

# **Concept**

for an  
**Electronic Academic Community in Switzerland**

and the creation of a Common  
**Authentication and Authorization Infrastructure (AAI)**  
for the Swiss Higher Education System

Prepared by an Inter-University Working Group\*

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## **Vision**

Our vision: We want a virtual community across our institutions in which all persons associated with the Swiss Higher Education System are able to gain access to its electronic resources, independent of the accrediting organization and independent of the place where they happen to be working. Our concern: At the moment we are coming across individual paper-based registration procedures at each institution of higher education, the use of incompatible access control systems and the necessity of having several electronic identities. The future of higher education should not be characterized in this way. Hence our appeal: let's develop e-academia, let us build the foundations in the form of a uniform authentication and authorization infrastructure (AAI) for the higher education system in Switzerland.

## **e-Trust**

There exists a long and fruitful tradition of collaboration amongst our institutions of higher education in Switzerland. Achievements of these efforts have been the uniform access policy (Matura), a system for financial settlement of educational costs among cantons, or a common national computer network infrastructure. Besides the benefits for the individual, this collaboration has also created an essential trust relationship: Academic degrees of other institutions are fully recognized, membership in a partner institution is the necessary

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and sufficient condition in order to access local resources like libraries or course offerings. This concept is about extending this trust relationship into the age of computers. To this end we are suggesting preparatory studies towards the development of a Swiss Authentication and Authorization Infrastructure (AAI) for higher education.

## **e-Mobility**

In the near future everything produced by institutions of higher education will be available on the network: online registration forms, teaching material (e.g. Swiss Virtual Campus), time tables, course marking and even exam results! Background considerations include the standardization of academic curricula and the introduction of bonus point systems as a basis for the mobility of individuals. Mobility in many cases means that an individual has to go through a full registration or application -process again at a remote place, simply ignoring the trust relationship and delegation principle mentioned above. The same thing applies in cyberspace where only the users in a specific place or on a network are given access to resources. This means that the benefits of available or future possibilities of remote access are heavily restricted. Remote access as well as mobility of individuals require the mobility and electronic transitivity of trust!

## **e-Administration**

We have talked about trust of the higher education establishments and the mobility problems of individual members of the higher education establishment community. Besides the alleviation of individual issues which a solution for these problems would bring about, an AAI is also important for the administrative processes: Too often do parallel registration processes and incompatible access control systems exist. The media chain is always broken when it comes to inter-university data exchange. It is our obligation to exploit the potential of the information technologies for the benefit of the higher education establishments. For this to happen there needs to be a nation-wide AAI upon which internal administrative processes can be superimposed.

## **e-Academia**

Our vision is e-academia: a community of students, researchers and teachers which takes the free flow of ideas, the exchange of discoveries and the scientific debate into the digital world. An AAI represents a small yet important step in this direction.

## **AAI Profile and Benefits**

An Authentication and Authorization Infrastructure serves multiple purposes:

- To provide fully computerized ways to determine over the network whether a person actually is a member of a Swiss academic institution or not (**authentication**).
- Access to resources can be granted based on member information (**authorization**). Many access control systems rely on such mechanisms e.g., libraries, access control to buildings, electronic services or remote course registration.
- Digital signatures in electronic documents can be checked for their **authenticity**, doc-

uments for their **integrity**. This is a prerequisite for replacing signed paper documents with electronic forms and is also used for secure e-Mail.

- Data can be protected from un-authorized inspection by using encryption that is keyed for a specific member. Data **privacy** becomes increasingly important for the individual as well as for joint academic/industrial R&D projects.

The net effect of these capabilities is that the interactions among individuals and with administrative entities are cryptographically secured and become electronically verifiable. These properties are also necessary to protect an academic institution's results and reputation in the nascent cyber world. For physical mobility of exchange students or roaming researchers, an AAI provides the basic mechanisms for their smooth and seamless integration into existing access control processes.

On the economic side the benefits are directly related to the ability to automate even more administrative processes: The unified identification (i.e., authentication) scheme allows the streamlining and merging of parallel authorization systems that today often need to be manually bridged. By sharing the effort to operate a national AAI, academic institutes benefit from the economy of scale. Furthermore, the common policy underlying an AAI will lead to a harmonization of the accreditation and registration processes.

There are several options and paths towards implementing an AAI. Student cards for example can be part of an AAI infrastructure, "soft certificates" on a harddisk are another possibility, biometric capture devices could also be integrated, if necessary. Moreover, there are various levels of decision delegation and a mix thereof that can be envisaged, ranging from pure authentication ("we just want to know the identity and then grant access rights based on our local tables") to general rules ("we grant network access to all members of a Swiss higher education institution") or explicit delegation ("if a student at ETH is officially registered for an IT course, full library access is granted"). These choices depend on each institution's preferences and on the technical, economic and legal boundary conditions. The first step towards the AAI is to find out how these constraints look.

## **Mandate for a Preparatory AAI-Study**

Given the above mentioned setting of facts, a preparatory study is required in order to define the shape and scope of an AAI. We point out four areas related to an AAI that need to be addressed:

1. **Legal Issues** Data protection issues, liabilities and responsibilities of participating institutions as well as of users within an AAI. Drafting policies for an AAI.
2. **Organizational Issues** Which processes within institutions need to be established or modified?
3. **Technical Issues** What is technically feasible, which technologies are ready for deployment? Determine which standards and profiles to use.
4. **Financial Issues** Estimates for one-time and repeating costs per institutions and per user. Explore funding models for the shared infrastructure and processes.

This study should be performed in close collaboration and consultation with the involved parties and should take into account the decentralized structure of the Swiss higher education system. Developments at the international level also have to be considered.

We propose to initiate the process of creating a common AAI. It is our recommendation that the “Conférence des Recteurs des Universités Suisses” (CRUS) should take care of mandating and coordinating the study in the above mentioned four areas, either to SWITCH, Universities, Institutes of Technology or private companies. The CRUS should then supervise the progress as well as prepare a final report with recommendations.

## A Roadmap Towards an AAI

The preparatory study as described above is seen as the first step towards an Authentication and Authorization Infrastructure for the higher education system in Switzerland. Although only the first study phase is in the scope of this Concept, we chart a possible roadmap and time table for the full path leading to an operational AAI:

- **Preparatory Study:** (Oct 2001 – Apr 2002)  
Reach a common understanding and view on what is needed and how to move forward to an AAI for Swiss academia. Yields a report and recommendations.
- **Decision:** (June 2002)  
The results are reviewed, individual institutions decide whether to form an AAI consortium or to issue a mandate.
- **Pilot:** (Aug 2002 - June 2003)  
A pilot is started based on the recommendations of the preparatory study. The goal is to gain practical experiences and to spot missing pieces.
- **Decision:** (June 2003)  
The consortium members decide to put the AAI into operation.
- **Implementation:** (Aug 2003 - Aug 2005)  
The pilot is gradually evolved into a large scale AAI. Complete implementation and coverage is envisaged by Autumn 2005.

## Conclusions

Not all institutions will share the same goals, and make the same use of the proposed Authentication and Authorization Infrastructure (AAI). However, it is the believe of the authors that in the future every member of the Swiss higher education system will need and benefit from a nation wide AAI.

We believe that a common AAI is an essential element when addressing the organizational challenges and the opportunities of information technologies in academia. The participating organizations remain free to choose their own AAI-solution or to form alliances among several institutions. To guarantee interworking between different AAI solutions, adherence to a minimal set of AAI standards, the operation of a basic infrastructure and the common policies are crucial. To help their creation, the CRUS is invited to take over the task of mandating and supervising a preparatory study on the scope and shape of a potential AAI.