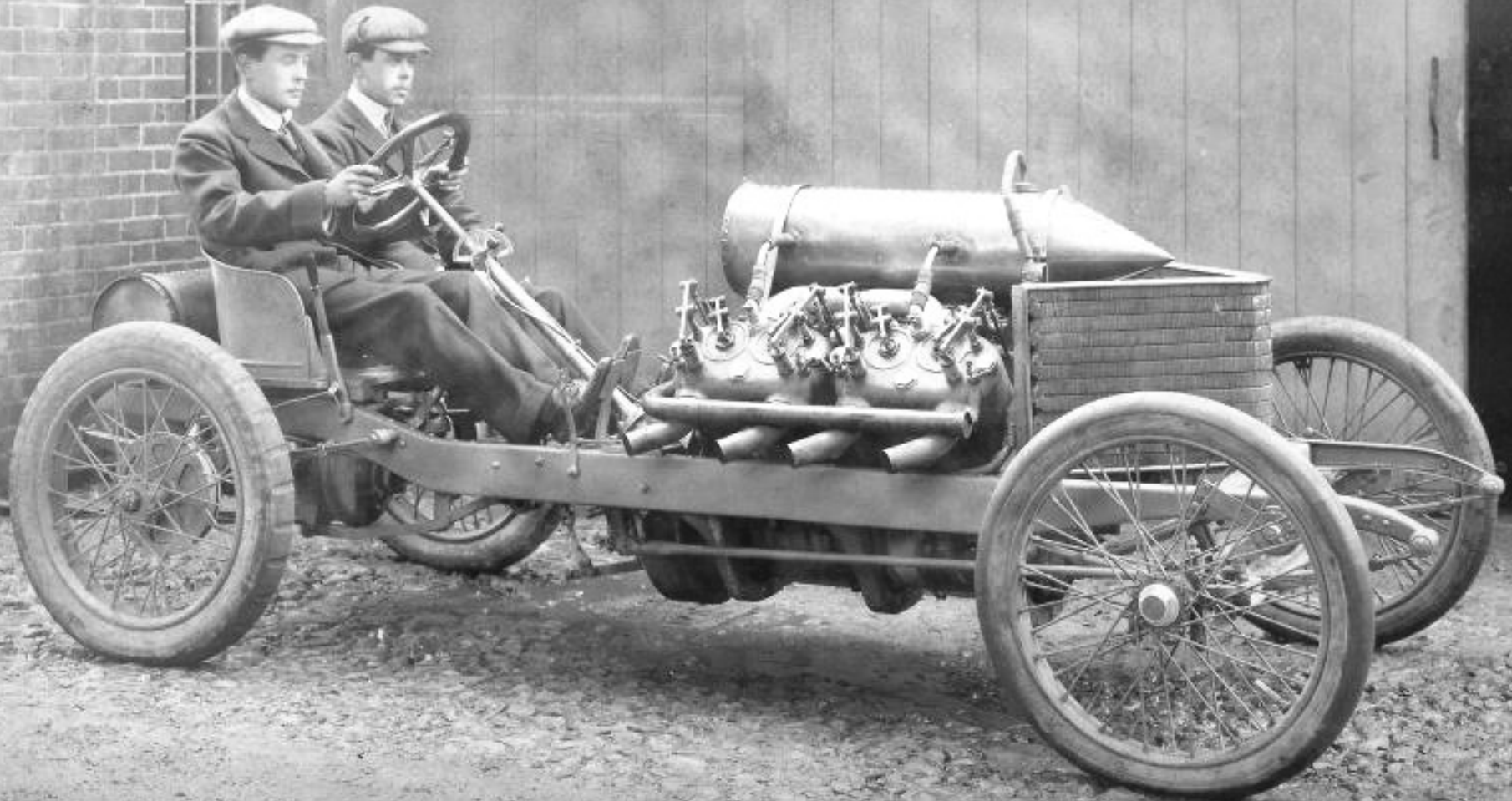


The past is a foreign land  
- they do things  
differently there!



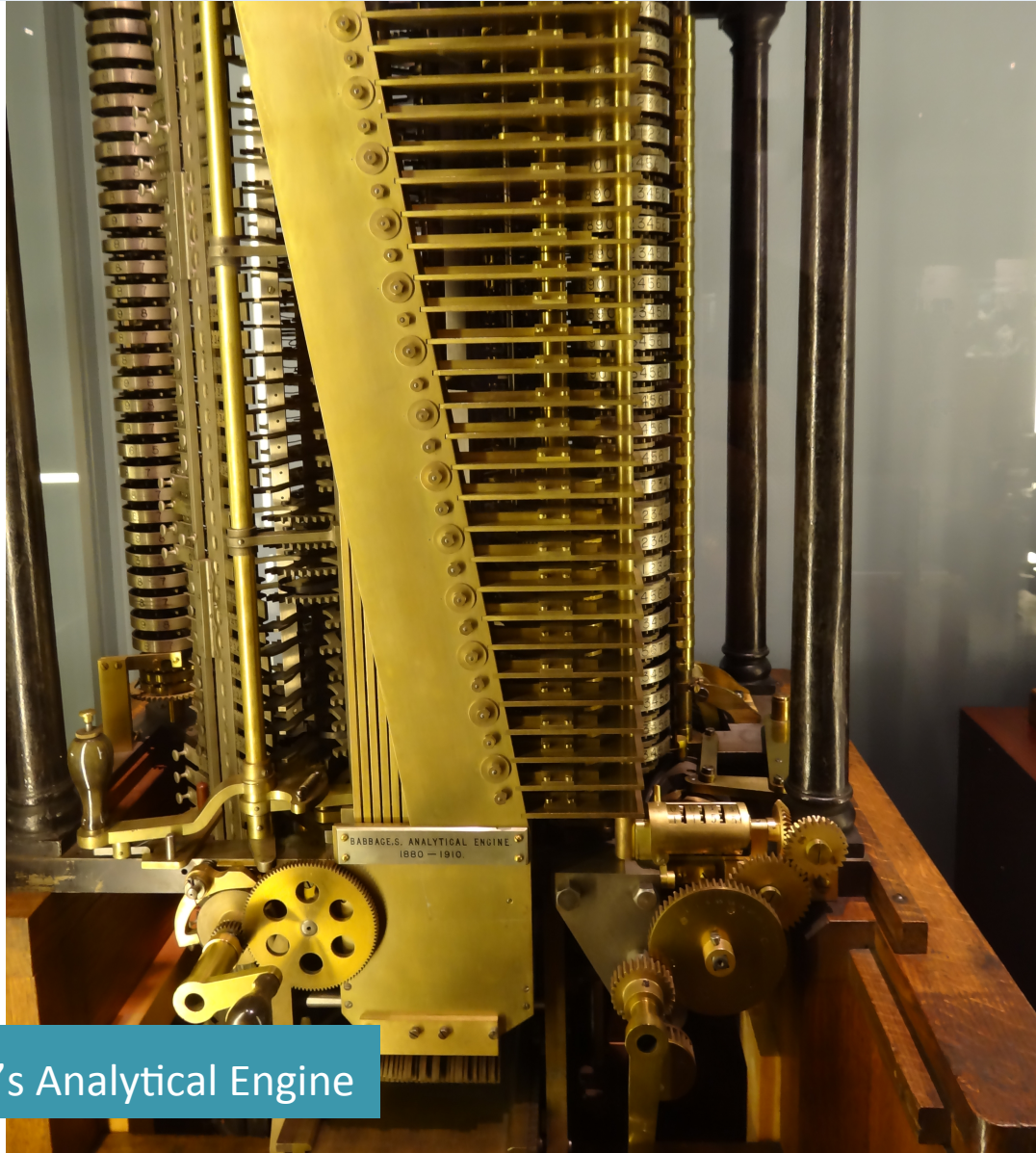
# The Computing Evolutionary Path



1843 – Palmer's Patented Slide Rule



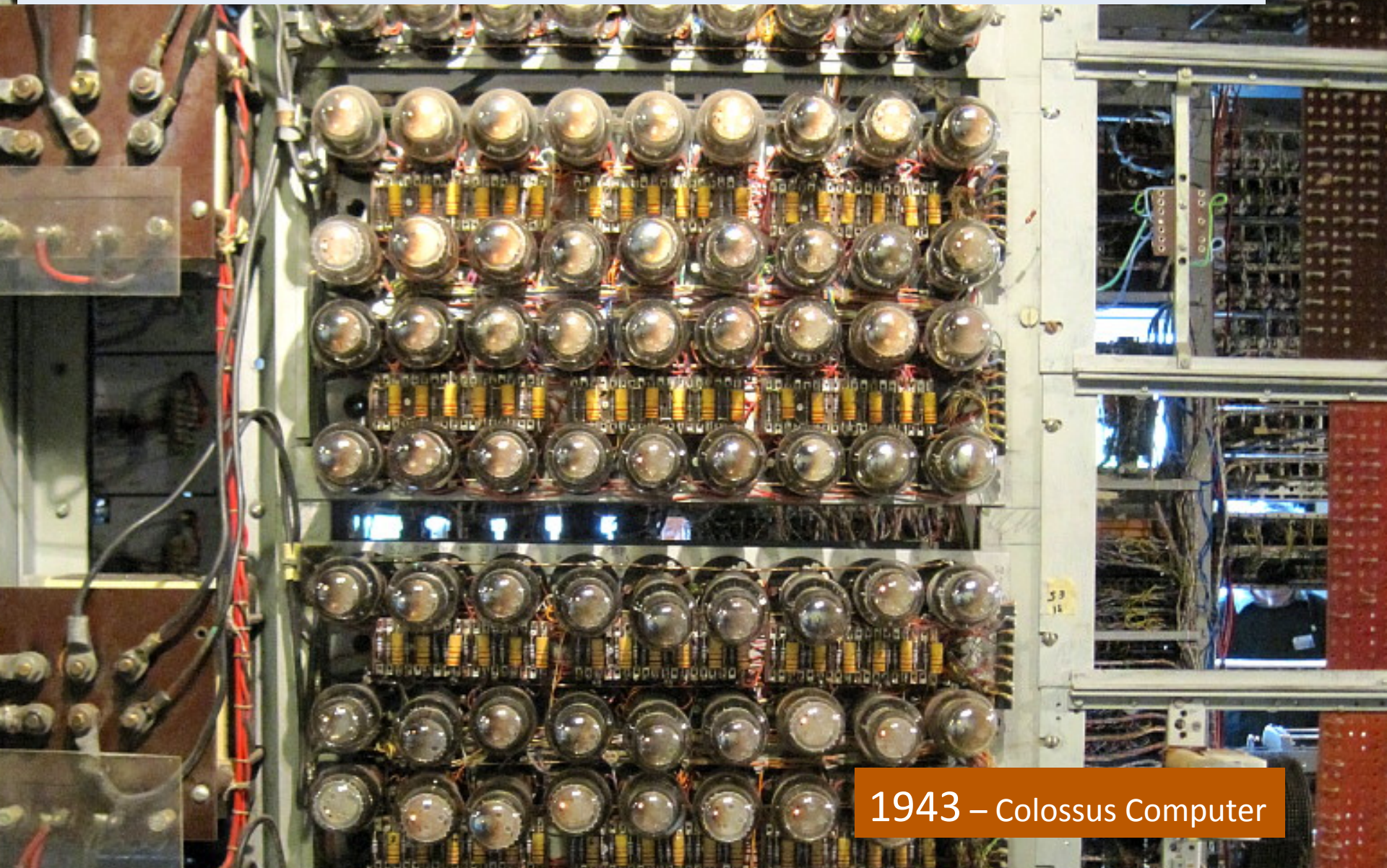
# The Computing Evolutionary Path



1837 – Babbage's Analytical Engine



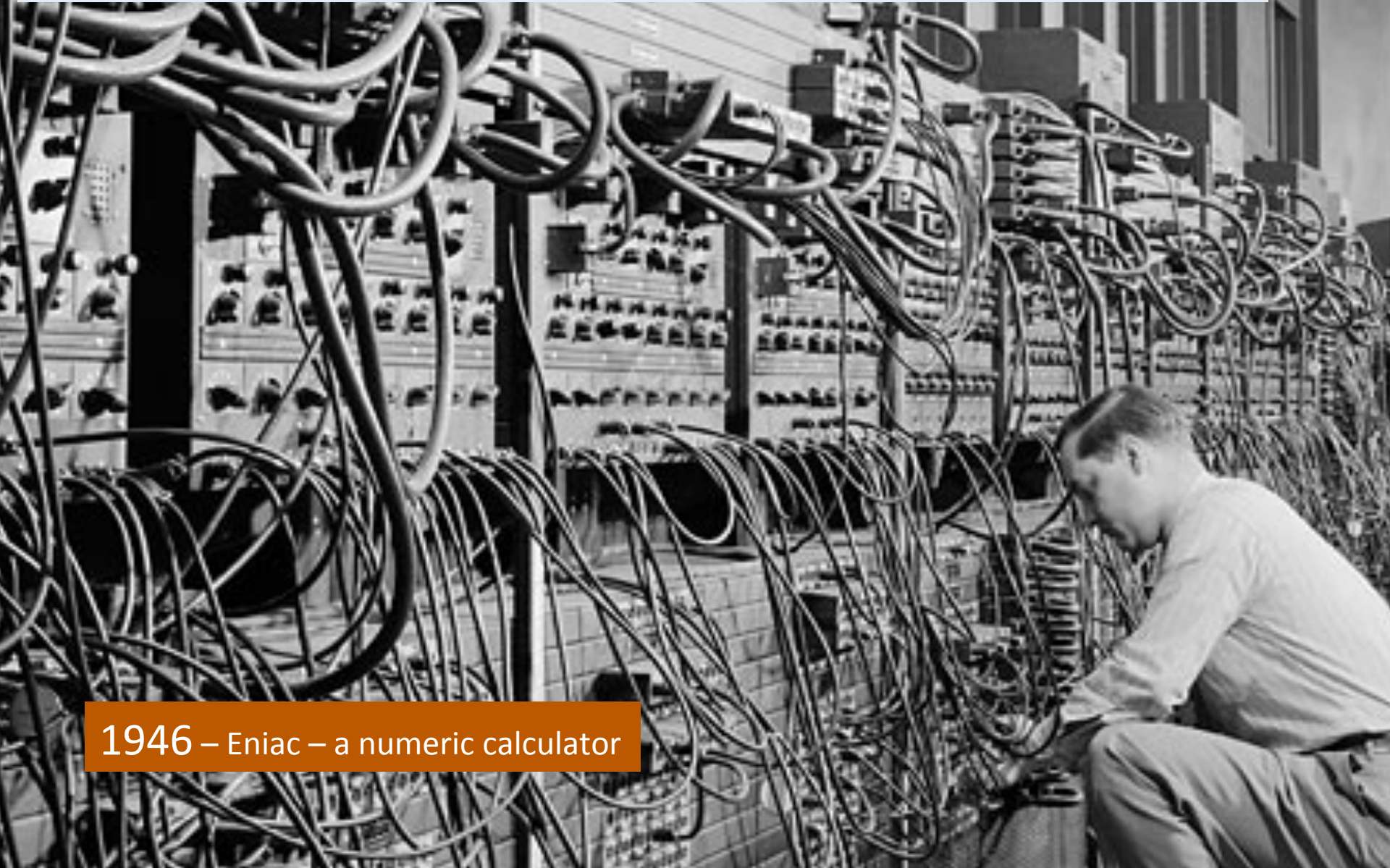
# The Computing Evolutionary Path



1943 – Colossus Computer

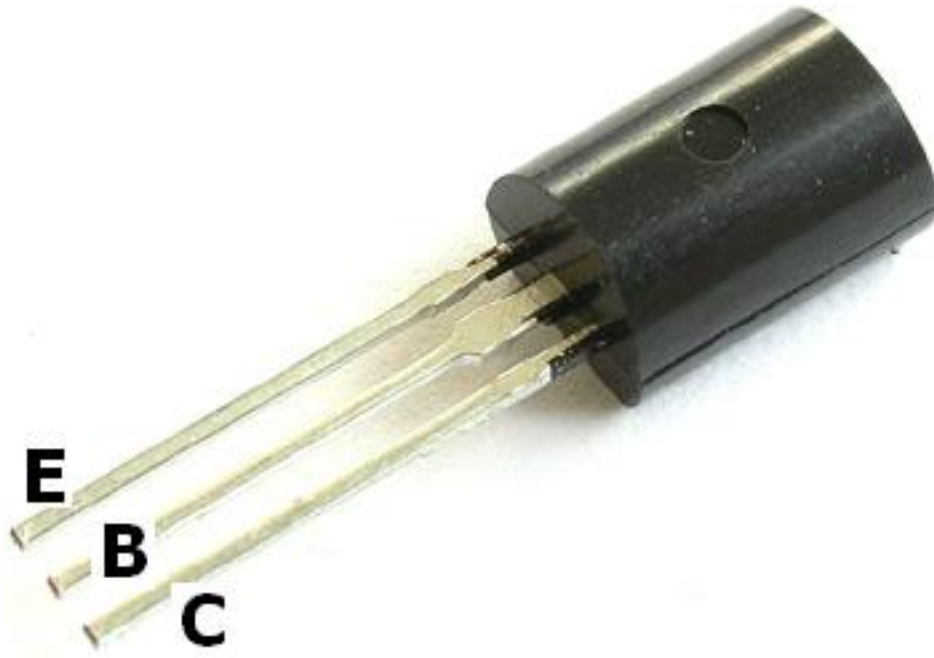


# The Computing Evolutionary Path



1946 – Eniac – a numeric calculator

# The Computing and Comms Evolutionary Path



1947– The Transistor



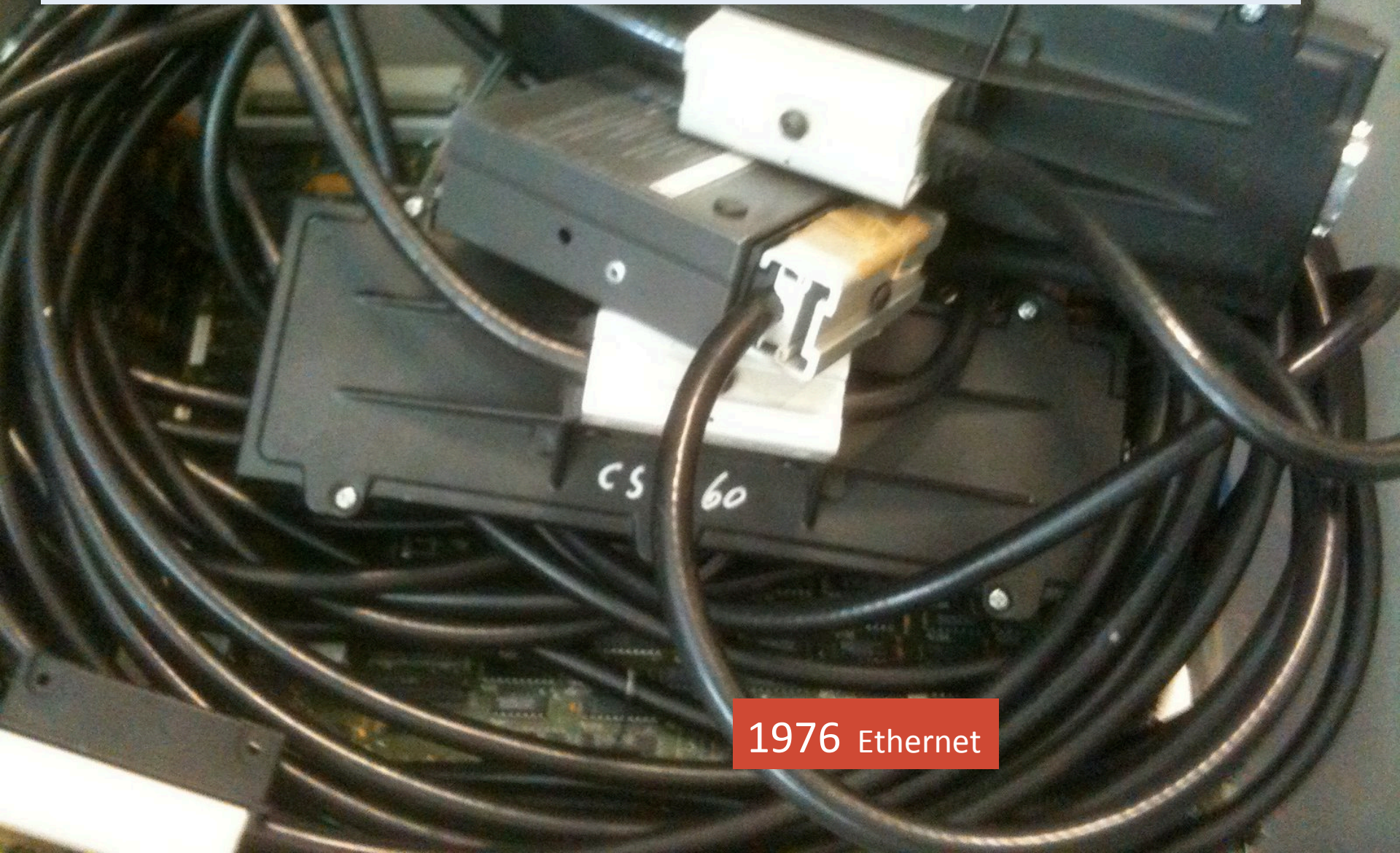
# The Computing Evolutionary Path



1964 IBM 360 – commercial computing



# The Computing and Comms Evolutionary Path



1976 Ethernet



# The Computing Evolutionary Path



1976 CRAY-1 – “super” computing

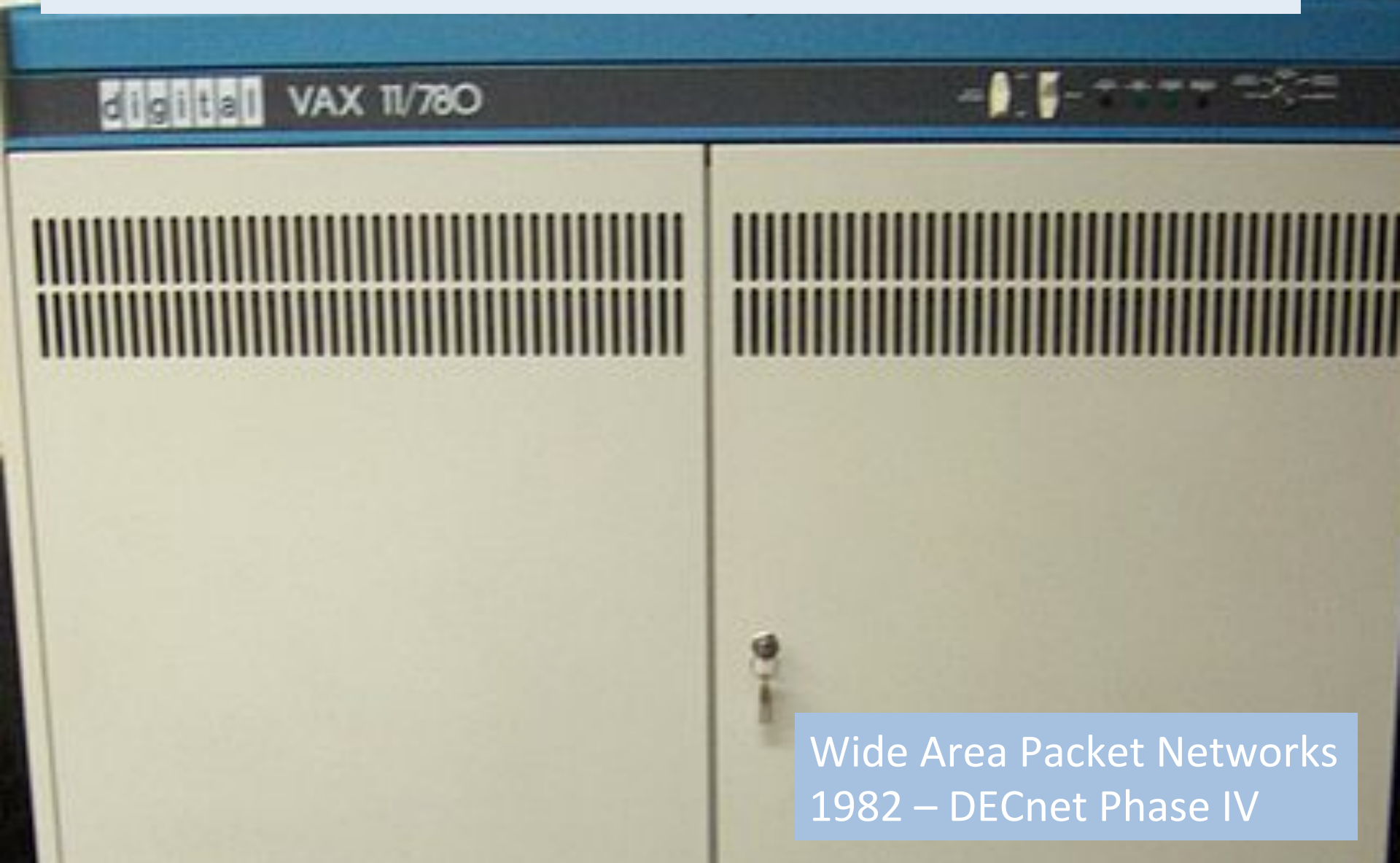
# The Computing Evolutionary Path



A fork in the road:  
1976 – Apple-1 “personal” computing



# The Computing and Comms Evolutionary Path



Wide Area Packet Networks  
1982 – DECnet Phase IV

# The Computing Evolutionary Path

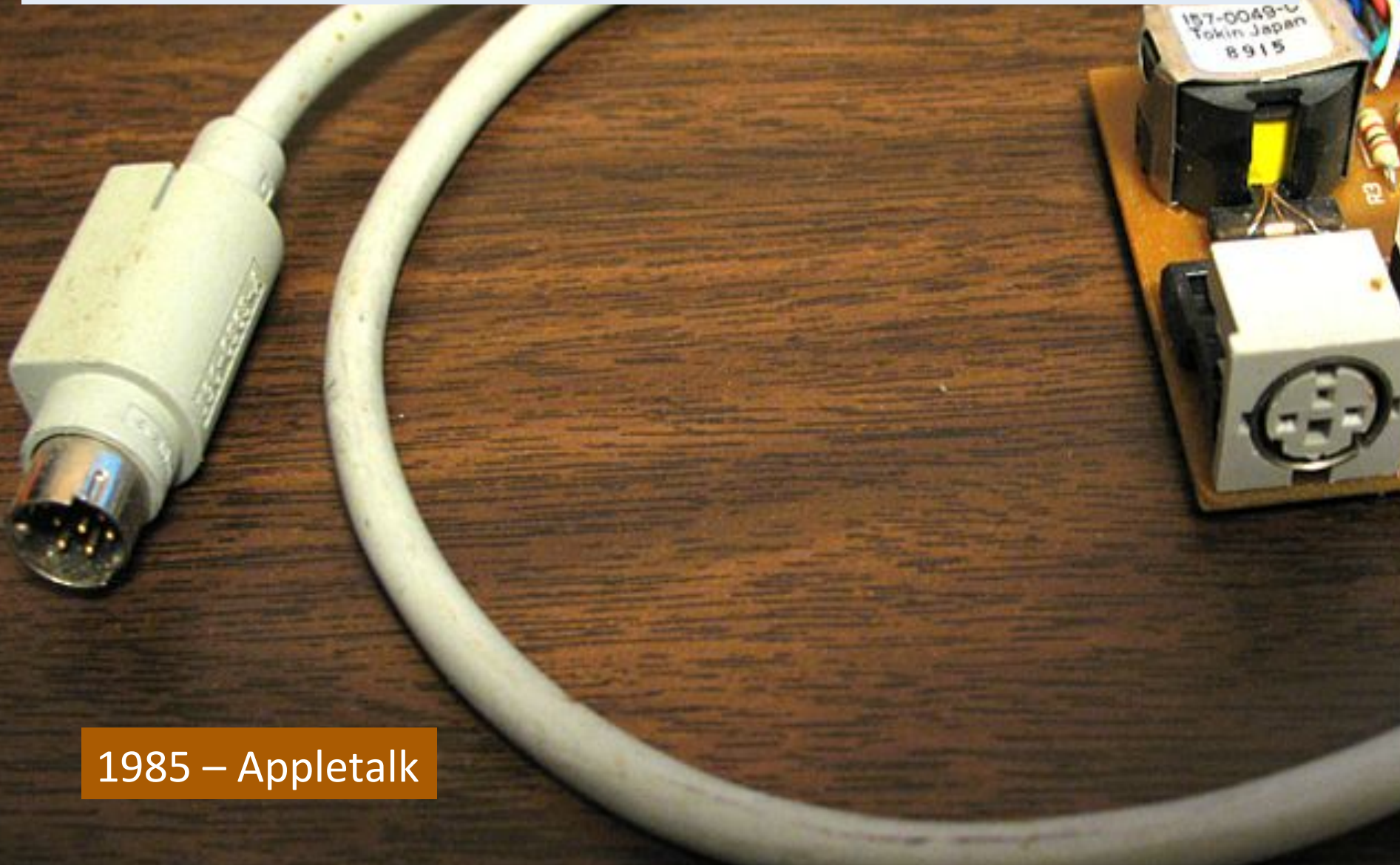
1984 – Mac - visual computing





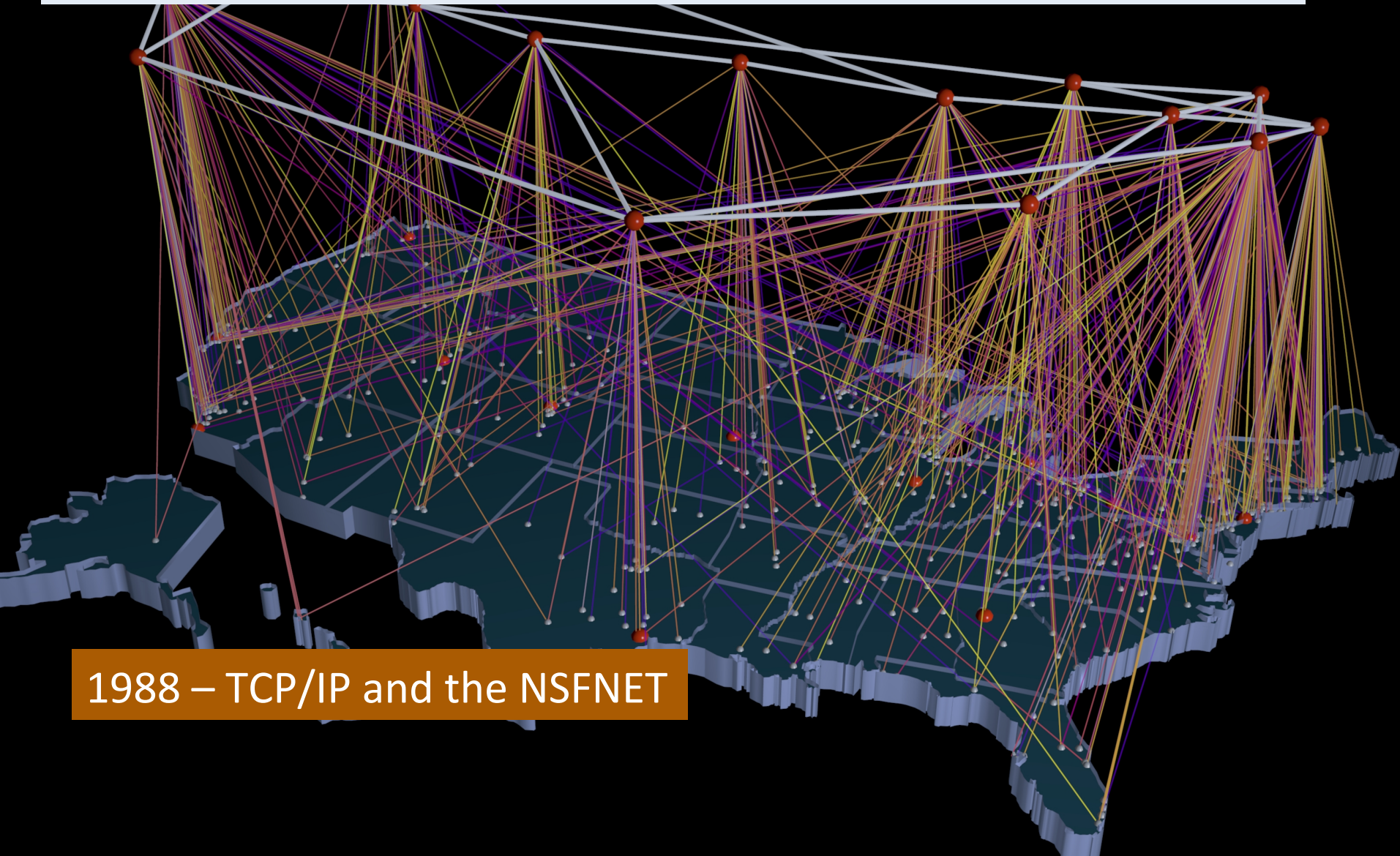
# The Computing and Comms Evolutionary Path

1985 – Appletalk





# The Computing and Comms Evolutionary Path



1988 – TCP/IP and the NSFNET



# Which brings us to 1989

(Or thereabouts)

Somewhere in Japan...





# A few familiar faces



# A few familiar faces





# A few familiar faces



Fashions have changed since then (thank god!)





What were we talking about then?



# ***Background***

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- **The mainframe to PC transition**
- **Shift away from terminal access networks**
- **The Local Area Network of peering hosts**





# ***The Field of Fire***

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- **ISO/IEC OSI**
- **Internet IETF**



# ***OSI - the Dream***

---

- **An "open" architecture**
- **specified from physical to application interface**
- **universal signon by the industry**
- **The specification of a single ubiquitous technology interoperation platform for the industry as a whole**





# ***From Dreams to Nightmares***

---

- **telcos never understood the real extent of the domain**
  - **telcos are not no longer at the cutting edge of technology development**
  - **telcos are predominately billing enterprises!**
- **The process of standards definition was flawed when applied to technology development**



## ***And of course***

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- **X.400 & X.500**
  - **working together defining the address from hell**





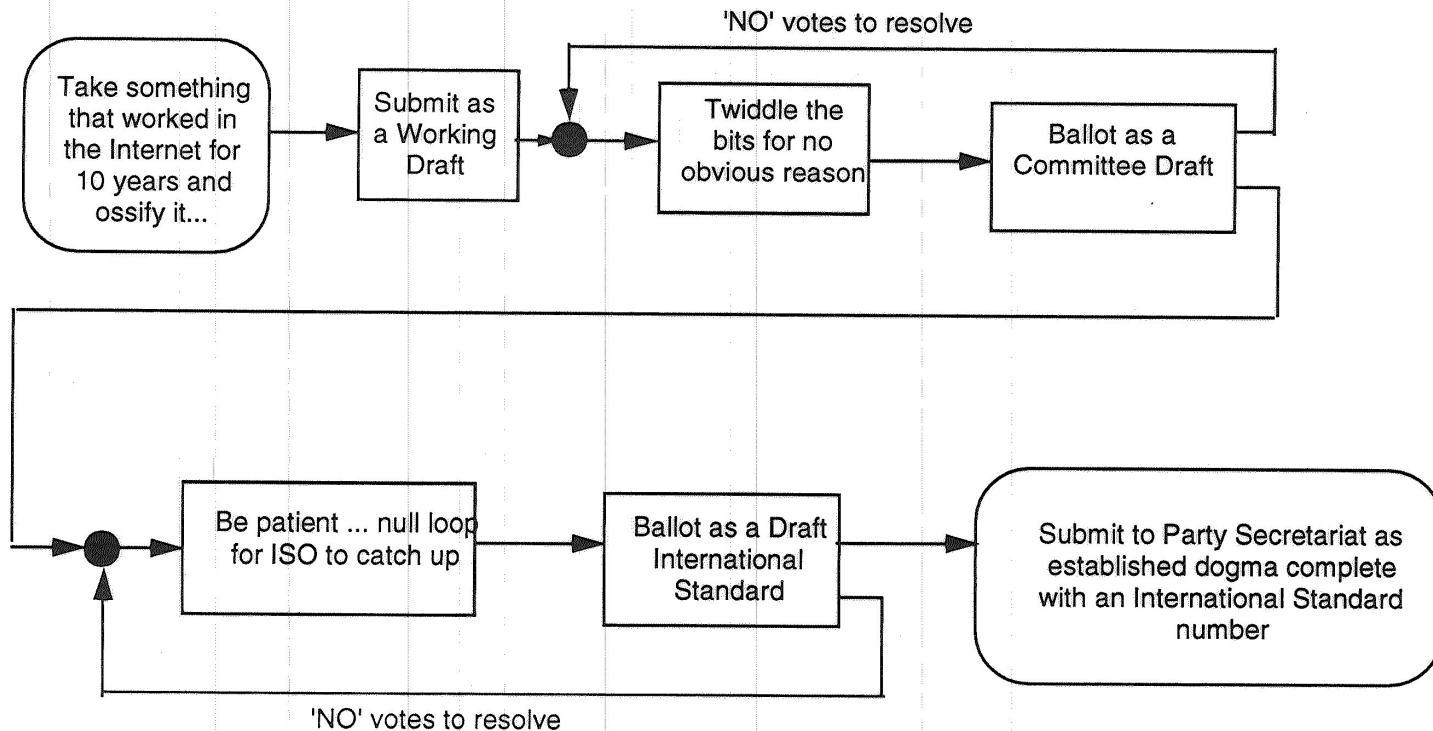
# ***The Network Management Debacle***

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- One should never attribute to malice that which can be adequately explained by incompetence

# The OSI Standards Process

(after Piscatello and Chapin)







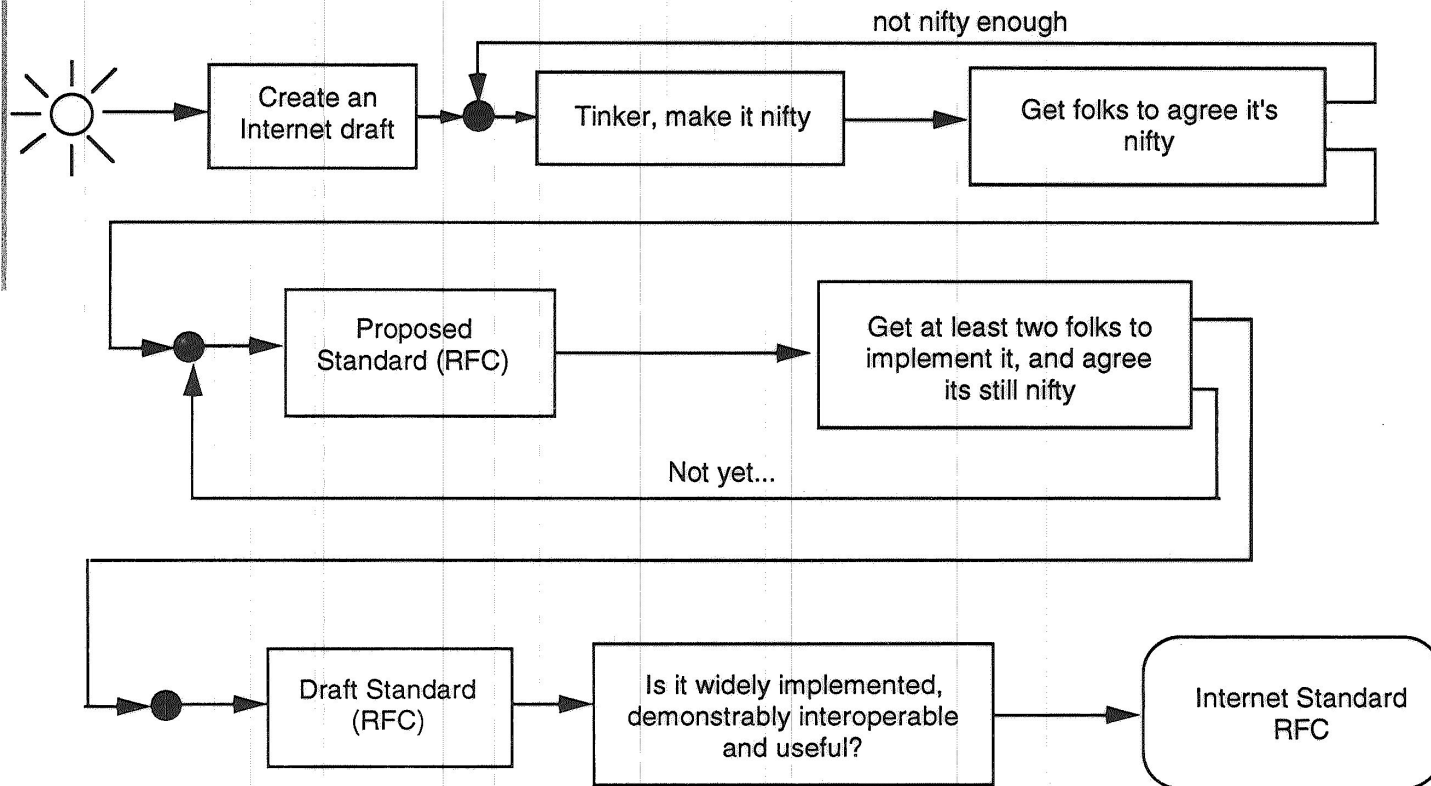
# ***The Impotence of Good Ideas***

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- **The OSI Standards Process...**
  - **Any Good Standards Process must be equally unfair to all participants**

# The Internet Standards Process

(after Piscatello and Chapin)







# ***The Role of Standards***

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- **Document sane and rational current operational practice**
- **Freely available**
- **Useful to developers, vendors and consumers**
- **not whimsical attempts at eternal truths**



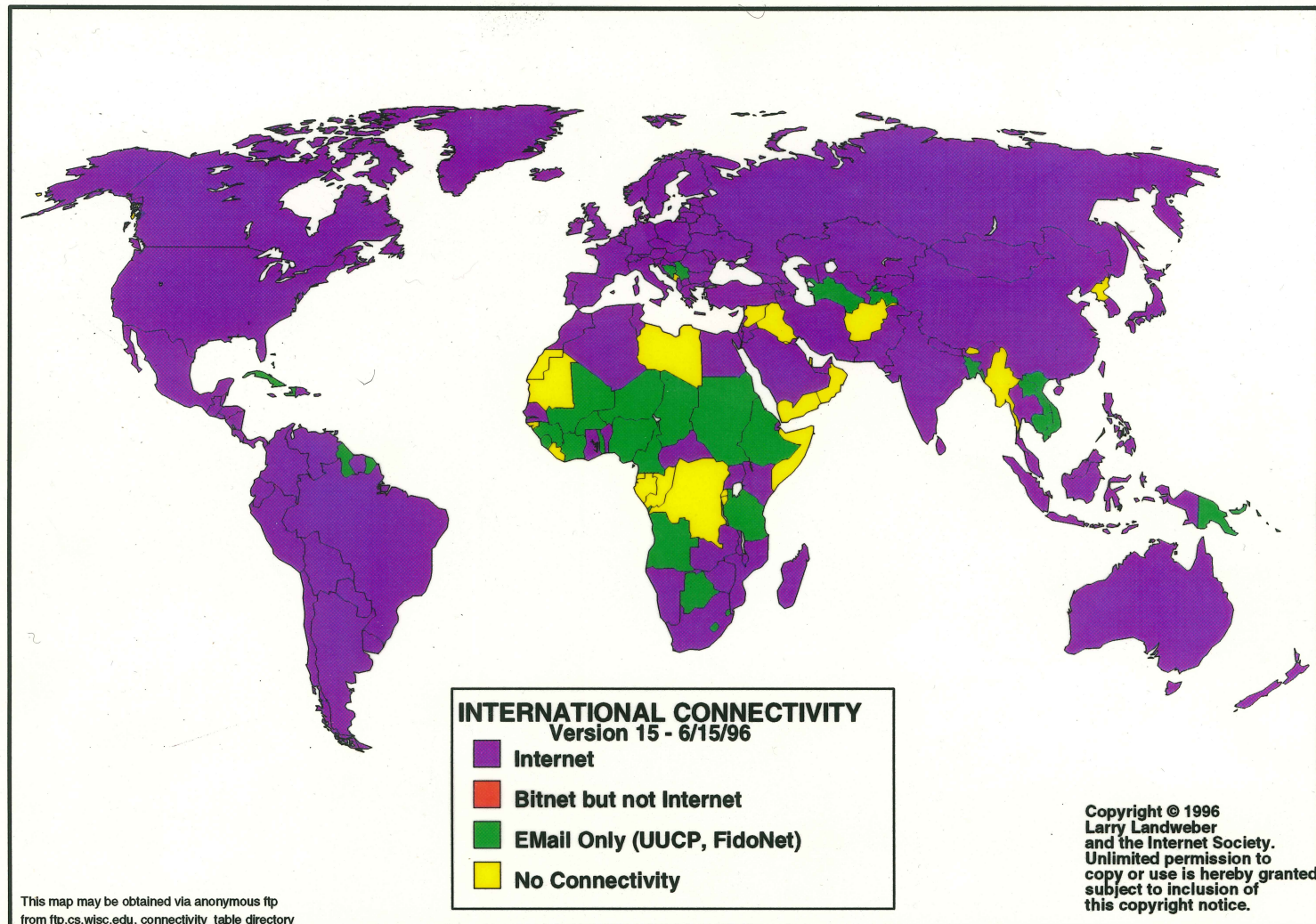
# ***Networking ..***

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- **sane technology choices**
- **underlying industry approach to rational competition**
- **the political process is a massive diversion of effort**



# We had high hopes for the Internet



# But we were a lot younger then



# And we were the underdog



Photo Credit: <https://www.flickr.com/photos/barrielynn/1817195121>



Things are different now

# Things are different now

We won

# Things are different now

We won:

We won the protocol wars with OSI

We won the voice wars with telephony

We're winning the content wars with television

Computers and the Internet are now everywhere...



# Recording **everything**



2005



2013

Always with us





All the time





And it sure looks like...

And it sure looks like...

WE are now the problem!



Street Art: Banksy