TURRIS OMNIA

Open router for small networks

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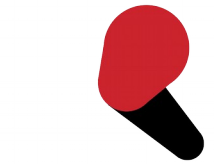
cz.nic | CZ DOMAIN REGISTRY

Who we are

- CZ.NIC is the operator of .CZ TLD domain
- CZ.NIC Labs - Projects for the good of the Internet
  - BIRD routing daemon, Knot DNS server
  - DNSSEC plugins for browsers
  - and much more…
- Everything we do is open-source

Project Turris



PROJECT:
TURRIS

- Started in 2013
- Security research in SOHO networks
  - Main goals:
    - End user security
    - Improve the situation of SOHO routers
- Router as a security probe and protection
  - Made by ourselves
  - 2000 pcs distributed to end users
- Introduce new technologies to SOHO networks
  - DNSSEC, better IPv6

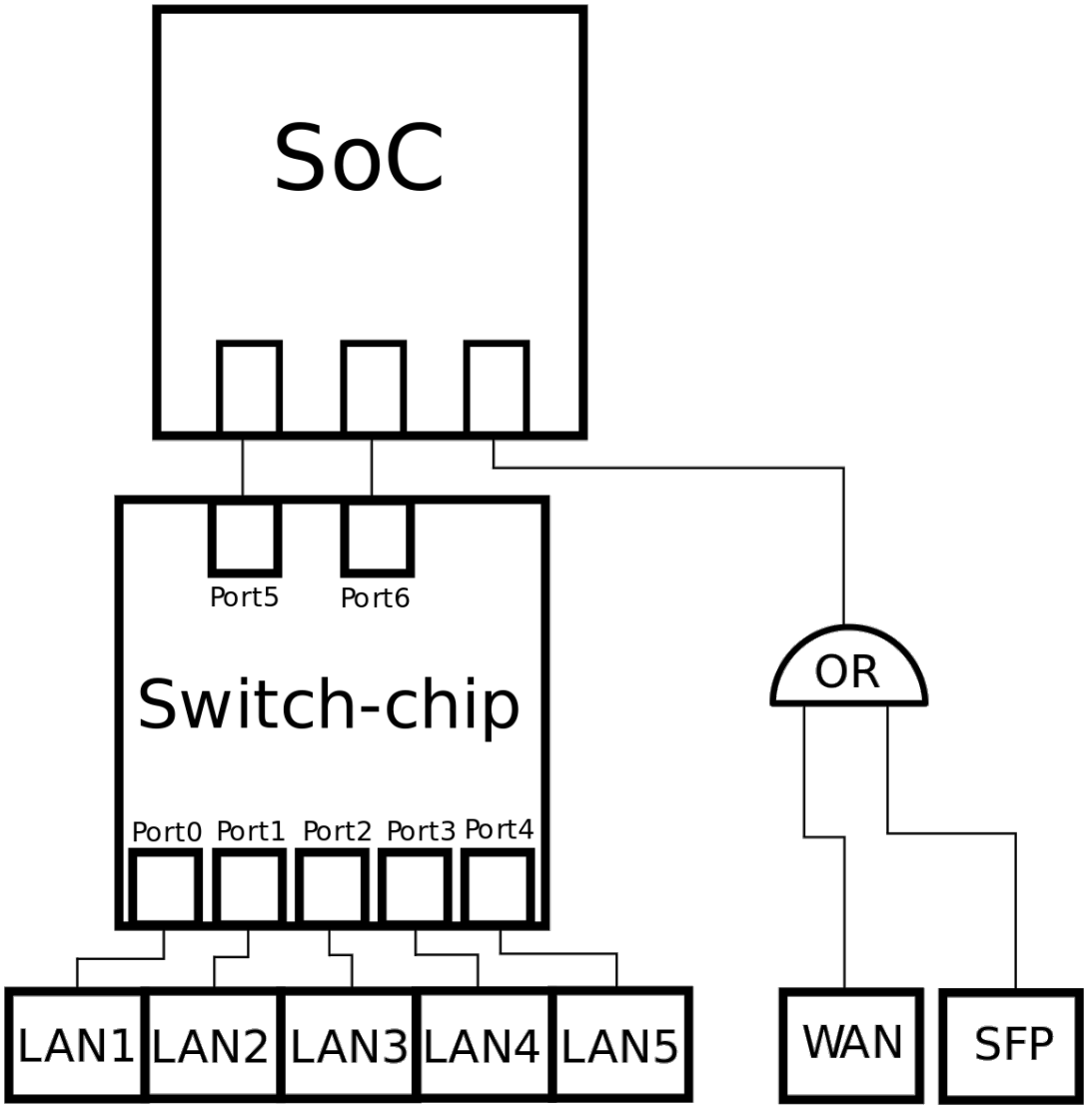
Last information about Turris Omnia

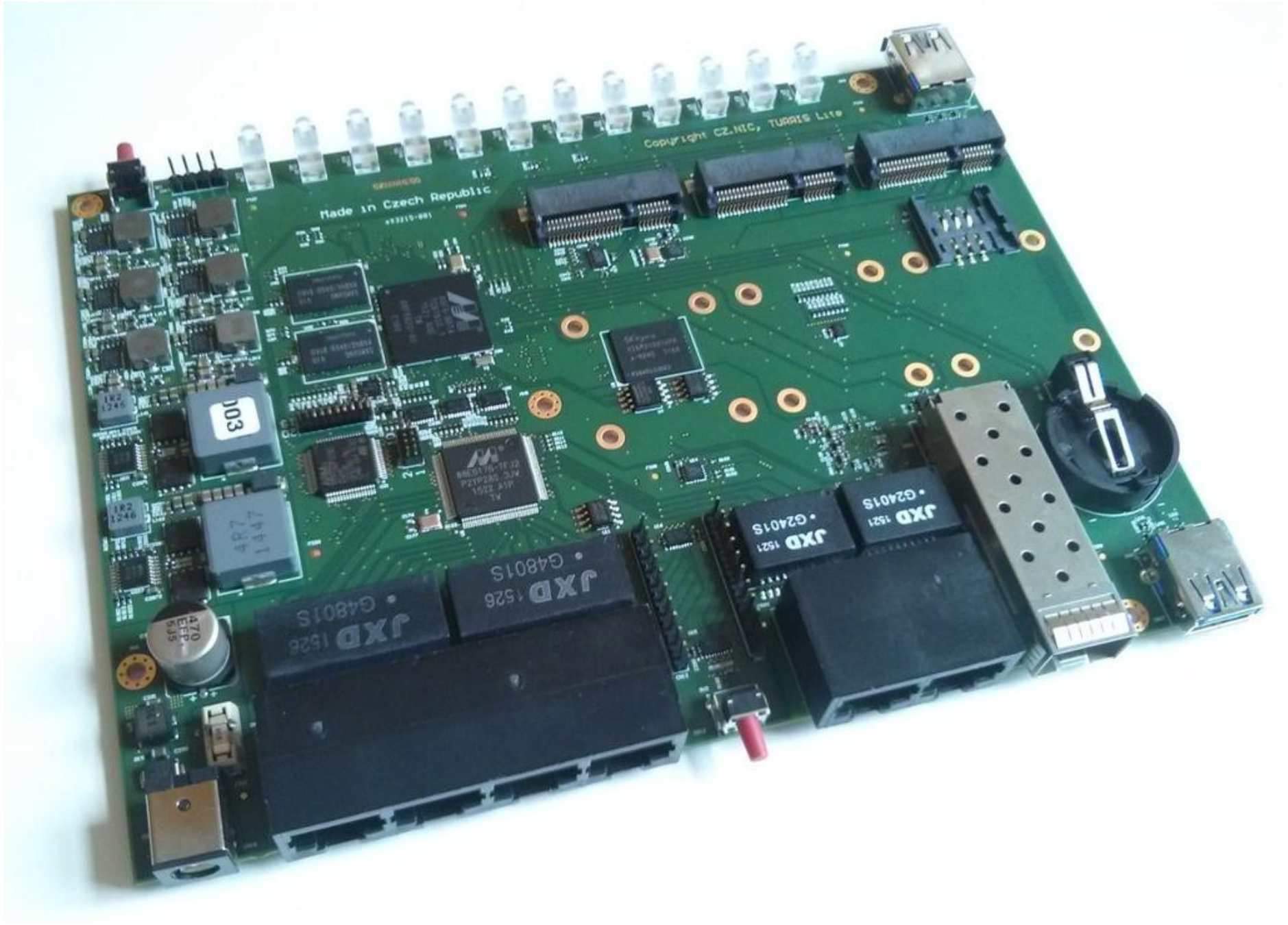
- Ondřej Filip @ Netnod Spring meeting 2015
- Turris:Lite – former name
  - Spec:
    - 64bit PPC
    - 1GB RAM
    - USB 3.0
    - SATA
    - miniPCIe

Turris Omnia – Final Hardware Spec

- SoC Marvell Armada 385 @ 2 x 1.6 GHz
  - Power consumption ~6 W, NAT throughput ~1 Gbps
- 1 GB RAM
- 4 GB eMMC + 8 MB NOR
- 5 + 1 Gbit port + SFP
- 2 x USB 3.0
- Programmable RGB LED
- 3 x miniPCIe (one of them switchable to mSATA mode), SIM slot
- RTC, crypto chip for better RNG entropy
- 10x GPIO, 2x UART, SPI, I2C

Internal network connection diagram

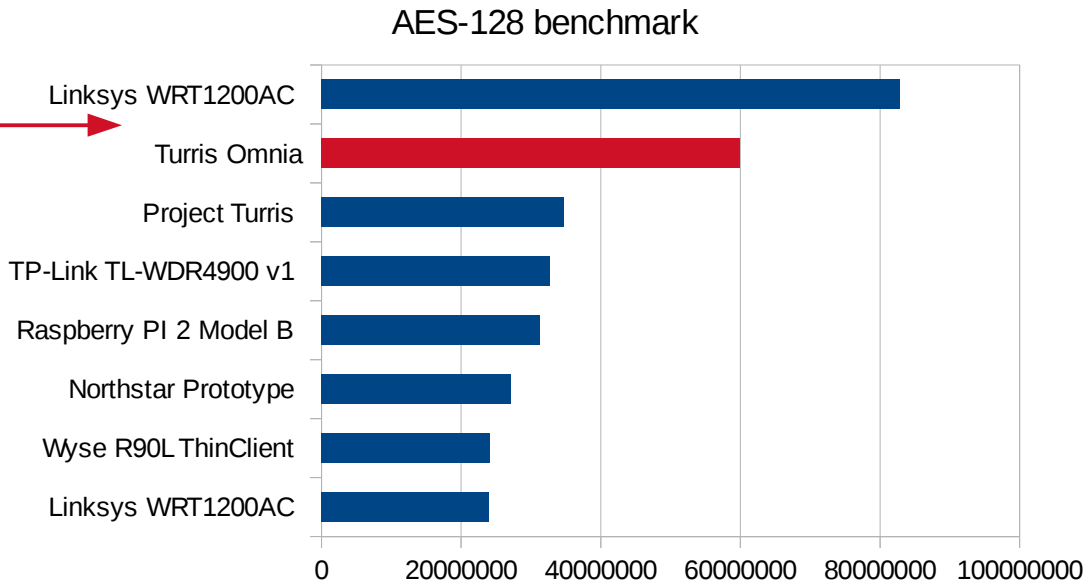


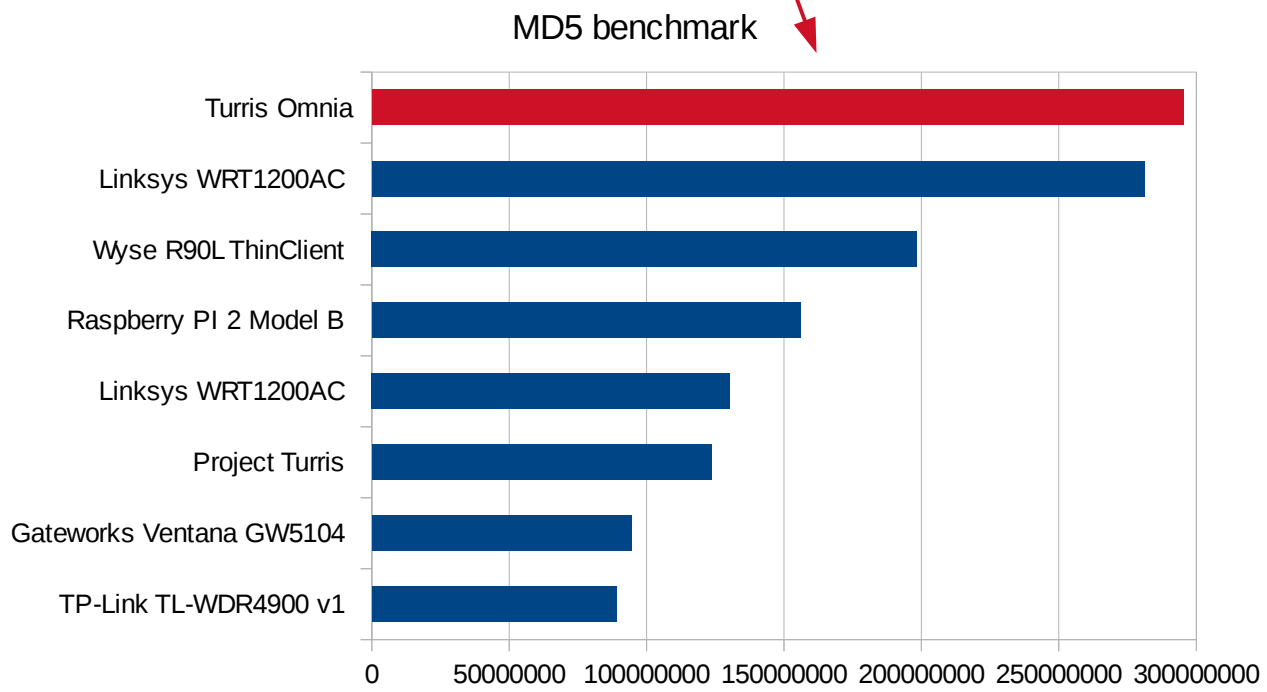

Made in Czech Republic
Copyright CZ.NIC, TURRIS Lite

http://wiki.openwrt.org/inbox/benchmark.openssl

Benchmarks

Acceleration off in Omnia





Operating system

- TurrisOS (fork of OpenWrt)
  - OpenWrt – Linux distribution for home routers
  - > 3000 packages available
  - Root access
- Automatic updates
  - ~ Every month
  - Short reaction time to security problems
    - OpenSSL HeartBleed – 2 days
  - Can be turned off

Majordomo

Majordomo - monthly statistics (2014-11)

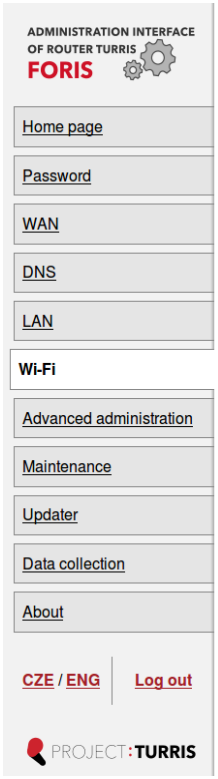
Go back to overview

Available daily statistics for this client are: 2014-11-14

e8:92:a4:98:95:74

Destination address	Port/Protocol	Count (download)	Packet size (download)	Payload size (download)	Count (upload)	Packet size (upload)	Payload size (upload)
mail.nic.cz	143/TCP	744	543.72 KB	505.79 KB	908	83.82 KB	37.43 KB
trubka.network.cz	993/TCP	211	77.81 KB	67.02 KB	337	30.43 KB	13.25 KB
ea-in-f95.1e100.net	443/TCP	25	20.65 KB	19.36 KB	28	4.66 KB	3.22 KB
fra07s27-in-f17.1e100.net	443/TCP	21	6.78 KB	5.70 KB	29	4.27 KB	2.77 KB
ec2-54-183-216-231.us-west-1.compute.amazonaws.com	443/TCP	18	7.33 KB	6.41 KB	31	3.66 KB	2.09 KB
ea-in-f188.1e100.net	5228/TCP	15	1.61 KB	848.00 B	28	2.91 KB	1.43 KB
d172ud.forpsi.com	80/TCP	14	1.77 KB	1.22 KB	33	2.12 KB	726.00 B
ber01s08-in-f7.1e100.net	443/TCP	11	5.77 KB	5.20 KB	18	3.70 KB	2.77 KB
ec2-54-241-32-13.us-west-1.compute.amazonaws.com	443/TCP	10	5.29 KB	4.78 KB	13	2.21 KB	1.54 KB

Foris



Wi-Fi

If you want to use your router as a Wi-Fi access point, enable Wi-Fi here and fill in an SSID (the name of the access point) and a corresponding password. You can then set up your mobile devices, using the QR code available next to the form.

Enable Wi-Fi

SSID Turris

Hide SSID

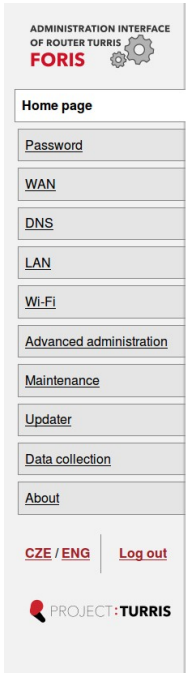
Wi-Fi mode 2.4 GHz (g) 5 GHz (a)

802.11n mode Enabled (20 MHz wide channel)

Network channel auto

Network password ••••••••••••••••••••••••

Discard changes | Save changes



Home page

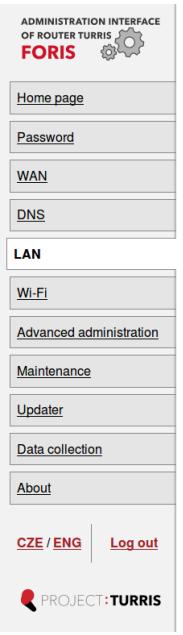
Welcome to the Turris administration site. Please, choose a config section you wish to change from the menu.

Update from 2015/09/18 16:45:22

- Installed version 112 of package nuci
- Installed version 107 of package ucollect-config
- Installed version 112 of package nuci-nethist
- Installed version 6.2-1 of package libreadline
- Installed version 0.9.33.2-1 of package libthread-db
- Installed version 7.5-1 of package gdb
- Installed version 107 of package ucollect-lib
- Installed version 107 of package ucollect-prog
- Installed version 26 of package ucollect-count
- Installed version 31 of package ucollect-buckets
- Installed version 12 of package ucollect-fake
- Installed version 19 of package ucollect-bandwidth
- Installed version 7 of package ucollect-spoof
- Installed version 24 of package ucollect-badconf
- Installed version 21 of package ucollect-flow
- Installed version 8 of package ucollect-refused
- Installed version 15 of package ucollect-sniff
- Installed version 52 of package turris-firewall-rules
- Installed version 107 of package lcollect
- Installed version 25 of package lcollect-majordomo

Update from 2015/09/16 04:44:51

- Installed version 18 of package libatsha204
- Installed version 1.5.2-3 of package mtd-utils



LAN

This section contains settings for the local network (LAN). The provided defaults are suitable for most networks. **Note:** If you change the router IP address, all computers in LAN, probably including the one you are using now, will need to obtain a **new IP address** which does **not** happen **immediately**. It is recommended to disconnect and reconnect all LAN cables after submitting your changes to force the update. The next page will not load until you obtain a new IP from DHCP (if DHCP enabled) and you might need to **refresh the page** in your browser.

Router IP address 192.168.1.A

This is not a valid IPv4 address.

Enable DHCP

DHCP start 100

DHCP max leases 150

Discard changes | Save changes

Security research

- Opt-in policy
- Access to more features
  - Firewall logs with visualization
  - HaaS – Honeypot as a Service
  - Passive bandwidth measuring
  - IPv4 / IPv6 statistics

More than just a router

- Decent home server
  - File sharing (Samba, DLNA, ...)
  - Backup services (TimeCapsule, ...)
- DIY home automation
  - Home Assistant, Domotics
- TOR gateway
- KNOT? Why not!
  - + resolver
- Bird
- Many more (VPN, ...)

Open source & Open hardware

- Bootloader, operating system, power management firmware, etc.
  - Everything is open-source
  - https://github.com/CZ-NIC
- Schematics will be also released
  - Including full production documentation (with a little delay) → Open Hardware

Current status, roadmap

- We have first prototype
  - It works... somehow
  - Few small HW bugs

- Second prototype in November
  - Hopefully this will be the last prototype series
- Manufacturing in Q1 2016

Do you want one?

- I hope so :-)
- Non-binding preregister form on https://omnia.turris.cz/
- In the near future we will start Indiegogo campaign
  - Bare board <= USD 100
  - Board with case, wifi and power supply < USD 200

Thank You

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