

Locating users and objects with help from the directory

1st December 2005

Jose A. Accino, University of Malaga, Central computing facility, 29071 Malaga
E-mail: accino@uma.es

Victoriano Giralt, University of Malaga, Central computing facility, 29071 Malaga
E-mail: victoriano@uma.es

Javier Masa, RedIRIS, CICA, 41012 Sevilla
E-mail: javier.masa@rediris.es

Keywords: geographical location, classifications, directory services
Subject: lost and found

Abstract

An enterprise directory can store many kinds of objects. Frequent ones are people descriptions, IT equipment and even places. We have developed means for producing different classifications of such objects, based on their geographical location and on their relationships. This way, it is possible to introduce various hierarchical views of an otherwise shallow directory tree. Classifications and their codes are also stored in the directory as another type of object. Classification information is added to entries as values of a classification code attribute. The semantics of such attributes describe which classification the value belongs to.

We have also developed appropriate software for creating and editing such classifications and for navigating the hierarchies this classifications create.

We present two different use cases, one for each possible way of using the classifications.

1 Aim

The main aim of the classification is to enable users and applications to find the geographical location of any physical object that has an electronic representation in the directory, using data stored in the object's entry.

It becomes necessary, in order to locate objects, to describe the relationships of the containers. This description turns easily into a hierarchy: like cubicles that are located in aisles, that are part of floors, that belong to a wing, that is part of a building which is in a campus.

This hierarchy concept can be generalized out of the geographical domain into the network domain, and describe the dependencies of network equipment, which are both connected by physical links and placed in geographical locations.

So, our aim is to produce the classifications for describing this relationships and to create the tools for managing them.

2 Uses

1. **Delivery instructions for mail.** The geographical location of persons is an invaluable resource in disperse organizations such as university campuses.
Many teams must find people, snail mail and goods delivery being one of the most common ones.
If this information can easily be gathered from the directory, the delivery team become a great source of customer satisfaction and, on the other hand, can be of great help for keeping the information up to date.
Anyway, this information must be subject to strict privacy policies, as it can be easily misused.
2. **Location information for trouble tickets.** We have found that field help personnel loose quite an important part of their time trying to locate users and equipment for support trouble tickets.
3. **Classify network equipment, network links and their hierarchy.** Network management needs a tool that can easily map the organization of structured wiring and the relationships that this structure induces on the equipment it connects. Also, logical links form trees and other kind of hierarchies.
There have been attempts to map the network structure onto directory trees, but the use of swallow hierarchies that are promoted in well organized directories destroys the possibility of directly representing such hierarchies. Adequate use of classifications, can reintroduce this concept in, otherwise, sparse trees.

3 Implementation

3.1 Classifications

We have developed classifications that allows us to describe the following hierarchies:

- Geographical locations, up to the cubicle
- Wiring up to the wall socket
- Network equipment, up to the network port
- Network links, up to the switches

The classification codes are designed so that any level extends the code of the upper one, which allows for easy navigation, as well as, for easy retrieval of all the objects that bellow to a certain part of the hierarchy. Also, classifications permit the creation of alternative views of the same set of objects, adapted to different needs, simply adding the appropriate codes to the objects.

3.2 Support software

Two basic tools are required for using this classifications:

1. **Web based hierarchy navigator.** We have built the tool around a PHP class that gets navigation and display information from the main classification object, which is stored in the directory using COPA classes and attributes. The class provides the required methods for presenting and dealing with hierarchical objects. Once class is instantiated, the software object does the queries needed to retrieve the directory objects that should be presented at each level.
2. **Web based classification editor.** The editor class is conceptually based on the navigation one, but it must implement more complex operations, as moving, inserting or deleting objects in the hierarchy can have deep effects on the rest of the classification.

4 Use cases

We have prepared two classifications for the facilities where two of the authors work. This location has been selected both for ease of access, the authors have full access to the whole building, and for its more than adequate level of complexity of the networking gear, provided the main network hub is located in the building, and the authors have direct personal access to the network management team.

We will not go into excessive detail in this abstract, as it can easily become too involved. Detailed examples will be provided both in the presentation and the full paper if the abstract is accepted.

4.1 Location classification for the Central Computing Facility building

The classification describes each room in the building and their containing units, which in this case are simply the four floors, the wing and the building itself. For the sake of completeness, we have also added descriptions for the campus where the building is located and the main starting point of the University.

The codes resulting from this classification have been added to the entries of all the persons working at the Central Computing Facility. These data are not public due to privacy concerns, they can be seen by properly identified people and are being used for parcel distribution.

4.2 Network hierarchy of the Central Computing Facility

The classification describes the network wiring from the fibers that connects the University to the Internet up to the wall outlet that connect the workstations to the LAN. It also describes the logical path elements such as links between switches or the port that a workstation is connected to. All entries for physical network elements, from switches through wall outlets, also carry geographical classification codes so they can be located if needed.

The networking team is using the application to follow network paths and to find faulty equipment.

5 Vitae

Jose Alfonso Accino is Project Manager in the Systems Management Team of the Central computing facility of the University of Malaga. He graduated from the University of Malaga with a degree in Philosophy in 1979. He is a member of ATI/CEPIS. He has worked for the University since 1979 and for the Computing Facility since 1988. He has been deeply involved in technical matters related to e-learning, working in several international projects. He is a member of the SCHAC committee.

Victoriano Giralt is the Systems and Telematics Services Manager at University of Málaga since 2002. In 1986 graduated as M.D. from University of Málaga. He has worked for the University since 1986 through 1990 and since 1995 onwards. He was systems manager at the International Sports University (UNISPORT), where he set up one of the first web servers in Spain. He has acted as director or manager for several Internet promoting projects. He has also acted as evaluator for the Telematics Applications Programme of the EC. He is involved in the TERENA tf-emc2 and the SCHAC committee and has been a speaker in both TERENA EuroCAMP at Torino and Porto. He is also a member of ATI.

Javier Masa is a member of the technical staff at RedIRIS, the Spanish NREN, where is responsible for indexing and directory services. He graduated in Computer Science from the University of Seville in 1992. Since 1990 he has been involved with RedIRIS, working in projects related to directory services, network information retrieval, metadata formats and query interfaces, and Web services development. At present he coordinates and participates in the development of

the PKI for IRISGrid, the national Grid infrastructure promoted by RedIRIS and is the Spanish representative in the EUGridPMA. He is also the main editor of SCHAC, an initiative for coordination of directory schemata in academia.