History of OSI

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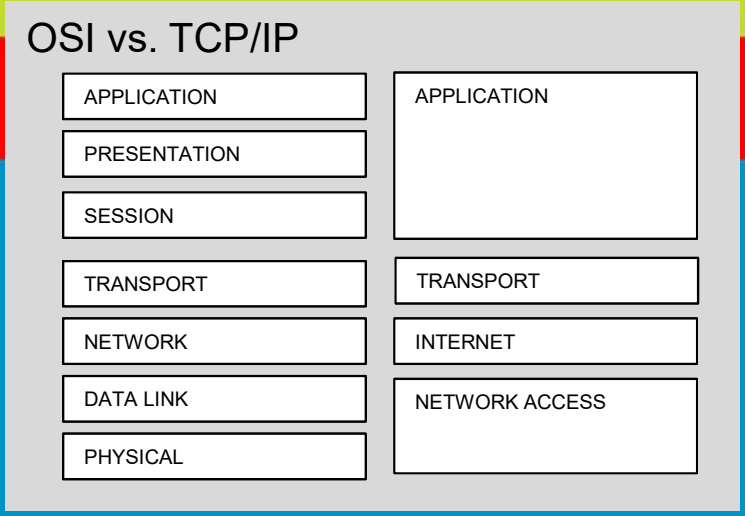
Curso 2017/2018



Foreword

- This presentation is based on the article

  “The Internet that wasn’t”, Andrew L. Russell

  IEEE Spectrum – 08-2013
- The author is Assistant Professor of History, Stevens Institute of Technology, N.J., USA
- He wrote an article in 2006 about OSI history:

  “Open Systems Interconnections (OSI) and the Internet”, *IEEE Annals of the History of Computing*

Foreword

- He received several emails from OSI veterans complaining about the way he pictured OSI
- The *IEEE Spectrum* article tries to make up for the incomplete description of events performed in the 2006 paper
- There is an upcoming book about this subject:

“Open Standards and the Digital Age: History, Ideology and Networks” (Cambridge University Press)

Introduction

- 35 years ago a group of computer industry representatives started developing a computer network standard
  - *France, U.K. and U.S.A*
- OSI: Open Systems Interconnection
  - Main goal: Enable global exchange of information
- **1980**: Thousands of engineers involved
  - OSI seemed a reality
- **1990**: TCP/IP was adopted

"OSI is a beautiful dream, TCP/IP is living it"

1960

- Computer communications was a hot research topic
- Packet switching arises
  - Paul Baran, Rand Corporation (USA)
  - Donald Davies, National Physics Lab (UK)
    - Data is decomposed in discrete blocks (packets) that are routed separately
    - The receiver reassembles the packet to obtain the original message
    - More efficient than circuit switching
- In **1969** Researchers from DARPA (Defense's Advanced Research Projects Agency) create the first packet-switched network: **ARPANET**
- **IBM** and European telephone monopolies started similar projects
  - IBM mimicked circuit switching → virtual circuits

    The idea was to reuse established technology constraining the development packet switching

1970

- In **1972** the International Network Working Group (INWG) was created to standardize packet switching
  - USA, UK and France: Cerf, Pouzin, etc.
- Luois Pouzin - leader of Cyclades, the French packet switching project - proposes the idea of the datagram:
  - Packets are sent without creating a connection
- INWG supported the datagram
- **1975**: Submission of networking protocol to CCITT

  Rejected!
- INWG blame circuit switching supporters for the negative
- **1975**: Cerf leave for ARPA
  - Cerf and Kahn (ARPA) published the basis of the Internet

  "Transmission Control Program", *IEEE Transactions on Communications*

1970

- **1978**: Pouzin abandoned French packet switching network (already with no funds)
- **1977**: UK proposed to ISO the creation of a standard for packet switching
  - Idea backed by France and USA
  - Goal: Interconnection of any kind of computer
  - Break monopoly from big companies
  - Creation of the “Open Systems Interconnection” → OSI
- Charles Backman (database expert) was the committee chairman
  - OSI was inspired in IBM Systems Network Architecture
  - However, OSI supported heterogeneity, and this was most welcomed by many companies with many different computing systems: **General Motors**

1970

- OSI layered model enabled **modularity:**

  Different committees and working group for each layer
- Each standard had to follow the ISO's 4-step process
  1. Working draft
  2. Draft proposed international standard
  3. Draft international standard
  4. International standard
- 28 Feb. **1978**: First plenary meeting
  - 10 countries and observers from international organizations
  - IBM managed to convinced OSI to include many of their business interests
- OSI forged and alliance with CCITT: datagram vs virtual circuits, <u>again!</u>
  - Both points of views were included in OSI → complexity!

1980

- **1984**: OSI reference model is published as an international standard
- There were individual standards for:
  - transport protocols
  - electronic mail
  - network management, etc.
- Meanwhile, USA developed TCP/IP (Internet, but still a research project) but...
  - **1983**: TCP/IP adopted as the Internet protocol
  - They joined OSI in **1985** and wanted to apply it! (?)
  - **1990**: All USA computers must follow OSI
- **1989**: OSI is still under development
  - Concerns from OSI people
  - Lots of money invested from companies, USA and European Community
  - Internet looked very attractive (it was already working...)

1990

- In the **mid-1990** it was clear that OSI was not happening
  - Too many interested parties
  - Too much bureaucracy
  - Too complex
- OSI was seen as an incomprehensible standard however
  - **1992**: Routing was modified based on OSI recommendations
- Internet was adopted because:
  - Internet standards were free, while OSI standards were not
  - It was up and running (in USA)
  - It also promoted openness
- OSI had some good points:
  - It has a better architecture
  - It was more complete