

Klepsydra SDK. High performance software with low power consumption

Klepsydra SDK is a high performance software development toolkit for applications that run on on-board computer. It offers three main benefits:

- Safety and reliability
- Cost reduction
- Scalability

Klepsydra SDK has been inspired by high frequency trading technologies and has a unique performance and low power consumption in the market. It can be applied in different sectors, like:

- Space
- Unmanned systems (robots, UAVs, etc.)
- Automotive
- lot
- Defense
- Smartphones
- Datacenter
- etc

Core benefits

Safety and reliability.

- **Zero data losses.** Klepsydra SDK can guarantee that any sensor data or communications message is going to be processed.
- **Real-time processing.** Klepsydra SDK can process data in real time with much less latency than other solutions, like ROS.
- **Predictable applications.** Applications built with Klepsydra are substantially more stable, predictable and deterministic than other edge solutions.

Cost.

- **Less hardware cost.** With Klepsydra SDK, more tasks can be performed on the same hardware, with less power and without any cloud computing support.
- **Reduce cloud costs.** Because Klepsydra SDK increases edge computer capabilities, less or no cloud computing needed.

Applications

Klepsydra SDK can be used for a number of processor intensive and large volume of applications including:

- Sensor fusion
- Image processing
- Data compression and recording
- Autonomous navigation
- Processor intensive algorithms

Scalability

Applications tend to increase in data volume with time, for example, better sensors, 5G communications, all amount to more data. Klepsydra SDK allows application to increase their data volume requirements on the same hardware.

Moreover, hardware upgrades will have a longer service life with Klepsydra.



Figure 1. Klepsydra SDK setup

Overview

Klepsydra Data Processor is a layer between user/client application and the sensors and communication middleware.

The Data Processor offers two sets of API, application and composition:

- The application API is a simple asynchronous API and follows the publish - subscribe pattern.
- The composition API is for performance tuning and follows the strategy pattern or dependency injection.

Core features

Klepsydra has three main core features:

- 2x to 8x increase in data processing capabilities with respect to standard techniques (e.g. ROS).
- x5 to x10 increase in image processing capability with respect to standard techniques (e.g., OpenMP).
- 25%-50% less power consumption with respect to standard techniques.
- Platform independent and easy integration.

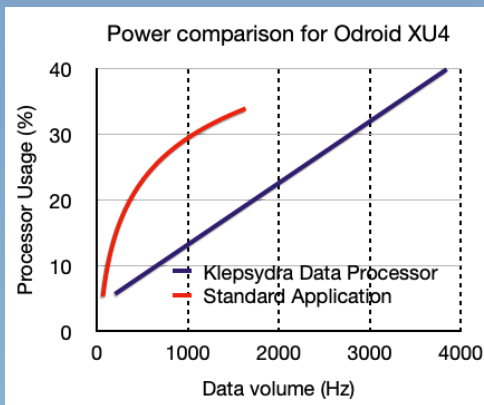


Figure 2. Performance benchmark for Klepsydra Data Processor vs standard data processing.

Compatibility features

- Supported languages: C++, C, NodeJS, Python
- Third party plugins: ROS, ROS2, DDS, ZMQ, CAN
- Frameworks: MATLAB, PX4, MAVROS.

Requirements

Klepsydra is platform independent with three main requirements for deployment:

- Operating system present in the target computer.
- Target computer with atomic operation set.
- C++11 compiler for the target computer.
- Klepsydra is supported in a growing number of platforms including:
 - Operating system: Linux, FreeRTOS, RTEMS.
 - Processors: ARM (V8, Cortex A7, Cortex A9), x86 64 and 32 bits, Cobham Leon3.

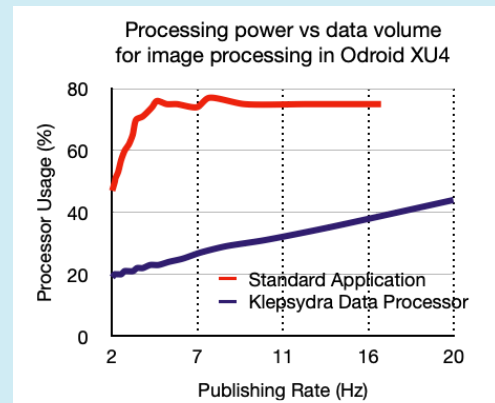


Figure 3. Image processing benchmark comparison for Klepsydra Data Processor vs OpenMP

Trial request

In order to request a trial version, send an email to sales@klepsydra.com or go to the website download section <https://www.klepsydra.com/download/>. A limited open source version of Klepsydra, "Community Edition", is available in GitHub at: <https://klepsydra-technologies.github.io/>

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