     A Standard for the Transmission of IP Datagrams over NetBIOS Networks

Status of this Memo

     This document specifies a standard method of encapsulating the
     Internet Protocol [1] (IP) datagrams on NetBIOS [2] networks.
     Distribution of this memo is unlimited.

Introduction

     The goal of this specification is to allow compatible and
     interoperable implementations for transmitting IP datagrams over
     NetBIOS networks.

     NetBIOS is a standard which specifies a means of creating virtual
     circuits and of transmitting and receiving point-to-point, multicast,
     and broadcast datagrams. This specification uses only the datagram
     services.

     Previous versions of this memo specified the use of the NetBIOS
     broadcast datagram services instead of the NetBIOS group name
     services to implement IP broadcasting. These versions are now
     obsolete.

Description

     NetBIOS networks may be used to support IP networks and subnets [3]
     of any class. By means of encapsulating IP datagrams within NetBIOS
     datagrams and assigning IP numbers to the hosts on a NetBIOS network,
     IP-based applications are supported on these hosts. The addition of
     a router capable of encapsulating IP packets within ordinary data-
     link protocols (such as 802.3 [4]) as well as within NetBIOS
     datagrams allows these NetBIOS hosts to communicate with the Internet
     at large.

Address Mappings

     In general, NetBIOS names may be any series of 16 bytes, however, a
     few values are reserved or used by common networking packages.
     NetBIOS names for the IP applications on each host are chosen on the
     basis of the internet number of that host. Since NetBIOS names are a
     mapping of IP addresses, no physical address query mechanism (e.g.,
     ARP [5]) is required.

For these internet protocol applications, IP.XX.XX.XX.XX is the
NetBIOS name for any IP over NetBIOS host where XX represents the
ascii hexadecimal representation of that byte of the internet
address.

This addressing scheme allows for the multiplexing of standard
datagram protocols over NetBIOS as well as easy visual confirmation
of the correctness of a given packet's address.

Broadcast and Multicast Addresses

Broadcast Internet addresses are represented by the NetBIOS group
name IP.FF.FF.FF.FF. Currently, no attempt is made to provide
support of IP multicast addresses using NetBIOS group names.

Maximum Transmission Unit

The maximum data size of a NetBIOS datagram, and therefore the
Maximum Transmission Unit (MTU) for IP over NetBIOS networks, is 512
bytes. Therefore, any hosts communicating with a host on a NetBIOS
network may be required to reassemble fragmented datagrams.

Implementation

To support IP on a NetBIOS host for any given IP address the
initialization code must:

    1) Add IP.XX.XX.XX.XX to the host's NetBIOS name table.

    2) Add IP.FF.FF.FF.FF to the host's NetBIOS group name table.

    3) Submit a receive datagram request for the reception of NetBIOS
       datagrams destined for IP.XX.XX.XX.XX.

    4) Submit a receive datagram request for the reception of NetBIOS
       datagrams destined for IP.FF.FF.FF.FF.

When a NetBIOS datagram to either address is received, it is
processed by the protocol stack and another receive datagram request
is submitted.

When an IP datagram is sent, it is considered to be NetBIOS datagram
data and sent by a send datagram request to either IP.XX.XX.XX.XX or
IP.FF.FF.FF.FF.

Optionally, the IP software may desire to make adapter status queries
of the NetBIOS network. As support for SNMP becomes a requirement
for IP hosts, these adapter status queries may become mandatory.

Finally, when the IP support for a given NetBIOS host is
discontinued, a cancel command request should be submitted for every
pending receive datagram, and a delete name request should be
submitted for both the IP.XX.XX.XX.XX and IP.FF.FF.FF.FF address
added during initialization.

Acknowledgements

This document would not have been possible without the efforts of
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and implementation of IP over NetBIOS.

References

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[3] Mogul, J., and J. Postel, "Internet Standard Subnetting
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[4] Postel, J., and J. Reynolds, "A Standard for the Transmission
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[5] Plummer, D., "An Ethernet Address Resolution Protocol",
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