MANET address autoconfiguration for legacy hosts
draft-perkins-autoconf-leghost-00

Abstract

   This document describes methods by which a host running only DHCPv6
   or Neighbor Discovery can obtain an address suitable for use in an ad
   hoc network.

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1. Introduction

This document describes methods by which a host running only DHCPv6
[RFC3315] or Neighbor Discovery [RFC4862] can obtain an address
suitable for use in an ad hoc network. Let us call such a host to be
a "legacy host". It is agreed that legacy hosts are not routers and
do not forward packets.

The basic mechanism in our proposal is very simple. DHCP Request
packets and certain Router Solicitations are treated as requests to
obtain an address. Any router receiving such an address allocation
request initiates an Address Allocation protocol procedure
appropriate for the MANET (Mobile Ad Hoc Network) in which the router
resides. There are numerous examples of such address allocation
protocols [bernardos-survey]. In the case of routers running
proactive MANET protocols, simple inspection of the routing table may
suffice for the router to determine a unique address for the
requesting host. In the case of routers running only reactive
protocols, additional steps may be necessary.

Once the router has determined a unique address appropriate for the
requesting host, the router returns either DHCP Request or Router
Advertisement to the requesting host. In the case of the Router
Advertisement, the router presumes that the host will follow standard
practice. Namely, the host is presumed to make use of the prefix
provided by the router along with the host ID of the requesting host.
In many cases, the prefix supplied by the router will be such that no
link-local addresses are supported within the range of addresses
defined by the prefix, because the prefix will be /128. Such
allocations do not require additional steps by the host, and the /128
prefix supplied by the router will typically already contain the host
ID of the requesting host.

The cases of interest may be classified into two general categories,
depending upon whether or not the ad hoc network (i.e., the MANET) is
attached to the Internet. If the MANET is attached to the Internet,
then the MANET as a whole is addressable from the Internet according
to a routing prefix appropriate for the point of attachment of the
MANET. In this case, addresses assigned to the requesting host by
the allocating router will be selected from the routing prefix for
the MANET.

Otherwise, the address will be selected from a generalized MANET
prefix (MANET_LOCAL_PREFIX) which is not reachable from the Internet.
Any address assignments from the MANET_LOCAL_PREFIX are only valid
within the connected domain defined by the routers in the MANET
containing the legacy host and its neighboring router(s). The
operation of legacy hosts using such addresses allocated form the

MANET_LOCAL_PREFIX may be viewed as analogous to the operation of
hosts making use of IPv6 Unique Local Addresses (ULAs) [RFC4193]. In
particular, any such host MUST NOT accept MANET_LOCAL an address
allocation from two different neighboring routers; only one
allocation can be accepted, and additional allocations SHOULD be
refused.

2. Details about DHCPv6 operation

In the absence of any additional information, the router returning
the DHCP Reply MUST indicate a prefix length of /128 for the address
given in the DHCP Reply.

3. Details about operation using Router Advertisement

After a legacy host has configured a link-local address, it may (if
so configured) issue a Router Solicitation in order to obtain routing
information from a local router. Any router receiving this
Solicitation MAY reply with an appropriate Router Advertisement,
unicast to the soliciting host. In the absence of any additional
information, the router transmitting the Router Advertisement MUST
indicate a prefix length of /128 for the address given in the
Advertisement.

4. Pictorial representation of address assignment

```
                    A router and a legacy host


             <~~~~~~~~~~~~~+~~~~~~~~~~~~~>
                          |       <~~~~~~+~~~~~~>
                    +--|--+        +--|--+
                    | RtrA|<=====>|Host |
                    +-----+        +-----+
```
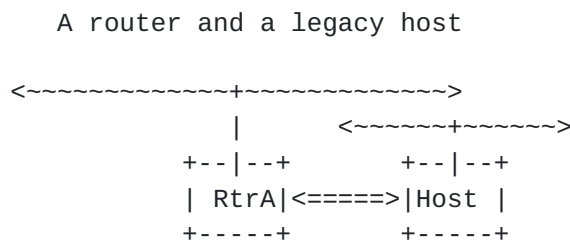
        Figure 1: RtrA can send and receive packets from Host.

In the situation depicted in Figure 1, RtrA may receive a DHCP
Request, or a Router Solicitation, from the Host. In either case, if
RtrA is able to obtain an appropriate address for use by the Host, it
may provide that address to the Host by either of DHCP Reply or a
Router Advertisement.

5. Security Considerations

This document does not have any security considerations.

6. IANA Considerations

This document does not have any IANA actions.

7. References

7.1. Normative References

   [RFC3315]   Droms, R., Bound, J., Volz, B., Lemon, T.,
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                        Configuration Protocol for IPv6 (DHCPv6)",
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   [RFC4193]   Hinden, R. and B. Haberman, "Unique Local IPv6
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   [RFC4862]   Thomson, S., Narten, T., and T. Jinmei, "IPv6
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7.2. Informative References

   [bernardos-survey] Bernardos, CJ., Calderon, M., and H. Moustafa,
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Appendix A. Acknowledgements

This document has benefitted from discussions with the following
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