NameFLOW-Paradise

Annual Report 1995-1996

This report was compiled by Vincent Berkhout with the help of many others, whose contributions are gratefully acknowledged. Parts of the report may be freely copied as long as the source is acknowledged.

Table of Contents

Foreword

Directories are gaining momentum and are growing. Not only is the directory itself growing but also the number of participants in the NameFLOW service. Malaysia is the first non-European country that has now formally joined the service. Another development is that traditional customers, being the National Research Networks, can be 'by-passed' by other organisations. An example of this is the Free University of Brussels joining NameFLOW this year and they are controlling the Belgium directory part.

'The bigger the better' quote of last year has changed slightly. 'The lighter the better' or 'lean and mean' reflects the developments of LDAP (Lightweight Directory Access Protocol) much better. With the announcement of over 40 major companies supporting LDAP in their products the "LDAP madness"is

spreading. The first products for integration and synchronisation from Stand Alone LDAP servers to X.500 are becoming available, connecting the old and new. For the main directory it is most likely that we will use the current X.500 Directory Backbone with LDAP to the desks. In second place and a worthy runner up are the CCSO or Ph servers (where Ph is the abbreviation for Phone book). Its success is largely based on the uncomplicated design, ease of management and it is used by one popular mail user agent.

The previous NameFLOW-Paradise Annual Report was well received by both the commercial world and the academic and research community. This annual report will highlight most important developments of the last twelve months, those that are part of the operational NameFLOW- Paradise service, e.g. the X.500 93-pilot as well as other general developments such as Ph, a common indexing Protocol and the vCard. Many things have happened this year so it is a rather bulky report.

This document has over 30 other contributors from all kinds of institutions and companies. The organisations that were not in a position to respond to our request for a contribution this year will be approached again next year in our ambitious effort to make this document a Directory Status Report rather than just a DANTE service report.

I would hereby like to thank everybody for their efforts and their valuable contributions. A lot of the hard work has been done by the DSA operators and/or country managers. In particular, ULCC, the operators of the NameFLOW service, did an excellent job.

So to all of you in one word: THANKS!

Vincent Berkhout
NameFLOW-Paradise coordinator

Introduction

This second NameFLOW-Paradise Annual Report is maybe not as lean as the first one but certainly twice as mean! The Lean (or was it Lightweight?) Directory Access Protocol (LDAP) made its move to become the Access Protocol for Directories supported by over 40 important companies. The second version of the protocol is becoming widely accepted and work on the third version is rapidly progressing.

The report contains all the information one would expect with facts and figures, an operational report on activities, some development activities, and the NameFLOW liaisons.

But ... there is more this year: there are more articles on development, such as the Nomenclator Project and the electronic business card, called vCard. A commercial Directory service provider from Denmark runs the first successful e-mail directory and could not be left out.

The followingNameFLOW activities will be highlighted: the X.500(93) pilot, Directory Indexing and

an introduction on how to manage a Root Context. To see what is happening in the real world this report contains an overview of developments at the national level, contributed by the country managers. On request we have added a Product Survey of X.500 products and specifically asked the vendors: ".... and what about LDAP?".

An updated overview is appended of Public Directory Interfaces to find an access point to NameFLOW near you, a list of contact persons per country to turn to with difficult questions, as well as a directory glossary with all relevant abbreviations.

The trend for the year ahead: LDAP will become more important but is only an access protocol and not a directory service. The question is how to interconnect all the LDAP servers, and an X.500 backbone can be the answer. Lean, mean or both? The coming year will tell us.

Directory facts and figures

It is difficult to determine precisely how 'big' NameFLOW-Paradise is. It is a fully distributed directory and parts have access control. It is known that several organisations have defined administrative limitations so their local directory can not be crawled or copied. For this reason it is nearly impossible to determine the total number of entries stored in the directory. However, there are a few objects that can be measured: the number of Organisations and the number of Directory System Agents. Once a year an automated script is run by ULCC to determine the number of organisations and DSAs.

When comparing the figures with last year's, the number of organisations has increased from about 4500 to 5146 organisations. Of these organisations 400 are "organisation only"entries providing pointers to alternative directories with no sub entries itself. Where are these organisations from? There are a few (8) organisations at the top level such as @o=NATO. There are about 249 US organisations, 455 International organisations ("other countries") and an overwhelming 4452 European organisations.

Number of Organisations
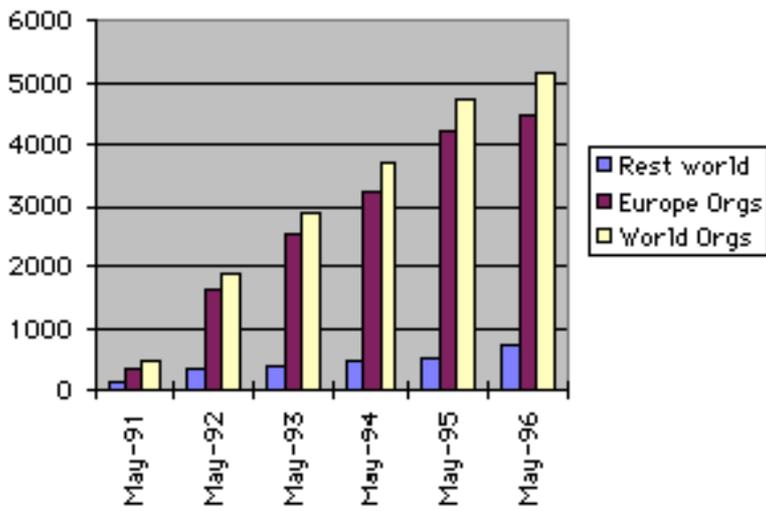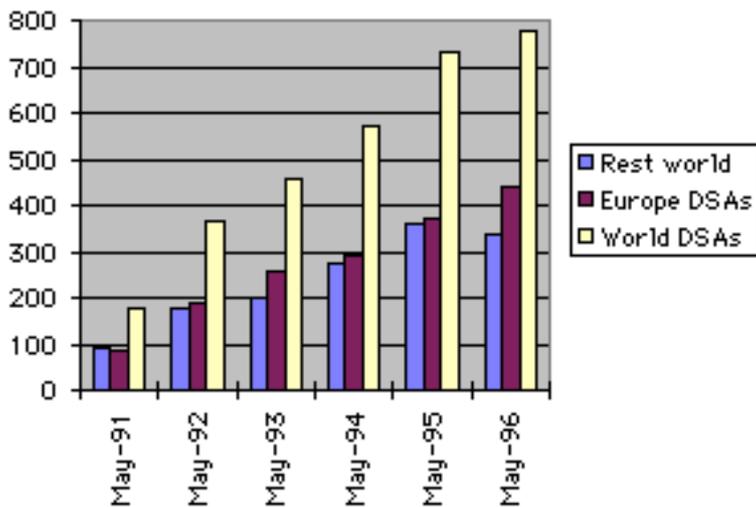
Number of DSAs

Number of organisations
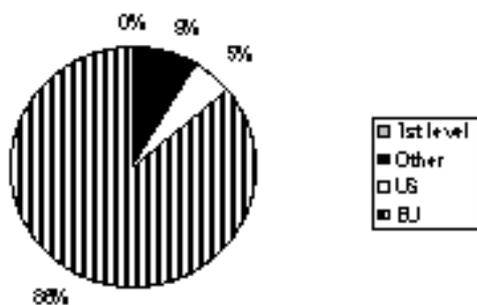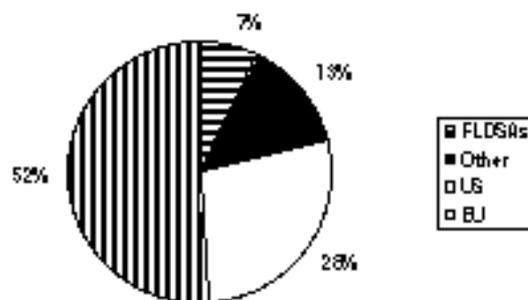
Number of DSAs

Number of Organisations:

```
First Level    8
Other        455
US           249
EU          4434
```

Total   5146*

* An alternative verification measurement via DAP has been done. Using a dish script indicated 4886 organisations, a variation of -5%

```
Number of DSAs:




FLDSAs        58
Other        103
US           218
EU           398
```

Total   777**

** An alternative verification measurement using DAP has been done. Using a dish script indicated 757 DSAs, a variation of -2.5%

An other good indication of growth is the actual number of Directory System Agents (DSAs). The number of DSAs 777 seem to level off and not that many are currently being added.

Trends

The following trends can be seen explaining the above figures:

LDAP

One trend that really makes an impact is the fast gaining popularity of LDAP. A Stand Alone LDAP Server (called SLAPD) is freely available as part of the University of Michigan LDAP distribution. At the moment many LDAP servers are being installed, however they are stand alone and not connected to each other nor to X.500 DSAs. Hence this growth can not be measured. SLAPD is a good and cost effective solution for local requirements but is not really a distributed Directory. There are currently two solutions to get stand alone LDAP servers connected to the X.500 infrastructure:

1. X.500 front end for stand alone server; a plug-in module which provides DSP and DAP connectivity to the X.500 infrastructure in both ways.
2. Replication: the information stored in a stand alone LDAP server is copied to a central DSA on

a regular basis.

Waiting for X.500(93)

It was repeatedly noted that Universities do not want to invest in the old Quipu technology. These Universities are waiting for the operational deployment of X.500(93) as it is perceived to be a better system and fully conform the letter of the standard.

Directory Purge

Organisations are trying to improve the quality of directory information by deleting outdated information or "chopping dead wood". A directory probe has been developed to check availability and response times of DSAs. For more information on Quality of Directory Service see *DANTE IN PRINT No 15*

Privacy and legislation

Some organisations are hesitant to join NameFLOW while some even decide to get disconnected because of national and international privacy and legislation restrictions. Although a lot of this information is already publicly available via the Web some organisations remain reluctant to provide a directory service. A good example of tough privacy laws is Germany where publicising personal data is heavily restricted. As a result special DUAs and other access mechanisms must be defined to make the situation workable. A trend is that organisations are no longer making all their information publicly available but only a subset of the internal information.

CCSO, the alternative Directory

There is one very good competitor to X.500 and LDAP, being CCSO or Ph servers. At its simplest the Ph database can be thought of as a computer resident "Phone book". It was designed to store relatively small amounts of arbitrary information for a relatively large number of people. The information is stored in simple character oriented tuples "name : value". There are Internet drafts specifying the servers, the query protocol and an introduction to the Internet Nomenclator Project describing how to integrate the hundreds of Ph servers world wide.

Operations Report

Ronan Flood - ULCC

Services

The services operated by ULCC for DANTE in support of NameFLOW- Paradise were reorganised and optimised during the year. The public- access DUA and its supporting DSA Ocellated Turkey

were removed, along with the e-mail based information server. Access restrictions were placed on the world-root DSA Giant Tortoise, limiting its use to mastering top-level entries and acting as a replication server.

The FTP and Gopher information servers continue to be provided. With the addition of a 4Gb disk, and the establishment of "mirror" agreements with other sources, it is hoped that the servers will become a central repository of directory-related information.

The infrastructure supporting the public-access LDAP server and the NameFLOW mailing lists has been reconfigured. The lists (forum@nameflow.dante.net and managers@nameflow.dante.net) are now supported on one of ULCC's own systems. As Ocellated Turkey is no longer available, the LDAP server is back-ended by DSAs operated by ULCC on behalf of UKERNA, administrators of JANET, the UK education and research network.

The helpdesk (helpdesk@nameflow.dante.net) continues to respond to requests for information, and to act as a central coordinating point for country-level DSA managers.

Hardware/Software

With the exception of the mailing lists, the services run on a dedicated 128Mb Sun SPARCserver-10 with 5Gb of disk, connected to the Internet via JANET. The original central host, a rather venerable Sun 4/330, was shut down in March 1996. That machine had given more than five years of continuous X.500 service at ULCC, with some time previously spent at University College London.

The software used is Nexor's XT-Quipu (DSA & DUAs), LDAPD from the University of Michigan (replacing XT-LDAPD), and Washington University's WUFTPD.

Personnel

The NameFLOW-Paradise services are supported by staff in the Network Services Group at ULCC. Currently Ronan Flood is the main person involved, with Stan Grant acting as a backup; Stan's primary responsibility is for UKERNA e-mail systems. We have become slightly more adept at performing these roles than we were when we started in January 1995.

Activities

There were some significant changes to the top level of the Directory Information Tree (DIT) during the year. One new country, Argentina (c=AR), joined the community, and there was renewed interest in Korea (c=KR), as coordination in that country was taken up by another organisation. Malaysia (c=MY) is in the process of joining, and first steps are being taken in Indonesia (c=ID). Experimental work is under way again in China (c=CN), which has involved quite a lot of helpdesk support.

In light of the growing use of gateways enabling WWW browsers to view the Directory, a labeledURI attribute was added to the entry for each country, pointing to a list of web servers in that country. Country managers were encouraged to do the same at the organisation level in their country.

NATO went through some reorganisation, which included changing their top-level entry from o=North Atlantic Treaty Organisation to o=NATO. Although this appears to contravene "usual practice", as recommended in RFC-1617, it was on the basis that the acronym is in fact more well known than the full name.

However, not all changes are positive: Estonia (c=EE) has been removed from the DIT, never having gone beyond the experiment stage.

Tales from the Helpdesk

The year brought the usual queries for e-mail addresses, some obscure: "a teacher called Kevin in the Isle of Skye"; some less so: "President Clinton"; and some ridiculous: "people who work on vibration sensors".

As well as these, and the ever-popular "help", more unusual requests arrive occasionally. This year's star prize goes to the US student who wanted to know "if Yugoslavia has access to orbital space" ...

NameFLOW- Paradise Development Activities

Migration to X.500(93)

The NP-93 migration has two objectives:

1. Introduce a Directory system based on X.500(93)

2. Phasing out the QUIPU system (a specific flavour of X.500 with several enhancements to the ISO standard)

Once a X.500(93) service is extensively tested, approved and operational the Directory services based on Quipu systems can be discontinued. The long term goal is to have an X.500(93) system without the need for "backwards compatibility" , that is gatewaying from X.500(93) to Quipu or X.500(88).

Why a 1993 pilot?

The pilot is necessary to gain experience, find potential failures in the software or detect defects in the 1993 edition of the X.500 standard. The pilot will pave the way for an operational Directory infrastructure primarily based on X.500(93). NameFLOW sees the opportunity to perform the first field test as there is limited practical experience deploying X.500(93) on a large scale. The goal of NameFLOW is to use X.500(93) to provide a multi system/multi vendor Directory service allowing

other Directories (also non-R&D!) to connect and share information.

The X.500(93) edition of the standard has improved in the following areas:

- access control
- replication (sub tree and incremental)
- schema knowledge

The upgraded X.500(93) system will be improved with:

- new management tools (as Quipu is no longer developed)
- better interfaces to the Directory (e.g. using LDAP)
- improved quality of information (a directory purge)
- shorter response times and better performance

The Tests

The planning depends on the availability of X.500(93) software and the necessary improvements. While software vendors state that their software is fully compliant with the 1993 edition of standard, it remains to be seen what they have implemented and whether it interworks with other implementations. To focus on the testing one consecutive week for testing was reserved for each test. An initial "experience test" (Phase 0) was performed in August/September 1995. The 'real' pilot has three phases:

1. Root Context Test
2. Inter working & Scaling Test (using X.500(88) and Quipu)
3. Operational Transition

Phase One - Root Context Test Results

The first X.500(93) pilot test was held from 12 to 16 February 1996. A full description of the test plan and the results can be found at <http://www.dante.net/np/93pilot.html>.

Root Context

"Managing the Root Context", a paper written by David Chadwick and others on behalf of DANTE was put through the test. Several complications with the proposal and the X.500(93) standard were discovered. The Root Context test has been made possible as a courtesy of NEXOR who implemented the specification.Hence interworking testing between different implementations was not possible. The replication as proposed in the paper between two NEXOR implementations was successful and could be considered as a proof of concept.

The replication/shadowing of the information worked, but using it in the "shadow DSA" seems to break the standard. It was beyond the scope of the tests performed as the basics of the standard prohibits the implementation as described in the Chadwick proposal. Problems are name resolving,

illegal context prefixes and invalid dseType combinations. As a result the proposal has been revised to describe the implications in full detail, and an alternative solutions must be found.

DAP and DSP (Directory Access Protocol and Directory System Protocol)

There were no major problems with the DAP and DSP tests. A few minor problems occurred but most of them were related to ill-configured Access Control Information or defects in the standard already reported. The DAP extensions were not thoroughly tested, but the first impression is that this works. The modification of some extensions was not possible.

Although outside the scope of this test phase, TU-Chemnitz-Zwickau have tested interworking between Quipu(=88) and the X.500(93) DSA in both directions. It was reported that DSP worked without any problems.

DISP (Directory Information Shadowing Protocol)

The DISP tests showed quite a few shortcomings. The initial limitation is that there are seven different test profiles for DISP, each specifying different shadowing functionality (EWOS EG DIR/ETSI TE.6 ADY 53). At the EuroSInet Workshop it became clear that the lowest common denominator of subsets implemented is:

Subset A: "naming context only" (= everything) and/or,

Subset B: "complete subtrees" (= everything starting from this node).

As one of the objectives of the pilot is to improve functionality, the subset closest to Quipu replication is EWOS subset C. Subset C describes a one-level shadow copy, officially called by EWOS; "chopped subtrees" (e.g. all organisation entries in a country). Unfortunately there was only one vendor implementing subset C so interworking testing for this has to wait until the next phase.

An unexpected feature was the increase in memory usage from 10 to over 45 Mbytes for an update of 3.300 person entries. Besides the increase of memory this DSA "blocked" during replication and other users (processes) were unable to connect to the DSA. The configuration of DISP agreements can also be improved, as it varies between a mix of dollars/text/hashes and editing ASN.1 strings. The conclusion of the DISP tests was that it was too early to deploy DISP between different implementations in an operational NameFLOW environment. To use X.500(93) replication in a global environment the one-level replication (Subset C) is needed.

Access Control Information (ACI)

The Access Control mechanism introduced in the X.500(93) standard is different and not as straightforward as in the Quipu model. Understanding the basics of the new Access Control mechanisms was perceived by the testing organisations as "problematic". Access Control needs simplification and proper introduction. The used one-to-one mapping from current Quipu to X.500 (93) creates large and complex Access Control Information and can be optimised.

DSA management

The management tools are improving and the graphical interface was appreciated. However management of the DSA is more restrictive compared to the old Quipu DSA management, not all functionality is yet available. There is the stability question for the conversion tool which needs improvement to be used for a production service.

LDAP support

The used LDAP implementation was based on software of an early prototype of the University of Michigan, not conforming to the proposed Internet Standard. A large part of Directory usage is via LDAP and must be supported in coming releases. It was suggested that this should be an integral part of DSAs instead of a gateway function.

Product stability

The early versions of the software tested in Phase 0 were unstable, but stability seems to improve as newer versions come along. Most DSAs ran stably during the test week with an occasional crash. In the problem report questionnaire people were asked to mark the tested product, and most participants think that the product are almost there, but not entirely. The software would presumably work in a single vendor environment, but for full operational deployment it is still too early. The biggest concern was stability of the product.

Source or Binaries

The organisations using source code had slightly more trouble installing the software than people using binaries. The installation of a native C-compiler fixed this, the problem seems to be the Gnu C-compiler (gcc). All in all, the disadvantages of having to compile source or having to redistribute binaries seems to balance each other. It is up to organisation what they prefer locally and what their local requirements are.

User Testing versus Vendor Testing

The tests performed by this user community are done using a live Wide Area Network environment. This makes DISP updates of 23 Megabyte for 3300 entries over the network somewhat tedious, and such problems do not occur in a local test setting. It is clear that this user testing is different from vendor testing at the EuroSInet workshops and NP-93 participants want to repeat this type of user testing in the Autumn of 1996 with more products. It is agreed that the participants can continue testing independently and the necessary information, such as knowledge references, will be made available via <ftp://ftp.nameflow.dante.net/root/>.

The start of the second Test Phase is planned for November 1996

Mailing list: NP-93@dante.org.uk

Managing the Root

When the first edition of the X.500 standard was published in 1988 it did not support the concept of centrally managed First Level DSAs or a Root Naming Context. The problem is when a country wanted to join the service it must contact all the operators of First Level DSAs to set up an agreement. As the service grows this will rapidly become impractical. The actual problem of interconnecting all these First Level DSAs was pragmatically solved in the QUIPU implementations where it introduces a central Root DSA managing all interconnection of First Level DSAs. In addition QUIPU introduced replication which was formalised in RFC 1276 to allow interworking with other systems and implementations. The concept of the Root DSA managing the First Level DSAs and entries, the Root Context, together with the replication made it possible to operate a global distributed Directory with an acceptable level of performance.

A replication mechanism was added to the recent edition of the X.500 standard in 1993 and supports the concept of First Level DSAs. However, it intentionally does not address the way a Root Context should be managed and still assumes that bi-lateral agreements should be made between Directory operators.

A real life example illustrates what would happen:
in June 1996 there were 58 First Level DSAs connected to NameFLOW which would require 58x57 / 2 is 1653 bi-lateral agreements! The Root DSA needs only one bi-lateral agreement per First Level DSA totalling 58 agreements. Fortunately this process can be repeated at lower levels. Just try to calculate the necessary bi-lateral agreements for the national level of c=GB with 142 DSAs if no central management for the UK or for the world is available!

In the QUIPU model the Root Context is stored in a single file, a so- called Entry Data Block or EDB, and this file is replicated to the First Level DSAs and subsequently to their subordinate DSAs. The file or EDB contains all DSA information, network addresses from the DSA, access control, replication information and whatever more information is stored in the DSA entry. This is quite different from the X.500(93) approach where only necessary information is stored, a so- called knowledge reference containing:

- distinguished name of what is managed (e.g. @c=GB) and
- distinguished name by who (e.g. @c=GB@cn=GB-DSA) and
- its presentation address (e.g. Internet=128.86.8.65+17003)

As one can see above there is not a lot of information to resolve queries. There are two penalties one has to pay for omitting the rest of the information. The first one is that a search operation becomes a very expensive and slow operation. If a user were to search for country "UK"all the First Level DSAs will be contacted. The problem becomes worse with an incorrect query, as all First Level DSAs have to be reply before we are sure that the requested entry does not exist. The second penalty is the

insecure List operation. Although the c=GB information is available, the DSA has to be contacted to see what Access Control to the entry is allowed. Not contacting the DSA is called an insecure List operation.

To solve the above problems David Chadwick has been asked to work on this as consultant to DANTE. The result of this is a document published in the DANTE in PRINT series and also published as an Internet Draft "Managing the X.500 Root Naming Context"in the IETF- IDS working group. (See liaisons for more information on IDS). The paper describes two solutions in parallel, a fast track solution and a slower track solution.

The fast track describes how the Root Context is assembled and how information is collected from First Level DSAs. Once the information is collected it needs to be distributed to the First Level DSAs. A defect report (#142) has been submitted to the ITU clarifying how such a shadow agreement between First Level DSAs should be established. The proposed changes are sufficient to allow an insecure List operation, but not an efficient one-level search.

The *slower* Track provides a solution for the one-level search but requires two important defect reports to be ratified. The first report will allow that the Access Control Information to be replicated (shadowed) to the shadowing DSA. This will allow a secure List operation. The second defect report will allow that besides the knowledge information the complete entry can be replicated. All the necessary information would then be available in a First Level DSA and one-level searches can be performed locally without contacting other First Level DSAs.

All technical implications were discussed at a Root Context meeting hosted by DANTE with leading X.500 implementors. During the discussion it became clear that there are two additional problems.

The first problem is that the replication protocol, called Directory Information Shadowing Protocol, has many flavours. In the EWOS test profiles one can see that there are seven subsets for DISP. Most implementors have only one subset of DISP in common, and unfortunately that is not the one the NameFLOW-Paradise community needs. David Chadwick has drafted a specific (or better reduced) DISP profile for our community with the exact functionality needed.

The second problem is whether the Slower track is fast enough (targeted at mid 1998). The group concluded that an alternative, indexed DSAs, could be a better and faster solution. Better, because it will allow more than a one-level search, and faster as it could be implemented right now.

Web references in the Directory

These days a vast majority of directory queries are coming from Web browsers using some kind of Gateway to the Directory. Until mid 1995 one could access the Directory via the web, but one could not access the Web via the Directory. Mark Smith (at that time working for the University of Michigan) took the initiative and wrote an Internet Draft defining a new attribute to store the needed web reference in the Directory.

Why is storing web references important? One growing drawback of the Web is its lack of structure. One can find a web site of a particular company or person by guessing the web reference ("www. companyname.country") or by using web crawlers with a search engine. One of the advantages of X.500 is that it has an explicit structure in the form of a hierarchical tree (the Directory Information Tree). The idea is straightforward, simply use the X.500 tree to locate the company or person and store a reference to where their web server lives! To allow all different types of references to be stored Uniform Resource Locators (URLs) are used; in addition to the Web one can refer to ftp, gopher and various other types of information service. In this particular case X.500 is not used for storing the information, but more as a reference mechanism.

The URI and the label in a labeledURI

At first the reference stored in the Directory was called not labeledURI but labeledURL. Uniform Resource Locators (as defined in RFC 1738) areonly the first in a series of several types of Uniform Resources Identifiers that are being defined by the IETF. The URIs are widely used and as they support additional types of reference they are preferred over URLs. Therefore the name labeledURL was deprecated in favour of labeledURI.

A question often asked is why the reference is called "labeledURI" and not "URI"? The answer is a rather technical one. The syntax of the labeledURI attribute is slightly different from the URI used in normal Hypertext documents. An example in Hypertext syntax is as follows: <A HREF="http://www. dante.net/">DANTE's Web </A> .

The actual syntax of attributes in X.500 is different as it does not include the value but uses the so-called attribute=value pair syntax. An example: labeledURI= http://www.dante.net/ DANTE's Web

The "trick"is rather simple: as the space character is not allowed in URIs everything after a space character is the label! In the example above the URI is "http://www.dante.net/"and the label is "DANTE's Web".

Collecting and storing labeledURIs

At one of the NameFLOW-Paradise managers meetings it was suggested to add more URIs to the Directory to allow closer interworking between the World Wide Web and X.500/LDAP and so promote usage of the Directory. Adding labeledURI on a larger scale to the Directory was done in two steps:

1. Add labeledURIs to all the county nodes.
2. Add labeledURIs to other entries.

The labeledURIs added to the country nodes are references to alternative Directories, an overview of national web servers and other relevant information. The first step was successfully implemented in the autumn of 1995 and was well-received. The second step was to add URIs to organisations, persons and other entries. This has been done by the national Directory Managers on a considerable scale. To assist people a recipe is available: "How to add a labeledURI to my Directory". The recipe is on-line

available from the DANTE web server via http://www.dante.net/np/ds.html.

Indexing

One of the major benefits of the X.500 directory is its scalability, allowing a globally distributed directory as NameFLOW demonstrates. However, the current X.500 implementation cannot resolve all types of queries or is simply too slow. A so-called white page search for a person without knowing the organisation or country is not feasible in practice as the directory as a whole must be interrogated. A specific type of directory server is needed to solve these types of queries. The concept is that most queries are looking for the same attributes, e.g. Surname. Similar to what is done for web browsers, we would like to set up a Yahoo or AltaVista service, not for the world wide web but for directories!

Getting the attributes together can be done with indexes, a small set of information which can be found in a DSA or other directory service. Index-DSA research has been done in 1995 by Paul Barker. On behalf of DANTE Paul investigated how indexes can be built using X.500 (see DIP #12). To continue with the work this year a follow- up paper was published written by David Chadwick with the aim of building a simple index server based on existing X.500 technology. The paper, named IndeX.500 (DiP #19) mirrors much of the technology used by Whois++ but does not provide the ultimate solution for Directory indexing. To gain more experience with indexing DANTE has proposed a joint project to experiment with indexing on a larger scale. Possible participants with indexing expertise will be the Umea University (SE), Free University of Brussels (BE) and SURFnet (NL), as well as DANTE.

Other important Development Activities

NOMENCLATOR

Joann J. Ordille

Distributed Search and Retrieval from CCSO Servers

The Internet Nomenclator Project is currently integrating many of the publicly available CCSO servers around the world. Each CCSO server has a database schema that is tailored to the needs of the organization that owns it. Nomenclator can integrate the different database schema at these servers and provide fast cross-server searches for locating people on the Internet.

More than 40 CCSO administrators have registered their servers as part of the Internet Nomenclator Project. We have used the registrations to develop and test a new type of data integration system called "Data Integration By Example."A paper on this technique has been published, and is also available through the Nomenclator home page as at the end of this section. The Nomenclator service will soon be available on the Internet. The service provides a Web interface for queries and a query

protocol for those who wish to create their own interface. We will also be distributing the query processing software, so you can run the query processor at your site to benefit from the increased speed of local caching and lower local load. Internet Drafts on the Simple Nomenclator Query Protocol (SNQP)and the Nomenclator project are available through the Nomenclator home page.

Nomenclator uses distributed indexing techniques to provide fast cross-server searches. It also supports extensive data and meta-data caching to scale the system to Internet size.

One of the best things about the system is that a CCSO site can incorporate its server into Nomenclator without having to change it. All we need is for the administrator of a CCSO server to provide some basic information about the server. We use that information to make queries faster by constraining searches to those servers where an answer is likely to be found. We also use the information to make queries easier to express and understand by mapping the data at each server to our global schema.

When Nomenclator constrains the search for a query answer, it screens out irrelevant queries from ever reaching a CCSO server. When Nomenclator finds an answer in its cache, it screens out redundant queries from reaching a CCSO server. Each server becomes easier to find and use without experiencing the high loads caused by exhaustive and redundant searches.

Nomenclator is described in detail through its home page at:

http://cm.bell-labs.com/cm/cs/what/nomenclator/

In particular, detailed technical papers about the system are available at

http://cm.bell-labs.com/cm/cs/who/joann/ordille2.html

The Internet Draft, "Internet Nomenclator Project,"provides a technical overview of the project. The Internet Draft, "Simple Nomenclator Query Protocol,"describes SNQP, the query protocol used by Nomenclator. SNQP has special features for handling the unavailability of servers, search costs, and caches that are characteristic of large distributed search services. The paper "An Experiment in Integrating Internet Information Sources"describes our Data Integration By Example techniques. The Ph.D. thesis "Descriptive Name Services for Large Internets"provides the most complete technical description. A shorter, but reasonably complete, technical description is available in "Distributed Active Catalogs and Meta-Data Caching in Descriptive Name Services."

New registrations are always welcome! Registration takes approximately one hour. We will be happy to receive comments about the registration process or other aspects of the system.

The Nomenclator Internet Pilot is sponsored by InterNIC Directory and Database Services of AT&T and Bell Laboratories Computing Science Research Center of Lucent Technologies.

vCard - The Electronic Business Card

Frank Dawson

Revolutionizing Personal Communications Personal Data Interchange (PDI) occurs every time two or more individuals communicate, in either a business or personal context, face-to-face, or across space and time. Such interchanges frequently include the exchange of informal information, such as business cards, telephone numbers, addresses, dates and times of appointments, etc. Personal information, by nature, is complex and diverse. Currently, proprietary standards exist to structure some types of PDI information, but no single, open specification comprehensively addresses the needs of collecting and communicating PDI information across many common communication channels such as telephone, voice- mail, e-mail, and face-to-face meetings. The traditional types of textual information corresponding to that found on a paper business card have been enhanced in the vCard specification with multimedia information, includes digital image and audio data.

The Electronic Business Card Revolution

The versit Consortium has recently completed the revision of a specification that allows the open exchange of PDI information typically found on traditional paper business cards. The specification defines a format for an electronic business card, or vCard. The vCard format is the first step in a revolution in the way people communicate with each other electronically. The vCard specification is suitable as an interchange format between applications or systems. The format is defined independent of the particular method used to transport it.

A vCard is intended to be used for exchanging information about people and resources. In today's business environment, this information is typically exchanged on business cards. The ultimate destination for this information is often a collection of business cards, Rolodex© file, or electronic contact manager. Prior to the introduction of the vCard specification, users of such applications typically had to re-key the original information, often transcribing it from paper business cards.

With the advent of the vCard specification, this information can be exchanged in an automated fashion. The basis for the data types supported by this specification have their origin in openly defined, international standards and in additional capabilities based on enhancements suggested in numerous public demonstrations of vCard exchange using the Internet's World-Wide-Web, infra-red data transport, and simultaneous voice and data (SVD) modems.

Leverages Existing Standards

Wherever possible versit attempts to leverage the work of existing standards in solving interoperability problems. The definition of the vCard Specification made use of a number of existing standards. The "person"object defined by the CCITT X.500 Series Recommendation for Directory Services was heavily referenced for the capabilities that are defined by vCard. Every attempt was made to make it possible to map the X.520/X.521 attributes and objects into and out of an instance of a vCard. This will facilitate the exchanging a vCard with X.500-based network directory services; such as those found in emerging client/server electronic messaging services.The vCard specification

has extended the capabilities that have been defined within the CCITT X.500 Series Recommendation to allow the exchange of additional information often recorded on business cards and electronic contact managers. For example, this specification provides support for exchanging graphic images representing company logos, photographs of individuals, digital sound clips, and geo-positioning information. Such multimedia objects were not standardized by the X.500 standard.

vCard and the Internet

The versit PDI Team is working with the Internet Engineering Task Force (IETF) to complete work on an extension to the Internet MIME- based electronic mail standard to allow for this capability. This work is designed to be used to transport directory information across Internet MIME based electronic mail services. The internet draft is directly applicable to the exchange of business card data, such as that defined by the vCard specification.

Impact of vCard on Your Desktop

When integrating vCard support into an application, an implementor must consider a number of user interface implications. Most applications provide some levels of support for interacting with other applications. This is usually accomplished in three ways. These include the File System, the Clipboard, and Drag/Drop techniques. The full potential of the vCard technology can be better utilized by an application that supports the vCard specification in each of these user interface forms.

The versit Consortium is a multivendor development initiative of the communication and computer industries, founded by Apple, AT&T, IBM and Siemens. The versit specifications are made freely available to any interested party.

E-mail: pdi@versit.com
URL: http://www.versit.com/pdi

Certificates in the Directory

Eduardo Garcia

Security has become a crucial issue for the widespread use of the Internet in commercial applications. Current security solutions are based on public key cryptography, that requires each user to have a pair of keys: a public key and a private key. The public key has to be widely distributed for user signature validation and for encryption of messages destined to the owner of the public key. One of the ways of making public keys available is placing them in the Directory along with other user information.

To ensure that the key has not been tampered with while in transit or while stored in the Directory, it has to be signed by a Trusted Third Party. A signed public key with other information such as validity period, serial number, etc. is known as a certificate. A certificate may have to be revoked before expiration for different reasons such as suspecting that a key has been compromised or changes in the

certificate information such as user affiliation. Certificate Revocation Lists (CRL) are produced by Certification Authorities to publicise revoked certificates and can be placed also in the Directory. The X.509 certificates are becoming increasingly popular and not only as part of the X.500 Directory, but as a way of providing security in WWW transactions. There are a number of groups over the world working on X.509 certification in different communities.

ISO/ITU maintain the base X.509 standard. Since its first version in 1988 it has been reviewed several times and ISO/IEC and ANSI X9 (The ANSI working group for Financial Security Standards) have recently developed X.509 version 3 and CRLs version 2. Standardisation of X.509v3 was completed in June 1996 correcting some drawbacks of previous versions.

ICE-TEL project as part of the Telematics programme is providing tool kits for X.509 certification and setting up a certification infrastructure for the European academic community. New software releases supporting the new certificate and CRL versions are expected before the end of the year. DANTE participates in the ICE-TEL project as an unfunded partner.

The IETF PKIX (Public Key Infrastructure using X.509) working group has already produced standard in three parts for the definition of a certification infrastructure for the Internet.

Other groups such as X/Open, Open Software Foundation (OSF), the US National Institute of Standards and Technology (NIST), the Japanese Institute for Computer Authentication are also working on the definition of Public Key Infrastructures. An important part of the work is also driven by the PKCS (Public Key Cryptography Standards) produced by RSA Laboratories. Certification is based on X.509 and is extensively used in Web servers and clients.

PGP

Similarly to the X.509 certificates distribution concept, the IETF ASID working group has been working on the definition of X.500 attribute types to hold public PGP keys. The current internet draft described how PGP keys can be stored within X.500 and alternatively how they can be referenced from the Directory by a URL.

DANTE is following these technologies and actively experimenting with the available tool kits for the future provision of a Certification Authority service.

Liaisons

Introduction

Liaising with other institutions and organisations has always been very important for the NameFLOW-Paradise community. A public Directory service distributed over so many (38) countries should not only benefit its own Community of Interest but should go far beyond that. Hence DANTE and its partners try to cooperate with as many organisations as possible with a clear goal of stimulating the

development of Directories wherever and whenever possible to allow (commercial) Directories to emerge.

We feel that the liaison function, or better the actual cooperation, has significantly improved over last year. Vincent Berkhout was appointed to act as project manager for the EEMA Directory Committee to join forces in the 'battle' of Directory promotion. Valuable 'interworking' is taking place with EuroSInet for the testing of X.500(93) and we are already looking forward to their LDAP test suite. NameFLOW is still pushing for a multi-vendor directory and EuroSInet provides a solid foundation to meet and talk to software vendors without commercial implications. EWOS has provided answers to some 'unclear' X.500 specification questions raised during the NP-93 pilot. In particular the EWOS DISP/replication profiles have been useful. As the NameFLOW directory gets a stronger Internet character the work at the IETF must be closely followed. Whenever an opportunity arises we will try to promote the latest developments, such as the adding of URLs to the Directory. There are three important IETF working groups: ASID, the birth place of LDAP and now working on LDAP Version 3; IDS, focusing on integration of directories, and FIND, dedicated to the much needed development of an directory indexing model/mechanism.

The EuroView project tries to encourage the use of X.500 directories for the European governments and other public bodies. Without doubt they intend to continue the successes of PARADISE and now DANTE's NameFLOW-Paradise international directory service. After a quiet period the NADF is resuscitated and has been merged with the EMA Directory Committee. The results of their 'full steam ahead' directory challenge will definitely be present in our next report.

EEMA Directory Committee

David Goodman

With the accelerating growth of the Internet and the penetration of messaging in the commercial marketplace, the need for good, robust and reliable directory services has never been greater. This has always been true, but it is only now that directory services have become one of the hot topics at conferences. The LDAP announcements earlier this year generated a tremendous wave of public interest, and, together with the growing market imperatives driving the requirements for pragmatic directory solutions, have made directories a driving issue for both corporate organisations and commercial service providers.

Since its formation in late 1993, the EEMA Directory Committee has provided a forum for user organizations, directory service providers and product vendors to meet and understand the requirements for the deployment of directory services in Europe. The focus has been on the role of X.500 and other technologies in achieving these aims and thereby stimulate the market.

These objectives can be summarised as follows:

- To provide a forum for the different groups engaged in directory activities in Europe to share

experiences and reach common agreement

- To stimulate the use of directories for electronic commerce and to demonstrate the commercial benefits
- To develop a market-oriented approach to directories
- To increase awareness of X.500 and other technologies, their potential uses and benefits
- To stimulate the usage of directories for the exchange of information amongst service providers

The Directory Committee has representation on most of the standards and pilot groups in Europe and North America. Of considerable significance is the relationship with the other committees within EEMA, notably the User Committee ("user friendliness and usability are critical features of directory services which should make things easier instead of more complex") and the SPLC ("security needs directories but vice versa too - there are many legal problems"). In addition, the EEMA Directory Committee maintains strong ties with the parallel committees in the sister organisations in North America (EMA), Australia (EMAA/AOEMA), Japan (JEMA) and Brazil (BRISA).

Across Europe and indeed the rest of the world, companies of all sorts are wrestling with directory infrastructure implementation issues. The significant role the EEMA can play in this area is to demonstrate the advantages of both private and public directory infrastructures in electronic business transactions and to take a lead in highlighting and resolving outstanding technical and non- technical issues which may be inhibiting deployment.

At any one time, the Directory Committee may be overseeing two-three different projects. Usually, once the project has been completed, the final report is published as an EEMA "Black Book"and made available to members and non-members.

The publications that are available so far comprise:

- X.500 Directory Product Guide [Second Revision] (April, 1996). Prepared by Roger Molesworth of Logica UK.
- Guidelines for Corporate Directory Deployment (July, 1996) A full and detailed description of what is needed to start an X.500 directory service written by people who experienced this first hand at the MAFF in the UK. In addition to the guidelines the document includes three case studies.

One publication is currently in draft:

- Top Level Naming for Europe - Issues & Analysis The first phase of this project forms a description and background for major decisions surrounding the issues relating to naming at various levels (national and regional) in a public European directory. The output of the second phase of the project will be a set of naming recommendations for directory service providers, vendor and user organisations in Europe.

In addition to written reports, the Directory Committee has been responsible for initiating several exhibition demonstrations at EEMA Annual Conferences:

- Amsterdam Interoperability (June 1995) A demonstration during the EEMA annual conference where ten vendors demonstrated X.500(88) interworking of their products on the exhibition floor.

- Powered By X.500 (June 1996) Similar to the previous year's interoperability demonstration at the EEMA annual conference in Brussels.

- EEMA Directory An X.500 directory service managed by NEXOR with information on EEMA and its members to demonstrate that directories work and whenever possible to be useful. (EEMA member access only).

At the Annual Conference in Brussels in June this year, several new projects were proposed:

EEMA '97 Directory Challenge

The aim of the EEMA'97 Directory Challenge is to create an X.500- based directory infrastructure to support a range of directory- enabled applications and to demonstrate them at the EEMA Annual Conference to be held in Maastricht, the Netherlands in June 1997. It is currently planned to be part of a worldwide, co-ordinated effort by all the messaging associations of the world (Europe, North America, Australia, Brazil and Japan) with similar demonstrations being replicated at each association's Annual Conference. As a result of this effort, a new group has been formed - the World Directory Forum - which includes the former NADF (North American Directory Forum) and an EEMA Directory Committee sub-group, which will take responsibility for the European region.

Understanding LDAP

A paper in the form of a FAQ to help understand the issues pertaining to LDAP and its relation to X.500 in order to clarify some of the uncertainty that has arisen during the course of 1996.

Business Drivers for Directories

Justifying the costs involved in deploying directories within an organisation is increasingly important, and the intent of this document is to produce a clear analysis of what those cost savings are to help administrators make their business case to senior management.

The EEMA Directory Committee usually meets four times a year often to coincide with EEMA Conferences. For further information about the work of the Committee or future meetings, please contact any one of the following:

Chair: David Goodman - dgoodman@ssw.com
Committee liaison: Jane Jobson - janejobson@attmail.com
Project manager: Vincent Berkhout - vincent.berkhout@dante.org.uk

In addition there are a number of mailing lists which have been sent up for the Committee as a whole as well as individual projects:

Mailing lists:
dircomm@eema.co.uk
topol@eema.co.uk
challenge97@eema.co.uk
Subscription:
dircomm-request@eema.co.uk
topol-request@eema.co.uk
challenge97-request@eema.co.uk

EuroSInet

Christine Toms

EuroSInet, the leading Systems Interoperability Testing Association focuses mainly on the production of Test Suites and promoting and running Interoperability Testing Workshops. The membership consists of open systems product suppliers, users and government agencies. EuroSInet is a 'not-for profit' association managed by executive officers with day-to-day support provided by a Secretariat.

Test suites already developed by EuroSInet include X.400 '88, X.400 Mail Gateway '88 and, most recently, X.500 '93. In addition to basic directory functionality, the X.500 '93 test suite includes tests to verify Access Control and Replication (Shadowing) both of which are of vital importance to users. An LDAP test suite is under preparation. The X.500 '93 was written in a workshop environment with contributions from EuroSInet's supplier and user members. By encouraging users to participate in Test Suite development, EuroSInet ensures that their requirements are met. An even broader perspective was achieved by valuable contributions being made by representatives from DANTE and EWOS.

The seventh workshop was held at NCR in Copenhagen from 13th/17th May in Copenhagen 1996. Nine members attended including Data Connection, Digital, ICL, ISOCOR, ISODE Limited, NCR, NET-TEL, NEXOR and Siemens Nixdorf. A notable feature of the event was the number of X.400 suppliers who are now able to offer Message Stores and P7 Remote User Agents. Participants at the event were able to use EuroSInet's newly developed X.500 '93 test suite.

The eighth workshop is being held at the Siemens Nixdorf Conference Centre in Munich 7th/11th October when a core group of members will be testing against an updated X.500 '93 test suite, extensions to the X.400 '88 test suite and a newly created LDAP test suite.

For further information, please contact the Secretariat.

Phone: +44 (0)1252 845400
Fax: +44 (0)1252 845401
E-Mail: Apertus@attmail.com (Internet)
/c=gb/a=attmail/s=Toms/g=Christine (X.400)

EuroView

Andrew Findlay

The EuroView Project is partly funded by the European Union under the Telematics Applications Programme. It aims to bring the benefits of X.500-based directory services to government departments and similar public-sector bodies across Europe. The partners in the project are the German communication specialist "Dr. Materna GmbH", Dortmund (DE), the Computer Centre of Brunel University (GB) and Sema Group SAE (E).

The opening of borders for free trade and the free choice of work within the European Union has caused communication requirements to increase dramatically on all administrative levels for federal, regional and local institutions. The need for directories has grown along with this increase in communication, but solutions so far have been unsatisfactory in many cases. The EuroView team bases its work on the internationally standardised Directory ISO 9594, also known as X.500, deployed by pilot projects like PARADISE and proven in large- scale use by the DANTE NameFLOW service.

EuroView started with a survey of the particular needs and concerns of European administrations, to get enough information from future end-users to define the requirements of a directory service within the public administration sector. The overall objective, this being a pilot project, is not only to develop a directory service, but to carefully analyse user perspectives in relation to the service. These are not restricted to the basic requirements, but also comprise the advantages and disadvantages that users perceive from electronic directory technology in general. Therefore, the user requirements survey addressed issues like quality of service, degree of security, integration with existing tools and service evolution and enhancement. The results have been published in the "User Requirements Survey".

An initial schema has been defined for the EuroView pilot. A major design issue has been maintaining compatibility with existing schema, especially as used by current projects (NameFLOW-Paradise service in particular) and related Internet standards. The "EuroView Schema"is considered to be a living document, which will evolve through the life of the project.

Data administration will ultimately be the responsibility of the institutions listed in the directory as this is the only way to ensure up-to-date information. In the early stages of the project it is anticipated that some data maintenance tasks will have to be done by the project partners, who will also run some of the DSAs.

It is already apparent that many institutions have conflicting requirements. Most want to present a restricted view of their data to the outside world while allowing a richer view to their own staff, though in some cases they ask for detailed access to other organisations but are not willing to grant similar access to their own data. EuroView will work to resolve these conflicts, probably by promoting a structure that makes official contact-point details available to the public at large while

restricting access to the names and phone numbers of individuals.

The EuroView User Group includes administrations from several sectors: finance, agriculture, local government, and social affairs. This broad base will ensure wide acceptability of the project results. EuroView will be able to demonstrate both cross-sector and transnational communication. EuroView is determined to maintain close links with NameFLOW-Paradise and to make public information available on the Internet for the widest possible benefit. We also hope to influence the development of IDA's European Union directory of Commission, Council, and Parliamentary contact details.

EuroView now has a draft Service Design and is working on a User Access Plan. The next phase will be to load data from sample user communities, build and adapt user interfaces, and deal with multi-protocol network issues before arranging the first demonstrations.

E-mail: euroview@brunel.ac.uk
URL: http://www.brunel.ac.uk/x500/euroview/

EWOS

Keith Richardson

EWOS (the European Workshop for Open Systems) has been widening its scope during 1995/96 to become a forum which provides ICT (Information and Communication Technology) specifications, services and guidance for all ICT concerned parties such as product suppliers, service providers, commercial and governmental users etc.

This task embraces a range of activities including the production of GOSS (the Guide to Open Systems Specifications) and acting as a neutral body providing standardization and advice to assist the enabling of the GII (Global Information Infrastructure), particularly in Europe. All new projects within EWOS must be justified in market/ business terms and scoped precisely to provide deliverables within identified timescales.

Over the last year, the Directory group within EWOS, together with its partner groups in OIW (North America) and AOW (Asia-Pacific), have been developing draft ISPs (International Standarized Profiles) based on the 1993 X.500 Directory standard. These ISPs define the basic set of functionality and operational procedures which vendors of 1993 X.500 systems need to implement in their products to enable interoperability. Procurers of X.500 systems can then request conformance to these ISPs within Invitations to Tender (ITTs).

Particular aspects of X.500 functionality and procedures covered by the ISPs includes protocol conformance, user and system schema requirements, X.509 authentication, distributed operations and X.525 shadowing.

The latest X.500 Directory ISP drafts are available via ftp at ftp.ewos.be. An HTML document, ftp://

ftp.ewos.be/pub/egdiri/00drafts.htm , lists the latest drafts and contains pointers to them.

The EWOS Directory group have also been participating in the work of the EIDQ (European International Directory Enquiries) group, a consortium of telephone service providers, to develop technical specifications for a project to set up an integrated F.510 directory enquiries service across participating European countries.

Further information about EWOS: URL: http://www.ewos.be/

IETF-ASID

Tim Howes

The Access and Searching of Internet Directories (ASID) working group of the IETF (Internet Engineering Task Force) was formed in the wake of the belief that a single directory service is unlikely to take over the Internet. Instead, ASID's goal is to provide an even playing field for multiple protocol development, in the hope that the strongest and best protocol(s) will be selected naturally.

Since its creation, ASID has worked to create or evolve the following directory service standards:

- LDAP, the lightweight directory access protocol, used both as a front-end to X.500 and as a stand-alone service.
- Internet X.500, including defining a transition path to X.500(93), and defining new object classes and attribute types for various purposes.
- WHOIS++, a relatively new directory service compatible with the WHOIS service, based on a text oriented query protocol and a distributed index ing model.
- SOLO, the simple object lookup service, another new directory service drawing parts from WHOIS++, LDAP, and X.500.
- application/directory, a MIME content-type for holding directory information.

In the last six months, directories have gained new prominence and momentum on the Internet, with the endorsement and adoption of LDAP by all major software vendors, leading many to believe that the process of natural selection that gave birth to ASID has taken place. ASID has received far more participation because of this shift in the industry. We are working hard to finalize the next version of LDAP (version 3) that will include support for better security, internationalization, extensability, and several features from X.500(93).

mailing list subscription: ietf-asid-request@umich.edu

IETF-IDS

The Integrated Directory Services (IDS) Working Group is chartered to facilitate the integration and interoperability of current and future directories into a unified Internet directory service. This work will unite directories based on a heterogeneous set of directory services protocols (X.500, WHOIS++, CCSO, etc.).

In addition to specifying technical requirements for the integration, the IDS Working Group will also contribute to the administrative and maintenance issues of directory service offerings by publishing guidelines on directory data integrity, maintenance, security, and privacy and legal issues for users and administrators of directories.

The IDS Working Group will pay special attention to the creation of an Internet White Pages Directory Service and will sponsor and track projects to achieve this goal and specifically take steps to facilitate widespread experimentation of the protocols evolving in the ASID Working Group.

The IDS Working Group will work on applications of directory technology and will track ongoing applications projects. The IDS Working Group will assume responsibility for the creation and maintenance of on-line catalogues of directory services implementations. These catalogues will be periodically published as Informational RFCs.

The IDS Working Group will take up the unfinished tasks of the WHIP - White Pages Requirements Working Group - that was constituted at the Seattle IETF. The WHIP Working Group set out to define the basic requirements for a Simple Internet White Pages Service.

The IDS Working Group will liaise with the groups working on development and deployment of the various directory service protocols.

The IDS Working Group is a combined effort of the Applications Area and the User Services Area of the IETF.

Ongoing Activities:

Track emerging directory service protocols in order to identify the need for specifying standards for interworking with other service protocols.

Liaise with groups working on deployment and development of directory services to locate and fix interoperability problems.

Identify unfilled needs of directory service providers, administrators, and users.

Pilot Projects reporting to this group:

- The Long Bud Project: Internet Pilot Project for the Deployment of X.500 Directory Information in Support of X.400 Routing (RFC 1802)
- The Internet Nomenclator Project
- The Internet Whois++ Project

- NameFLOW-Paradise
- The Schema Registry project: Identifying and publishing X.500 schema elements used on the Internet

The IDS RFCs that have been published so far are:

RFC1491 - A Survey of Advanced Usages of X.500
RFC1632 - A Revised Catalogue of Available X.500 Implementations
RFC1803 - Recommendations for an X.500 Production Directory Service
RFC1943 - Building an X.500 Directory Service in the US

Mailing list subscription: ietf-ids-request@umich.edu

Source: http://www.internic.net/ietf/ids/ids-charter.txt

IETF-FIND

A third directory Working Group of the IETF (Find) is working on a Common Indexing Protocol.

On the Internet, several more or less localised directory services have evolved over the last couple of years. Also two global directory services have been deployed, X.500 and Whois++. To be able to find something or someone, one needs to know what service to use, and what server to query. One step towards the solution of this problem is to define one and only one common indexing protocol which all directory services can use when passing indexing information. When a user queries one server it should be possible for that user to get a referral to another server and even another service, if the two servers have exchanged index information.

For this to work, one common protocol must be developed. The idea is to expand on the Centroid ideas used by Whois++, to allow it to be used for other services than Whois++. At the very least, a localised service should be able to be polled by an indexing server using the Common Indexing Protocol (CIP).

To be specific, three specifications are to be presented:

1. An interface specification, where one says how you present a query and what the referrals you get back look like

2. A server interface specification, where one says that the CIP will be able to include information presented in this format

3. An engine specification, which specifies that this is how one support the functionality using Centroids a la Whois++.

The task of this working group is to create the Common Indexing Protocol so it is (1) usable for other distributed directory services such as X.500, (2) allows the use of non-distributed directory services such as CCSO in the distributed directory service, and (3) addresses needs such as replication to make the protocol itself more stable.

As the Common Indexing Protocol is already in use by Whois++, but not published, the first task of this group is to publish version 1 of the Common Indexing Protocol as is. After that, the protocol must be extended according to the specification below. This will result in version 2 of the protocol.

Other topics to be addressed potentially include:

- Incremental updates of indices
- Support for the UNICODE character sets
- Guidelines for building an effective mesh of indexing servers
- Administrative protocols and procedures such as server registration
- Security between directory services

The working group will work in very close cooperation with the working groups ASID and IDS at the IETF.

The working group will use the following Internet-Drafts as input:

- Architecture of the Whois++ Index Service, Chris Weider, draft- ietf-wnils-whois-03.txt
- How to interact with a Whois++ mesh, PatrikFaltstrom, draft-ietf-wnils-whois-mesh-01.txt

Mailing list subscription: majordomo@bunyip.com
in body: subscribe find
Source: http://www.internic.net/ietf/find/find-charter.txt

NADF

The North American Directory Forum (NADF), was 'born" in '88 after US public service providers of X.400 agreed to cooperate and that the next logical step after linking e-mail was to link directories. In late 1989 all providers showed at the start-up meeting and formed a permanent group to create a North American directory. X.500 was hot off the press and everyone was excited about the standard. The goal was linking service providers or better ADDMDs. As time went by interest grew from the user community and in 1992 the NADF opened up to the users and PRDMDs. In 1994/1995 progress was slow and it became evident that the private group had to open up to make it a public group. The US Electronic Messaging Association (EMA) was approached with this idea and the interest was there. A formal hand- off happened in February 1996, and this was the first official meeting of the new public group.

The NADF is trying to work through the issues involved in fostering a commercial-quality Public

Directory Service in North America, and are coordinating closely with similar efforts under the World EMAs. The NADF is the "parent", so to speak, of the EMA 1997 X.500 Directory Challenge.

In the short term, the Directory Challenge-97 is working on a pilot public directory service within "c=us"and "c=ca", and demonstrating some real products using the capabilities of such a service. To demonstrate that the pilot directory is fully coordinated with the global directory the NADF would like to interoperate with NameFLOW in order to show global functionality. At this moment PSI Inc. is providing the interface for the NameFLOW community.

On a larger scale, the NADF is working on issues of registration, uniqueness, and commercial service offerings (what would they be, and how would they work?) within a North American public directory.

The US Government is already supporting the "c=us@o=U.S. Government" directory tree, and needs to have connectivity through the "c=us" level to other international entities. In order to support these requirements, the NADF (and by inference, the EMA Directory Challenge) must be coordinated with the NameFLOW service to ensure seamless functionality.

The first Directory Challenge-97, scheduled for EMA '97 in Philadelphia, will be followed by Challenges in Europe, the EEMA Annual Conference in Maastricht (Netherlands) and the Pacific Rim (including Australia and Japan). The challenge will show applications that use directory technology, including secure messaging, secure EDI, voice messaging, multi-coloured directory pages and others.

Mailing list:NADF-L@ema.org, subject: subscribe

Source: NADF Anaheim minutes, e-mail Bob Johnson and Challenge-97 announcement.

Country reports

Belgium

Nils Meulemans

Due to a lack of resources the Belgian Academic Network (BELnet) has no policy for Directory Services. Therefore X.500 is still the initiative of the STC (Service Telematique et Communication) of the University of Brussels. For this reason STC also decided to become a customer of the NP services.

There is hardly any growth in the number of organisations under the Belgian DIT. For what it's worth, given the limited number of entries in the Belgian NP infrastructure, 40% of the organisation are from the academic world while 60% are private, governmental or other organisations.

At the same time X.500 access in Belgium is still increasing, mainly through our WWW/LDAP gateway. This can probably be explained by the increasing interest in LDAP and not so much in X.500 itself. These evolutions have made us decide to spend more time on LDAP v3 and at present we are

already running a parallel LDAP service based on SLAPD of the LDAP 3.3 release from University of Michigan.

One of the major projects around X.500 within Belgium in the '95/'96 timeframe was the EC funded LIRN (Library Information Referral and enquiry Network) project. The aim of LIRN was the establishment of a library referral system based on X.500. Within this project an X.500 infrastructure was created between Belgium, United Kingdom and Portugal. For Belgium, the LIRN project will get a follow-up in a different context. BELNET has approved a project to create a Directory of Belgian libraries. LIRN will still be the basis for this, but the accent might move towards an LDAP based directory. This seems to be a tendency which can be seen within some other BELNET approved projects. This does not make it a BELNET policy as these projects are mainly user driven.

The LIRN project was also the basis for a more general X.500 based classification system for organisations, YP500 (Yellow Pages 500) which has been used on an experimental basis as a Yellow Pages classification of the NP infrastructure. Both systems might however merge in the futher into an index-based X.500 system, called Centroid 500.

Centroid 500 resulted from the development of a Whois++/LDAP gateway. It is an attempt at generating Centroids (as in Whois++) over and within the X.500 DIT. A dedicated DSA has been set up which at present holds full "person"centroids for 32 countries of the NP infrastructure. Other similar initiatives exist and harmonization is one of our aims for the future.

Belgium is also present in another large X.500 infrastructure, namely Eurescom P416. This project is a joint initiative of a number of European PNOs trying to harmonize their public directory services onto an X.500 platform. Within an extension of this project, together with other partners, Belgacom is trying to pilot EIDQ's FDAS directory service with an X.500 infrastructure with millions of entries.

Within the near future we are expecting a closer collaboration between STC and Unisys to pilot X.500 '93 services.

Croatia

Anamarija Cecuk

Anamarija Cecuk administrates the X.500 Directory at the Croatian top level. They have three organizations running 3 DSAs at this moment. They also have a few whois++ and index servers running at some institutions and in Croatia.

Future plans are based on development of Directory service which would be spread across most institutions and universities in Croatia. They would also like to have a simple directory service that would be easy to maintain by only a few people, like most of other information services, as there are not that many administrators at Croatian institutions.

X.500 requires more work on installation and administration, and they hope it will become more user and administrator friendly.

Denmark

Jens Ramsboel

Two years ago a collaboration between the 10 bigger e-mail providers in Denmark was initiated by the Danish Ministry of Research. The goal of this cooperation was to establish procedures for an exchange of addresses of e-mail customers between the providers, to facilitate set up of directory services.

Tele Danmark, one of the players started the show in the beginning of 1995 by publishing a printed book with e-mail addresses. Half a year later in October Tele Danmark released an X.500-directory as a public service. The directory service offered by Tele Danmark can be used free of charge by anyone in or outside of Denmark. Since the start the service has evolved quickly, new facilities have been launched, the number of inclusions has been growing steadily, and especially the use of directory is sky rocketing. *E-Mail Denmark service*

The directory service is implemented and operated by Dan Net A/S on behalf of Tele Danmark. The system is based on X.500 1993 and comprises the standard protocols for interconnection of other directories and users. Thus, for the moment these protocols are not offered directly to customers, but are used internally as basis for a number of dedicated directory services.

These directories are primarily accessed via two types of interfaces, one based on the exchange of e-mail messages (QBM and UBM, Query and Update By Mail) and one based on WWW. A number of other interfaces, e.g. Gopher, CSO/PH, FTP, etc. are of minor general interest. The directory service includes a number of search facilities, for free search, lookup of WWW-addresses and functions for search by different parameters as locality, e-mail address and so on.

In the very beginning the address data were delivered by the e-mail providers. To base a directory on this information would give a rather static database and a poor quality of data. Therefore a number of update facilities have been included, functions that are accessible from all e-mail users. These update facilities, UBM (Update By Mail) and WUD (Web-UpDate), supports the user with on-line functions for entering e-mail addresses, EDI- and www-addresses, telephone, fax and mobile numbers as well as free text for hisw inclusion. The update functions comprises some security facilities to avoid fake inclusions. Furthermore a Windows-program for local maintenance of data in an organisation can be combined with the central update-service. Today 30 % of the data in the X.500 directory are entered and maintained by the private users or the administrators in the companies.

Growth in use

Within the first year of service the use of the directory has been growing steadily. Today it includes

more than 100,000 e-mail addresses for more than 60,000 organizations, their organizational units and employees and residential persons. And every day more than 100 new users enter their inclusion via the subscribe function.

The E-Mail Denmark Directory is available as a public service to all WWW and e-mail users. Since the release of the directory service in October we have measured an increased traffic. In 1996 the average rate has been about 25% per month, which means that the directory on a normal business day sends out more than 10,000 web-pages.

This is very satisfying especially compared to the number of Danish e-mail users which is estimated at 300 - 500,000, the number of active users expected to be much less. Also the exploitation of the service from users outside Denmark is increased. Today about 5% of all queries are entered from international users.

Future plans

A number of new functions are on their way. More types of data, new search facilities, and possibly interoperation with other directories. A set of facilities for maintaining the quality of the data is under implementation for the moment including a service for user notification of obsolete data.

The WWW-service of the E-Mail Denmark Directory may be accessed on "http://katalog.tele.dk". This address may also be used from gopher, finger, CSO and Whois. A userguide for the QBM-service may be requested by sending a message with the text 'help' in the body to "opslag@katalog. tele.dk" or "S=opslag;P=katalog;A=dk400;C=dk".

Finland

Ilkka Siissalo

In Finland a directory project called "Mainari"(= "Miner"in English) is run. It all started with discussions within the so called Finnish Directory Forum, a joint meeting between all the major Finnish ISP's. The ultimate goal is to set up one single "directory mechanism", so that the end user will get the answer to his query no matter where the data come from. FUNET's part of all this is the forthcoming "Mainari"system. FUNET is creating a database of their own and automated updating of data contents from the Funet member organizations - the data will be extracted from systems like the telephone switchboard database, personnel & student databases etc. All these data go into a database of our own and from there copies of it will be extracted and put into whois++ and X.500. The whois++ side will most likely be Bunyip's Digger software and will be (hopefully) setup so that it will "talk with"EUnet Finland's digger database. Likewise, the X.500 side of it will be made to exchange information with the X.500 systems of Telecom Finland and the Finnet group.

This is the goal. Where are we now?

Well, we have our own database, we have some sample data in it and we are right now building the automated data transfer from the first of the member organizations (The Technical Research Center of Finland) into our Mainari system. We have also the indexing and www query forms ready for the end users. The next step will be the setup of whois++/digger and linking that to the Mainari database. X.500 is still waiting a bit; this was due to the fact that both Telecom Finland and the Finnet group are right now in the process of upgrading their X.500 systems to the X.500 93 level and we are giving them a little time to get those up and running. Then we will most likely want to have the same software at Funet, too. We expect the whole development process of our concept still to take something like 8 to 10 months from now.

France

Kathy Treca

Directory services in France are sleeping. Right now French universities chose CCSO and there is no more reflection on the subject. Nevertheless, the X500 entry point is still alive and maintained at CNRS/UREC.

Germany

Renate Schroeder

The German Research Network DFN runs two Directory projects. One project is concerned with operational aspects while the other should help to increase the amount of data in the Directory.

The Technical University of Chemnitz manages the First-Level DSA and supports the DSA managers of the organizations. A central DUA service with several user interfaces and an e-mail access are also provided. The accesses via telnet and mail have decreased in the last years while the access via a WWW/X.500 gateway web500gw developed in Chemnitz has increased at the same time. URL http://tricia.hrz.tu- chemnitz.de.

Due to the very strict legislation in Germany concerning the privacy of personal data many organizations hesitated to store data of persons in their DSAs. As a promoter of communications DFN is allowed to store personal data under less restrictions. That is why DFN started a project at the University of Tuebingen called AMBIX. Organizations that do not want to take the responsibility in view of privacy for the storage of personal data can now forward the responsibility to DFN and thus store organizational as well as personal data in the AMBIX.DSA under the locality=DFN. All data of AMBIX can be accessed in WWW via a modified WWW/X.500 gateway TWEB, developed at the University of Tuebingen. This version includes special features necessary in AMBIX, such as access restrictions due to privacy legislation. AMBIX implemented different automated mechanisms by which the organizations can add, modify or delete the organizational data, single persons likewise

their own entry. (See http://ambix.uni-tuebingen.de/)

The WWW/X.500 gateway TWEB from Tuebingen offers a special feature, the so-called gateway-switching that is used to access data located at an external DSA via another gateway run by the appropriate organization. Advantage of this method is improved performance due to reduced usage of network resources e.g. by avoiding the DSP protocol. Another advantage for the organizations is a locally configurable data access and display to support Corporate Identity.

The number of accesses by applications is mainly caused by a small group of organizations that use the Directory to support mail routing.

Some statistics of the DFN Directory:

```
First-Level DSAs                        2
DE-Level DSAs                          46

Number of entries            150,000
Number of personal entries    50,000

Number of accesses per day    90,000
Accesses by persons           20,000
Accesses by applications      70,000
```

In the future the DFN Directory is going to support security in open systems. The project AMBIX in cooperation with the project DFN-PCA at the University of Hamburg will provide attributes for "public keys" (PGP and PEM) as well as entries for certification authorities necessary for PEM keys in the Directory.

Ireland

Donal O'Mahoney

Interest in the X.500 service in Ireland has declined in the past year. EUNET Ireland have ceased to operate a country backup DSA and entries mastered by them have continued to become outdated. The country master DSA is being maintained on a best effort basis by the Trinity College Networking & Telecommunications Research Group and a number of second level DSAs are operating at diverse levels of availability. We expect a renewal of interest in the service to occur with the increasing support of LDAP by WWW server software, and the increasing deployment of X.509 certification infrastructures.

Italy

Antonio-Blasco Bonito

Italy has been very active at the time of the PARADISE/VALUE project. We launched an Italian project called DIR-ITA whose main aims were to define the Italian DIB structure, to set up an initial backbone of DSAs for the Italian directory, to nationalize the IDM and DE user interfaces, to train new DSA managers and to promote the knowledge of X.500 technology. That project was a success.

But after that we realized that X.500 technology was not able to attract Italian network politicians. So we were not able to finance the DANTE service and cover the costs for human resources required to run the national service in a professional way.

However the people who were involved in the PARADISE project are still taking care of the Italian country master DSA and are also devoting some spare time to help X500 newcomers in Italy in setting up their DSA. They also spent considerable time to make interoperability tests with new X500 proprietary implementations (e.g. Olivetti, Digital, ...).

X500 technology is still slowly spreading in Italy: if you look at the number of connected DSAs during the last two years you will see an increase. It may be worth noting that X500 is locally used at CNUCE to support the e-mail users database.

Luxembourg

Marc Stiefer

RESTENA runs the master DSA for Luxembourg. The master DSA based on QUIPU is located in the Research Centre Henri Tudor in Luxembourg and holds information about 15 organisations and 893 entries. The other QUIPU DSA is a second-level DSA running at the Research Centre Centre Universitaire. Both DSAs have IP connectivity.

Direct access to the directory is available through the PARADISE DUA de (french and english version) at arakis.restena.lu (158.64.1.14 login as 'de' or 'defr'). The X.500 directory can also be accessed via a WWW-X.500 gateway. The majority of queries are received from this gateway.

The activities include an on-line information service based on Word- Wide-Web and a multilingual helpdesk (2-4 queries per month via electronic mail).

In the next few months, there are plans to:

- improve the quality of service (especially the accuracy and information richness),
- extend the directory database and incorporate other members of the education and research community,
- reorganise the national directory structure.

Other activities include:

- organisation of regularly training courses "Introduction on X.500" for students of the Institut Sup•rieur de Technologie (IST)
- creation of completely new administrative procedures for data management

It is expected that the measures above will help to make the national X.500 directory more attractive and user-friendly.

Malaysia

David Leng

Malaysia Online (MOL), is the first Commercial Internet Service Provider in Malaysia which provides various value-added services to both individuals as well as corporates. Some of the existing value-added services are:

- E-mail exchange between dissimilar mailers
- Internet access
- Online database
- Financial Information System (Stock watch)
- Web page design
- Directory services
- Manage network services

As far as X.500 is concerned, MOL is looking into offering X.500 as a standards based approach for incorporating global directory services into an enterprise messaging environment. MOL is currently implementing a X.500-based Yellow/White Page Services (url: http://www.mol.net.my). Global X.500 access will also be introduced once the Yellow/White Page Services are completed.

The White page service is designed to be a directory listing of mainly individuals as well as corporations similar to the White pages section of a phone book. Users can lookup information on entries such as a person's telephone number, street address, and email address. All entries in White pages will be made available for the public - except if access control is required.

The Yellow page service is a directory of business, services or corporations which desire a presence or to "advertise" their products similar to the Yellow Pages of a phone book.

Connection to the global X.500 directory tree will be accomplished via a connection to NameFLOW. MOL has registered its DSA "RIMAU" with DANTE and will become the owner and administrator of the country entry of Malaysia for the global X.500 directory.

Other potential use of X.500 directory includes security, directory synchronization, user access conrol, and EDI related applications.

There are approximately 5,000 entries in the MOL X.500 directory currently and this is expected to increase to 10,000 entries by the end of the year.

Netherlands

Peter Jurg

SURFnet has organized an X.500 seminar for its customers to promote participation of new sites. Since then three new sites have linked their DSA to the Dutch part of the DIT. One site has withdrawn its DSA. Furthermore many local governments have been added in the Dutch central DSA for small organisations.

In 1996/1997 SURFnet will further promote its directory service and has planned for an index service to be created upon the directory service. In addition SURFnet will reorganize the DIT structure (as too many organizations are below c=NL at the moment) and will tackle legal issues of the service together with the Dutch registration office for public databases.

Poland

Tomasz M. Wolniewicz

The Polish X.500 pilot is coordinated by NASK (Polish Academic and Research Network) which runs the central DSA and development of localized tools.

Currently available data splits into two groups:

1. data loaded in 1994 from an external database onto the central DSA
2. data maintained by the regional DSA managers. This set of data is of much better quality.

The Polish tree contains about 65,000 entries on one top level and 6 regional DSAs.

1995 was run without any substantial funding for data maintenance. In 1996 the Polish Ministry for Research has awarded a grant for X.500 expansion.The main plans are to unify the data formats, create tools for automatic data updating from existing databases, and to increase the number of DSAs.

The main development effort has been put into making the X.500 data appearing to Polish users in proper spelling without unnecessary overhead of simplified (accentless or ASCII) versions. Simplified naming has been left in place for international use. Development consisted of defining extensions to

the data structures (object classes, attributes), patches to the software (T.61 handling routines), modifications to WWW gateway to make it aware of the data structure. This work required a considerable amount of planning and programming and is going to be described in a separate article.

Another important project under development is using the X.500 structure for public key certification. A Certification Authority will be set up which will produce PGP and X.509 certificates. Those will be then stored in the X.500 directory. A separate tree branch will be set up facilitating access to certificates based on e-mail addresses. The structure of this branch will follow the DNS domain structure with leaves being aliases to entries in the main organizational branch. This system will also allow storing data about e-mail users who do not fit into the organizational structure branch.

Sweden

Roland Hedberg

Index server experiment

On 1st September this year a new directory service was launched by SUNET. This service is based on an index server implemented in a SLAPD server collecting indices from a number of X.500 DSAs, some SLAPD servers and one WHOIS++ server. The index is searchable through a WWW interface (http://x500.umu.se/is.html) and is now seeing around 1100 searches per day, even though it is not heavily marketed. The index server gathers the information using the Common Indexing Protocol, a protocol which is under development by the IETF FIND working group. Since WWW servers cannot yet cope with ldap- or WHOIS++- URLs the WWW server includes a gatewaying function between the leaf directory servers and the WWW client.

The Swedish Directory Forum

In June 1996 a proposal by a Swedish government committee was presented; its aim was to propose a way by which a national directory of addresses (email addresses as well as telephone numbers) could be implemented. The basis of the proposal is that initially all addresses will be publicly available, and that individuals are given the right to remove their addresses from the directory, while organizations decide which of their addresses will be published. The newly formed Swedish Directory Forum (SDF) is one of the chief forces in creating this directory. The SDF is organized around a couple of working groups in much the same way as the IETF. These working groups are supposed to tackle technical, organizational and policy problems while they are building the national directory. One of the problems is that not all Directory Providers in Sweden will use X.500 to publish their information. Any organization seriously considering publishing address information by any method may be a voting member of the SDF; organizations representing the users of the directories may be non-voting members.

Developments in the Swedish University Network X.500 service SUNET's X.500 service is witnessing a steady growth each year both in number of addresses in the directory as well as in the

number of accesses to the directory. SUNET is providing central WWW and Gopher interfaces, a PH->X.500 gateway and the classic DE-interface. The usage of these interfaces are today in number of accesses per week 24,000, 2,000, 1,000 and 100 respectively.

Switzerland

Thomas Lenggenhager

In early 1995, the Swiss Directory Forum (SDF) reached its primary goal, when the structure for the Swiss DIT as well as the basis for the register of organization RDNs below countryName=CH was finalised by the Federal Office for Communication (OFCOM). New goals for the Swiss Directory Forum are in the area of directories for certificates used for secure communication as well as providing input for the ordinances to the new Swiss telecommunication law which will be in place for the beginning of 1998.

The Swiss data protection law causes a major administrative overhead when an organization wants to set up a world-wide accessible directory. This, together with the fact that many organizations do not want to provide detailed information about their staff to the public, are the reasons for a slow increase of information in the Swiss DIT.

The major ogranization new in the DIT is the Federal Administration. SWITCH participated in the X.500(93) tests and plans to start using a X.500(93) DSA for the central service where organisations provide their data and SWITCH bulkloads it into one DSA.

United States

Peter Bachman

PSINet has renewed its commitment to world wide X.500 connectivity by designating Peter Bachman as the lead c=US manager with Eric Bowles of PSINet Japan in systems administration support and management.

Since assuming the role of c=US manager, PSINet has enabled web and ldap access to the Alpaca DSA running on usdsa.psi.net on a "proof of concept basis". PSINet is also working closely with the X.500 services at ds.internic.net who are registering X.500 participants. Al Grimstad is heading up those efforts. In addition, since Wengyik Yeong has relocated to Epicenter, wpp-manager has been working closely with other DSA managers to ramp up the level of service that will promote scalability of the X.500 services in North America. There have been significant interactions between PSINet and DANTE's NameFLOW (Vincent Berkhout) regarding future directions of the PSINet WPP. PSINet has received valuable support from DANTE NameFLOW in this regard.

PSINet is also extending the c=US to the EEMA and EMA Directory Challenge, and is cooperating with the Federal GSA to provide connectivity to the c=US DIT during the Directory Challenge Project. Details are being worked out with EMA's NADF group, and the U.S. Governement via GSA. In addition, PSINet is planning on extending the concept of scalability through replication of the database on other servers on PSINet, and by increasing the share of other stake-holders in North America to make X.500 and other related services a viable commercial product.

PSINet is also informally reviewing existing and new directory products such as Netscape's Beta Directory Server which is currently running on a Solaris platform in a test bed environment. PSINet has been contacting manufacturers of X.500 software to become familiar with their products and to evaluate them for advice to PSINet customers and DSA managers in c=US. Because of the highly technical nature of X.500 support PSINet is uniquely situated to deal with the networking aspects of X.500, but will be ramping up to provide the type of support envisioned within the c=US hierarchy. A great deal of interest is revolving around DISP and spot shadowing under Quipu.

NATO

Steve Zeber

We are currently running two experimental NameFLOW-Paradise DSAs with minimal data:

1. a FLDSA for o=NATO running XT-QUIPU 8.4
2. an OU=NC3A DSA running Nexor's directory server (Note: SHAPE Technical Centre has become part of the NATO C3 Agency as of July 1, 1996, and is now known as NC3A - The Hague as part of the agency is located in Brussels).

Plans/Projects

Upgrade the experimental NameFLOW-Paradise DSAs to IC '93 DSAs by end 1996.

Implement an experimental internal communications directory at NC3A and at NACOSA by end 1996 on IC DSAs (initially there will be no public access).

There is a project to develop NATO requirements and a NATO schema for an X.500 Directory that will support NATO administration and operations including Military Message Handling Systems (MMHSs).

Although the ISO/ITU-T Directory standards explicitly allow the case, there are procedural and technical difficulties in establishing a FLDSA for an international organization such as NATO with a top level DIT entry o=NATO instead of a country entry.

First, there is no international registration authority to allocate organization names, comparable to ISO 3166 for country codes. This being the case, registering a FLDSA for o=XXXX becomes a matter of

establishing a domain with this as the top level DIT entry and then negotiating with the established domains one desires to recognize this DSA. In the case of NameFLOW, the argument that NATO is an international organization established by international treaty and is therefore entitled to operate a FLDSA with a top level DIT entry o=NATO was accepted by the administrators and the entry o=NATO was added under the world root.

Until there is a universally agreed definition of an international organization, and an international registration authority, this procedure is purely ad hoc. A comment was submitted to the EEMA on the document "Top Level Naming In Europe" proposing the definition of an international organization as one established by an international treaty or other form of international agreement.

Even if the registration is accepted there are still technical difficulties in configuring a DSA with a top level DIT entry o=XXXX as many Directory implementations have built the assumption that the top level DIT entry will be a country entry into the configuration tools. There may also be technical interoperability difficulties with other domains and implementations that make this assumption as well.

Product survey

Introduction

One rumour that still goes about is that there are no X.500 1993 implementations available. Putting this to the test we have contacted vendors and asked them what X.500 products they have and what features of LDAP their products support. The e-mail list we used is based on RfC-1632, "A Revised Catalog of Available X.500 Implementations" and the EEMA Black Book, "X.500 Directory Product Guide (edition two)". During one of the EEMA Directory meetings it became clear that most X.500 vendors do not have a public directory! We also asked them to specify the distinguished name of their company so you can find everything about them in the Directory.

Boldon James

Enterprise Mail X.500 Graphical DUA
This product takes full advantage of Windows (3.1.x, WIN95 or NT) to provide a simple intuitive interface to the X.500 directory. Users can Add, Delete and Modify entries as well as searching in and browsing through the directory. The directory is viewed in a Windows "File Manager/Explorer"style of interface allowing the user to easily navigate up and down through the directory to find the entry they are seeking. The product uses LDAP to access directories conforming to the 1988 or 1993 standards.

Enterprise Mail X.400 User Agent with Integrated X.500 DUA
This product is a fully featured X.400 User Agent with an integrated X.500 DUA for address look-up. This product is also available in a "Secure Mode"and as such supports Public/Private Key Encryption

and X.509 access to access keys.

MAPI to LDAP Service Provider
This is a fully MAPI 1.0 conformant Address Book Service Provider, allowing full access via LDAP to X.500 directories from Microsoft Exchange, Windows95, Novell GroupWise or any other application that supports a MAPI Address Book Provider Interface. The product can be used to provide a simple MAPI interface to bespoke directory applications.

LDAP to DAP Converter
This product is a simple windows DLL (16 and 32 bit) that provides a mapping/translation between LDAP and DAP. When used with any Boldon James LDAP product it converts that product to DAP access.

All Boldon James products support LDAP and have done so for some years.

```
Contact: Sales
Phone:   +44 1270 844000
Fax:     +44 1270 883631
E-mail:  Sales@bj.co.uk
URL:     http://www.bj.co.uk/
```

Bull S.A.

Products: X500-DS and X500-DUA, release V3.1

X500-DS and X500-DUA are integral parts of the large Bull OSI offer and run under AIX 4.1 on the Escala hardwares. Although based on the DCE/GDS of OSF, these two products may be installed and used without the DCE environment. Enhancements have been added for user and management facilities.

The X500-DUA product contains:

- The X/Open standards APIs XOM and XDS for the development of portable applications,
- A core DUA to translate all users' requests (bind, read, list, compare, modify, modifyRDN, search, add, remove, unbind...) into the DAP protocol used for communication with distant DSAs,
- The OSI standard high layers (ASN.1, ROSE, ACSE, Presentation and Session) for communication with the distant DSAs. The interface with the low layers is XTI, RFC 1006 is supported under XTI or the OSI Session,
- A powerful management application facilitating the configuration of the product and controlling the operations, logs and traces,

- A user application for the manipulations of the database entries,
- A generic tool to load and unload ASCII and binary files in/from distributed DSAs,
- The support of the simple authentication and of the DCE authentication,

The X500-DS product contains:

- All components of X500-DUA,
- A core DSA to process all requests received from distant DUAs through DAP protocol or from distant DSAs through DSP protocol,
- The support of the referral, chained and multi-casting modes of operation, access control lists and management of knowledge information (for distribution, shadows and copies of sub-trees),
- A management application for managing the schema information (creation, deletion and modification of object classes and of attribute types, management of the rules of the DIT).
- A C-ISAM database that is specially designed for high performances: e.g. less than 10 ms to read an entry on an Escala at the XOM/XDS interface.
- These two products are easily installed, configured and administered thanks to the System Management Interface Tool (SMIT) screens of AIX.

LDAP support in X500-DUA and X500-DS:

An LDAP server is already provided in both products together with a gateway from X500 to WWW that allows to read, search and browse the entries from any navigator (on PC, Mac or X terminal).

```
Name:    Pascal Deveze
Phone:   +33 (0) 4 76 39 78 68
Fax:     +33 (0) 4 76 39 77 70
E-mail:  P.Deveze@frec.bull.fr
```

Control Data

Global Directory Server

Scalable, flexible, and secure, Control Data's X.500 implementation allows an organization to use a single directory to keep track of everything from E-mail and network addresses, to ordering and payment information, to human resource records. The structure and schema of Control Data's directory, called the Global Directory Server, can be easily extended to include any information an organization needs to do business. The Global Directory Server provides the most complete implementation of the 1993 X.500 directory services standard on the market, which includes comprehensive access controls, automatic replication of directory information, and support for security features like public key cryptography and user certificates. The Global Directory Server scales to at least 500,000 users per DSA.

Using LDAP, you can write your own network-based applications that use the Global Directory Server.

```
Contact:   Sue Tracy
Phone:     +1 612/482-2619
Fax:       +1 612/482-2783
E-mail:    Sue.Tracy@cdc.com
URL:       http://www.cdc.com/
```

Datacraft

DX500 OpenDirectory is a carrier grade, high integrity directory server. It has subsecond performance on million entry directories, independant of width or depth of tree, aliases and security, due to its patented design for integrated SQL RDBMS operation.

The product family consists of DX500 OpenDirectory Server, DXPLORER clients and DX Tools.

The server has 93 DAP, 93 DSP, 93 DISP (plus a replication gateway to 88 servers), 93 Access Controls. It has an integral LDAP protocol handler (no gateway) that is interoperable with commonly available user agents and Web gateways. It has sophisticated diagnostics and monitoring.

DXPLORER is a world leading, full 93 DAP stack Windows GUI user agent. It outperforms all LDAP clients when used in conjunction with DX500 Server.

```
Contact: Mike Horton, Business Development Manager
            Datacraft Australia
E-mail:   Michael.Horton@Datacraft.com.au
          marketing@datacraft.com.au
URL:      http://www.datacraft.com.au/dx500ovr.html
```

Data Connection Ltd - DCL

"DC X500 is a highly scalable, high performance X.500 Directory server, designed and implemented to the 1993 X.500 Directory standards, supporting:

- 1993 DAP, DSP and DISP protocols

- 1993 Basic Access Control
- SNMP support for remote management
- native LDAP support (without the need for a gateway)
- native HTTP support for direct WWW access
- developers APIs (including X/Open XDS and proprietary gateway (G- XDS), synchronisation (G-DISP) and management (NMI) APIs).

DC X500 is available on a wide variety of operating system platforms including UNIX, Windows NT and OS/2."

Re LDAP, DC X500 already fully supports the LDAP v2 standard, and we are closely monitoring the progress of the current work on LDAP v3 with the intention of supporting this in the future.

```
Distinguished name: c=GB, o=Data Connection Limited
Contact: John Cooper
Phone:    +44 (0) 181 366 1177
Fax:      +44 (0) 181 363 1039
E-mail:   jc@datcon.co.uk
URL:      http://www.datcon.co.uk/docs/mdcomms.htm
```

Digital

Product Name: Digital X.500 Directory Services

This product is full implementation of X.500 1993. The product set consists of a DSA, several DUAs, an LDAP gateway, a web interface, a MAPI service provider and various programming interfaces. In addition, a fully flexible directory synchronizer is available.

Shipping since 1993, this product provides extensive support for all X.500 protocols including 1993 DISP replication and access control. It is of very high performance. LDAP is supported via a gateway. Both Motif and command line DUAs are available.

Product Name: AltaVista Directory

The AltaVista Directory products provide multiprotocol servers with support for LDAP, HTTP, Finger, ph and X.500 1993 protocols. The product provides a Windows client, a web interface and a MAPI service provider as well as a flexible directory management interface which use Tcl scripting to enable loaders and synchronizers to be built. It is able to work directly with many common mail agents such as Microsoft's Windows Messaging and Qualcomm's Eudora clients.

Based on the highly successful Digital X.500 Directory Services product, but with direct support for

LDAP and other protocols, this new product set provides the same high performance and reliability, together with an extremely easy to use graphical user interface to setup and configure servers.

```
Company: Digital
Contact: Nad Nadesan
Phone:    + 44 118 920 4943
Fax:      + 44 118 920 6852
E-mail:   nad.nadesan@mrmog.reo.dec.com
URL:      http://altavista.software.digital.com/
```

The Esys Corporation

Simeon Directory uses the ISODE Consortium DSA as its repository, and has implemented an LDAP client that is fully integrated with Simeon Mail. This allows users to conduct X.500 searches from within the mail application. In addition to address look-up, Simeon Directory is the primary repository for other critical information associated with the Internet Workflow products that ESYS is developing (eg., security certificates, business process rules, etc.). LDAP is supported.

```
Company: The Esys Corporation
Contact: Don McCormick
Phone:    + 1 403 424 4922
Fax:      + 1 403 424 4925
E-mail:   sales@esys.ca
URL:      http://www.esys.ca/
```

ISOCOR

ISOCOR Global Directory products provide the building blocks needed to implement directories for messaging and other standalone enterprise-wide applications, including:

- a complete set of products ranging from the desktop clients to servers on leading hardware and OS platforms
- high performance and industrial strength communication stacks with DAP and LDAP support for Windows applications and Internet browsers
- graphical, intuitive and easy-to-use Directory management and administration
- utilities for interfacing with corporate databases including relational, network, hierarchical, and object-oriented types

- standard protocols (1993 X.500: DAP, LDAP, DSP and DISP) adherence to the latest international and open standards, ensuring global and multi-vendor interoperability
- comprehensive API support both on the client and on the server (MAPI, X/Open XDS and ISOCOR's Libraries)
- standard Directory access from any World Wide Web Internet browser through the support of HTML given by the World Wide Web connectivity module of ISOCOR GDS (Global Directory Server)
- SNMP support for standard management
- gateways for cc:Mail, Lotus Notes and Microsoft Mail providing Directory synchronization

ISOCOR GDS is a high performance and robust 1993 X.500 Directory System Agent (DSA) with support for Directory System Protocol (DSP), Directory Information Shadowing Protocol (DISP), and Directory Access Protocol (DAP) over most popular networks such as Public Data Networks (PDN), Internet, LAN and Public Services Telephone Networks (PSTN). ISOCOR GDS also supports the Lightweight Directory Access Protocol (LDAP) over TCP/IP transport.

- 1993 ITU-T X.500 / ISO 9594 conformant DUA, DSA, and GUI management capability (through the ISOCOR Global Directory Navigator)
- high performance, scalable, multi-process DSA
- response times of a few hundredths of a second on reads and searches for a database containing more than 500,000 entries
- extensible Directory schema (defined through the Navigator)
- support for X.400, X.500, NADF, EDI, RFC 1274 (NameFLOW-Paradise) attributes and object classes, and others
- inter-vendor replication and shadowing of Directory tree branches supported through the standard DISP protocol
- 1993 new features support include: Basic and Simplified Access Control, Administration Authority Model, Extended Information Model
- Robust, disk based Directory data base, featuring a two-phase commit and allowing rollback and rollforward in critical recovery procedures (selective updates can be applied)
- transport connectivity options include TCP / IP (RFC 1006), X.25 (including PAD), and X.445 (APS)
- SNMP management: the Directory agent supports the IETF Directory Monitoring MIB (RFC 1567)
- statistics and logs can be used for performing account management
- smooth transition from X.500 88 directories (including previous versions of ISOPLEX DS) through a migration utility

.

```
Contact: Paolo Malinverno,
         Senior Product Manager
Phone:   +353 1  6760366
Fax:     +353 1  6760856
```

```
E-Mail:  paolo.malinverno@isocor.ie   (Internet)
         c=ie; a=eirmail400; p=isocor; s=malinverno; g=paolo; (X.400)
Address: ISOCOR Ireland
         42-47 Lower Mount Street
         Dublin 2, IRELAND
URL:     http://www.isocor.com/products/DIRECTRY.htp
```

ISODE

The ISODE Consortium Enterprise Directory Server includes the following features:

- Conformance to X.500 (1993) and LDAP RFC 1777, which allows use as either an X.500 directory server, an LDAP directory server, or both simultaneously.
- Integrated LDAP support, offering high performance and scalability, eliminating the need for a separate LDAP gateway.
- Scalable server architecture, supporting one million entries per database, and multiple databases per server. A typical server supports 200,000 queries per hour and 150,000 add operations per hour.
- Powerful and flexible X.500 replication and access control.
- Robust, multi-threaded architecture, which allows simultaneous processing of multiple tasks.
- MADMAN based SNMP Monitoring (RFC 1567) enabling integrated monitoring of servers in a distributed environment.
- Fully tested for interoperability in a multi-vendor environment.

```
Contact: Gillian Greenwood
Phone:   +44 181 332 9091
Fax:     +44 181 332 9019
E-mail:  ic-info@isode.com
URL:     http://www.isode.com/
```

Net-tel

Route500

Directory Server

- 1993 Standard X.500 Directory featuring Replication, Access Control, and Authentication
- High performance disk based database
- Full DSP, DISP, DOP and DAP support

- "Approximate Match" searching based on the Soundex algorithm
- Flexible Schema support
- Attribute Inheritance
- Caching
- Logging/Statistical information gathering
- Full range of communications options
- Can be supplied standÐalone or integrated with a Route400 Message Server

The Route500 Directory Server (Directory System Agent/DSA), manages data held in an X.500 Directory, which may itself be connected to the wider global directory community. The data stored in the directory can be completely general, but will usually include information about an organisation's members such as postal and electronic mail addresses, telephone numbers etc. It can also include graphical, sound and multimedia information.

The X.500 directory supports general purpose querying of information by users. It is also intended for use within the messaging infrastructure to provide mail addresses, support for messaging security and configuration information. In essence the directory is a database that can be large and highly distributed. It is hierarchically structured with its entries held in a Directory Information Tree.

The Route500 Directory Server conforms to the international X.500 1993 standards. It can be supplied standÐalone or integrated with a Route400 Message Server.

Route500 DSAs can be accessed by Route500 (Windows, Macintosh) or other vendor's DUAs using the Directory Access Protocol (DAP), and by Route500 or other vendor DSAs using the Directory System Protocol (DSP).

Directory Client for Macintosh and Windows

- Powerful user friendly name searches
- General directory attribute searches
- Forms based search control
- Discretionary search chaining to remote DSAs
- Wide range of viewing features, including pictures, sound and "hot links"
- Collector window for saving entries for future use
- High level of integration with Route400 message clients
- Copy/Paste directory information to other applications
- Configurable search menus and information displays
- Supports Directory Access Protocol (DAP)

The Route500 Directory Client (Directory User Agent/DUA) for Macintosh and Windows provides a graphical interface for user friendly searching and browsing of X.500 directories. It is usually installed together with a Route400 message client with which it is closely integrated.

The X.500 directory is a hierarchical distributed database accessible via open communications systems. In addition to providing so-called white and yellow pages services (giving access to

individual and classified information, respectively), X.500 directories can hold photographs, sound, graphics, multimedia material, inventories etc., and can store security keys and certificates to authenticate an individual or an application's identity.

The Route500 directory client performs searches on specific information attributes and User Friendly Names. It can browse through the directory in a natural way. At the press of a button, any X.400 or Internet address that has been found can be transferred easily from the directory into the recipient field of a Route400 message client or to a Route400 Address Book. Other information obtained from the directory can be pasted into general purpose office documents.

The DUA supports general or specific searching of local or remote Directory System Agents (DSAs) which in turn can access other DSAs for information they do not locally hold.

```
Contact: Sales
Phone:    +44 1582 83 42 22
Fax:      +44 1582 83 42 83
E-mail:   info@net-tel.co.uk  (Internet)
             s=info; p=NET-TEL; a=Gold 400; c=GB)
URL:      http://www.net-tel.co.uk
```

Unisys

Unisys TransIT 500 Directory Services

TransIT 500 Directory Services is a high-performance, 1993 standards based Directory System Agent (DSA) available for Microsoft Windows NT, Hewlett Packard HP/UX, Unisys U6000, and as portable source code.

TransIT 500 includes many features required by today's enterprise for global access and mission-critical applications, including: replication, extensible schemas, Basic and Simplified Access Control, integration with popular databases such as Oracle, Informix, and Microsoft SQL Server, authentication services, scalability, performance and interoperability for enterprise-wide usage, and support of industry standards such as LDAP, DAP, DSP, DISP, XAP, XDS/XOM.

Unisys TransIT 500 Administrator

TransIT 500 Administrator is an extremely powerful tool designed to assist administrators in all directory adminitration, maintenance and security functions. Available for Microsoft Windows NT, Windows 95 and Windows 3.1.1 based systems, TransIT 500 Administrator is the first tool of its kind to provide fully graphical X.500 directory management. All functions are provided and multiple DSAs can be managed simultaneously from a single administrative console.

TransIT 500 Administrator enables the following:

- Directory Service Operations
- Directory Controls Management
- Access Control Management
- Schema Management & Maintenance
- Directory Information Tree Management
- Knowledge References & Information
- Replication Agreements & Information
- Logging, Tracing and System Logs
- Directory System Configuration
- Data Import & Export
- Directory Backup & Restore Operations

Unisys TransIT 500 Browser

TransIT 500 Browser is a powerful, graphical information retrieval tool designed to make navigating directories as simple as possible. The Browser interface makes detailed directory searches and retrievals easy while the unique Directory Lookup interface provides extra ease-of-use for simple lookups. TransIT Browser is available for Microsoft Windows 3.1, Windows 95 and Windows NT systems.

TransIT 500 Browser provides the following features:

- Browse multiple directories from a single console
- Tree-oriented Browser or Tabular Directory Lookup
- Object classes mapped to icons to enhance object recognition
- Extensive attribute search capabilities
- Save/Load scratchpad for search criteria & prefix criteria
- LDAP support
- Configurable cache to speed data delivery

TransIT 500 has supported LDAP since 1994. Enhancements will be added to the product to remain current with the LDAP standard.

```
Contact: Martin Reber
Phone:   +1 (610) 993-3063
Fax:     +1 (610) 695-5378
E-mail:  mdr5@trpo5.tr.unisys.com
URL:     http://www.transit500.com
Address: Unisys Corporation
         Malvern Building M.S. B221
         2476 Swedesford Road
```

```
            Paoli, PA 19301 (USA)
```

University of Michigan

WaX.500 is an X.500 client or DUA (directory user agent) developed at the University of Michigan that runs on Microsoft Windows 3.1, Windows NT 3.51, and Windows 95. It features:

- the ability to search for people, groups, joinable groups, organizations, & documents.
- a visual browser with which you can browse through the global X.500 directory.
- allows you to change the information in entries (such as your personal entry), create and maintain groups, and other entries.

For more information, see the waX.500 home page at http://www.umich.edu/~rsug/ldap/wax500

WaX.500 uses libldap.dll for its connectivity and so fully supports and relies on LDAP.

```
Distinguished name:
        o=University of Michigan, c=US
Contact:  Steve Rothwell
Phone:    +1 (313)  763-4902
Fax:      +1 (313) 764-5140
E-mail:   sgr@umich.edu
URL:      http://www.umich.edu/~rsug/ldap/wax500 &
          http://www-personal.umich.edu/~sgr/
```

Promotion and publicity

In the area of promotion and publicity the following activities have been carried out/developed in the past year.

NameFLOW-Paradise WWW server

Since January 1995 a NameFLOW Web server has been in place at DANTE, reachable via: http://www.dante.net/.

The NameFLOW-Paradise web pages have been further expanded during the past year. The NP web currently contains general information on NameFLOW-Paradise, Web access to the Directory itself, contact details of the National Directory Managers, an overview of links to public directory interfaces, the monthly, quarterly and annual reports, directory related papers, Internet Drafts (http://www.dante.

net/np/ds/id.html) RFCss (http://www.dante.net/np/ds/rfc.html), standards and other documents, and meeting information.

The ftp information server are still maintained at ULCC: (ftp://ftp.nameflow.dante.net/)

Presence at events

DANTE was present with a stand at the EEMA Annual Conference in Brussels, 10-13 June 1996 to promote NameFLOW as a basic X.500 infrastructure, ready for use. The NameFLOW managers meeting was co- located at this event, aenabling the National Directory Managers to participate in both events.

Several introductionary presentations to NameFLOW and more specific the NP-93 pilot were given, e. g. at the Finnish Directory Launch at FUNET and for European Public Administrations.

NameFLOW-Paradise publications

Papers* on the following development topics were written by external advisors David Chadwick and Colin Robbins.

Monitoring Quality of Service in a Global Information systems

Colin Robbins, August 1995
DANTE IN PRINT No.15
http://www.dante.net/pubs/dip/15

Managing the X.500 Root Naming Context

David Chadwick, January 1996
DANTE IN PRINT No.18
http://www.dante.net/pubs/dip/18

IndeX.500

David Chadwick, May 1996
DANTE IN PRINT No.19
http://www.dante.net/pubs/dip/19

Other Publicity material

In addition a new brochure introducing NameFLOW was prepared for general publicity purposes:

"NameFLOW-Paradise, a Directory for Europe and beyond ... " - June 1996

Other publicity items still available:

- NP A2 poster.
- NP Annual Report 1994-1995
- *X.500 Index DSAs*
  Paul Barker, June 1995
  DANTE IN PRINT No.13
  http://www.dante.net/pubs/dip/13

If you would like to order any of the publications or other publicity material please send e-mail to: dante@dante.org.uk mentioning the item and quantity required. Items are available as long as stock lasts.