Multicast and Unicast MAC Address Asignment Protocol (MUMAAP)

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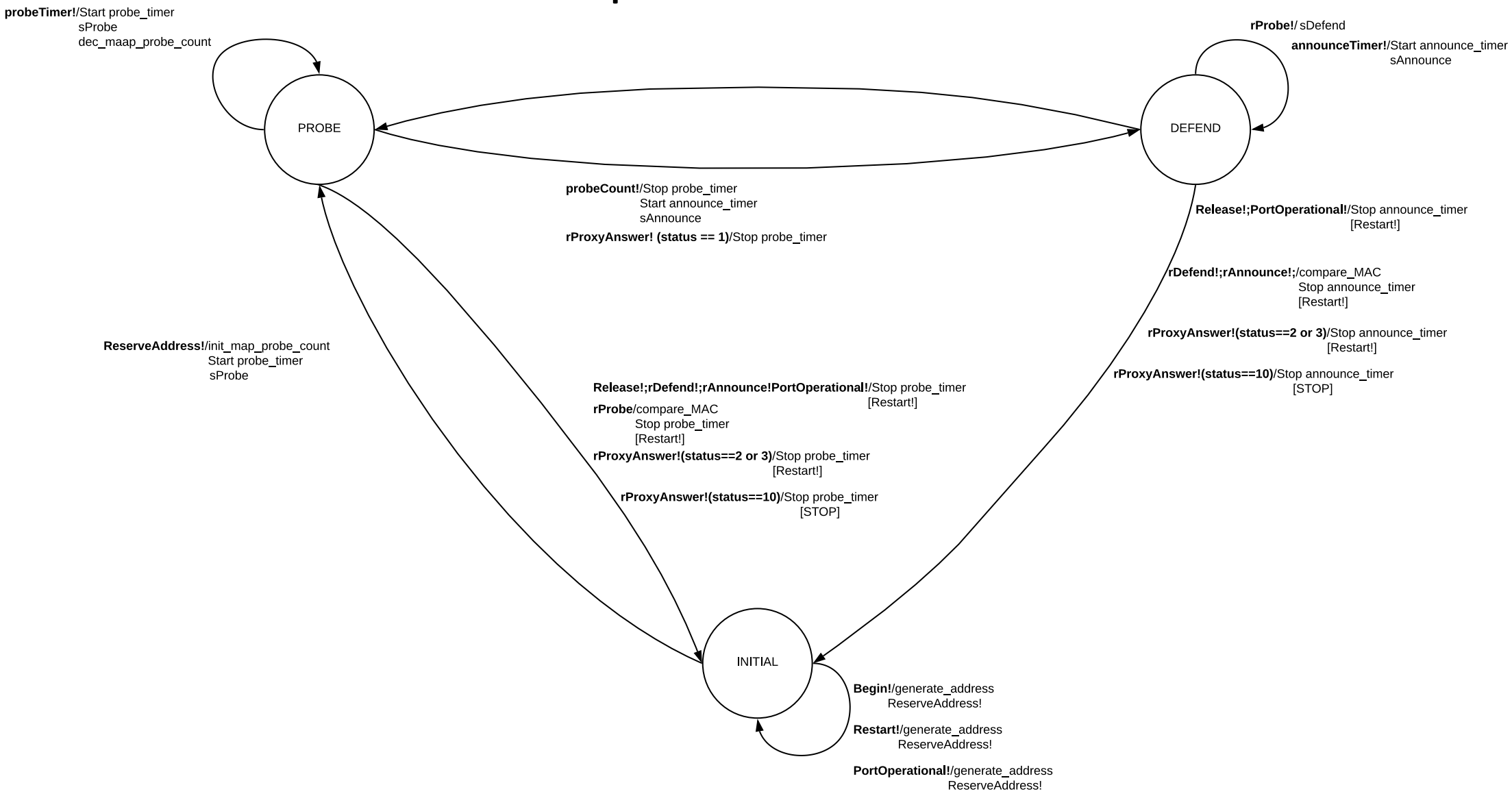
Introduction

- MUMAAP has two variants:
  - MASAP: MAC Address Self-Assignment Protocol.
    - MASAP is largely based on IEEE 1722 MAAP protocol
  - MAMAP: MAC Address Managed Assignment Protocol
    - MAMAP is inspired by DHCP operation

MASAP Operation

- Following the IEEE 1722 concept, MASAP is based on a PROBE, ANNOUNCE and DEFEND message exchange.
  - After choosing one MAC address, the station will send multiple PROBE messages to advertise the new address allocation
  - If no response is received, the station will go into ANNOUNCE and DEFEND mode, where it advertises its MAC address allocations periodically.
  - In case a PROBE containing an allocation colliding with any of the owned allocations, the station will answer with DEFEND messages.
  - In specific cases, a Proxy in the network can maintain a record of addresses in use and respond to PROBE messages directly.

MASAP Protocol Operation



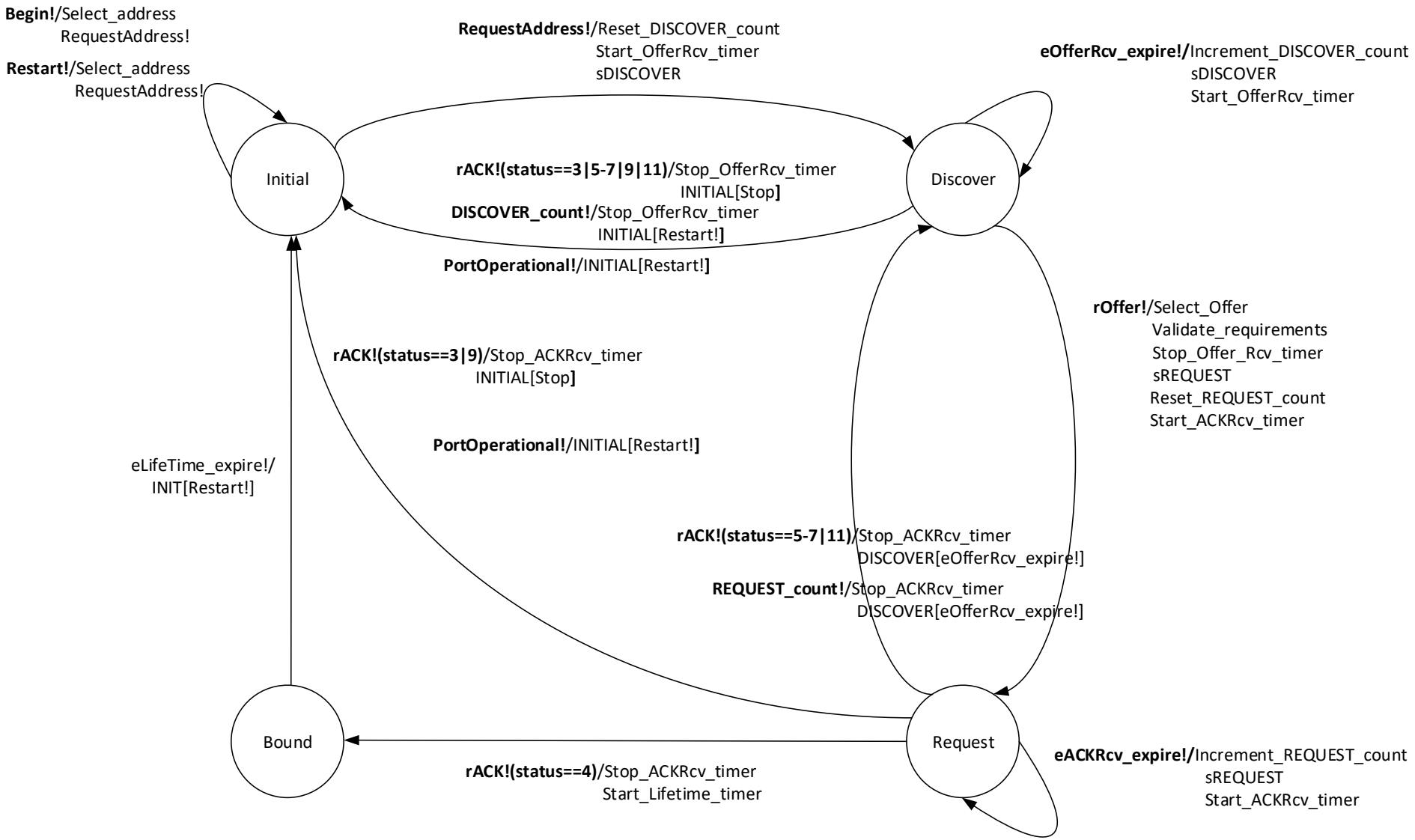
MASAP Message Addressing

- MASAP makes use of the following rules for addressing:
  - Source MAC address for MASAP_PROBE messages will be chosen randomly from a range specified in IEEE 802.1CQ.
  - Source MAC address for MASAP_DEFEND and MASAP_ANNOUNCE messages will use the MAC Address previously assigned or the EUI-64/48 assigned to the station.
  - Destination MAC address for MASAP_PROBE messages corresponds to the multicast address specified in IEEE 802.1CQ.
  - Destination MAC address for MASAP_DEFEND and MASAP_ANNOUNCE messages correspond to the source MAC address of the MASAP_PROBE message.

MAMAP Operation

- MAMAP is used for assign unicast and multicast addresses following IEEE 802c SLAP definition with clients discovering and requested addresses from a MAMAP server(s) or proxy in the network.
- It follows a 4 messages exchange, with DISCOVER, OFFER, REQUEST and ACK messages
- The state machine is based on 4 states: INITIAL, DISCOVER, REQUEST and BOUND

MAMAP Operation



MAMAP Addressing

- MAMAP makes use of the following rules for addressing:
  - Source MAC address for MAMAP_DISCOVER messages will be chosen randomly from the range defined in IEEE 802.1CQ.
  - Source MAC address for MAMAP_REQUEST messages will use the MAC Address previously assigned or the EUI-64/48 assigned to the station.
  - Destination MAC address for MAMAP_DISCOVER messages corresponds to the multicast address specified in IEEE 802.1CQ.
  - Destination MAC address for MAMAP_OFFER and MAMAP_ACK messages correspond to the source MAC address of the MAMAP_DISCOVER message.

Message formats

- Both MUMAAP variants share the same message format, under a new Ethertype.

0							7	8		10	11				15	16													31
subtype								ver			message_type					control_word													
Cookie																Status								length				

MUMAAP Subtype	
MASAP	TBD
MAMAP	TBD

Message formats

Value	Function	Description
0	---	Reserved
1	MASAP_PROBE	Probe MAC address(es)
2	MASAP_DEFEND	Defend MAC address(es)
3	MASAP_ANNOUNCE	Announce MAC address(es)
4	MASAP_PROXY_ANSWER	Answer from proxy regarding Probe messages
5	MAMAP_DISCOVER	Request for a MAC address to a Server
6	MAMAP_OFFER	MAC allocation offer from the server
7	MAMAP_REQUEST	Confirmation of the addresses to be allocated
8	MAMAP_ACK	Confirmation of allocation from server to station or error reporting
8-1024	--	Reserved

Message types

Bit	Name	Description
0	AAI	Bit set to 1: Address in the AAI space requested/provided
1	ELI	Bit set to 1: Address in the ELI space requested/provided
2	SAI	Bit set to 1: Address in the SAI space requested/provided
3	Reserved	Reserved for future use
4	64/48 bits	Bit set to 1: 64 bits address requested/provided Bit set to 0: 48 bits address requested/provided
5	Multicast/Unicast	Bit set to 1: Multicast address requested/provided Bit set to 0: Unicast address requested/provided
6	Infrastructure/Station	Bit set to 1: Message source is Server/Proxy Bit set to 0: Message source is an end-node
7	MAC Provided	Bit set to 1: MAC address is provided Bit set to 0: MAC address is not provided This bit is used by a station providing an already used MAC address as hint to a Server.
8	Station ID provided	Bit set to 1: Station ID is provided Bit set to 0: Station ID is not provided
9	Network ID provided	Bit set to 1: Network ID is provided Bit set to 0: Network ID is not provided
10	Code field provided	Bit set to 1: The message contains a code field Bit set to 0: The message does not contain a code field
8	Specific address type	Bit set to 1: Specific address type information is provided Bit set to 0: Specific address type information is not provided
12-15	Reserved	Reserved for future use

Control Word

Message formats

Value	Description
0	Field not used
1	MAC Range not in use
2	MAC Range in use
3	Re-generate addresses in the given prefix and use MASAP
4	ACK – Assignment accepted
5	Failure – Assignment cannot be completed
6	Failure – Requested quadrant not available
7	Failure – Requested range not available
8	Offer provided
9	Mandatory use of MASAP
10	Mandatory use of MASBAP
11	Parameter problem
12	Offer Provided - Partial fulfillment
13-15	Reserved

Status codes

Type ID	Description
0	Station ID
1	48 bits MAC Address (Range)
2	64 bits MAC Address (Range)
3	Network ID
4	Specific MAC Range
5	48 bits MAC Range in Conflict
6	64 bits MAC Range in Conflict
7	MAC Address Count
8	Lifetime

Message Options