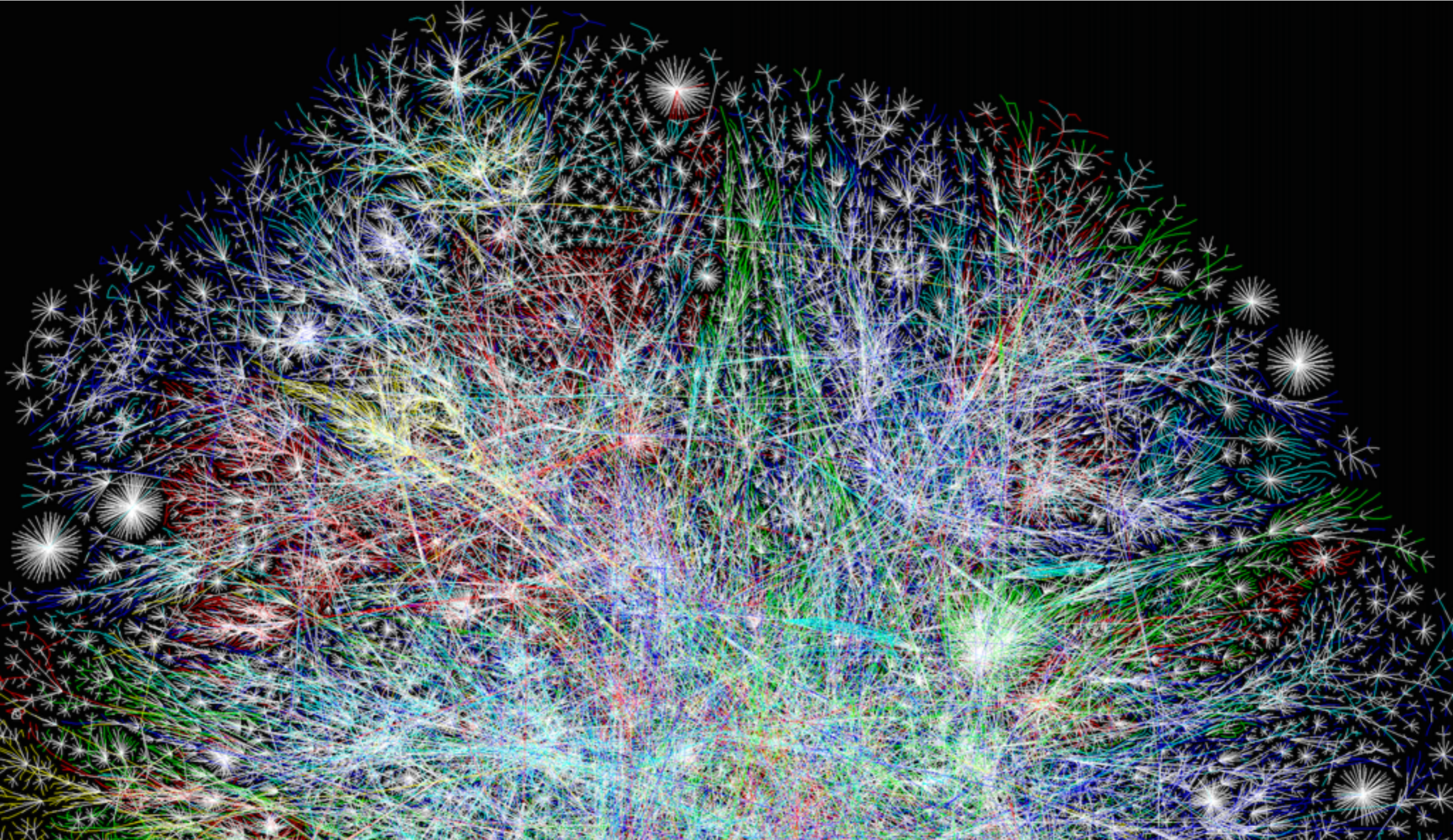


+ presentatie **Netwerken**





gedistribueerd netwerk van gedistribueerde netwerken...





Geschiedenis van Internet

1972: ARPAnet

1982: TCP/IP standaard

1984: CERN en NSFnet verbinden supercomputers

1985: introductie domeinnamen

1988: Internet wordt algemeen in academia

1991: Gopher protocol (hyperlinks)

1993: (ontwerp-)versie HTML v1.0

1995: eerste commerciële internet startups

2000: einde dot-com bubble

2005: browser wars

2008: social media

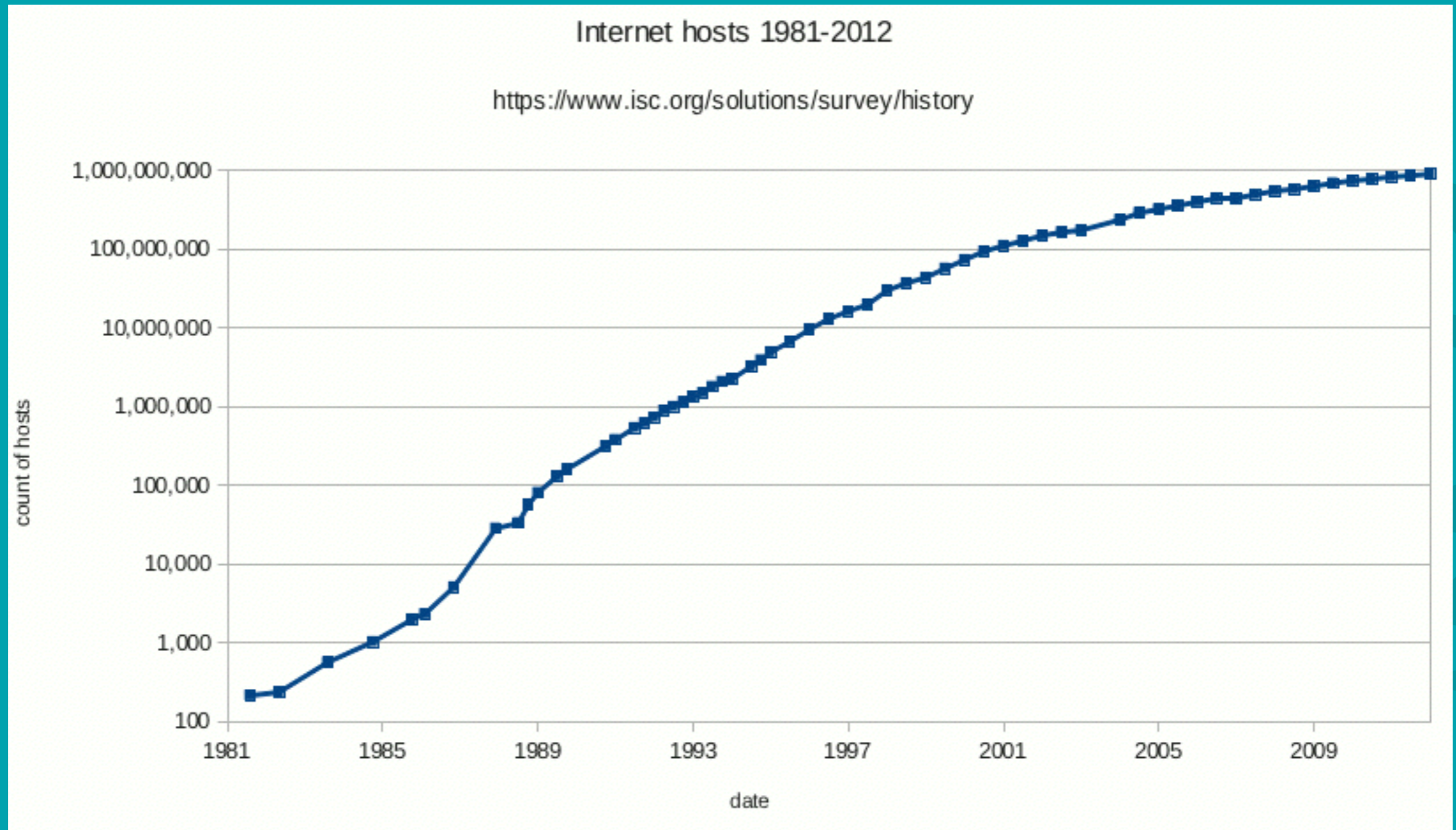
2010: mobile web

2015: internet of things en big data





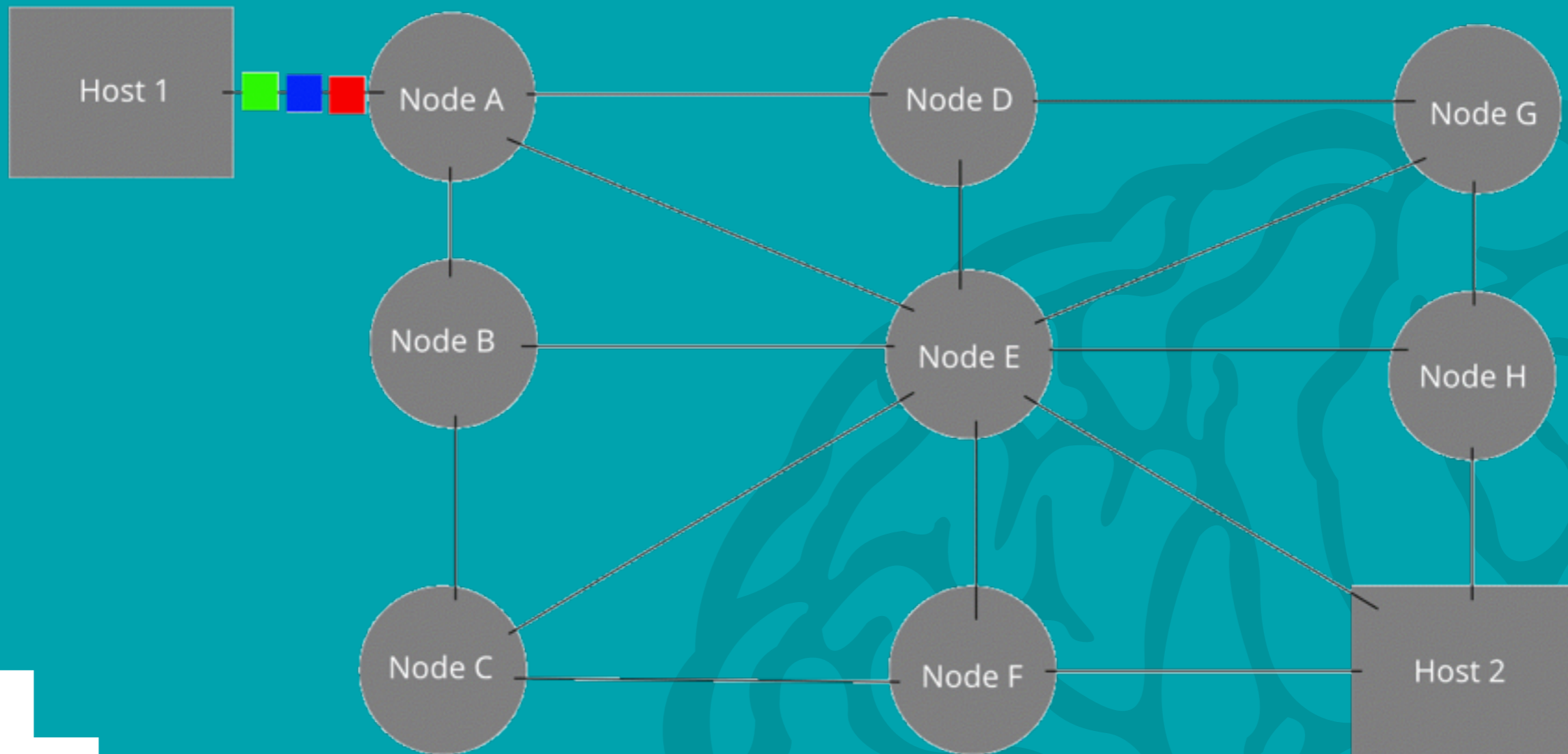
Geschiedenis van Internet II





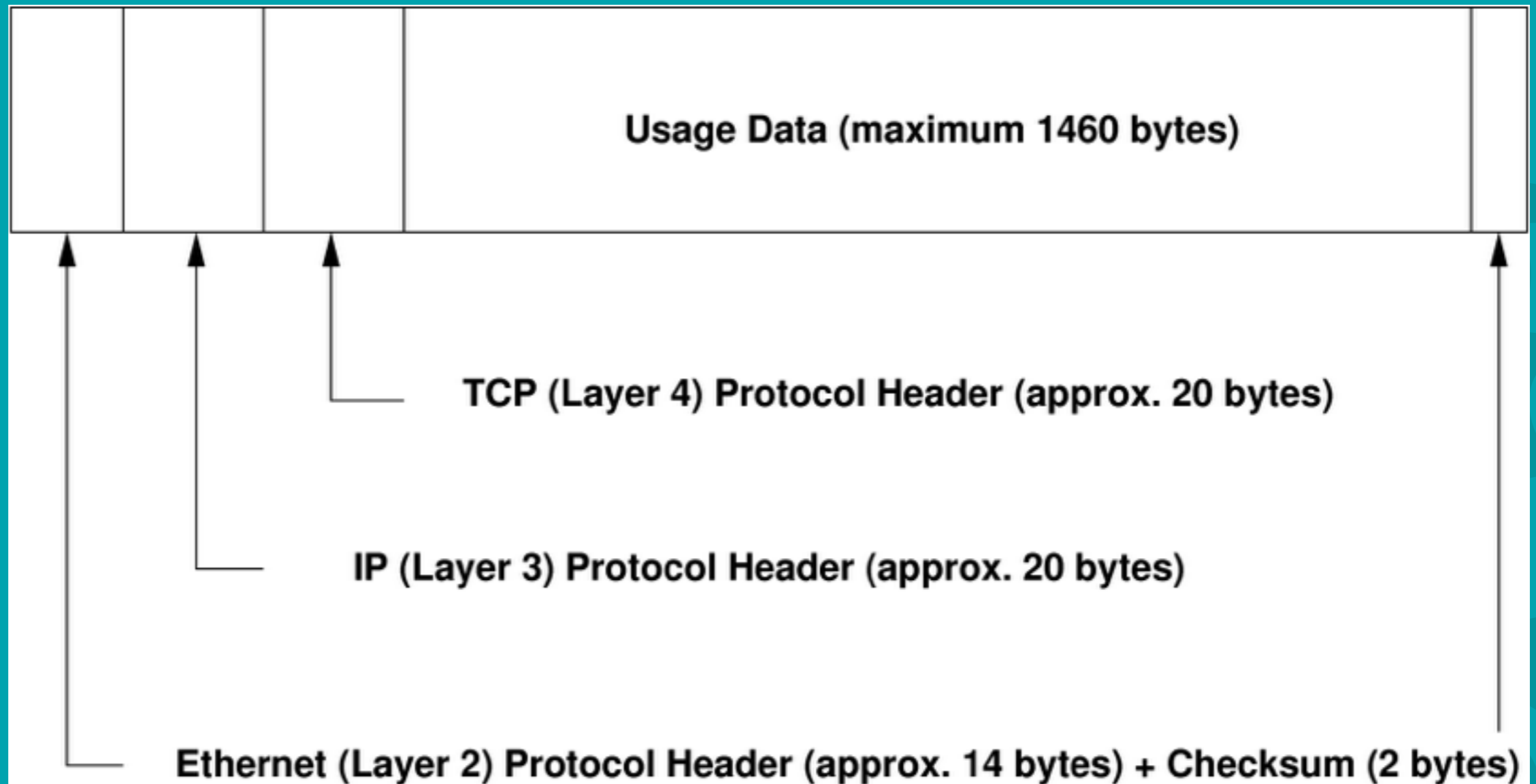
Packet Switching

The original message is **Green, Blue, Red**.





Packet Switching II





Packet Switching III

Juniper core router 20 x 2TB/s



serverkooi van een peer op AMS-IX





IP-adressen

subnetten



Een IP-adres: 137.120.014.156

machine

Class B netwerk: 65.000 unieke ID's





thuisnetwerken: NAT

WAN = Wide Area Network

Extern IP-adres: 77.118.023.113



192.168.0.101 192.168.0.102 192.168.0.103

Interne IP-adressen, afgeschermd van Internet!

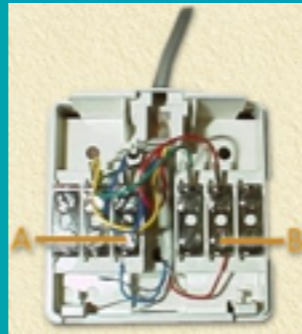
LAN = Local Area Network





thuisnetwerken: verbinden met je ISP

(A/S)DSL



kabel



glasvezel





sitecom “router”

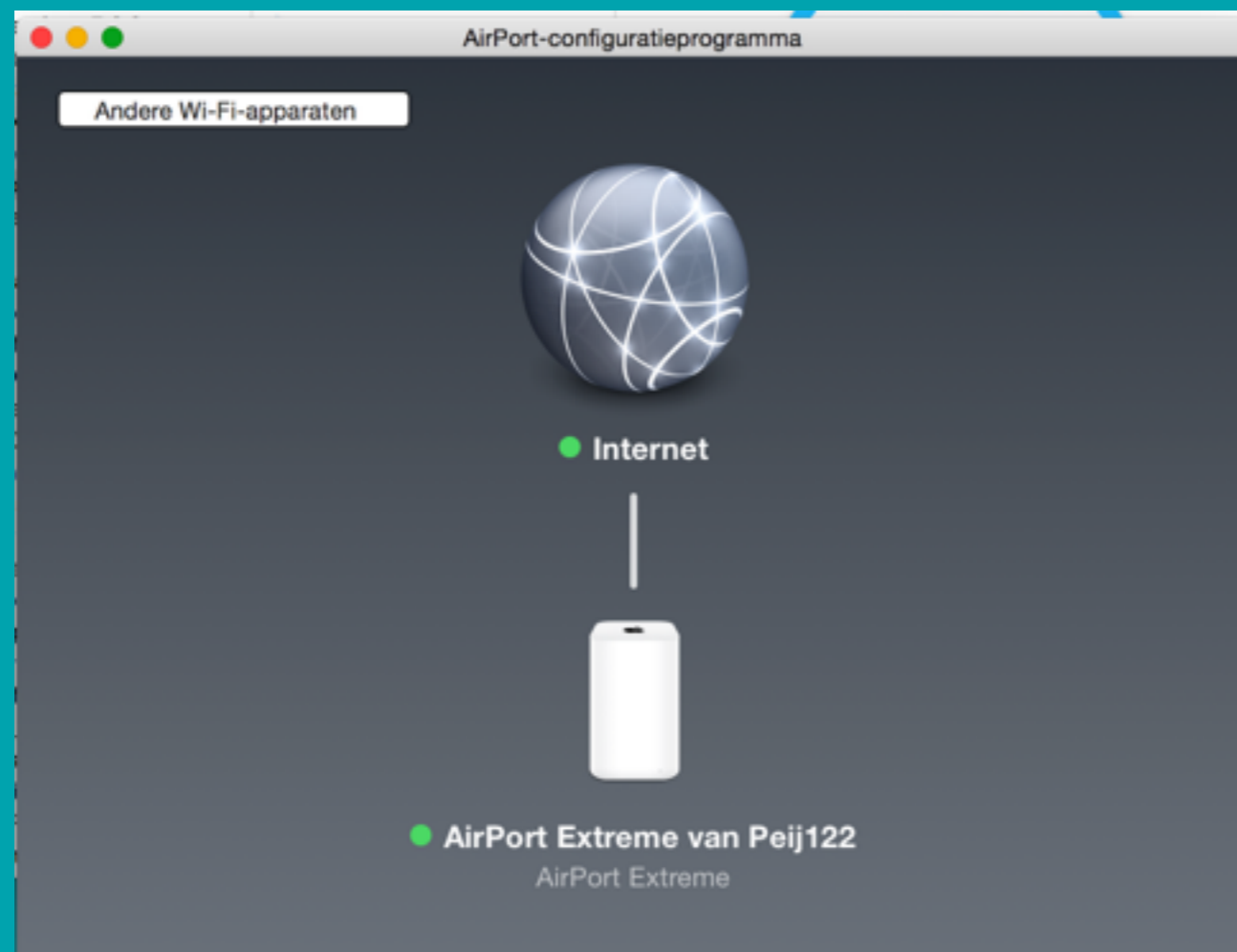


1. **Modem**
2. Switch
3. Router
4. DHCP-server
5. WIFI access point
6. USB-hub
7. Firewall





Apple Airport router



1. Modem
2. Switch
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7. Firewall





Alphabet Soup

“The nice thing about standards is that you have so many to choose from.” *Andrew Tanenbaum*

UPnP: Universal Plug and Play
DLNA: Digital Living Network Alliance
Airplay

LAN = 802.3 = Ethernet
802.3 10BASE5 (coax)
802.3i 10BASE-T (twisted pair)
802.3y 100BASE-2T (twisted pair)
802.3aq 10GBASE-LRM (dark fiber)

...

WLAN = 802.11 = WiFi

802.11a
802.11b
802.11g
802.11n
802.11ac

...

2.4GHz
5 GHz

Bluetooth

RF

IrDA = Infrarood

...





DLNA of Airplay?

	DLNA	Airplay
Twonky	✓	✓
iOS en OSX		✓
JRiver	✓	
B&W, Bose, etc.	✓	✓
SONOS	✓	
Devialet	-	-
Auralic	✓	✓





Bandbreedtes

	<i>bandbreedte</i>
mp3 128kbps	128 Kbps
mp3 320kbps	320 Kbps
redbook CD (44.1 kHz/16bit)	1411 Kbps
SACD (48kHz/24bit)	5644 Kbps
DVD Audio	9600 Kbps
24/96	4400 Kbps
24/192	8500 Kbps
4K video (uncompressed)	3.8 Gbps



WiFi max \approx 160 Mbps