

5 Services

Many NRENs are involved in providing a number of important services to their customers, in addition to providing the connectivity. This section provides information about NREN work in four service areas: authorisation and authentication (5.1), security incident response (5.2), bandwidth on demand (5.3) and Grid services (5.4).

5.1 Authorisation and Authentication Infrastructure (AAI)¹

Authorisation and Authentication have always been important topics on the campus level, with an emphasis for the last couple of years on campus-wide identity management systems. These campus-wide systems have brought inter-institutional and international federated authentication and authorisation within reach. This leads to an important new role for NRENs: facilitating such federations through harmonisation, standardisation and implementation of the necessary trust fabric.

The increased need for an Authentication and Authorisation Infrastructure (AAI) in the NREN environments reflects a number of tendencies:

- * users travel much more and they demand their familiar environment, services and privileges available whenever they move from one site to another.
- * Grid applications are being used by more scientists and due to the nature of Grids (typically distributed computers and resources in different geographical locations) authentication and authorisation play a key role.
- * Although still improving, the network has reached a good level of stability, so that it is becoming easier to offer reliable services.
- * Various NRENs have been developing AA tools over the past few years; these tools are now stable enough to look for inter-operability among the various pieces and to try to seek harmonisation.

It is important to note that the currently deployed AAI's have very different capabilities, ranging from simple username/password based authentication systems to sophisticated middleware for granting or denying access to resources.

To address the need for an AA Infrastructure, the GN2 project has set up a dedicated Joint Research Activity to focus on the creation of a European AAI infrastructure.

The following definitions have been developed in this Joint Research Activity:

* **Authentication:** The process of verifying the identity of an entity, either in person or electronically, where credentials are requested and checked to verify or disprove an entity's claimed identity.

* **AAI:** An infrastructure that supports Authentication and Authorisation Services. The minimum service components would be the management of identities and privileges specific to users or resources.

* **Authorisation:** The assignment of rights and capabilities granted to a specific principal (such as a person). Normally authorisation takes place when a user has been authenticated.

* **Federated AAI:** An AAI that supports multiple identity and privilege providers, trusted by the members of the federation.

NRENs have been asked questions about their current AAI situation: whether they run the

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infrastructure or they outsource it, what kind of AAI they have, if it they run a federation in the country and if so, whether it is Shibboleth-based or not; if the NREN uses a schema and if so, what kind it is; and if the NREN operates a Certification Authority (CA).

Table 5.1 summarises the answers that have been received. The last column provides URLs to more information on NREN websites.

There seems to be a trend toward increased interest in the PKI area. This is due to the fact that Grids services make heavy use of PKI. Many NRENs increased the operation of their sometimes dormant CAs or in some case have established a CA to issue certificates to work with the Grid middleware. The increasing popularity of AA Infrastructures and eduroam will most likely increase the demand for PKIs even more.

Table 5.1 shows another interesting and new result: many NRENs say that they have eduroam and that they see this as a federation. Eduroam is the pan-European educational roaming infrastructure to provide wireless access to visited institutions. Eduroam is not a classical example of federation. It is important to point out that Shibboleth-like infrastructures and eduroam are used

for different purposes: Shibboleth-like infrastructures provide federated access to applications, whereas eduroam provides access to a (wireless) network.

NRENs that employ Shibboleth or similar technologies also need to define a national schema. The table below shows this.

Note that for many NRENs, this is still a relatively new subject; therefore, not all NRENs have answered these questions.

Table 5.1 Authorisation and Authentication Infrastructures

	NREN	NREN or outsourced?	AA federation?	Schema used / what kind?	CA?
EU/EFTA countries					
Belgium	BELNET	nren	no		yes
Cyprus	CYNET		no		no
Czech Republic	CESNET	nren	no		yes
Estonia	EENet	nren	no		yes
Finland	FUNET	nren	Shibboleth-based	funet-edu-person	no
Germany	DFN	nren	no		yes
Hungary	NIIF/HUNGARNET	outsourced	no		yes
Ireland	HEAnet	nren	no		yes
Italy	GARR	outsourced	no		yes
Latvia	LATNET	nren	no		no
Malta	CSC	nren	no		no
Netherlands	SURFnet	nren	yes		yes
Norway	UNINETT	nren	Yes, Shibboleth-compliant		no
Poland	PIONIER	nren			yes
Slovenia	ARNES	nren	yes	siEduPerson	no
Spain	RedIRIS	nren	Yes	LDAP-based (see http://www.rediris.es/ldap/esquemas/index.en.html)	yes
Sweden	SUNET	outsourced	No		yes
Switzerland	SWITCH	nren	Yes, Shibboleth-based	swissEduPerson derived from eduPerson	yes

	NREN	NREN or outsourced?	AA federation?	Schema used / what kind?	CA?
Other countries					
Algeria	CERIST	nren	no		no
Azerbaijan	AzNET	nren	no		no
Azerbaijan	AzRENA	nren	no		no
Belarus	BASNET	nren	no		no
Bulgaria	IST Foundation	nren	no		no
Croatia	CARNet	nren	no	Yes, hrEduPerson i hrEduOrg.	no
Georgia	GRENA	nren	no		no
Kazakhstan	KazRENA	nren	no		no
Kyrgyzstan	KRENA-AKNET	outsourced	no		no
Moldova	RENAM	nren	no		no
Morocco	MARWAN		no		no
Romania	RoEduNet	nren	no		no
Slovakia	SANET		no		no
Turkey	ULAKBIM		no		yes
Ukraine	URAN	nren	no		yes

5.2 Security Incident Response

Security Incident Response is increasingly being considered vital to the end-users. They expect NRENs to provide such services or to make sure that somebody else provides them.

Table 5.2 below provides information on whether Security Incident Response is provided by NREN itself, or if it has been outsourced. Often, special Computer Security Incident Response Teams (CSIRTs) are formed to ensure a timely response to (potential) security threats. International collaboration is of key importance to CSIRTs. A precondition for such collaboration is that CSIRTs have to be able to trust one another. In order to facilitate such trust relationships, TERENA has been instrumental in setting up the Trusted Introducer scheme (see <http://ti.terena.nl> for more information). The table shows which NRENs have CSIRTs that are either accredited with the scheme or candidates for accreditation (note that only the information that is at ti.terena.nl is fully up-to-date and authoritative).

The last column provides URLs to more information on NREN websites.

Table .5.2 Security Incident Response

	NREN	Security incident response?	Accredited CSIRT?		NREN	Security incident response?	Accredited CSIRT?
EU/EFTA countries				Other countries			
Belgium	BELNET	nren	yes	Algeria	CERIST	nren	no
Cyprus	CYNET	nren	no	Azerbaijan	AzNET	nren	no
Czech Republic	CESNET	nren	no	Azerbaijan	AzRENA	nren	no
Denmark	UNI•C	nren	yes	Belarus	BASNET	nren	no
Estonia	EENet	nren	no	Bulgaria	IST Foundation	nren	no
Finland	FUNET	nren	yes	Croatia	CARNet	nren	yes
France	RENATER	nren	yes	Georgia	GRENA	nren	no
Germany	DFN	outsourced	yes	Israel	IUCC	nren	no
Hungary	NIIF/HUNGARNET	nren	no	Kazakhstan	KazRENA	nren	no
Iceland	RHnet	nren	no	Kyrgyzstan	KRENA-AKNET	outsourced	no
Ireland	HEAnet	outsourced	no	Moldova	RENAM	nren	no
Italy	GARR	outsourced	yes	Morocco	MARWAN	nren	no
Latvia	LATNET	nren	no	Romania	RoEduNet	nren	no
Lithuania	LITNET	outsourced	yes	Serbia / Montenegro	AMREJ		no
Malta	CSC	nren	no	Turkey	ULAKBIM	nren	no
Netherlands	SURFnet	nren	yes	Ukraine	URAN		no
Norway	UNINETT	nren	yes				
Poland	PIONIER	nren	no				
Portugal	FCCN	nren	yes				
Slovakia	SANET	outsourced	no				
Slovenia	ARNES	nren	yes				
Spain	RedIRIS	nren	yes				
Sweden	SUNET	outsourced	yes				
Switzerland	SWITCH	nren	yes				
United Kingdom	UKERNA	nren	yes				

5.3 Bandwidth on Demand

Bandwidth on Demand (point-to-point dedicated bandwidth services at layer 2 or below) is being introduced as a new service as part of the GN2 project. The following table provides information on which NRENs are planning to introduce such a service. Some NRENs have definite plans for this, others would like to find out first what the demand is for such services and again others are not planning to introduce such a service.

Table .5.3 Bandwidth on Demand

	NREN	Plans?
EU/EFTA countries		
Belgium	BELNET	yes if demand
Cyprus	CYNET	no
Czech Republic	CESNET	yes
Denmark	UNI•C	yes if demand
Estonia	EENet	yes if demand
Finland	FUNET	no
France	RENATER	yes
Germany	DFN	yes
Hungary	NIIF/HUNGARNET	yes
Iceland	RHnet	no
Ireland	HEAnet	yes
Italy	GARR	yes
Latvia	LANET	no
Latvia	LATNET	yes if demand
Lithuania	LITNET	yes
Luxembourg	RESTENA	yes if demand
Malta	CSC	yes if demand
Netherlands	SURFnet	yes

	NREN	Plans?
Norway	UNINETT	yes if demand
Poland	PIONIER	yes
Portugal	FCCN	no
Slovakia	SANET	no
Spain	RedIRIS	yes
Sweden	SUNET	no
Switzerland	SWITCH	yes if demand
United Kingdom	UKERNA	no
Other countries		
Algeria	CERIST	yes if demand
Azerbaijan	AzNET	no
Azerbaijan	AzRENA	no
Belarus	BASNET	yes if demand
Bulgaria	IST Foundation	no
Croatia	CARNet	yes if demand
Georgia	GRENA	yes if demand
Israel	IUCC	no
Kazakhstan	KazRENA	yes if demand
Kyrgyzstan	KRENA-AKNET	yes
Moldova	RENAM	yes if demand
Morocco	MARWAN	yes if demand
Romania	RoEduNet	yes if demand
Serbia / Montenegro	AMREJ	no
Turkey	ULAKBIM	yes if demand
Ukraine	URAN	yes

5.4 Grid services

Grid services have recently become an important area for NRENs. Projects such as the EGEE project aim to introduce a production Grid service for scientific research purposes, making use of distributed computing services. In many cases, the NRENs provide the networking infrastructure for such services.

Table 5.4.1 gives information on whether or not Grid services are currently running over the NREN network and if such services are planned over the next year or two. The table also lists who provides the Grid service – either the NREN itself, the institutions concerned together with the NREN, the concerned institutions alone, discipline-based groups or virtual organisations or some other body. The geographical extent of the service is also listed. The last column provides URLs to more information on NREN websites.

As is clear from the table, Grid services are currently running in 15 out of the 27 EU/EFTA NRENs in the survey and in 5 out of the 16 NRENs from other countries in the survey. Eight more EU/EFTA NRENs are planning to introduce such a service; a similar number of the NRENs from other countries have that plan.

NREN support is needed for running the service in the great majority of cases. The geographical extent of the service is in almost all cases international.

From the table, it seems that physics and chemistry are the most active disciplines, followed by biomedical applications and astrospace.

Table 5.4.2 provides an overview of the disciplines that are running Grid-enabled applications.

Table 5.4.1 Grid services

	NREN	Currently running?	Planned within the next year or two?	Who runs the service?	Geographical extent	URL
EU/EFTA countries						
Belgium	BELNET	yes		nren support	national	http://grid.belnet.be
Cyprus	CYNET	no	yes			
Czech Republic	CESNET	yes		nren	international	http://meta.cesnet.cz
Denmark	UNI•C	no	yes	nren support		
Estonia	EENet	yes		nren support	international	http://grid.eenet.ee/
Finland	FUNET	yes		nren support	international	
France	RENATER	yes			international	http://www.grid5000.org , http://www.deisa
Germany	DFN	yes	no	nren support	international	
Hungary	NIIF/ HUNGARNET	yes		nren	international	http://www.clustergrid.niif.hu
Iceland	RHnet	no				
Ireland	HEAnet	yes		nren support	international	no
Italy	GARR	yes		nren support	international	-
Latvia	LANET	no	yes			
Latvia	LATNET	no	yes		international	
Lithuania	LITNET	no	yes			no

	NREN	Currently running?	Planned within the next year or two?	Who runs the service?	Geographical extent	URL
Luxembourg	RESTENA	no	no			
Malta	CSC	no	yes	nren		
Netherlands	SURFnet	yes		nren support	international	http://www.netherlight.net
Norway	UNINETT	no	yes	nren support		http://www.norgrid.no/
Poland	PIONIER	yes		nren	international	
Portugal	FCCN	no	yes	nren support	regional	
Slovakia	SANET	no				
Slovenia	ARNES		yes			
Spain	RedIRIS	yes		nren support	international	http://irisgrid.rediris.es/
Sweden	SUNET	yes		nren support	international	http://www.swegrid.se/
Switzerland	SWITCH	yes		Distributed groups or virtual organisations	international	
United Kingdom	UKERNA	yes				
Other countries						
Algeria	CERIST	no	yes	other		
Azerbaijan	AzNET	no				
Azerbaijan	AzRENA	no				
Belarus	BASNET	no	yes			
Bulgaria	IST Foundation	yes		nren	international	
Croatia	CARNet	yes		institutions alone	national	http://www.srce.hr/crogrid/infrastruktura/
Georgia	GRENA	no	yes			
Israel	IUCC	yes		nren support	international	http://iag.iucc.ac.il/
Kazakhstan	KazRENA	no	yes			
Kyrgyzstan	KRENA-AKNET	no	no		regional	
Moldova	RENAM	no	yes			
Morocco	MARWAN	no	yes	nren support	international	http://www.eumedgrid.org/
Romania	RoEduNet	no	yes			
Serbia / Montenegro	AMREJ	yes		nren support	international	
Turkey	ULAKBIM	yes		nren	international	
Ukraine	URAN	no	yes	institutions alone	regional	

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The answers in the table below are 'now' (service is currently running), 'planned' or '-', the NREN is not currently aware of the situation in that discipline.

Table 5.4.2 Disciplines that are running Grid-enabled applications

	NREN	High-energy physics	Other physics	Computational chemistry	Other chemistry	Biomedical	Astroscience	Earth science	Climatology	Other disciplines:
EU/EFTA countries										
Belgium	BELNET	-	-	-	-	-	-	-	-	
Cyprus	CYNET	-	-	-	planned	planned	-	-	-	
Czech Republic	CESNET	now	now	now	now	planned	-	planned	-	material science - running, technical simulations - running, visual rendering - planned
Estonia	EENet	now	now	now	planned	planned	planned	-	-	
Finland	FUNET	now	now	now	-	planned	-	planned	-	material physics
Germany	DFN	now	-	-	-	-	-	-	-	
Hungary	NIIF/ HUNGARNET	now	now	now	now	now	now	now	planned	
Ireland	HEAnet	planned	now	now	null	now	now	now	now	
Italy	GARR	now	now	now	now	now	now	now	-	hydrology - planned
Lithuania	LITNET	planned	planned	-	-	planned	planned	-	-	
Netherlands	SURFnet	planned	-	-	-	-	now	-	planned	
Norway	UNINETT	planned	-	-	-	-	-	planned	planned	
Poland	PIONIER			now						
Portugal	FCCN	planned				planned	planned		planned	
Slovenia	ARNES	planned								
Spain	RedIRIS	now	now	now	now	now	now	now	now	neural networks; circuit design; biology-ecology, research into Grid itself
Sweden	SUNET	now	now	now	-	now	-	-	-	
Switzerland	SWITCH	planned	-	-	-	planned	-	-	planned	

Table 5.4.2 Disciplines that are running Grid-enabled applications (continued)

	NREN	High-energy physics	Other physics	Computational chemistry	Other chemistry	Biomedical	Astroscience	Earth science	Climatology	Other disciplines:
Other countries										
Algeria	CERIST	-	planned	-	planned	-	-	-	planned	
Bulgaria	IST Foundation	planned	planned	planned	-	planned	planned	planned	planned	
Georgia	GRENA	planned				planned	planned			
Israel	IUCC	now	-	-	-	planned	-	planned	-	
Kazakhstan	KazRENA		-			planned				
Kyrgyzstan	KRENA-AKNET	-	-	-	-	-	-	-	-	
Moldova	RENAM							planned		
Morocco	MARWAN	planned	planned	planned	-	planned	planned	planned	-	
Serbia / Montenegro	AMREJ	planned	planned	-	-	-	-	-	-	medicine
Turkey	ULAKBIM	planned	planned	planned	planned	planned	-	-	-	

