Bluetooth Friendship

For Home Security Project

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This document is intended to define how Friendship will be used with the nodes in the system to support Low Power nodes and save some power.

If anything is unclear, ambiguous or needs to be changed, please notify the team so this document can be updated and everyone can stay up-to-date with changes.

Note: It is strongly recommended that any 'magic numbers' mentioned in this document be implemented with #defines in code so that if, for any reason, they need to be changed that can be done so easily

References:

<https://www.bluetooth.com/blog/bluetooth-mesh-networking-series-friendship/>

Spec: <https://www.bluetooth.com/specifications/mesh-specifications/>

**Friend Node**

The network will contain only one Friend node. This is the central node that displays alarms and accepts user (‘homeowner’) input. It will be the Friend node for all of the low power nodes in the system.

**LPN**

All other nodes (the sensor nodes, providing alarms) will be low power nodes. This will allow them to sleep most of the time and save power.

**Establishing Friendship**

The system should try to ensure that the LPNs always have a Friendship with the Friend node. When the LPN first initializes, it should immediately send a Friend Poll. The only Friend node must accept this request and send back a Friend Offer; the LPN then must accept this offer.

If for any reason the LPN loses its friendship (a poll timeout, for example), this sequence of events must immediately start back up.

**Parameters**

The 3 parameters that define timings in the Friendship relationship are the Receive Delay, Receive Window, and Poll Timeout.

Receive Delay and Receive window can be implemented as desired by the programmer for each node. Keep in mind that there may be up to 3 LPNs sharing a single friend, so sufficient time should be provided for the friend node to handle requests from all of these LPNs at once.

The Poll Timeout can also vary from node to node, but it is recommended to be 1 second. This is a very long time between communications, but there are no communications sent from the Friend to LPN that are urgent. Time-sensitive messages (e.g. alarms) all go from the LPN to the friend. This lets the LPN sleep as much as possible.