

Use cases for gRPC in network management

draft-talwar-rtgwg-grpc-use-cases-00

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RTGWG

gRPC : an open, multi-platform RPC framework

gRPC is a open source version of Google's microservice communication framework

gRPC leverages standard HTTP/2 as its transport layer

- binary framing, header compression
- bidirectional streams, server push support
- connection multiplexing across requests and streams

gRPC features

- load-balancing, app-level flow control, call-cancellation
- serialization with protobuf (efficient wire encoding)
- multi-platform, many supported languages
- open source, under active development



[@grpcio](https://twitter.com/grpcio)

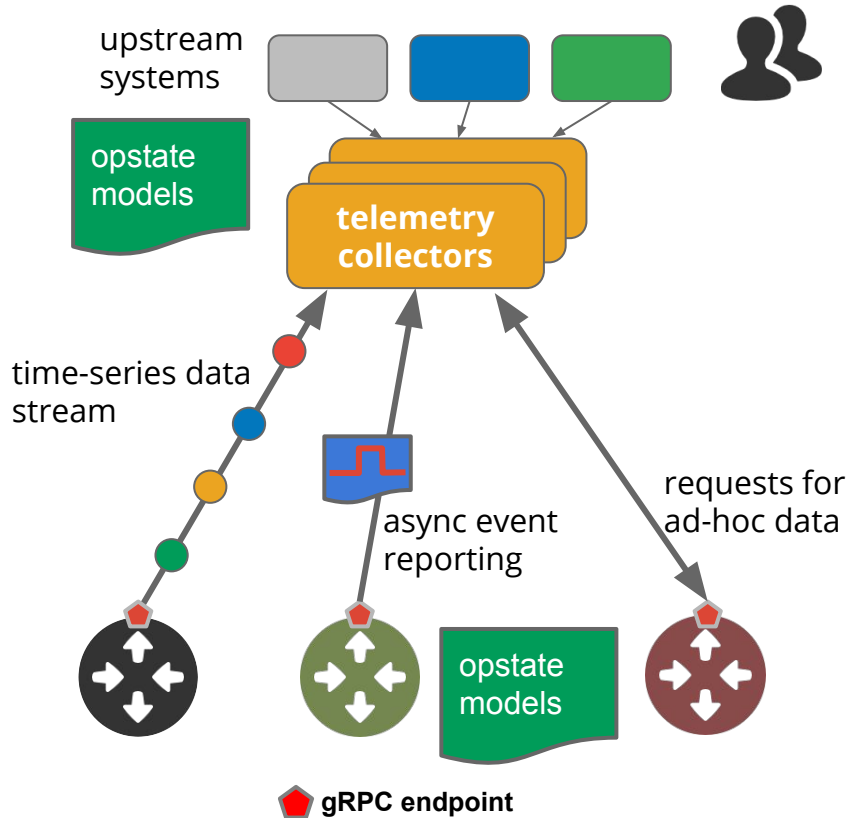
www.grpc.io

see `draft-kumar-rtgwg-grpc-protocol-00` for protocol details

gRPC use cases for network management

- **streaming telemetry** -- high-volume data streaming from network devices
 - alternative to SNMP
- **network configuration** -- flexible RPC framework for config and oper commands
 - alternative to NETCONF, TL1, and proprietary protocols

Streaming telemetry architecture



stream data continuously -- with incremental updates

telemetry sent based on subscriptions

observe network state through a time-series data stream

device data follows a common model

gRPC for streaming telemetry

binary framing and header compression -- highly efficient bulk xfer

bidirectional streaming -- independent request and telemetry streams

flexible data encodings -- payload agnostic, can support XML, JSON, protobuf, ...

open source IDLs for 10 languages -- easy to stand up gRPC endpoints

gRPC for network configuration

flexible data encodings -- e.g., no requirement to use XML

support for a variety of security mechanisms -- TLS, simple auth, client-server mutual auth, ...

easy platform integration based on the large number of OSS language implementations available

gRPC implementation status

gRPC-based streaming telemetry on major platforms

- early-release implementations and announced support from:
Arista, Cisco, Juniper, Ciena

gRPC network configuration implementations

- demos / early-release implementations from Cisco, Juniper (additional announcements pending)

Additional gRPC use cases

- multi-language communications with idiomatic APIs
- large-scale microservice communication
- native iOS / Android libs for efficient mobile communications to backend services
- highly efficient communication for cloud services (e.g., storage, messaging, ...)
- device-to-device and device-to-cloud for embedded systems
- unified IPC and remote communication

Additional material

Streaming telemetry and gRPC

Streaming telemetry benefits over SNMP

- devices stream data based on a specified frequency or upon state change
- data is sent as soon as it is available, reducing the need to buffer
- no single large request for all data (unlike SNMP polling)
- data sent incrementally, e.g., only for those data items that have changed
- ability to distribute the telemetry sources (e.g., directly to linecards)
- users issue subscription requests via RPC for data of interest
- data exported in a well-structured, common format, e.g., based on YANG models
- device and collector communicate over a secure, authenticated, reliable channel