INSTRUMENTATION TECHNOLOGIES

LIBERA

June, 2026

# *Recent developments in the Libera Tango Device Server at Instrumentation Technologies*

**Tango Community Meeting**

**Robert Černe**

robert.cerne@i-tech.si

www.i-tech.si

# Outline



- Company introduction
- Tango Device Server for Libera instruments
- Upgrade to use Tango framework 9.5.0 and recent evolution
- Future improvement plans
- Conclusions

# Instrumentation Technologies

- Est. 1998
- Data acquisition and signal processing
- 50+ employees
- Work with more than 70 research institutes around the world
- Off-the-shelf products and customizations, co-development of electronics

INSTRUMENTATION TECHNOLOGIES

LIBERA

# SOLUTIONS FOR INDUSTRIES



## Beam-diagnostics-and-control instrumentation

- Research Particle Accelerators
- Medical Particle Accelerators
- Nuclear Research Reactors and Fusion

## Custom data-acquisition products

- Space & Defense
- Transportation Industry
- Energy Industry
- Test and Measurement
- Communications

redpitaya

## Open-source general-purpose lab devices

- Universities
- Research

## LUGUS

## Quantum control instrumentation

- Cold Atoms Labs
- Neutral Atoms Labs
- Quantum Computing

## SWICSSY

## Submerged wireless conductivity sensor system

- Desalination plants
- Producers of RO membranes

# Libera - Solutions for particle accelerators



**Beam Diagnostics**

Beam Position Monitoring

Beam Loss monitoring

Beam current / Beam phase

**RF generation and transfer**

Reference Master Oscillators

RF distribution systems

**LLRF controls**

LINAC

Proton synchrotrons

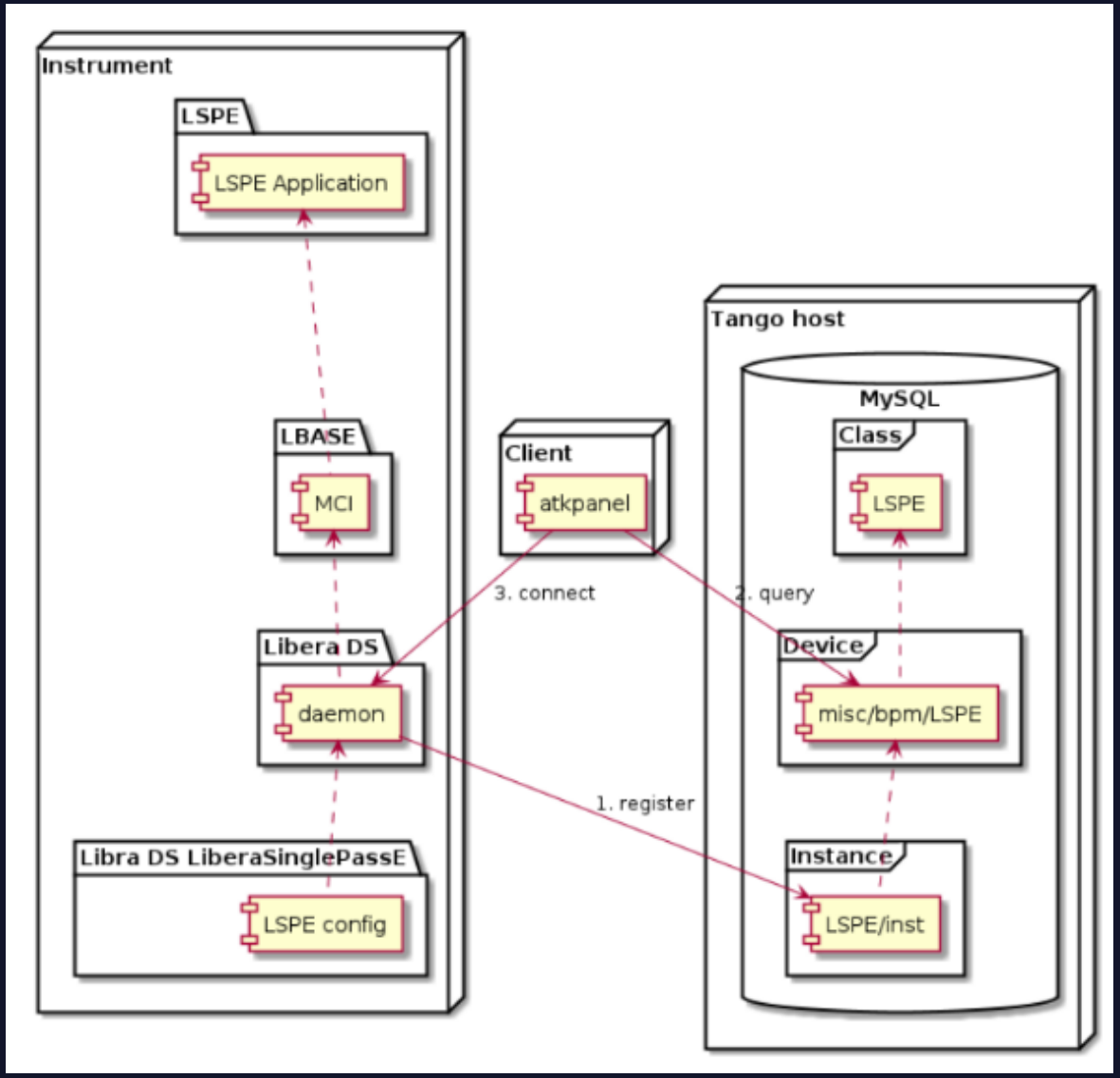
**General Purpose**

RF Digitizers

Current Meters

# Tango Device Server for Libera instruments

- One of multiple adapters for the Libera instruments.
- Supports integration of Libera instruments into Tango control system.
- Upgrade to Tango framework 9.2.2 performed 10 years ago.
- Upgrade to Tango framework 9.5.0 finished in 2025.
- Configuration driven architecture – attributes are generated based on mapping files.
- Running as a separate process on the Libera instrument.
- Running on a variety of CPU architectures (x86, armelx, armhf, arm64) and OS (Ubuntu, Buildroot) versions.



# Upgrade of Tango Device Server to Tango 9.5.0 and evolution



**Upgrade motivation:**

- Longterm support of the Tango framework.
- Bug fixes in the Tango framework.
- Introduction of new OS version.
- Introduction of new Tango features.

**Evolution and new features:**

- Driven by customer requirements.
- Support for multiple device class types.
- Introduction of states ALARM and FAULT
- Support for Tango logging
- New Tango commands for clearing the alarm state and log contents
- Support for configurable location of the mapping file

# Planned improvements for the Tango Device Server



**Introduction of new features provided by Tango frameworks 10+:**

- Support for alarm and warning hysteresis
- Support for Open Telemetry
- Use of the latest Tango protocol version
- Support for two-dimensional data type for signal attributes (DevDict)
- Usage of cybersecurity and encryption provided by the Tango framework

**Planned improvements:**

- Introduce user friendly attributes' mapping file
- Add support for min/max values for alarm and warning properties to the mapping file
- Support for general purpose attribute properties (description, label, unit)
- Support for archive events

# Conclusions



- Configuration driven architecture serves us well
- Our Tango Device Server is in constant evolution driven by external and internal factors
- The Tango framework is flexible enough and has the performance required, to support the use cases needed by our customers

THANK YOU!