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# Better software observability using Tango Controls with OpenTelemetry - experience at MAX IV

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Distributed software systems are complex and the interactions across multiple machines can be difficult to debug and monitor. Log messages are not enough for observability. We need more information about the communication between applications, how each one is executing, and its internal state. In practice, applications can be made more observable using software frameworks such as OpenTelemetry. The Tango Controls framework has built-in support for OpenTelemetry in C++ and Python since version 10.0.0. We are using it operationally at the MAX IV synchrotron. We provide examples of the traces, trends, and other data available when running at scale on a beamline with hundreds of devices. We report on the compute and performance impact for client and server software applications, as well as practical issues. For the backend servers that ingest and query the telemetry data (running Grafana Tempo for traces and Grafana Loki for logs) we report on the compute resources required.

## Footnotes

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