

Netwerken tegen het licht

Cees de Laat



Utrecht University

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- **Mogelijke interpretaties**
"Netwerken tegen het licht"
 - Snelheid (m/s, Mbit/s)
 - Optische netwerken
 - Het verschijnsel (research)netwerken
- **We nemen onder de loep:**
 - 3 ontwikkel scenario's
 - Veranderend model Internet
 - Nieuwe rollen voor de spelers
 - Spanning research <-> toepassing

Old:

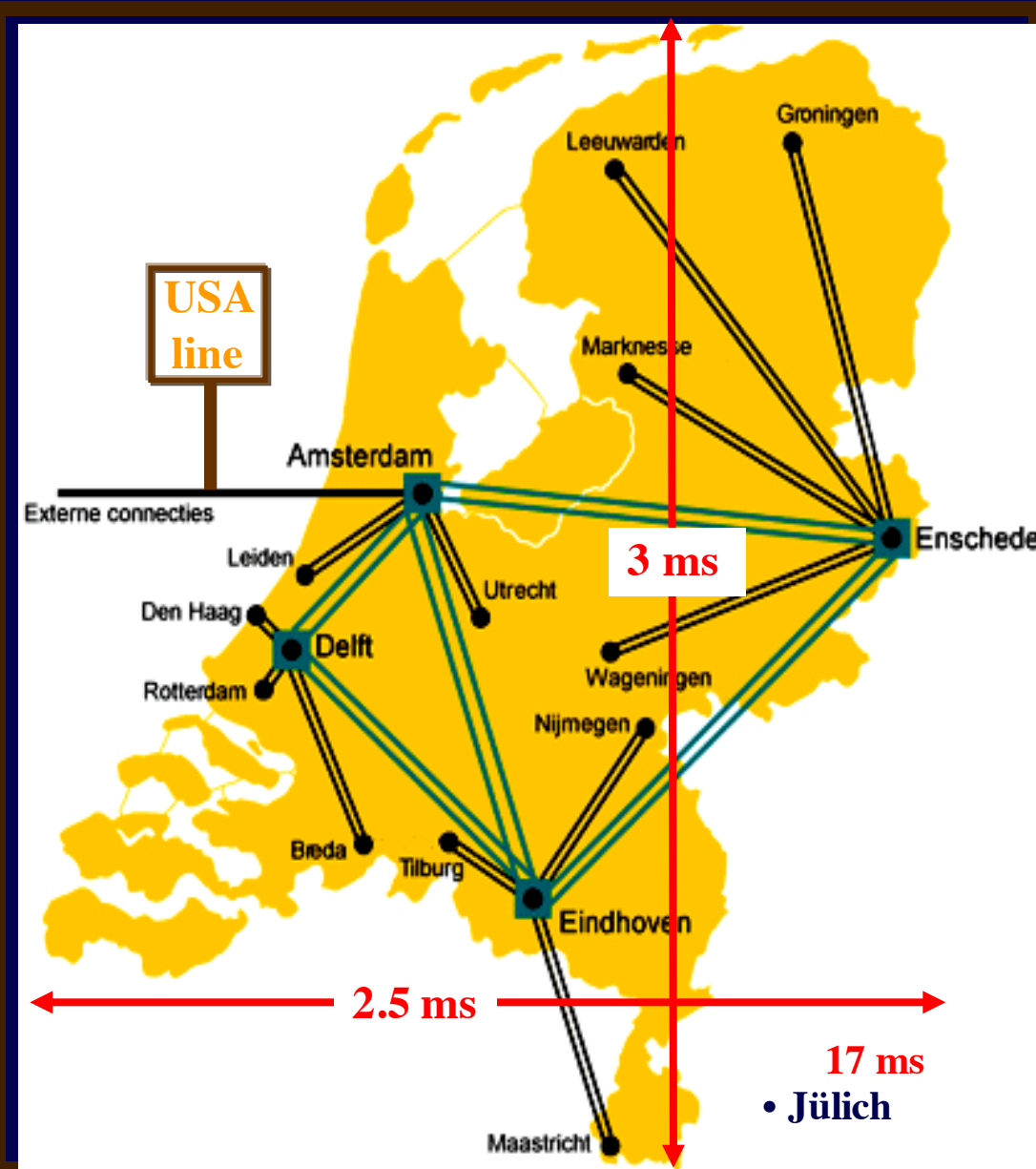
- ~ "OSI model"
- IP in the core network
- Switching to the wire centers
- Hubs to connect computers and equipment

New:

- Star network topology
- Edge devices layer 4 or higher aware
- Central router-ISP layer 3 connection
- ISP network layer 2 (MPLS)
- Core -> optical switching, DWDM, layer 1
- Classical model turned inside out

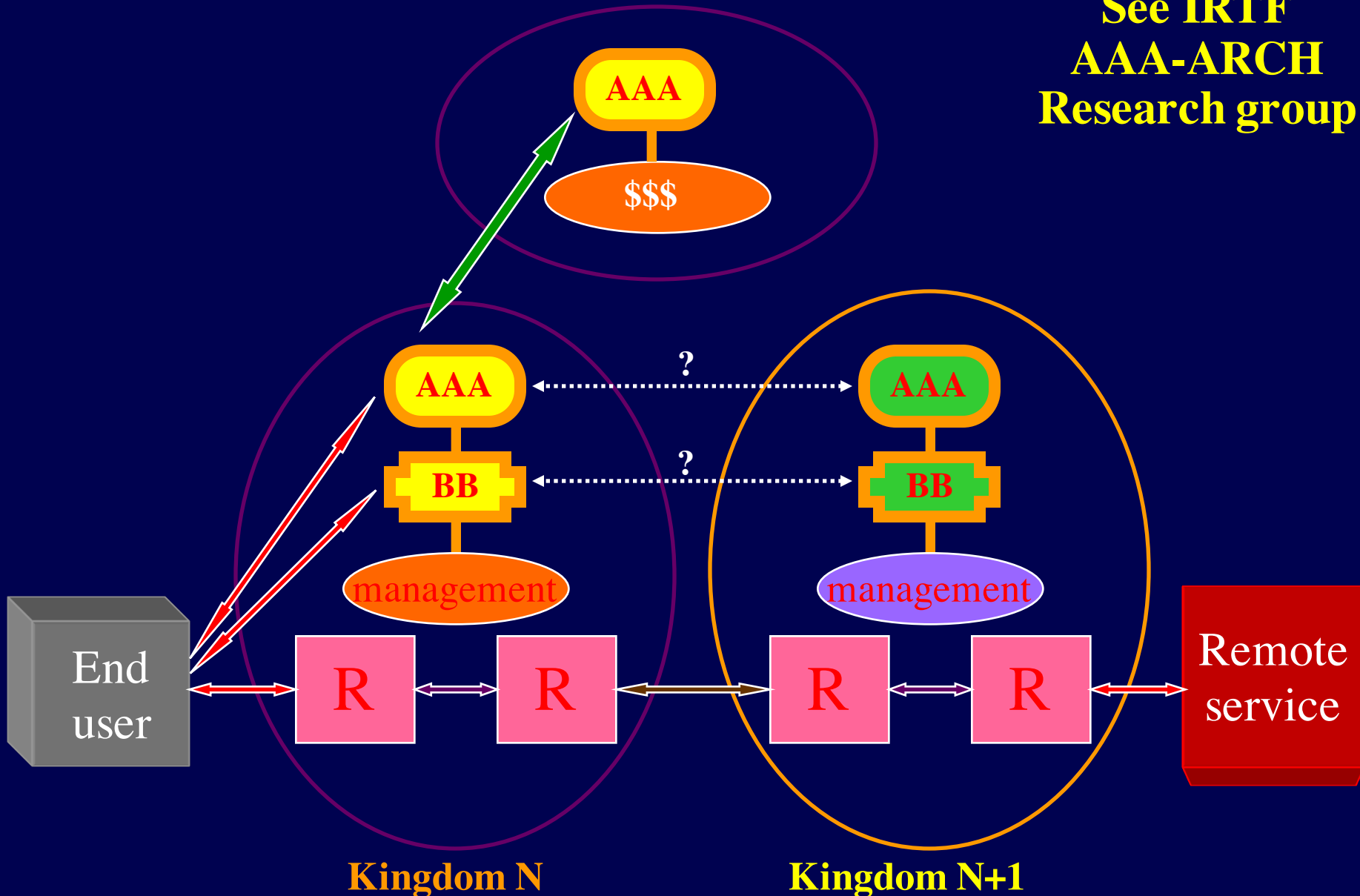
Physics-UU to IPP-FZJ => 7 kingdoms

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

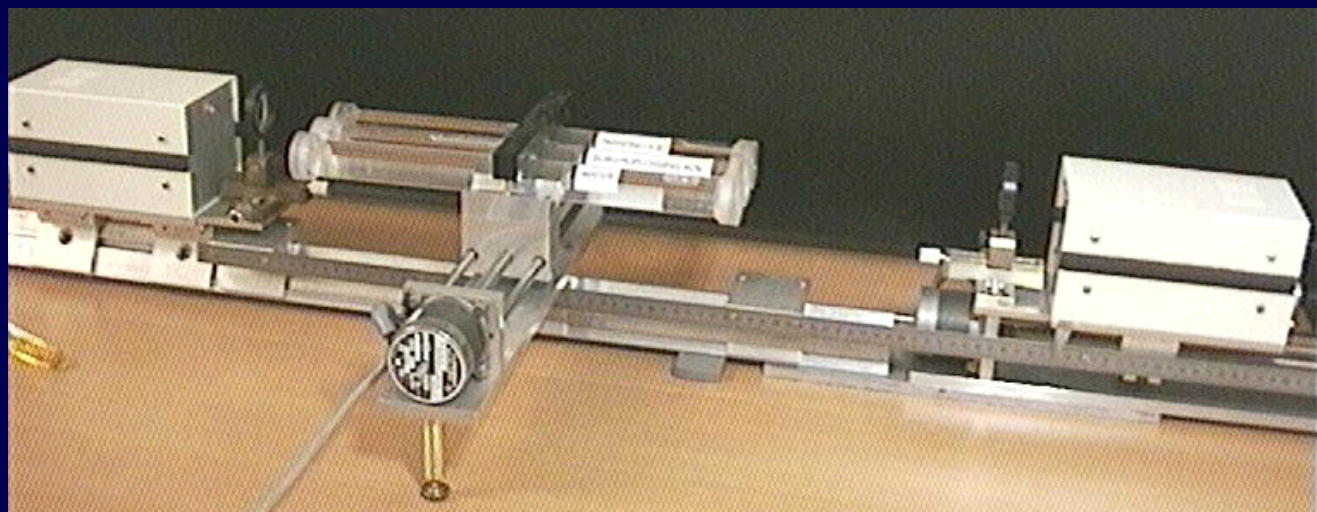
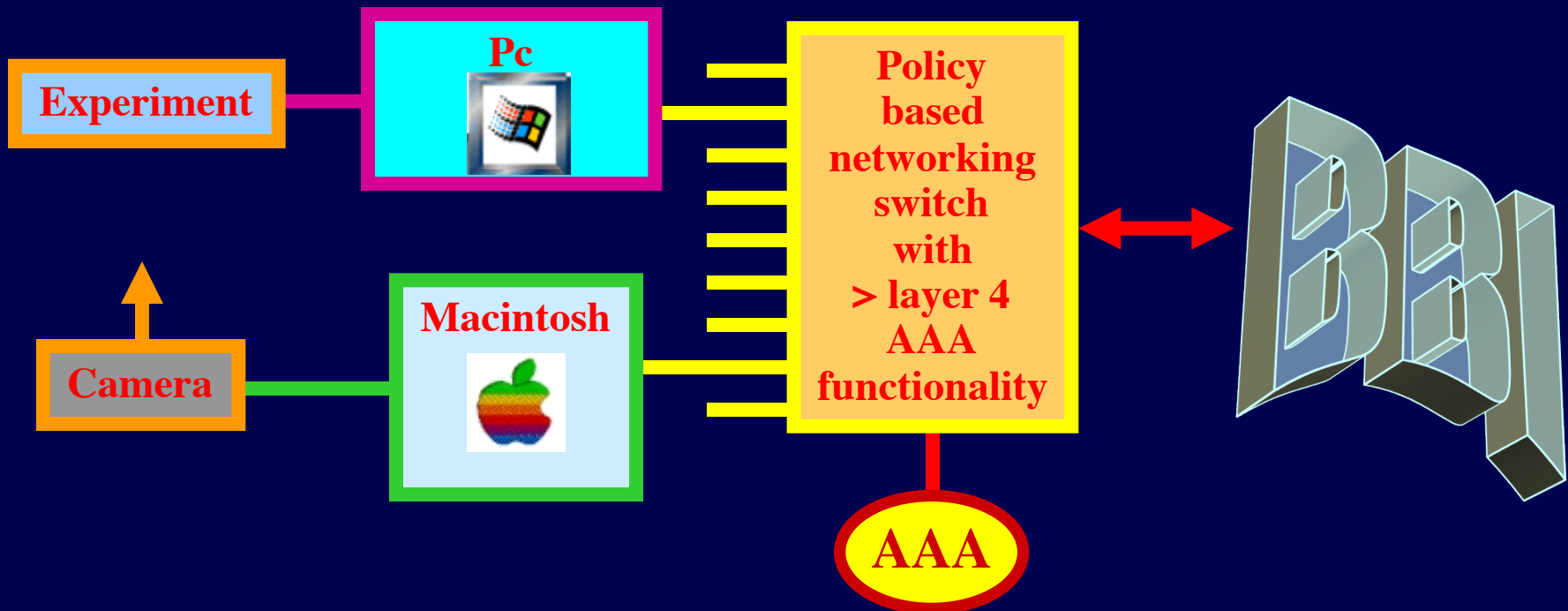


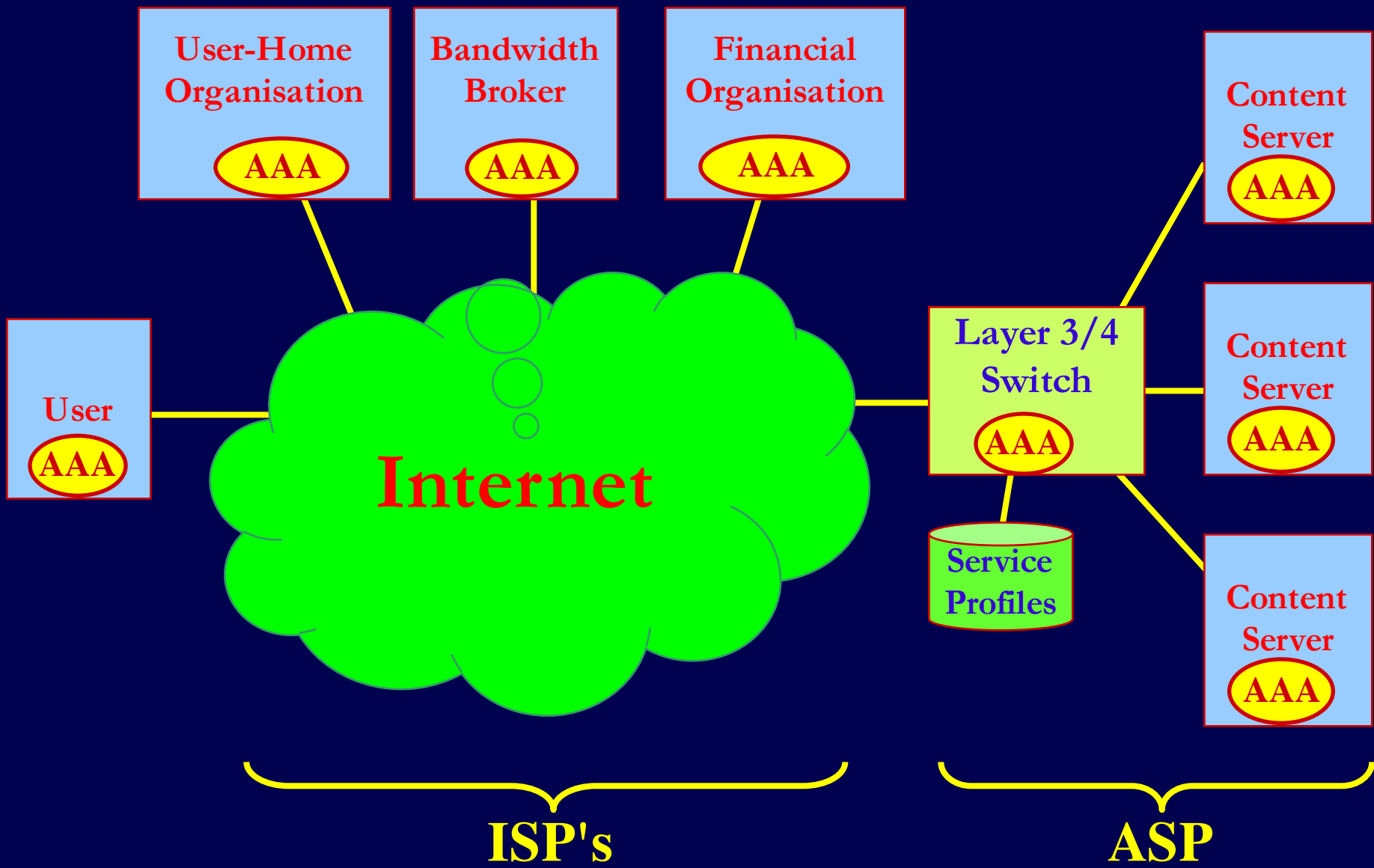
The need for AAA

See IRTF
AAA-ARCH
Research group



Policy based networking example





Content

**Portals
Brokers**

Customers

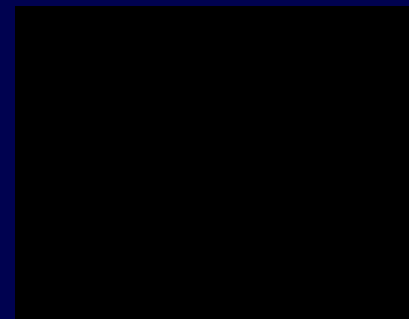
University

Hogeschool

Library

NOB

SUREnet



- **Bureaucracy**

- Do the advanced applications by hand
- Long turnaround (rtt \approx days)

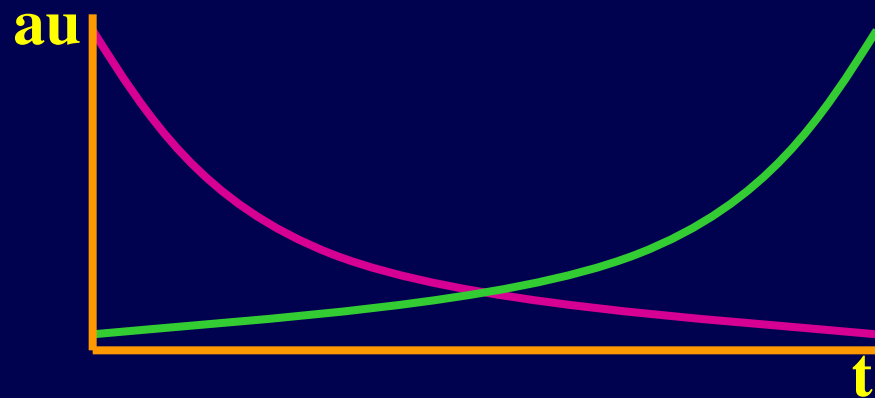
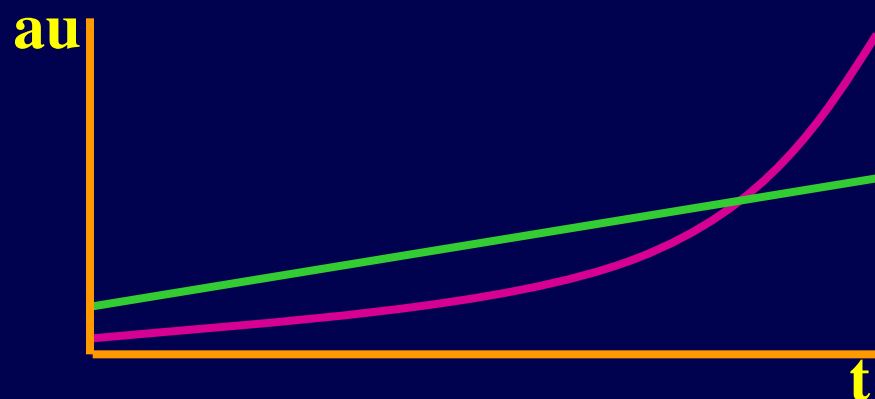
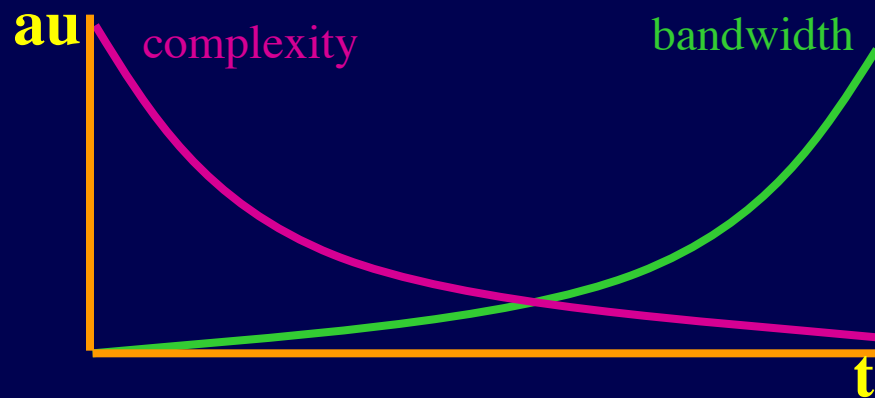
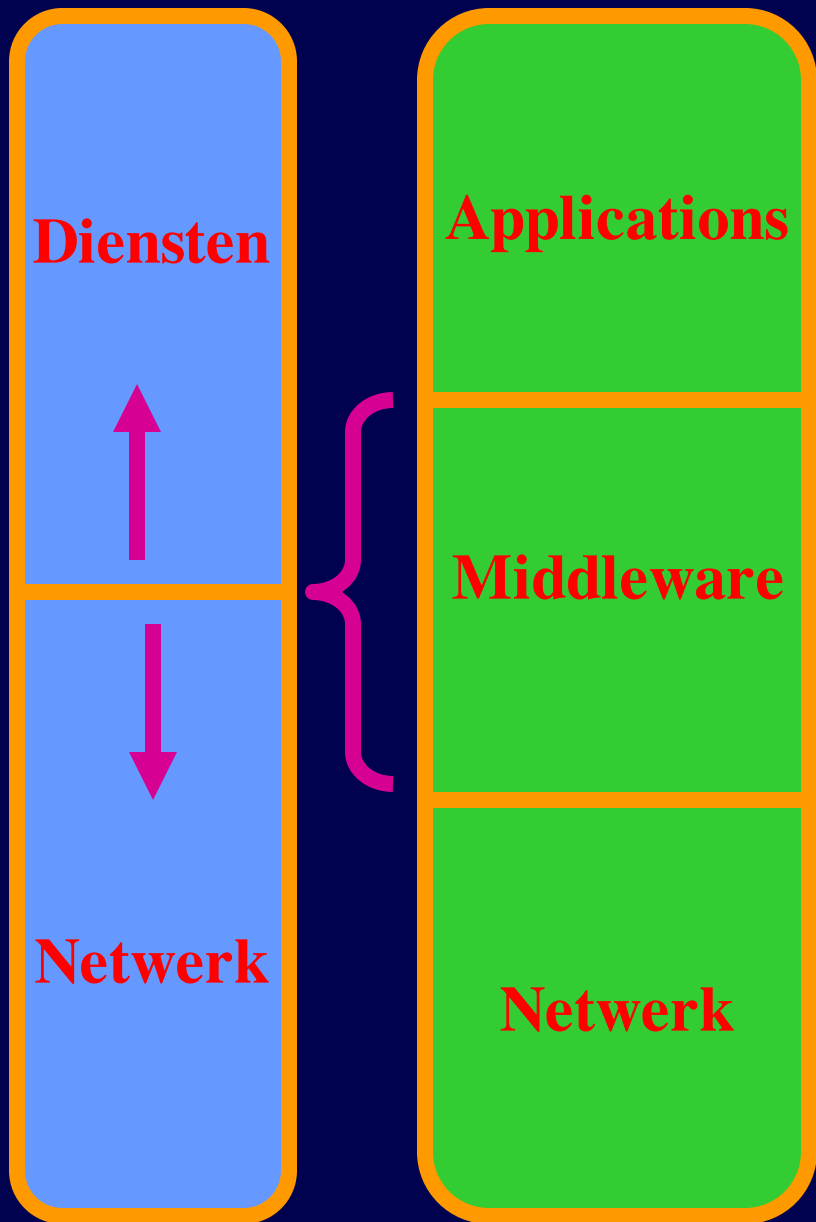
- **Complexity**

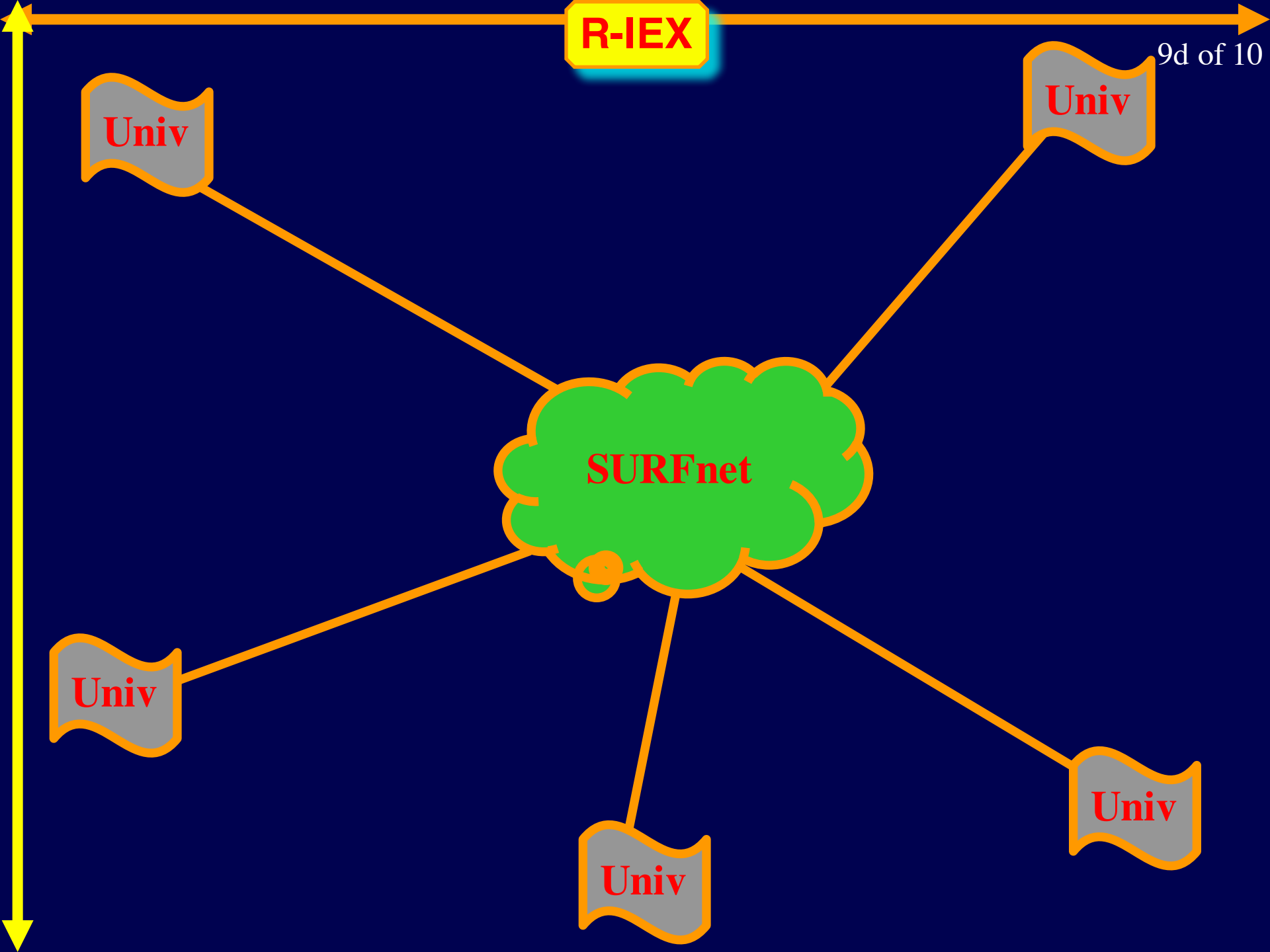
- Automatic application setup
- Need advanced middleware and probably also bureaucracy

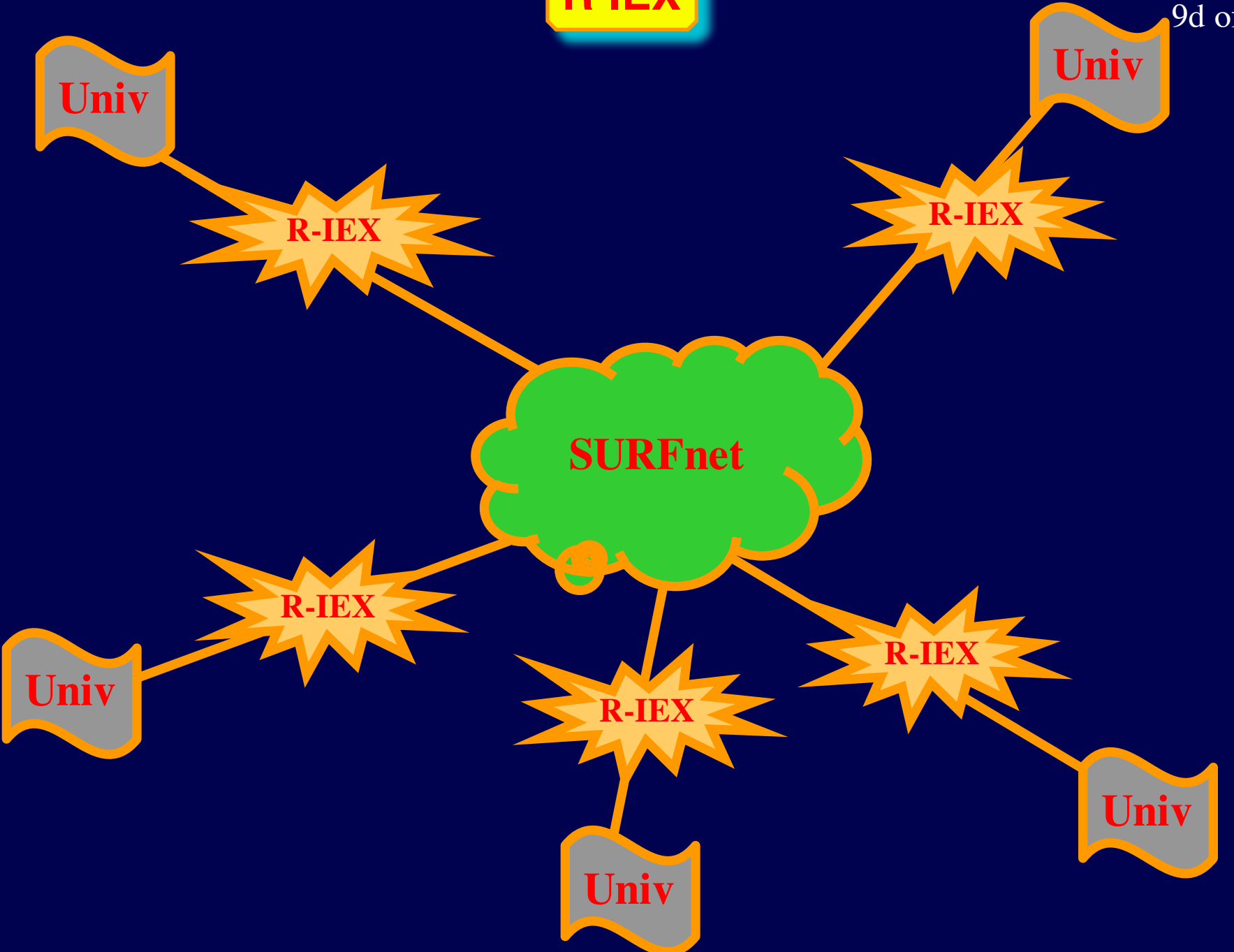
- **Throw Bandwidth at the problem**

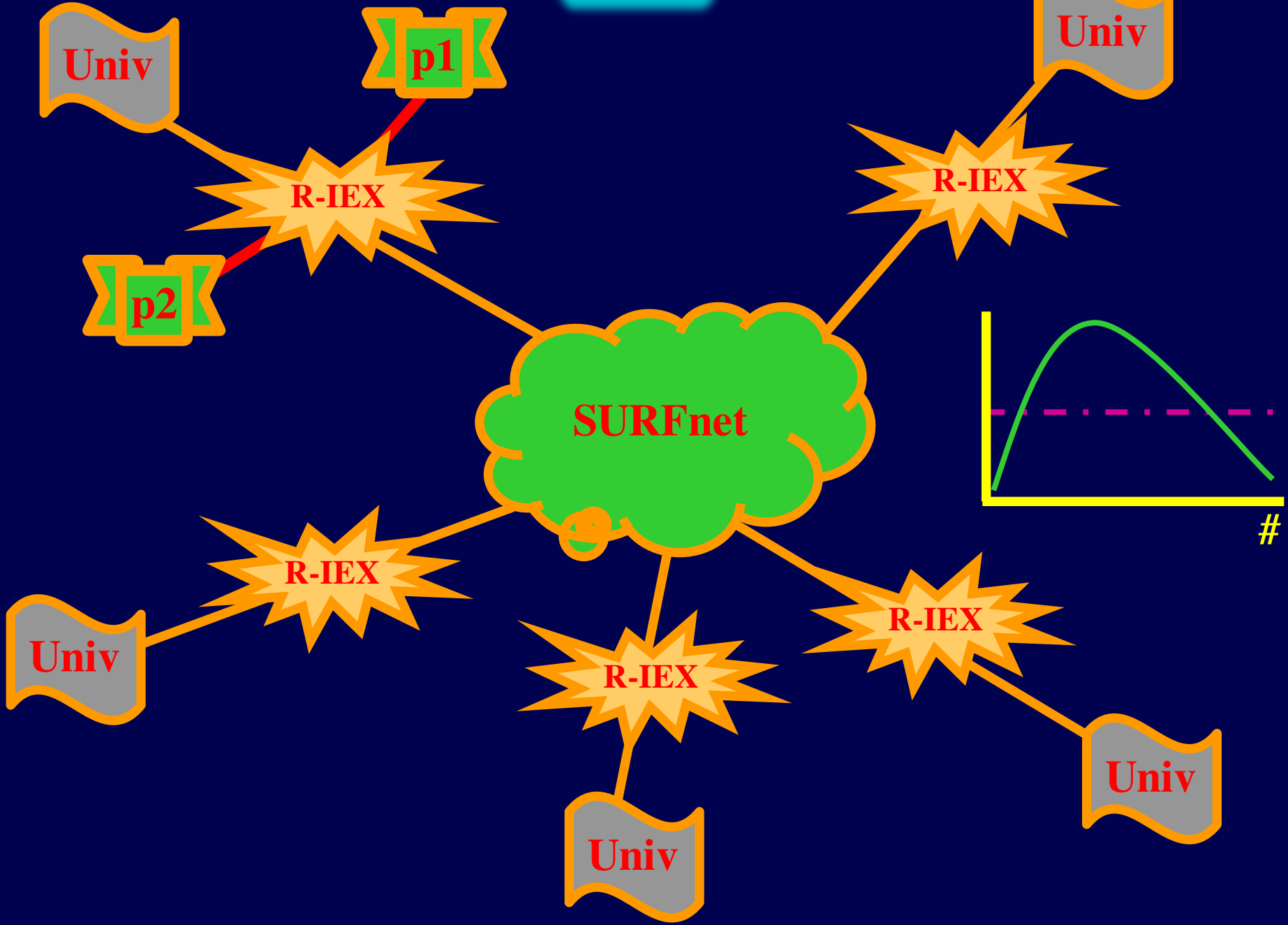
- Might go wrong at bottlenecks
- Easiest solution
- Do it yourself services

Stretching the OSI model

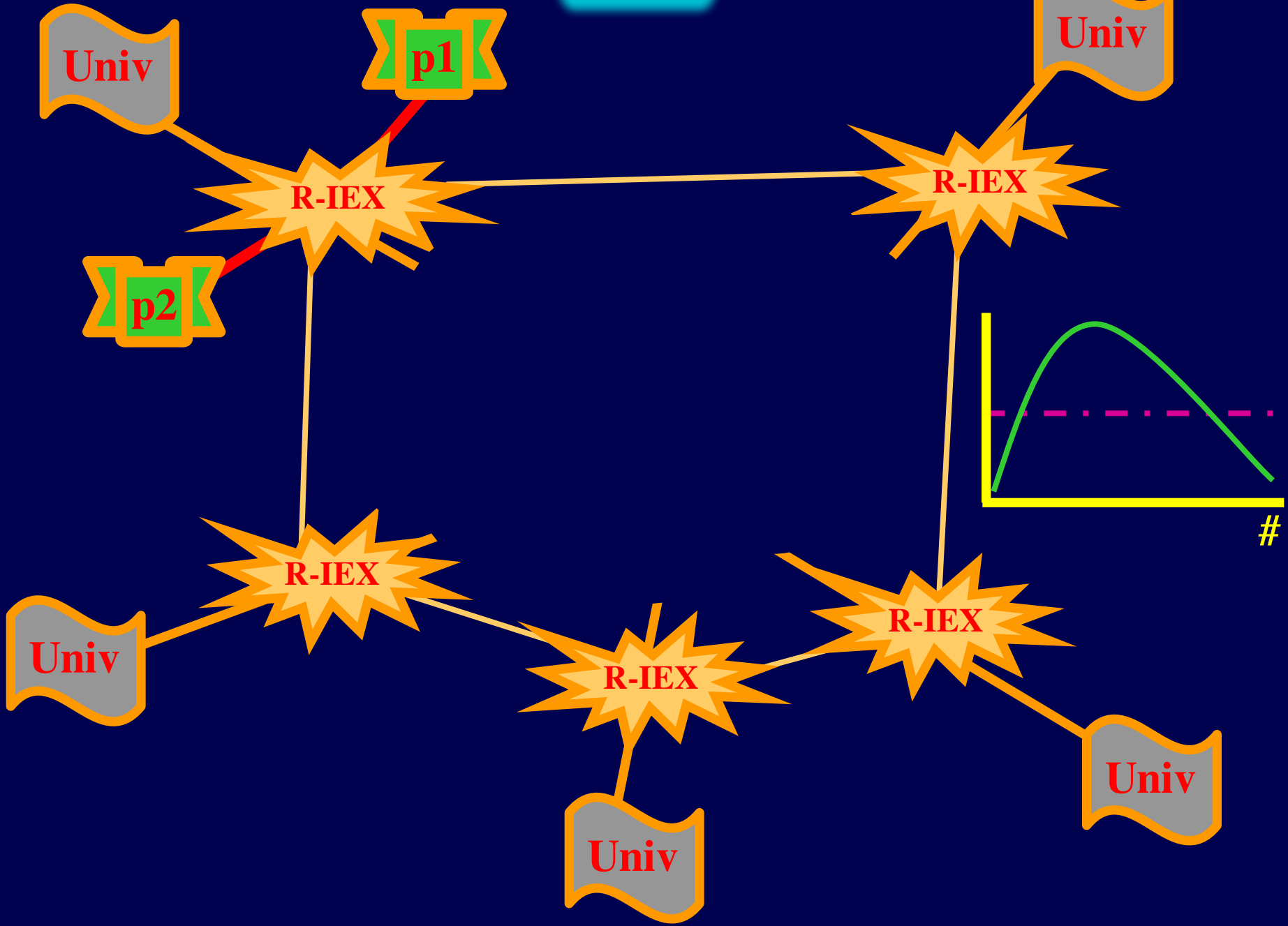












Gespannen verhouding

- 90% van het Universitaire netwerk is een gewoon productienetwerk
- 90% van de geavanceerde applicaties wordt door 10% van de Universitaire gemeenschap gebruikt
- 90% van het netwerk gebruik van de studenten staat niet in de doelen van de diverse "fiber to the students" projecten
- Research -> productie
 - ATM videoconference
 - Multicasting
 - Policy based networking

- **This work is supported by**
 - SURFnet bv
 - TERENA Technical Programme
 - European Commission, DG XIII
 - » Telematics Applications Programme
 - » RE 1008 REMOT
 - » RE 4005 DYNACORE
 - Enterasys (Cabletron)
 - CISCO
 - Ellacoya



- **More info:**

- <http://www.phys.uu.nl/~wwwfi>
- <http://www.phys.uu.nl/~wwwfi/aaaarch>
- <http://www.phys.uu.nl/~dynacore>

