



CEB - Companhia Energética de Brasília

Revolutionary Architecture Implementation Challenges

Context

CEB is a state-owned distribution company responsible for the region of the Federal District, which includes the city of Brasilia and several surrounding cities.

In 1999, Spin, in partnership with STD - Technical Digital Systems, won CEB's competition to replace its Operation Center of the Electric System (COS). The task was to provide the SCADA COS and all substations, while the STD would provide remote substations.

The SCADA to be replaced controlled 31 substations and in the scope of supply, the first 64 post keys would be deployed in the 13.8 kV network.

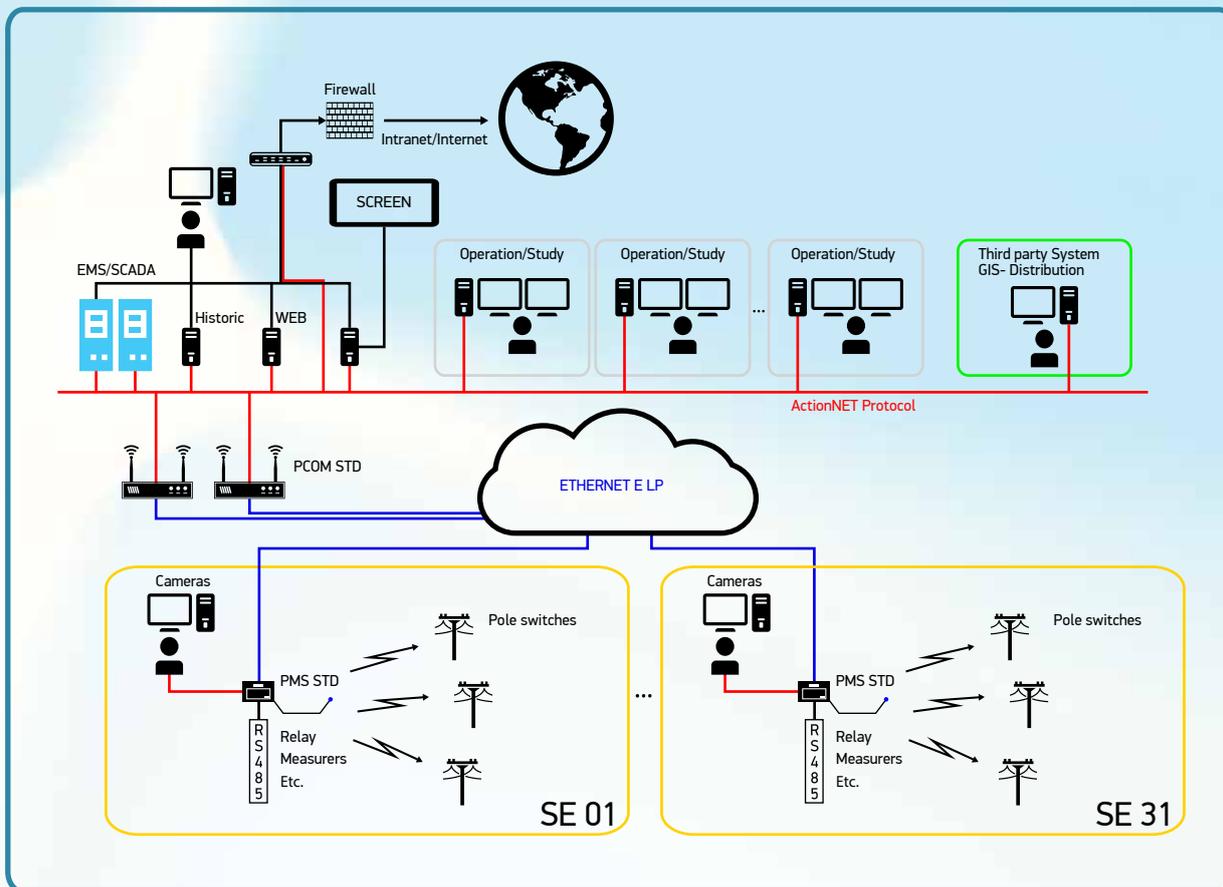
The replacement should take place without system interruption. The solution opted required that SCADA Spin possessed an EMS system (Energy Management System) integrated, with Power Flow functions, estimated state and Contingency Analysis.

Challenges

The 31 existing substations should be operated from a distance, without the need for hand labor at the spot. Also, due to the large number of strikes at this time, the COS should have mobility, ie a given substation could take control becoming a COS or part of it, creating, in the second case, a COR also mobility.

Implanted Solution

The following figure shows the deployed solution in 2000. Since then, the software remained technologically updated and is in operation, controlling 37 substations and a few tens of post keys.



Each substation has a STD concentrator, designated SMP (substation multiprotocol processor), which communicates with Spin's SCADA with all IED (Intelligent Electronic Device) and with the remote pole of the area of the substation as well as with PCOM (Communication Processor) COS. Both PCOM as PMS have a boot file that tells with what it communicates and with what protocol. So for a PMS turn a PCOM, all you have to do is change this boot file. With this architecture and the versatility of concentrators, any substation can become a COS or COR.

With the concentration of remote pole near the substation, decreases the data traffic between substations and COS, since only the most important data substation goes to the center, so as to allow, in the case of local operation at the substation, the dispatcher to also have access to the key post in its area of operation.

In COS, SCADA Spin was deployed in hot-standby operation with several operation islands. This SCADA was coupled to a EMS system, developed in partnership with Unicamp, which operates both in real time as in study mode. In real time, whenever a key changes state, the configurator module, the power flow and the state estimator start to run. Each operation of the island can operate with the measures read from the field or the estimated measures.

If an operator wishes to conduct a study, it enters the study mode and is automatically disconnected from the real-time mode, keeping the state of the last time he was connected. From this point, he can study the current data or can make a study of a past situation, stored in the historical database.

Results

The solution was implemented in 2000 and the EMS in 2001, and is still in operation. The EMS was the first developed in Brazil and implemented in a distribution company. During strikes, when there are pickets in access to COS, the system is operated from another substation without operating loss. Today all substations of the CEB are unattended and operated from the COS. The places where the maintenance teams that support substations stay, function as CORs.

