UNISON ISA100 Wireless Compliant Product Line
Solution Brief

ISA100 is an open-standard wireless networking technology developed by the International Society of Automation. The protocol utilizes a time synchronized, self-organizing, and self-healing mesh architecture, forming full mesh network topologies. The protocol currently supports operation in the 2.4 GHz ISM Band using IEEE 802.15.4 standard radios. Developed as a multi-vendor, interoperable wireless standard, ISA100 was defined specifically for the requirements of process field device networks.

The NIO200 ISA100 product family includes three infrastructure devices that address all mesh environment needs for deploying ISA100 Wireless networks.

- **NIO200IAG - ISA100 Compliant All-in-One Gateway**
- **NIO200IDR - ISA100 Compliant Backbone Router**

TECHNICAL PRIMER - ISA100 WIRELESS LOGICAL ROLES

Building blocks in ISA100 Wireless are called roles, where a given device might fulfill multiple roles. The NIO200 product family fulfills the infrastructure roles listed in the table below.

Note: This is just a list of the logical roles fulfilled by the NIO200 products family and not a comprehensive list of ISA100 logical roles.

Role	Role Definition and Responsibility
Backbone Router	The Backbone Router mitigates between devices operating in the wireless subnet and devices operating on the backbone infrastructure.
System Manager	The “brains” of the network. Manages all network devices through policy controlled configurations based on collection of performance parameters reported.
Security Manager	Enables, controls and supervises the secure operation of all devices present in the network via standards compliant security policies.
Gateway	Provides an application interface between the ISA100 network and entities residing on the plant network.
System time source	Responsible for maintaining the master time source of the network.

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SOLUTION HIGHLIGHTS

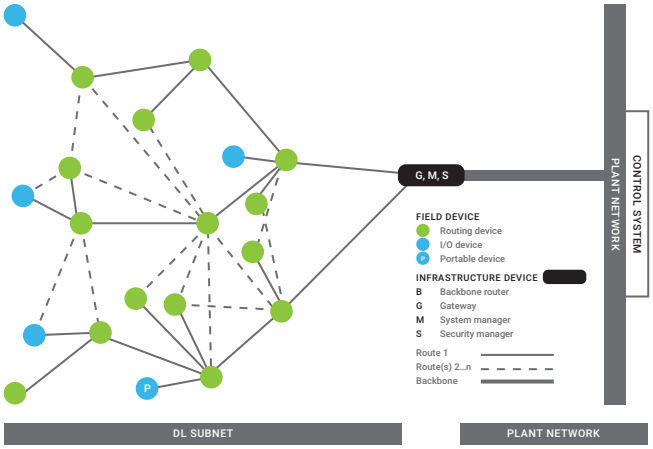
Each NIO200 ISA100 infrastructure product showcases the following features:

- Robust wireless connectivity with support for path redundant, mesh topologies for
  - The ISA100 wireless subnets composed of field instruments
  - Backbone infrastructure via Wi-Fi Mesh technologies
- High throughput rate Wi-Fi backbone
- Dual Wi-Fi Mesh path diversity ensures optimal reliability for communications over the backbone
- Wide temperature range, high EMC immunity to Surge, ESD and EFT
- Suitable for deployment in hazardous environments
- Incorporates power redundancy (DC and PoE)

Deployment Topology Scenarios

ISA100 network deployments are either single subnet (“All-in-One”) or multiple subnet (“Distributed”). The deployment topology end users and vendors choose for their ISA100 Wireless deployments are influenced by various factors such as:

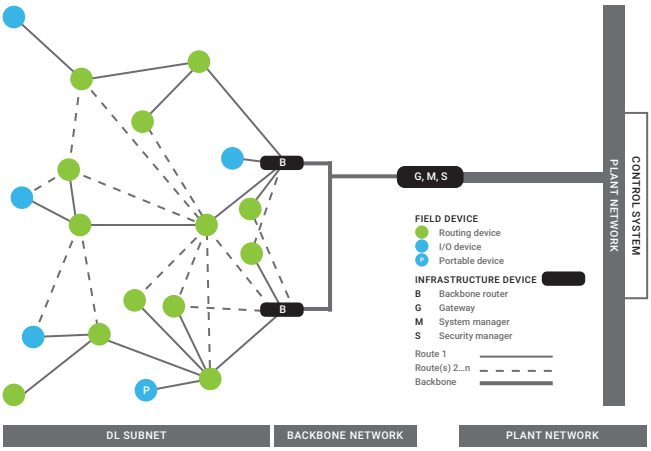
- Scalability requirements – number of field instruments deployed
- Layout of the facility
- Geographic area that needs to be covered
- Financial and budgeting constraints



SINGLE SUBNET “ALL-IN-ONE” DEPLOYMENT TOPOLOGY

Key Characteristics:

- Single subnet - no backbone networking infrastructure
- Simple network
- Typically consists of less than 100 field instruments
- Instruments deployed are typically in close proximity to each other



MULTIPLE SUBNET "DISTRIBUTED" DEPLOYMENT TOPOLOGY

Key Characteristics:

- Multiple subnets connected via IPv6 enabled backbone networking infrastructure
- Complex network
- Typically consists of hundreds of field instruments
- Instruments deployed are scattered throughout the facility

Meet the Family Members

NIO200IAG – ALL-IN-ONE GATEWAY

The "All-in-One Gateway" hosts the the ISA100 System/Security Manager, Gateway and Backbone Router roles. It manages the subnet composed of field instruments arranged in a multi-hop wireless mesh configuration. This product is best suited to be used in a single subnet "All in One" topology.

Topology Considerations	Pros	Cons
Gateway is installed outdoors	Simple network deployment	Limited scalability
Typically close to control room	Low cost installation and maintenance	Limited geographic coverage
Determining optimal location is vital		Deeper mesh networks resulting in: • Higher power consumption, shorter field battery life • Increased communication latency • Decreased network throughput

NIO200IDR – BACKBONE ROUTER

The NIO200IDR is an ISA100 compliant, cost effective Backbone Router. It manages wired and wireless backbone connectivity to the ISA compliant wireless field instruments. This type of router is deployed in conjunction with the NIO200IDG Distributed Gateway.

Topology Considerations	Pros	Cons
Gateways are installed in optimal locations throughout facility Architectural support for wired connections is needed The distributed approach includes data routing plans that increase optimization, and decrease bottlenecks	Network capacity can scale and increase linearly in a cost effective manner Optimal path diversity and resiliency	Network deployment more complex

Centero is a provider of wireless technologies, products and services for the Internet of Things.

Centero is a privately owned technology company headquartered in Atlanta, Georgia. We are at the forefront of the Industrial Internet of Things revolution which is transforming process automation and utility management. We offer end-to-end, standards-based communication platforms that are swiftly integrated into novel or existing products.

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