TITLE: A proposal for X.500 Directory Views

STATUS OF DRAFT:
This draft has been approved by the Network and Telecommunications Standing Committee and has been adopted as a "preferred practice" by the Council on Information Technologies and Services.

ABSTRACT:
This document describes a proposed directory structure for computing at UF using X.500 directory services. No structure described in this document has been implemented. Implementation and other issues regarding the deployment of X.500 directory services are to be described in a separate document.

1. INTRODUCTION

The Internet continues to grow at rates that few can imagine. UF's own collection of networked devices --- computers, printers, and other devices --- has also grown rapidly. New devices are being purchased and added on a daily basis and existing devices continue to be networked. Directory services provide a means for locating resources, and authorized users of those resources throughout the UF community and the Internet. The X.500 directory services standard provides definitions for development of software to implement such services.

Directory services organize resources into a hierarchical structure or tree. The tree contains entries which may be containers or leaves. Containers are objects that contain other objects. An example would be a container object named "Chemistry Department" which in turn might consist of a large tree of computing resources. A leaf is an object that does not contain any other objects. An example might be a printer leaf object. The printer leaf object represents a particular network printer. By examining the object we might learn where the printer is located, who manages it, who is authorized to print to it, and its operating hours. Leaf objects are used to denote entries that are not subdivided further, such as users, printers, disk volumes and computers.

At the present time, Novell, Inc. Netware version 4.0 uses X.500 directory services. This software is popular at UF. Approximately 4,000 computers currently use previous versions of Novell's Netware software. Many other products from other vendors are expected to implement X.500 services. See Section 7. for additional information.

This document describes a proposed directory structure for UF. The structure has been designed to accommodate all computing resources at UF. It provides for four "views" that enable a user to find resources using the following approaches: 1) The organizational view puts resources into an electronic version of the UF organizational chart; 2) The geographical view locates resources into buildings, floors and rooms; 3) The directory view locates resources into alphabetized lists, as in a
phone book; 4) The units view allows resources to be located by the unit in which they reside.

In section 2, an overview of the proposal is presented along with a graphical display of the views. In sections 3, 4, 5 and 6 each of the views is described in additional detail, along with samples of queries that can be resolved using each view.

2. AN OVERVIEW OF THE PROPOSAL

In the diagram that follows, the four views of the proposed structure are shown. Names for the containers, the number of containers and the contents of the containers are not part of this proposal. The names in the diagram are for illustrative purposes only.

The diagram starts with the Internet. The UF tree would be part of a global X.500 directory structure which can locate computing resources world-wide. One benefit of such a structure is the ability to find names and addresses and electronic mail addresses for computer users at UF and around the world.

The University of Florida entry into the global X.500 directory structure consists of a container object with four objects in it. Each object is a container and each corresponds to a "view" of the University.

Particular leaves in the University of Florida directory structure may be located using more than one view. A faculty member may be located using the directory view, by last name. This is analogous to using a printed directory. The faculty member may also be located in the organizational chart by moving down the tree into the appropriate college and department.

The order of presentation of the views in the diagram and the discussions that follows is not intended to rank the views by any criteria. All the views are intended to be useful for a variety of tasks.
3. THE ORGANIZATIONAL VIEW

The organizational view is a rendition of the organizational chart of the university. By traversing the organizational view, a user can learn the formal relationships among units of the university. People are located in the organizational view in their home departments. Computing resources are displayed within the owning department. Administrative units may find the organizational view easy to use for
locating people and resources within the university. The organizational view can be used to answer questions such as "How many departments are there in the College of Engineering?", "Is Neonatology a department or a division?", and "How many faculty are appointed in the Psychology Department?"

The organizational view makes it easy to locate resources if one knows their formal position in the university's administrative structure.

4. THE GEOGRAPHIC VIEW

The geographic view enables resources to be found by physical location. The lowest level containers on the geographic view are the rooms of the university. These are collected by floors and buildings and quadrants. The view contains both on-campus and off-campus containers.

The geographic view makes it easy to answer questions such as "Who has assigned space in Anderson Hall?", "What equipment is located in CSE 502?" and "How many printers are on the fourth floor of Weil Hall?"

The geographic view is important for maintenance purposes and for network support. It could also be used to drive graphical displays of various University resources.

5. THE DIRECTORY VIEW

The directory view provides the user with a series of lists. The lists are very similar to the white pages of the phone book. They list students, faculty and staff alphabetically. Lists can also be constructed for public disk volumes, public printers, publicly accessible computing resources, and any other resources that are naturally listed alphabetically. The directory view is the natural way to find an entry for student, given their name.

6. THE UNITS VIEW

The units view provides the user with a list of the operational units of the university. These are academic departments and administrative units. In most cases, the units manage their own computational resources --- desktop computers, servers, printers, account lists and public data. How objects are organized within a unit is determined by the unit. The unit view corresponds to the distributed management of computational resources at the University. It also makes it simple to find a department or unit, given it's name. One may not know where Traffic and Parking is located on the UF organizational chart, or on a map of the university, but it is easy to find in the units view --- under "T" for Traffic and Parking. It is anticipated that the units view will consist of 100-200 units.

The units view puts many organizations near the top of a "flat" directory structure. This is easy to use for people who know the name of the unit they need to examine. In some implementations of X.500, the user may need to type a "path" to the object
of interest. By using the units view, a short form path exists to most objects in the structure.

7. FOR FURTHER INFORMATION

Several documents describe the X.500 directory standard. These documents are available via gopher, via ftp from NIC or from Todd Hester at CIRCA. A good place to start is "Executive Introduction to Directory Services Using the X.500 Protocol," By C. Weider and J. Reynolds, 1992, 4 pages, available as RFC 1308, FYI 13. For a detailed description and extensive bibliography, see "Technical Overview of Directory Services Using the X.500 Protocol," by Weider, Reynolds and Hecker. This is available as FYI 14, RFC 1309. Available implementations are described in "A Catalog of Available X.500 implementations", ed. Lang and Wright, FYI 11, RFC 1292.

AUTHORS:
Fred Buhl
Animal Science
fred@animal.ufl.edu

Mike Conlon
College of Liberal Arts and Sciences
mconlon@clas,ufl.edu

Stephanie George
Shands Hospital
george@net.health.ufl.edu

Todd Hester (chair)
CIRCA
todd@circa.ufl.edu

Eric Johnson
Astronomy
esj@astro.ufl.edu

Bill Covey
UF Libraries
wcovey@nervm.nerdc.ufl.edu

Eric Olson
College of Business
eric@chip.cba.ufl.edu

Dave Porkorney
NERDC Telecommunications
poke@nervm.nerdc.ufl.edu

Susan B. Wright
College of medicine
swright@dean.med.udl.edu