Introducing the IETF

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I'll probably talk about:

- Some Background - The Rise of Open Networking
- The emergence of the IETF
- Kings, Voting and Running Code
- Today’s IETF
- And a few opinions!

About me and the IETF

- First RFC encounter: Implemented RFC 850 on Vax/VMS in 1985
- First IETF meeting: November 1989
- RFCs (co)authored: 44
- IETF Working Group Chair: TACIT, SHIM6, GROW, SIDR
- IAB Member: 1999 – 2005 (Executive Director 2001 – 2005)

In the Beginning…

- Work on digital data networking is probably as old as the teletype machine of the 1940's
- Early work in dedicated networking probably starts with the SAGE in the late 1950s
  - Air Force program to build a continental air defence system
- Commercial networks appeared in the 1960s
  - Such as SABRE for airlines
  - Vendor-specific platforms leasing digital circuits from the phone company
- Packet switching also emerged in the 1960s
  - Parallel work in US, UK and France on the use of packets rather than time divisions to share a common transmission system
  - Research project in the US supported by ARPA to develop communications protocols that were an overlay across a packet switching network substrate

Emergence of the Internet

- Vint Cerf and Bob Kahn published a paper on the design of the Internet Protocol in May 1974
- This was envisaged as a “network of networks” overlay where packets were passed through a sequence of networks to reach their intended destination:
  - Datagram architecture as the Lowest Common Denominator
  - Adaptive Fragmentation to bypass the MTU problem
  - End-to-End architecture to push reliability and performance to the edge

Next Steps

Three events occurred at about the same time to push the Internet into prominence:

- Digital Equipment gained market share through the development of the “mini computer” which changed the computing environment from a cluster of peripherals around a mainframe to a diverse collection of computers sharing users and (hopefully) computation tasks!
- The divestiture of AT&T released the Unix operating system to universities as an open source free-to-use tool . There was at last a viable alternative to vendor-proprietary computing and networking technology
- UC’s Berkely Software was contracted by ARPA to code the Internet Protocol suite and this was released as a public open source bundle without copyright constraints

OSI

- There was a parallel effort to develop open networking tools that became known as the Open Systems Interconnection protocol suite OSI)
- This had strong backing from the telco sector as well as backing from some computer vendors
- It's work was focussed in Europe where it was seen as the next step for the (telco) X.25 packet switched service
- The problem was that it had not gathered much support in the US, and it was very incomplete work – in contrast with the IP protocol suite that was now in widespread use in parts of the the academic and research world.

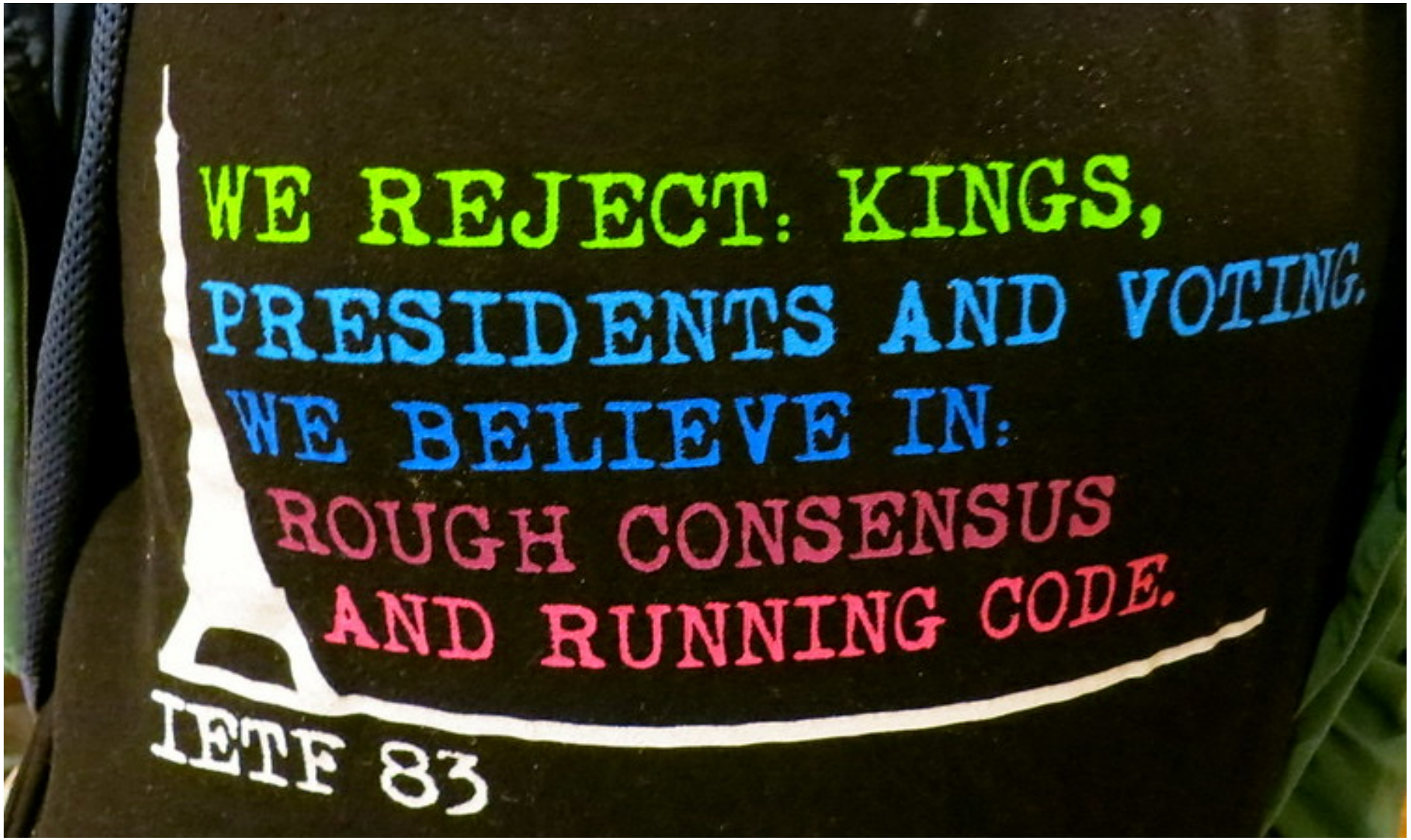
The IETF

- Was formed in acknowledgement that the US government agencies were not going to be the sole funding agency for the further development of the Internet. The Internet effort needed to broaden its support base and involve other researchers and industry to sustain it
- The interests of the folk involved in the effort had much in common - in that they wanted cheap, fully functional, and a common open technology that could work at scale. They were not interested in vendor proprietary approaches

The Tao of the IETF

Much has been borrowed from the research community:

- We participate as individuals, not corporates
- Documents are created to individual authors and editors, not anonymous committee
- Its open in almost every possible way
- Nothing is ever finished
  - Everything is a work in progress
  - Anything can be revised if a better approach comes along
- And there is no voting



Tristian Nitot, https://www.flickr.com/photos/nitot/8294413830

The Role of an IETF Standard Specification

- An IETF standard specification is meant to provide sufficient guidance to programmers such that any implementation produced in accordance with this specification will fully interoperate with any other implementation built from the same specification
- An IETF specification is intended to be ‘fit for purpose’. Its not meant to solve every problem, but it is intended to solve the problem it was intended to solve and not cause more problems for other
- An IETF specification is intended to describe open technology. If there are encumbered alternatives then the IETF would tend to use the option that was fully open. Otherwise the IETF will tend to use technologies that are generally freely available on non-discriminatory terms

Today's IETF

The effort is divided in many ways:

- The IETF LLC provides a corporate “home” for the various IETF activities – it is a “single member disregarded entity of the Internet Society”
- The IETF Trust, which provides a point for the licence of use of IETF material
- The Internet Architecture Board – a committee that has some oversight roles, liaison roles, procedural roles and some advisory roles. In their spare time they dabble in architectural topics
- The Internet Engineering Steering Group and Areas – the work of the IETF is divided into areas, and each area is headed by 2 Area Directors. These Area Directors are responsible for the overall technical management of the IETF activities and the operation of the standards process
- Working Groups – do the work!

And there's the IRTF

- The Internet can be looked at as an unfinished piece of work
- We are still learning how to do this well, at scale, in a secure manner, and without blowing it all up!
- The IETF has always engaged with the research community to provide us with insight as to what we could be doing and why – this engagement is structured into the Internet Research Task Force
- The IRTF has a number of Research Groups
- These groups may publish their thinking, but it is really iup to the IETF to take up any outcomes from these groups and map then into standard specifications

The Role of Standards

- In a command economy goods are produced on order and in accordance with the orchestrator of the activity
- In a deregulated economy goods are produced in hope that others will find them to be of value
  - The orchestrator of deregulated market is the market itself
  - Standard specifications are intended to support such a deregulated market by providing a neutral (in independent) benchmark that will allow producer and consumer to mutually assure compatability

IETF Failures

- Attempting to steer the course of the Internet through standards actions
  - NATs, IPv6, Security
- Losing touch with the research community
- Losing touch with current network needs and focussing on past requirements

IETF Successes

- Open to individuals to participate by contribution
- Debate the idea not the person
- Your future leadership are already in today's working groups
- Adapt and change to reflect a changing world
- Perfection is impossible in this space – try to aim for "useful", or even "not harmful"
- Be humble – things will change and "right" today may well be "wrong" tomorrow

IETF Challenges

- Renewal
- Relevance
- Sustainability

Thank You !