

MANET Autoconfiguration (Autoconf)
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MANET address autoconfiguration for legacy hosts
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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 from 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

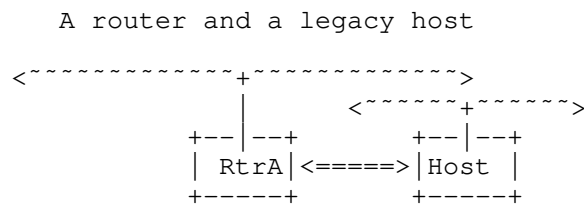


Figure 1: RtrA can send and receive packets from Host.

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., Perkins, C., and M. Carney, "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", RFC 3315, July 2003.
- [RFC4193] Hinden, R. and B. Haberman, "Unique Local IPv6 Unicast Addresses", RFC 4193, October 2005.
- [RFC4862] Thomson, S., Narten, T., and T. Jinmei, "IPv6 Stateless Address Autoconfiguration", RFC 4862, September 2007.

7.2. Informative References

- [bernardos-survey] Bernardos, CJ., Calderon, M., and H. Moustafa, "Survey of IP address autoconfiguration mechanisms for MANETs", draft-bernardos-manet-autoconf-survey-05.txt (work in progress), 2010.

Appendix A. Acknowledgements

This document has benefitted from discussions with the following people, in no particular order: Buu-Minh Ta.

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