Routers...

Household's sleeping evil

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Internet domain registry operator
CcTLD .cz
• National CSIRT in Czech Republic

• Established within academic environment as a part of research project (2007-2010)

• Work later formalized by memorandum(s) with Ministry of Interior and National Security Authority

• Since December 2015 public contract for indefinite duration
Where to buy (get) a router?

- Internet Service Providers
- Electronics
- E-shops...

vs.

Where to get support?
Manufacturer...transport...supplier...transport...ISP...in stock...customer  
=  
xy months
Weaknesses
- Outdated SW
- Default passwords
- Remote administration
- UPnP on by default

Responsibility?
- Manufacturer
- ISP
- Sales companies
- Producers
- CSIRTs...?

$$$
vs.
performance
vs.
security

Secure by default???
Turris

- Motivation: situation on the market of SOHO routers :(
- Open source (fork of OpenWRT)
- Open hardware
- Not-for-profit and RESEARCH project
- 2000 routers distributed in Czech republic
- Automated updates
- Strong demand especially from Czech IT community
- Assembled in Czech republic :)
Another added security value

- **Collection** of input data (most importantly monitoring of end devices)
- **Analysis** of obtained data on central server
- Preparation of **firewall rules** based on data analysis
- **Update** of end devices
- CSIRT.CZ feeds distributed adaptative firewall
- Provision of generated greylists as a feed to IntelMQ
https://youtu.be/3ATAFufg_pY

- **Enhanced** HW part
- Possibility to buy the Turris router
- Funding? - we have tried crowdfunding (to see whether there would be an interest)
<table>
<thead>
<tr>
<th>Honeypots</th>
<th>Cryptochip</th>
<th>Extensibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Omnía, you can observe network attackers’ activity from the safety of your home.</td>
<td>Not having enough entropy may be a security weakness. This is why we include an extra cryptochip.</td>
<td>There are many things you can use Omnía for besides connecting to the Internet.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>mSATA</th>
<th>Additional features</th>
<th>4 GB flash</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you want extra fast storage in your Omnía, connect an SSD via the mSATA interface.</td>
<td>Turris Omnía has two orders of magnitude more flash memory than common routers.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RTC with battery backup</th>
<th>Wi-Fi</th>
<th>Dimmable RGB LEDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing time information may be a security problem when cryptography is involved.</td>
<td>Turris Omnía has dual band Wi-Fi with 802.11ac and 802.11b/g/n.</td>
<td>LEDs are an important source of information in a router. But they might not be so nice at night.</td>
</tr>
<tr>
<td>Feature</td>
<td>Regular router</td>
<td>Turris</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>CPU</td>
<td>500 MHz MIPS</td>
<td>2x1.2 GHz PowerPC</td>
</tr>
<tr>
<td>RAM</td>
<td>32-64 MB</td>
<td>2 GB</td>
</tr>
<tr>
<td>Storage</td>
<td>8 MB</td>
<td>256 MB</td>
</tr>
<tr>
<td>Extension connectors</td>
<td>USB</td>
<td>USB, miniPCle, GPIO</td>
</tr>
<tr>
<td>Internal network connection</td>
<td>LAN and WAN share the same line to the CPU</td>
<td>LAN and WAN are connected to the CPU using dedicated lines</td>
</tr>
<tr>
<td>Power consumption</td>
<td>3-6 W</td>
<td>9 W</td>
</tr>
<tr>
<td>Firmware updates</td>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>
People are interested in powerful, open source, secure routers with lifetime support they can trust :)

<table>
<thead>
<tr>
<th></th>
<th>Turris Omnia</th>
<th>Router</th>
<th>Indiegogo</th>
<th>Ongoing</th>
<th>$100,000</th>
<th>$1,116,258</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Conclusion...?

- Can we encourage routers manufactures to focus on routers security more?
- Can we talk to local ISPs about the routers they provide (sell) to their customers?
- Can CSIRTs do awareness activities on “routers in households”?
- What will be the role of routers in coming IoT age?
What kind of router would you buy your parents (or kids:) ?