

Report on the results of the DEEP questionnaire

Deliverable A.2 of the Project "Definition of an European EduPerson" (DEEP)

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Status of this document

This is the final report on the results of the questionnaire activity performed in the frame of the DEEP Project in its final version. It replaces a preliminary report and prior versions of this report. Any comments are welcome and should be sent to the author via email.

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1. Introduction

The questionnaire reported about in this document was defined as part of a bigger project that aims at defining standardized directory schema for the European Research community. TERENA decided that the survey should first be performed before deciding about the continuation of the whole project. This situation is definitely reflected in the questionnaire and in this report.

The on-line web form based questionnaire was mainly developed in August 2002 (including communication with TERENA representatives) and was available on the Web since beginning of September (at www.daasi.de/surveys/DEEP). This was announced at several TERENA mailing lists (TF-LSD, TF-AACE, middleware), to single relevant persons of this community as well as to a representative of EUNIS (www.eunis.org). Unfortunately responses came in quite slowly, most probably due to holidays. Thus the planned timeslot for the survey was extended until end of October. (A very last participant joined as late as December 6). This made it possible that a considerable number of participants filled in the questionnaire (see below). In addition to the questionnaire software was developed that produces some basic statistical analysis of the data, mainly computing percentages. With this tool the analysis of the questionnaire's results were made which lead to this report.

The report is structured according to the questionnaire although the section numbering is different (the numbering of the questionnaire is reproduced with a prefixed "Q. ". In tables the single questions are quoted and the answers displayed together with absolute numbers and percentages. Please note that the questionnaire on the net is not reproduced one to one, especially concerning the layout due to the different formats of an HTML-page and a document like this report. Nevertheless the questions are reproduced here literally. Additional text in these tables that does not occur in the Web questionnaire is marked by square brackets ("[]").

The questionnaire gave the following introductory information:

<p>Questionnaire on standardization of LDAP schema for the European Academia Version: 2.05 Date: 29. August 2002, last change: 7. October 2002 PG</p> <p>Introduction This is part of the TERENA DEEP Project (Definition of a European EduPerson) phase 1: Survey on standardization of LDAP Schema for the European Academia.</p> <p>Since LDAP Directories become more and more relevant in Internet applications of academic institutions in Europe, TERENA is considering to fund a project to define necessary standardization/extensions of LDAP schema for the European academic and research community.</p> <p>With this questionnaire it is intended to find out the relevance of such an activity, the grade of interest in the European academic community and the scope such an activity should have.</p> <p>Currently a similar attempt is being carried out in the US in the frame of the Internet2 Project (www.internet2.org) in an activity called EduPerson (see www.educause.edu/eduperson) which resulted in the definition of the object classes eduPerson and eduOrg. With a similar European attempt, the requirements of the European community could be brought into the Internet2 work.</p> <p>Please contribute some time and fill in this web form for your institution and please motivate colleagues from other academic institutions to do the same. If you only want to answer a subset of these questions, please feel free to do so. You can use the table of contents to skip to the parts you want to fill out. Thank you very much in advance.</p> <p>The data will be analysed by: DAASI International GmbH Wilhelmstrasse 106 D-72074 Tuebingen</p> <p>Tel. +49 7071 29-70336 Fax +49 7071 29-5114 E-Mail: Peter.Gietz@daasi.de</p> <p>Privacy Statement No personal data will be given away to anyone, the anonymised results of the survey will be made available at the project's web sites at http://www.terena.nl and http://www.daasi.de</p> <p>The form contains links that give additional information on the topics</p> <p>Table of contents Introduction 1. Contact Data 2. General questions on the topic 3. ..</p>
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2. Who filled in the questionnaire

The questionnaire begins with asking contact data. Thus this is no anonymous survey. Following fields were asked to be filled out:

Q. 1. Contact Data	
Name of the Institution	
Department in charge of directory services	
Name of contact person	
Telephone	
Fax	
E-Mail	
Additional remarks:	

All participants filled in name of institution, department and contact person. Most also filled in telephone, fax and email-address. Three additional remarks were made which are mentioned in the following where appropriate.

The following 18 participants from following countries filled in the questionnaire (Countries are first ordered by number of participants):

UK (4):

- Bath Spa University College, Department: Computing
- Project SELLIC, Edinburgh University Library, Department: Registry
- University of Cambridge, Department: Computing Service
- University of Manchester, Department: Manchester Computing

Netherlands (2):

- SURF (performed by Stelvio on behalf of SURF), “aggregated answers of about 10 institutions”
- TERENA

Poland (2):

- Nicholas Copernicus University, Department: Information & Communication Technology Centre
- Wroclawskie Centrum Sieciowo-Superkomputerowe (university computer center), Department: EuroPKI Polish CA

Spain (2):

- RedIRIS, Department: Middleware
- Universidad Pablo de Olavide, de Sevilla, Deptment: Centro de Informática y Comunicaciones

Tchech Republic (1):

- Czech Technical University, Department: Computing and information centre

Australia (1):

- Deakin University, Department: Information Technology Services Division. ITSD

Hungary (1):

- Office for National Information Infrastructure Development of the Hungarian Academy of Sciences, Department: Computer and Automation Research Institute

Croatia (1):

- Zagreb University Computing Centre, Department: Information systems and applications (in charge of Directory Services for whole CARNet network)
- Switzerland (1):
- SWITCH, Department: NetServices (as organization not for all Swiss Universities)
- Sweden (1):
- Stockholm university, Department: Enheten för IT och media
- Norway (1):
- UNINETT
- Finland (1):
- Ebo Akademi University, Department: Datacentralen

Thus 18 parties from 12 countries took up the effort to fill in this lengthy questionnaire and thus showed a considerable interest in this project.

Of these:

- 17 participants come from Europe, and 1 is from Australia.
- 11 participants represent an university (the Zagreb University Computer Center which represented CARNet in this questionnaire not counted)
 - the departments involved are in all but one cases the computing or IT centres.
 - The one exception is the SELLIC Project which is "a bridge between the Edinburgh University Library and the Faculty of Science and Engineering".
- 6 organisations (including the Zagreb University Computer Center) represent National Research Networks or similar organisations like the Office for National Information Infrastructure Development in Hungary. SWITCH was the only explicitly remarking that it represents only its organisation and not the Swiss universities.
- 1 organisation (TERENA) represents multinational members.

There was no contribution from Germany. The DFN directory representative (DFN Directory Services) is managed by DAASI International, the performer of this survey. To maintain the objectivity of the survey, DAASI refrained from filling in the questionnaire. Another German participant was searched for, but couldn't be found.

The number and kind of participants does fairly represent the European Research community and thus the results of the questionnaire will be meaningful and give insights into the needs of this aimed at community. Although the project name DEEP includes "European", the one Australian participant was not excluded, since the Australian Research community seems to have a similar standing towards schema standardisation needs, especially with respect to the US-initiative eduPerson (see below Future Directions).

3. General questions

The general questions, most relevant for a decision about continuation of the work, were answered as follows:

Q. 2. General questions on the topic		
2.1. Do you see a need in interoperability between directory services of different research institutions?	yes	16 (88.89%)
	no	1 (5.56%)
	no opinion	1 (5.56%)
2.2. Would you provide your LDAP data for an international indexing service?	Yes	10 (55.56%)
	no	2 (11.11%)
	no opinion	5 (27.78%)
2.3. Do you think the current eduPerson definitions are sufficient for the European research community?	yes	2 (11.11%)
	no	7 (38.89%)
	no opinion	6 (33.33%)
2.4. Do you consider privacy issues important in the frame of directory deployment?	yes	18 (100.00%)
	no	0 (0%)
	no opinion	0 (0%)
2.5. Do you think privacy should be dealt with while defining directory person schema (e.g. an attribute where the user can define the visibility of her entry)?	yes	17 (94.44%)
	no	1 (5.56%)
	no opinion	0 (0%)
2.6. Would you favour a TERENA follow up standardization activity?	Yes	11 (61.11%)
	no	0 (0%)
	no opinion	7 (38.89%)

Conclusions:

- A very high percentage of the participants (89%) saw a need for interoperability of directory services beyond domain borders. (2.1)
- 56% would participate in an international indexing service (2.2). Since this question did not give any additional information about such an indexing system, e.g. about its privacy and anti spam features, this is seen as a high percentage. With additional such information it most probably would have been even higher. Only 1 explicitly said he wouldn't participate.
- Only 2 participants(11%) saw eduPerson as sufficient (2.3). One participant gave contradictory answers by answering yes to 2.3 and yes to 2.4, 2.5, and 2.6, which all three in case you think eduPerson is sufficient should have been answered by no. Thus we can conclude that even less than 11% hold eduPerson for sufficient.
- Privacy issues were considered important in directory deployment by all 18 participants (2.4). Thus all but one agreed to respective schema that, e.g., enables the user to define the visibility of her entry (2.5). Privacy is not directly addressed in eduPerson, although it does have high relevance in the Internet2 community and is addressed, e.g., in their authentication mechanism Shibboleth.
- 11 participants (61%) would positively favour a continuation of DEEP. All participants that didn't answer yes to this question, answered "no opinion". Thus no one explicitly said that a continuation should not happen.

4. Questions about current and future directory deployment

4.1. Directory deployment status (Q. 3.1)

Following Question was asked:

Q. 3.1. Directory deployment status				
Operational	Pilot	Planned	Study	No plans yet
13 (72.22%)	2 (11.11%)	1 (5.56%)	0 (0%)	2 (11.11%)

- 72% of the participants have an operational directory service
- 11% a pilot service
- 6% plan to deploy a directory service
- only 2 (11%) don't have precise plans yet, one of which is TERENA that usually does not run such services.

Of course, a participant of such a survey most probably has experiences with directory services and thus these figures may not tell too much. What can be said though is that organisations dealing with directory services in a great majority of 71% already reached the status of an operational production service. Thus directories fulfil an important role in today's IT-infrastructure of European higher educational organisations.

4.2. Used / planned directory technology (Q. 3.2)

Following questions were answered:

Q. 3.2. Used / planned directory technology				
Which Directory technology do you use / plan to use?				
[The questionnaire asked for 1.) technology, 2.) operational/planned and 3.) Vendor, product name and version. The display here is changed from the original questionnaire for convenience (more than one was choosable thus the sum is >100%):]				
1.) Technology				
X.500 2 (11.11%)	LDAP 16 (88.89%)	Novell NDS 2 (11.11%)	MS AD 6 (33.33%)	Other 3 (16.67%)
2.) Operational/Planned (op./pl.)				
both operational. No plans in future. One explicitly said that they want to "stop X.500 service; full transition to LDAP"	11 are operational 9 are planned	1 operational 1 planned	3 operational 4 planned	2 operational 1 planned
3.) Vendor, product name and version				
Both use old ISODE X.500(88) Quipu software, the latest release of which was 1995	The wide majority use OpenLDAP software (7 of the operational and 8 of the planned). Mainly versions 2.0.23 or .25 are operational, all planned will be version 2.1.14 or higher. Other mentioned implementations: iPlanet Directory Service (2op./1pl.) Novell (1 NDS 7 op. / 1 eDirectory 8 pl).	one eDirectory 8 operational. As to the planned it only says: "Some members of <organisation> are using Novell"	Two operational are based on standard Windows 2000, as well as two of the planned. the two other planned will be Windows XP and ".NET Server (as experimental use only)"	The 2 operational are: "Netscape Directory Server (old, to be closed)" and: "Proprietary DB built on Adobe FrameMaker with web front end". The planned one will be: Oracle OID. It also says: "Some members of <org> are using Lotus Domino"

Conclusions:

- There is definitely a trend for pure LDAP implementations (to which at least the NDS mentioned under "others" has to be included. Oracle Internet Directory can also be seen as pure LDAP. Only MS Active Directory as shipped within Windows 2000 / XP and .NET server has some (few) future implementations.
- As to LDAP implementations the academic community definitely prefer the Open Source Software OpenLDAP. Currently the version considered as stable is used, in future the currently worked upon release 2.1.4 will be used. This shows that the persons active in implementing directories with OpenLDAP are very aware of the most current versions (in contrast to the maintainers of the X.500 based services)
- X.500 technology is not favoured in this community. The existing services are based on the last freely available software.
- There is some but very little interest in Novell.

4.3. Kind of services deployed (Q.3.3)

Following questions were answered:

Q. 3.3. Deployed / planned directory services			
Which directory services do you deploy / plan to deploy?			
15 (83.33%)	White pages	Operational 13 (72.22%) Planned 3 (16.67%)	Pilot 0 (0%) No plans 2 (11.11%)
12 (66.67%)	Email user management	Operational 7 (38.89%) Planned 5 (27.78%)	Pilot 1 (5.56%) No plans 5 (27.78%)
10 (55.56%)	User login management	Operational 5 (27.78%) Planned 4 (22.22%)	Pilot 3 (16.67%) No plans 6 (33.33%)
13 (72.2%)	Authentication service	Operational 7 (38.89%) Planned 5 (27.78%)	Pilot 3 (16.67%) No plans 3 (16.675%)
9 (55.00%)	Resource management	Operational 3 (16.67%) Planned 5 (27.78%)	Pilot 1 (5.56%) No plans 9 (50.00%)
6 (33.33%)	Grid information system	Operational 0 (0%) Planned 5 (27.78%)	Pilot 0 (0%) No plans 14 (72.22%)
7 (38.89%)	e-learning	Operational 2 (11.11%) Planned 5 (27.78%)	Pilot 1 (5.56%) No plans 10 (55.56%)
7 (38.89%)	course management	Operational 2 (11.11%) Planned 5 (27.78%)	Pilot 0 (0%) No plans 11 (61.11%)
4 (22.22%)	Library information management	Operational 1 (5.56%) Planned 1 (5.56%)	Pilot 1 (5.56%) No plans 15 (83.33%)
5 (27.78%)	Video conferencing	Operational 0 (0%) Planned 2 (11.11%)	Pilot 2 (11.11%) No plans 14 (77.78%)

Other operational services mentioned (in addition to those already listed in the questionnaire) were: Voice over IP, Yellow Pages, dial-up authentication, conference registration and submission, web based intranet, online shops, electronic elections, PKI and Metadata store.

Conclusions:

- As was expected, White Pages services are the most often mentioned (83%).
- Followed by the related services: Authentication service (72%), Email user management (67%) and User login management (56%).
- Resource management was mentioned by 50%.
- All other listed services but one were mentioned by 28-39%.
- Only Library information management was mentioned considerably less (22%).
- As to the status, again the majority of the already operational services are White Pages services (72%), Authentication and Email user management (both 39%), User login management (28%).
- 3 (17%) resource management services are already operational.
- All other services either have zero to 2 mentioned as operational.
- Following services have the most future potential (mentioned as planned): Email user management, Authentication service, resource management, Grid information system, e-learning, and course management (all 28%).
- These answers show a wide variety of operated or planned services based on directory technology. Although the classical deployments are still the majority, there are future trends like resource management, Grid computing and e-Learning.

5. Questions about existing person and organization schema

The next part of the questionnaire wanted to inform about the already standardised schema for persons and organisations and to ask about the relevance of the single attributes.

Following object classes were introduced in the questionnaire as standard or candidate for a standard:

- For person schema:
 - person
 - organizationalPerson
 - inetOrgPerson
 - eduPerson
- For organisation schema:
 - organization
 - organizationalUnit
 - eduOrg

Since the introduction explicitly allowed participants to skip questions, this was done in this part of the questionnaire. One participant didn't give any answers about the relevance and one skipped a few of the attributes. There was no default in the web form, thus the total sum in most cases is 15 or 16 (instead of 17) and in very few cases only 14. The percentages are computed with the total population of 17.

5.1. Existing person attributes

These were the results:

Q. 4. Relevance of person attributes			
Q. 4.1. Object class Person			
As defined in RFC 2256			
Attribute name	Description	Syntax	Implementation/ Relevance
sn / surName	"This is the X.500 surname attribute, which contains the family name of a person."	directory string	Yes 17 (94.44%) No 0 (0%) Don't know 0 (0%)
cn / commonName	"This is the X.500 commonName attribute, which contains a name of an object. If the object corresponds to a person, it is typically the person's full name."	directory string	Yes 17 (94.44%) No 0 (0%) Don't know 0 (0%)
userPassword	"Passwords are stored non encrypted. Transfer of cleartext passwords are strongly discouraged where the underlying transport service cannot guarantee confidentiality and may result in disclosure of the password to unauthorized parties." Every entry with a standardized Objectclass includes this attribute	octet string	Yes 11 (61.11%) No 3 (16.67%) Don't know 3 (16.67%)
telephoneNumber		telephone number	Yes 16 (88.89%) No 0 (0%) Don't know 1 (5.56%)
seeAlso	"specifies names of other directory objects which may be other aspects (in some sense) of the same real world object". A pointer to a related directory entry.	directory name	Yes 11 (61.11%) No 3 (16.67%) Don't know 2 (11.11%)
description	"contains a human-readable description of the object."	directory string	Yes 9 (50.00%) No 3 (16.67%) Don't know 4 (22.22%)

Q. 4.2. Object class organizationalPerson

As defined in [RFC 2256](#) - inherits all attributes of object class person

Attribute name	Description	Syntax	Implementation/ Relevance
title	"This attribute contains the title, such as 'Vice President', of a person in their organizational context. The 'personalTitle' attribute would be used for a person's title independent of their job function."	directory string	Yes 12 (66.67%) No 3 (16.67%) Don't know 1 (5.56%)
x121Address		numeric string	Yes 1 (5.56%) No 12 (66.67%) Don't know 3 (16.67%)
registeredAddress	"This attribute holds a postal address suitable for reception of telegrams or expedited documents, where it is necessary to have the recipient accept delivery."	postal address	Yes 4 (22.22%) No 9 (50.00%) Don't know 2 (11.11%)
destinationIndicator	"This attribute is used for the telegram service."	printable string	Yes 1 (5.56%) No 12 (66.67%) Don't know 3 (16.67%)
preferredDeliveryMethod	Possible values are: 'any', 'mhs', 'physical', 'telex', etc.	delivery method	Yes 4 (22.22%) No 8 (44.44%) Don't know 4 (22.22%)
telexNumber		telex number	Yes 1 (5.56%) No 12 (66.67%) Don't know 3 (16.67%)
teletexTerminalIdentifier		teletex terminal identifier	Yes 2 (11.11%) No 11 (61.11%) Don't know 3 (16.67%)
internationaliSDNNumber		numeric string	Yes 4 (22.22%) No 7 (38.89%) Don't know 5 (27.78%)
FacsimileTelephone-Number	Fax number	facsimile telephone number	Yes 11 (61.11%) No 3 (16.67%) Don't know 2 (11.11%)
street	"This attribute contains the	directory	Yes 11 (61.11%) No 3 (16.67%)

	physical address of the object to which the entry corresponds, such as an address for package delivery."	string	No 3 (16.67%) Don't know 2 (11.11%)
postOfficeBox		directory string	Yes 9 (50.00%) No 5 (27.78%) Don't know 2 (11.11%)
postalCode		directory string	Yes 11 (61.11%) No 2 (11.11%) Don't know 2 (11.11%)
postalAddress		postal address	Yes 14 (77.78%) No 0 (0%) Don't know 2 (11.11%)
PhysicalDeliveryOffice-Name		directory string	Yes 4 (22.22%) No 7 (38.89%) Don't know 5 (27.78%)
ou / organizationalUnitName	This attribute contains the name of an organizational unit.	directory string	Yes 16 (88.89%) No 1 (5.56%) Don't know 0 (0%)
st / stateOrProvinceName	This attribute contains the full name of a state or province	directory string	Yes 9 (50.00%) No 4 (22.22%) Don't know 3 (16.67%)
l / localityName	This attribute contains the name of a locality, such as a city, county or other geographic region	directory string	Yes 12 (66.67%) No 1 (5.56%) Don't know 3 (16.67%)

Q. 4.3. Object class InetOrgPerson

As defined in [RFC 2798](#)) - inherits all attributes from object classes person and organizationalPerson

Attribute name	Description	Syntax	Implementation/ Relevance
audio	"The Audio attribute type allows the storing of sounds in the Directory. The attribute uses a u-law encoded sound file as used by the "play" utility on a Sun 4. This is an interim format." (taken from RFC 1274)	octet string	Yes 2 (11.11%) No 10 (55.56%) Don't know 4 (22.22%)
businessCategory	(taken from RFC 1274)	directory string	Yes 5 (27.78%) No 5 (27.78%) Don't know 5 (27.78%)

carLicense	"vehicle license or registration plate"	directory string	Yes 1 (5.56%) No 11 (61.11%) Don't know 4 (22.22%)
department-Number	"Code for department to which a person belongs. This can also be strictly numeric (e.g., 1234) or alphanumeric (e.g., ABC/123)"	directory string	Yes 9 (50.00%) No 3 (16.67%) Don't know 4 (22.22%)
displayName	"When displaying an entry, especially within a one-line summary list, it is useful to be able to identify a name to be used. Since other attribute types such as 'cn' are multivalued, an additional attribute type is needed. Display name is defined for this purpose."	directory string	Yes 14 (77.78%) No 2 (11.11%) Don't know 1 (5.56%)
employeeNumber	"Numeric or alphanumeric identifier assigned to a person, typically based on order of hire or association with an organization. Single valued"	directory string	Yes 11 (61.11%) No 3 (16.67%) Don't know 2 (11.11%)
employeeType	"Used to identify the employer to employee relationship. Typical values used will be "Contractor", "Employee", "Intern", "Temp", "External", and "Unknown" but any value may be used."	directory string	Yes 13 (72.22%) No 1 (5.56%) Don't know 2 (11.11%)
givenName		directory string	Yes 15 (83.33%) No 1 (5.56%) Don't know 1 (5.56%)
homePhone	"The Home Telephone Number attribute type specifies a home telephone number associated with a person. Attribute values should follow the agreed format for international telephone numbers: i.e., '+44 71 123 4567'. " (taken from RFC 1274)	telephone number	Yes 11 (61.11%) No 3 (16.67%) Don't know 2 (11.11%)
homePostal-Address	"The Home postal address attribute type specifies a home postal address for an object. This should be limited to up to 6 lines of 30 characters each." (taken from RFC 1274)	directory string	Yes 10 (55.56%) No 4 (22.22%) Don't know 2 (11.11%)
initials		directory string	Yes 7 (38.89%) No 5 (27.78%) Don't know 4 (22.22%)

jpegPhoto	"a jpeg photo"	jpeg	Yes 11 (61.11%) No 2 (11.11%) Don't know 3 (16.67%)
labeledURI	"Uniform Resource Identifier with optional label" (taken from RFC 2079)	directory string	Yes 12 (66.67%) No 2 (11.11%) Don't know 2 (11.11%)
mail	email address	ia5 string	Yes 16 (88.89%) No 0 (0%) Don't know 1 (5.56%)
manager	"The Manager attribute type specifies the manager of an object represented by an entry." (taken from RFC 1274)	directory name	Yes 5 (27.78%) No 7 (38.89%) Don't know 4 (22.22%)
mobile	"This attribute contains the number of a cellular phone"	telephone number	Yes 14 (77.78%) No 2 (11.11%) Don't know 1 (5.56%)
o / organizationName	"This attribute contains the name of an organization" (taken from RFC 2256)	directory string	Yes 16 (88.89%) No 1 (5.56%) Don't know 0 (0%)
pager	"The Pager Telephone Number attribute type specifies a pager telephone number for an object. (taken from RFC 1274)	telephone number	Yes 9 (50.00%) No 6 (33.33%) Don't know 2 (11.11%)
photo	"The Photo attribute type specifies a "photograph" for an object. This should be encoded in G3 fax as explained in recommendation T.4, with an ASN.1 wrapper to make it compatible with an X.400 BodyPart as defined in X.420." (taken from RFC 1274)	(see description)	Yes 5 (27.78%) No 8 (44.44%) Don't know 3 (16.67%)
roomNumber	"The Room Number attribute type specifies the room number of an object. Note that the commonName attribute should be used for naming room objects" (taken from RFC 1274)	directory string	Yes 11 (61.11%) No 3 (16.67%) Don't know 2 (11.11%)
secretary	"The Secretary attribute type specifies the secretary of a person. The attribute value for Secretary is a distinguished name." (taken from RFC 1274)	directory name	Yes 6 (33.33%) No 6 (33.33%) Don't know 4 (22.22%)
uid	"The Userid attribute type specifies a computer system login name." (taken from RFC 1274)	directory name	Yes 14 (77.78%) No 1 (5.56%) Don't know 1 (5.56%)

	from RFC 1274)		Don't know 1 (5.56%)
userCertificate	"This attribute is to be stored and requested in the binary form, as 'userCertificate;binary'." (taken from RFC 2256)	certificate	Yes 12 (66.67%) No 2 (11.11%) Don't know 1 (5.56%)
x500unique- Identifier	"The x500UniqueIdentifier attribute is used to distinguish between objects when a distinguished name has been reused. This is a different attribute type from both the "uid" and "uniqueIdentifier" types." (taken from RFC 2256)	bit string	Yes 4 (22.22%) No 7 (38.89%) Don't know 5 (27.78%)
preferred- Language	"Used to indicate an individual's preferred written or spoken language. This is useful for international correspondence or human-computer interaction. Values for this attribute type MUST conform to the definition of the Accept-Language header field defined in [RFC2068] with one exception: the sequence 'Accept-Language' ':' should be omitted. This is a single valued attribute type."	directory string	Yes 10 (55.56%) No 2 (11.11%) Don't know 4 (22.22%)
UserSMIME- Certificate	"A PKCS#7 [RFC2315] SignedData, where the content that is signed is ignored by consumers of userSMIMECertificate values. It is recommended that values have a 'contentType' of data with an absent 'content' field. Values of this attribute contain a person's entire certificate chain and an smimeCapabilities field [RFC2633] that at a minimum describes their SMIME algorithm capabilities. Values for this attribute are to be stored and requested in binary form, as 'userSMIMECertificate;binary'. If available, this attribute is preferred over the userCertificate attribute for S/MIME applications.	binary	Yes 10 (55.56%) No 3 (16.67%) Don't know 3 (16.67%)
userPKCS12	"PKCS #12 [PKCS12] provides a format for exchange of personal identity information. When such information is stored in a directory service, the userPKCS12 attribute	binary	Yes 6 (33.33%) No 2 (11.11%) Don't know 8 (44.44%)

	should be used. This attribute is to be stored and requested in binary form, as 'userPKCS12;binary'. The attribute values are PFX PDUs stored as binary data.		
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Q. 4.4. Objectclass eduPerson 1.5.

as defined [rpr-nmi-edit-mace_dir-eduPerson-1.5.html](#)

The [eduPerson 1.0](#) object class inherits all attributes from Object classes person, organizationalPerson and inetOrgPerson but eduperson 1.5 is defined as a standalone auxiliary object class and thus can be added to any kind of entry. Still the existence of the attributes of inetOrgPerson are implied.

Attribute name	Description	Syntax	Implementation/ Relevance
eduPersonAffiliation	"Specifies the person's relationship(s) to the institution in broad categories such as student, faculty, staff, alum, etc." (controlled vocabulary: faculty, student, staff, alum, member, affiliate, employee).	directory string	Yes 14 (77.78%) No 1 (5.56%) Don't know 1 (5.56%)
eduPersonNickname	"Person's nickname, or the informal name by which they are accustomed to be hailed."	directory string	Yes 8 (44.44%) No 6 (33.33%) Don't know 1 (5.56%)
eduPersonOrgDN	"The distinguished name (DN) of the of the directory entry representing the institution with which the person is associated."	directory name	Yes 15 (83.33%) No 1 (5.56%) Don't know 0 (0%)
EduPersonOrgUnit-DN	"The distinguished name (DN) of the directory entries representing the person's Organizational Unit(s)."	directory name	Yes 14 (77.78%) No 1 (5.56%) Don't know 1 (5.56%)
EduPersonPrimary-Affiliation	"Specifies the person's PRIMARY relationship to the institution in broad categories such as student, faculty, staff, alum, etc. (controlled vocabulary: faculty, student, staff, alum, member, affiliate, employee)."	directory string	Yes 15 (83.33%) No 1 (5.56%) Don't know 0 (0%)
EduPersonPrincipal-Name	"The "NetID" of the person for the purposes of inter-institutional authentication. Should be stored in the form of user@univ.edu, where univ.edu is the name of the	directory string	Yes 13 (72.22%) No 1 (5.56%) Don't know 2 (11.11%)

	local security domain. "		
EduPersonEntitlement	"URI (either URN or URL) that indicates a set of rights to specific resources."	directory string	Yes 9 (50.00%) No 3 (16.67%) Don't know 3 (16.67%)
EduPersonPrimary-OrgUnitDN	"The distinguished name (DN) of the directory entries representing the person's primary Organizational Unit(s)."	directory string	Yes 13 (72.22%) No 1 (5.56%) Don't know 2 (11.11%)

Conclusions:

- Following attributes were seen as needed by a majority ($\geq 50\%$):

Yes	No	Don't know	Attribute name	Object class
17	0	0	surName / sn	Person
17	0	0	commonName / cn	Person
16	1	0	organizationalUnitName / ou	organizationalPerson
16	1	0	organizationName / o	InetOrgPerson
16	0	1	telephoneNumber	Person
16	0	1	mail	InetOrgPerson
15	1	1	givenName / gn	InetOrgPerson
15	1	0	eduPersonOrgDN	EduPerson
15	1	0	eduPersonPrimaryAffiliation	EduPerson
14	2	1	mobile	InetOrgPerson
14	2	1	displayName	InetOrgPerson
14	1	1	uid	InetOrgPerson
14	1	1	eduPersonAffiliation	EduPerson
14	0	2	postalAdress	organizationalPerson
13	1	2	eduPersonOrgUnitDN	EduPerson
13	1	2	employeeType	InetOrgPerson
13	1	2	eduPersonPrincipleName	EduPerson
13	1	2	eduPersonPrimaryOrgUnitDN	EduPerson
12	3	1	title	organizationalPerson
12	2	2	labeledURI	InetOrgPerson
12	2	1	userCertificate	InetOrgPerson
12	1	3	locality / l	organizationalPerson
11	3	3	userPassword	Person
11	2	3	jpegPhoto	InetOrgPerson
11	3	2	street	organizationalPerson
11	3	2	seeAlso	Person
11	3	2	roomNumber	InetOrgPerson
11	3	2	homePhone	InetOrgPerson
11	3	2	facsimileTelephoneNumber	organizationalPerson

11	3	2	employeeNumber	InetOrgPerson
11	2	2	postalCode	organizationalPerson
10	2	4	preferredLanguage	InetOrgPerson
10	4	2	homePostalAddress	InetOrgPerson
10	3	3	userSMIMEcertificate	InetOrgPerson
9	3	4	description	Person
9	5	2	postOfficeBox	organizationalPerson
9	3	4	departmentNumber	InetOrgPerson
9	6	2	pager	InetOrgPerson
9	3	3	eduPersonEntitlement	eduPerson

- Relevant for the majority were:
 - all attributes of object class person
 - 8 of the 17 attributes of object class organizationalPerson
 - 18 of the 28 attributes of inetOrgPerson
 - 7 of the 8 attributes of eduPerson
- Thus eduPerson seems quite relevant for this community, but as can be seen by question 2.3, it isn't sufficient.
- Most of the attributes seen as relevant by the majority are attributes you normally expect in white pages services (names, mail, telephoneNumber, etc.).
- Both userCertificate and userSMIMEcertificate were seen as relevant.
- There is a high relevance of the attributes o and ou. These attributes are mainly needed to connect a person entry with the respective organizationalUnits when this relation is not made in the structure of the Directory Information Tree (DIT), i.e. when the person entry is not put beneath the ou entry. It seems that the majority of the participants favour a solution where you put the person entries into a flat hierarchy, e.g., below ou=people, o= <orgname>, c=<countryname>.
- The high relevance of the attributes eduPersonOrgDN, eduPersonPrimaryAffiliation, eduPersonOrgUnitDN, eduPersonAffiliation also point to this conclusion.
- The high relevance of the attributes homePhone and homePostalAddress show that such private information (which is highly delicate in terms of privacy) is intended to be stored in information services. The high need of privacy as answered to questions 2.4 and 2.5. is in conjunction with this. The attributes mentioned here should not be world wide readable, but only by persons authorised to do so.
- The use of displayName seems to be very relevant to this community. Software should make use of this feature.
- The same is true for seeAlso.

5.2. Existing organisation attributes

These were the results:

Q. 5. Relevance of organisational attributes	
Q. 5.1. Object class organization	
As defined in RFC 2256	
Description	Implementation/Relevance
Contains the following (above described) attributes: o and userPassword, searchGuide, seeAlso, businessCategory, x121Address, registeredAddress, destinationIndicator, preferred-DeliveryMethod, telexNumber, teletexTerminalIdentifier, telephoneNumber, internationaliSDNNNumber, facsimile-TelephoneNumber, street, postOfficeBox, postalCode, postalAddress, physicalDeliveryOfficeName, st, l, description	Yes 11 (61.11%) No 1 (5.56%) Don't know 5 (27.78%)

Q. 5.2. Object class organizationalUnit	
As defined in RFC 2256	
Description	Implementation/Relevance
Contains the following (above described) attributes: ou and userPassword, searchGuide, seeAlso, businessCategory, x121Address, registeredAddress, destinationIndicator, preferred-DeliveryMethod, telexNumber, teletexTerminalIdentifier, telephoneNumber, internationaliSDNNNumber, facsimile-TelephoneNumber, street, postOfficeBox, postalCode, postalAddress, physicalDeliveryOfficeName, st, l, description	Yes 11 (61.11%) No 1 (5.56%) Don't know 5 (27.78%)

5.3. Objectclass eduOrg			
As defined in exp-nmi-edit-mace_dir-eduOrg-1.0.html (EXPERIMENTAL!)			
Name	Description	Syntax	Implementation/Relevance
eduOrgHomePageURI	"The URL for the organization's top level home page."	directory string	Yes 11 (61.11%) No 0 (0%) Don't know 6 (33.33%)
EduOrgIdentityAuthNPolicy URI	"A URI pointing to the location of the organization's policy regarding identification and authentication (the issuance and use of digital credentials). Most often a URL, but with appropriate resolution mechanisms in place,	directory string	Yes 10 (55.56%) No 0 (0%) Don't know 6 (33.33%)

	could be a URN."			
eduOrgLegalName	"The organization's legal corporate name."	directory string	Yes No Don't know	11 (61.11%) 0 (0%) 6 (33.33%)
eduOrgSuperiorURI	"LDAP URL for the organization object one level superior to this entry."	directory string	Yes No Don't know	8 (44.44%) 2 (11.11%) 6 (33.33%)
eduOrgWhitePagesURI	"The URL of the open white pages directory service for the university, predominantly LDAP these days."	directory string	Yes No Don't know	9 (50.00%) 1 (5.56%) 7 (38.89%)

Conclusions:

- The object classes organization and organizationalUnit were seen as relevant by the majority of the participants.
- The attributes eduOrgHomePageURI, eduOrgIdentityAuthNPolicyURI, eduOrgLegalName and eduOrgWhitePagesURI of the object class eduOrg were seen as relevant by the majority of the participants ($\geq 50\%$).
- The only other attribute of the object class eduOrg (eduOrgSuperiorURI) was seen as relevant for a relative high number of participants (44%).

6. Desired schema extensions

Q. 6. Desired schema extensions

In the following you will find a list of already standardised object classes. By clicking on the respective links you will find the definition of these. Please consider, whether these definition fulfil the requirements of the European research community.

6.1. Which structural object classes should have a specialised form containing attributes specific for the European academic environment?	person from RFC 2256:	6 (33.33%)
	organizational person from RFC 2256:	6 (33.33%)
	residential person from RFC 2256:	1 (5.56%)
	inetorg person from RFC 2298 :	8 (44.44%)
	organization from RFC 2256:	9 (50.00%)
	organizational unit from RFC 2256:	9 (50.00%)
	application process from RFC 2256:	2 (11.11%)
	group of names from RFC 2256:	3 (16.67%)
	group of unique names from RFC 2256:	3 (16.67%)
	organizational role from RFC 2256:	7 (38.89%)
	alias from RFC 2256:	4 (22.22%)
	device from RFC 2256:	1 (5.56%)
	CRL distribution point from RFC 2587:	3 (16.67%)
Posix group from RFC 2307:	1 (5.56%)	
IP service from RFC 2307:	3 (16.67%)	
IP protocol from RFC 2307:	2 (11.11%)	

	<p>ONC RPC from RFC 2307: 1 (5.56%) IP network from RFC 2307: 4 (22.22%) NIS netgroup from RFC 2307: 0 (0%) NIS map from RFC 2307: 0 (0%) NIS object from RFC 2307: 0 (0%) other: 2 (11.11%) namely "academic studies related details" "pkiUser, pkiCA"</p>
6.1a. Additional remarks (e.g., stating what you miss):	<p><u>[Following remarks were made:]</u> "I assume that auxiliary classes eduPerson and eduOrg will at the final stage fulfil all requirements to describe persons / Orgs / OrgsUnit in the academic world." "Not had time to assess response to 6.1 (above)." "single valued preferredLanguage should be replaced by multiple valued preferredLanguages and single valued preferredPrimaryLanguage. labeledURI should be replaced with something more flexible (no T.61 usage). It should be possible to register labels similar to e-mail headers. All other labels could start with x-whatever. countryName should be included into the europeanEduPerson." "videoconferencing directory, calendar/schedule service" "Mail and certificate in organizational role" "suggest adding nationality to basic person definition suggest an academic studies related class with details of modules studied, year of study, entry and leave dates, etc." "the most important to us is to have possibility to store CRLs, CA certificates and many certificates of one person (multiple user certificates in one entry)"</p>
6.2. Which auxiliary object classes should have a specialised form containing attributes specific for the European academic environment?	<p>strong authentication user from RFC 2256: 6 (33.33%) certification authority from RFC 2256: 7 (38.89%) certification authority-v2 from RFC 2256: 7 (38.89%) user security information from RFC 2256: 7 (38.89%) PKI user from RFC 2587: 6 (33.33%) PKI Certification authority from RFC 2587 6 (33.33%) Delta CRL from RFC 2587 2 (11.11%) Posix account from RFC 2307 1 (5.56%) shadow account from RFC 2307 1 (5.56%) IP host from RFC 2307 2 (11.11%) IEEE 802 device from RFC 2307 1 (5.56%) bootable device from RFC 2307 1 (5.56%) other: 0 (0%)</p>
6.2a. Additional remarks:	<p><u>[Following remarks were made:]</u> "No time to assess this at present." "calendar/schedule, learning object (if not specified by LOM)"</p>

"Need for 8bit gecoc in posixAccount, geographical location (maybe as DNS LOC record) in a separate class"

"the most important to us is to have possibility to store CRLs, CA certificates and many certificates of one person (multiple user certificates in one entry)"

Conclusions:

- Following structural object classes should according to a high number of participants (29%-47%) have a specialised form containing attributes specific for the European academic environment:
 - organization 9 (50.00%)
 - organizational unit 9 (50.00%)
 - inetorg person 8 (44.44%)
 - organizational role 7 (38.89%)
 - person 6 (33.33%)
 - organizational person 6 (33.33%)
- A relative high percentage also ticked the object class IP network 4 (22.22%)
- The two additional entities mentioned by participants were:
 - academic studies related details
 - pkiUser, pkiCA
- As to auxiliary object classes the following should according to a high number of participants (29%-47%) have a specialised form containing attributes specific for the European academic environment:.
 - certification authority 7 (38.89%)
 - certification authority-v2 7 (38.89%)
 - user security information 7 (38.89%)
 - strong authentication user 6 (33.33%)
 - PKI user 6 (33.33%)
 - PKI Certification authority 6 (33.33%)
- Additional remarks named the following additional / alternative entities / modifications:
 - preferredLanguages and single valued preferredPrimaryLanguage
 - replacement for labeledURI
 - registered labels similar to e-mail headers
 - countryName as person attribute
 - videoconferencing directory
 - calendar/schedule service
 - mail and certificate in organizational role
 - nationality to basic person definition
 - academic studies related class with details of modules studied, year of study, entry and leave dates, etc.
 - CRLs, CA certificates and many certificates of one person (multiple user certificates in one entry)
 - learning object (if not specified by LOM)
 - 8bit gecoc in posixAccount
 - geographical location (maybe as DNS LOC record) in a separate class
- Overall there seems to be considerable interest in additional schema definitions specific for the European academic environment.
- There is a big variety of proposals

- There is no majority in favour of specific enhancements

7. Desired new attributes

Besides asking about extension of already existing object classes, the questionnaire ended by asking for additional attributes (irrespective of object classes) that are desired / required in the aimed at community:

Q. 7. Desired new attributes	
Which additional attributes would you need? (please provide a name and a description)	
[Following answers were made:]	
Name	Description
1.) [mentioned as first attribute:]	
"ssn"	"social security number (urgent..)"
"socialSecurityNumber"	"Social security numbers are not always numbers, sometimes they contain letters. Therefore the serialNumber cannot be used."
"personalTitle"	"This attribute is only defined in pilotPerson structural object class; it is indispensable to describe Person defined by inetorgperson structural object class chain and eduPerson auxiliary class. Additionally, in Poland we have probably a specific situation - we should distinguish between professional degree and academic/research degree, so in fact two attributes will be necessary (or we will extend our schema locally)."
"areaOfInterest"	"A description of the areas of interest of the entry (research activities, etc.). Although not required, a numeric classification scheme (such as UNESCO codes) would be desirable"
"unique_userid"	"unique id of a user (e-mail address is not good enough - it can change in time, and even be shared)"
"birthdate"	"Not meant for global use, but more for internal use"
" birthDate"	"The birth date of a person"
"cv"	"[URI] link to Online Curriculum Vitae"
" userCertificates"	"stores more than one certificate (X.509)"
2.) [mentioned as second attribute:]	
"studentnumber"	"Student's number in the student database"
"mail"	"There is the lack of mail attribute in classes describing Org / OrgUnit and i.e. organization/organizationalUnit or eduOrg; the same problem is with mail for organizationalRole objects."
"classificationScheme"	"An URI pointing to the definition of the classification scheme used in the above attribute" [referring to areaOfInterest]
"user_class"	"to detect the user's group e.g. what level of the service he/she is entitled to"
"gender"	"Not meant for global use, but more for internal use"
"fedID or netID"	"federated or network ID based on Liberty specification or

	Microsoft Passport"
3.) [mentioned as third attribute:]	
"expertise"	"persons area of expertise"
"position"	"My doubts: I wonder if it is OK to put such things as e.g. Programmer or Secretary in the title attribute? In X.500 service we used locally defined position attribute, assuming that title attributes contain important functions as president, chairman."
"releasePolicy"	"A definition of the policy under which the data of this entry should be disclosed (see question 2.5). May be implemented as a list of (attribute, release policy) pairs"
"studyBranch"	"Would require a controlled vocabulary to be of use internationally."
4.) [mentioned as fourth attribute:]	
"expirationdate"	"expiration date of account"
"indexingPolicy"	"A definition of the policy under which the data of this entry should be collected for indexing (see question 2.5). May be implemented as a list of (attribute, release policy)"
5.) [mentioned as fifth attribute:]	
"accountstatus"	"values: active, disabled, removed ..."
6.-9.) [no participant made more than 5 attribute proposals]	
10) If you have more that 9 attributes to add to the existing LDAP Schema, please submit your proposal to the DEEP Project team at deep@daasi.de	

Conclusions:

- 20 different attribute proposals were made, only two attributes were identically proposed twice: birthDate and socialSecurityNumber.
- All proposed attributes except one (mail for organization object class) were person attributes.
- The proposed person attributes can be grouped into the following groups:
 - relating to identity:
 - socialSecurityNumber, unique_userid, studentnumber, fedID, netID
 - relating to additional information about a person:
 - personalTitle, position
 - areaOfInterest (together with classificationScheme), expertise, studyBranch
 - birthDate, cv, gender
 - relating to policy and privacy issues:
 - user_class, expirationdate, accountstatus
 - releasePolicy, indexingPolicy
 - relating to PKI
 - userCertificates
- Comments to single attributes:
 - **mail** attribute for organization and organizationalUnit will be needed by all

organisations that have mail addresses for groups of people and for organisational email-addresses. The later could also be taken into account by defining a person entry with a generic name like "cn= contact person", but this would most probably be the second best solution.

- **personalTitle** is definitely needed in addition to the attribute title from organizationalPerson. As mentioned the object class pilotPerson, which was used in the frame of the X.500-NameFLOW project introduced such an attribute (see RFC 1274). The RFC describes the attribute as follows:
The Personal Title attribute type specifies a personal title for a person.
Examples of personal titles are "Ms", "Dr", "Prof" and "Rev"
Here as in some other proposed attributes the questions rise, whether there should be a controlled vocabulary for it, how to maintain such a vocabulary and how to make such a vocabulary multilingual. RFC 1274 does not address any of these questions. BTW: RFC 2256 does mention an attribute "personalTitle" while describing "title", but it does neither define such an attribute, nor refer to such a definition.
- **position** could as the comment of the indicates be of value in addition to "title" for common positions like "programmer", "secretary", etc. A controlled vocabulary for such an attribute seems quite impossible.
- **gender** and **birthDate** are both attributes that most probably will be used by a lot of organisations.
- **cv** (Curriculum Vitae) could be differently represented in a directory. The participant of the questionnaire was thinking of a mere URI pointer to a CV document in the web. This is definitely the most simple solution. There also has been the idea (coming from the European Academic community) to define a whole objectclass for CV. Such an object class could include attributes for the single parts of a CV, like primarySchool, secondarySchool, university, employment, etc.. Each of these attributes could have a syntax like: name, start_date, end_date, description, e.g.:
university=foo university#1.3.1993#28.2.1996#applied mathematics and information theory
It would be interesting to evaluate the feasibility of such an object class.
- **expertise**, **areaOfInterest**, and **studyBranch** seem to address something similar.
 - **studyBranch** might only want to address study courses available at the educational Institution, and thus would be applicable only to students (and if convenient, also to the organizationalUnit-entry of the department that provides such a study course). This attribute could also be used in an object class for CVs (see above).
 - It is questionable whether the community needs both attributes **expertise** and **areaOfInterest** (the first describing past activities, the latter current interests).
 - In any case the usability of all three attributes would be increased by a controlled vocabulary. The idea to include a pointer to a classification scheme that documents the controlled vocabulary used should be taken into consideration, but might produce complications in terms of interoperability. The eduPerson approach would be to define one and only one controlled vocabulary for such an attribute (see, e.g., eduPersonAffiliation).
 - If a classification scheme pointer would be introduced, the name of that

- attribute should include the attribute that is classified (thus "areaOfInterestClassificationScheme" instead of classificationScheme"
- **socialSecurityNumber, fedID, netID, studentnumber, and unique_userid** are all means to uniquely identify a person.
 - **socialSecurityNumber** seems to be an urgent need for at least two participants. Since such a number identifies a person uniquely also outside the internet, there are privacy issues to be taken into consideration. Such an attribute shouldn't be public available.
 - **studentnumber** would be the attribute for students parallel to employeeNumber (from inetOrgPerson) for the staff. With both there are again privacy issues and they should not be public.
 - **fedID** and **netID** are both world-wide unique IDs. It could be useful to store them into a directory. Since there are the two competing identity architectures from Microsoft and from the Liberty Alliance most probably both attributes are needed.
 - **unique_userid** might also be helpful, since uid from inetOrgPerson only is unique inside a domain (provided that a user has the same login name on all computers of a domain) and since, as the participant states, an email address sometimes doesn't uniquely identify a person.
 - **user_class, expirationdate, accountstatus** all three can be used in user management.
 - **user_class** seems to be equivalent to eduPersonEntitlement.
 - **expirationdate** and **accountstatus** might also both be interesting to use in combination. There should definitely be a controlled vocabulary for account status and that should in addition to the stati proposed (active, disabled, removed) include a status expired.
 - **releasePolicy** and **indexingPolicy** both take privacy concerns into account.
 - **releasePolicy** The idea proposed by the participant, namely "may be implemented as a list of attribute, release policy pairs" is not totally clear. One should ask back for a more elaborate description of this idea. Inside a DFN directory project a similar idea was developed, where an attribute dfnDistribution stores the decision of the person concerned, how far her entry is visible: only inside the own domain, having 4 choices: only inside the own country, only in countries that have privacy legislation and world wide. The user interface (or the LDAP server itself) has to implement such a policy, by using, e.g., DNS reverse look up.
 - **indexingPolicy**. Similar work is already on its way in the frame of TF-LSD, where a text on crawler policy has been distributed.
 - **userCertificates**: since the attribute userCertificate is defined as multi-valued, this attribute does not make a lot of sense.
 - A lot of interesting ideas were put forward in this part of the questionnaire. It would make great sense to think these through and include them while defining an European EduPerson.

8. Summary

Following conclusions are seen as most important:

Q. 1:

- A considerable number of participants (18) could be found that took their time to fill in the quite long questionnaire. All but two answered all the questions.- The participants quite well represent the aimed at community and the combination of single universities and of NRNs and similar organisations provide a wide enough spectrum of participants. The participants showed great expertise in the field, and they made valuable proposals that should be followed up.

Q. 2

- Interoperability through common schema is seen as needed by 88% of the participants.
- eduPerson does not fulfil all needs of the European community.
- 11 participants favour a continuation of DEEP, not one explicitly said that they did not favour such a continuation.

Q. 3

- OpenLDAP is the most used technology among the participants. Only MS-Active Directory plays another considerable role which is due to the fact that it is part of Windows 2000 / XP / .NET, and is thus essential in any environment that includes Windows computers. Novell is used by some.
- White pages service, Authentication server, email user management and user log in management are the most important directory applications and should definitely be taken into account when continuing DEEP.
- Resource management, Grid Information system, e-Learning and course management are other applications that are thought about by a considerable part of the community.

Q. 4

- The table given in conclusions of "5.1. Existing person attributes" show the attributes seen as relevant for the majority of participants.

Q. 5

- Some of the eduOrg attributes were also seen as relevant for the majority of participants.

Q. 6

- All classical person object classes including eduPerson are interesting for the community, but also need extensions.
- The object classes organization and organizationalUnit as well as the object class organizationalRole are the structural object classes that interest the community most in respect of additional attributes.
- As to the auxiliary object classes only PKI relating attributes were seen as relevant.
- The additional remarks made show a large variety of interesting ideas that can be taken into account in a follow-up activity.

Q. 7

- 20 different attribute proposals were made, nearly all of them should be taken into consideration when defining standardised schema for the European community.
- Two attributes seem to be most urgent since they were mentioned by two participants: birthDate and socialSecurityNumber
- The Major proposed extensions can be generally grouped into two groups:
 - professionalPerson (cv, interests, expertise)
 - networkIdentity (or aaaPerson) – supposedly originated from recent development of AAA issues and network identity (MS Passport and > Liberty) which is not covered by eduPerson (except eduPersonEntitlement). eduPerson started 3 years ago and there was not much attention then to AAA and Identity - now people want this information.

The Questionnaire ended with the following sentence:

Thank you very much again for taking your time to help us understand your institution's needs in the directories' deployment for the European academic and research community.

This sentence seems to have been proven right by the participants of the survey. The Questionnaire was capable of showing needs that seem to be peculiar to the European requirements, since they have in their majority not been addressed by eduPerson. Of course eduPerson didn't want to solve all schema problems and the authors explicitly say that single universities can define their own object classes for specific needs. The questionnaire showed that there seems to be enough interest in standardising more than what eduPerson does.

9. Future Directions

The results of the questionnaire clearly shows that there is a need of standardised directory schema for the European research community. The representatives of Internet2 who have defined eduPerson, showed great interest in DEEP and would be willing to cooperate towards international standardisation. We assume that they are thinking of defining eduPerson 2.0 which also takes into account the needs of non-US communities.

Interestingly, the Australian research community has a project similar to DEEP, namely WALAP (West Australia Libraries Authentication Project, see <http://john.curtin.edu.au/walap/>). One result of WALAP was the definition of directory schema, basically two yet unpublished object classes auEduPerson for person schema and auEduUnit for organisational units. The auxiliary objectclass eduPerson 1.5 that is also included in the WALAP recommendations obviously didn't fulfil all the needs of that community. First contacts to the WALAP project could be made and a future cooperation in the frame of a follow up activity to this first phase of DEEP would definitely be possible and fruitful.

We generally see international standards as something to aim at and schema for academic communities is no exception. Thus a follow up activity should definitely cooperate with Internet2 and WALAP in the search of such a standard. Since there are already different (but interoperable) schema definitions eduPerson and auEduPerson, DEEP should evaluate whether it would be strategically wise to define euEduPerson and in a second step, try to align all three. Such a strategy would have the advantage of having something standardised for the European community with which it can experiment, and which can be further developed and used even if there will not be an international agreement. We are convinced that such an agreement is possible though and such an international eduPerson should be standardised in the frame of an IETF RFC.

While performing the work on the questionnaire and its results, a number of schema definitions of higher educational organisations were collected, e.g. schema of single US universities enhancing eduPerson like done by the University of Florida (see <http://www.cio.ufl.edu/projects/directory/>), or by European organizations, e.g., schema of the Czech Technical University (see <http://usermap.cvut.cz/ldap/>), as well as similar work done by SURFnet, the Nordunet community and the DFN. All these, together with the input from Australia and from eduPerson should be taken into account in a follow up activity together with the documents mentioned in the initial project proposal.