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Department of Information Technology

Course Name – 19IT503 Internet of Things

III Year / V Semester

Unit 4 – IPv6 TECHNOLOGIES FOR THE IOT

Topic 5- Modifications to IPv6 Neighbor Discovery

Modifications to IPv6 Neighbor Discovery

Existing Protocols modified with the following options

- Modified Router Advertisement Message
- Modified Prefix Information Option
- New Advertisement Interval Option
- New HA Information Option
- Changes to Sending Router Advertisements

Modifications to IPv6 Neighbor Discovery

Modified Router Advertisement Message

- MIPv6 modifies the format of the router advertisement message by the addition of a single flag bit to indicate that the router sending the advertisement message is serving as an HA on this link.

Modified Prefix Information Option

- MIPv6 requires knowledge of a router's global address in building an HA list as part of the dynamic HAAD mechanism.

- MIPv6 extends neighbor discovery defined in RFC 2461 to allow a router to advertise its global address by the addition of a single flag bit in the format of a prefix information option for use in router advertisement messages.

New Advertisement Interval Option

- MIPv6 defines a new advertisement interval option, used in router advertisement messages to advertise the interval at which the sending router sends unsolicited multicast router advertisements.

Modifications to IPv6 Neighbor Discovery

New HA Information Option

- MIPv6 defines a new HA information option, used in router advertisements sent by an HA to advertise information specific to this router's functionality as an HA.

Changes to Sending Router Advertisements

- The basic NDP specification limits routers to a minimum interval of 3s between sending unsolicited multicast router advertisement messages from any given network interface.

- This option used for faster movement detection, that is to increase the rate at which unsolicited router advertisements are sent.

- MIPv6 may send unsolicited multicast router advertisements more frequently.

Requirements for Various IPv6 Nodes

IPv6 nodes - Any IPv6 node may at any time be a CN of an MN.

IPv6 nodes with support for route optimization

- The node must be able to validate a home address option using an existing binding cache entry.
- The node should be able to interpret ICMP messages.
- The node must be able to send Binding Error messages.
- The node must be able to process Mobility Headers.
- The node must be able to participate in a return-routability procedure.
- The node must be able to process BU messages.
- The node must be able to return a BA.
- The node must be able to maintain a Binding Cache of the bindings received in accepted BUs.

Requirements for Various IPv6 Nodes

IPv6 routers

- Every IPv6 router should be able to send an advertisement interval option in each of its router advertisements, to aid movement detection by MNs.

- The use of this option in router advertisements should be configurable

- Every IPv6 router should be able to support sending unsolicited multicast router advertisements at a fast rate (the used rate should then be configurable)

- Each router should include at least one prefix with the router address (R) bit set and with its full IP address in its router advertisements

Requirements for Various IPv6 Nodes

IPv6 routers that serve as an HA

- Every HA must be able to maintain an entry in its binding cache for each MN for which it is serving as the HA
- Every HA must be able to intercept packets (using proxy neighbor discovery) addressed to an MN for which it is currently serving as the HA, on that MN's home link, while the MN is away from home
- Every HA must be able to encapsulate such intercepted packets in order to tunnel them to the primary CoA for the MN indicated in its binding in the HA's binding cache
- Every HA must support decapsulating reverse tunneled packets sent to it from an MN's home address.
- Every HA must also check that the source address in the tunneled packets corresponds to the currently registered location of the MN
- The node must be able to process mobility headers.
- Every HA must be able to return a BA in response to a BU
- Every HA must maintain a separate HA list for each link on which it is serving as an HA

Requirements for Various IPv6 Nodes

IPv6 MNs

- The node must maintain a BU list
- The node must support sending packets containing a home address option and follow the required Ipsec interaction
- The node must be able to perform IPv6 encapsulation and decapsulation
- The node must be able to process type 2 routing header
- The node must support receiving a binding error message
- The node must support receiving ICMP errors
- The node must support movement detection, CoA formation, and returning home
- The node must be able to process mobility headers
- The node must support the return-routability procedure
- The node must be able to send BUs
- The node must be able to receive and process BAs
- The node must support receiving a BRR by responding with a BU
- The node must support receiving mobile prefix advertisements and reconfiguring its home address based on the prefix information contained therein
- The node should support use of the dynamic HAAD mechanism
- The node must allow route optimization to be administratively enabled or disabled. The default should be enabled

THANK YOU