



# Why open protocols are important



- Computer Protocol

- *In computing, a protocol is a convention or standard that controls or enables the connection, communication, and data transfer between two computing endpoints. In its simplest form, a protocol can be defined as the rules governing the syntax, semantics, and synchronization of communication. Protocols may be implemented by hardware, software, or a combination of the two. At the lowest level, a protocol defines the behavior of a hardware connection. -- Wikipedia*

[http://en.wikipedia.org/wiki/Protocol\\_%28computing%29](http://en.wikipedia.org/wiki/Protocol_%28computing%29)



- TCP/IP
  - TCP, IP, ICMP, and related protocols
  - A protocol suite
- HTTP
- SMTP: Simple Mail Transport Protocol
- X.25
- Shaking hands
- The “*namaste*” or “*How do you do?*”



- A designer or design team needs two boxes to talk to each other
- The features of the communication: the “verbs”
- Performance considerations: speed, reliability, acknowledgement, transaction guarantee
- The “build or buy?” question



- Requirement: general-purpose computer communication
- Requirement: de-centralised
- No requirement: guaranteed response time
- Result:
  - IP address: 4 octets, no information content
  - IP: lightweight, non-guaranteed datagram
  - TCP: guaranteed-delivery stream transport
  - ICMP: control and regulation of data



- By companies:
  - IBM: the SNA protocol suite
  - Digital: the DecNet protocol
  - Microsoft: the SMB/CIFS suite
- By the “open” or “semi-open” process:
  - TCP/IP
  - Ethernet
  - 802.11b/g (wireless Ethernet)



- Initial design done by a research team
- All intermediate results, discussions, published in research journals
- Suggestions freely given and accepted
- Competing and alternate designs highlighted
- Let the users decide how good it is



- Some “open” protocols have been born in industry
- Initial implementations manufactured and sold (either hardware or software)
- Protocol definition then handed over to an independent consortium or industry body (*e.g.* IEEE)
- Example: Ethernet, the hardware standard





- Created by a company:
  - Microsoft for SMB
  - IBM for SNA
- Protocol standard *NEVER* handed over to an independent body
- Changes, revisions keep coming from the original parent
- All other implementers are in a state of perpetual dependency



- No single company can keep a competitive edge over other implementers
- As customer, you choose from many implementations and vendors
- If the user community wants a new feature, a new version of the protocol is added by the industry as a whole
- Compliance is visible and transparent
- No “secrets”



- Designed by DEC and Xerox
- Initial Ethernet protocol was proprietary IP
- If you want to manufacture an Ethernet card, you'll have to pay royalty
- After “opening up” of the protocol, royalty was waived
- Old price of Ethernet card: USD 1000
- Current price: almost free



- Designed by a research team using the “open” process from the start
- Enormous emphasis on pragmatism and simplicity
- Initial implementation in “open source” form in BSD Unix on VAX-11 systems
- Continuously upgraded by the “open” process



- The “open” process for upgradation and extensions: the RFC (Request for Comments)
- Anyone (yes, even you) can write a Draft RFC
- It is circulated and reviewed worldwide
- Your test implementation is also reviewed
- If accepted, it becomes a Draft Standard, then a Standard RFC
- 2500+ RFCs currently in the archives; you can download and read them all, free of cost



- Originally created by Microsoft for MS-DOS based on an old IBM protocol
- Runs on NetBEUI or (later) TCP/IP
- Heavy enhancements added for WinNT, then for Win2K server family
- Modern features:
  - Domain feature of NT
  - Active Directory extensions



- Microsoft's protocol is never fully documented
- Bugs and major security holes are always discovered by reverse engineering
- Reverse engineering is now illegal in the USA (DMCA)
- No third-party product with this protocol is ever as good as Microsoft's implementation
- No "community-based" improvements, fine-tuning or growth
- If the user base needs a feature and MS does not want to give it... then???



- Compatibility issues with existing “open” protocols: NT’s TCP/IP implementation
- Sometimes unnecessary incompatibilities are implemented: Active Directory extensions to DNS and LDAP
- Result: very long-term proprietary lock-in for customers on Microsoft platforms





- Samba: open source implementation of SMB
- Constant stability problems due to incompatibilities
- A Samba server can not replace 100% of a Win2K server
- A never-ending game of catch-up
- However, Samba is by itself an excellent implementation



- You are safer with an “open” protocol
- You have to live with your protocol choices much longer than application software choices
- Finally, single-vendor lock-in always translates to higher cost for end-user
- Open protocols are usually of a higher quality
- Open protocols are more secure

**AOSS**  
TRAINING

---



Thank you