
Prefix and Address Assignment in a Home Network

draft-pfister-prefix-assignment
Changes from version 00 to 02

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Changes outline

Minor changes

- ❖ Network leader definition *terminology*
- ❖ Designated router election *optimization*

More significant changes

- ❖ Ad-Hoc interface mode *configured option*
- ❖ Downstream prefix delegation *fully specified*
- ❖ Delegated prefix deprecation mechanism *new*
- ❖ Prefix selection algorithm *suggested algorithm in appendix*

Network leader election

- ❖ The network leader is the router with the highest router ID in:
 - Assigned prefixes
 - Advertised delegated prefixes
- ❖ Already used in 00 for ULA address generation.
- ❖ Could be used by other algorithms that need a single leader.

Designated router election

When no prefix is assigned on a given link:

- ❖ *Previously:* A router always considers itself designated.

Generates collisions when multiple routers try to assign the first prefix on some link.

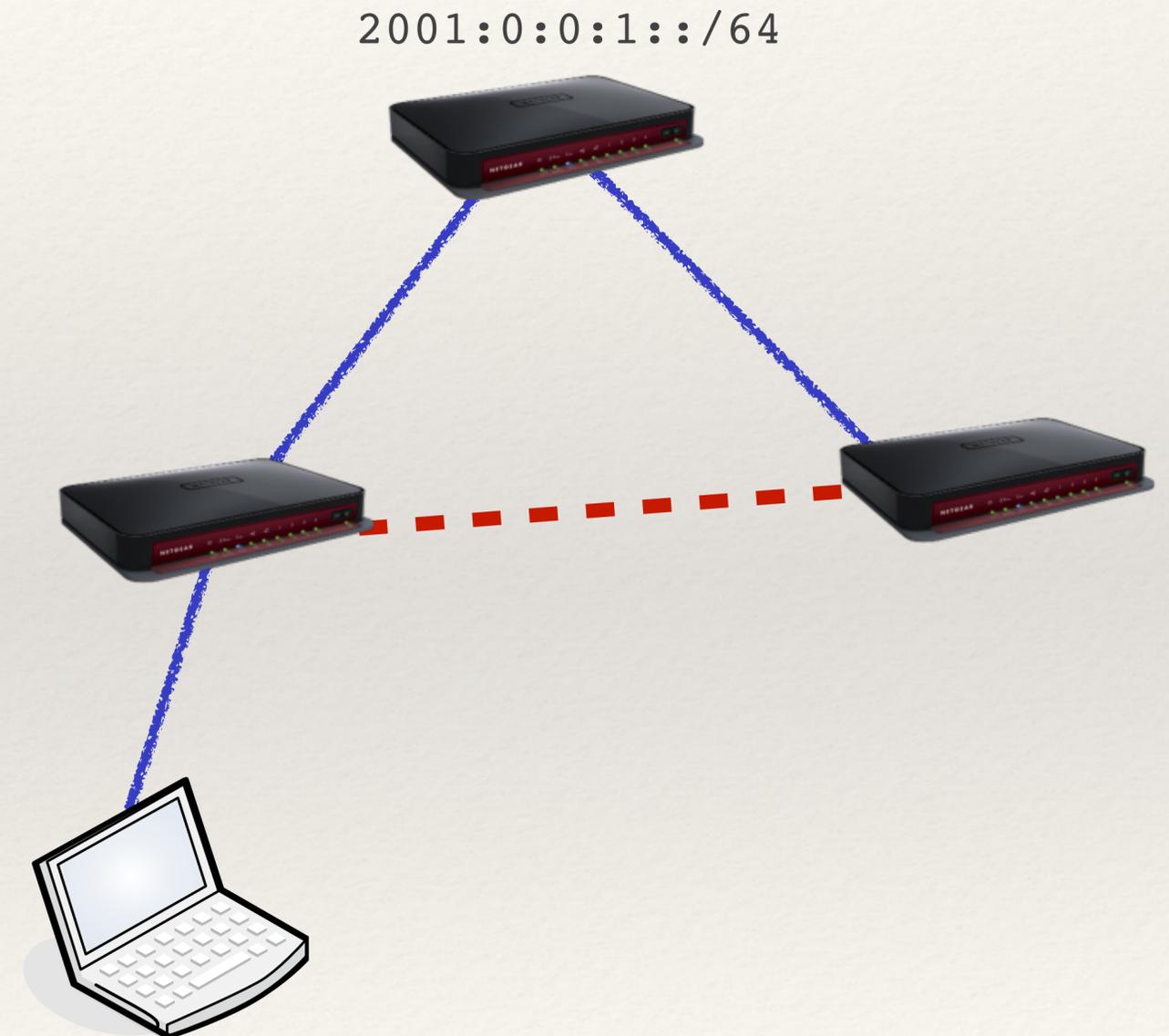
- ❖ *Now:* A router considers itself designated unless it knows some other router on the link has a higher router ID.

Depends on the Flooding Protocol's capabilities. Implementation based on HNCP supports it.

Interface Ad-Hoc mode

To be used when link's neighboring relationships are not transitive.

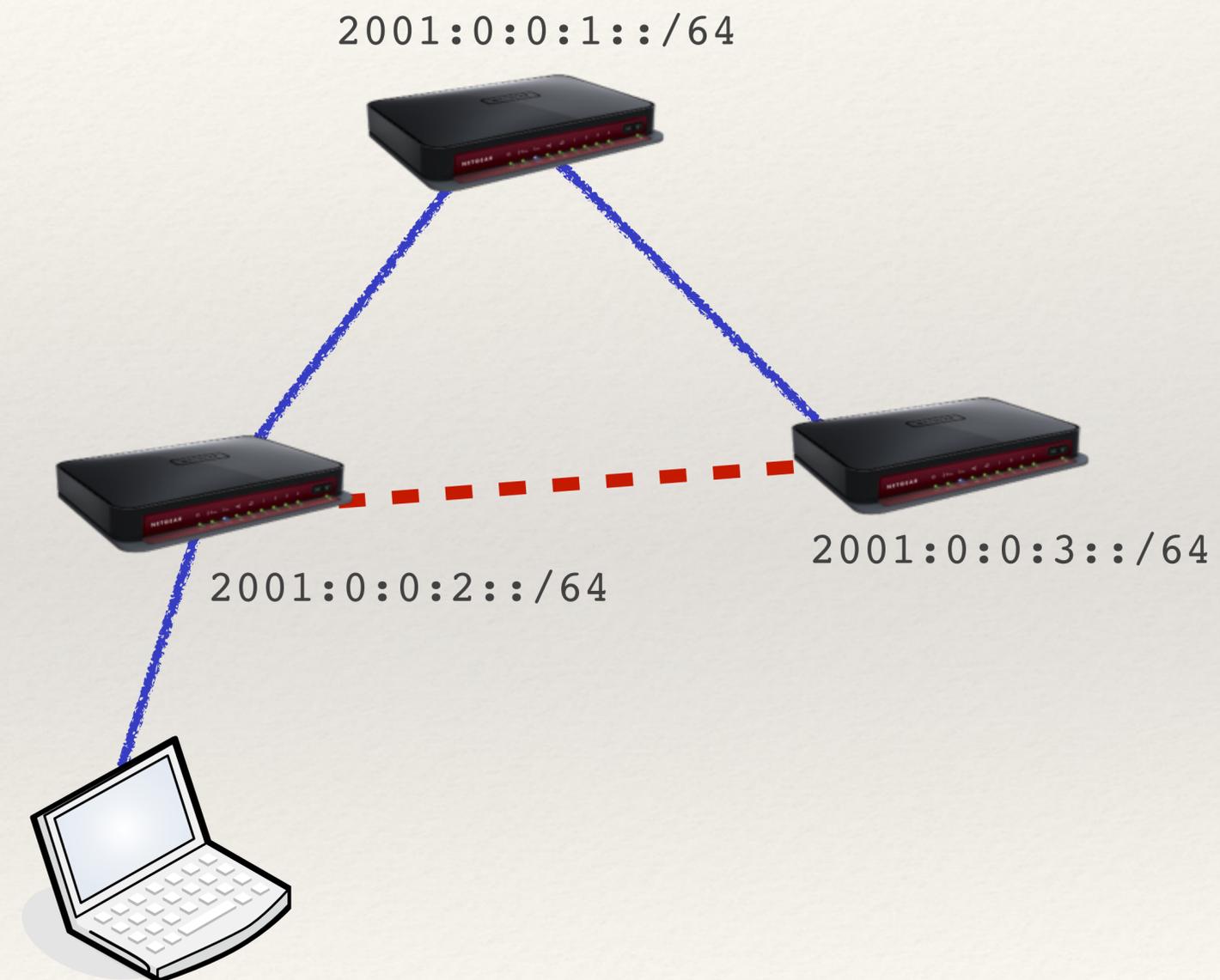
- ❖ By default, hosts could be unable to receive RAs.



Interface Ad-Hoc mode

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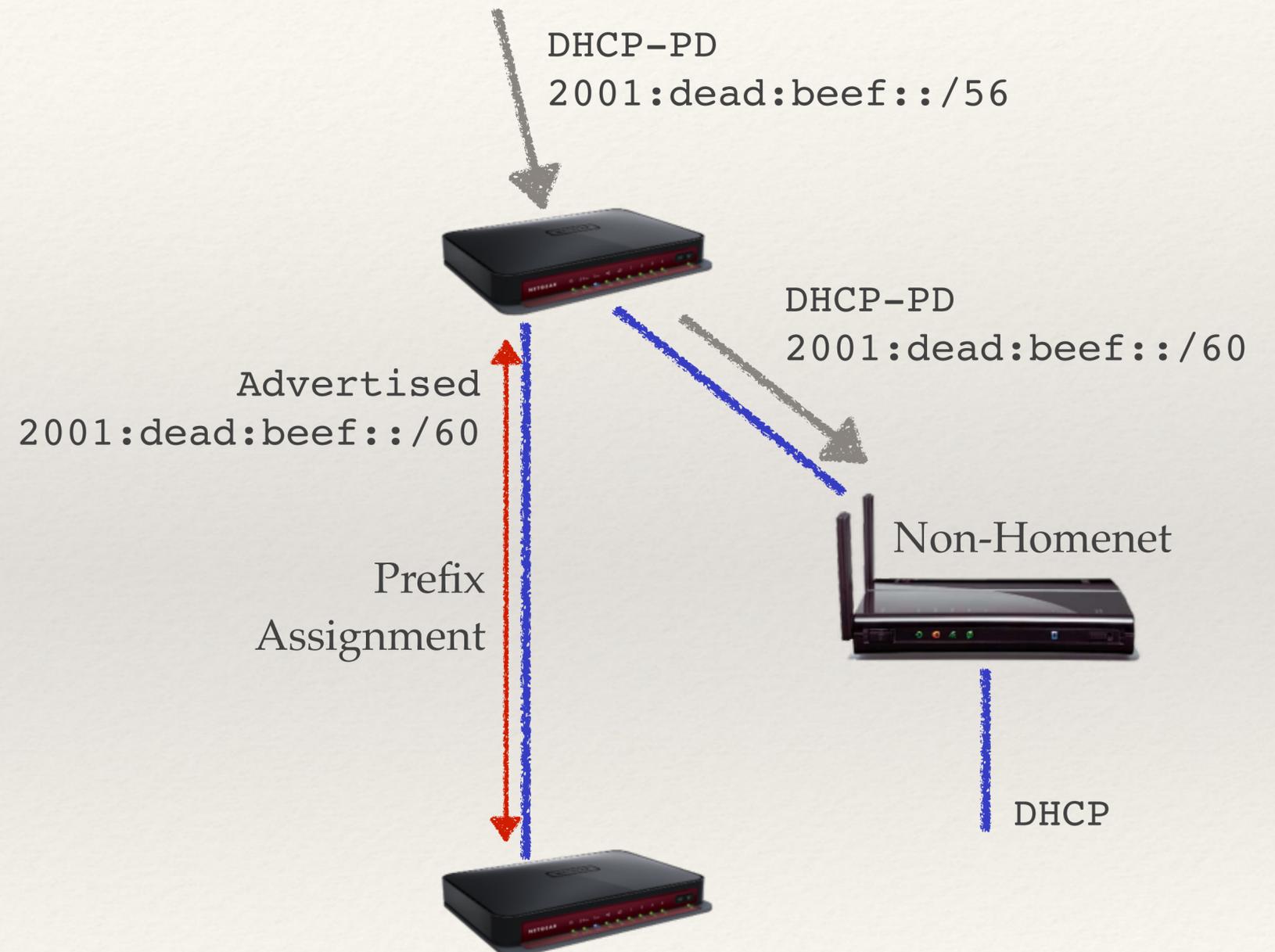
- ❖ By default, hosts could be unable to receive RAs.
- ❖ Every router considers itself as designated.
- ❖ All routers will assign and serve prefixes for their own part of the Ad-Hoc link.



Downstream Prefix Delegation

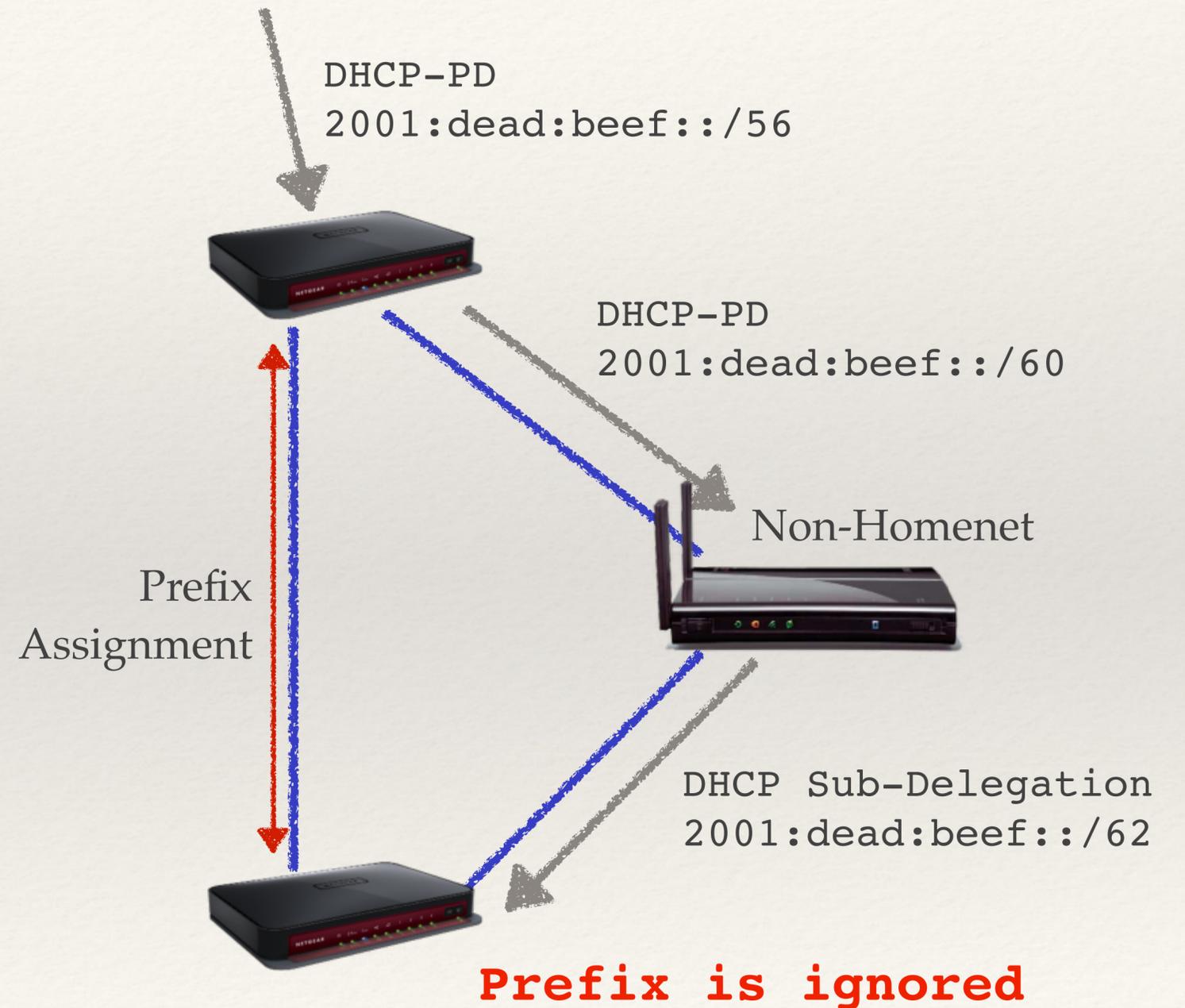
A router MAY support downstream prefix delegation.

Delegated prefixes are advertised by both *flooding* and *routing* protocols as assigned on a private link.



Downstream Prefix Delegation

If an advertised delegated prefix is included in another advertised delegated prefix, it is ignored.



Delegated prefix deprecation mechanism

In case of flapping links, it makes sense to keep using a delegated prefix for some time even when the advertising router disappears.

- When a node disappears, other routers **MUST** keep using the Delegated Prefixes that were advertised by the disconnected node.
- When a Delegated Prefix must not be used anymore (e.g. DHCP-PD reconfigure), it **MUST** be advertised with a lifetime of *zero*. It is then deprecated.

Prefix selection algorithm

Prefix Assignment explains how to claim and assign prefixes. But selecting the right prefix is challenging.

It must be:

- ❖ Random *enough* to avoid collisions
- ❖ Stable across reboots
 - Pseudo random (deterministic)
 - Stable storage (killing SSD)
- ❖ Avoid wasting prefix space

Prefix selection algorithm

Proposed selection algorithm works as follows.

1. Select a desired prefix length
2. Find N (e.g. 256) possibilities amongst available prefix of
 - Longest prefix length
 - Smallest value
3. Try pseudo random prefixes included in the Delegated Prefix. If part of the chosen set, use it.
4. If no pseudo-random prefix is found, take a random one among the N s.

Thanks

Implementation at www.homewrt.org
Available as OpenWrt package.