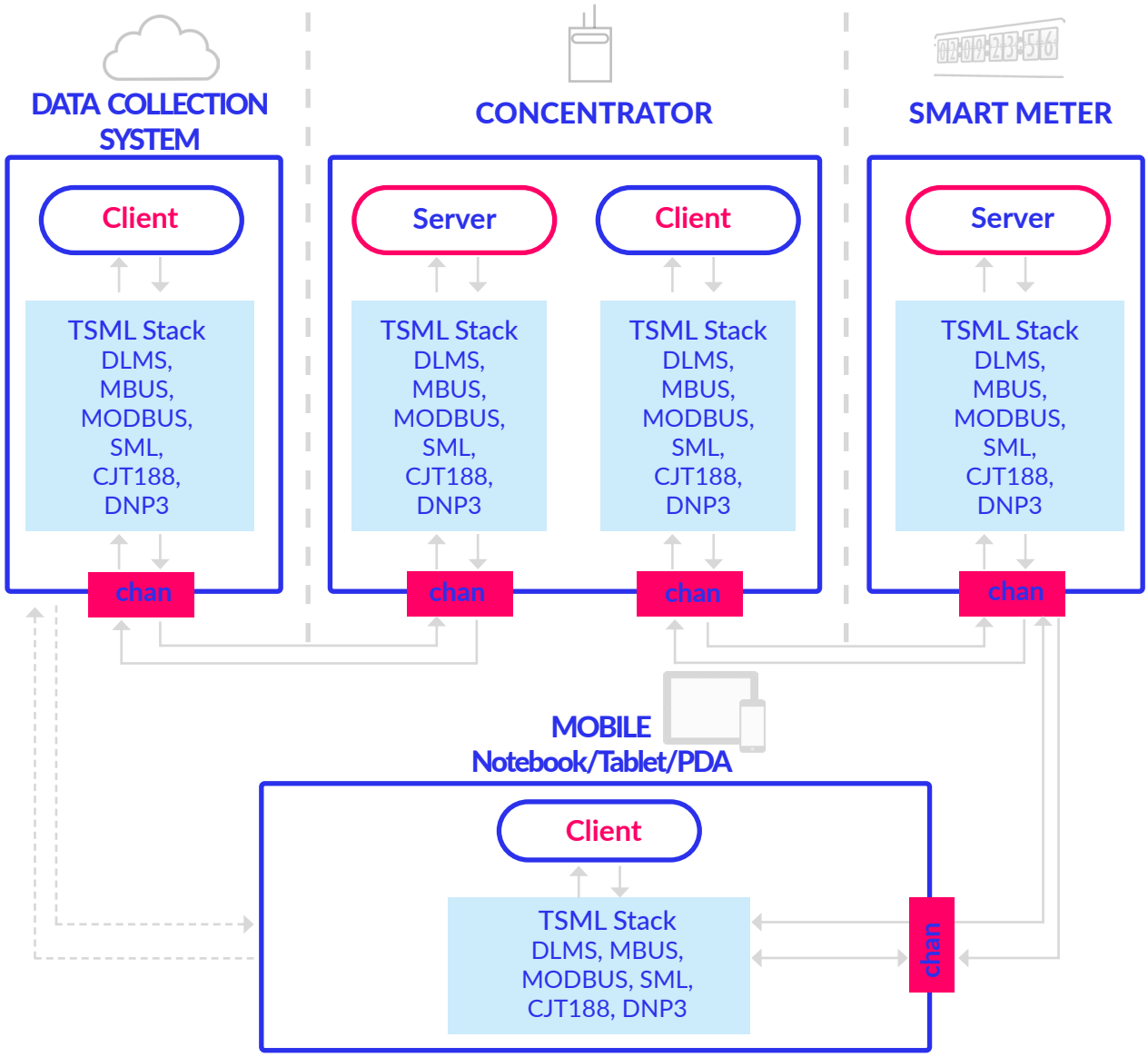
DLMSLIBRARY

TERRANOVA

TSML
SMART
METER
LIBRARIES

Terranova's Smart Meter Libraries suite is designed for the implementation of some of the most important and widely used communication protocols such as DLMS/COSEM, MBUS, SML, MODBUS, CJT188, DNP3. The Libraries can be used for a wide range of applications, but mainly for the implementation of:

- Smart metering systems (server);
- Data collection systems (client);
- Data concentrators (client/server);
- Customized Stack Layers.



ADVANTAGES OF THE SUITE

- **Prompt time to market**
  Choosing the Terranova Libraries allows drastic reduction of development times for communication protocols because Terranova guarantees consistent conformity of its products to the companions prevailing in the various countries, both in start-up phase and the subsequent design phase.

- **Optimization of investments**
  Entrusting specialists with communication protocols means that it is no longer necessary to make further investments to monitor complex and highly vertical fields of competence with respect to the customer's own core business.

- **Compliance**
  Thanks to a team specialized in the development of communication protocols constantly monitoring the various markets and co-operating with them, prompt adaptation to the standards and verticalizations of the various countries is guaranteed, especially as regards the following companions:

  - UNI TS 11291 issued by CIG (Italy)
  - GBCS issued by the "Department of Energy & Climate Change" (UK)
  - TR 03109 issued by BSI (Germany)
  - ENERGA-OPERATOR SA (Poland)
  - SPODES (Russia)
  - IDIS (Interoperable Device Interface Specification)

- **Modularity/Flexibility**
  The Terranova Libraries suite consists of different components (DLMS/COSEM, MBUS, SML, MODBUS, CJT188 and DNP3) that can be combined with each other according to Customer's needs as well as market and service characteristics.

- **Quick and easy integration**
  The Terranova Libraries are easy to integrate, above all thanks to a series of optional services offered by the Company, such as:

  - Possibility of developing clients, servers, HHT and concentrators
  - Supply of concrete examples, hints and highly evolved testing tools
  - After sales support (during development and any certiflcation tests)
  - Training
  - Easy and user-friendly API for customization
  - Integration module for OpenSSL or MatrixSSL

- **Compiling for different operating systems**
  The Terranova Libraries have been compiled to be compatible with various OS and independent of the underlying Operative System or Firmware.

- **Reduced memory requirements**
  According to a recently conducted benchmark by Landis+Gyr (Toshiba Group), the Terranova Libraries are the best on the market in terms of utilization of resources, thanks to their reduced memory requirements and an optimized dynamic memory allocator.

DLMS LIBRARY - MAIN FEATURES

DLMS Library, component of the **Smart Meter Libraries** suite, is able to supply all the necessary software tools for rapid set-up of intelligent systems in multi service environments:

- Independent software package developed by using the ANSI-C (C89) programming language, in accordance with the MISRA-C syntax rules
- Object-Oriented module for organizing rough data in the server
- Scalable and modular architecture of the protocol stack
- Conforms to Green Book 11 and Blue Book 15: Push Service, Compact Frame, etc.
- Partial data management (COSEM objects larger than the available memory can be handled)
- Includes definition of the more widely used OBIS codes (OBject Identification System) and offers possibility of adding their customized versions
- Security Suites: 0, 1 and 2: AES-GCM-128, AES-GCM-256, ECDSA, ECDH, SHA-256, SHA-384, V.44, etc.

COMPONENTS OF THE SOFTWARE ARCHITECTURE

The library has a modular architecture where each module represents a specific communication protocol.

- **DLMS/COSEM:** provides all tools for managing a DLMS communication and the functions to interact with the Terranova Object Model.
- **Wrapper:** light "stateless" protocol, used for supplying another level of multiplex/demultiplex over TCP/IP
- **High-Level Data Link Control (HDLC)**: protocol designed for controlling data link and transfer
- **Terranova Object Model:** designed to be independent from the underlying protocol stack; it facilitates communication and sharing of data between other modules.
- **High-Level User:** user code which directly utilizes the services offered by the stack modules
- **Low-Level User:** user code which can read/write on the communication channel