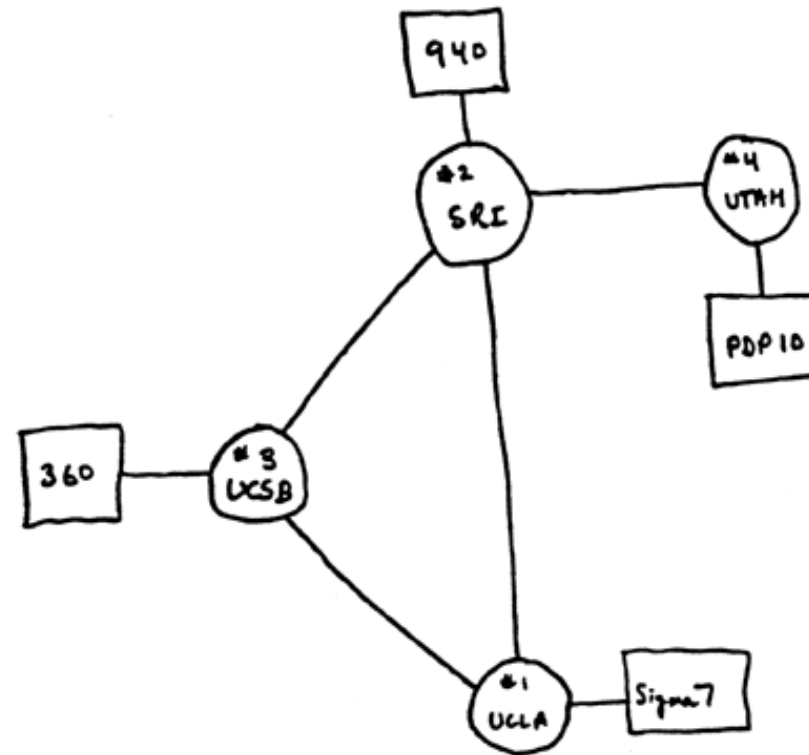Welcome to

Internet Internals
A short story

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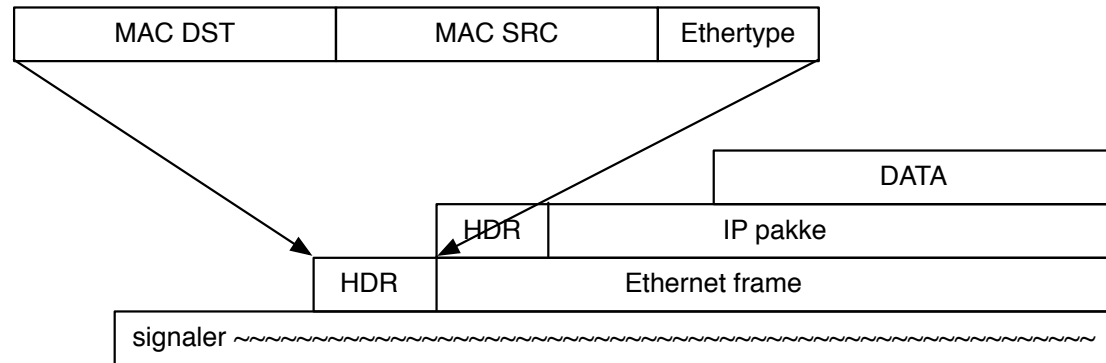

Cryptoparty - Januar 2015 PDF available kramshoej@Github

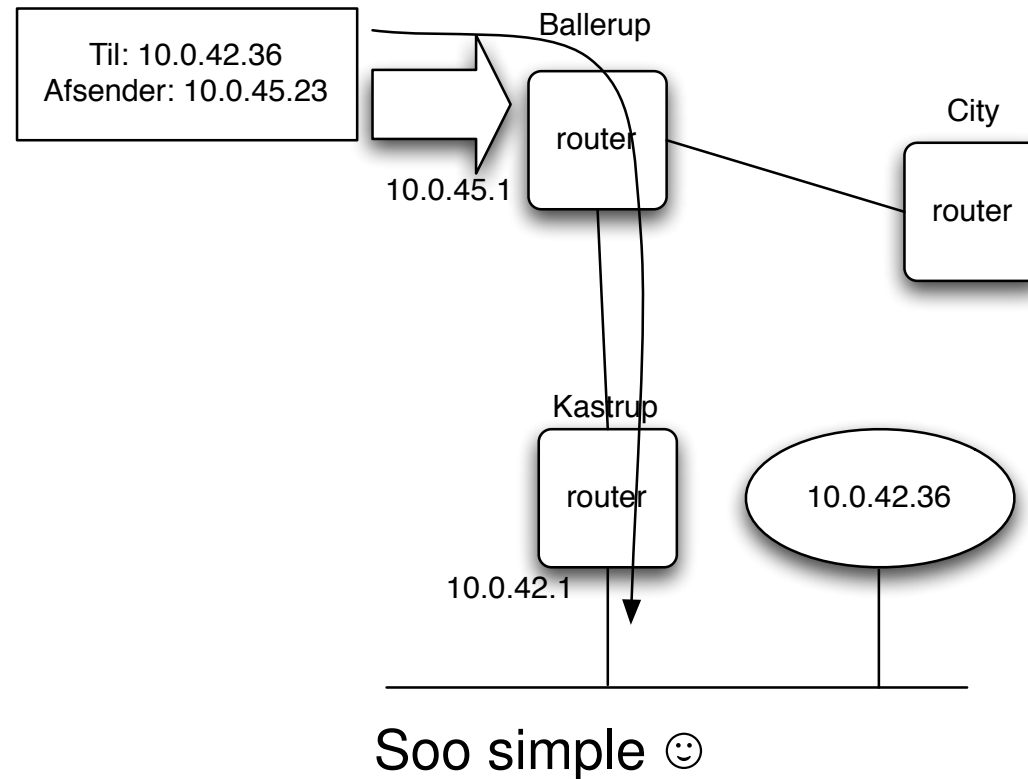# Goal today

1969: ARPANET 4 nodes

Present some internet internals, what is it?

TCP/IP basics

MAC DST	MAC SRC	Ethertype

```
                                              DATA
                           HDR        IP pakke
                HDR              Ethernet frame
     signaler ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

```
     0                   1                   2                   3
     0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |Version|  IHL  |Type of Service|          Total Length         |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |         Identification        |Flags|      Fragment Offset    |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |  Time to Live |    Protocol   |         Header Checksum        |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |                       Source Address                          |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |                    Destination Address                        |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |                    Options                    |    Padding    |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

                 Example Internet Datagram Header
```

Internet Protocols since approx 1983

Routing

Til: 10.0.42.36
Afsender: 10.0.45.23

Ballerup

router

10.0.45.1

City

router

Kastrup

router

10.0.42.1

10.0.42.36

Soo simple ☺

IP routing is based on address longest match in the routing table

Internet core today AS numbers
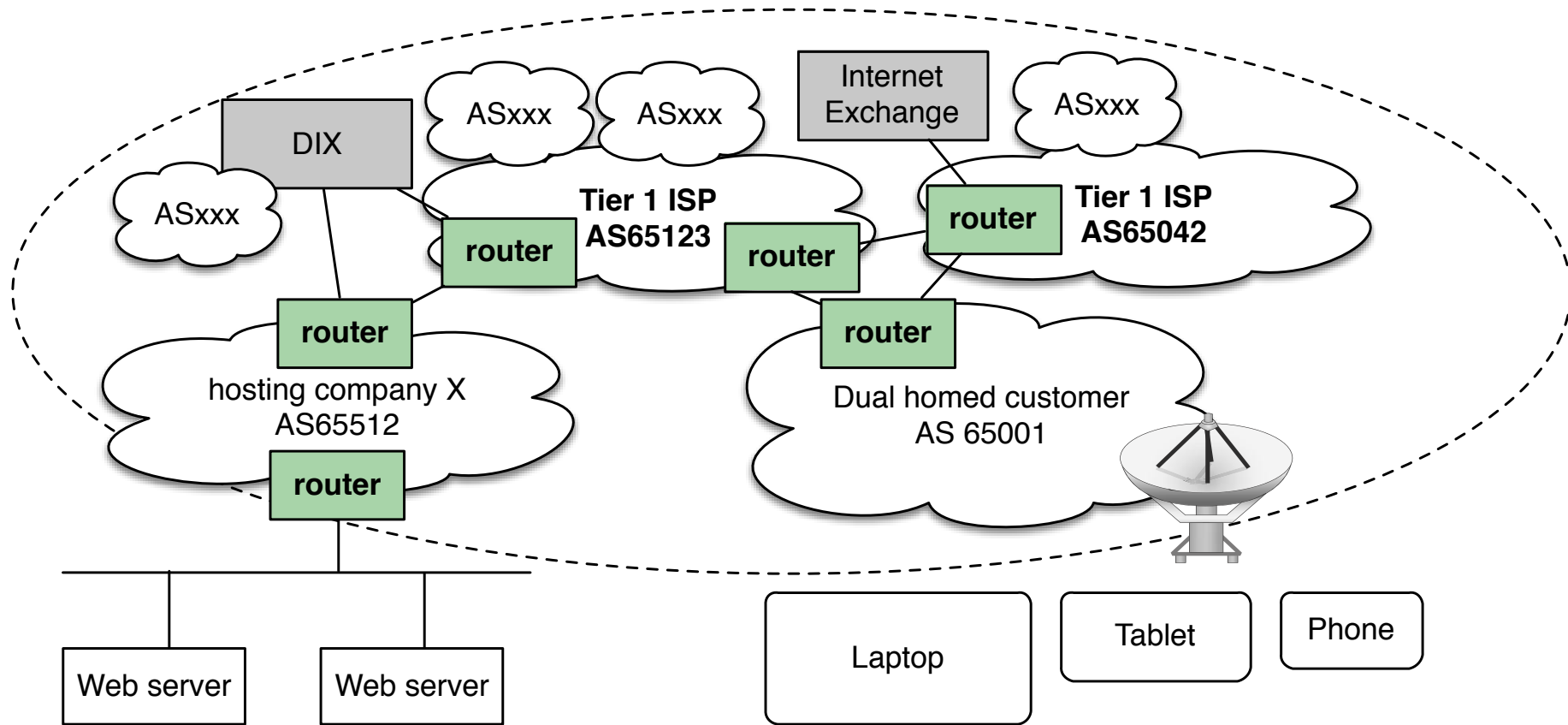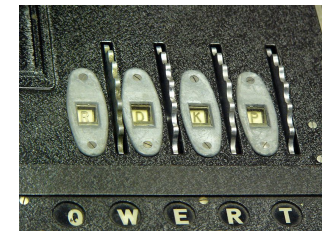
Also pretty pictures in *Intercountry BGP As Topology* Martin J. Levy
`http://oldwww.dknog.dk/dknog3/agenda`

BGP changes

A good analogy for the development of the Internet is that of constantly renewing the individual streets and buildings of a city, rather than razing the city and rebuilding it. The architectural principles therefore aim to provide a framework for creating cooperation and standards, as a small "spanning set" of rules that generates a large, varied and evolving space of technology.

Source: RFC-1958

- Constant change

- Now 54.000 ASNs announcing "the internet", and more than 80.000 allocated

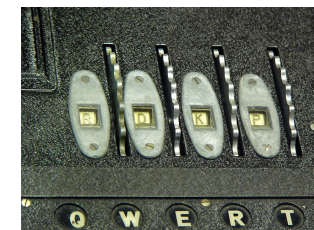- Now 599.000 IPv4 prefixes, soon 30.000 IPv6 prefixes

- Source: http://bgp.potaroo.net/v6/v6rpt.html

Source and more info to be found at `http://bgp.potaroo.net/`

Movietime: internet as seen from Zencurity AS57860
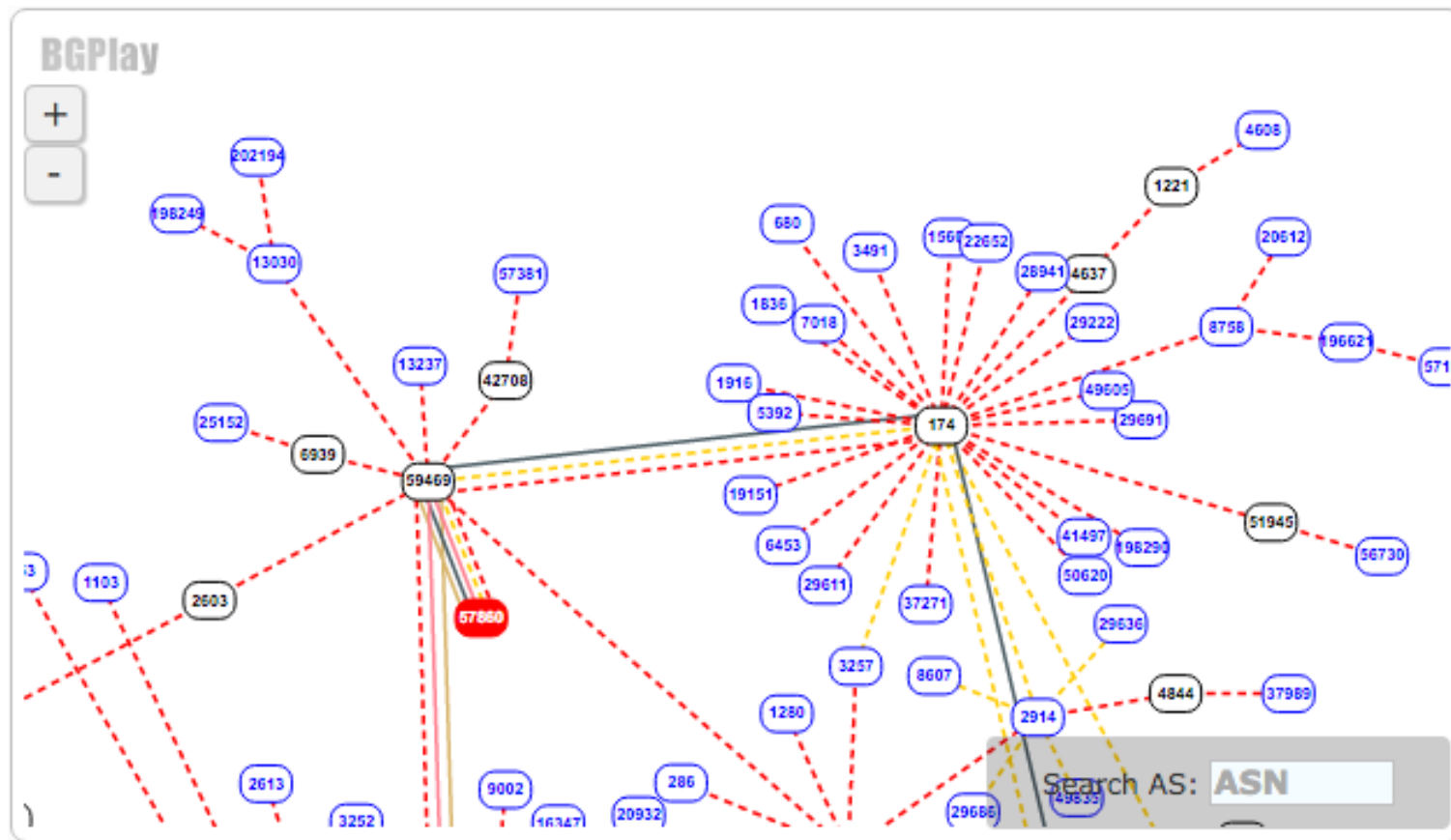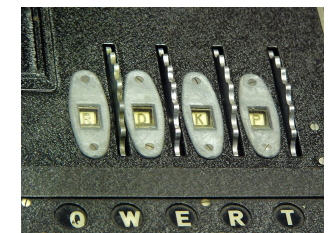
Small excerpt from:
https://stat.ripe.net/185.129.62.0/22#tabId=routing

NSA infiltrates links to Yahoo, Google data centers
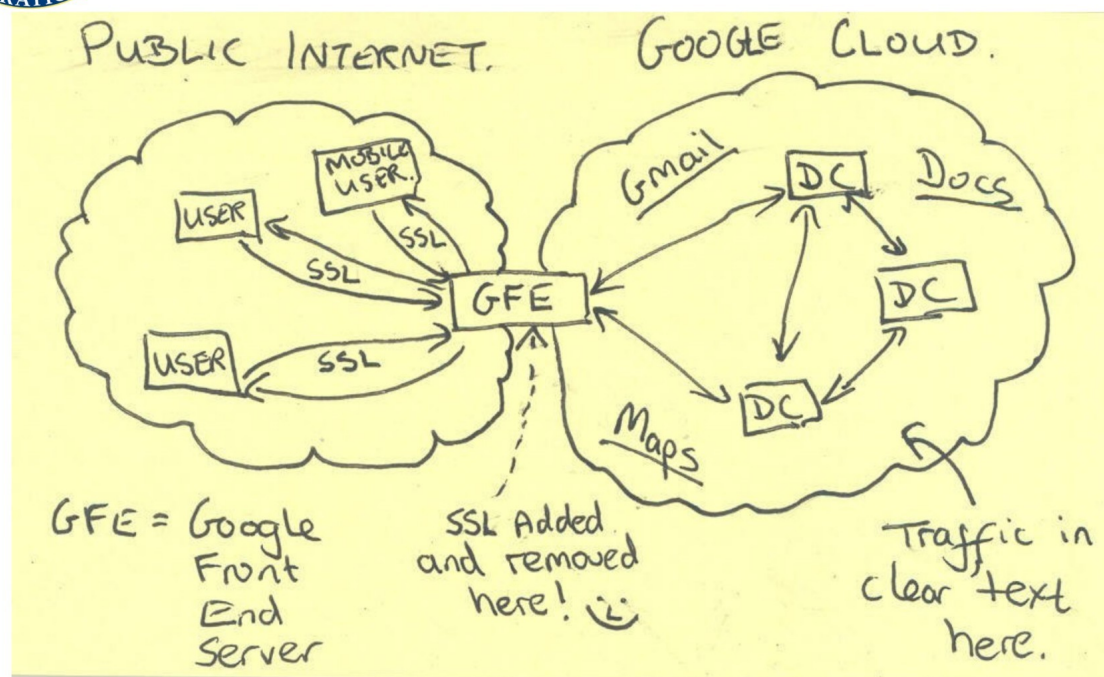
SSL (encryption) added and removed here

You are always welcome to send me questions later via email

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