Next-Gen Proactive MANET Routing

MANET, 62th IETF, Minneapolis, 2005

Status

- Background:
  - experiences from RFC3626, RFC3648, misc I-Ds
- Design team:
  - "vocal" implementers/users of proactive protocols
- Activities thus far:
  - gather experience
  - ponder components
  - write design-documents
  - not (yet) draft writing....

Design "Dogmas"

- Flexible and extensible where sensible:
    - external extensibility - new message types
    - internal extensibility - add information to existing msgs
- Unification of concepts/messages:
    - e.g.: OLSR TC, HNA, MID
    - e.g.: OLSR HELLO, MID
- Maintain/respect IP architecture
- The "Graduate Student Criteria"

Design "Dogmas"

- Keep basic case (e.g. single if/address) simple
  - while supporting complete case (e.g. multi if, multi-address)
- Std. track specification will contain:
  - normative for interoperability
  - example algorithms/parameters
- Based strictly on "known stuff"
  - but accommodating for future extensions
- Efficiency - but not at all costs

Basic Protocol Functioning

- Basic link-state protocol
- Optimized flooding
- Local-scoped signaling (HELLOs)
  - topology maintenance (link, neighbor detection)
  - forwarder/relay signaling, etc
- Global-scoped signaling (TCs)
  - Inject link-state information to all nodes

Control Traffic

- Making statements about addresses:
  - "there's a link between me and....."
  - "this property is associated with....."
- Possible properties:
  - "sym", "asym", "cost", "DR-selection", "flooding relay selection", "security association"....

▸ Address block & TLV association
  - inspired by OSPFv2 LLS

Address Block & TLV

- Example:
  - `{<address-block><tlv1><tlv2><tlv3><tlv4><tlv5>}`
  - <tlv> can apply:
    - to single address
    - to sequence of addresses
    - to all addresses
    - to message
- Unknown TLVs: ignored

E.g.: OLSR HELLO message TLVs: SYM, ASYM, MPR

Addresses

- An address is a sequence....any sequence...of bits
  - IPv4 - 32bit, IPv6 - 128bit
  - other lengths: bluetooth, sensor, ...
- Most nodes share the same, long, prefix
- ▸ Flexible, compressible address representation: address-block
  - {<address-length><head-length><head>{<tails>+}}

IPv6 support

- More than just longer addresses:
  - multiple addresses/node: the norm
  - link-local addresses:
    - useless in MANETs
    - not advertised or routed
    - supported for IPv6 "legacy" support
  - unique local addresses, global addresses
    - advertised & routed within MANET
    - no advertisements outside MANET

Tasks & Thoughts

- Simplify multiple address/interface case
- Possible separation between flooding relay & "DR" designation
- Support for different msg. interval models:
  - exponential backoff, periodic, fuzzy/fsr, ...
- Support for != mandated behavior

Near-term schedule

- -00 draft: ~2-4 weeks after IETF
  - compilation of design-doc's
  - well-iterated by design-team
- Possible informal documents (I-Ds ?):
  - design rationales / considerations
  - best practice
    - "exotic extension X implemented thus...."