Interview Patrick Colling

Recently MCCResources interviewed Patrick Colling, former communications expert at Creos Luxembourg S.A., the company that owns and manages electricity and natural gas networks in Luxembourg and is responsible for planning, maintaining and operating these networks.

Gert Jan Wolf asked Colling about the Tender process and implementation of TETRA at Creos, his view on the importance of Critical Communication networks in the Utility sector and his opinion about Critical Communication of the Utility sector in the future.

Today Creos employs some 700 people and the Creos networks comprise around 9,000 km of power lines and around 1,900 km of natural gas pipes. Almost 250,000 customers are connected to the electricity networks and around 45,000 customers are connected to the natural gas networks.

In an earlier interview Colling mentioned that under the European Union's 20-20-20 energy savings objectives, by the end of 2018 Creos would have installed smart meters with 95 percent of its 300.000 customers. Colling said: "Meter data will be collected every 15 minutes, brought to a central platform in Luxembourg, then back to the customer and also injected as data for SCADA and billing".

Now, as Colling is looking back at the project, he is proud of what the communication department has archived.

MCCResources - Currently there is a lot of interest on what has been happening on the TETRA project at Creos. Can you explain why especially this project is so important for the Utility sector?

Patrick Colling: Today many utility organizations still use analogue systems with low data rates. In fact also Creos already had a similar communications network. In 2000 Creos decided to migrate from Power Line Communication (PLC) technology (data over high voltage lines) to SDH/PDH. In early 2011 Creos started to investigate in order to understand the evolution of technology in the sector. As a result, IP/MPLS was chosen as a backbone and basically covered all the needs. Alcatel-Lucent provided a 10 Gb/s backbone interconnected to several 1Gb/s full mesh rings and this network became a huge backbone for SCADA and CCTV and covered all other needs. As at that time Creos did not know too much about IP/MPLS, a team needed to be trained on this technology. A a six-day training session on Creos owned equipment, was he beginning of a story of success.

You have to understand that Creos was one of the first companies to adapt digital communications technology within the energy sector. In 2011, Creos decided to migrate from analog voice communication to digital voice communication. The decision was made to acquire a technology that is secure and reliable. By analyzing related technologies, a team discussed all the options and then it became clear: "Why shouldn't we choose a technology that can handle both, voice and data?" The Creos team started analyzing technologies such as DMR, TETRA, CDMA, WiMax, etc. At that time, TETRA was not the first choice. The first choice was CDMA technology. Companies like Alliander and Stedin already use CDMA for end-to-end smart metering successfully. However, the regulator said that was a lack of spectrum and therefore CDMA could not be used. The only spectrum the regulator could offer was 1,1 MHz at 462Mhz(44carrier) This spectrum could only be used for TETRA and so the choice was made.

Creos became one of the first companies in the utility sector to use TETRA for voice and data transmission. Due to the national coverage of the voice transmission and the possibility to

transmit data simultaneously as a bonus, 3000 MV stations could be reached at the same time.

MCCResources - I suppose Creos needed to start an EU tender for this project. Can you tell us a little bit more about the tender process?

Patrick Colling: A tender with the focus on TETRA started in 2013. This tender consisted of the purchase and implementation of the system, including radios and SCADA solutions. A communication system was needed to support 500 users in their day-to-day voice communications and 3000 modems covering smart metering plus additional modems for RTU's. A short timeline was given to choose the right bidder, in April 2013 management decided to go to tender and end of August 2013 the contract was signed. Keeping in mind that the benefits of using high voltage stations as TETRA base stations is that no new ground is to acquire, no extensive installation costs since cabinets and supports were present. There was solely an investment in equipment for 56 TETRA base stations.

There were five bidders on the tender, a focus on three bidders was made in final negotiation phase. Four of the bidders were offering a TETRA system through integrators. The only manufacturer that offered directly was Sepura. From the five bidders, 3 offered Piciorgros TETRA RTU modems.

MCCResources - As already three of the five bidders offered Piciogros modems, what was the benefit of using the Piciorgros TETRA RTU modem?

Patrick Colling - The benefit of Piciorgros modems compared to the other products is, the Piciorgros solution consists of only one box, including RTU functionality, protocol converter, TETRA modem, etc., instead of a variety of different equipment. The impact of using equipment from different vendors is high:

- costs of mounting, cabling, servicing and supervising
- failures and errors are not assignable

By installing one product, the liability is much clearer and it takes less time for installation, which means less money to invest. The big advantage of the Piciorgros modems was that Piciorgros could deliver a single product maintaining the highest standard in communication.

MCCResources - Did the tender include a proof of concept?

Patrick Colling- By signing the contract Creos insisted on a proof of concept (PoC). The proof of concept needed to be conducted under real conditions and in September 2014 the 1st Base Station was linked with Piciorgros modems. The PoC was supervised and accompanied by a Piciorgros team.

The PoC was conducted with 10 modems connected to 10 RTU's in the field and coming out on one TETRA modem connected to the SCADA gateway. Finally different test where implemented, using different protocols. One test was conducted by using the older protocol IEC101 and at another test, the new IEC104 protocol was used, as well as testing Over the air (OTA) Modem upgrading and the MODBUS protocol. The test was a complete success.

MCCResources - How important is it for an energy provider to use a reliable and secure communications network for voice and data?

Patrick Colling - Reliable and secure communication is an absolute necessity. By law, Creos has to provide energy. However when there is an outage, Creos has to rely on a high-level communication network. Such a network is as important as any other communication network e.g. Police, Fire and Rescue services.

Currently there are two TETRA networks build up in Luxembourg. There is a network for Creos and one for governmental needs including Police, Fire and Rescue services. Creos was not defined critical enough to participate in the national TETRA network.
If there is a major outage, the Creos network has to be operational as long as possible (<72hrs) in order to manage the energy network. Anyhow, all other power-based technologies are dependent on how fast the “normal” situation could be reestablished.

MCCResources - How secure is the Network?

Patrick Colling - Creos has invested a lot in the encryption of the network. The TETRA network has a TEA1 service Class 2 encryption. This means, that the network is highly encrypted including authentication. Actually, there was no obligation by law to have TEA 1 in the network. The data that flows over the network is not so important that encryption is necessary. Nevertheless TEA1 was installed, extended by the OTA (over the air upgrade) functionality. Piciorgros TETRA RTU modems had also to support TEA1 and OTA..

MCCResources - How do you manage and analyze the received data?

Patrick Colling – Creos is busy with some developments on the control room side. A Network Operations Centre (NOC) is under construction. It will combine several control platforms and management systems from different technologies and different vendors. In the end Creos will be able to manage the power grid and communication network from one location.

Finally an “umbrella platform” on alarming that is able to identify, in a split second, where exactly the alarms are coming from, will be installed.

MCCResources - How do you see the future on communication for the utility sector?

Patrick Colling - As mentioned earlier, it is important to provide anyhow energy. You can’t base any element of a network on a third party provider. I can’t imagine that a utility company will built an independent LTE network, this is too cost intensive. Using a public LTE network as a service is not an option, due to unreliable segments. Independency is and must be the key.

An utility communication network is not and will never be a buisiness case.