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TECHNIQUES TO FACILITATE REDUNDANCY FOR DYNAMIC TELEMETRY SUBSCRIPTIONS IN A NETWORK ENVIRONMENT

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ABSTRACT

Network administrators often desire redundancy when creating telemetry subscriptions in order to ensure that updates are not lost if a particular receiver fails. However, dynamic telemetry subscriptions do not offer a natural way to achieve such a redundancy. Proposed herein are techniques to facilitate redundancy for dynamic telemetry subscriptions through which multiple telemetry data receivers, that each initiate a dynamic telemetry subscription Remote Procedure Call (RPC) towards a device, can be attached to an existing subscription initiated by a first receiver as long as parameters for the subscription RPCs initiated by the receivers are identical to parameters for the existing subscription initiated by the first receiver. Such techniques can be utilized to reduce duplication in collecting data from a backend and also to enable higher scaling.

DETAILED DESCRIPTION

Redundancy is often desired when creating telemetry subscriptions in order to ensure that updates are not lost if a particular receiver fails. However, dynamic telemetry subscriptions (e.g., over Network Configuration protocol (NETCONF) interfaces or Google™ Remote Procedure Call (gRPC) Network Management Interface (gNMI) interfaces) do not offer a natural way to achieve such a redundancy. Typically, when multiple clients want to subscribe to the same data (for redundancy), each one sends a subscription remote procedure call (RPC) independently, creating multiple subscriptions on a device, with each subscriber modelled as a receiver and attached to each respective subscription. Google™ is a registered trademark of Google LLC.

This results in unnecessary overhead, wastes resources, and, for large datasets, can cause unacceptable Central Processing Unit (CPU) and/or memory load on the device that fulfills a subscription. There is also no guarantee in this case that all clients would receive identical data. Thus, it would be desirable to replicate the same updates from one dynamic

subscription to multiple receivers while minimizing unnecessary resource use. Figure 1, below, illustrates a network architecture involving conventional telemetry redundancy mechanisms in which multiple, identical/duplicative subscriptions are maintained in order to facilitate telemetry redundancy.

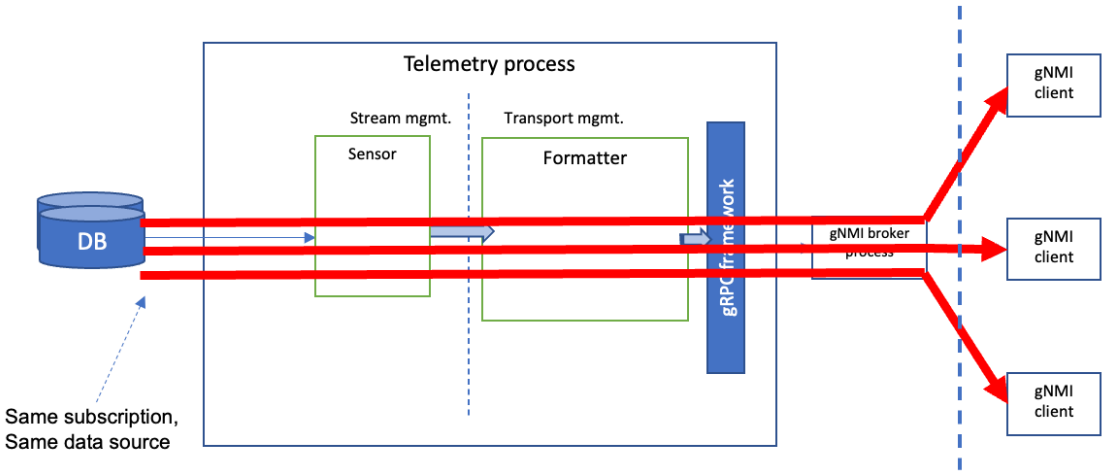

Figure 1: Conventional Redundancy Involving Duplicative Subscriptions

In order to address the issues that can be caused by duplicative subscriptions for telemetry redundancy, this submission proposes techniques through which incoming subscription RPCs, when received by a particular device, can be attached to an existing subscription, rather than creating a new subscription for each received subscription RPC in order to facilitate redundancy for telemetry data in a network.

During operation in accordance with the techniques of this proposal, when a dynamic telemetry subscription RPC is received by a device, a list of existing subscriptions for the same protocol can be checked by the device. If a subscription is found that has the same protocol, path, trigger, and (in the case of periodic subscriptions) period, then the incoming RPC will be attached as new receiver to the existing subscription, rather than creating a new subscription for a new receiver altogether.

Figure 2, below, illustrates example details of the techniques proposed herein in which a single subscription can be used to facilitate redundancy among multiple receivers.

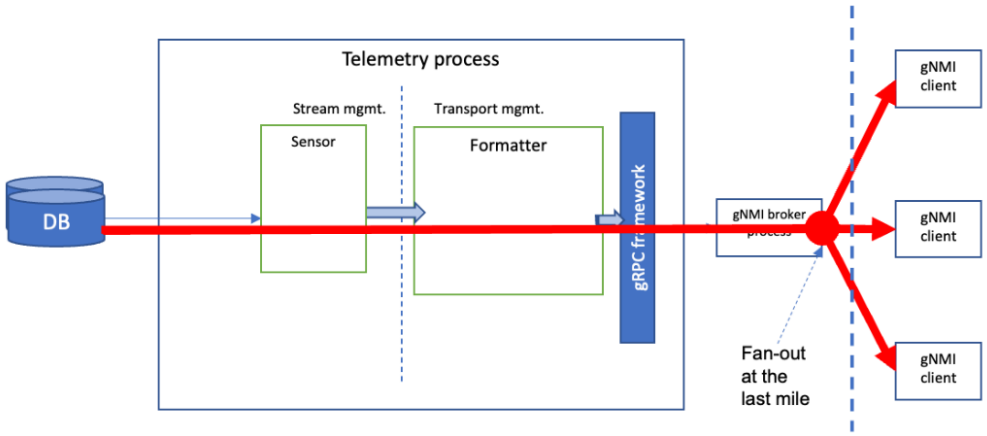

Figure 2: Telemetry Redundancy Utilizing a Single Subscription

In accordance with techniques of this proposal, as illustrated in Figure 2, above, when a subscribe RPC is ended, the corresponding receiver is detached from the subscription. However, the subscription is only torn down if it has no remaining receivers. This means that a subscription can be initiated from one client, reused by a second client, and can then continue with that second client even if the first client subsequently disconnects.

In the case of an on-change subscription, an initial synchronization (sync) message can be sent to the first receiver when the subscription is first established. When a second receiver is attached, the subscription must re-send the initial sync. For periodic subscriptions, the receivers can be synchronized such that the updates are sent in the same cadence to each receiver.

Thus, in accordance with techniques of this proposal, redundant telemetry subscriptions can be used in an efficient manner by allowing multiple receivers, having identical subscription parameters, to be attached to the same subscription. Such techniques can be utilized to reduce duplication in collecting data from a backend and also to enable higher scaling.