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Internet Engineering Steering Group
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Applicability Statement for the Implementation of Classless Inter-Domain Routing (CIDR)

Status of this Memo

This RFC specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" for the standardization state and status of this protocol. Distribution of this memo is unlimited.

1. Introduction

As the Internet has evolved and grown in recent years, it has become clear that it will soon face several serious scaling problems. These include:

- Exhaustion of the class-B network address space. One fundamental cause of this problem is the lack of a network class of a size that is appropriate for a mid-sized organization. Class-C, with a maximum of 254 host addresses, is too small, while class-B, which allows up to 65534 addresses, is too large to be densely populated. The result is inefficient utilization of class-B network numbers.

- Routing information overload. The size and rate of growth of the routing tables in Internet routers is beyond the ability of current software (and people) to effectively manage.

- Eventual exhaustion of IP network numbers.

It has become clear that the first two of these problems are likely to become critical in the near term. Classless Inter-Domain Routing (CIDR) ttempts to deal with these problems by defining a mechanism to slow the growth of routing tables and reduce the need to allocate new IP network numbers. It does not attempt to solve the third problem, which is of a more long-term nature, but instead endeavors to ease enough of the short to mid-term difficulties to allow the Internet to continue to function efficiently while progress is made on a longer-term solution.

The IESG, after a thorough discussion in the IETF, in June 1992 selected CIDR as the solution for the short term routing table

explosion problem [1].

2. Components of the Architecture

The CIDR architecture is described in the following documents:

- "An Architecture for IP Address Allocation with CIDR" [2]
- "Classless Inter-Domain Routing (CIDR): An Address Assignment and Aggregation Strategy" [3]

The first of these documents presents the overall architecture of CIDR; the second describes the specific address allocation scheme to be used.

In addition to these two documents, "Guidelines for Management of IP Address Space" [4] provides specific recommendations for assigning IP addresses that are consistent with [2] and [3], and "Status of CIDR Deployment in the Internet" [5] describes the timetable for deploying [4] in the Internet. Both [4] and [5] should be viewed as supporting, rather than defining, documents.

In addition to the documents mentioned above, CIDR requires that inter-domain routing protocols be capable of handling reachability information that is expressed solely in terms of IP address prefixes. While several inter-domain routing protocols are capable of supporting such functionality, this Applicability Statement does not mandate the use of a particular one.

Although Internet routing domains are not required to use routing protocols capable of propagating CIDR routes, the topology such routing domains can support will be somewhat limited. In particular, the non-CIDR-capable parts of the Internet will need to default towards the CIDR-capable parts of the Internet for routes which have been aggregated to non-network boundaries.

3. Applicability of CIDR

The CIDR architecture is applicable to any group of connected domains that supports IP version 4 [6] [7]. CIDR does not require all of the domains in the Internet to be converted to use CIDR. It assumes that some of the existing domains in the Internet will never be able to convert. Despite this, CIDR will still provide connectivity to such places, although the optimality of routes to these places may be impacted.

This Applicability Statement requires Internet domains providing backbone and/or transit service to fully implement CIDR in order to

ensure that the growth of the resources required by routers to provide Internet-wide connectivity will be significantly slower than the growth of the number of assigned networks.

This Applicability Statement strongly recommends that all non-backbone/transit Internet domains also implement CIDR because it will reduce the amount of routing information inside of these domains.

Individual domains are free to choose whatever inter-domain and intra-domain routing architectures best meet their requirements. Specifically, this Applicability Statement does not prevent a domain or a group of domains from using addressing schemes which do not conform to CIDR. Subject to the available resources in routers, CIDR should be able to co-exist with other addressing schemes without adversely impacting overall connectivity.

4. References

[1] Gross, P., and P. Almquist, "IESG Deliberations on Routing and Addressing", RFC 1380, IESG Chair, IESG Internet AD, November 1992.

[2] Rekhter, Y., and T. Li, "An Architecture for IP Address Allocation with CIDR", RFC 1518, T.J. Watson Research Center, IBM Corp., cisco Systems, September 1993.

[3] Fuller, V., Li, T., Yu, J., and K. Varadhan, "Classless Inter-Domain Routing (CIDR): An Address Assignment and Aggregation Strategy", RFC 1519, BARRNet, cisco, Merit, and OARnet, September 1993.

[4] Gerich, E., "Guidelines for Management of IP Address Space", RFC 1466, Merit, May 1993.

[5] Topolcic, C., "Status of CIDR Deployment in the Internet", RFC 1467, CNRI, August 1993.

[6] Postel, J., "Internet Protocol - DARPA Internet Program Protocol Specification", STD 5, RFC 791, USC/Information Sciences Institute, September 1981.

[7] Braden, R., Editor, "Requirements for Internet Hosts -- Communication Layers", STD 3, RFC 1122, IETF, October 1989.

5. Security Considerations

Security issues are not discussed in this memo.

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