BUILDING FOR THE ROAD AHEAD

DETROIT 2022

Feature Work in gRPC; xDS and Not

Eric Anderson, Software Engineer, Google
Kevin Nilson, Engineering Manager, Google

- What’s New
- xDS and Not

We want to hear from you

- We want to hear about your experience with gRPC – about what we're getting right, but more importantly about where things could be better.
  - Schedule a session at grpc.io/meet

- Join the gRPC mailing list groups.google.com/g/grpc-io

We Want Your Help

We actively review issues and PRs daily

Issues get reviewed and triaged within one week

Most PRs get merged

We are looking for maintainers

gRPC at a Glance

Total GitHub stars

66.7K

New team members last 6 mo.

5

New service mesh features

- Observability
- Custom load balancer policies
- Custom backend metrics
- RPC retries
- AuthZ
- Outlier detection

Merged Pull Request	Java	C++	Go	Python	Nodejs	ObjC	Ruby	PHP
	431	369	252	137	109	82	61	35

BEST IN

Microservices Infrastructure

PRESENTED TO

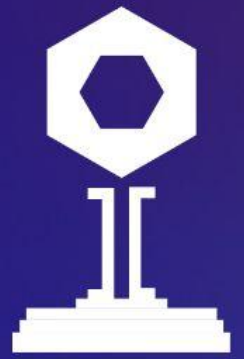
gRPC

COMPANY

Google

THE 2022

API AWARDS



presented at

{API:WORLD}

Oct 25-27 | San Jose, CA

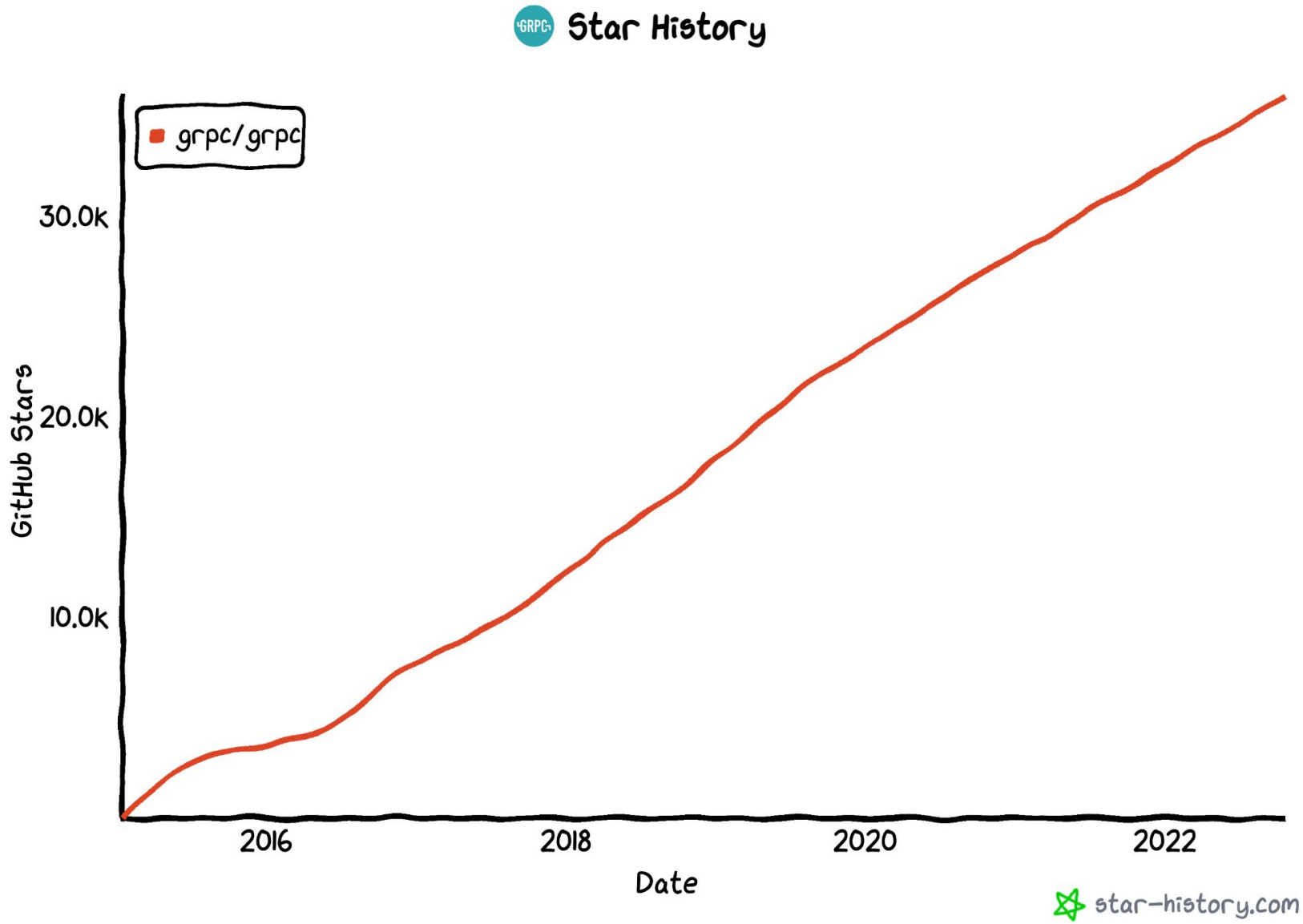
Nov 1-3 | Virtual

5 million weekly downloads of @grpc/grpc-js

Downloaded 2 million times per day

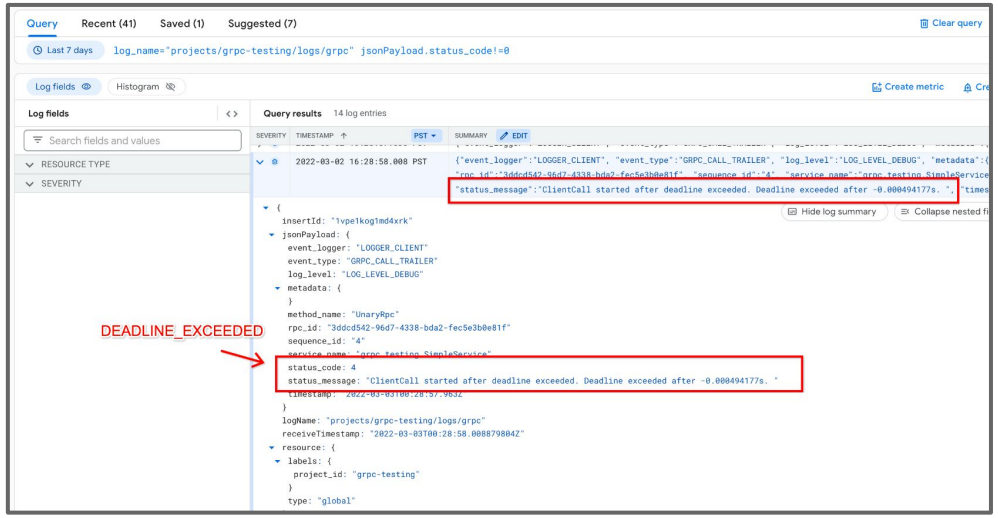
#52 most downloaded package on PyPi

12.5 Million Maven downloads per month of Java gRPC Context

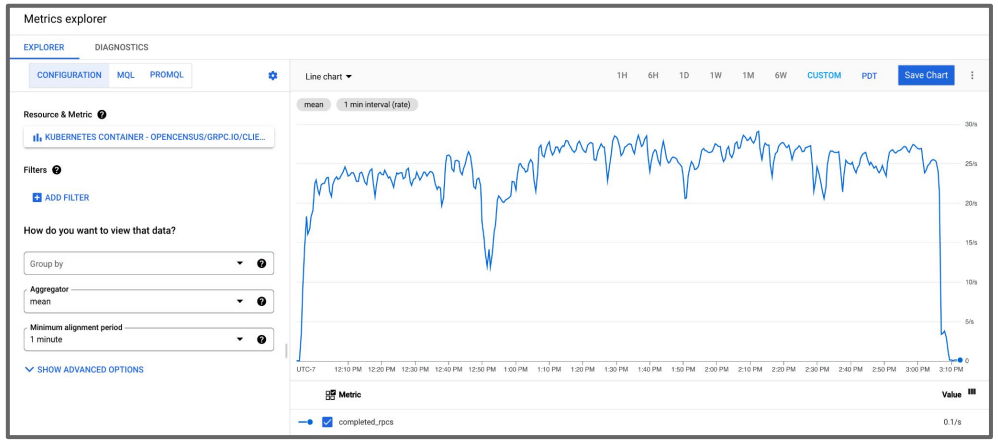

Star History
grpc/grpc
30.0k
20.0k
10.0k
GitHub Stars
2016
2018
2020
2022
Date
star-history.com

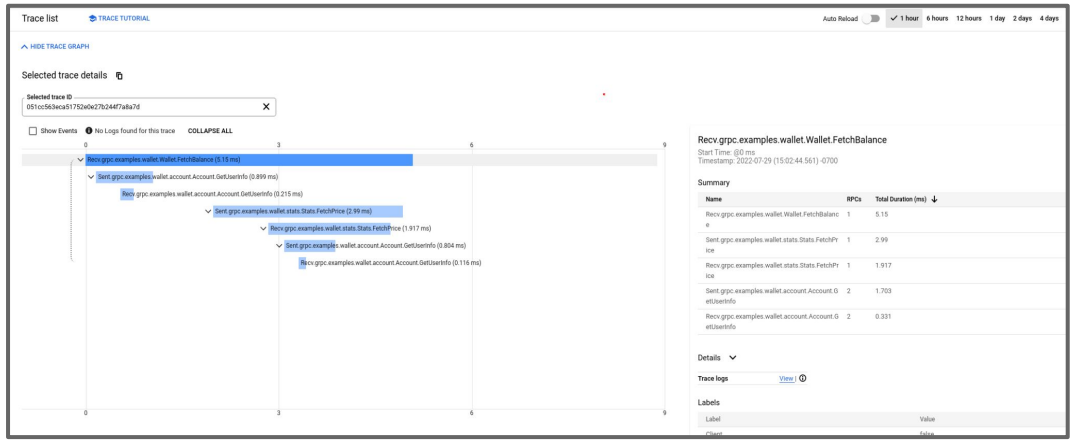
Observability

[Blog post]



NEW





xDS?

- Control plane protocol to configure mesh
- Came out of Envoy. With gRPC support, can be “proxyless”
- X Discovery Service: Listener, Cluster, Route, Endpoints, others
  - e.g., Listener Discovery Service
  - LDS, CDS, RDS, EDS

Recent xDS Features

- RPC Retries - try the RPC again based on status
- TLS Security - control plane configures (m)TLS
- Service Authorization - only allow connections from services A and B
- Outlier Detection - avoid failing servers
- Least Request LB (Java) - send traffic to backend with fewest RPCs
- Custom Locality LB - bring-your-own LB
- Custom Backend Metrics - client receives server utilization for LB

Recent xDS Features

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How do they impact gRPC’s core? Do they work without xDS?

xDS ↔ gRPC Mapping

xDS Concept		gRPC Concept
Listener	→	Config for Client or Server Credentials
Route	→	Service Config
Cluster	↔	LB Policy
HttpFilter	↔	Client or Server Interceptor (C core: Filter)

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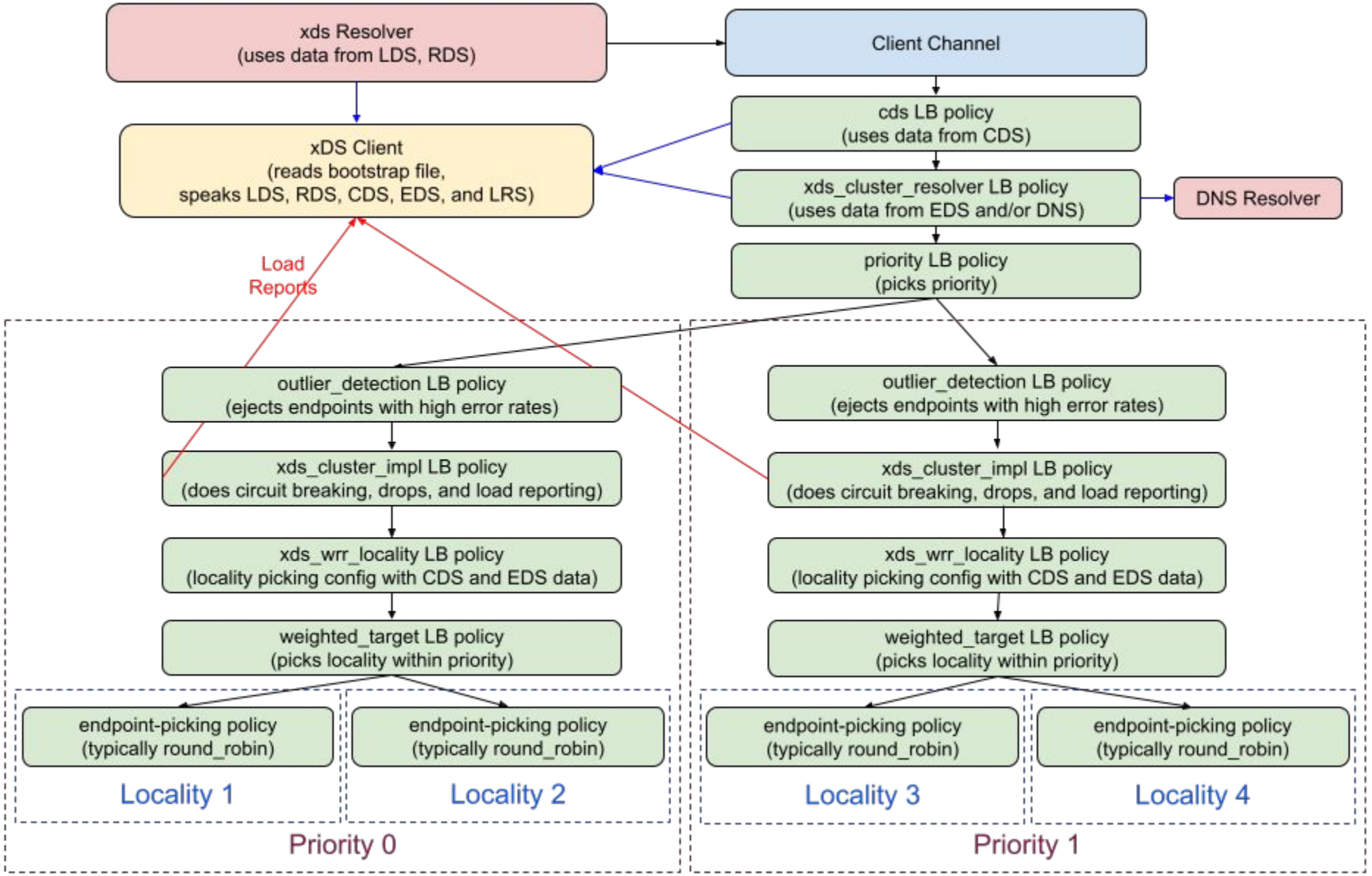
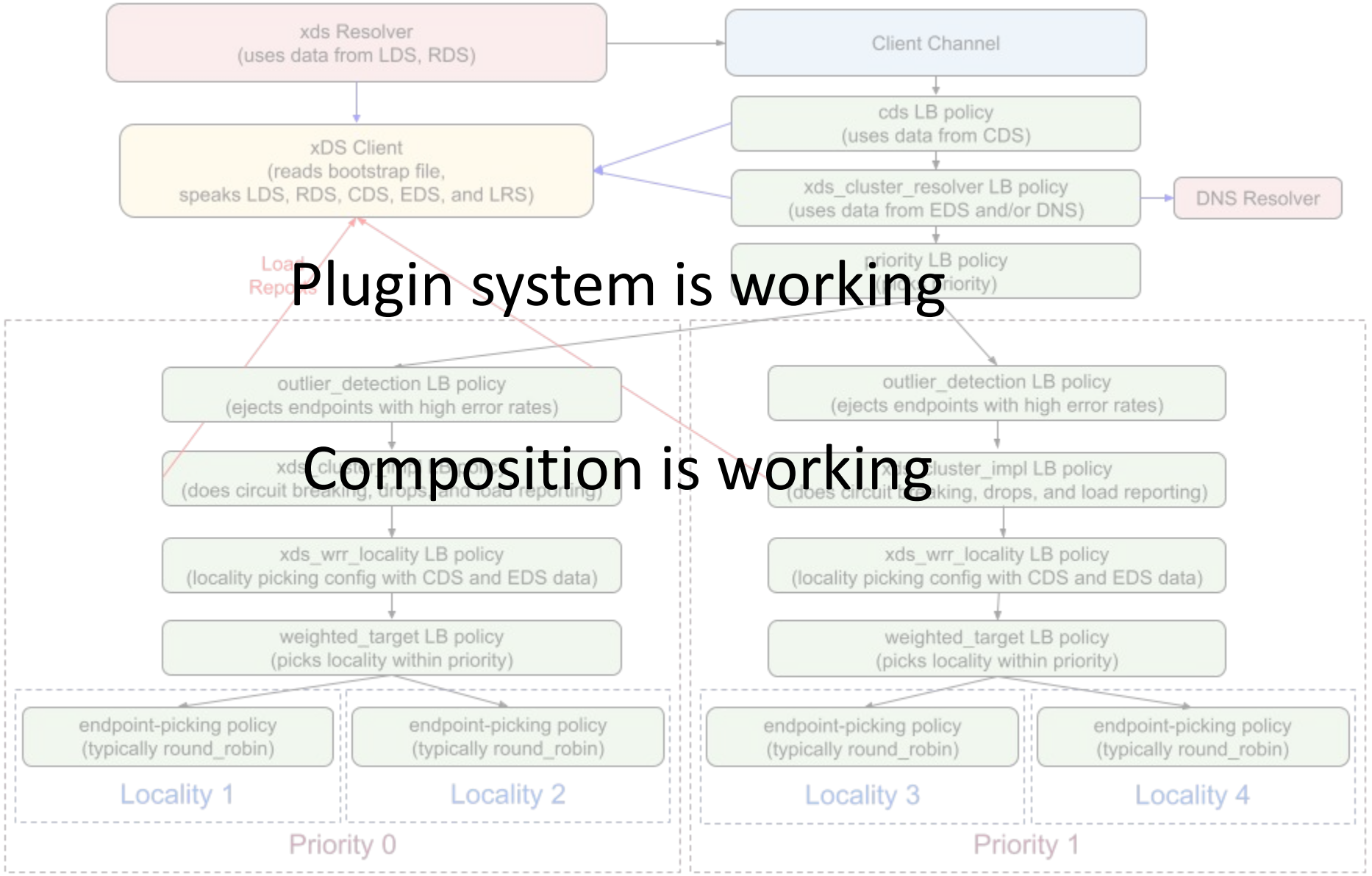
(Bold: most new features)

Implementing features mostly uses existing plugin infrastructure

xDS NR/LB Structure in gRFC A52



xDS LB Structure in gRFC A52



xDS-only?

- RPC Retries
- TLS Security
- Service Authorization
- Outlier Detection
- Least Request LB
- Custom Locality LB
- Custom Backend Metrics

xDS-only?

- RPC Retries (Service Config)
- TLS Security (Credentials)
- Service Authorization (Server Interceptor)
- Outlier Detection (Load Balancer)
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xDS-independent, with some xDS configuration processing

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gRFC: “outlier_detection LB policy will not be specific to xDS, so it will also be usable by non-xDS gRPC users.”

xDS-only?

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gRFC: “this policy will be implemented in a non-xDS-specific way, so that it can also be used without xDS in the future.”

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What about those two other items?

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No generic config mechanism, because of security

Similar APIs exist; “advanced” TLS APIs

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No generic config mechanism

Config too expansive for long-term stability; simpler Authorization API

Main Reasons for xDS-specific Features

- Nobody's asked for it outside of xDS

- Integrates too tightly with xDS-specific concepts
  - e.g., Clusters for load balancing
- Expansive API
  - Features in xDS ecosystem can be removed/replaced
  - gRPC stability is long-term


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