Ad hoc network autoconfiguration: terminology and problem statement
(draft-singh-autoconf-adp-02.txt)

Updates (since ver. 00)

- A better terminology explanation
- Problem statement section:
  - MANET node's multi-hop feature explanation
  - MANET node's host & router capability explanation
- Inclusion of goals section
- Better scenario section explanation
- Editorial changes (e.g. grammar, spelling, etc)

Terminologies

- **Local address**:
  - valid only within the MANET
- **Standalone ad hoc network**:
  - MANET not connected to any other/infrastructure network
- **Hybrid ad hoc network**:
  - MANET connected to infrastructure network (e.g., via one or more gateways)
- **Internet Gateway**:
  - a node which has connectivity to the Internet and enables a MANET to be reachable from the Internet (and vice versa)
  - Sometimes called Gateway for short

Terminologies (cont.)

- **Duplicate address detection**
  - A protocol mechanism for insuring uniqueness of IP addresses – akin to RFC 2461
  - A protocol mechanism for insuring uniqueness of IP addresses, even in the face of network merger
- Network Merger:
  - Process by which two or more ad hoc networks (either standalone or hybrid), previously disjoint, get connected.
- Network Partition:
  - Process by which an ad hoc network (either standalone or hybrid) splits into two or more (disconnected) ad hoc networks.

Problem statement

- Typical features of ad hoc networks:
  - Multi-hop packet forwarding
  - Hosts (can) also serve to forward packets
  - Infrastructure-less
  - Random mobility/topology
  - Different concept of link
- These features require re-examination of existing mechanisms
  - RFC 2462: Stateless Address Autoconfiguration
  - RFC 2461: Neighborhood Discovery Protocol
  - RFC 3315: DHCPv6
  - etc.
- No standard specification describing how ad hoc node should autoconfigure IP address and undergo DAD

Problem statement (cont.)

- A MANET may appear in two different situations:
  - There is complete absence of any infrastructure
    - Standalone ad hoc network
  - There is address and/or prefix allocation agency
    - Hybrid ad hoc network
- Switching between the above two (i.e., the ad hoc network is intermittently connected)
  - Requires the various allocation modes to be compatible
- A Manet autoconfiguration solution should be able to accommodate all these situations

Problem statement (cont.)

- Network merger & partition
  - inherent property of ad hoc network
  - may occur at any point of time
  - merger may result in address conflict
  - relevant to standalone as well as hybrid network
  - partition may not cause any problem but resources could be re-used after partition

Goals

- MANET node MUST configure local address(es) when standalone. It MAY also configure global address(es) when connected to the Internet.
- MANET node MUST perform duplicate address detection test on addresses before configuring them to its interfaces
- MANET node SHOULD use a mechanism to detect network merger and to ensure the uniqueness of its current address-in-use
- MANET node MAY need a mechanism to detect network partition which can be either independent or integrated with the main protocol.
- Mechanism SHOULD be designed to avoid as many security pitfalls as can be avoided

Potential design guidelines

- A node may choose which Internet gateway's routing prefix to use for autoconfiguration according to any convenient criterion, not necessarily constrained by the autoconf protocol
- Routes internal to the ad hoc network must not leak into the Internet.
  - Internet nodes cannot see past the Internet gateway
- A Internet gateway can be treated as a default router towards the Internet.
- An autoconf solution should take care of the following situations:
  - Address assignment
  - Network partitioning
  - Network merger
- A Internet gateway should maintain routes for active nodes within the MANET

To do ?

- Terminology
  - MANET-DAD OR DAD ?
  - MANET-local address OR local address ?
  - etc
- Security considerations
- Routing-addressing dependencies