Topic: Connect Time Delay Algorithm

Gemini Public

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1 Brief Description

<PRE TEMPLATE CONTENT>

Random time delay algorithm needed to ensure that all CONSUMER systems do not try to connect with new PROVIDER at instant of "Hello" announcement; for example, connecting an infusion pump to an SDC network with 1,000 other systems connected (see Meeting Logs & Notes - 2020.06.23[1])

Peter Kranich[2]

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1 https://confluence.hl7.org/pages/viewpage.action?pageId=82915047
2 https://confluence.hl7.org/display/~peter.kranich%40philips.com
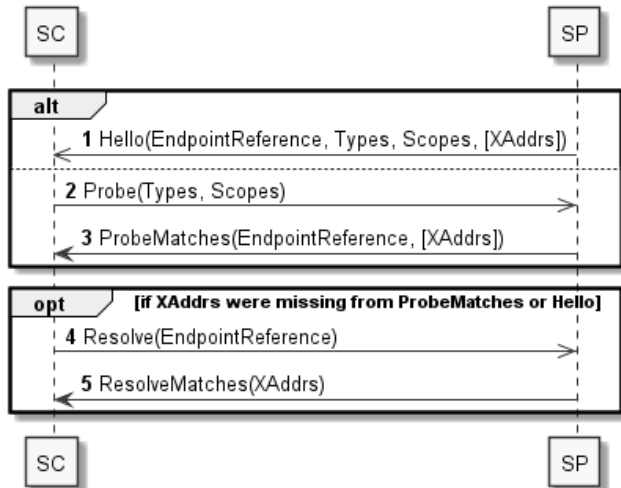
2 Final Approach

There are two different means to avoid processing bursts on SDC SERVICE PROVIDERs caused by SDC SERVICE CONSUMERs concurrently trying to reach out for a (TLS) connection. One measure can be controlled by the SDC SERVICE PROVIDER, the other by the SDC SERVICE CONSUMER.

2.1 Delayed ResolveResponse

IEEE 11073-20701 normatively references DPWS which in turn leverages WS-Discovery to provide distributed (ad-hoc) or centralized (managed) service registries. WS-Discovery basically decomposes into two message sequences, implicit and explicit discovery.

- Implicit discovery is covered by participants announcing themselves by sending Hello messages
- Explicit discovery is covered by participants probing for services

See below the message sequence. While Hellos and ProbeMatches convey certain service metadata, there is another message request/response, namely Resolve/ResolveResponse. This message exchange conveys actual physical addresses opposed to Hello and ProbeMatches which can but may not include them.

> **An SDC SERVICE PROVIDER MAY omit physical addresses from the WS-Discovery Hello and ProbeMatches messages and delay the response of ResolveMatches messages.**
>
> This inhibits SDC SERVICE CONSUMERs from initiating (TLS) connections right after receiving Hello or ProbeMatches messages.
>
> It's up to the MANUFACTURER to choose a delay that fits the hardware capabilities of their SDC SERVICE PROVIDER for concurrent connection requests.

2.2 Configurable Priority Groups

IEEE 11073-20701 proposes the concept of priority groups inflicting SDC SERVICE CONSUMERs to postpone initial connection requests once being in possession of an SDC SERVICE PROVIDER's physical address. Depending on the priority groups 0 to 10, with increasing group numbers the initial connection delay increases linearly based on random or fixed durations in predefined intervals.

This priority group concept does not define numbers for specific purposes but rather appeal to MANUFACTURERs to implement priority groups meaningful to their SDC SERVICE CONSUMER's purpose.

> **An SDC SERVICE CONSUMER SHOULD be configurable with a priority group number in accordance to IEEE 11073-20701, R0076.**
>
> As it is hard to determine the priority of a certain SDC SERVICE CONSUMER in all and every circumstance, configurable options allow for flexible adaptation on environmental changes.

3 2020.06.30 Discussion

1. The -20701 (8.1.5) R0076 addresses w/ internal priority group + randomized connection algorithm
2. Priority groups are not defined in the standard or per device type
3. Should be a service setting *configurable* per installation
4. Algorithm could be fixed or randomized (0 - 5 seconds)
5. Additional random time in -20702 => DPWS "app max delay"; pertains to the UDP multi-cast messages

☑ David Gregorczyk[3] Write up final approach to question; guidance on "configurability" of priority groups etc.

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3 https://confluence.hl7.org/display/~david_gregorczyk