Legion Performance Analytics

Strategies and Tactics

May 2022

Legion Performance Analytics

Introduction

- logs, metrics, traces
- latency, stability, satisfaction
- for local, distributed & cloud native applications

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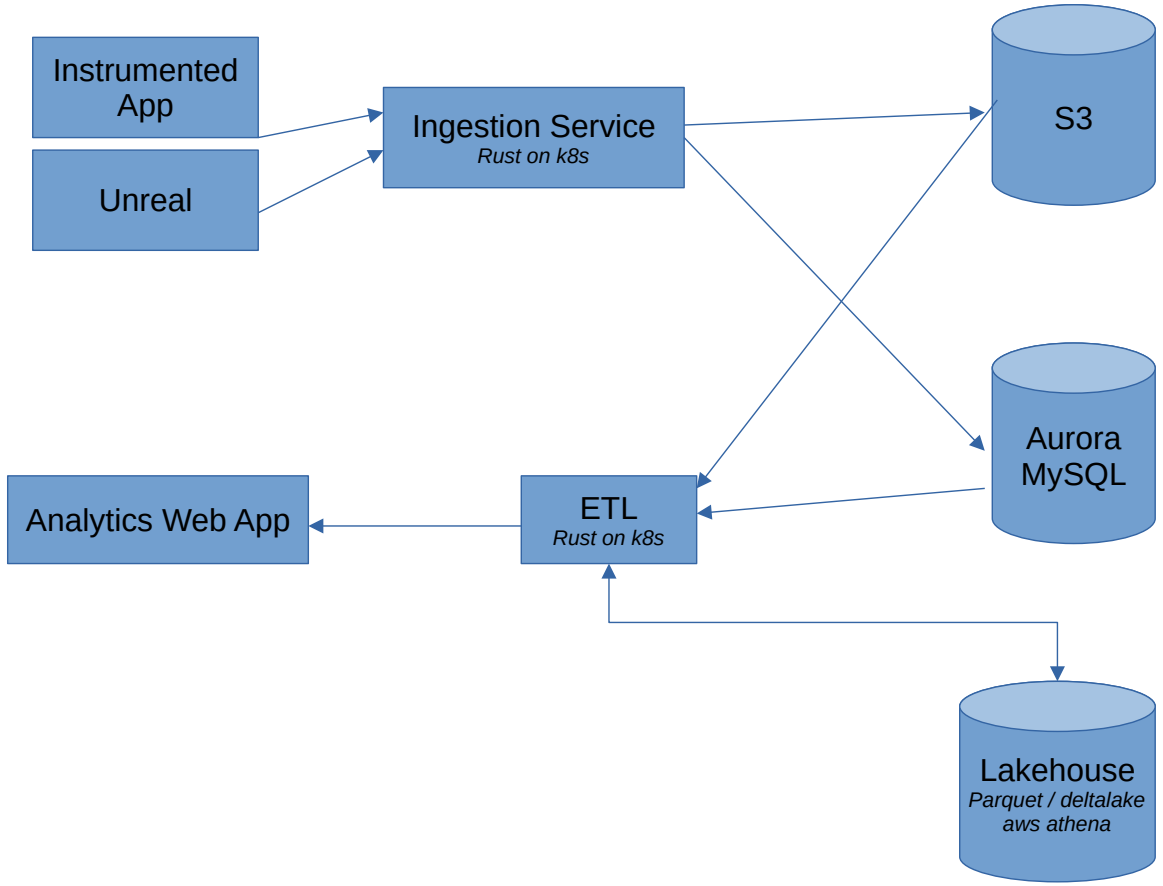
Introduction



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Whole stack solution

- off the shelve components are not good enough
- instrumentation
  - low overhead (~40 ns / event)
  - generic and flexible format (like protobuf with references)

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Whole stack solution

- database
  - scalable in writing
  - low cost when unused
  - bursty reads
  - write like a data lake, read like a data warehouse

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Whole stack solution

- user interface
  - flame charts with billions of entries
  - graphs with (at least) thousands of nodes
  - tight integrations with time series and lists
  - web based
  - mashup of rad telemetry + prometheus + kibana + grafana

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Record cheap, Read maybe

- low overhead instrumentation
  - thousands of events per frame
  - recording is serializing with heterogenous queue
    - patform-specific memory layout
  - batching
  - fast compression using lz4

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Record cheap, Read maybe

- cheap ingestion
  - Event block payload in S3 without decompression
  - MySQL: metadata about processes, streams and blocks

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Record cheap, Read maybe

- pay for what you read
  - ETL on demand
  - decompression of structured event blocks
  - parse events to build trees and graphs
  - write in parquet on S3 with lambda
  - query using AWS Athena & datafusion

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All the data, one protocol

- Structured events
  - time series are not general enough
- Stream definition contains memory layout of events
- Instrumented apps are free to upload any event in any stream
  - analytics relies on tagged streams
  - analytics expect and process specific event types
- Forward & backward compatibility

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All the data, one protocol

- Custom binary protocol could be extented
  - Crash dump
  - Images
  - Video

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From inception to live

- Development
  - High event density
  - low constant costs
- Live
  - High scalability
  - Fast adaptability
    - configure output verbosity of instrumented app
    - to-the-minute live data

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Progress

- Instrumentation libraries: Rust, Unreal
- Ingestion in the cloud
  - Rust on k8s (gRPC + http)
  - MySQL Aurora Serverless + S3
- Analytics/ETL
  - Rust on k8s (gRPC-web)
  - Cache on S3
- UI: Svelte, Typescript, Canvas

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June Priorities

- Regulations: GDPR, Pipeda, bill 64
- UI improvements (logs, l10n/i18n, timeline, metrics)
- Unreal module
- Lakehouse: just-in-time parquet generation + query engine