AUTOCONF proposal

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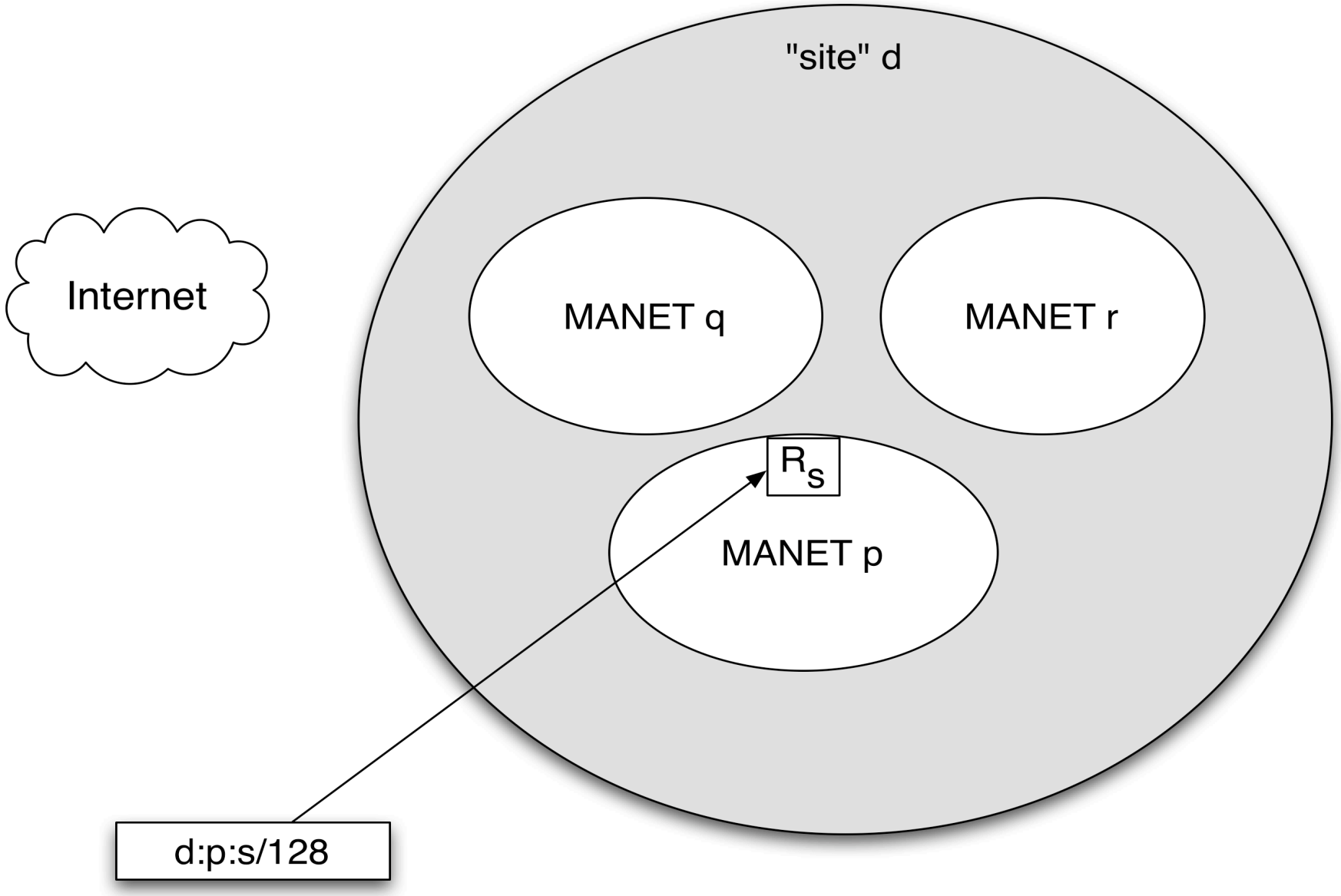
Design goals of the proposed autoconfiguration algorithm

- It should correspond to the address architecture model in draft-ietf-autoconf-adhoc-addr-model
- The allocated prefixes should be easily aggregatable using CIDR
- Allocation of MANET-local prefixes should not depend on link-local addresses
- Network overhead should be reasonable low

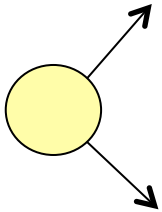
Addresses to be configured: MANET-scope



Router configuration 1/5

- Two-step approach:
  - Acquire the MANET-prefix
  - Choose a tentative address and verify the uniqueness in the MANET

- First router in a MANET:



Broadcast of Prefix Solicitation (PS) message to acquire the MANET prefix

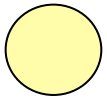
Router configuration 2/5

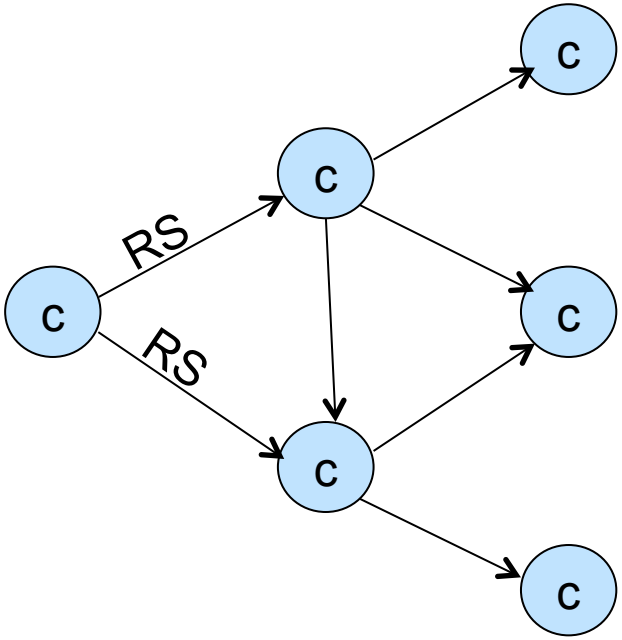
- From second router on

1. Initiator node sends Prefix Advertisement (PA) message including:
   - Universally Unique Identifier (UUID) of the initiator node
   - Prefix d:p: of the MANET
2. The requesting router chooses a random s
3. Next the requesting router sends a Router Solicitation (RS) message to the initiator node via link-local multicast including:
   - UUID of the requesting router
   - Target UUID of the initiator router
   - Chosen router prefix s

Router Configuration 3/5

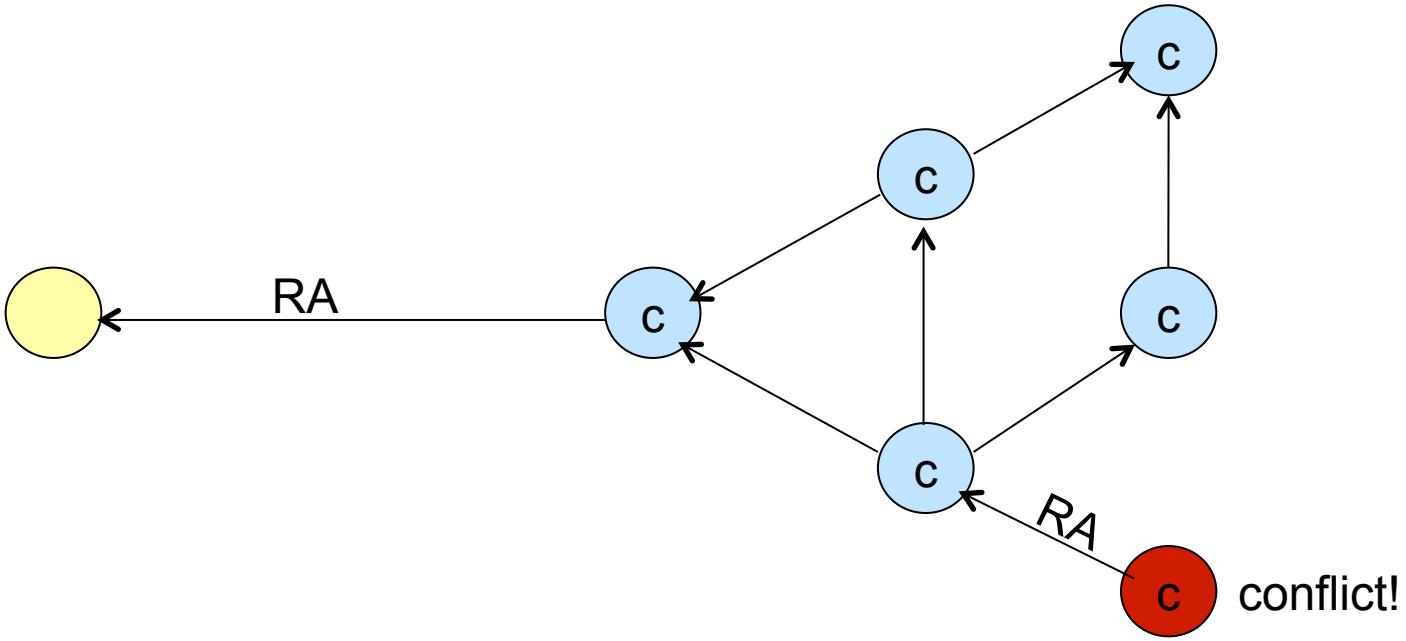
4. The initiator router starts the so-called AC-Timer and forwards the RS message via multicast in the MANET





Router Configuration 4/5

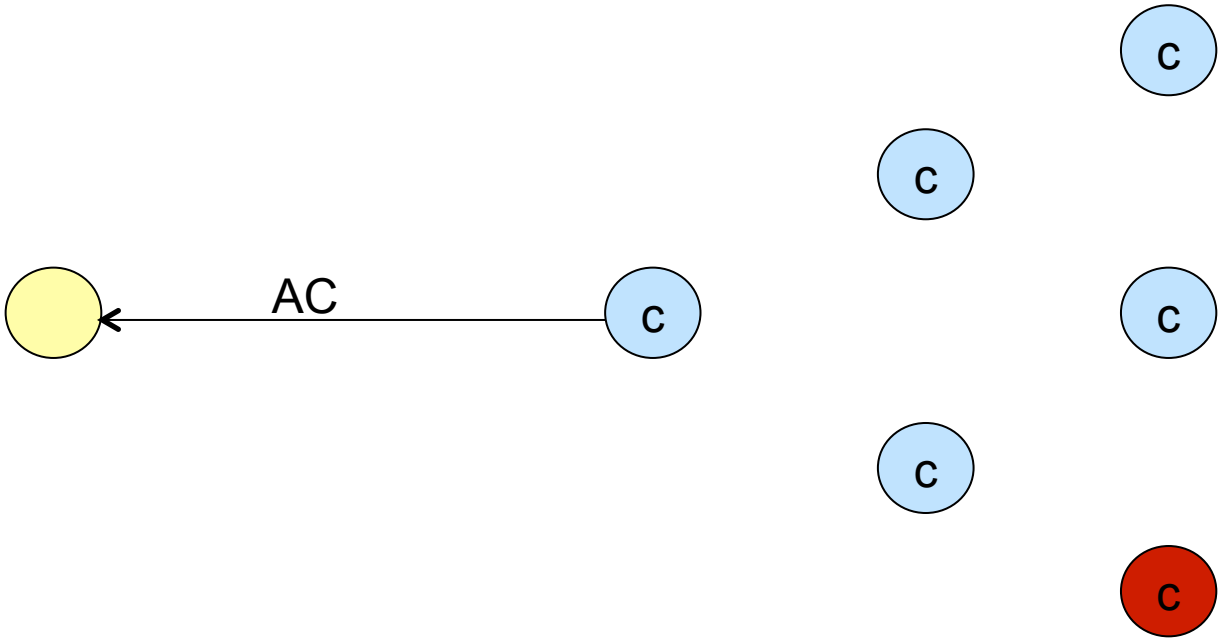
5. a) conflict!



The conflicting router broadcasts a Router Advertisement (RA) message which will then be forwarded by the initiator node

Router Configuration 5/5

5. b) no conflict



If no conflict occurs (i.e. no RA messages arrive at the initiator router), an Autoconfiguration Confirmation (AC) message is sent to the requesting router

Summary of router configuration

- Routers verify their unique router prefix in the MANET
- Routers may be aggregated as they share a common first prefix part
- No routing protocol is necessary (only broadcasting is used)
- No link-local addresses are used (only UUIDs)
- All messages are using RFC5444 for the message format

Possible optimizations

- Optimized broadcasting (e.g. MPR relaying):
  Reducing the number of multiple packets
- Proxying:
  Caching prefixes already seen in RS messages
- Jittering:
  Random delay before sending any message
- Unicast RA messages:
  Sending RA messages back using unicast

Summary

- The proposed protocol correctly configures MANET routers in a coherent way

Conclusion

- Implementation and simulation tested the protocol in real-life environments
- Formal validation by way of model checker (UPPAAL) has proven the algorithm to be correct