

Applications and Services in a Research and Education Network

or

Why should we have NRENs?

- Case of DFN -

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Rabat, Morocco
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- **DFN / X-WiN**
 - **Short Overview**
 - **Services and Applications Services in DFN / X-WiN**
- **Applications Scenarios**
 - **Example eLearning**
- **Services for Applications**
 - **Example DFN-VC**
 - **Example DFN-AAI**
- **Lessons learned**

The network infrastructure for the academic community in Germany the

WiN = WissenschaftsNetz

- 5th WiN-generation: **X-WiN** – the dark fibre backbone
- Components bought from several vendors (fibre, routers and lightning, monitoring)
- In place since 2006
- ~60 nodes; ~8000 km fibre; ~400 institutions connected
- Connections to other networks (GEANT, Global upstream, commercial ISPs in Germany)

Some universities and research institutes organise their connectivity via commercial ISPs

GEANT

**German
ISPs**

X-WiN

**Global
Upstream**

- IP Service (DFN-Internet)
- VPN Service (DFN-VPN)
- Videoconferencing Service (DFN-VC)
- Public Key Infrastructure (DFN-PKI)
- Authentication and Authorisation Infrastructure (DFN-AAI)
- Security-Services /
Emergency Response Team (DFN-CERT)
- ... others

The German Academic Network Association

founded 1984, initiated by the academic community

- **Members**
 - universities, polytechnics, governmental research labs (Max-Planck Society, Fraunhofer Society etc.) as well as research labs of industry
- **Member Assembly** (~ 330 members, twice a year)
 - Votes on the yearly budget
 - Votes on yearly report
- **Council of Administration** (13 members, elected by MA)
 - Discusses future work and developments, prepares of MA
- **Board of directors** (3 members, elected out of CA)
 - Decides on DFN activities

- No government funding since 2004
- Costs of the network: roughly 35 Mio €/a
- Income is from the users
 - Membership fees
 - Access to X-WiN depending on bandwidth
- Access to X-WiN does not depend on membership
 - Institutions have to meet the requirements of DFN charter
- Price for access includes all services

Until 2004: DFN-Projects to promote Network Applications

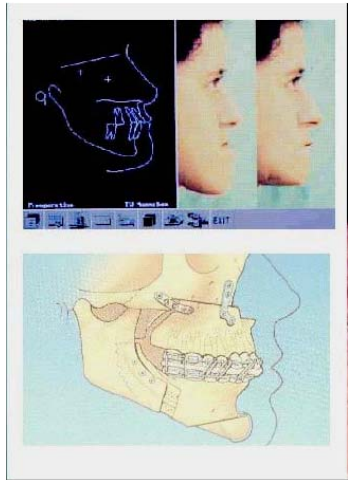
- Information Services projects for various disciplines
- eLearning projects (portals for learning materials, development of Learning Management Systems (LMS))
- Health Care projects

Since 2004: No DFN-funded application projects

- Application projects/activities are organised by the user communities
- funding from various bodies
- no direct DFN impact

But

- **X-WiN** is the reliable network infrastructure for applications
- **DFN-Services** provide support the usage of applications



Applications



- **Developed for the needs of research and education communities for**
 - Communication and cooperation
 - Exchange of data and information
 -
- **Developed, deployed and (often) operated by the research and education communities**
 - They know what they need
 - They have the expertise in their fields
 - They know the people who are involved

But they need a reliable network, services and support

- **Covers many scenarios**
 - Transmission of lectures
 - National and international classes
 - Distance Learning / Open University
 - and many others
- **Covers (almost) all disciplines**
 - Natural sciences
 - Engineering sciences
 - Humanities
 - Medicine
 - ... and many others
- **Needs various services**

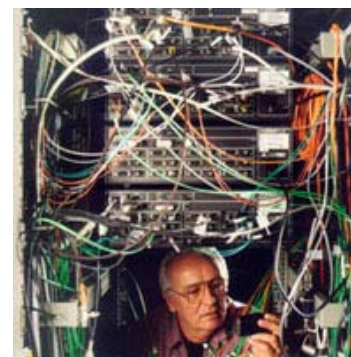
Many players involved



Administration



Lecturers



**Computer/Network
Centre**



Students



Multimedia Support Centre

- **eLearning material and systems**
 - Web-based teaching materials, modular structured courses, Computer aided assessment (online quizzes or tests)
 - Tools to create and manage eLearning material
- **Organisation**
 - Curricula applicable for eLearning
 - Workflows applicable for eLearning
- **Network and Services**
 - Network connection / Access from everywhere (roaming)
 - Videoconferencing
 - Security / Authentication and authorization

Services

VideoConferencing

AAI

Incident response

PKI

VPN

Roaming

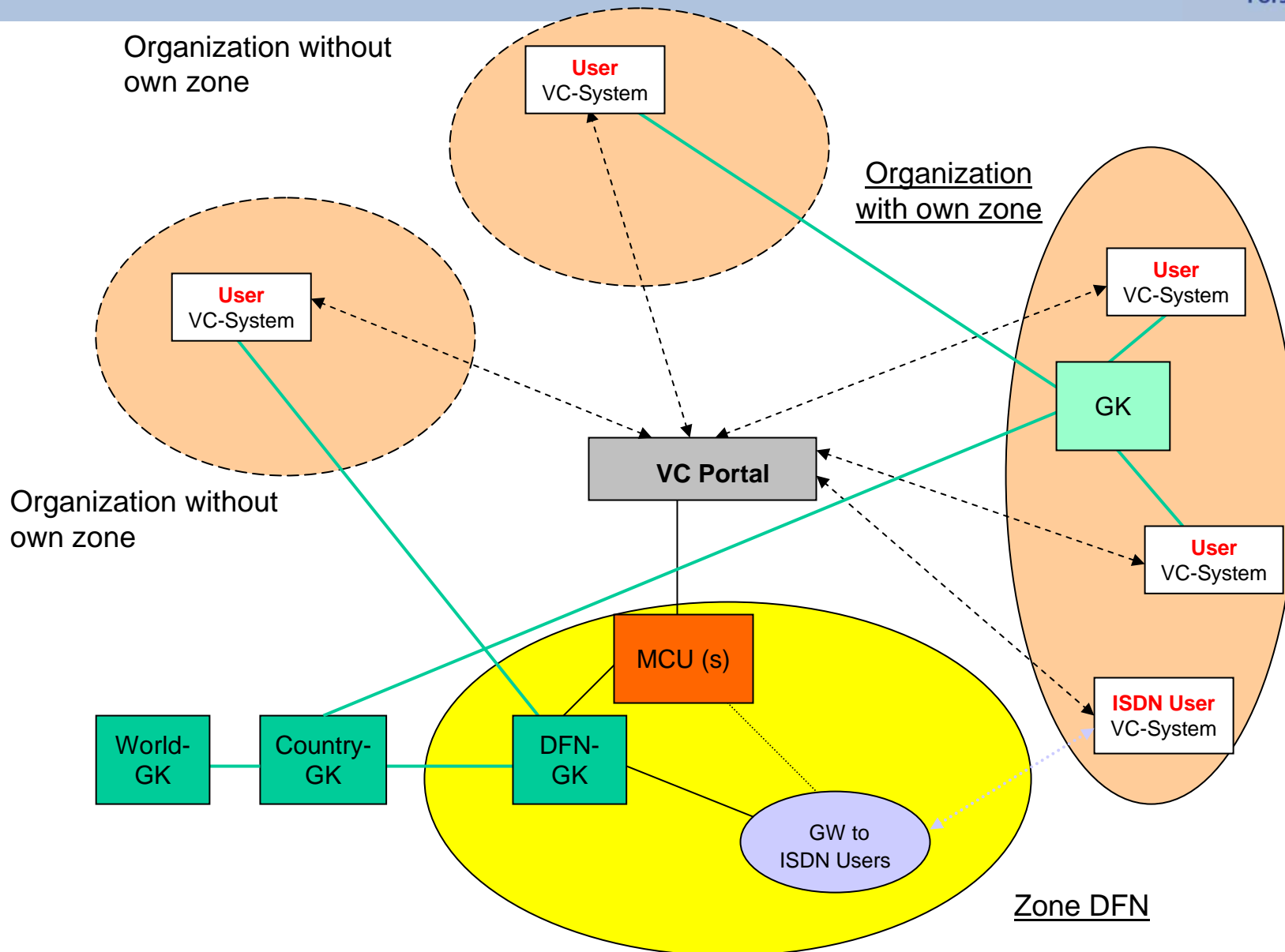
- **Provide generic services**
 - Usable for many organisations (universities, research labs etc.)
 - Usable for many applications
 - Usable for many end-users
- **Provide support for usage of services**
 - Establish competence centres
 - Organise workshops
 - Offer training for trainers

- **Evaluate the needs and possibilities of the target groups**
- **Evaluate the financial, technological and organisational conditions and requirements**
- **Be aware, that technology is important but there are other components which are more difficult to handle**
 - Technical problems can - in general - be solved rather easily
 - organisational problems are far more difficult to handle

A well established service

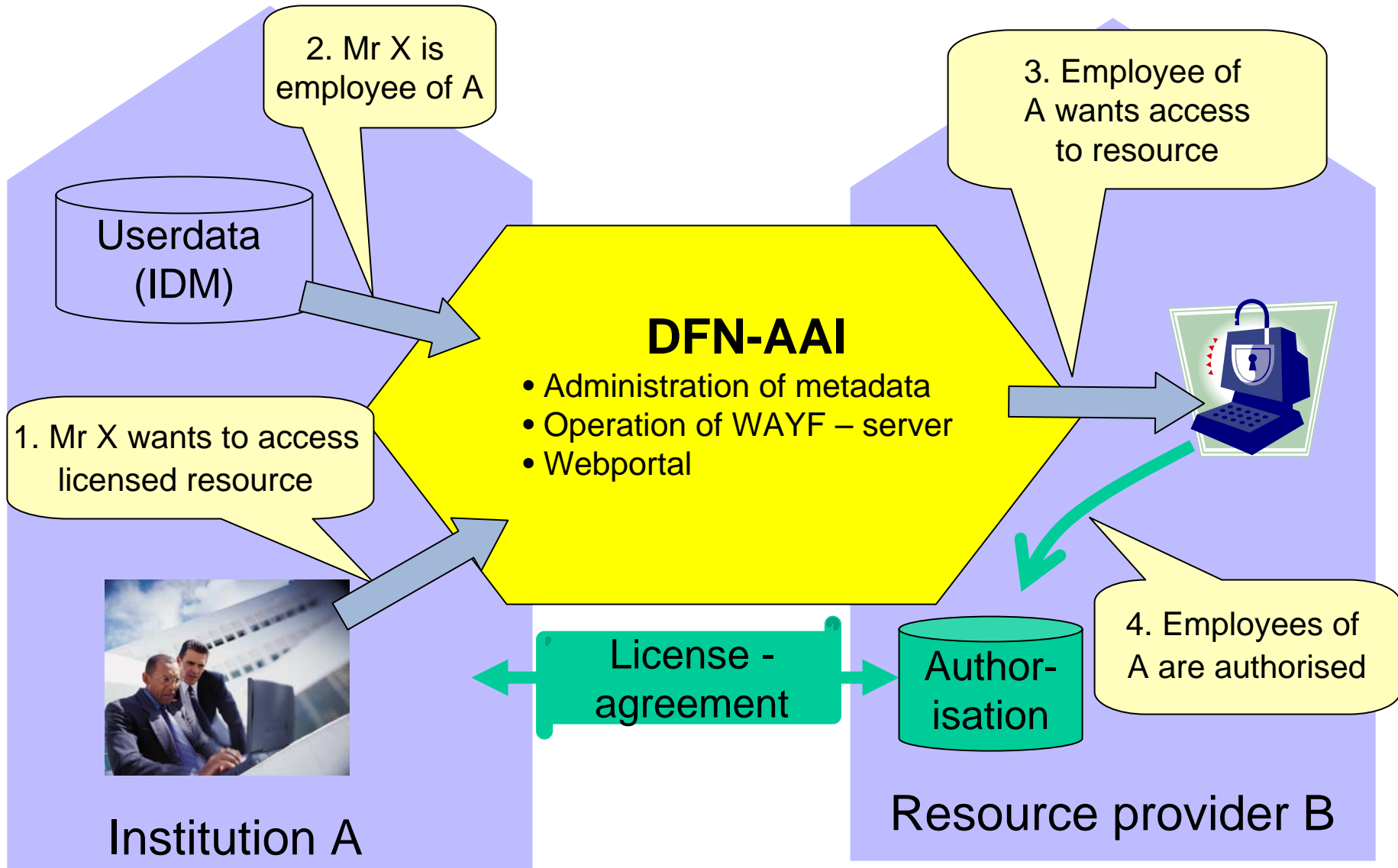
- **Application scenarios**
 - Meetings on management level / Working group meetings
 - eLearning – e.g. remote attendance, tests and examinations
 - Interviews (jobs etc.)
- **User demands / Service features**
 - Ad hoc conferences
 - Dial-In for ISDN-based VC systems / Global Dialling Scheme
 - Support for preparation and management of conferences
- **Support - Competence Centre for Video Conference Services**
 - Ongoing tests of VC systems and test reports
 - Configuration manuals / Videoconference cookbook
 - Hotline
 - Training courses for administrators

DFN-VC Architecture



A service in progress

- **Providers of resources (eLearning materials, Grid Services etc.) want to know who is using it**
 - For financial reasons (publishers etc)
 - For administrative and legal reasons
- **Member institutions asked DFN to set up a trusted federation**
- **DFN set up an authentication and authorisation infrastructure based on Shibboleth (DFN-AAI)**
- **Main tasks**
 - Provision and operation of central (technical) components
 - Provision of policy /contract framework
 - Coordination and support for setting up the local components



- **Current main issues: Reliable Identity Management Systems**
 - definition of "minimum requirements" for Identity Management Systems
 - definition of attributes that are understood by all components
- **Problems**
 - Many institutions have to reorganise their management systems
 - Some decide to start from the scratch

- **The benefit of an NREN for the research and education community is – besides the provision of excellent network connectivity - the provision of services that help applications**
- **If services are build according to the needs and and possibilities of the target groups, they are very well accepted**
- **Only central components of a service should be operated by the NREN, the others should be operated locally**
- **Organisational issues are very important and more difficult to handle than technical problems**

Thank you!



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- **Students**

- Have to learn how to use eLearning systems
- Have to use various technologies for communication and collaboration
- Need appropriate equipment and services

- **Lecturers**

- Have to redesign lectures and materials to be used as online learning material
- Have to learn how to move and present with cameras "watching" and talk to people who are actually not present
- Have to learn how to use eLearning systems
- Need help from professional multimedia and communications experts and services

- **Multimedia Support Centres**
 - Provide all "actors" with the multimedia equipment needed
 - Provide for training and help to create eLearning material
 - Give assistance during online lectures (cameras, microphones, light)
- **Computer/Network Centres**
 - Provide for sufficient and stable network connectivity
 - Provide for all eLearning systems to run reliably
 - Implement necessary (security) components (PKI, AAI, IDM)
- **Administration**
 - Establish curricula appropriate for eLearning
 - Establish workflows that meet the requirements of eLearning and eLearning systems
 - Registration of students and provision of means for authentication and authorization (e.g. crypto-token)
 - Regular updates of the Identity Management Systems

DFN-Projects to promote Network Applications (1985 - 2004)

- **Development of network based applications, such as**
 - Information Services for various disciplines
 - eLearning projects (portals for learning materials, development of Learning Management Systems (LMS))
 - Health Care projects
- **Encourage usage of network and services e.g. by**
 - Promoting development, testing and adoption of videoconferencing in various application environments
 - Setting up a service competence centres

