Nebula Node Extenders™

Self-Organizing Mesh Intelligence

> *"Extending the boundaries of what's possible in mesh networking"*

Product Overview

Nebula Node Extenders represent the cutting edge of wireless mesh technology, combining advanced AI processing with next-generation radio technology to create self-organizing, self-healing networks that adapt to changing environments in real-time. These intelligent nodes enhance signal reach and strength while providing unprecedented reliability in mission-critical deployments.

Key Features

📡 Adaptive Mesh Intelligence

- Self-forming, self-healing mesh topology with zero configuration
- Dynamic frequency selection with interference avoidance
- Distributed AI processing for local decision making
- Proactive signal path optimization with 3D spatial mapping

🔥 Next-Gen Radio Performance

- Multi-band operation across 2.4GHz, 5GHz, 6GHz and mmWave
- 8x8 MU-MIMO with beamforming technology
- Up to 9.6 Gbps aggregate throughput
- Ultra-low latency with edge computing capabilities
- Lossless handoff between nodes with predictive roaming

🔋 Autonomous Power Intelligence

- Solar/renewable energy harvesting capabilities
- AI-driven power management with up to 3 years battery life
- Mesh-wide power optimization algorithms
- Environmental awareness for sustainable operation

🛡️ Distributed Security

- Zero-trust approach with per-device authentication
- Quantum-resistant encryption at the edge
- Distributed intrusion detection across all nodes
- Physical tamper detection with automatic isolation

Technical Specifications

Feature	Specification
Wireless Standards	Wi-Fi 6E, Wi-Fi 7 Ready, 5G Private Network
Range	Up to 300m outdoor, 100m indoor per node
Meshing Capacity	250+ nodes per deployment
Edge Processing	Dedicated AI/ML neural processing unit
Battery Life	Up to 3 years with intelligent power management
Environmental Rating	IP67 (outdoor model), IP54 (indoor model)
Operating Temperature	-40°C to +70°C
Dimensions	196mm × 196mm × 52mm

Deployment Scenarios

Smart Campus/City Infrastructure

Create an intelligent fabric across urban environments, enabling smart city initiatives with consistent connectivity and edge computing capabilities for real-time analytics and autonomous systems.

Industrial IoT Environments

Deploy in challenging industrial settings where traditional infrastructure fails, providing resilient connectivity for critical OT/IT convergence and real-time monitoring of industrial processes.

Temporary Event Networks

Rapidly deploy high-capacity networks for events, emergency response, or construction projects with zero pre-configuration and automated optimization.

Remote/Harsh Environment Connectivity

Extend reliable connectivity to remote locations, harsh environments, or developing regions with minimal infrastructure requirements and sustainable power utilization.

ROI Impact

- **82%** reduction in network deployment time
- **67%** decrease in coverage dead zones
- **44%** lower total cost of ownership compared to traditional AP deployments
- **93%** reduction in network outages through predictive maintenance

Advanced Features

Spatial Intelligence

Nebula uses 3D environmental mapping to optimize signal propagation, automatically adjusting power levels and frequencies based on physical surroundings and movement patterns.

Swarm Configuration

Instead of configuring individual nodes, simply define network requirements and allow the Nebula swarm to self-organize into the optimal configuration for your environment.

Digital Twin Integration

Every Nebula deployment creates a real-time digital twin, enabling simulated changes and upgrades before physical implementation.

Compliance & Certification

- EU AI Act Compliant
- SOC2 Type II Certified
- ISO 27001 Certified
- Carbon Neutral Certified
- GDPR Compliant
