



Lightweight GRASP

(draft-zhu-anima-lightweight-grasp-01)

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Lightweight GRASP (Motivation)

- IoT networks need self-management functions and PROTOCOL
- Although GRASP was designed for self-management, it is not an ideal choice for the IoT
- GRASP is built on TCP and IPv6/IPv4. For resource-constrained devices in the IoT, there are many issues:
 - Both TCP and IPv6/IPv4 are heavy
 - Additional latency, control overhead, and memory consumption are caused by complex reliability mechanisms of TCP
 - TCP performs badly in the weak network environment, such as un-stable mobile environment, ad hoc networks, etc.



Lightweight GRASP (Details)

- Shorten the fixed fields:
 - Change the 32-bit session id to 16-bit
 - Change the objective name with indefinite length in the form of a text string to the 8-bit objective number

- Introduce an UDP-based mechanism with an alternative message-oriented built-in reliability mechanism
 - (details in the next page)



Lightweight GRASP (Details)

- Introduce a message-oriented built-in reliability mechanism:
 - UDP-based, removes the dependence on TCP
 - Acknowledgment based on the 16-bit number (i.e., Nonce) carried in messages
 - Timeout with retransmission
 - Newly define two options (i.e., the req-ack for acknowledgment request, and the ack option for an acknowledgment, both with a Nonce in) and an ACK message
 - All the unicast messages must be acknowledged. Hence, they must carry a req-ack option and also zero or more ack options, while the multicast messages are not allowed to carry the req-ack or the ack option



Lightweight GRASP (Details)

- Discuss the possibility of IP-independent method:
 - For some IoT networks, IP connections may not be supported
 - In order to adapt LW-GRASP to networks without IP: a new Locator option and a new protocol identifier should be selected and defined
 - An example: Exchange LW-GRASP over BLE



Lightweight GRASP (Discussion)

- Good review from Brian Carpenter, most of comments are addressed :
 - A recipient-side duplicate detection mechanism based on the nonce cache have been added
 - A negative acknowledgment mechanism, when UDP checksum failed, have been added
 - Still need work: more security issues concerning constrained nodes and their possible solution will be considered together with the balance of their constrained resources
- More reviews and comments are welcome.
- The authors think this work is valuable and in the scope of the ANIMA WG. We would like to ask adoption.



Thanks!