# Research activities on (Optical) networking and Internet Standards

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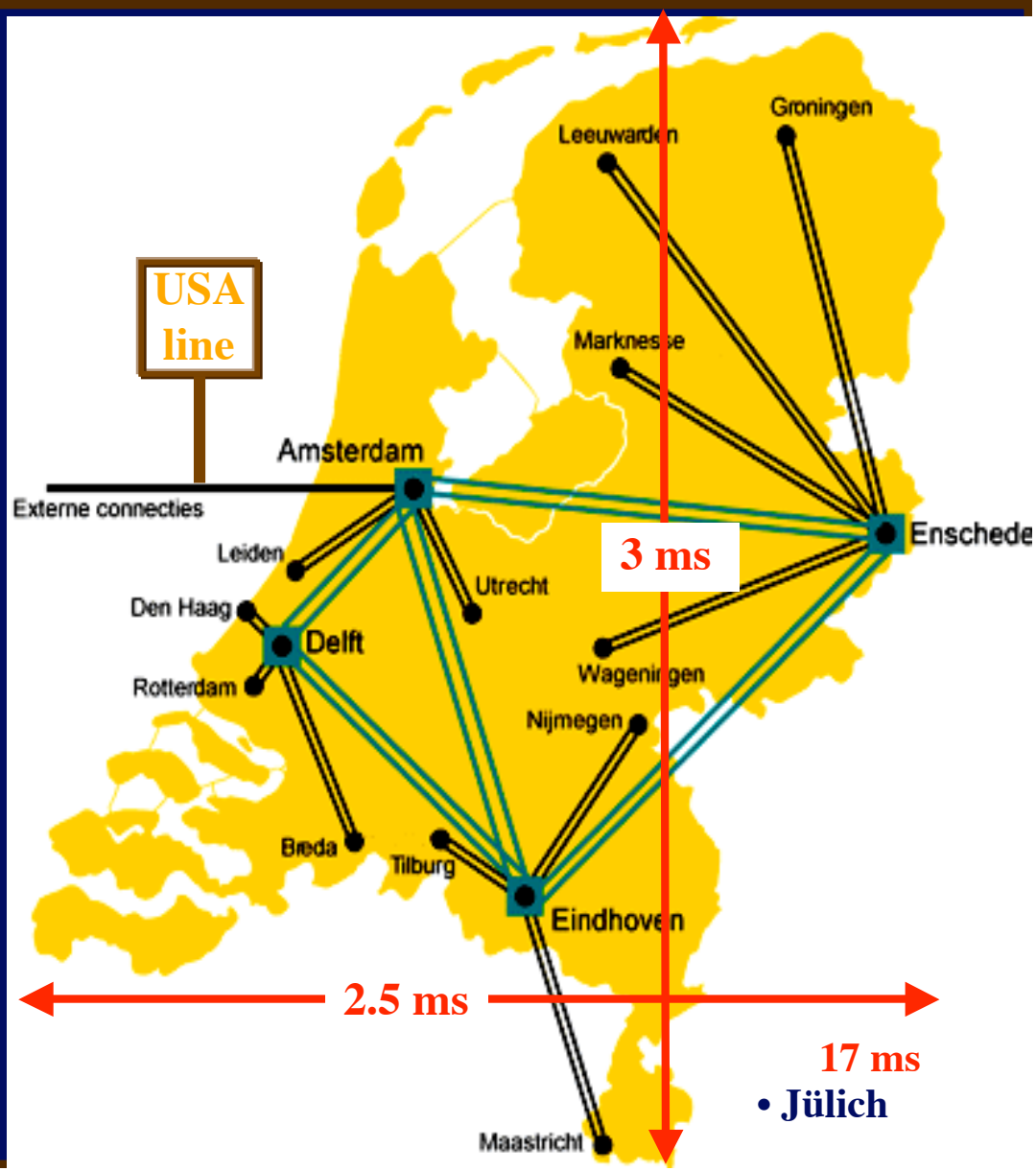
# Multi Kingdom Problems



## FOM-Rijhuizen to IPP-FZJ => 7 kingdoms

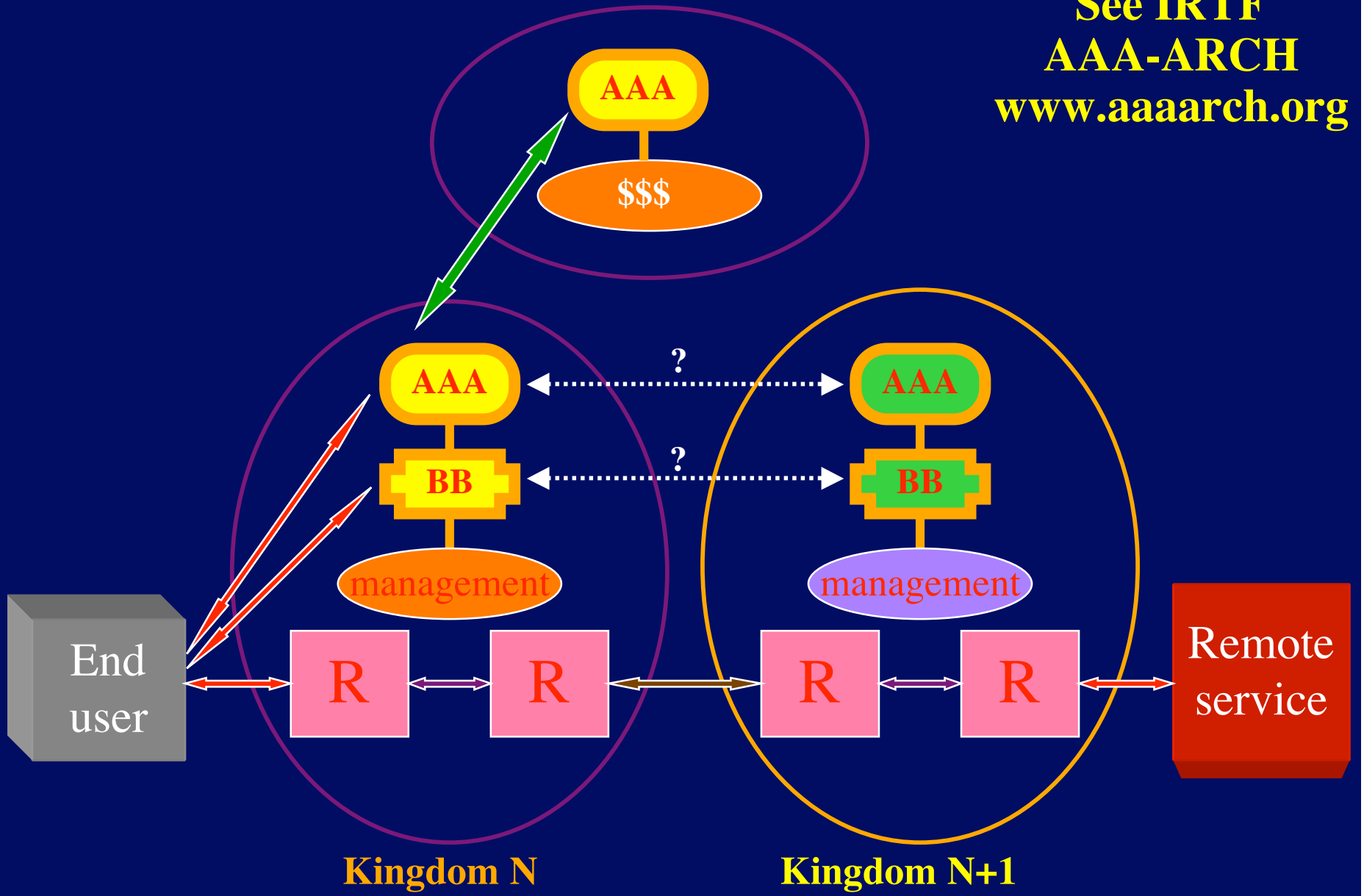
- Netherlands
  - » Science dept
  - » Campus net
  - » SURFnet
- Europe
  - » TEN 155
- Germany
  - » WINS/DFN
  - » Jülich, Campus
  - » Plasma Physics dept



# The need for AAA



**See IRTF AAA-ARCH www.aaaarch.org**



# Policy based networking example



Experiment

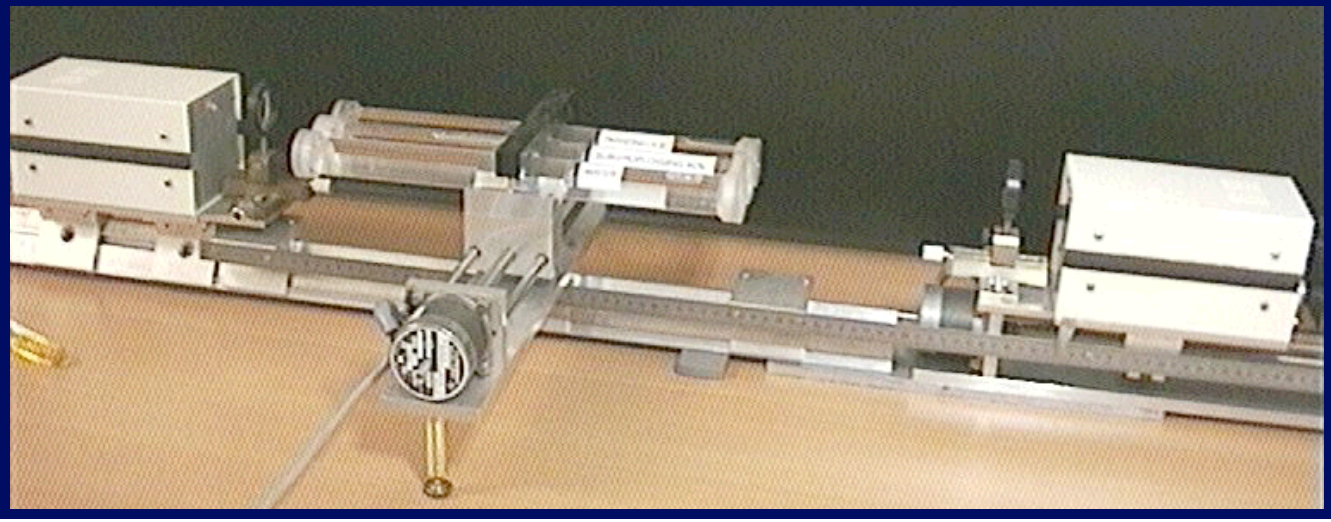
Pc

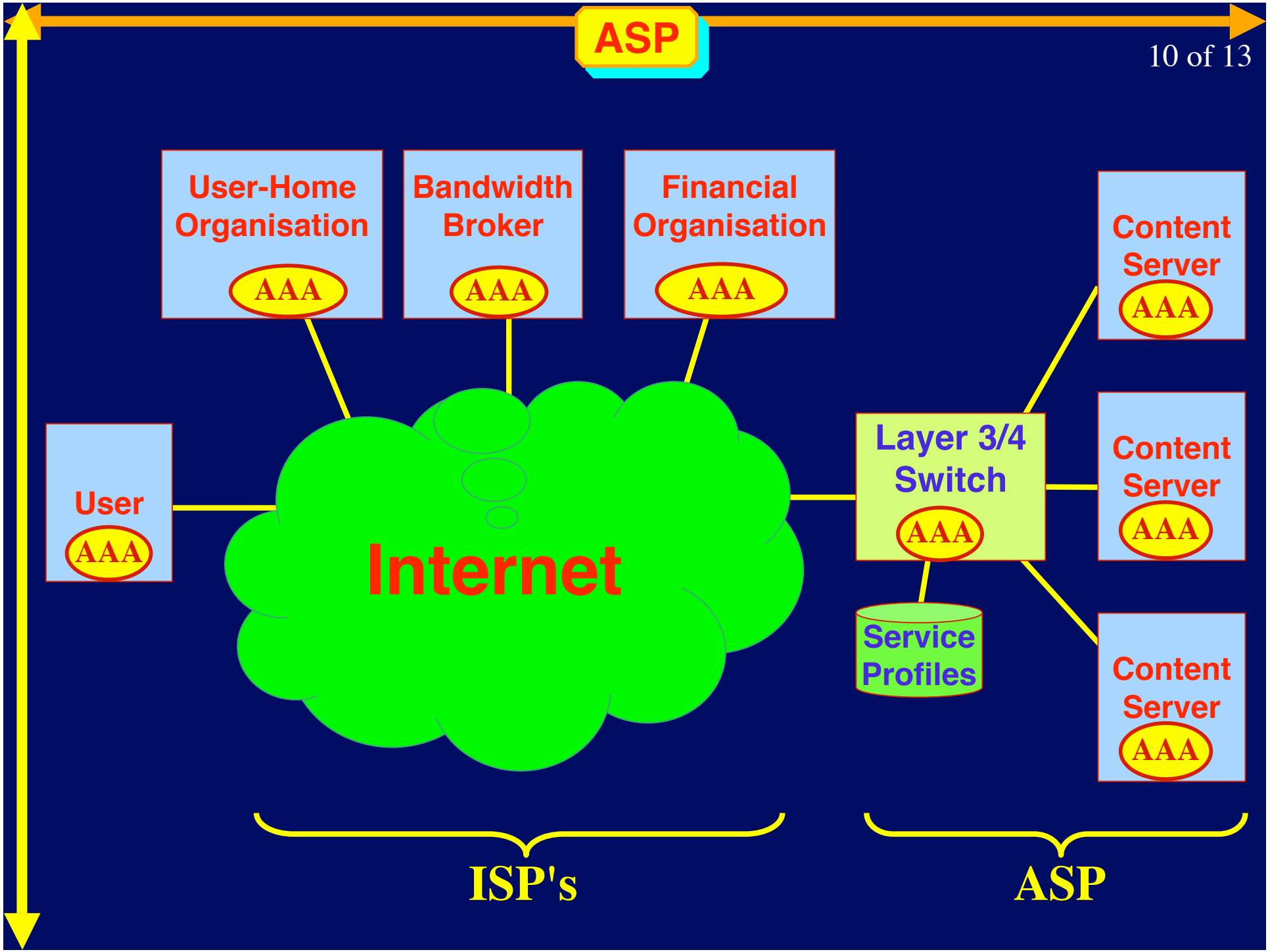
Camera

Macintosh

Policy based networking switch with > layer 4 AAA functionality

AAA

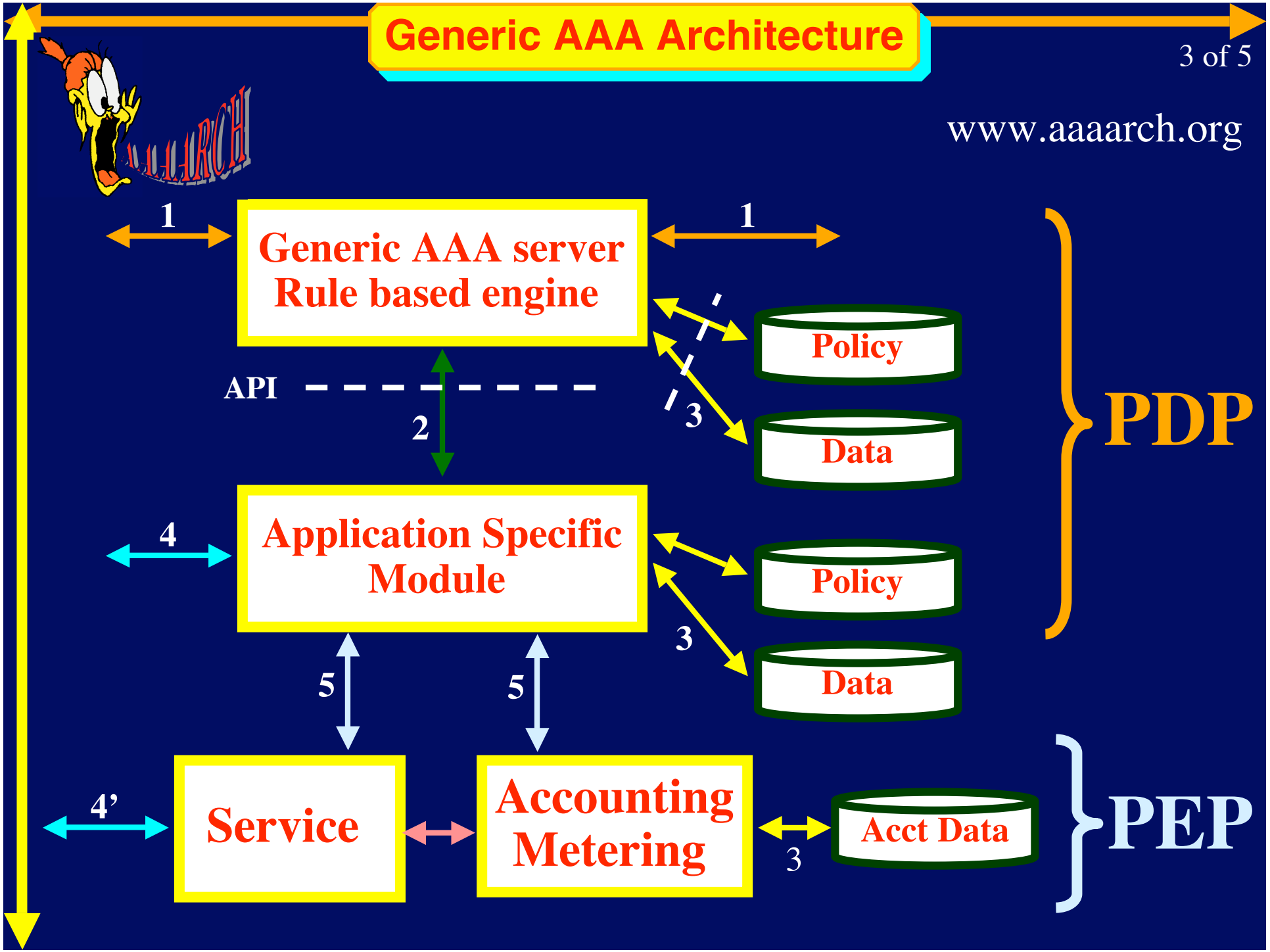



ASP
User-Home Organisation
AAA
Bandwidth Broker
AAA
Financial Organisation
AAA
Content Server
AAA
User
AAA
Internet
Layer 3/4 Switch
AAA
Content Server
AAA
Service Profiles
Content Server
AAA
ISP's
ASP

# Generic AAA Architecture

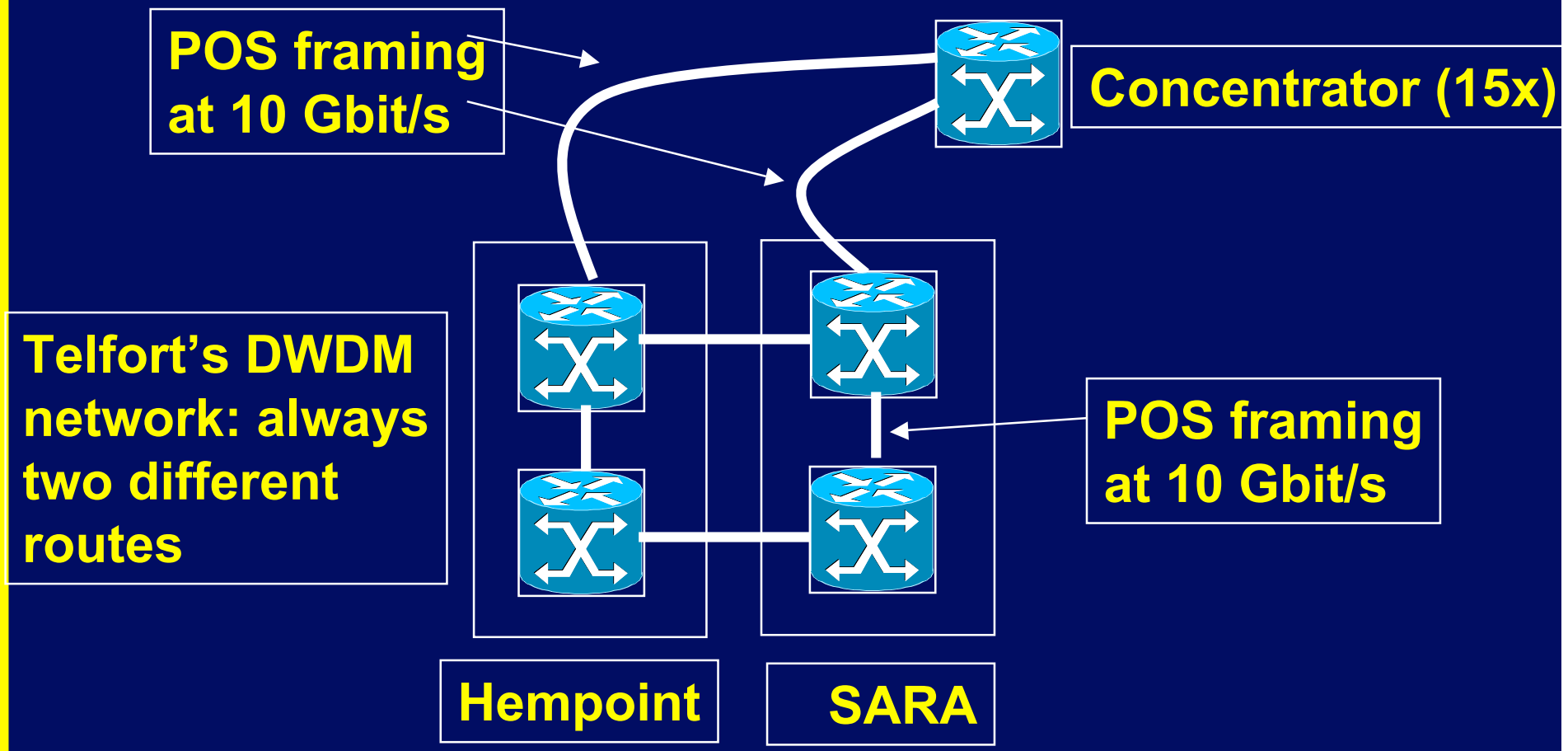


www.aaaarch.org

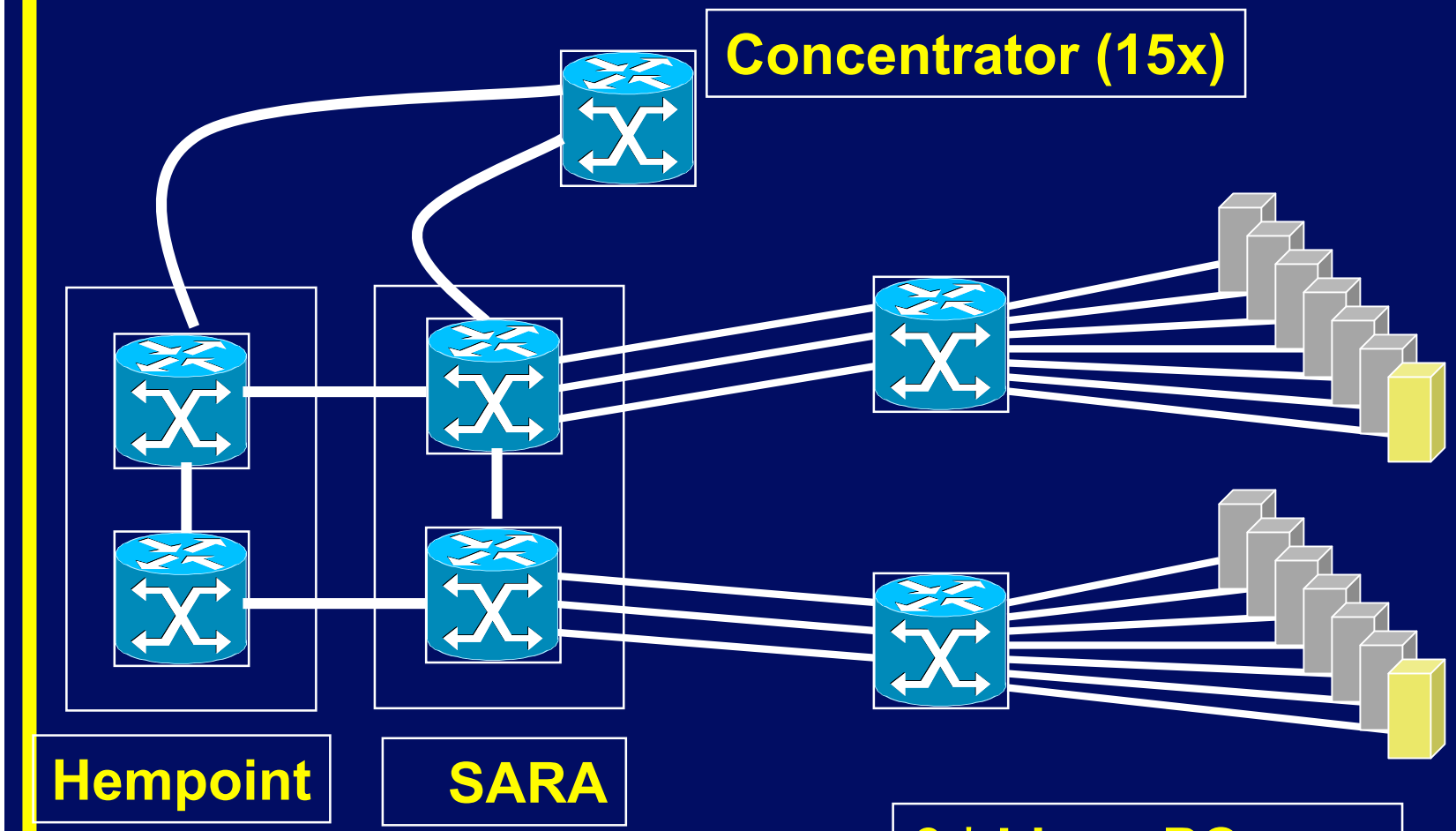


# SURFnet5: Pre-production network



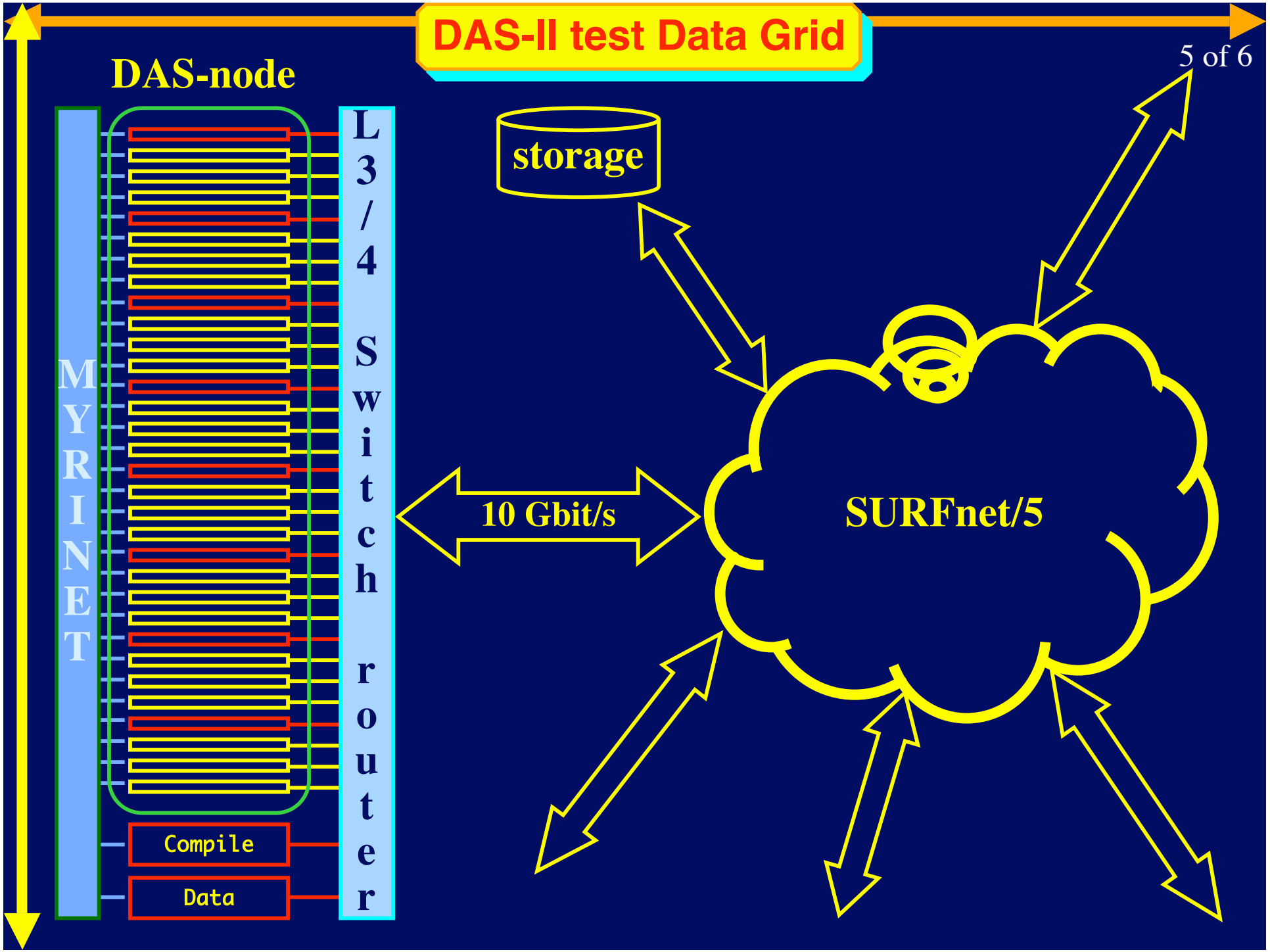


# GIGAcluster



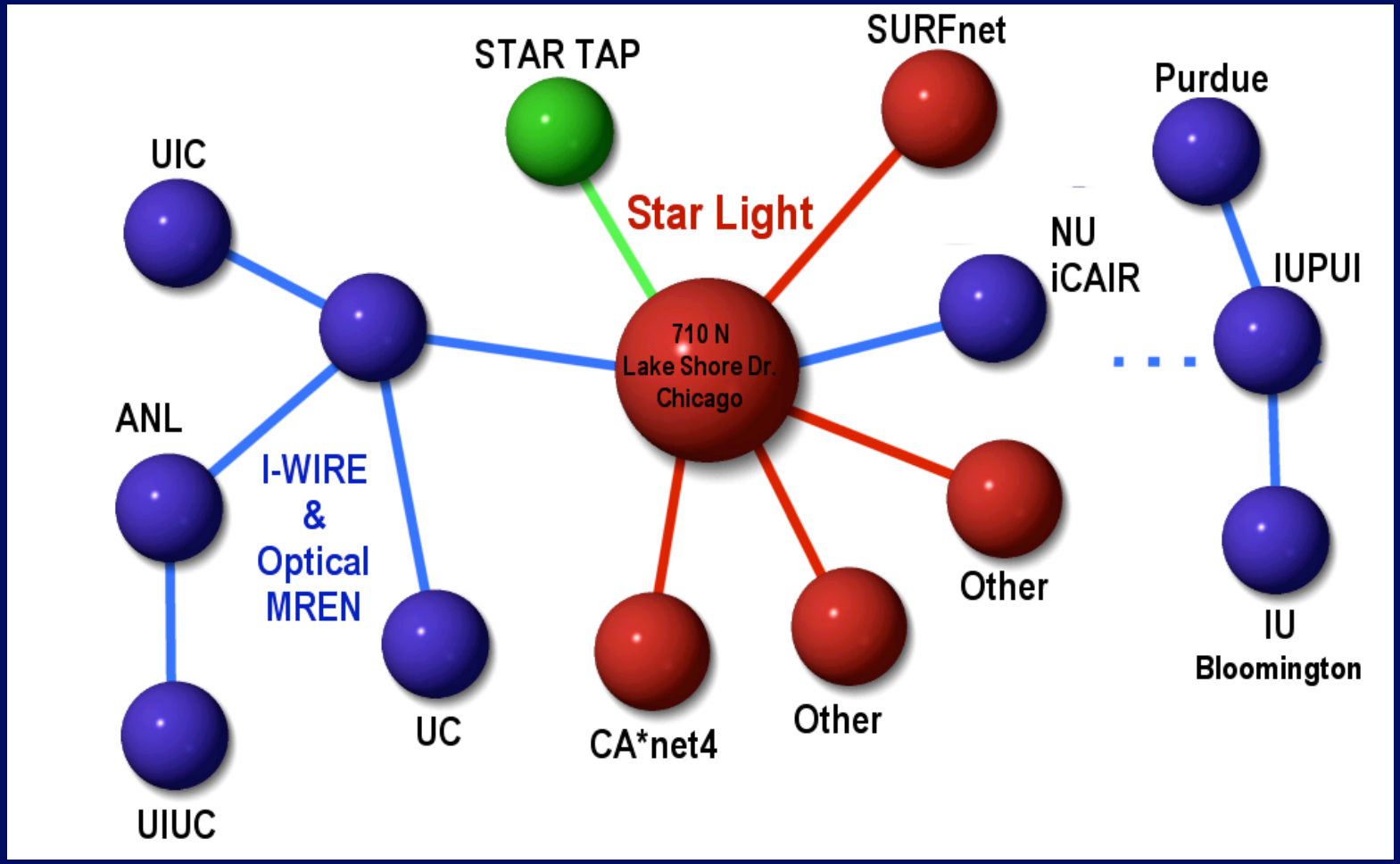

6 * Linux PC
1 * SUN
3 * 1 Gbit/s uplink

# DAS-II test Data Grid



# StarLight: The Optical STAR TAP



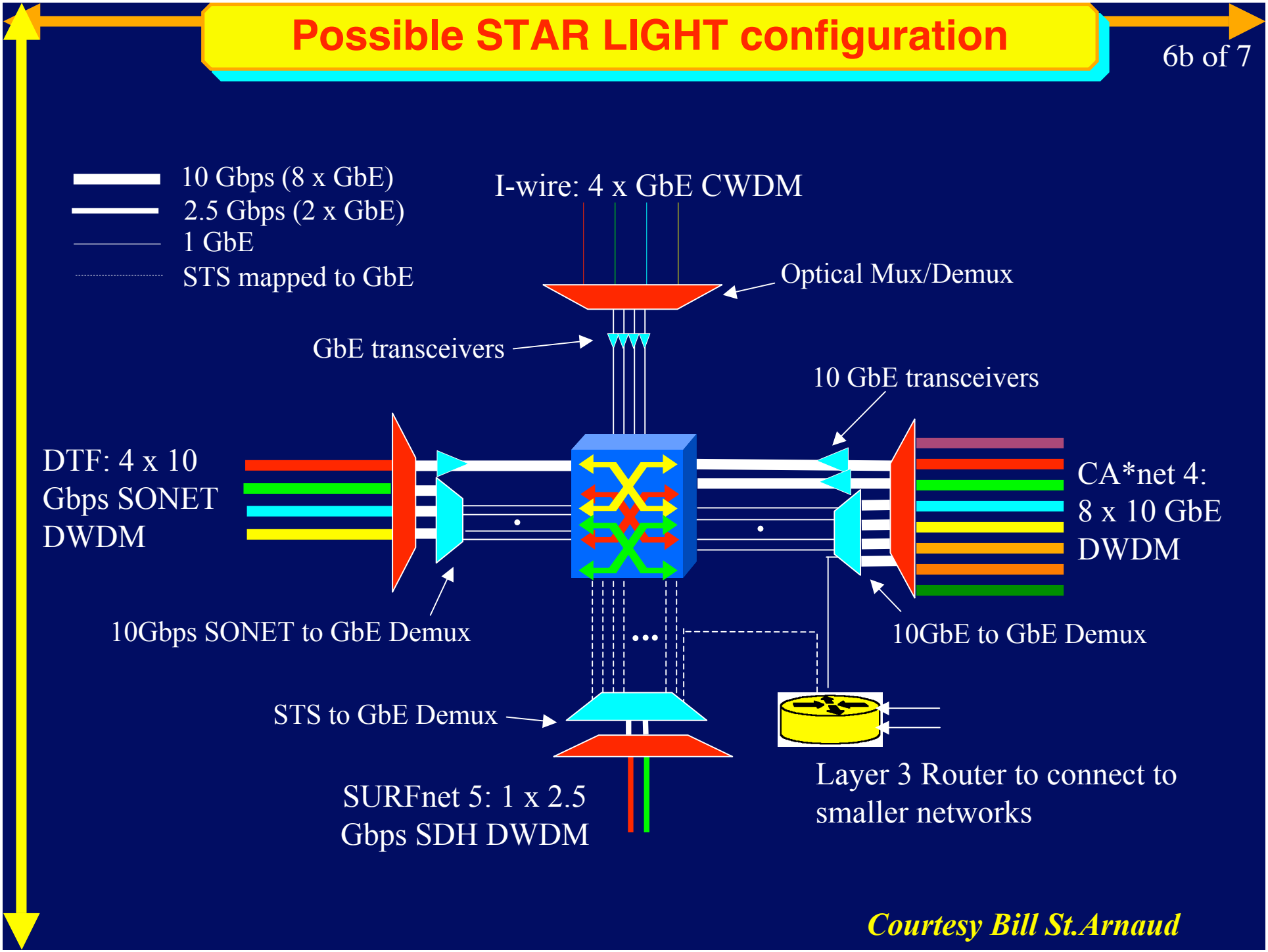



*This diagram subject to change*

*Courtesy Bill St.Arnaud*

# Possible STAR LIGHT configuration






*Courtesy Bill St.Arnaud*

# Revisiting the truck of tapes



Consider one fiber

- Current technology allows for 160 λ in one of the two frequency bands
- Each λ has a bandwidth of 40 Gbit/s
- Transport: 160 * 40*$10^9$ Gbit/s / 8 bit/Byte = 800 GByte/s
- Take a truck with a capacity of 10 metric ton
- One DLT contains 50 Gbyte, weights 200 gr
- Truck contains ( 10000 kg / 0.200kg ) * 50 Gbyte = 2.5 PByte
- Truck / fiber = 2500000 GByte / 800 GByte/s = 3125 s ≈ one hour
- For distances further away than a truck drives in one hour (50 km) minus loading and handling 50000 tapes the fiber wins!!!

# Summary

Research topics

- Optical networking infrastructure for grid applications
- Metering, monitoring, features and performance analysis for grid apps
- Directory enabled networking for ASP functionality
- Standardization research on AAA (IRTF)
- http://www.science.uva.nl/~delaat