Welcome to

Internet Internals

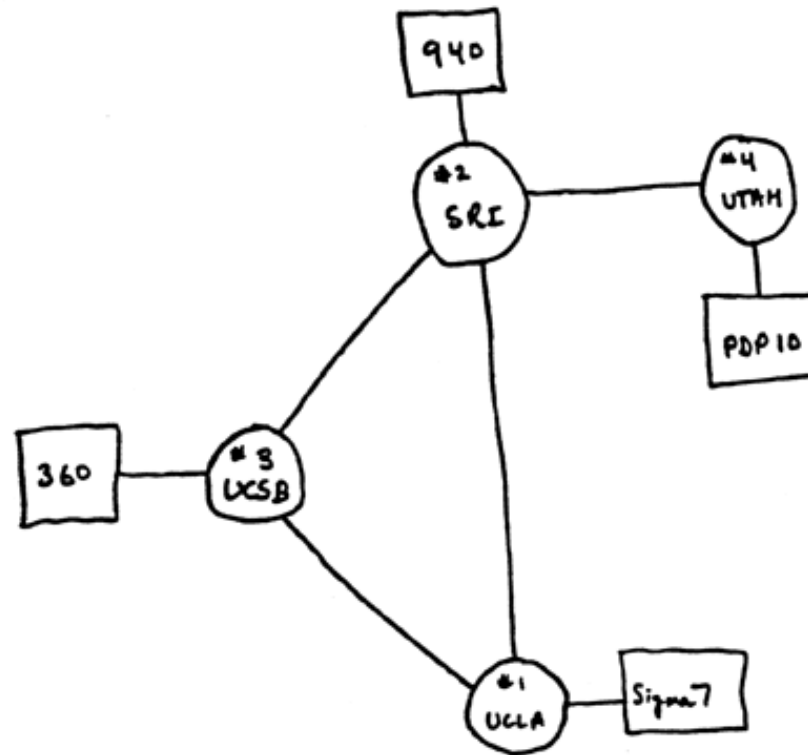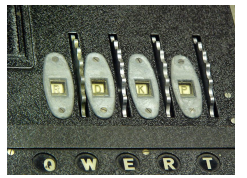# A short story

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Cryptoparty - Januar 2015 PDF available kramshoej@Github
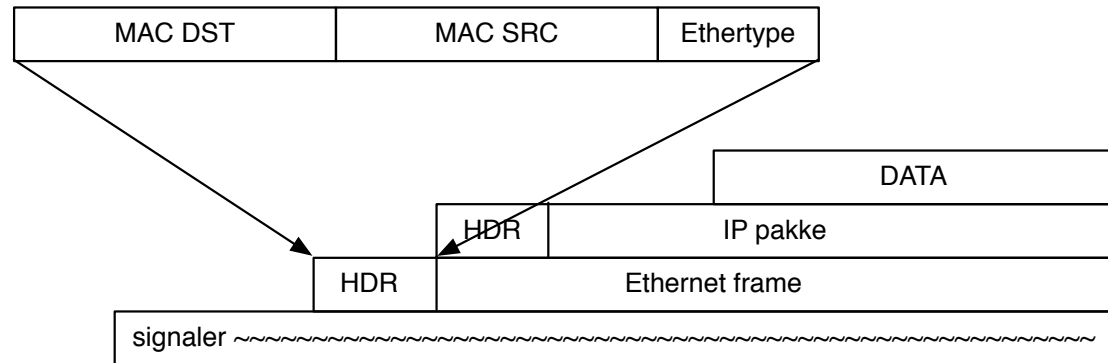
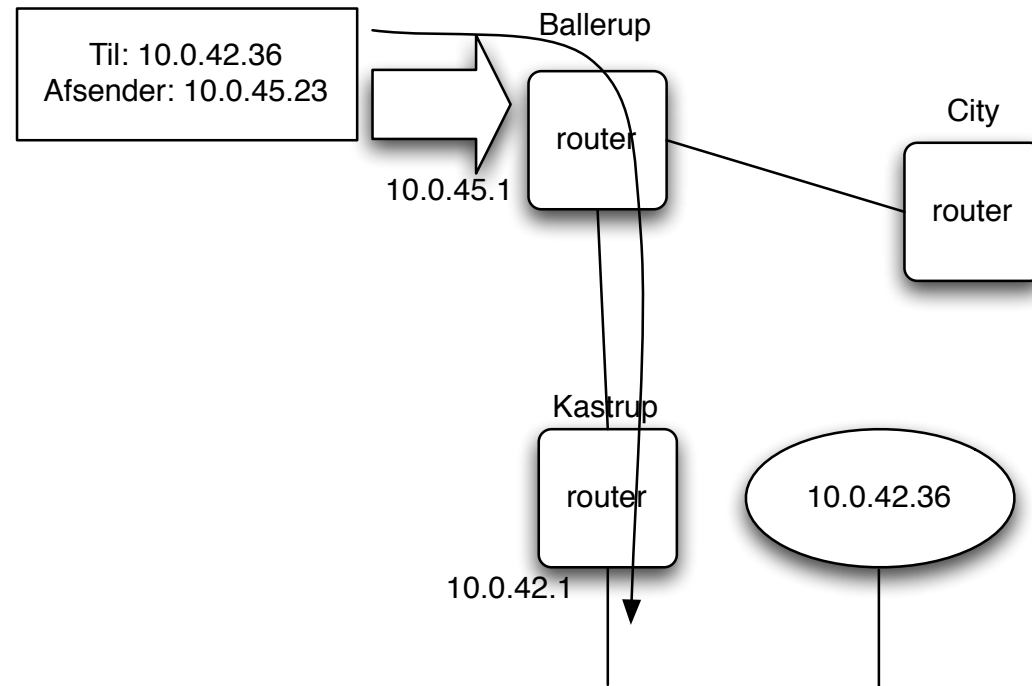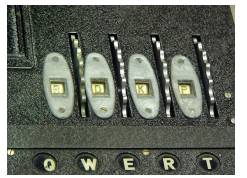1969: ARPANET 4 nodes

Present some internet internals, what is it?

TCP/IP basics

MAC DST	MAC SRC	Ethertype

```
                             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
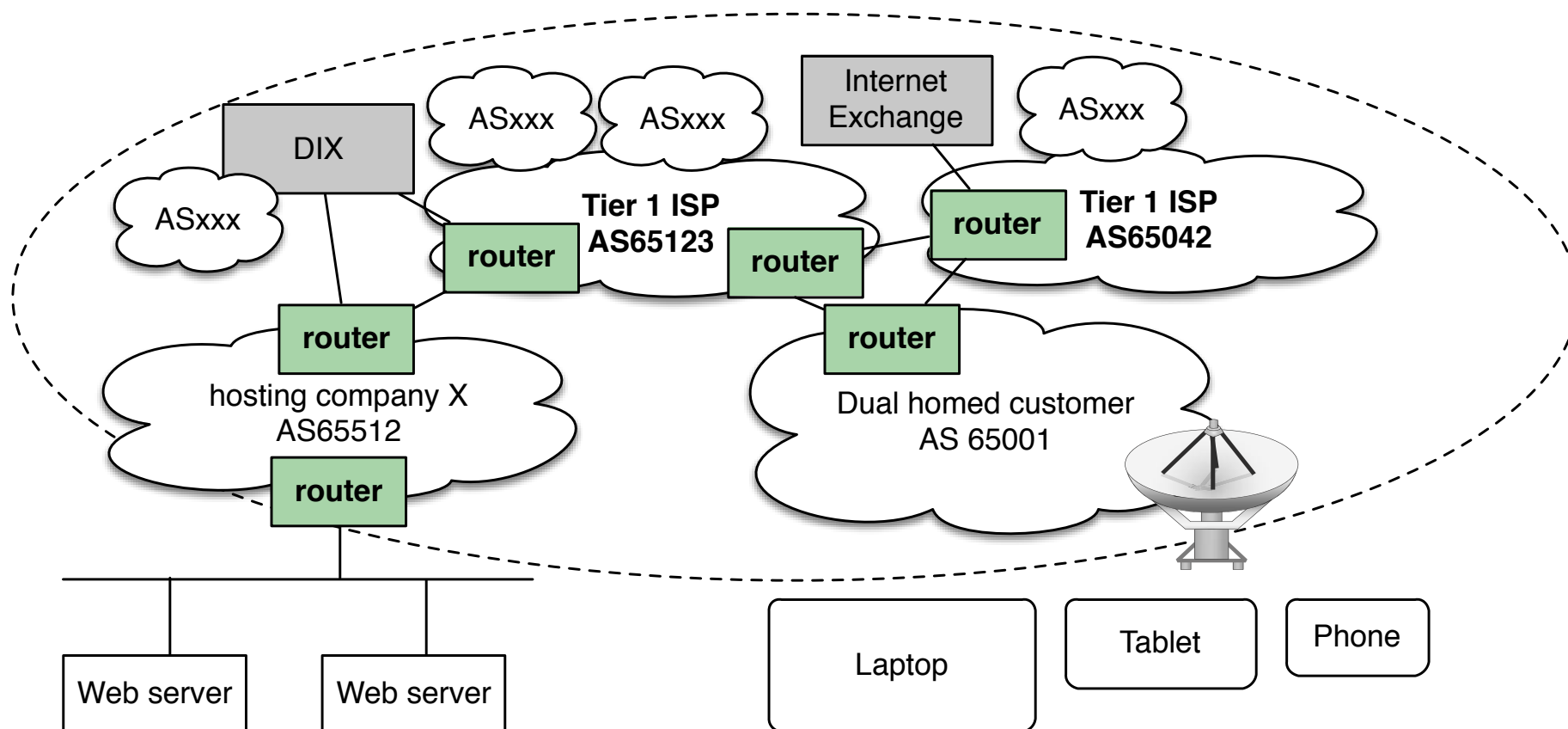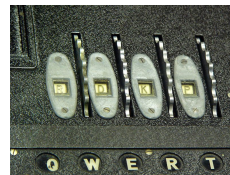
City

router

Kastrup

router

10.0.42.1

10.0.42.36

Soo simple ☺

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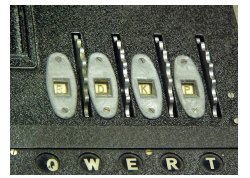
A good analogy for the development of the Internet is that of constantly renewing the individual streets and buildings of a city, rather than razing the city and rebuilding it. The architectural principles therefore aim to provide a framework for creating cooperation and standards, as a small "spanning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

Source: RFC-1958

- Constant change

- Now 50.000 ASNs announced, and 80.000 allocated

- Now 515.000 prefixes - reach 550.000 routes/prefixes in 2015?

Movietime `https://stat.ripe.net/94.126.176.0/21#tabId=routing`
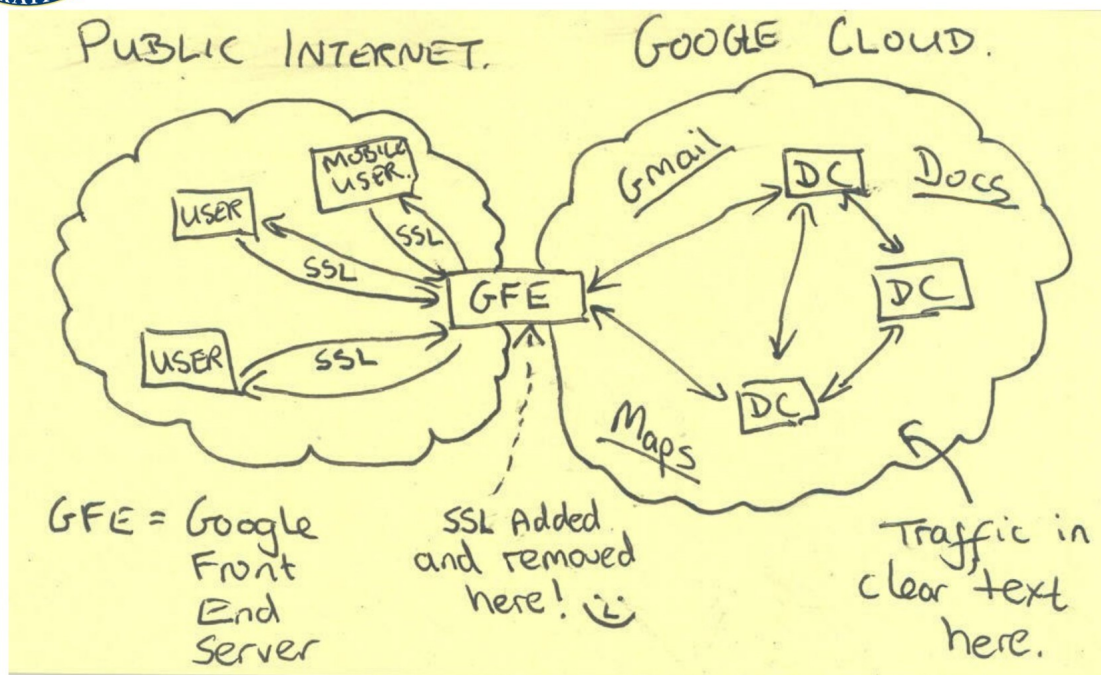Lots of data to be found at `http://bgp.potaroo.net/`

NSA infiltrates links to Yahoo, Google data centers
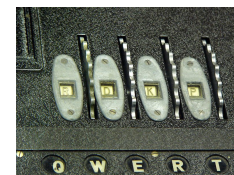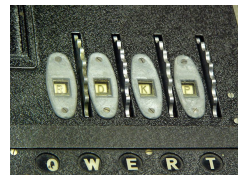

TOP SECRET//SI//NOFORN

Current Efforts - Google

SSL (encryption) added and removed here

Comments and questions

You are always welcome to send me questions later via email

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