



ITE

INSTITUTO TECNOLÓGICO DE LA ENERGÍA

ITE POSITION PAPER.

Workshop on the Future Internet PPP Architecture between Industry and European R&D Centres

The “Instituto Tecnológico de la Energía” is working together with the industry and utilities in different communications projects in the area of the Smart Grids, and Electromobility

Our R&D departments are involved in these projects. They are working in the design and development side very close to our partners

Laboratories

ITE laboratories give constant technological support for the products made by the companies in our target sectors. The speed and reliability of tests and calibrations is one of our basic objectives, which has led us to obtaining ENAC (National Accreditation Institute) accreditation of some of our laboratories.

Laboratories

- [Electrical safety](#)
- [Calibration](#)
- [Quality of Supply](#)
- [Electromagnetic Compatibility](#)
- [High Voltage](#)
- [Legal Metrology.](#)
- [Measurement of Electromagnetic Fields](#)
- [Prototyping of Electronic Circuits](#)
- [Environment and Quality](#)

A brief description of several projects that ITE is involved in these fields

EPV PROJECT

It is a cooperation project in the area of the electric infrastructure that we need for the EV introduction on the market. One of our main goals in this project is to develop an ICT system for the communications between the vehicle and the charging infrastructure V2. Also between the charging infrastructure and the Grid.

A short project objectives description is:

Analysis and design specification of a new energy efficient urban transport system, based on the use of electric vehicles integrated in the power grid and driven by high renewable energies integration

- Development of an optimal algorithm for charging station distribution and the charging process
- System specification design for Vehicle-to-Grid (V2G) in a metropolitan area based on standards
 - ICT architecture and control.
 - Storage system and energy management in the vehicle.
- New business models for the introduction of EV in urban areas
- Development and implementation of a new charging station (CS) model.

New ICT systems has been developed for our charging station prototype, and for the infrastructures communications (Control & Management)





OPEN NODE

The essential component of the project is the SSN. The SSN is an embedded system that will be integrated in the transformation centers and it will provide them intelligence and autonomy. We are designing them of such form that has a great flexibility and the possibility to extend their functions.

Another very important component is the Middleware, that it is in charge to communicate the network of SSNs with the rest of stakeholders of the electrical system (Utilities, Control centers, Billing, etc.). In addition it is acting like a tasks planner, equipment management, massive code and functionalities updates in hundreds of thousands of SSNs, and the management of millions of users data too.

The set of SSNs will form a very complex distributed system with hundreds of thousands of nodes with the MW as a master for the entire system control and management.

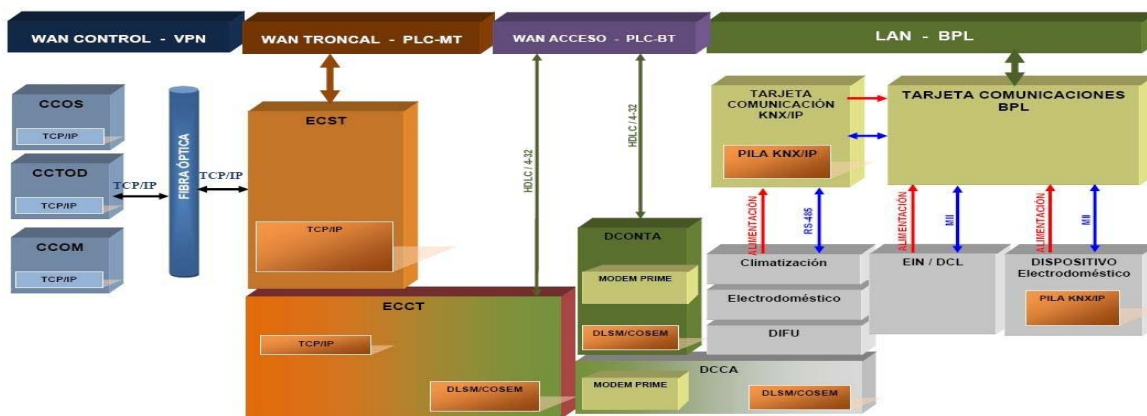
The communications system is especially heterogenous where the SSN communicates with the intelligent accountants (smart meters) with PLC technologies by DLMS-COSEM on PREVAELS or on FSFK, and with Middleware (MW) by means of IP based on TCP/IP. For the communications with the MW the transport levels have still not been decided but it is being spoken of wireless technologies (mainly GPRS and 3G) and wired (Optical fiber where he is available or PLC)

We use technologies like SOA (Service Oriented Architecture), services WEB, and the already known IEC 61850, IEC 60870-6-104, IEC 61970 and IEC 61968.

GAD PROJECT

Within the project we defined a communications architecture has been designed using standard, it is a solution to reach the provision points of million consumers in the different sections from the network, from the control centers of the implied agents to the home of the consumer.

The following scheme is the exposition of the zones of boarded communication, introducing the devices considered in each of them:



- WAN of control, approaches the communication between the agents control centers, realised by means of virtual tunnel (VPN) to guarantee the privacy and security of the information interchanged between the agents.
- Main WAN, approaches the section of communications between the control center of the distribution operator (CCTOD) and the substations (ECST) and the communication from the substation (ECST) to the transformation center (ECCT). They will be realised by means of PLC (Power Line Communications) of average tension. The used protocols will be based on TCP/IP.
- WAN of access, defines the communications from the transformation center (ECCT) to the equipment intelligent accountants (DCONTA) and the control systems of loads (DCCA). This section is most critical due to the capillarity of the unfolding, at physical level, has been decided on PLC of low tension, agreed to the standard PREVAELS. In the layers superiors it has been decided on standard DLMS/COSEM.
- Section LAN includes/understands the communications inside the home. The border of entrance of the communications in the home is denominated equipment DCCA (control system of loads).