

GARRETTCOM ETHERNET SWITCHES AT THE CORE OF A RADIOACTIVE SODIUM REPROCESSING PLANT

An Industrial Ethernet Application TECHNOLOGY TODAY

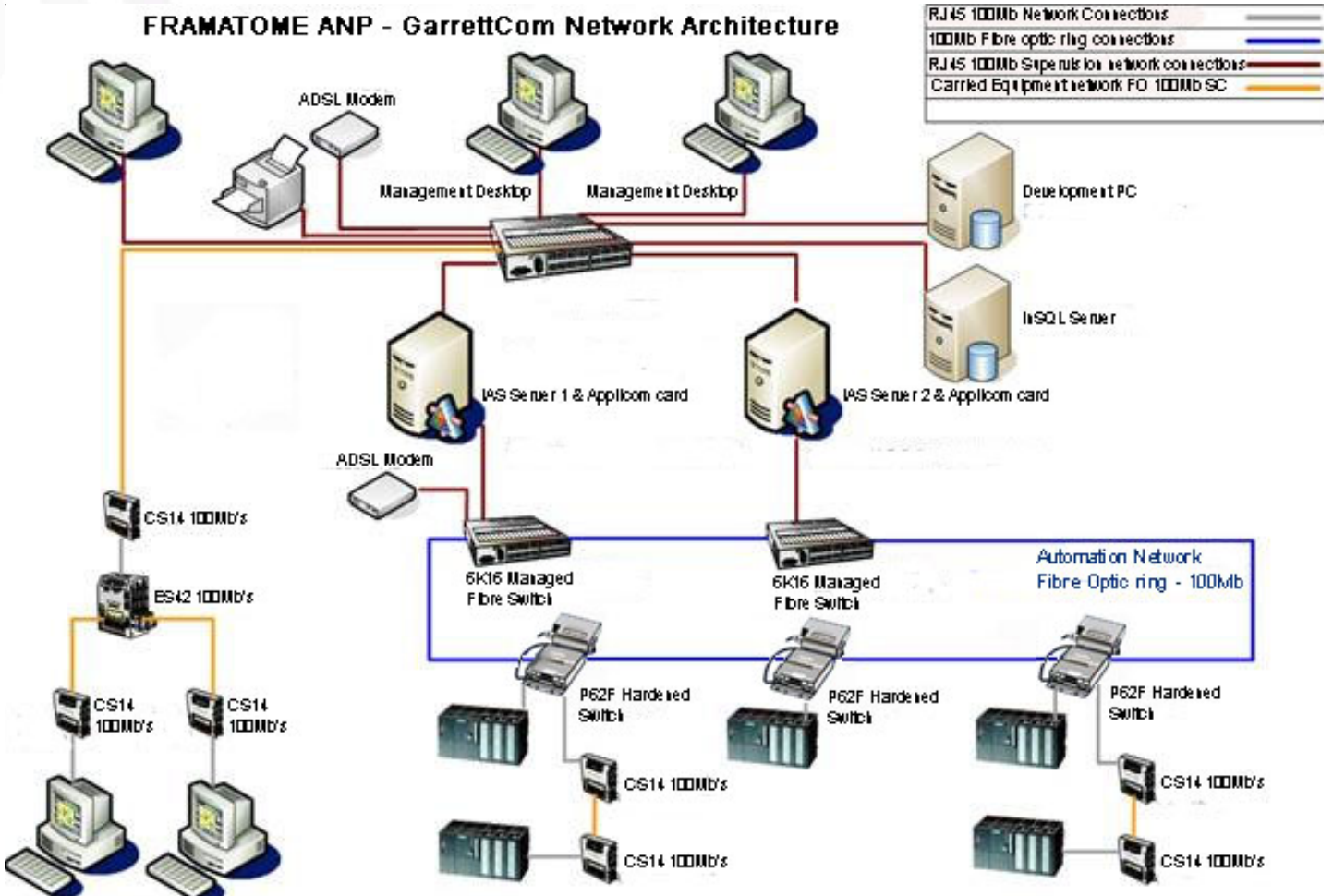
When construction of the Super Phénix fast-breeder reactor began in 1977 in Creys Malville, France, it was hailed by the French Government as "the new Concorde". The pioneering design was intended as a prototype for future nuclear energy production, and was touted as the near perfect way to generate electric power. Unfortunately, almost from the moment of its commissioning in 1984, it was beset by problems, running only intermittently for the next 13 years. In June 1997, the French National Assembly pulled the plug on the project.

This left France's principal energy company, the EDF (Electricité de France), with a number of problems, not least of which was the reprocessing of 5500 tonnes of radioactive liquid sodium. After years of debates, enquiries and proposals, it was finally agreed in April 2004 that, as part of the build out of the Super Phénix, a new plant would be installed to drain the sodium and a 'reactor' constructed at Creys Malville to transform the sodium into caustic soda.

THE CHALLENGE

The contract to construct the sodium reprocessing reactor was awarded to Framatome AREVA NP – an acknowledged leader in the design, construction and maintenance of nuclear power plants. For the control and communication equipment that the build required, which covered a complete package of SCADA, PLCs and Ethernet network equipment for a high level of automation, Framatome turned to French industrial and utility integrator Factory Systemes.

The last few years has seen a dramatic increase in the automation of electrical utilities, with the result that the IEC 61850 standard was introduced. The 61850 standard defines a common communications architecture for automation components. This comprehensive standard was conceived to enforce interoperability between a variety of IEDs.



GarrettCom Switches at the Nuclear Core

The wider goal was to facilitate the implementation of systems which took advantage of the latest network products to make more control information available, and to make it easy to transfer that information seamlessly and reliably to exactly where it was needed. Further, the standard also enforces stringent environmental performance. All automation and networking components used in electrical utilities must be compliant.

About AREVA NP

Over the past 30 years, AREVA NP has become the world's leading designer and builder of nuclear power plants and supplier of fuel, maintenance and modernization services. AREVA NP supplies nuclear islands, and nuclear steam supply systems, engineering services for the modernization of existing plants, and instrumentation and control systems for nuclear power plants. The company has built almost 100 of the 303 light water nuclear reactors in service worldwide. These reactors represent a total installed power of nearly 100,000 MWe, or 31 percent of the world's installed capacity using this technology.

THE SOLUTION

Recognising the need for a host of compliant, hardened Ethernet switches for the communications infrastructure, Factory Systemes turned to GarrettCom Europe. Factory Systemes specified a range of GarrettCom products, including Magnum 6K16 managed switches, P62F and ES42 unmanaged edge switches, and CS14 converter switches. All were chosen due to the high configuration flexibility and high reliability, as witnessed by compliance with both the IEC 61850 and IEEE 1613 standards. Rigorous testing has ensured that these components fulfill the criteria deemed necessary by the power utilities industry to support mission-critical applications that demand high reliability, electromagnetic radiation immunity, and sustained operation under temperature stress among other tough conditions.

THE RESULTS

IEC 61850-compliant Ethernet switches from GarrettCom Europe are playing a key role in the reprocessing of sodium waste from the decommissioning of France's former flagship Super Phénix nuclear reactor. Building the new plant at Creys Malville to process the sodium might seem like a long drawn-out approach, but the treatment process itself has the huge benefit of being fast. Estimates show that all of the radioactive sodium could be treated and cemented within two years, producing around 70,000 tons of concrete. This timescale will play a big part in reducing the overall build-out of the plant to 25 years. With this in mind, Factory Systemes designed and installed the Magnum 6K16 managed switches at the corporate level, and the Magnum ES42, CS14 and P62F switches at the SCADA and PLC level.

Magnum 6K switches have powerful, highly secure and robust remote access management capabilities that Framatome use to monitor the network and protect its resources. GarrettCom's MNS-6K software runs on all Magnum 6K-Series Managed switches with Secure Web Management (SWM), providing encrypted authentication and access over Ethernet from remote locations.

The use of RSTP (Rapid Spanning Tree Protocol) technology provides redundancy for recovery from network faults, and the rigorous testing GarrettCom products are put through fulfills the criteria deemed necessary by the power utilities industry to support mission-critical applications that demand high reliability, electromagnetic radiation immunity, and sustained operation under temperature stress among other tough conditions.

For more information on GarrettCom and its products, visit www.garrettcom.com or www.garrettcom.co.uk.



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