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Enterprise Renumbering: Experience and Information Solicitation

Status of this Memo

This memo provides information for the Internet community. This memo does not specify an Internet standard of any kind. Distribution of this memo is unlimited.

Abstract

Because of the urgent need for, and substantial difficulty in, renumbering IP networks, the PIER working group is compiling a series of documents to assist sites in their renumbering efforts. The intent of these documents is to provide both educational and practical information to the Internet community. To this end the working group is soliciting information from organizations that already have gone through, or are in the process of going through, renumbering efforts. Case studies, tools, and lists of applications that require special attention are sought.

Table of Contents

1. Introduction

There are immediate and increasingly severe requirements to renumber both small and large-scale networks. The Procedures for Internet/Enterprise Renumbering (PIER) working group in the IETF urgently requests specific input for producing concrete guidance for the renumbering task as quickly as possible. As part of collecting such information, the PIER working group therefore is soliciting input from people and organizations with experience in changing the IP addresses of enterprise networks or in making major changes in the subnetting of existing networks. We are especially interested in actual case studies -- that is, accounts describing what was actually done to renumber one or more networks. Information is also solicited on specific tools used in the process, and on areas in which tools were needed but not available. Because applications that use IP addresses directly in their configuration or security mechanisms pose specific difficulties and coordination issues for renumbering, a catalogue of such applications is being compiled.

All interested parties are invited to submit material in any of these areas:

A) Accounts of the experience of renumbering networks:
-- Retrospective reports on renumbering efforts.
-- Journals or running accounts of a renumbering effort, written while the task is underway.

B) Information on tools to help renumbering:
-- Descriptions of tools used, whether commercial, freeware, or ad hoc (such as perl scripts).
-- Descriptions of specific needs where a tool could clearly have helped, but none was found.

C) Information on applications using embedded IP addresses:
-- Software applications that use embedded IP addresses for security keys, authentication, or any other "inappropriate" purposes.
-- Hardware devices whose IP addresses are hardcoded into the hardware design (and so may require extensive time lags to retool).
-- Both software and hardware whose vendors are no longer in business and that may require replacement or specialized solutions.

The focus of this solicitation is on experience with renumbering that has been done or is now underway in IPv4 networks, and not on future changes to protocols or environments that may eventually be useful. We are especially concerned with the most common situation faced today: single-homed networks that are not transit providers. However, experience with renumbering more complex environments is also

welcome.

The information provided will be used as an information base from which at least three documents will be composed: a document summarizing the processes to follow when renumbering, a document describing the available tools, and a document containing a list of known applications requiring special attention when renumbering. The information will also be available on the PIER home page, http://www.isi.edu/div7/pier. More specific reports on renumbering particular environments may also be produced in those cases where enough information is received from the community.

Although our emphasis is on technical issues and responses, solidly based advice on smoothing the human problems is also appreciated. Political and cultural sensitivities, and handling them, are major issues in the real world.

There is no requirement that a formal document be submitted, although with the permission of the submitter, selected accounts of experience in renumbering will be published by PIER as part of their planned series of case studies. If you wish to have your account released as a PIER case study, please follow the standard RFC format described in RFC 1543, "Instructions to RFC Authors". (For convenience, these formatting rules are given in Appendix A below.)

The people and organization(s) involved and the network(s) renumbered need not be identified in any document made public by PIER: please explicitly indicate if a submission should have its anonymity protected.

The deadline for the submission of your information is May 15, 1996, though early submission is encouraged. Any information, however informally written, that can be submitted earlier, would be greatly appreciated and will help shape the further work of the PIER group. In particular, if you expect to submit a detailed write-up by May 15, 1996, please let us know as soon as possible.

Please send submissions, questions, or suggestions to the PIER discussion list, pier@isi.edu.

To subscribe to the PIER discussion list, please send your request to pier-request@isi.edu. Further information on PIER is available on the PIER home page, http://www.isi.edu/div7/pier.

Mail may also be sent directly to the editors, without its appearing on the PIER list, by sending to pier-solicit@bellcore.com.

2. Renumbering Experience

An account of a renumbering effort should provide enough concrete information, based on actual experience, so that the reader can understand exactly what was done. Broadly speaking, we anticipate two styles of account:

i) Retrospective reports

Based on one or more renumbering efforts, recapitulate what was done and what was learned in the effort. Such a report should describe:
-- The environment being renumbered.
-- The planning undertaken.
-- What was done.
-- What worked.
-- What didn't (unanticipated issues, problems with planned approaches).

In addition, the report would be even more useful if it also addressed:
-- The reasons for taking the approach chosen.
-- Any alternative approaches that were rejected, and why.
-- What could have been done in advance to make the task easier.
-- Lessons learned: how would you do it next time?

It is hoped that individuals and organizations that have already been through a renumbering effort could quickly look back over their experiences, and capture their knowledge.

ii) Running accounts

Many people are in the midst of a renumbering effort, or are about to embark on one in the next few months. If, in the midst of that hectic task, one could write down a brief account or "diary" of what actually happens, as it happens, such a report is likely to capture the glitches and fixes of even the best-planned effort more accurately than any retrospective.

Of course, these are only rough categories: any record of the experience of renumbering or of information gained by such experience can be a valuable contribution to PIER. When submitting accounts of renumbering efforts, please attempt to be as articulate and concise as possible.

3. Information on Tools

Information on the tools that were used in renumbering is valuable, whether provided as a separate note or as part of an account of a renumbering effort. We welcome comments, however detailed or brief, on any tools that helped with renumbering, whether or not you intend to produce an account of the entire renumbering effort.

Some areas in which tools may be used in renumbering include:

-- Identifying what needs to be changed in your network, such as configuration files, hosts and servers with embedded or cached IP addresses, DNS, access control lists (ACLs), firewalls, routers, license servers, and other applications.
-- Identifying external factors (such as remote servers, routers, and Internet registries) that need to be updated to accommodate your new numbers.
-- Identifying dependencies between the different places where the numbers must be updated.
-- Notifying external agents.
-- Generating the new information (such as routing, configuration, and ACLs) required in order to carry out the updates.
-- Coordinating updates.
-- Making the updates.
-- Verifying the updates.
-- Trouble-shooting and debugging.
-- Maintaining network functionality.
-- Informing your users and other affected human beings (such as NOC staff) of the changes.

The most useful tools are those that are, or can be, available to other renumbering efforts. For a given tool, it would be helpful to describe:

-- How to obtain it (if not a well-known tool).
-- What you used it for.
-- How you used it.
-- What its strengths and limitations are for these specific uses.

If a tool was created as part of the renumbering effort, a description of exactly what it does should be included. (For example, a script to check for IP addresses in configuration files on user machines should be described in terms of just what it did to obtain the list of machines, what files it looked for, and how it checked them.)

Although the primary goal of this solicitation is to learn what tools exist and are useful, we also value specific, experience-based descriptions of ways in which tools could have helped even though nothing was available during the renumbering to perform these

functions. Advisories on tools that appear to be useful but in practice created further problems may also be considered, as appropriate.

4. Application Information

Information on applications that require special attention when renumbering are of particular interest, since specialized applications are among the most difficult aspects of renumbering. It typically requires special intervention with the vendor to provide new security keys, new license addresses, new versions of applications, or perhaps even new hardware or proms to change the hardcoded IP addresses.

A list of any such applications that required "extra" efforts during the renumbering process is valuable. Please include as much specific information as possible, including but not limited to: application name, version, platform, vendor, operating system, operating system version, the steps taken to overcome the problem, and lead times needed.

In particular, any applications that are no longer supported, or whose vendor has ceased to do business, are extremely important since these applications will likely be some of the more difficult issues a renumbering effort will encounter. Any solutions to these types of problems, including replacement applications and proprietary solutions, are also sought.

5. Security Considerations

This RFC raises no security issues, although accounts of renumbering are encouraged to describe any security issues encountered, any tools that helped identify or resolve the issues, and the actions taken to address them. Submissions should give serious consideration to the content and context of issues regarding security.

6. Authors' Addresses

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Appendix A - Formatting Rules (from RFC 1543)

Note: there are a set of NROFF formatting macros for the following format. Please contact pier-solicit@bellcore.com if you would like to get a copy.

3a. ASCII Format Rules

The character codes are ASCII.

Each page must be limited to 58 lines followed by a form feed on a line by itself.

Each line must be limited to 72 characters followed by carriage return and line feed.

No overstriking (or underlining) is allowed.

These "height" and "width" constraints include any headers, footers, page numbers, or left side indenting.

Do not fill the text with extra spaces to provide a straight right margin.

Do not do hyphenation of words at the right margin.

Do not use footnotes. If such notes are necessary, put them at the end of a section, or at the end of the document.

Use single spaced text within a paragraph, and one blank line between paragraphs.

Note that the number of pages in a document and the page numbers on which various sections fall will likely change with reformatting. Thus cross references in the text by section number usually are easier to keep consistent than cross references by page number.