IETF Topics and Internet Evolution

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A slight detour to 2013...
There's a Trend:
RFC Publication Over the Years

Comparison of Countries over the Years

Year

France
Germany
USA
United Kingdom
The Netherlands
Finland
Israel
Japan
Australia
China
Belgium
Canada
Sweden
There’s a Trend:
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There's a Trend:
RFC Publication Over the Years

Comparison of Companies over the Years

Number of RFCs

Year


Ibm
Juniper
Alcatel
Att
Ntt
Mit
Nokia
Nortel
Google
Ericsson
Bbn
Sri
Cisco
Microsoft
Huawei
Huawei Hosts IETF-88!

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Huawei to Host IETF 88 in Vancouver!

Announce Huawei Host Vancouver

The IAOC is pleased to announce that Huawei will be the Host for IETF 88 in Vancouver.

Huawei has been a long time supporter of the IETF through its participation and sponsorship at IETF meetings, but this is their first time as the Host of an IETF meeting. Congratulations, welcome and Thank You!

Registration is now open for IETF 88 at: http://www.ietf.org/meetings/88/

Thank You!
Huawei Hosts…

IETF-97! (Seoul)

2016 IETF Hackathons

Thank You!
Back to Internet Evolution
Some Areas of Active Work at the IETF

- Web protocols (HTTP2, QUIC)
- Security and privacy (RFC7258, UTA, DPRIVE, TLS1.3)
- Enabling real-time communications from browsers (WebRTC)
- Management, orchestration, virtualisation, and data-model driven networking (NVO, SFC, YANG)
- Internet of Things
- Running code and open source
Web Protocol Stack

• Overall, much change in last few years: HTTP2, certificate pinning, HSTS, webpush, increased use of encryption, WebRTC, TLS 1.3, …

• Considering even bigger changes: QUIC

• Why is this happening and what does it mean for the Internet?
Background

• We needed all this those things…

• But also, consolidation of Internet services, traffic, OSes and applications plays a role

• Internet architecture and role of endpoints plays a role as well, as does the ease at which software today gets updated
Observations 1

- Prediction: Big shifts so far, even bigger ahead

- Functionality moves to applications & browsers, fast change

  - Encryption change was just an example — others will follow: specialised transports for movie download, etc.

- Applications are firmer in control: e2e security, browsers, now transport
Observations 2

- At the same time, in the network, SDN and virtualisation are driving another change which also enables fast changes.

- The networking industry needs to embrace this fast change, as well as to understand how the traffic it carries evolves.

- The mobile industry is doing a lot of this in 5G, but are we doing enough?
## Internet of Things

- **IETF role**: Specify the underlying, fundamental Internet technologies

- “Permissionless innovation” — others can build on top

<table>
<thead>
<tr>
<th>Run IP over &lt;IOT media&gt;</th>
<th>Security for IOT</th>
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<td>Routing for lossy &amp; low power networks</td>
<td>Thing-to-Thing communication (IRTF)</td>
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<tr>
<td>Web technology for IOT</td>
<td>Architectural oversight (IAB)</td>
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Observations 1

- A shift from closed, vertical solutions to open, general networking solutions (IP, IPv6, mobile networks, WLAN, web)
- A shift from devices to thinking about systems, connections between systems, analytics, etc.
- Security & privacy continue to be big challenges
- Management, interoperability, and updatability
Semantic Interoperability

- Most systems run on standard L2, on IP, and on top of the web protocols
- Good interoperability from a network perspective
- But is there application-level interoperability?
- Different applications, different data models across the industry (needs work!)
Ownership and Control

• Software updates are essential

• But this seemingly simple issue is actually complex — who has the right to update software on a device? Can the manufacturer EOL a device that you own?

• More generally, when you buy, say, a car, are you buying a tangible object, or the rights to use the cloud services that are behind it?
... although with the Huawei E5186 router my car may soon be using some cloud services, as well
Observations 2

• Underlying networking details are the bread and butter of IETF’s IOT work

• Much work is still needed on that, security in particular

• But as a whole, a lot work remains at the level of systems, how they are connected and controlled, how they interoperate, and so on
Running Code And Open Source

- A big part of today’s mainstream networking development happens in open source
- What’s the relationship of open source and standards?
- How does this affect organisations like the IETF?
Open Source and Standards

• Both are needed

• There are often multiple open source efforts that need to interoperate

• Need to work together

• The usual patterns of what companies keep proprietary and where they work together in standards and open source still apply
Open Source @ IETF

• Running code always a big part

• IETF Hackathon series

• Our latest run in Berlin was our most successful one to date

• Working groups using open source style collaboration tools

• WG on open source tech (e.g., BABEL)
Open Source @ IETF

• Future evolution?

  • Culture change in moving more of the IETF to similar collaboration style?

  • IETF hackathons outside IETF meetings?

  • Ability of developers to “drop in to IETF” and publish a spec?

• <Your ideas here>
Thank You