Generic Address Assignment Option for 6LoWPAN
Neighbor Discovery

draft-iannone-6lo-nd-gao-02
draft-iannone-6lo-nd-gao-03

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Email expansions
History

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draft-iannone-6lo-nd-gao

00 01 02 03

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Main changes: Revised message sequence and processing to improve clarity
General Changes

- Welcome Adnan!

- Removed (a lot) of typos

- Updated IANA section according to IANA review
Message Sequence & Processing text improvements

No technical changes just improved text

- Better clarify the two phases
- Created two subsections for each phase
7.1. Request Phase

When the node requests an address, the node will go through the following steps:

1. The node will issue an NS message with the GAAO option to request an address assignment. This initial GAAO option has a length equal to ROV’s length as a multiple of 8 bytes plus one (no address appended), Status/Prefix set to 0 opaque, as well as the P-bit and I-bits will be set according to local configuration. The C-bit is set to zero. The F-bits are set according to the type of address it is requesting. The AAF is set to zero if no preference for the assignment algorithm. The lifetime field is set to the minimum desired lifetime, or zero otherwise.

2. Assuming no errors occur, the node will receive an NA message with a GAAO option with a length increased by two compared to the corresponding NS message, because of the presence of the address/prefix field. All fields have been copied back except for:
   - Prefix: now indicating the length of the prefix.
   - C: The C bit is set if the GLR requests a confirmation via a registration procedure.
   - AAF: Indicating the Address Assignment function, i.e., the algorithm, used to assign the address/prefix. If the node is a GLR it will use the same AAF to generate addresses/prefixes to requesting neighbor nodes.
   - Assigned lifetime: the maximum lifetime of the assigned address/prefix.

The message sequence is depicted in Figure 3.

![Figure 3: Address/Prefix assignment with d6AO message sequence and no confirmation request.](image)
### Optional Confirmation Phase

Depending on the algorithm in use and the underlying technology, the address assignment procedure terminates after these two messages. This may be sufficient for instance in deployments where the link layer offers reliable packet delivery.

If the C bit is set, to confirm the acceptance and usage of the proposed address/prefix received in the NA message, the GLN has to register with the obtained address following the procedures in [RFC7586], [I-D.ietf-glo-mcast-registration], or [I-D.ietf-glo-prefix-registration] depending on the type of address.

*In the case the complete sequence of actions is depicted in Figure 4.*

![Diagram](image)

- **GLN**
  - NS(GAOG)
  - NA(GAOG)
  - [_______]
  - NS(EARD)

- **GLR**
  - NS(GAOG)
  - NA(GAOG)
  - [_______]
  - NS(EARD+TLLAO)

*Procedure According to [RFC7586], [I-D.ietf-glo-mcast-registration], or [I-D.ietf-glo-prefix-registration] depending on the type of address.*

*Figure 4: Address/Prefix assignment with GAOG message sequence.*

The specifications in [RFC7586], [I-D.ietf-glo-mcast-registration], and [I-D.ietf-glo-prefix-registration], define how nodes can keep address/prefix registering state so to maintain addressing in case of reboot. When needed, in order to use this feature with GAOG, after reboot the optional confirmation phase MUST be used to perform an explicit registration. However, when using GAOG, and when performing the re-registering, if a “registration refresh request” or “invalid registration” status value is returned, the node MUST restart from the top with the initial request phase.

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- **Added text about reboot**
  1. At boot time, if state available in non-volatile memory then just re-register addresses
     - In case of error, restart from request phase
  2. Otherwise, if no state available in non-volatile memory, start from request phase
7.3. Message exchange optimization

The request of a prefix/address uses a RS/RA transaction likewise prefix/address registration. In order to reduce the number of transactions the GAA Option MAY be used at the same time like the EARO+TLLAO options. In other words the GAA Option can be picky-bagged on other transactions. For instance, it can be picky-bagged in an link-layer address registration, as shown in Figure 5. In this case the returning RA will contain two addresses, one in the TLLAO Option, namely the registered link-layer-address, and one directly appended in the GAA Option, namely the offered prefix/address.

Figure 5: Message sequence when GAA Option is picky-bagged on a link-layer registration transaction.

When prefix/address request is performed at boot time, the GAAO request MAY be appended as an option of the first RS message, implicitly signaling that the node sending the RS message supports the specifications in the present document. In the same way, the responding routers that support this document send back a prefix/address offer in a GAAO option appended to the returning RA message, as depicted in Figure 6.

Figure 6: Message sequence when GAAO option is used with the RS/RA transaction.

GAAO that do not support GAAO will simply ignore the option, and the corresponding RA, which will not include the GAAO Option, implicitly signaling that the feature is not supported.

- GAA Option usage with other options
- GAAO can be used during a registration transaction
  - The registered address in the TLLAO
  - The GAAO assigned address is directly appended to the GAA Option
- GAAO can be used with RS/RA exchange
  - Option is ignored if not supported
Next Steps

- Document relatively stable
- Time to consider WG Adoption?
- All help and feedback is welcome ;-)