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Telemetry Based Performance Engineering

Performance problems? Gotta Catch Them All!
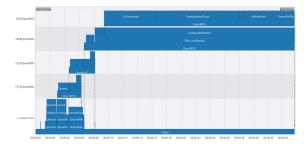
Summary
Telemetry (logging, metrics, tracing) based performance analysis provides insight in and allows visualization of system flow execution. It also allows (automatic) analysis and conformance checking in e.g. complex microservice a rchitectures. Standard instrumentation tooling like Jaeger, LTTng and Prometheus can be applied for (desktop) based applications depending on its timing requirements. For very critical applications and real time environments bespoke implementations remain needed.
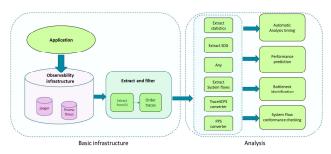
Introduction

Performance problems often emerge at late integration stages. Finding and resolving problems in large, distributed systems is notoriously difficult, resource and time consuming. Therefore, there is an urgent need for improvements in performance analysis capabilities.

Functional (input, output) testing of complex cyber physical systems alone, does not yield sufficient information to analyze, debug and optimize the performance of these applications. With the inclusion of cloud based software and the adoption of microservice architectures in the CPS-domain, analysis is further complicated. A solid and automated solution supporting the same is therefore highly desirable.
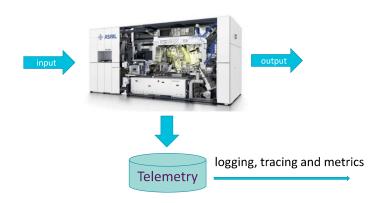
Telemetry data, providing insight in the internal state and execution flow of applications form the basis of such solution by ESI. However, as large Cyber-Physical systems may produce gigabytes of telemetry data in a short time, these cannot be inspected or understood through visualization alone. In the ESI-methodology telemetry data is therefore complemented with automatic analysis

3D-reconstruction trace, captured and converted with ESI's performance framework, and visualized in PPS-tool

Performance Analysis framework ESI

Telemetry based performance topics

- Visualization of system execution flow and performance parameters
- Analysis of system flow execution, timing and behavior
- Conformance checking of system execution and timing
- Daily test and trend analysis of performance parameters
- Bottleneck and optimization opportunities identification
- Performance prediction of system configurations

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