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Application Note

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Parallel Redundancy Protocol Requires Fewer Units and Delivers Zero Fail Time

Working with Dexter System Solutions, Belden® created a breakthrough solution for an oil refinery using PRP over WLAN and Ethernet.



Breakthrough Redundant Industrial Ethernet and WLAN Network for Oil Refinery

- Time-savings: quick and easy network commissioning, troubleshooting and management.
- Zero downtime: thanks to Parallel Redundancy Protocol (PRP).
- Ease of maintenance: remote access and mobile monitoring capability with SNMP and PROFINET IO diagnostics.
- Improved security: reduced risk of data theft and possible network failures.
- High-data transfer: fast Ethernet and high bandwidth.
- Maximum reliability: industrial Ethernet combined with the flexibility of WLAN.

Dexter System Solutions is an operations and solutions integrator for the industrial process industry. The company has built a global reputation by producing mission critical networking solutions for the oil and gas industry, within a wide array of hazardous environments according to the latest safety requirements such as ATEX, IEC-Ex and NEN.

To meet the needs of one of the world's largest petrochemical companies, Dexter Solution Systems and Belden were asked to provide a redundant industrial Ethernet and WLAN network according to IEC 61850 specification for an oil refinery location. This would require explosion proof certifications (UL and ATEX) and shipboard approvals (ABS and DNV) and would have to provide a high level of industrial security.

Using Hirschmann™ RSR(S) and OpenBAT-F combined with ruggedized industrial backbone switches Hirschmann™ MACH1040 and Hirschmann™ MACH4000, Belden and Dexter

were able to deploy a comprehensive and redundant WLAN and Ethernet Parallel Redundancy Protocol (PRP) solution that could withstand the rigorous environment and strict standardization requirements commonplace within the oil industry. This PRP was created in accordance to series DIN EN/IEC 62439. PRP is relatively new in Ethernet via the RSP. PRP executed over WLAN via the RSPS is a break-through development. Both networks are managed centrally via their own devoted Hirschmann™ MACH1040 switches. In addition, both networks are connected centrally to the plant control room and managed by the Hirschmann™ MACH4000 switch. Industrial security is provided by the EAGLE30; segmenting each independent network into subnets. For the first time, networks are able to guarantee uninterrupted data communication over WLAN and Ethernet.

System Requirements

This project requires stable and reliable wireless links because

- Video is transmitted, demanding high bandwidth
- Safety of information technology equipment needs to be EN 60950
- Transmission rate is 450 Mbps according to IEEE 802.11n for WLAN network
- Operation temperature is between -40°C to +70°C
- High Availability Ethernet is required in accordance with IEC 62439
- A multimode fiber optic network is applied
- Certification for Atex Zone 2 hazardous environment is required.

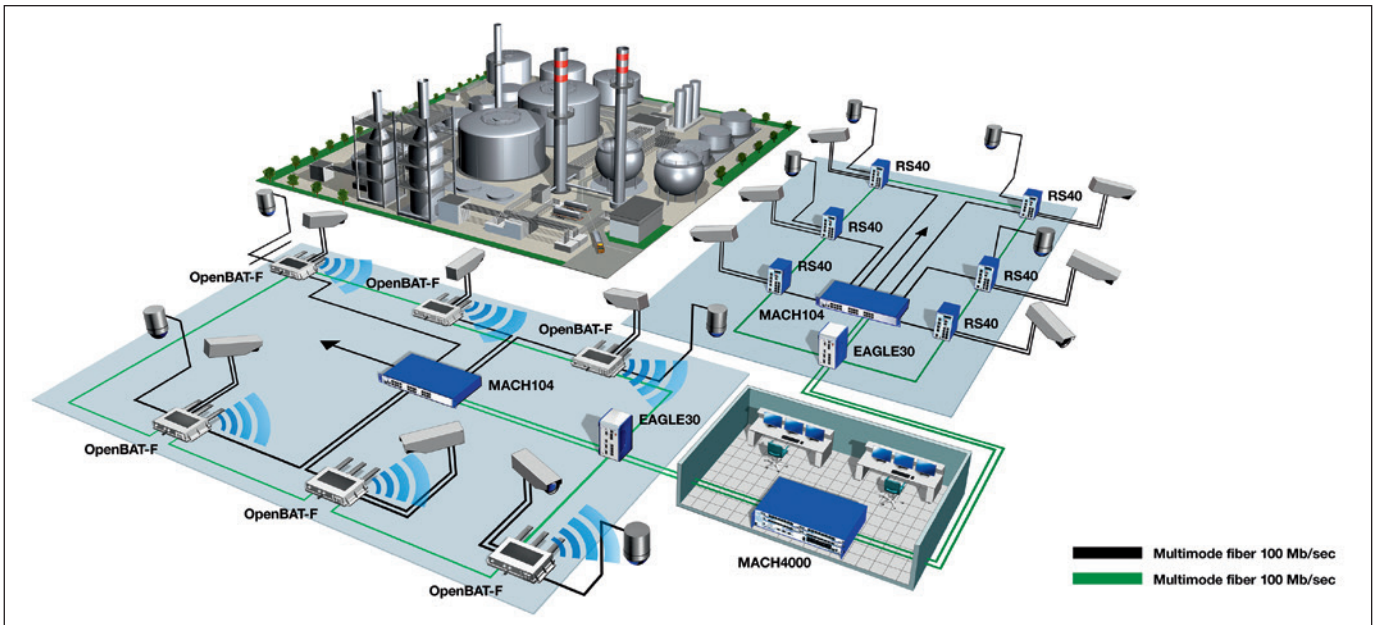
**Be certain.
Belden.**



Belden® Solution



Adjacent redundant fiber optic rings support Parallel Redundancy Protocol (PRP) over two separate networks; one industrial WLAN (OpenBAT-F) and one industrial ethernet (RS40). Both networks are managed centrally via their own devoted Layer 2 industrial 19-inch workgroup switch; the Hirschmann™ MACH1040. Both networks are connected centrally to the plant control room and managed by Hirschmann™'s Layer 3 industrial backbone switch; the MACH4000. Industrial security is provided with the EAGLE30; segmenting each independent network from the control room. Because BAT devices with Atex Zone 2 certification do not require external housing, they are lightweight and easy to mount.



Why Belden

Belden and Dexter System Solutions were able to meet the customer's wireless and Ethernet network demands with a minimalist solution that surpassed the competition in redundancy features, technical capability and overall cost-effectiveness. The Belden solution also provided the customer with access to network design and integration support.

Belden has a broad portfolio of Hirschmann™ Ethernet switches and wireless modules that meet the strict EX and shipboard regulatory standards commonplace within the process automation sector.

Product Details

RSPS – Rail Switch Power Smart

- High network availability based on PRP, HSR, MRP, and RSTP redundancy methods
- Precise time stamping IEEE 1588v2, FE type, 6 ports
- Comprehensive security mechanisms: Role-based access, port security, SSHv2; HTTPS, SFTP
- Compact stainless steel housing for DIN rail mounting

OpenBAT

- Built-in Clear Space® technology and ESD protection for maximum reliability in industrial environments
- Rugged housing for installation on DIN rails, walls or poles, IP30 or IP65/67 ingress protection
- Extended temperature range: -40°C to at least +70°C
- Open platform provides maximum flexibility

MACH4000

- High flexibility: expandable by up to 4 hot swappable media modules, Plug & Play function, supports power sources with 100 up to 240 V AC, 24 V DC and 48 V DC
- Maximum performance in the industrial backbone: extensive Layer 2 and Layer 3 software, extended temperature range from 0°C up to +60°C, up to 48 GE ports and 3 x 10 GE
- Increased uptime: power supply redundancy through use of M4-POWER chassis

MACH1040

- Various Switch variants with different port density
- 8 TP ports fix or extendable up to 24 Fast Ethernet ports and 2 gigabit uplinks
- 24 Gigabit TX ports, four of which are combo ports
- Up to 16 Gigabit TX ports for PoE/PoE Plus and 4 Gigabit combo ports (TX or FX)

