\$MSK prio 30002 table XY ip rule add to \$HNA/\$MSK prio 30001 lookup main ip route add default \ via \$TUNNEL_NEIGH_IP \ dev \$TUNNEL_DEV \ table XY ip route flush cache

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Overview	CPU/Architecture	Compression	Cache	QoS	
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compress data to inet-gateway

Compressed tunnel to inet-gateway

```
• ip tunnel \
add tunnel0 \
mode ipip \
remote 10.10.1.1 \
local 10.10.99.1 \
compress lzo
ip link set dev ipip0 up
ip address add 172.16.1.2/24 dev tunnel0
```

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Overview	CPU/Architecture	Compression	Cache	QoS	
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slow DSL-lines?

Compressed tunnel from inet-gateway to data-centre

• use lzo-compressed tunnel to server with better connection

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Overview	CPU/Architecture	Compression	Cache	QoS	
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Caching HTTP-Proxy on each device

Polipo

- 8 Gigabyte USB-Sticks (10 Euro)
- mount -t btrfs -o compress,ssd /dev/sda1 /tmp/usb0
- needs 32MB RAM

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Overview	CPU/Architecture	Compression	Cache	QoS	
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Gateway HTTP-Proxy

Caching HTTP-Proxy on gateway

- Polipo
- maybe squid on strong hardware

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Overview	CPU/Architecture	Compression	Cache	QoS	
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DNS-Cache

Caching DNS-Resolver

- odnsmasq
- each local dnsmasq asks a central dnsmasq
- easy...

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Overview	CPU/Architecture	Compression	Cache	QoS	

synchronise regulary

unison

- always 1hop
- always in inet2node direction
- while WifiIsIdle; do unison A B; done

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Overview	CPU/Architecture	Compression	Cache	QoS	
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compress to zer	o				

local Ad-Blocker

Polipo

- easylist.txt + adblock2polipo.py
- http://spiralofhope.com/polipo.html

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Overview	CPU/Architecture	Compression	Cache	QoS	
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layer7-QoS for better Layer8 experience

shape everything

Iayer7: http://I7-filter.clearfoundation.com/

- web + games fast
- downloads slow (every connection, where conntrack detects >1 Megabytes)
- class for internal-traffic (unison-cache-synching)

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Overview	CPU/Architecture	Compression	Cache	QoS	future
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what could be done better?

- in-kernel compressed ipip-tunnel (packet aggregation?)
- dynamic one-hop-tunnels with olsr
- hardware-supported compression
- automagic layer7-framework-builder
- do everything with IPv6
- do bandwith aware routing
- having a second mesh-routing-table for "bulk"
- having package polipo-dev / unison
- having HT40 meshing
- having dynamic powercontrol aka minstrel_blues

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B.Bittorf