Part II: Internet Standards

- The role of standards
  - benefits and drawbacks

- Organizations involved
  - similarities and differences

- The standards process
  - help evaluating claims of “standard”
Internet Standards

- A technical definition of a network protocol, a protocol element, a data format
- Specified in sufficient detail that it can be implemented
- Supported by industry and users
- (Often) openly available
- (Often) published by a standards body
Importance of standards

- **Permanence**
  - Stability over time and version

- **Interoperability**
  - different vendors, platforms, contexts

- **Avoiding the “tragedy of the common”**
  - *Common resource: the Internet*
  - *Individual access: offering products and services*
  - *Common good: Internet interoperability*
  - *Use: “use my software”*
  - *Tragedy: everyone has proprietary extensions*
Formal Standards follow Innovation

Innovation, Divergence

Standardization, Convergence
Who creates Internet standards?

- Standards organizations
- Consortia
- Companies
- Individuals
Internet Engineering Task Force

- Defines standards for the Internet
- Different rules, structure than most other standards organizations
Internet Society

- Non-governmental organization created to coordinate Internet activities
- Umbrella organization for IETF
IETF structure

Internet Architecture Board (IAB)

Internet Engineering Steering Group (IESG)

Applications
- HTTP
- HTML
- URC
- ...12 WG

Security
- WTS
- PKIX
- ...6 WG

Transport
- ...6 WG

User Services
- ...7 WG

...9 areas
IETF Working Groups

- Open organizations
  - no formal membership, all volunteer
- Most work happens via email
  - may meet at IETF meetings (3 a year)
- Small focused efforts
  - published goals and milestones
- No formal voting
  - “Rough consensus and running code”
IETF Documents

- Internet-Drafts
  - works in progress, no formal status
  - deleted after 6 months

- RFCs (*Request For Comments*)
  - Archived series of documents
  - RFC 1796: “Not all RFCs are Standards”
IETF RFC Categories and Process

Standards Track

- **Proposed Standard**
  - complete, credible specification
  - demonstrated utility
  - 6 months - 2 years

- **Draft Standard**
  - multiple independent interoperable implementations
  - 4 months - 2 years

- **Standard**
  - operational stability

Other Categories

- **Experimental**
  - not ready for standards track

- **Informational**
  - Important but not standards track

- **Historic**
  - superseded or otherwise unused
World Wide Web Consortium

- Members are vendors and user organizations
- Paid (and volunteer) staff
- Develops web-related standards
- Hosts workshops, working groups
W3C Process

- Advisory Committee sets priorities
- New work requires member approval
- Exploratory workshops spawn working groups
- Working groups for members
  - outside experts may be invited
W3C Document Status

- **Notes**
  - no official status
  - may be statement of opinion, policy, obsolete

- **Submission**
  - Contribution from member
  - may or may not be basis for future work

- **Working Draft**
  - interim document of working group

- **Recommendation**
  - stable document approved by members
  - short review period as “proposed recommendation”
W3C and IETF relationship

- Narrow overlap:
  - W3C focus on Web
  - IETF focus on Internet protocols
- W3C *researches and develops* protocols
- IETF *reviews and resolves* standards
- Coordination in overlap
  - W3C participates in IETF
Other groups developing Internet standards

- Consortia, vendor groups, trade groups
  - ECMA (formerly European Computer Manufacturer’s Association)
  - CommerceNet
  - Internet Messaging Consortium

- ANSI, ISO, ITU
Summary: Internet standards

- Increasing Number of Organizations
  - Common goal: improve the value
  - Many opportunities to participate
  - Common element: wide review and consensus

- Evolution along many fronts
  - Web, Mail, commerce, devices
  - some overlap

- Standards come after innovation
  - local market forces contervail
Future of Internet Standards

- Innovation still leads, standards will follow
  - *This will not end*
- Organizations adapt too
  - *IETF, W3C change*
- Interoperability vs. features
  - *if we’re careful, we can have both*
- Avoiding the tragedy of the commons
  - *local greed over global optimization*