



Observability Analytics Project 1.0

Outline

Observability Analytics refers to the assembly, analysis, visualization, and interpretation of a system's output—such as telemetry data, including logs, events, metrics, traces, and other data—to understand the internal state of complex systems. Observability is one of the most fundamental techniques essential to software engineering. Observability goes beyond traditional monitoring by enabling dynamic, real-time exploration of “unknown unknowns” in the multidisciplinary, integrative domain of systems engineering.

The primary **goal of this project** is to develop the foundations of a state-of-the-art, modern observability analytics framework that is ready-to-use and extensible to future needs. To achieve this goal, we will (A) adopt open standards to implement observability, (B) develop a modern, advanced software application for comprehensive coverage and testability of observability analytics, and (C) apply the fundamentals of software engineering and project management principles to implement a supreme, high-quality observability analytics framework.

The **purpose of the rest of this document** is to provide the essential (1) guidelines, (2) reference architecture, (3) prescriptive specification for building and evaluating a comprehensive and extensible observability solution, and (4) recommended software engineering best practices.

1) Guidelines

The observability analytics solution shall strive to meet the guidelines documented in “modern observability capabilities [1]” in addition to the core requirements listed below: -

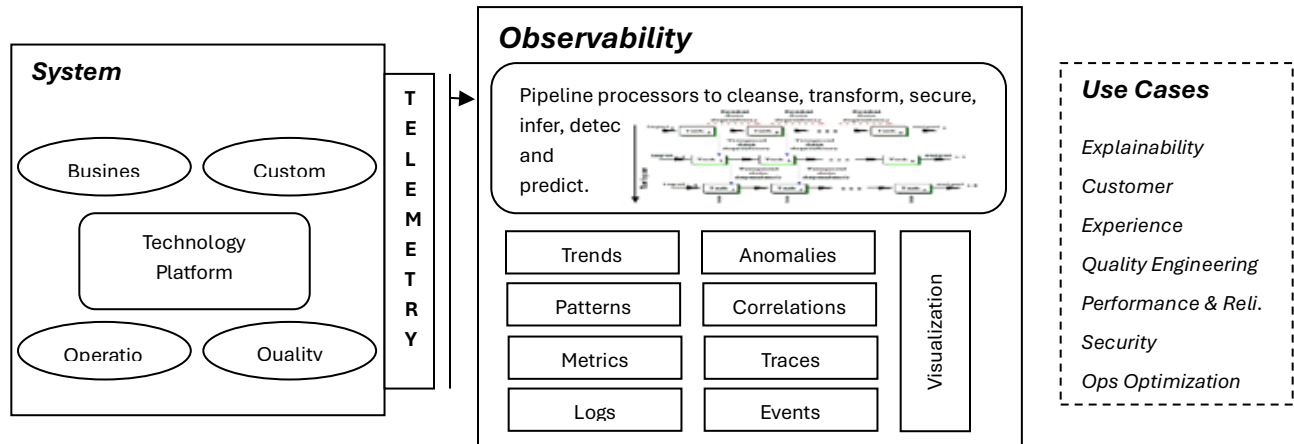
- I. The solution must minimize the overhead added to the Systems & Applications from observability instrumentation itself.
- II. The solution must support scaling both horizontally and vertically, allowing system administrators to strike the right balance between performance and cost.
- III. The solution shall allow operations to discover and act at the speed of near-real-time.
- IV. The solution shall allow system administrators to swiftly control data collection, data retention, pipeline processing, and ML agents in real-time to optimize performance versus cost.



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Autonomic Soft
George Clement
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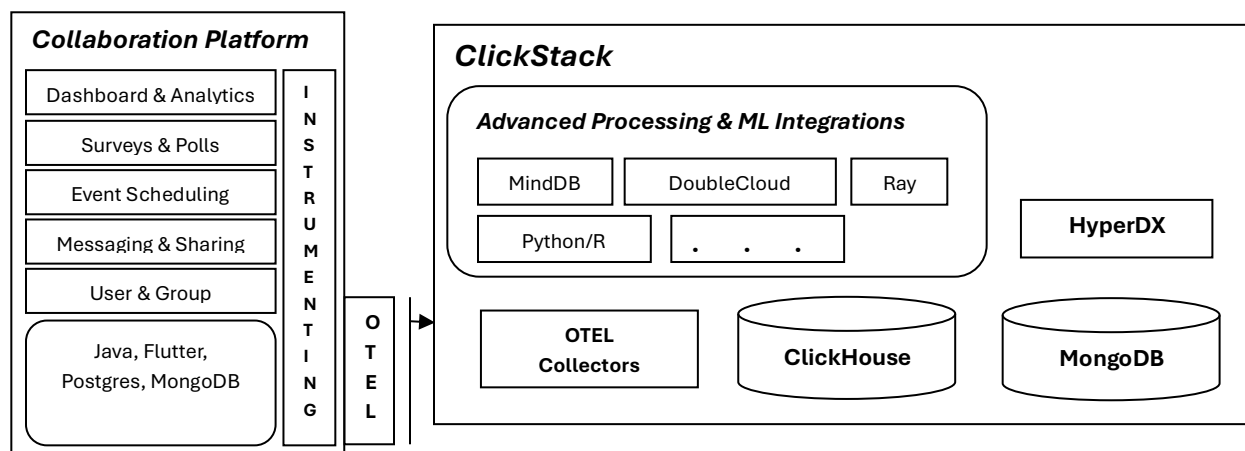
2) Reference Architecture



The reference architecture diagram above shows an implementation-agnostic view of the observability analytics framework. The System represents all aspects of target systems necessary to 360° observability use case coverage. Fundamentally, units of logs, events, traces, metrics, and more must get instrumented, captured, and sent to the Observability backend for analytics. This instrumentation data must be collected and processed in the Observability backend for rich, fast, and efficient data analytics insights. These insights can be visualized and applied to various engineering and business use cases.

3) Specification

Solution Architecture



The solution architecture is based on industry-standard specifications and open-source software. The Collaboration Platform is a sample application used to demonstrate and verify the performance of the observability solution. The Open Telemetry (OTEL) industry standard must be utilized to instrument the Collaboration Platform and bring observability data to the backend. The "ClickStack", an open-source, industry-standard observability platform, must be implemented to develop the observability analytics. The observability data must be hosted within "ClickHouse", an open-source column-oriented database management system for online analytical processing (OLAP). The "HyperDX" must be implemented to support observability instrumentation and visualization, as well as other state-of-the-art functionalities.



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Work Breakdown

- 1** Collaboration Application
Collaboration Application Requirement Specification [2] for requirement & specification
 - 1.1** Development of User & Group Management
 - 1.2** Development of Messaging & Sharing
 - 1.3** Development of Event & Scheduling
 - 1.4** Development of Surveys & Polls
 - 1.5** Development of Dashboard & Analytics
 - 1.6** Instrumentation of OTEL
<https://opentelemetry.io/> for the standards spec & documentation
 - 1.6.1** Logs
 - 1.6.2** Metrics
 - 1.6.3** Traces
- 2** Set up “ClickStack”
<https://clickhouse.com/docs/use-cases/observability/clickstack> for installation, configuration & deployment documentation.
 - 2.1** Set up the “ClickHouse” database.
 - 2.1.1** Install
 - 2.1.2** Configure
 - 2.2** Set up “HyperDX”
 - 2.2.1** Install “MongoDB”
 - 2.2.2** Install “HyperDX”
 - 2.2.3** Configure “HyperDX”
 - 2.3** Set up OTEL Collector
<https://opentelemetry.io/> for the standards spec & documentation
 - 2.3.1** Logs
 - 2.3.2** Metrics
 - 2.3.3** Traces
- 3** Advanced Processing & ML Integration
Research-based initiatives. Requires proposals aimed at improving specific areas.



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4) Software Engineering Best Practices

Process

- ✓ Kanban, an Agile management method, must be adopted as a software development process.
- ✓ Infrastructure-as-a-Code and deployments must be automated.
- ✓ Unit Testing, subsystem testing, and performance benchmark testing must be automated.

Tools

- ✓ Jira must be used to track activities, issues, and burndown.
- ✓ Git must be used for version source control.

People

- ✓ Hungry to learn.
- ✓ Great teamwork.
- ✓ Good mindset.
- ✓ Humility.
- ✓ Respect for team members.

Reference

1. *Modern Observability Capabilities*, George Clement, Autonomic Soft, LLC. [LINK](#)
2. *Collaboration Application Requirement Specification (1.0)*, Autonomic Soft, LLC. [LINK](#)