First step to manage migration to SIEMENS S7-15XX PLCs using TANGO framework

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Use of TANGO with PLCs at SOLEIL

TANGO is a software toolkit for distributed control systems, supervisory and data acquisition.

Device Servers (DS) are software representation of physical devices [Fig 1]. DS can then be used in supervision applications.
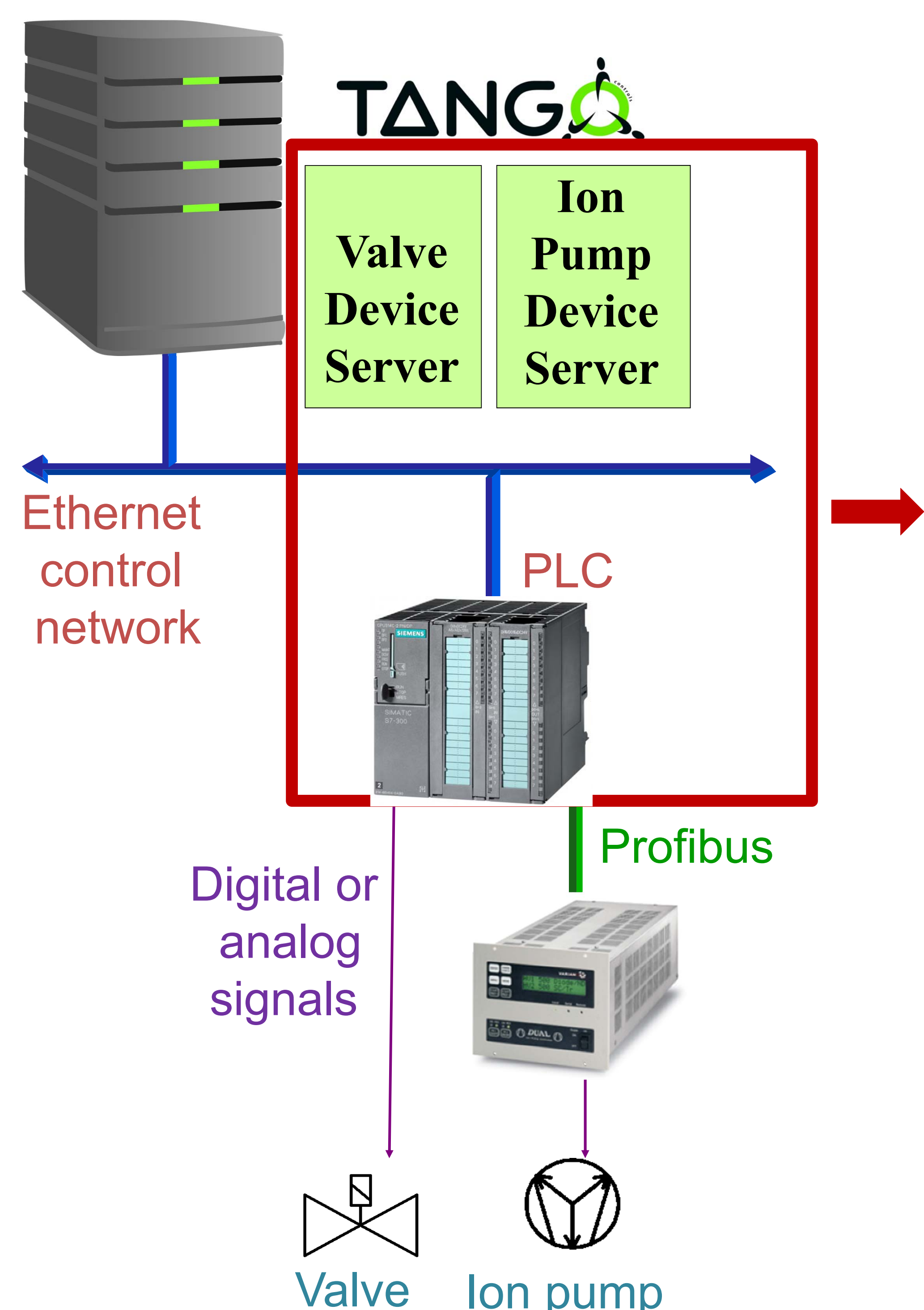
Figure 1: Overview of the TANGO model for vacuum related devices controlled by PLC.

PLCServer
Core of the data exchange mechanism between SIEMENS PLCs and TANGO software bus since 2004

Use

PLCServer performs readings and writes from/to PLC data blocks (DB) for the clients DS [Fig. 2].

Limitations

- **Poor data rate**: limits the number of acceptable clients.
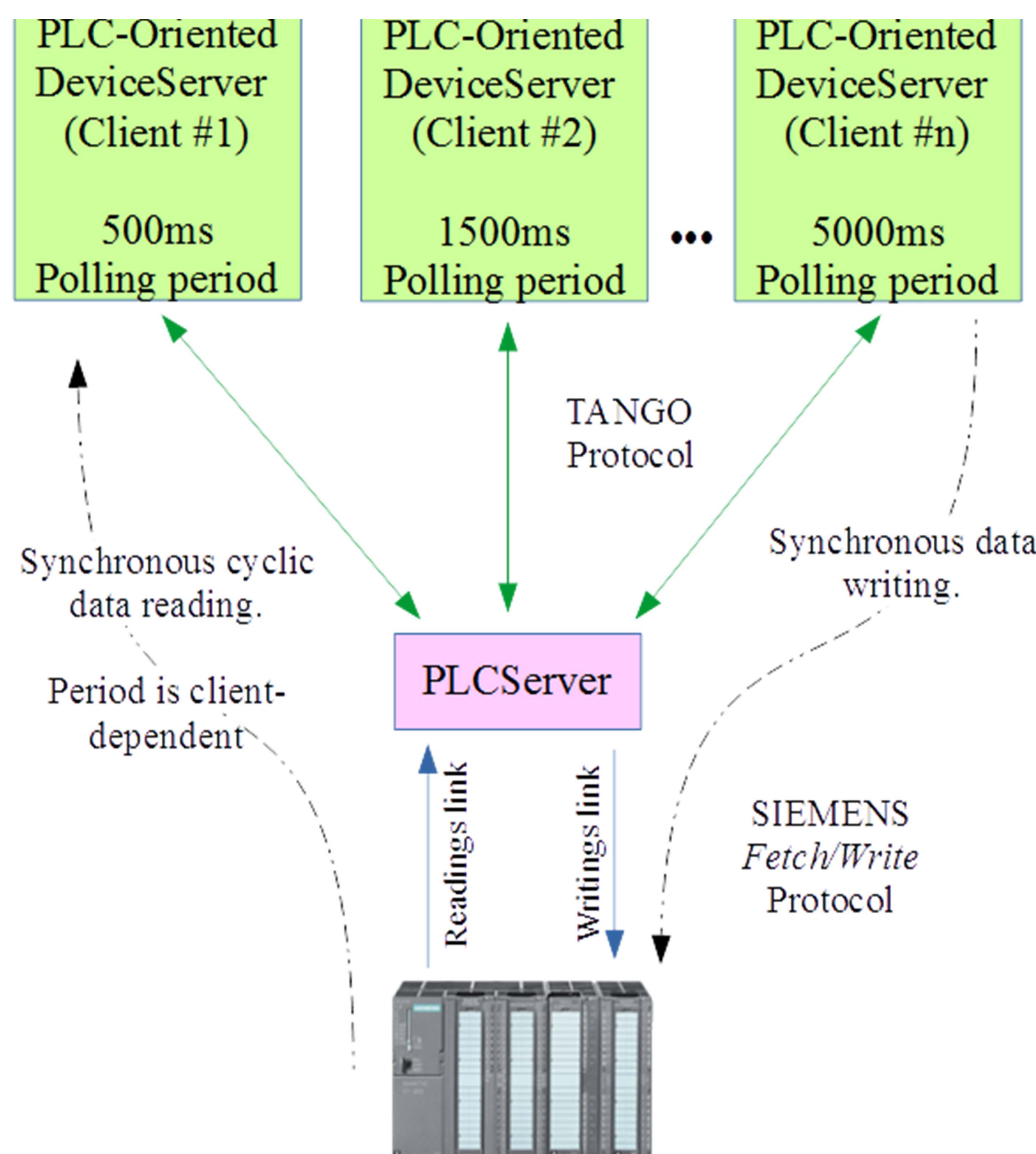- **Fetch/Write protocol** is not supported by new S7-15xx PLC series.

Figure 2: Detailed view of the communication model between Tango devices and PLC using PLCServer.

Need for improvement

Since 2017: PLCServer upgrade for new PLCs

New PLCServerV3
- Improves PLCServer/PLC communication layer.
- Based on the Snap7 communication library [1].

Benefits of Snap7

- Based on S7, the native and fastest communication protocol available on all SIEMENS PLCs.
- S7 connections do not require PLC-side configuration.
- Can read several DB in a single TCP/IP telegram
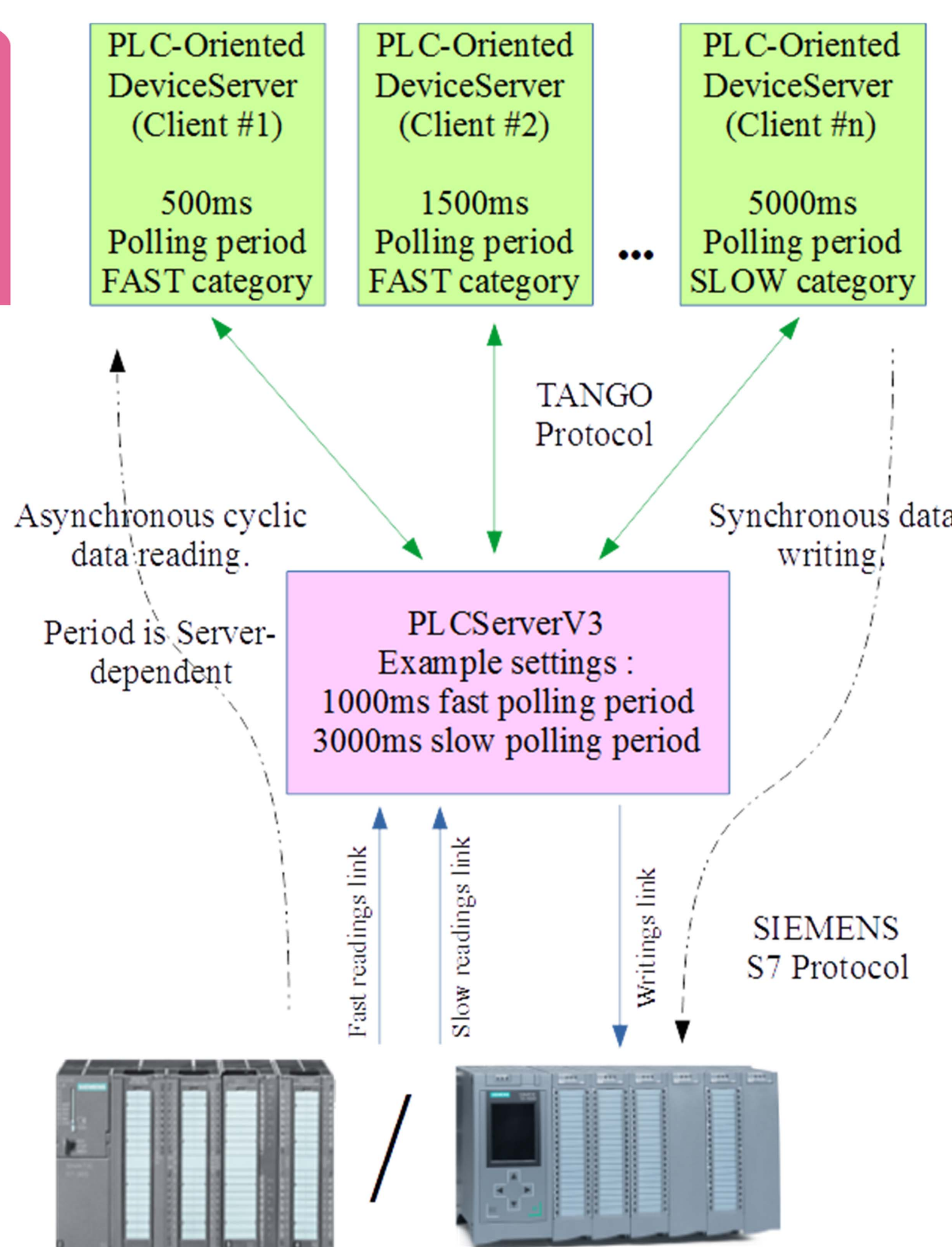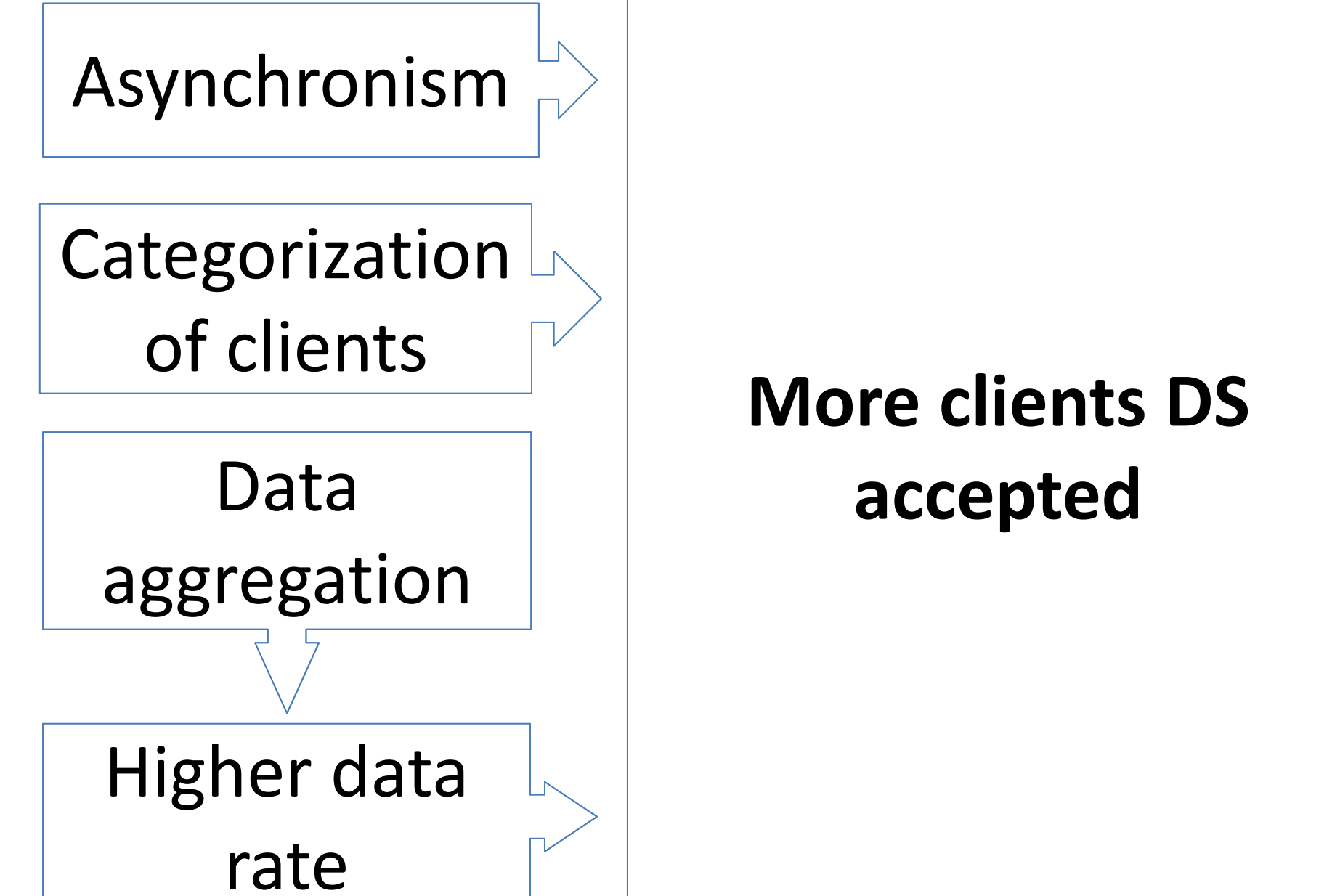- Open source (LGPLv3).

[1] http://www.snap7.sourceforge.net

Performances and results

Enhancements

Asynchronism

Categorization of clients

Data aggregation

Higher data rate

More clients DS accepted

PLCServerV3 is more **efficient** and it permits an **easy deployment** without intervention on PLCs or clients DS in production at SOLEIL.

Figure 3: Communication between Tango DS and PLC using PLCServerV3.