

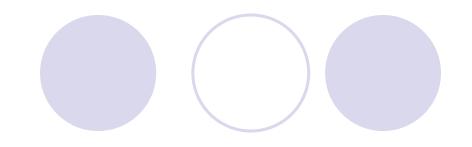




Survey of IP address autoconfiguration mechanisms for MANETs draft-bernardos-manet-autoconf-survey-01 69th IETF, Chicago – July 2007 Carlos J. Bernardos (UC3M) María Calderón (UC3M) Hassnaa Moustafa (orange-ftgroup)

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# Outline

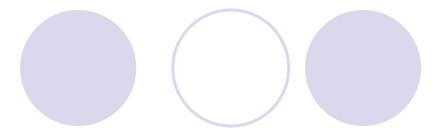


- Draft History
- Introduction and motivation
- Classification properties
- Solutions analysed
- Classification results
- Next Steps





## **Draft History**



- Version -00: July 2005
- Changes from -00 to -01
  - Added classification properties, considering
    - Autoconf Problem Statement I-D
    - MANET Architecture I-D
  - Autoconf proposals analysed based on these classification properties
  - Our More solutions have been added to the I-D





#### 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
  - OPURE MANETS
    - Standalone MANETs
    - MANET-local IP addresses
  - Hybrid MANETs
    - Connected MANETs
    - Global IP addresses (in addition to local ones)
    - 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





### **Classification Properties (III)**

- Distributed/centralised approach
- Partitioning/Merging support
  - Detect MANETs' partitioning
  - Oetect MANETs' merging
  - Over the 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





### 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:  $9/19 \rightarrow 47\%$
- Hybrid MANETs: 10/19  $\rightarrow$  53%
  - Gateway involvement
    - IGW involved: 8/10  $\rightarrow$  80%
    - IGW not involved:  $2/10 \rightarrow 20\%$

#### DAD-based or DAD-free

- $^{\circ}$  Pre-service DAD: 6/19 → 32%
- In-service DAD:  $6/19 \rightarrow 32\%$
- DAD-free: 7/19 → 36%





### Classification results (II)

Routing Protocol Dependency

- Independent: 11/19 → 58%
- Dependent: 8/19 → 42%
- Distributed/centralised approach
  - Centralised:  $2/19 \rightarrow 10\%$
  - Fully distributed:  $12/19 \rightarrow 64\%$
  - Partially distributed:  $5/19 \rightarrow 26\%$
- 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  $\rightarrow$  37%
  - $^{\circ}$  Local signalling/piggybacking: 9/19 → 47%
  - Passive:  $3/19 \rightarrow 16\%$





### Next Steps

- Comments are welcome
- Complete/refine analysed proposals
- Work on evaluation considerations for autoconf solutions
- Work on a general IP autoconf solution space analysis



