           Recommendations for an X.500 Production Directory Service

Status of this Memo

Abstract

   This document contains a set of basic recommendations for a country-
   level X.500 DSA. These recommendations can only be considered a
   starting point in the quest to create a global production quality
   X.500 infrastructure. For there to be a true "production quality"
   X.500 infrastructure more work must be done, including a transition
   from the 1988 X.500 (plus some Internet extensions) to the 1993 X.500
   standard (including the '93 replication and knowledge model). This
   document does not discuss this transition.

1. Introduction

   The ISO/CCITT X.500 Directory standard enables the creation of a
   single world-wide Directory that contains information about various
   types of information, including people. In the United States, in mid
   1989 NYSERNet (the project was later taken over by Performance
   Systems International - PSI) started a White-pages Pilot Project
   (WPP). Several organizations in the US joined this project. The PSI
   WPP provided the c=US root level master Directory System Agent (DSA)
   where organizations that joined the pilot were connected. In
   November 1990, the PARADISE project was started in Europe to provide
   an international directory service across Europe with international
   connectivity to the rest of the world. The PARADISE project also
   operated the "root of the world" DSA that connected each of the

national pilots into a single world-wide Directory Information Tree
(DIT), enabling information about people all over the world to be
obtainable using an Internet DUA (Directory User Agent).

Much of the criticism of X.500 stems from the lack of a production
quality infrastructure. Although there are already well over 500
organizations and 1,000,000 entries in the the X.500 directory, some
portions of the directory are still considered a "pilot project".
Poor availability of portions of the directory and inconsistent
quality of information are two problems that have not been adequately
addressed in a number of the X.500 "pilot projects". One of the
reasons for this has been a lack of formal service objectives for
running an X.500 service, and recommendations for achieving them.

In X.500, the country-level DSAs form the access path for the rest of
the world to access directory entries associated with that country's
organizations. Thus, the availability and performance of the
country-level DSAs give an upper bound to the quality of service of
the whole country's part of the Directory.

2. Recommendations for the country-level Master DSA

We will split the recommendations into three categories: Operational
recommendations for the organization running the master DSA (service
provider), DSA recommendations and personnel recommendations.

2a. Operational recommendations for the country-level master and shadow
 DSAs

In general, the country-level data should be available for querying
100% of the time. Availability for updating is also important, but
may be slightly reduced in practice, given X.500's single master
scheme.

* The master DSA should be available at least 95% of the time. This
means that the DSA must be monitored and supported over the weekend.

* The Master DSA and its shadows should be positioned to minimize the
possibility of single points of failure.

* The master and its shadow DSAs should be disbursed across the
national network infrastructure in order to distribute the load
across the network, and to get the information closer to the
requesters. This distribution should also minimize the possibility
of a single point of failure, increasing availability.

* Country DIT information, including naming infrastructure
information such as localities and states, should be replicated
across the oceans - not only to serve when the trans-oceanic links go
down, but also to handle name resolution operations for clients in
other countries. There should be a complete copy of the US root in
Europe and a copy of the Japanese root in Africa and North America,
for instance. Generally, data should be replicated where ever it is
heavily used, and where it will be needed in the event of a network
partition.

* The master and shadow DSAs must run software that conforms to all
the recommendations listed in section 4.

2b. Operational recommendations for the service provider

* Provide a generic e-mail address for the DSA manager (e.g., x500-
manager@foo.com). More than one manager should be available to
handle problems as they come up (i.e., the manager should be able to
go on vacation!).

* E-mail to the manager of the master DSA must be answered in a
timely fashion:

   * All mail to the manager should be acknowledged as received
   within one working day.

   * Trouble reports concerning the master and shadow DSAs must be
   answered within 24 hours; this response should include a
   resolution to the problem (when possible). There are situations
   where problem resolution may take longer than 24 hours, but this
   should be unusual.

   * General informational requests (e.g., how to join the service,
   where to get the software, etc.) should be acknowledged within 2
   working days and should normally be resolved within 2 working
   days.

* Maintain a current e-mail distribution list of all DSA managers
within the country. Changes to this list must be made in a timely
manner (within 2 working days). It may be useful to include X.500
software vendors and funders on this distribution list.

* Provide quick turn around (2 working days) for changes/additions
to the national master DSA (i.e., requests to add a new organization,
to change a DSA's information, or to remove a DSA). Acknowledgments
to these requests must be made within 1 working day.

* At a minimum, the manager will make available documentation about the X.500 Production Service that includes information about how to join, which software to run and where to obtain it, naming guidelines, schema requirements, operational requirements, etc. Ideally, the manager should take a proactive role in advertising the X.500 Production Service and soliciting new members.

* If the service is currently operating at a "pilot" level, remove references to "pilot" from the service and establish a process with the national-level DSA managers to transition from a pilot to a production service. This transition plan must include the production of a new set of requirements for their DSAs in the new production service (see section 3).

* Remove organizations and their DSAs that do not meet the service's published operational guidelines (see section 3). DSA managers should be notified at least 4 weeks in advance of removal to give them time to correct their operational deficiencies. This procedure should be performed at least once every 3 months. A grace period of 3 months should be given to new organizations to come up to speed.

* The service provider should work with other national X.500 service providers in the same country to ensure a single consistent DIT within the country. In North America, for example, the Production X.500 service should act as an ADDMD in the North American Directory Forum (NADF) X.500 service, producing timely Knowledge and Naming (KAN) updates for the Central Administration for the NADF (CAN) when entries under c=US or c=CA are added, changed or removed, and applying KAN updates produced by the CAN in response to updates from other ADDMDs.

This will ensure a single consistent DIT common to both NADF and Internet X.500.

2c. Personnel recommendations for the country-level Master DSA

* Participate in various technical forums, where appropriate. This requirement will become more important as more technical work transpires (e.g., for the 93 transition).

* Provide a help desk that DSA managers can go to for help resolving operational problems. Support should be provided via e-mail and optionally via telephone. This help desk facility is intended to provide support above and beyond that provided on the mailing list mentioned previously.

   * Publish quarterly status reports giving details on the state of the
   service: new organizations, deleted organizations, statistics on the
   availability of the master and shadow DSAs, number of operations
   performed by the master and shadow DSAs, etc.

   * Provide electronic access to service information. Some useful ways
   of doing this are:

      Provide a World Wide Web (WWW) page that includes information
      describing the service, together with contact information,
      pointers to useful software, a form that can be used to submit
      comments/bug reports, and any other useful information that can be
      provided.

      Provide FTP access to above information.

3. Recommendations for operating a DSA within the National Directory
   Management Domain (DMD)

   The following are recommendations for all DSAs that are operating
   within the country-level DMD.

      * The availability of the organization's subtree should be as
      close to 100% as possible. This coverage shall be provided by a
      master DSA and zero or more shadow DSAs.

      * Organizations should maintain information in their DSAs that is
      complete, accurate, and up-to-date. This information shall be
      accessible through Directory protocols to the extent allowable by
      the security and privacy policies of the respective organizations.

      * Organizations experimenting with the Directory should either be
      marked clearly as "experimental" (e.g., with an appropriate
      Quality of Service attribute, or perhaps by including the word
      "experimental" as part of the organization's RDN), or they should
      be listed in a separate portion of the namespace, also clearly
      marked. Once the organization is done experimenting, it can be
      move to the "production" part of the DIT.

      * Two contact persons must be named as DSA managers for each DSA

      * DSA software should conform to the recommendations found in
      section 4.

4. Recommendations for DSA software

   The software should support the attributes and object classes found
   in the Internet schema [RFC 1274].

   Software should be reliable, supportable and should provide
   sufficient performance to handle the DSA traffic.

   Additional requirements may be imposed by the service provider (e.g.,
   '93 replication).

5. References

   [CCITT-88] CCITT, "Data Communications Networks Directory",
               Recommendations X.500-X.521, Volume VIII - Fascicle
               VIII.8, IXth Plenary Assembly, Melbourne, November
               1988.

   [RFC 1274] Barker, P., and S. Kille, "The COSINE and Internet
               X.500 Schema", RFC 1274, University College, London,
               England, November 1991.

6. Security Considerations

   Security issues are not discussed in this memo.

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