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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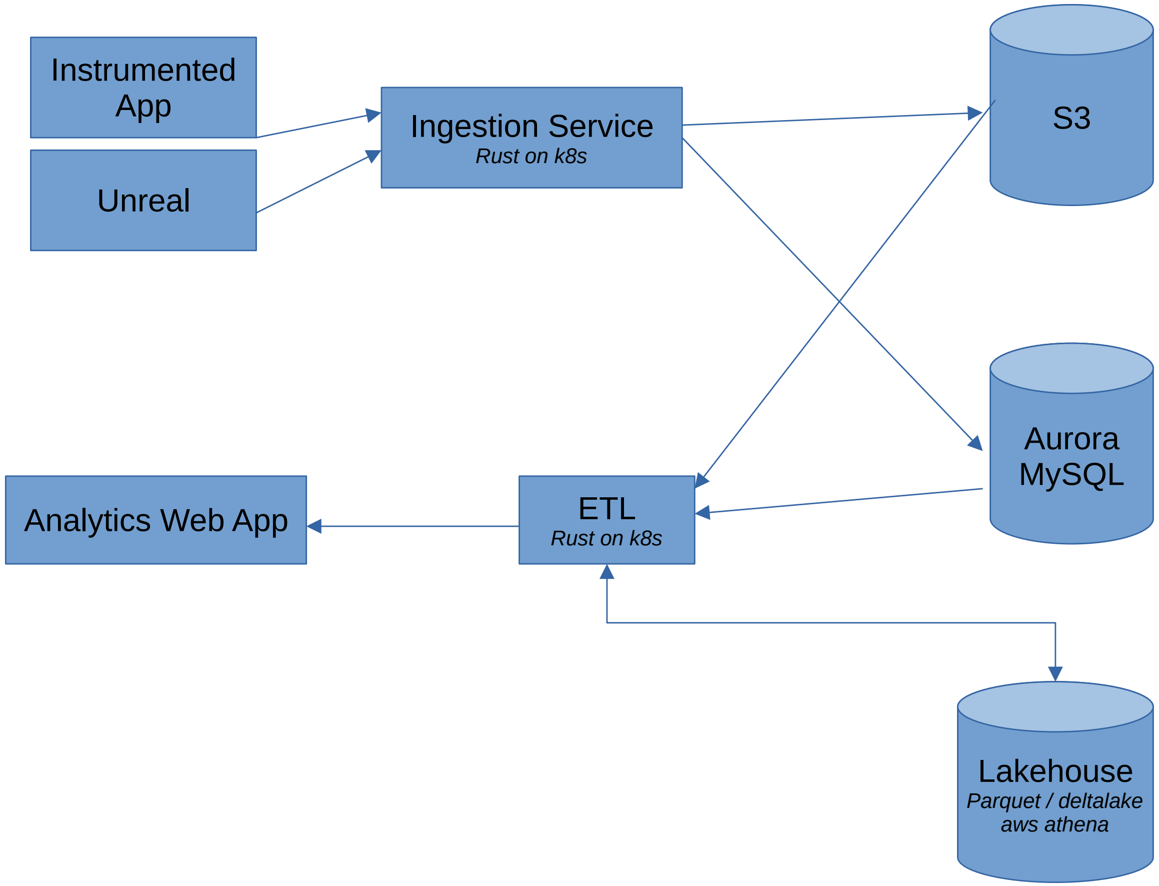
Introduction



Legion Performance Analytics Strategies

Table of Contents

- **Whole stack solution**
- Record cheap, read maybe
- All the data, one protocol
- From inception to live
- Progress & roadmap

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Whole stack solution

High density of events break all the existing solutions

Component	Good Enough
Instrumentation	❌
Database	❌
User Interface	❌

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Whole stack solution

- 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/UX improvements (logs, l10n/i18n, timeline, metrics)
- Unreal module
- Lakehouse: just-in-time parquet generation + query engine