



I E T F[®]

Survey of IP address autoconfiguration
mechanisms for MANETs
draft-bernardos-manet-autoconf-survey-04

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Outline

- Draft History
- Introduction and motivation
- Classification properties
- Next Steps
- A question to the WG

Draft History

- Initial submission (-00): July 2005
- Not updated since November 2008
 - References to outdated autoconf-statement and manet-arch documents
 - Does not reflect current WG status and the discussions around addr-model doc
 - Some solutions not yet there (e.g., 6lowpan, Teco's, etc.)
 - Some terminology is outdated

Introduction and motivation

- Provide a survey covering IP autoconf proposals
- Provide a context for understanding the solution space
- Analyse and classify similar proposed solutions

Classification Properties (I)

- MANET Scenario

- Pure MANETs

- Also known as Standalone MANETs
- No need for global IP addresses

- Hybrid MANETs

- Also known as Connected MANETs
- Global IP addresses needed
- Gateway involvement
 - Connectivity to the fixed infrastructure
 - Involvement in IP address assignment

Classification Properties (II)

- “DAD”^{**}-based or “DAD”-free
 - Merging / partitioning
 - Pre-service DAD / DAD-free
 - In-service DAD
- Routing Protocol Dependency
 - Dependent
 - Utilise information from routing protocol
 - Independent

^{**} We do not refer to IPv6 DAD here

Classification Properties (III)

- Distributed/centralised approach
- Partitioning/Merging support
 - Detect MANETs' partitioning
 - Detect MANETs' merging
 - Avoid IP address conflicts in such cases
- Prefix delegation support
 - Address assignment
 - Prefix delegation

Classification Properties (IV)

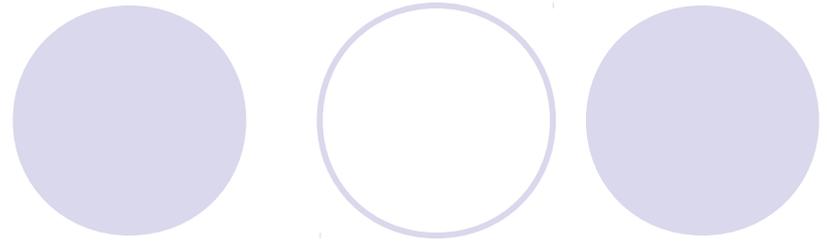
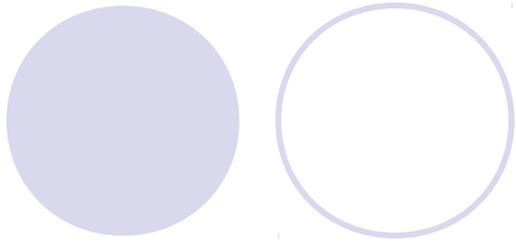
- Protocol overhead
 - Additional message flooding
 - Local signalling
 - Piggybacking of messages into routing protocol
 - Passive behaviour

Next Steps

- (as usual) Comments are welcome
- Update the document
 - Solutions missing
 - Align the document with current WG status
- Improve the document (based on WG feedback)
 - The way solutions are analysed
 - The classification criteria

A question to the WG?

- Do people think this document is worth to be updated and improved?
 - People felt so in the past, but there was no clear place for this doc in IETF
 - It might help in the solution design phase



Backup slides

Solutions analysed (I)

- IP address Autoconfiguration for Ad Hoc Networks (Perkins et al.)
- IPv6 Autoconfiguration in Large Scale Mobile Ad-Hoc Networks (Weniger et al.)
- Ad Hoc IP Address Autoconfiguration (Jeong et al.)
- IP Address Assignment in a Mobile Ad Hoc Network (Mohsin et al.)
- An Address Assignment for the Automatic Configuration of Mobile Ad Hoc Networks (Tayal et al.)
- No Overhead Autoconfiguration OLSR (Mase et al.)
- PDAD-OLSR: Passive Duplicate Address Detection for OLSR (Weniger et al.)
- Passive Duplicate Address Detection for On-demand Routing Protocols (Jeong et al.)
- Prophet Address Allocation for Large Scale MANETs (Zhou et al.)
- Automatic Configuration of IPv6 Addresses for Nodes in a MANET with Multiple Gateways (Ruffino et al.)

Solutions analysed (II)

- Simple MANET Address Autoconfiguration (Clausen et al.)
- Extensible MANET Auto-configuration Protocol (EMAP) (Ros et al.)
- Global Connectivity for IPv6 Mobile Ad Hoc Networks (Wakikawa et al.)
- Multihop Radio Access Network (MRAN) Protocol Specification (Hofmann)
- Automatic IP Address Configuration in VANETs (Fazio et al.)
- Address Autoconfiguration in Optimized Link State Routing Protocol (Adjih et al.)
- Extended Support for Global Connectivity for IPv6 Mobile Ad Hoc Networks (Cha et al.)
- Gateway and Address Autoconfiguration for IPv6 Adhoc Networks (Jelger et al.)
- MANET Autoconfiguration using DHCP (Templin et al.)

Classification results (I)

- MANET Scenario
 - Pure MANETs: 9/19 → 47%
 - Hybrid MANETs: 10/19 → 53%
 - Gateway involvement
 - IGW involved: 8/10 → 80%
 - IGW not involved: 2/10 → 20%
- DAD-based or DAD-free
 - Pre-service DAD: 6/19 → 32%
 - In-service DAD: 6/19 → 32%
 - DAD-free: 7/19 → 36%

Classification results (II)

- Routing Protocol Dependency
 - Independent: 11/19 → 58%
 - Dependent: 8/19 → 42%
- Distributed/centralised approach
 - Centralised: 2/19 → 10%
 - Fully distributed: 12/19 → 64%
 - Partially distributed: 5/19 → 26%
- Partitioning/Merging support
 - Yes: 12/19 → 64%
 - No: 7/19 → 36%

Classification results (III)

- Prefix assignment support
 - Yes: 3/19 → 16%
 - No: 16/19 → 84%
- Protocol overhead
 - Message flooding: 7/19 → 37%
 - Local signalling/piggybacking: 9/19 → 47%
 - Passive: 3/19 → 16%