How to Save the Smart Home from Cyber Invasion

IoT DevCon 2017
Art Swift, President, prpl Foundation
Research Findings

- Smart device adoption has reached a tipping point - the smart home is already here
- The smart home is woefully insecure due to users’ failure to follow best practices
- Smart home users prefer security to usability and are prepared to take more responsibility

Methodology and demographics

Survey conducted by OnePoll in accordance with the Market Research Society code of conduct - data collected between 22.06.2016 and 01.07.2016
Smart device adoption has reached the tipping point

Q1) Which connected devices do you use in your home?

Connected devices per Smart Home

Top 10 Smart Home devices

- Game console
- Wireless printer
- Smart TV
- Media streaming device
- Digital camera with Wi-Fi
- Smart watch / Wearables
- Home security
- Toys
- Home surveillance camera
- Smart appliance
Many users never update their home gateway firmware

Home gateway firmware updates

- 57% at least once a year
- 23% didn’t know was possible
- 20% never done

3) How many months has it been since the firmware on your router at home was last updated?
Many users never configure security settings

Q4) Do you or does anyone else in your household take the following measures to secure your home router?

- Change admin password: 46%
- Configure firewall policies: 37%
- Enable MAC filtering: 17%
- Use guest network for guest devices: 30%
- Use guest network for home devices: 20%
- Disable UPnP: 10%
Too many firewall ports are unnecessarily open

Q5) How many services in your home (such as games consoles, VoIP apps such as Skype, etc.) require open ports on your home router firewall?

![Internet attack surface diagram]

- 7%: Safe
- 29%: 1 - 2
- 32%: 3 - 4
- 24%: 5+
- 8%: Don't know

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Most users prefer security over ease of use

Q6) When thinking about connected devices, what do you think is the most important out of the following?

- Security: 51%
- Configurable usability vs. security: 19%
- Ease of use: 30%
Most users want to be responsible for security

Q7) From the following, who do you think should be most responsible for the security of your connected devices?

- End user: 60%
- Service provider: 20%
- Manufacturer: 20%

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... and would pay a premium for more secure devices

Would pay a premium for more secure devices

- 32%
- 42%
- 26%

Q8) Which of the following statements best describes your views on connected devices?

- Security concerns keep me from buying more smart devices
- I would pay a premium for more secure devices
- I am not concerned about the security of smart devices
Top 10 tips for better smart home security

1. Regularly check router firmware updates
2. Change default admin password on router
3. Configure firewall policies – close all ports
4. Enable MAC filtering
5. Use guest network for guest devices
6. Use guest network for all home devices
7. Enable wireless isolation
8. Disable DNS setting via DHCP
9. Disable USB file sharing
10. Disable UPnP

prpl Foundation Reference Publications
Smart device adoption has reached the tipping point

Q1) Which connected devices do you use in your home?

<table>
<thead>
<tr>
<th>Country</th>
<th>Average number of devices per household</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR</td>
<td>5.8</td>
</tr>
<tr>
<td>IT</td>
<td>5.0</td>
</tr>
<tr>
<td>DE</td>
<td>4.5</td>
</tr>
<tr>
<td>UK</td>
<td>2.6</td>
</tr>
<tr>
<td>USA</td>
<td>2.4</td>
</tr>
<tr>
<td>JP</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Total: 5.8 FR, 5.0 IT, 4.5 DE, 2.6 UK, 2.4 USA, 1.0 JP

![Smart devices per household by country graph]
Many users never update their home gateway firmware

3) How many months has it been since the firmware on your router at home was last updated?

Home gateway firmware updates by country

- Every 0-2 months
- Every 3-6 months
- Every 7-11 months
- Every 12+ months
- Never done
- Didn’t know was possible
- Firmware what?

FR: 70% 10% 20% 10% 10%
DE: 60% 20% 10% 10% 10%
IT: 50% 20% 20% 10% 10%
JP: 40% 30% 20% 10% 10%
USA: 30% 30% 30% 10% 10%
UK: 20% 40% 20% 20% 10%
Many users never configure security settings

Q4) Do you or does anyone else in your household take the following measures to secure your home router?

Users managing the security of their home gateway by country

<table>
<thead>
<tr>
<th>Country</th>
<th>Basic (password)</th>
<th>Advanced</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT</td>
<td>60%</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td>DE</td>
<td>70%</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>FR</td>
<td>60%</td>
<td>30%</td>
<td>10%</td>
</tr>
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Most users want to be responsible for security

Q7) From the following, who do you think should be most responsible for the security of your connected devices?
Consumers would pay a premium for more secure devices

Q8) Which of the following statements best describes your views on connected devices?
Too many firewall ports are unnecessarily open

Internet attack surface by country
[number of services requiring open ports on the firewall]

Q5) How many services in your home (such as games consoles, VoIP apps such as Skype, etc.) require open ports on your home router firewall?