BRDP based Address Autoconfiguration

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Ad-Hoc Network Autoconfiguration (autoconf)
History and status

- Finding solutions for scalable MANETs by using a backbone

- MANETs connected to the Internet have their problems:
  - Getting global addresses
  - Multi-homing with ingress filtering

- Started with attempt to combine MANET and NEMO technology (e.g. MANEMO). Now, the NEMO part is removed.

- Based on Tree Discovery for scoped flooding
  - Now, we have this function in RPL (Roll)
  - Obvious choice to line up with RPL (not decided yet)

- Implemented in Opnet (basics)
Scenario 1: Single-homed MANET
Scenario 2:
Multi-homed MANET
Scenario 3: Multi-homed MANET nodes

- Support for multi-path transport protocols, MIP6 etc.
How does it work?

Border Router Discovery Protocol (BRDP):

- Distributes Border Router Information Option (BRIO) via Neighbor Discovery Router Advertisements
- BRIOs provide prefix information to interior nodes
- BRIOs are distributed in the MANET using scoped flooding
- BRIOs provide metrics for address selection
  - Assumption: Address selection == Border Router selection == Path selection from and to DFZ
- BRIOs provide DHCP (relay) information, for getting additional parameters, using unicast
BRDP BRIO flooding without scoping

Working:
- BRs start sending BRIOs
- BRIOs piggy-backed on RA
- Routers increment metric value and re-send

Results:
- Nodes learn prefixes for BRs, with metric information
- Nodes learn DHCP addresses for relaying or for getting additional parameters (e.g. prefix delegation)
BRDP BRIO flooding with scoping (required in large MANETs)

- Reduction of propagated BRIO set is acceptable, as only the best BRIO would be used anyway
BRIO format  (very similar to Prefix IO)

D=1: BR is DHCP server or relay

BR address with prefix for address generation

Metric for this prefix
Is a bidirectional metric between DFZ and router
MANET Address generation

- Select best Border Router based on metrics

- Prepend Interface Identifier with very high probability of uniqueness to Border Router prefix:
  - Use /64 prefixes (as Ethernet, RFC2464)
  - Unique 64-bit interface IDs:
    - EUI-64 format-based Interface Identifier [RFC4291]
    - Generation of randomized Interface Identifier [RFC4941]
    - Well-distributed hash function [RFC3972]

- Duplicate Address Detection MAY/SHOULD/MUST be used

- The BRDP provided metric can be used for the RFC3484 address selection policy table
  - To be defined in other document
Address generation

BR /64 prefix

64-bit IID

MANET Address