

The significance of the new Internet standards for experimental physics and education.

Cees de Laat



Utrecht University

- **This space is intentionally left blank**
- 

- **Located in Minnaert Building 3th floor**

- 1 Professor
- 3 staff
- 1 secr
- ± 6 on project
- ± 10 stud
- 3 stag
- 2 industry

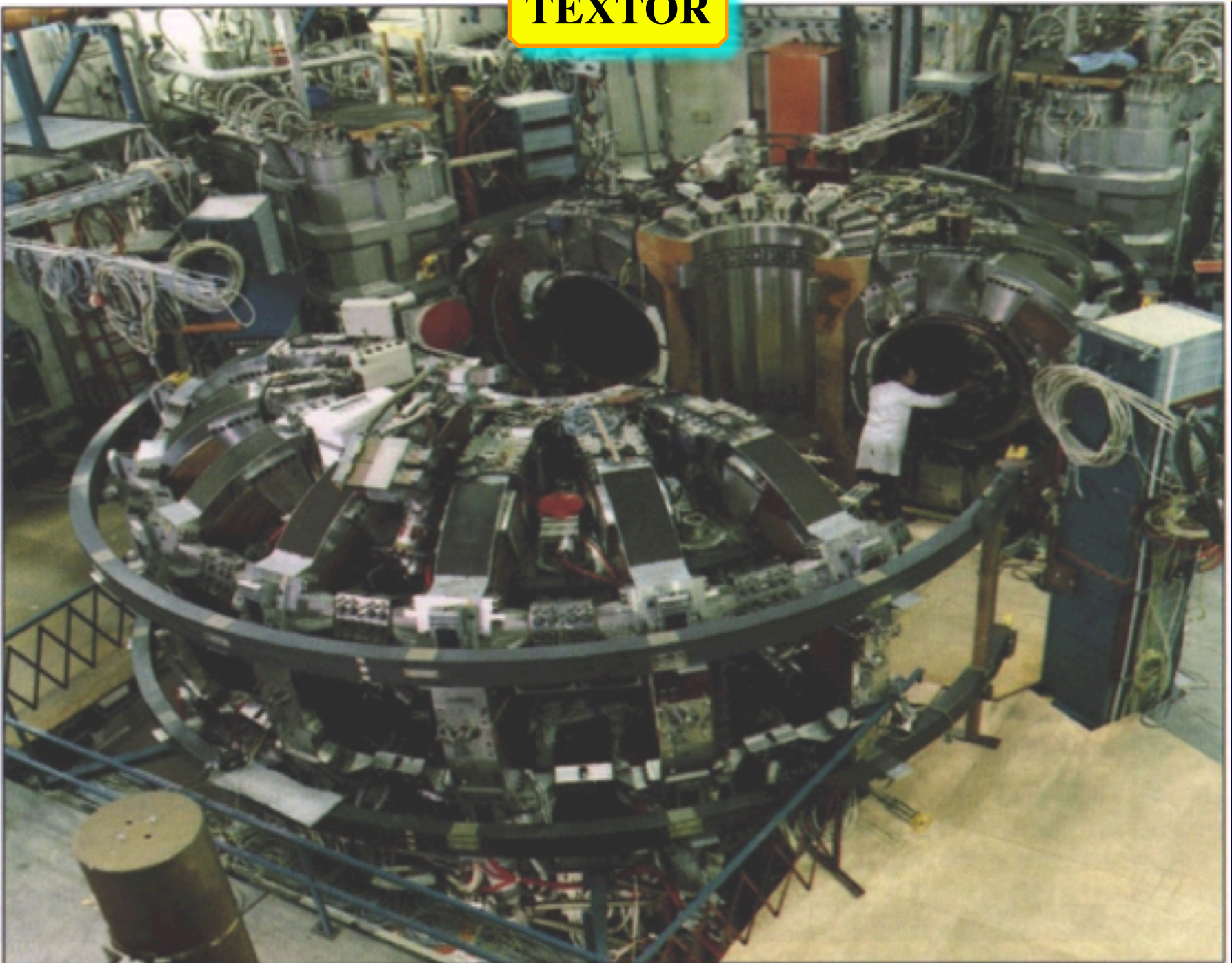


- **Computational Physics**
 - Ocean and weather modeling
 - Solid State physics
 - Supercomputing massive parallel system
 - Code distribution and optimization
- **Computer based learning systems**
 - SENS project
 - Computer and network based college
 - WEB based (Java, HTML, Db, Groupware)

- **Networking**
 - **Focus on applications for Physics**
 - **QoS networks for computing, laboratories and telelearning**
 - **Distributed systems topics:**
 - » **Modeling**
 - » **Optimization**
 - » **Simulation**
 - » **Emulation**

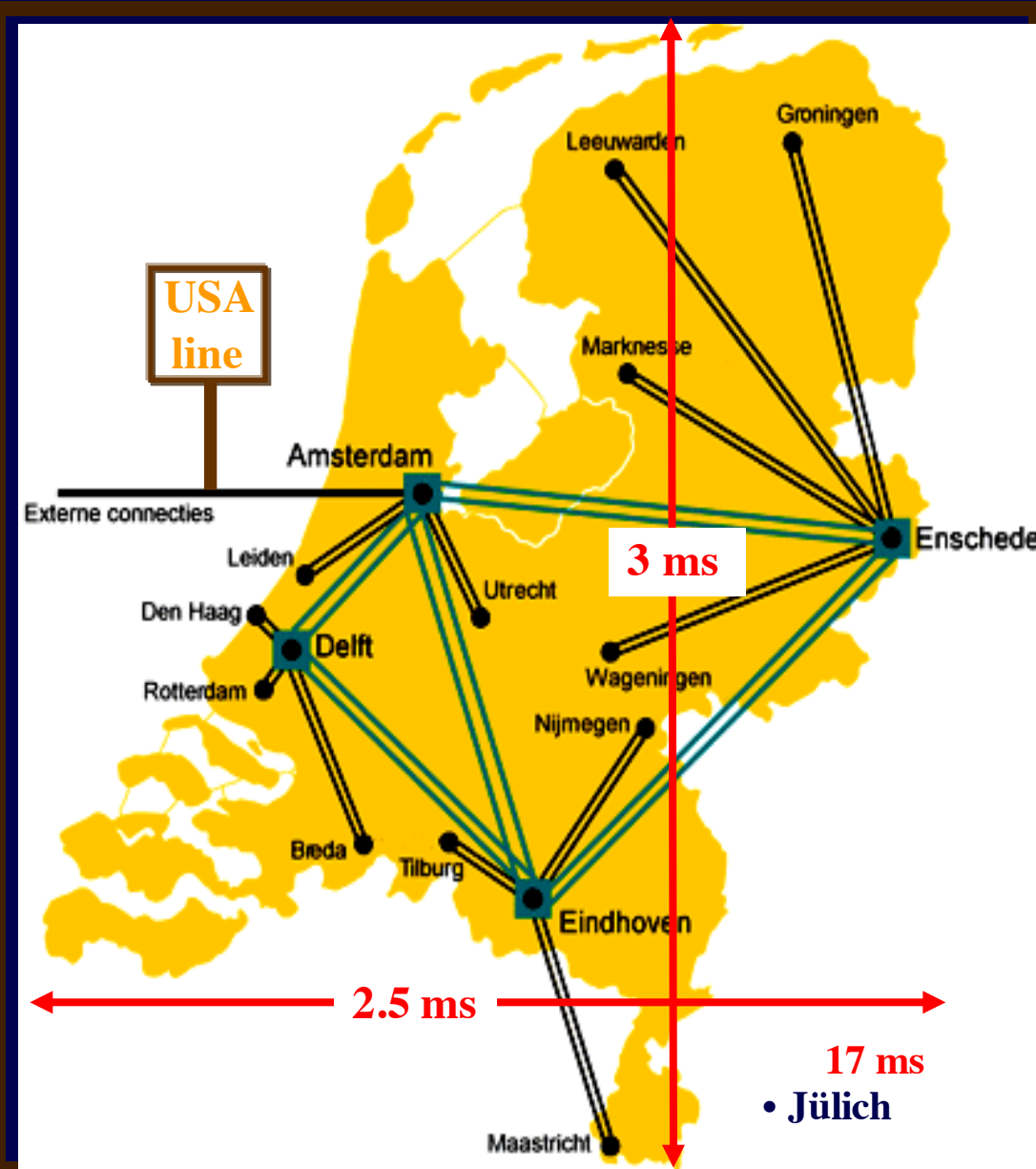
- **EU project REMOT / DYNACORE**
 - Collaboratories, virtual control rooms
 - Support science at the home institutes
 - Groupware, Videoconference tools point to point and point to multipoint
 - Corba services, distributed object db
 - www.phys.uu.nl/~dynacore

TEXTOR



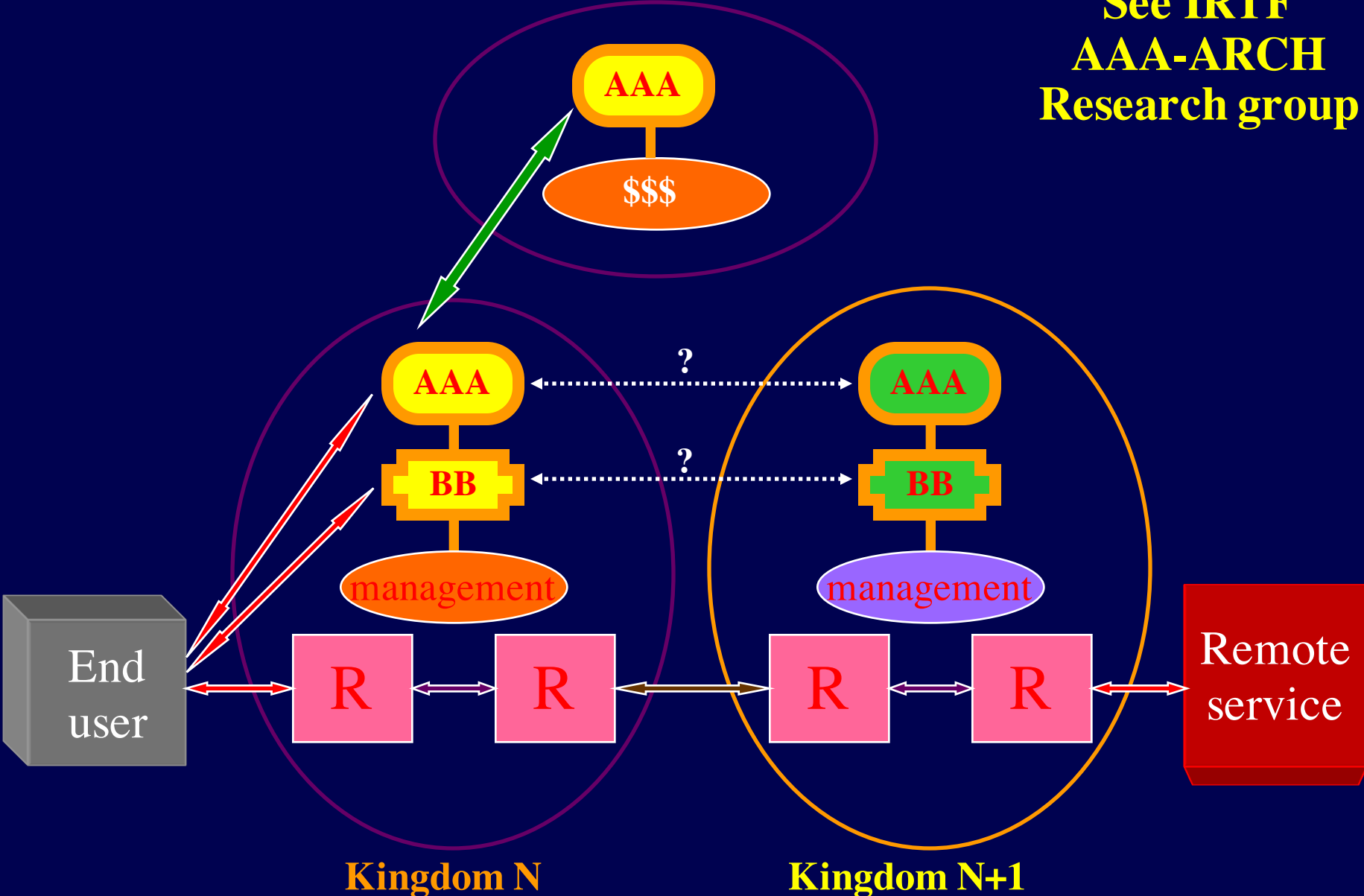
Physics-UU to IPP-FZJ => 7 kingdoms

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

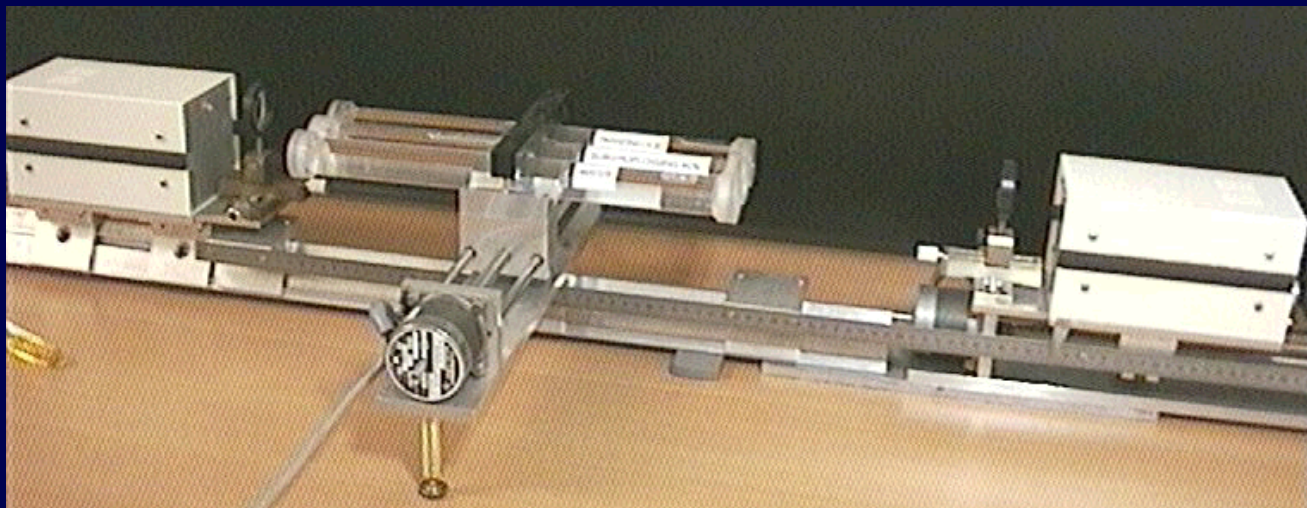
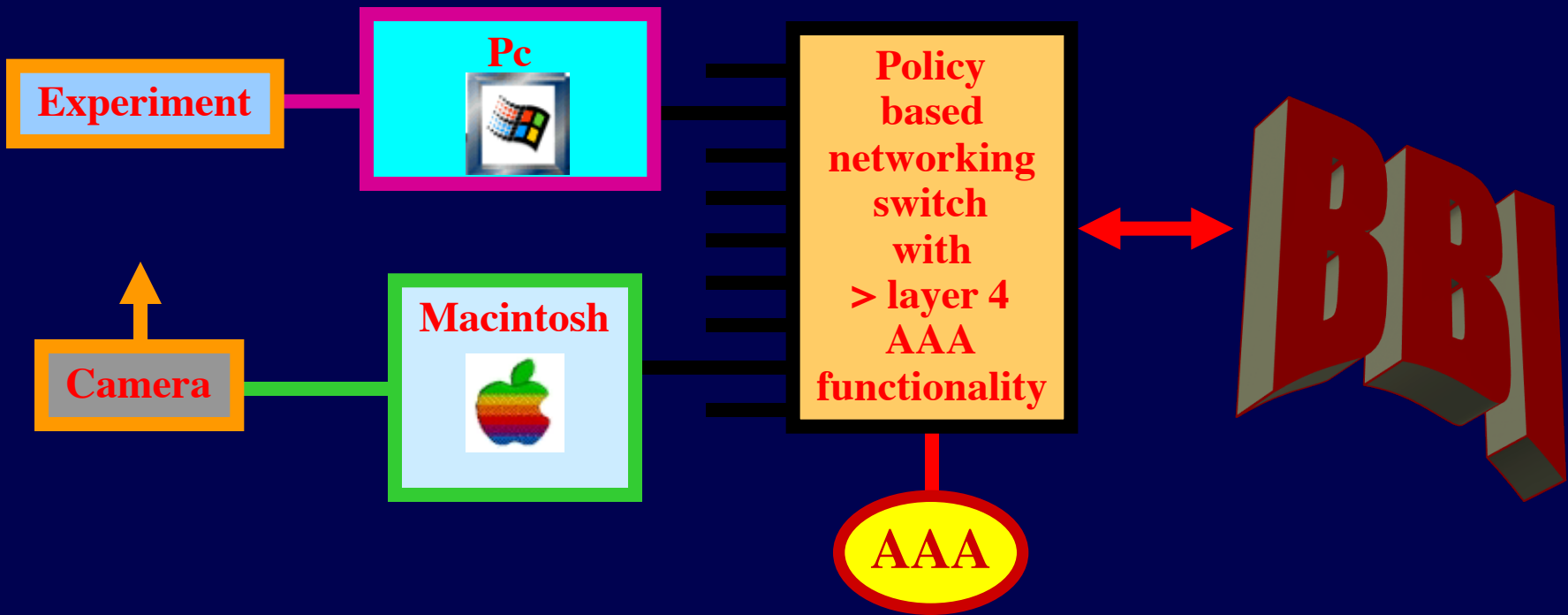


The need for AAA

See IRTF
AAA-ARCH
Research group



Policy based networking example



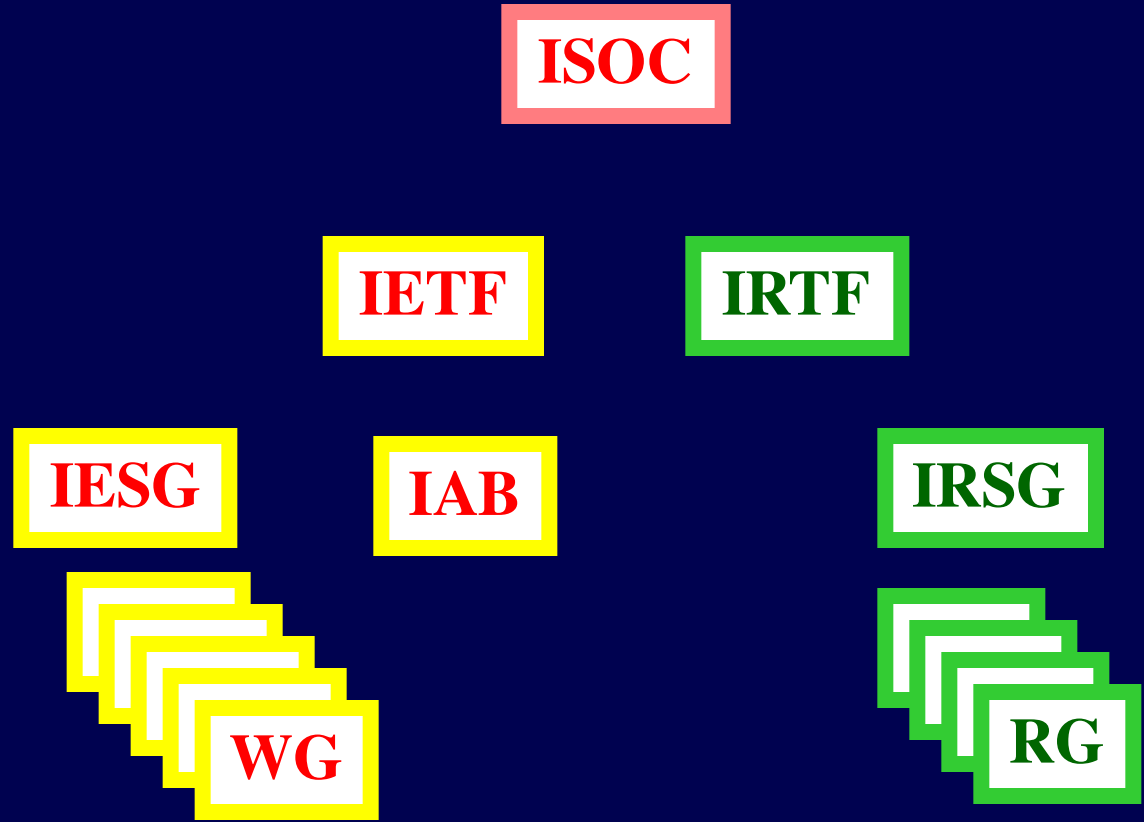


- **Network Access**


- **Bandwidth Broker**
- **Authorization of resources living in many administrative domains**
- **Budget system**
- **Library system**
- **Computer based education system**
- **E-Commerce**
- **Micro-payments**
- **Car Rental**
- **Daily life**

Authentication Authorisation and Accounting ARCHitecture Research Group

chairs: C. de Laat, J. Vollbrecht



Specific goals of the RG are:

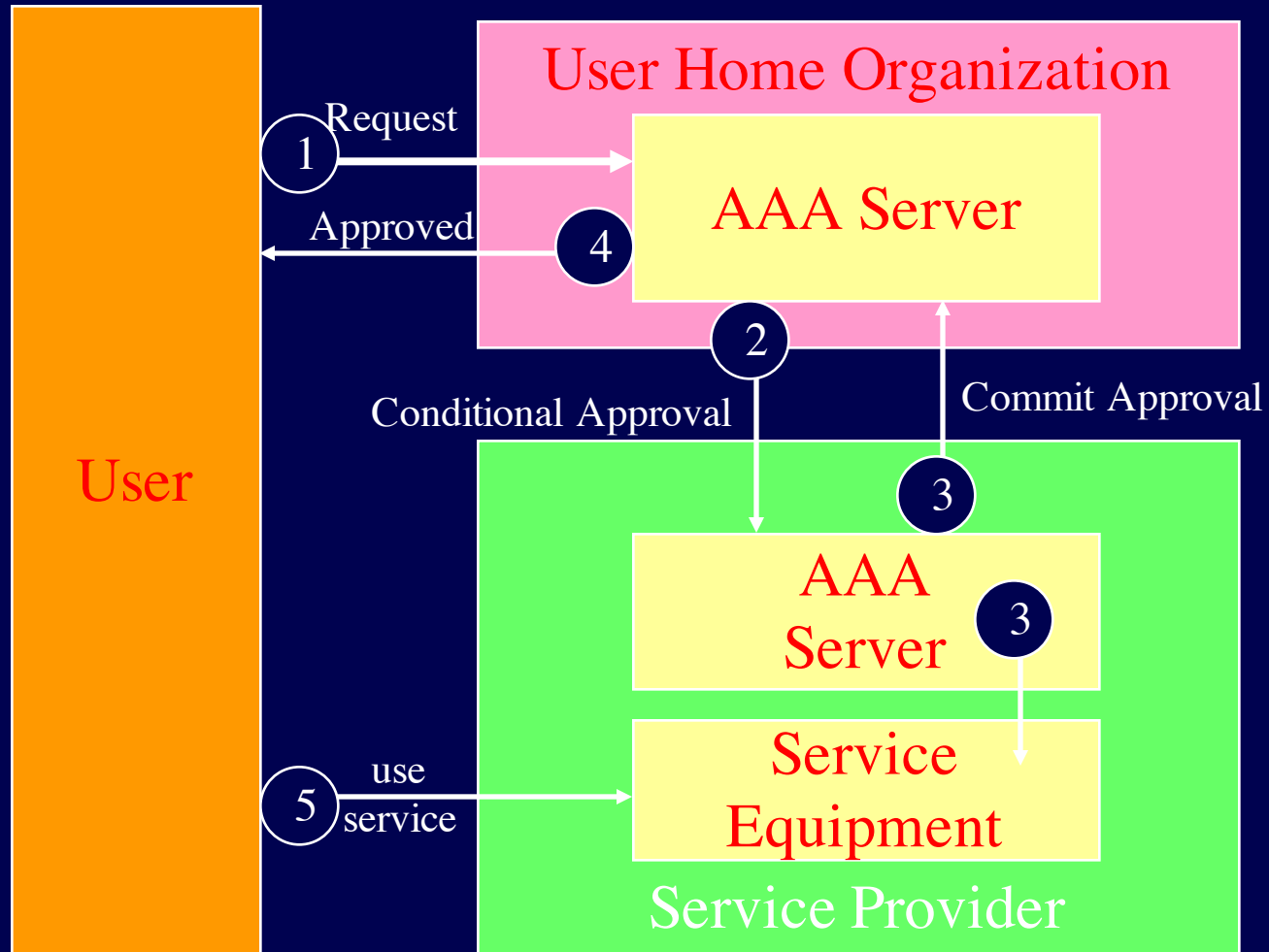
- **develop generic AAA model by specifically including Authentication and Accounting**
 - **develop auditability framework specification that allows the AAA system functions to be checked in a multi-organization environment**
 - **develop a model that supports management of a "mesh" of interconnected AAA Servers**
 - **define distributed policy framework, coordinate with policy framework WG and others**
 - **develop an accounting model that allows authorization to define the type of accounting processing required for each session**
- 

Specific goals of the RG are:

- **implement a simulation model that allows experimentation with the the proposed architectural models (also work on an emulation)**
- **describe interdomain issues using generic model**
- **work with AAA WG to align short term AAA protocol requirements with long term requirements as much as possible**
- **complete the work in Q4 - 2000 (ambitious)**

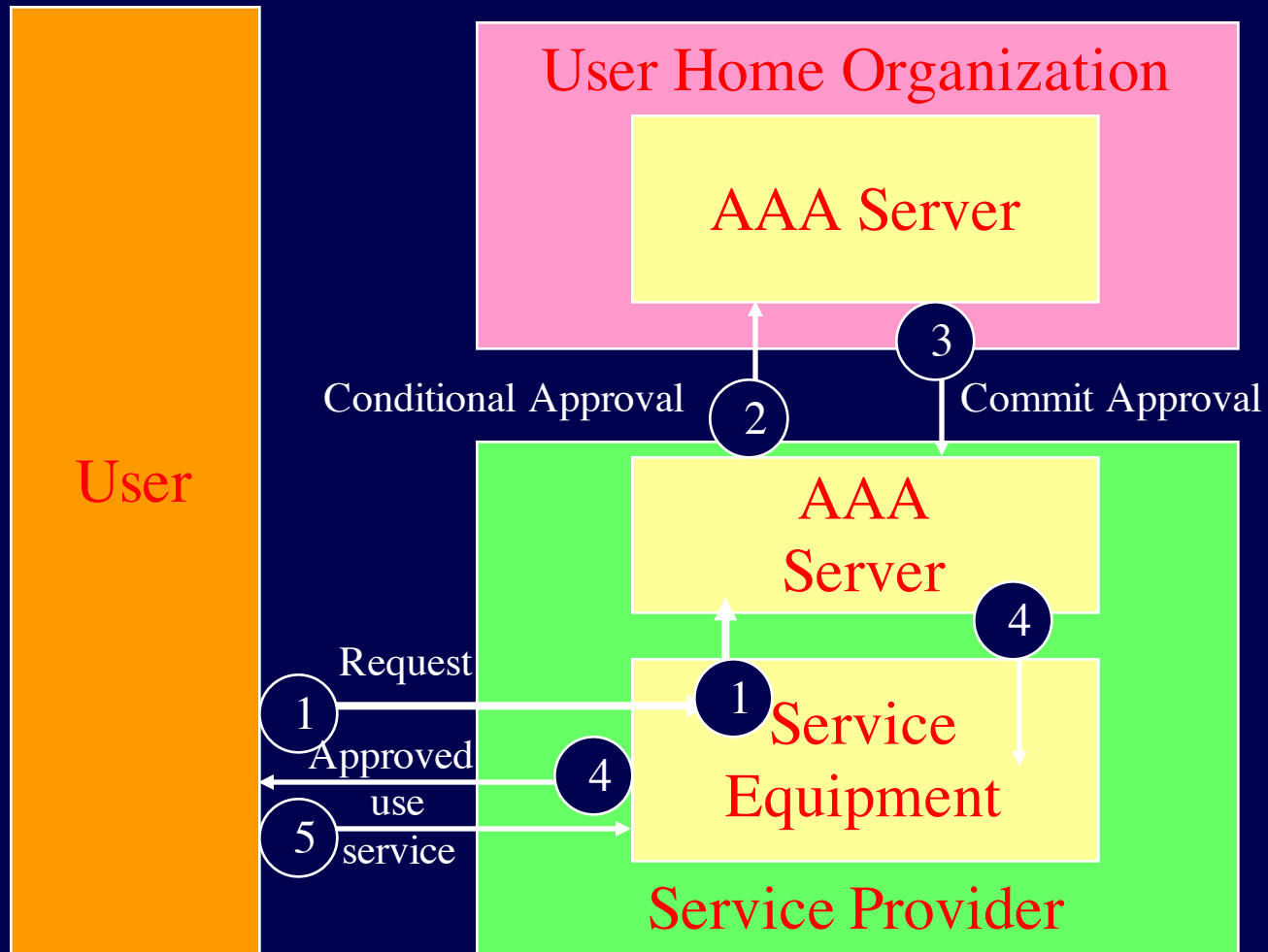


- **Research Group Name: AAAARCH - RG**
- **Chair(s)**
 - John Vollbrecht -- jrv@merit.edu
 - Cees de Laat -- delaat@phys.uu.nl
- **Web page**
 - www.irtf.org
 - www.phys.uu.nl/~wwwfi/aaaarch
- **Mailing list(s)**
 - aaaarch@fokus.gmd.de
 - For subscription to the mailing list, send e-mail to majordomo@fokus.gmd.de with content of message
subscribe aaaarch
end
 - will be archived, retrieval with frames and in plain ascii:
 - » <http://www.fokus.gmd.de/glone/research/aaaarch/>
 - » <http://www.fokus.gmd.de/glone/research/mail-archive/aaaarch-current>
 - » <ftp://ftp.fokus.gmd.de/pub/glone/mail-archive/aaaarch-current>



Example application: bandwidth brokerage at Enterprise/Service Provider boundary

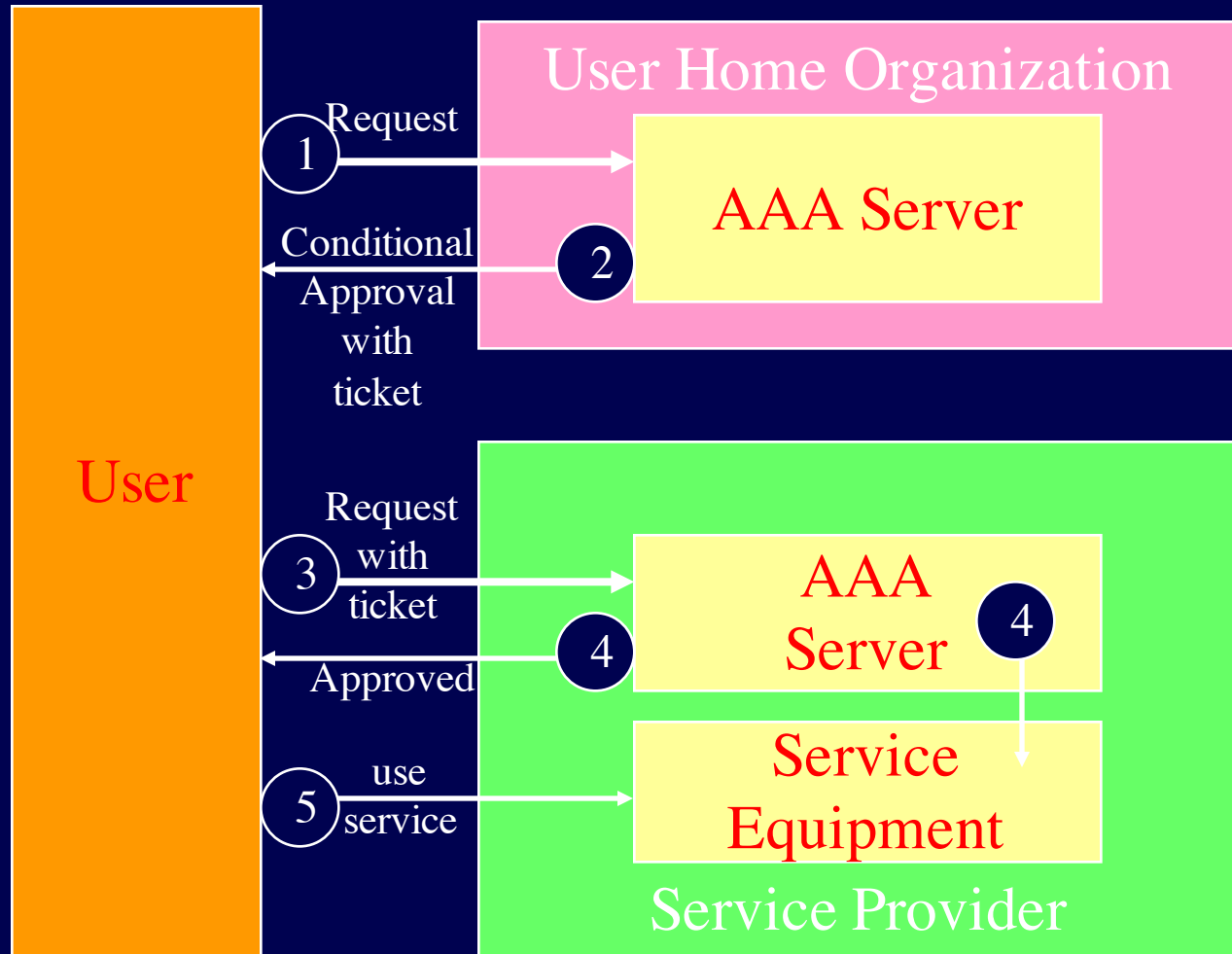
Roaming "Pull" Authorization Model



Example applications: Mobile IP, PPP dial-in to NAS



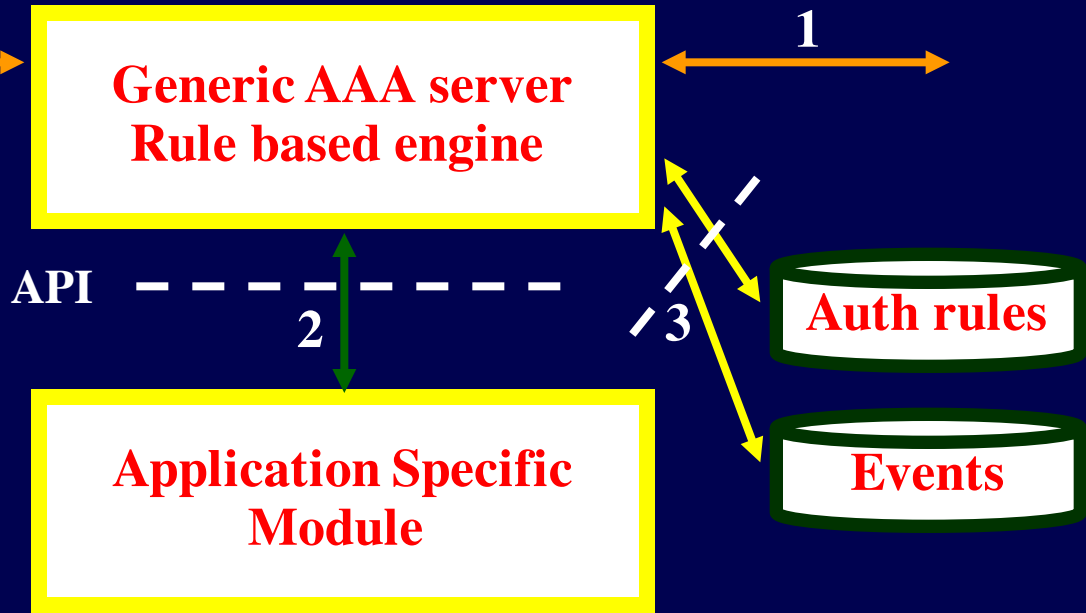
Roaming "Push" Authorization Model



Example application: Internet printing, where file and print servers are in different admin domains

Rule example: Auth_A = (B>9) .or. C .and. D

USER



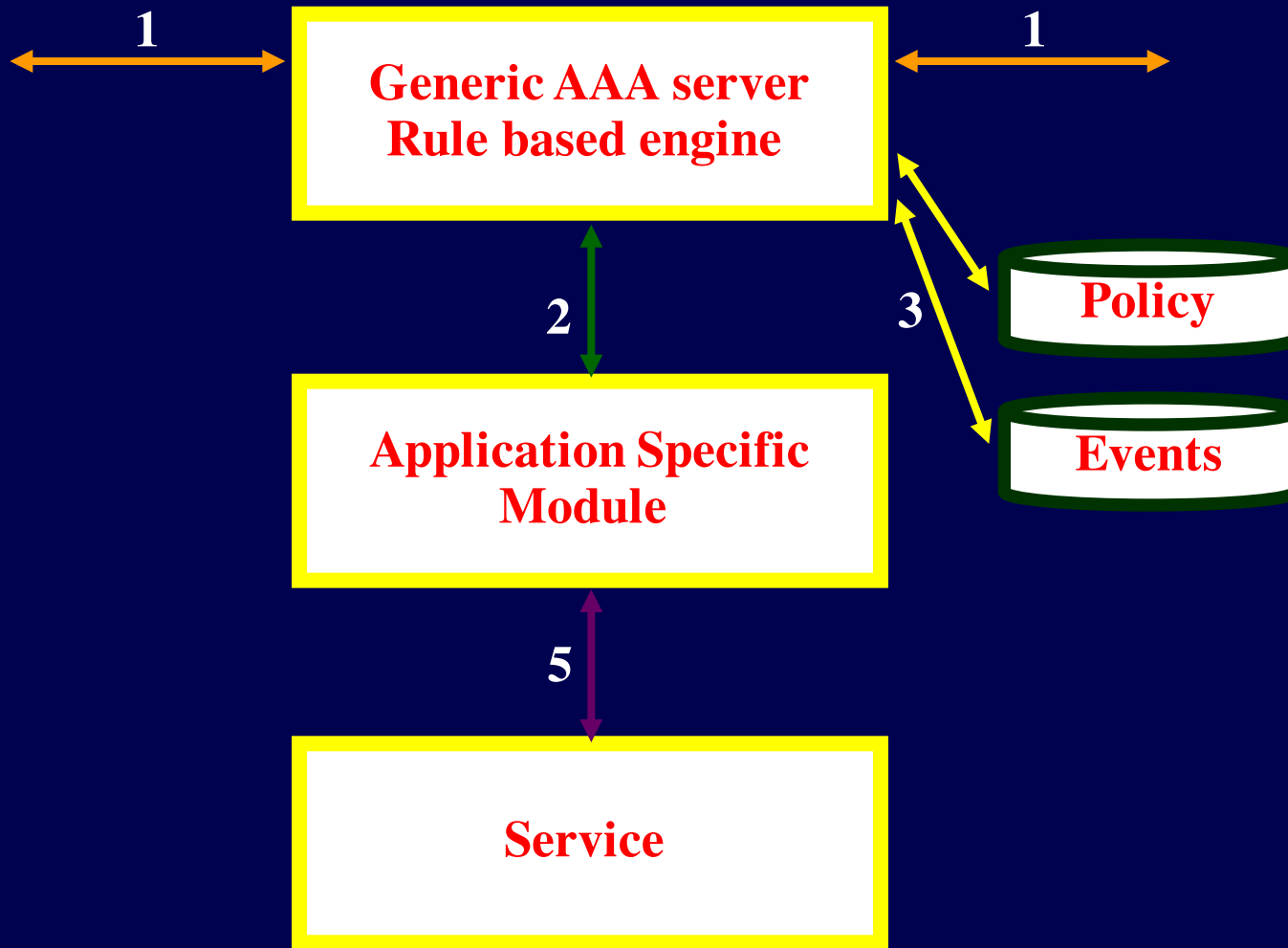
Types of communication:

1: "The" AAA protocol

2: interface (API) to app specific module (addressing!)

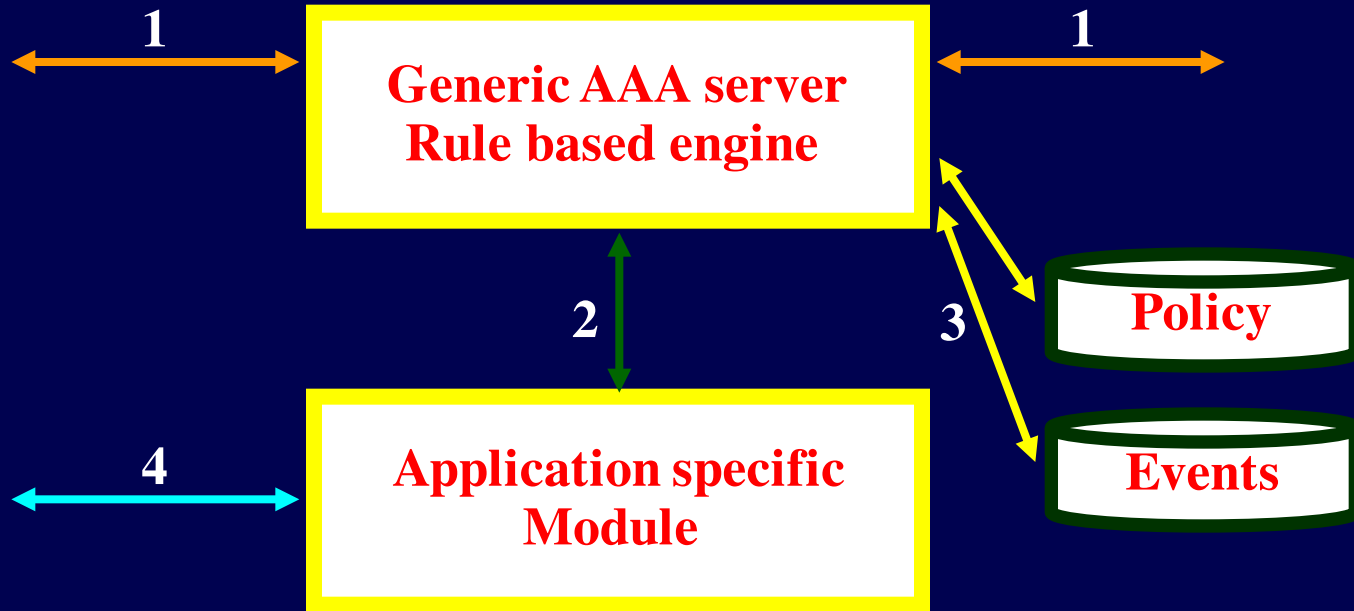
3: interface (API or connection) to repositories (e.g. LDAP)





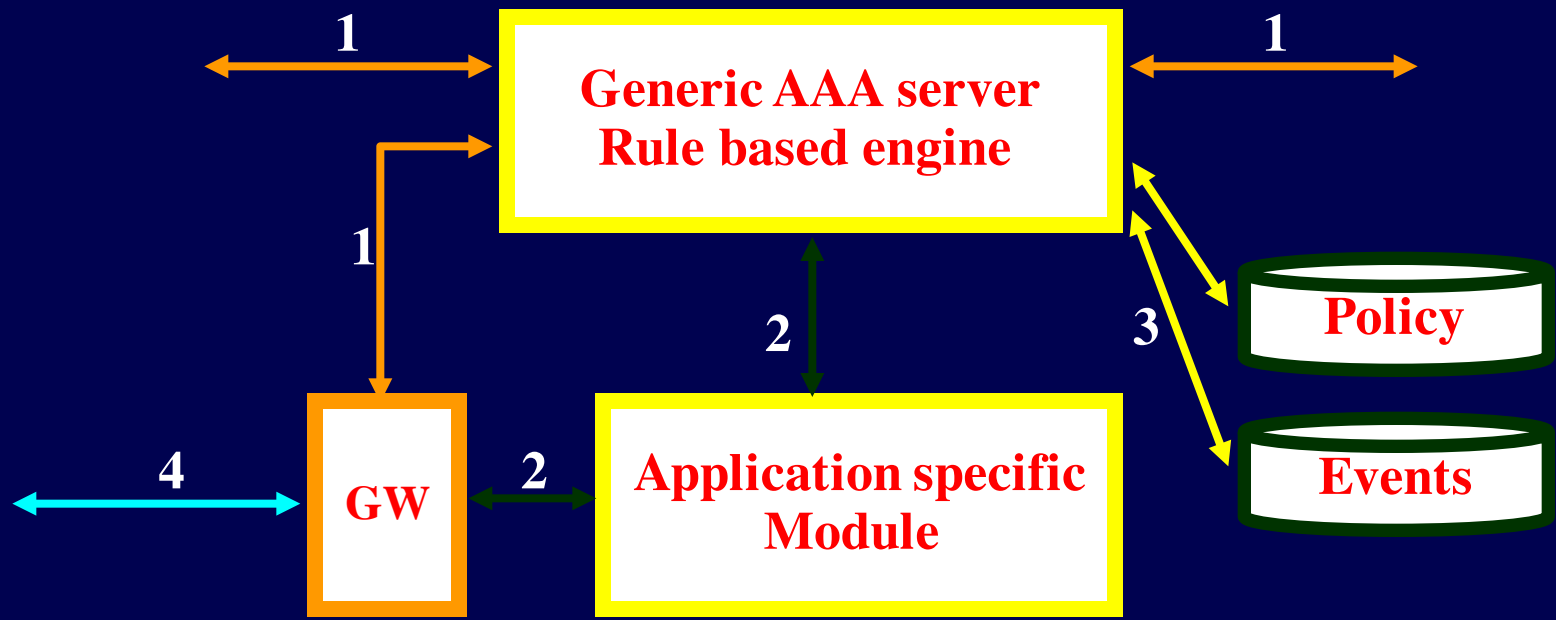
Types of communication:

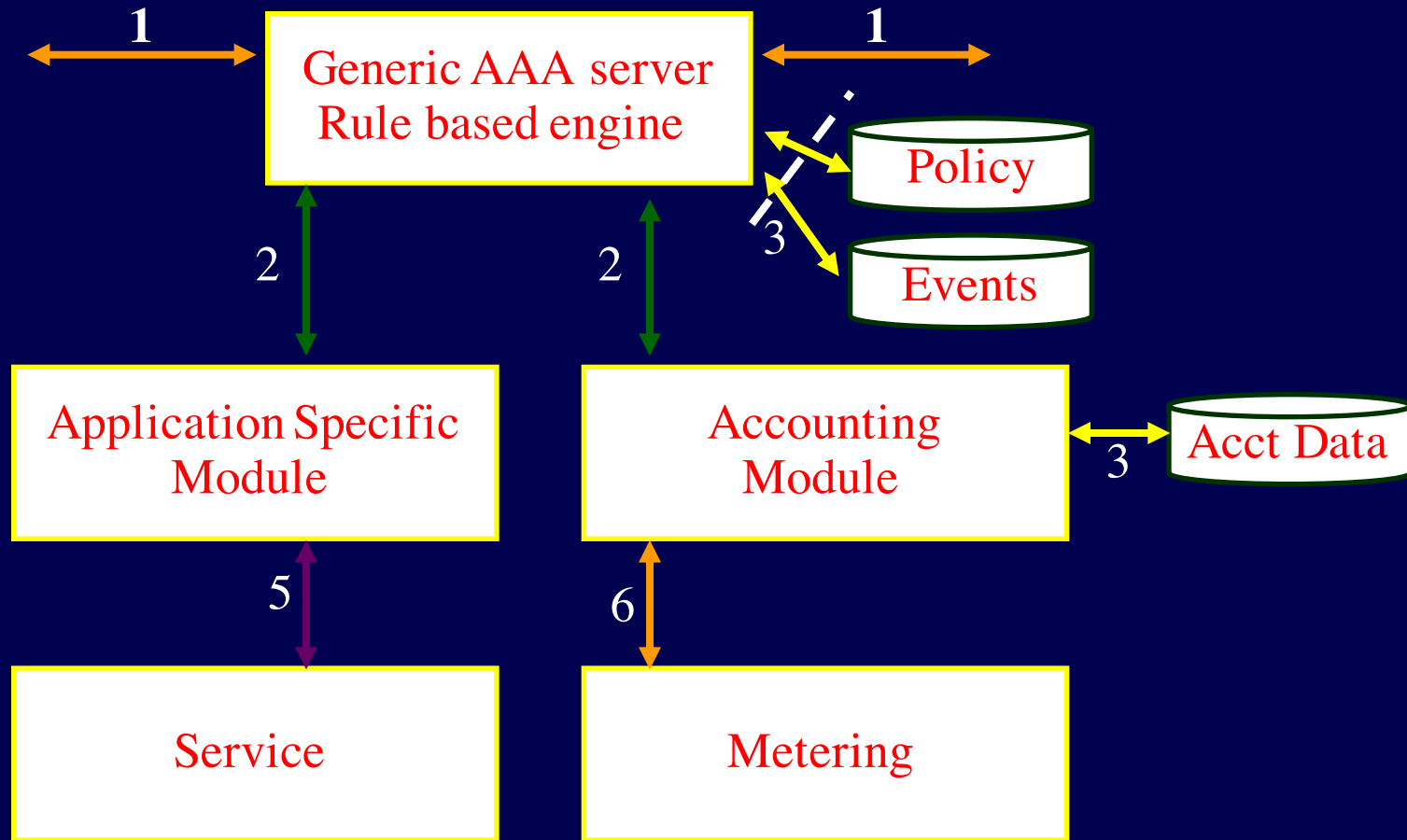
5: Towards service (f.e. COPS, CLI, SNMPv3)

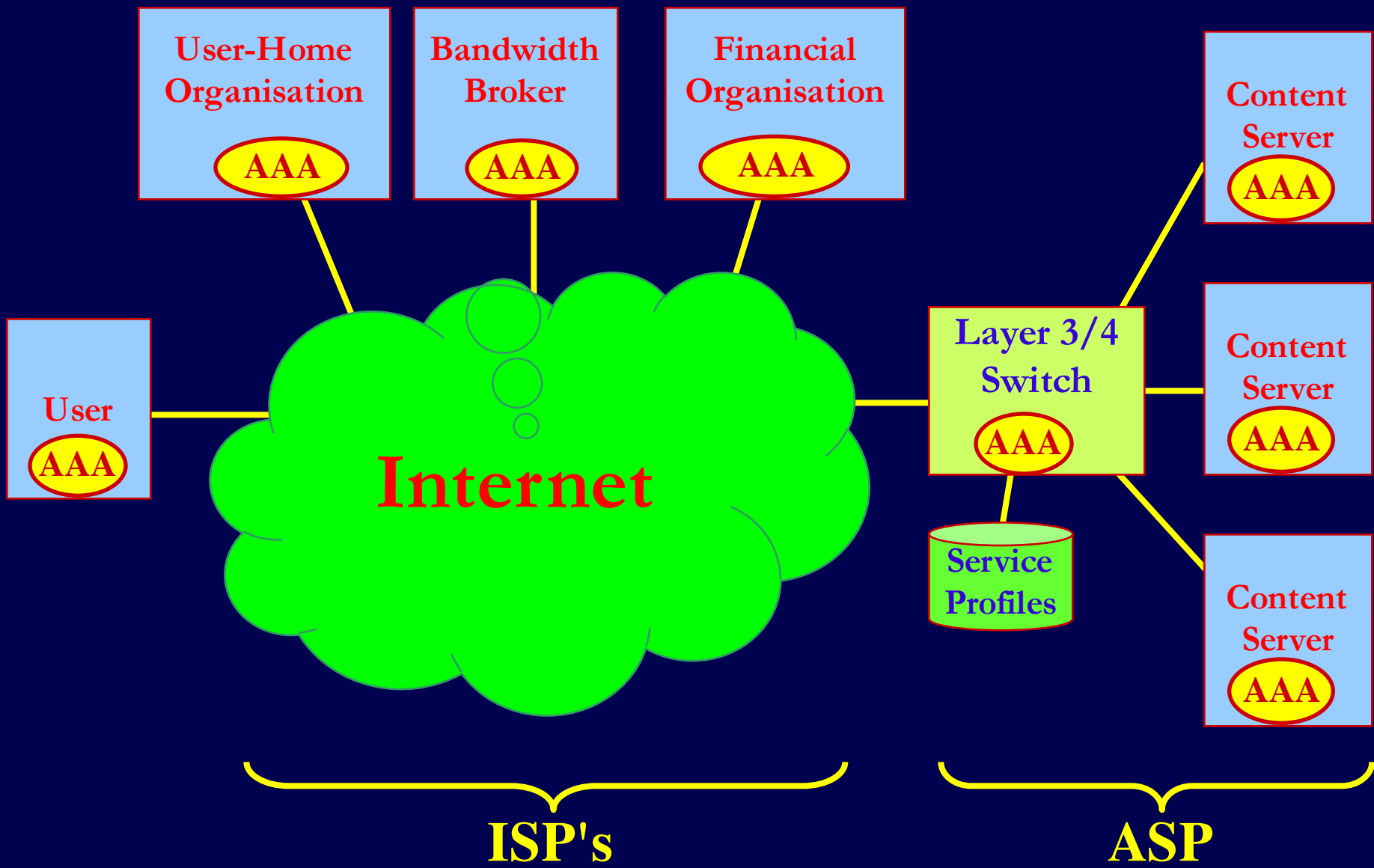


Types of communication:

4: Legacy protocols (Radius, Diameter, ...)



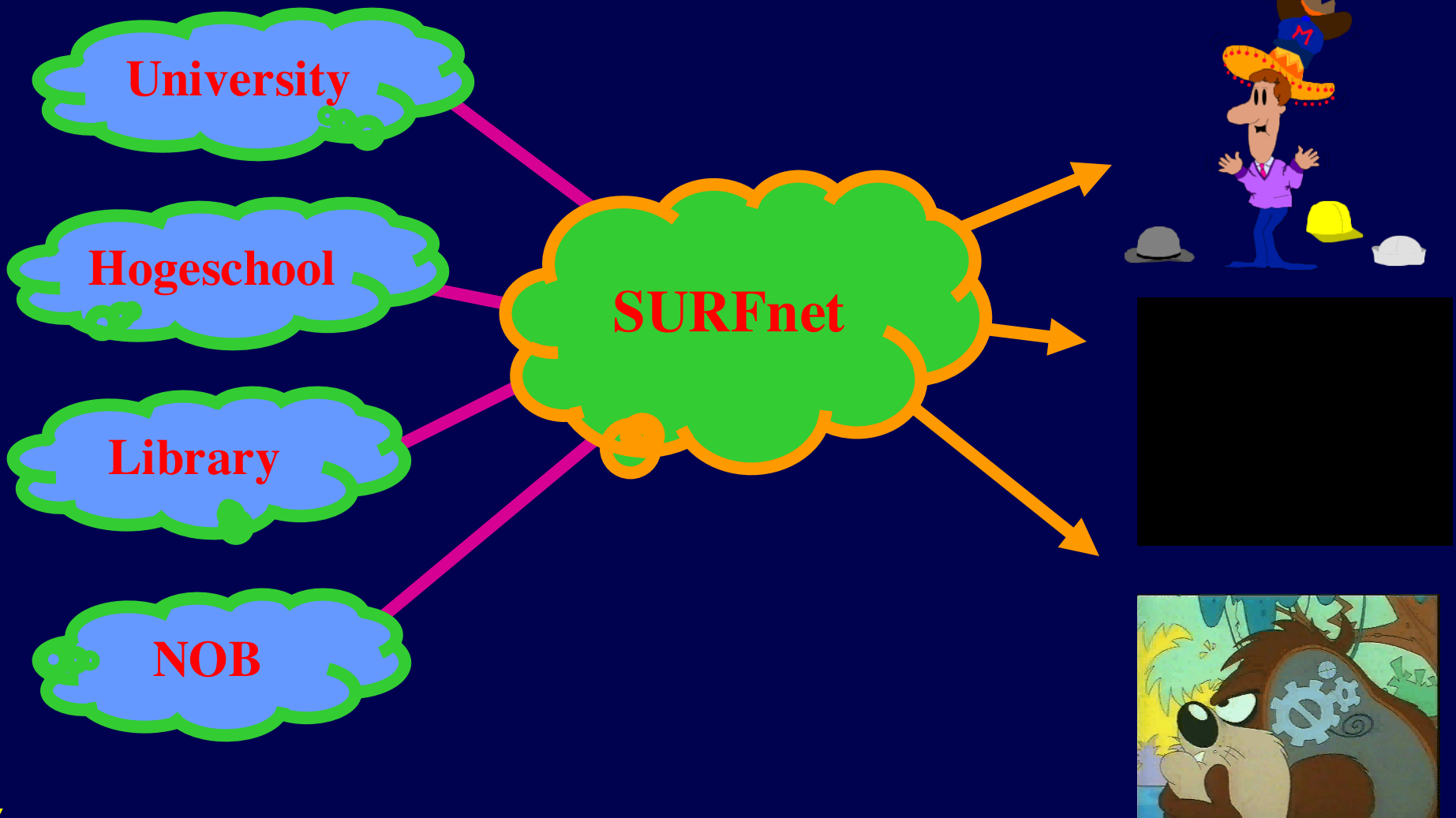




Content

**Portals
Brokers**

Customers



- **Bureaucracy**

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

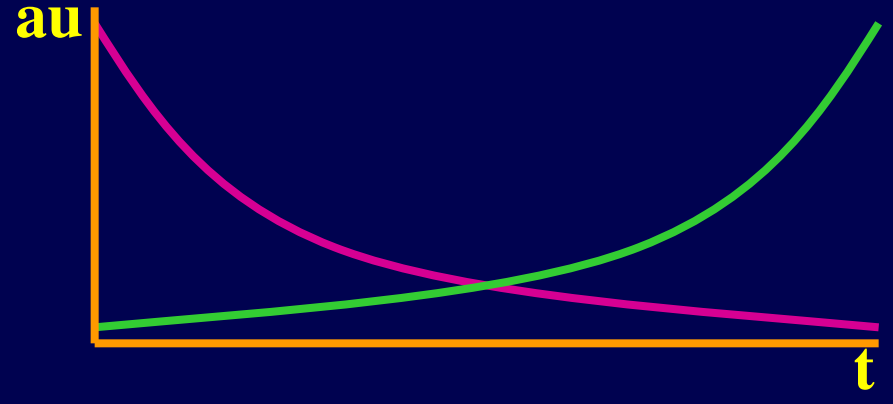
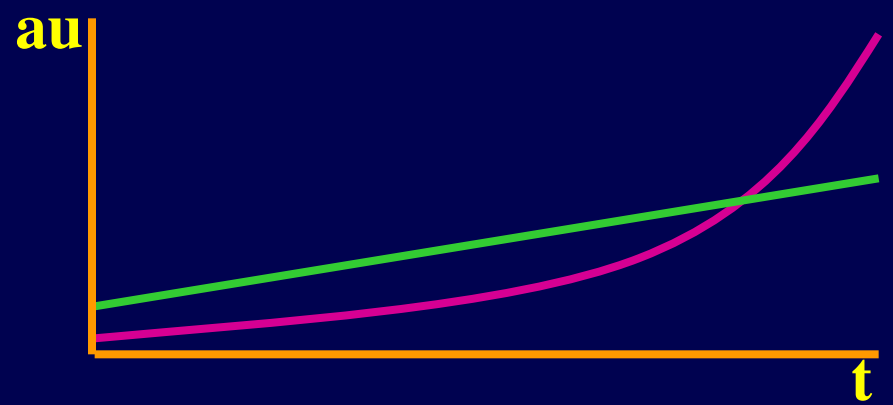
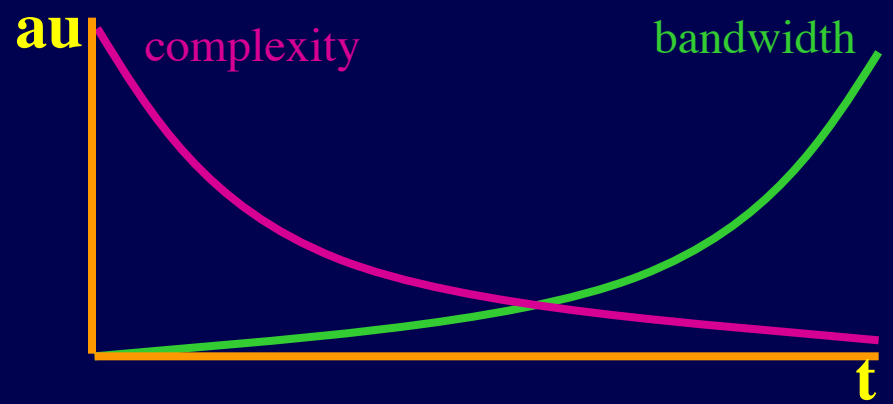
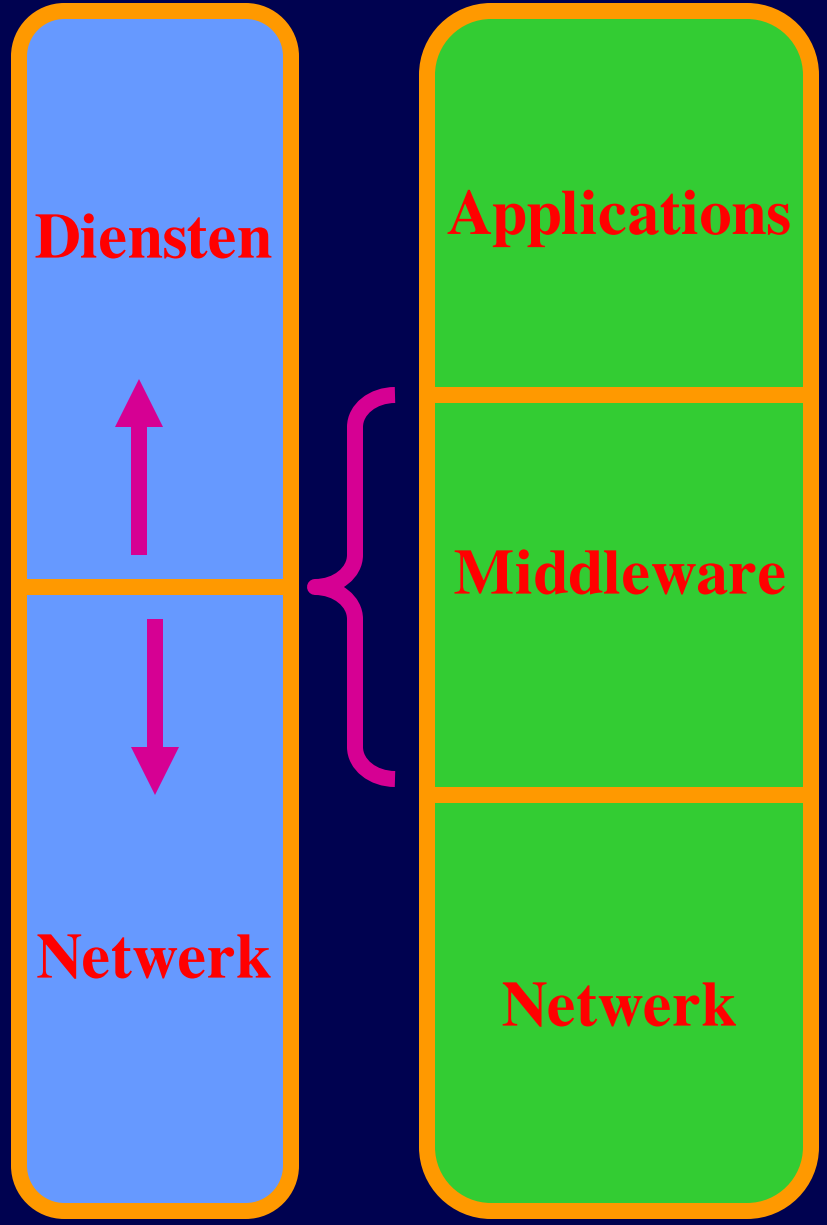
- **Complexity**

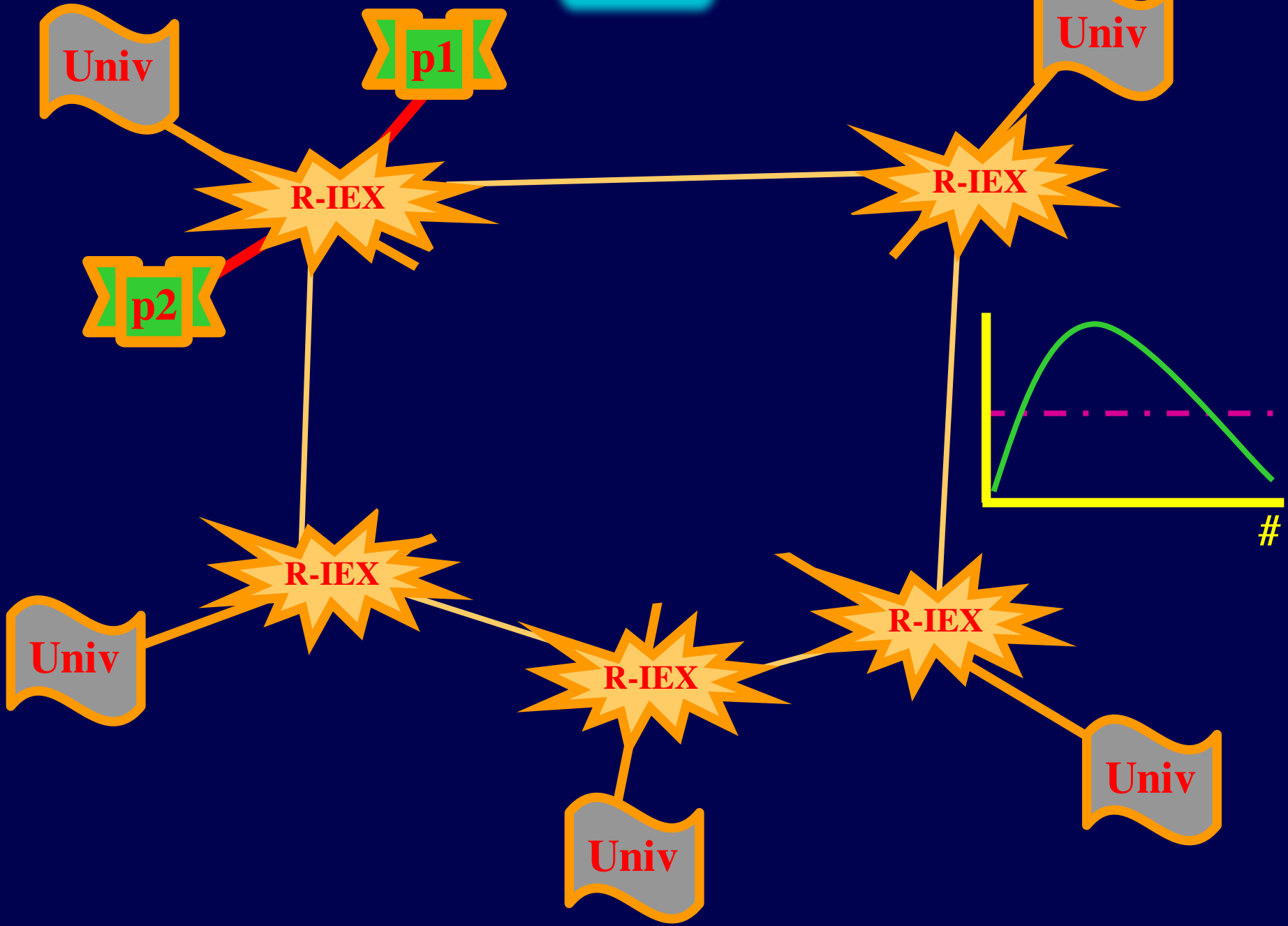
- Automatic application setup
- Need advanced middleware and probably also bureaucracy

- **Throw Bandwidth at the problem**

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

Stretching the OSI model





Univ

Univ

R-IEX

R-IEX

R-IEX

R-IEX

R-IEX

Univ

Univ

p1

p2

Gespannen verhouding

- **90% of the University network is an ordinary production network**
- **90% of the advanced applications is used only by 10% of the University community**
- **90% of the usage of the network by students is not mentioned in the goals of the many "fiber to the student dormitories" proposals**
- **Research -> production**
 - **ATM videoconference**
 - **Multicasting**
 - **Policy based networking**