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Industrial Communication

Rugged network solutions on the right track

Siemens partners with system integrator Resologis to help a transportation company by leveraging the RUGGEDCOM Multi-Service Platform products

Automation has the power to dramatically improve the global rail industry. For a city's subway system, for example, which can have dozens of stations in its network, the ability to control all the elements of each station with a few clicks on a computer screen from a central location holds enormous potential. This includes major cost savings, improved service and much more effective operations and maintenance in general.

One company actively involved in this process is Resologis – niche software and systems integration company based in Montreal, Canada, whose team of experts specializes in the transportation sector. One of their clients is a transportation company, specialized in rail vehicles, infrastructure and signaling systems & services.

Julien Ciesla, President of Resologis, explains that his company's signature offering is known as IPC – Linux-based programmable logic controller (PLC) software. It is designed to automate everything involved in operating a subway system in a large city. So when Resologis' customer approaches large urban transit organizations, it will be able to provide automation as part of its package – automation to cover everything from camera security and entrance turnstiles to schedule displays and the public address system.

Resologis develops the software for this, but that alone is not enough. Special RUGGEDCOM hardware and a unique RUGGEDCOM computing platform provided by Siemens are also critical elements in enabling a completely functional solution.



The MPM-10 (Montréal Pneumatic Material 2010), also known as the Azur, is a fleet of subway trains currently in use by Montreal Métro.

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The combination of these Siemens products and Resologis' software is well down the path toward successful prototype testing for La Société de Transport de Montréal (STM), the public corporation responsible for the city's subway system. Based on this model, comprising products and Resologis's software, the experience and knowledge gained from the project can be used as a template and applied on a global basis.

The challenge

A solution that reliably provides full functionality – but compact enough to fit into small spaces.

Resologis' IPC software needs accompanying hardware so its automation data can flow through a transit system's communications network. This means that switches must be physically deployed throughout the subway system to seamlessly work with the software.

However, rail systems can vary dramatically depending on where they are located, and in some instances, tough conditions must be able to be handled. For example, rail operators in climates with harsh winters must deal with extreme cold. Others must face oppressive heat, while some are confronted by persistent rain and regular flooding.

As a result, whatever hardware is used, it must be extremely rugged and reliable. And no matter what the climatic challenges, or where a rail system is located, they all share one difficulty that must be addressed – very limited space. Whether tunnels or platforms in railway stations, the physical layouts are designed to leave just enough space for the transit vehicles, space is always restricted when it comes to installing extraneous communications equipment.

At the same time, the devices need to be modular, packed with the appropriate features, have field-replaceable platforms and be cost-effective.

The solution

Everything in one box: modular RUGGEDCOM RX1500 with RUGGEDCOM APE to house third-party software.

There is only one way to meet the challenge when space is limited like this – and that is to find a "one box solution" where all the software is physically embedded within the network switch.

As Mr. Ciesla describes, only Siemens has a switch capable of housing third-party software, while being rugged enough to handle the harsh conditions. The solution, he says, is the RUGGEDCOM RX1500 with APE (Application Processing Engine).

The RX1500 is a 19-inch rack-mounted device that is highly modular, allowing thousands of configurations to be created. As a field replaceable platform – with optional redundant power supply – the device is offered with WAN,

serial connectivity and Ethernet communication options. Reliable in harsh environments, it is highly resistant to electromagnetic interference and high-voltage electrical transients, can operate in temperatures of -40°C to +85°C without fans and has an aluminum metal enclosure. So no matter where in the world the trains are operating, difficult environmental conditions will not pose a threat – whether those challenges come from blazing heat, bitter cold, powerful vibration or extremely dirty conditions, which are typically found in underground rail environments.

Most compellingly, Siemens is able to deliver a unique, integrated solution. "By adding the RUGGEDCOM APE, the equivalent of an industrial-grade personal computer is created, which can run our software in the switch itself," explained Mr. Ciesla.

The APE is available with Microsoft Windows 7 Embedded, Linux and CheckPoint GAIa platforms already installed. Compliant to the standards of a PC, the user can install and run their customized operating system as they choose. That includes being able to extend the life of obsolete and unsupported software by running them on APE's secure operating systems.

The APE provides a 1 Gigabit Ethernet link at the front of the unit, and another identical, but completely separated link to the backplane of the RX1500 chassis. This physical separation of ports and the special arrangement of the connections make it an ideal platform for network and security-related applications, such as security appliances, firewalls, network log and load processors and intrusion sensors – all elements involved in running a communications network for transportation companies such as railway and public transit operators.

"To our knowledge, Siemens is the only company with a solution that offers such a unique form factor, such a high level of modularity, switching & routing functionality as well as a computing capabilities," notes Mr. Ciesla. "No one else can offer such a wealth of features in a rugged design."

The results

Complete Siemens solution to help deliver cost savings, reduced downtime and simpler maintenance.

Transportation companies can hugely benefit from the RUGGEDCOM RX1500 with APE as a result of its functionality and design.

"Because the RX1500 is so modular, it is extremely versatile when addressing the needs of transportation companies, no matter how diverse their requirements," he explains. "The cost of maintenance is reduced significantly for operators - along with the associated maintenance delays – as a result of the modularity and the fact that the units can be hot swapped.

He adds that the solution's elegance is striking. "We're using standard, off-the-shelf hardware that is rugged and reliable,

and yet we can still offer a huge number of customizable features to meet whatever unique application needs there are. And it's so easy and simple to manage it all, with hardware and software platforms that can be efficiently supported for many years to come."

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The future

A long-term partnership with a wealth of new possibilities.

The introduction of this particular solution is the fruition of Siemens and Resologis working closely together for years. The team at Resologis is not only very satisfied with RUGGEDCOM products, but they also have a lot of confidence in the Siemens personnel.

"It is much deeper than a supplier-customer relationship," notes Mr. Ciesla. "The support we have had is excellent. If we ever have a problem or a question, they respond in minutes to resolve the issue so that we can move forward."

In addition to this project, Resologis hopes to leverage the flexibility of Siemens RUGGEDCOM Multi-Service Platform products to other transportation companies, where the challenges of limited space and a harsh environment are similar, and the benefits of automation just as compelling.

"It's a very appealing solution," says Mr. Ciesla, adding that the future could hold many more creative Siemens-Resologis solutions brought to the market.

"We've got some exciting years in front of us," he says.

Key Specifications

RUGGEDCOM RX1500

Physical ports

- Field-replaceable line modules
- Up to 24 ports 100FX
- Up to 24 ports 10/100TX
- Up to 12 ports 10FL/100SX
- Up to 8 ports Gigabit Ethernet
- Up to 24 serial ports

Universal power supply options

- Modular and hot-swappable
- Fully integrated power supplies (no external adaptors)
- Input voltage range of 24VDC, 88-300VDC and 85-264VAC for worldwide operability
- CSA/UL 60950 safety approved to +85°C

RUGGEDCOM APE

- Qualified for operating ambient temperatures of -40°C to +70°C
- Surpasses EN50155 and EN50121-4
- Meets IEC61850-3 and IEEE 1613 electrical specifications for operation under extremely harsh industrial conditions



RUGGEDCOM
RX1500



RUGGEDCOM
APE



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Case study at-a-glance

Customer: Resologis is a software developer and system integrator specializing in the transportation sector; a major Resologis customer is a transportation company - provider of rail solutions.

Challenge: for the modernization and automation of railway systems, sophisticated communications infrastructure is needed. This includes hardware that can fit into a small space, is durable and able to withstand heat and humidity – and an operating platform that can run third-party software.

Solution: Siemens RUGGEDCOM RX1500 family with RUGGEDCOM Application Processing Engine (APE); these are part of a Multi-Service Platform product family featuring cost-efficient, utility-grade switches with a degree of modularity that makes them ideal for railway systems, especially as third-party software applications can run on them.

Results: based on ground-breaking work being done for the Montreal subway system as a model, the vision is global deployment of Siemens RUGGEDCOM Multi-Service Platform product family to ultimately allow for much more cost-effective, efficient and reliable control and supervision of railway systems around the world.

Future: partnership with Resologis has infinite opportunities for delivering significant benefits in the global transportation industry for many years to come.

Siemens AG
Process Industries and Drives
Process Automation
Postfach 48 48
90026 NÜRNBERG
GERMANY

Siemens Canada Limited
300 Applewood Crescent
Concord, Ontario, L4K 5C7
CANADA

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