Understanding NMEA OneNet
Revolutionizing Marine Data Networking with
Next-Gen Ethernet Integration

FAQs

What is OneNet?

NMEA OneNet is the third-generation NMEA Standard for marine data interfacing and networking. Operating on Ethernet, it has the power to bridge all three NMEA Standards (NMEA 0183, NMEA 2000®, and OneNet) together into a combined data network.

OneNet is an open industry standard, based on the power of high-speed Internet Protocol v6 (IPv6). It provides a standard method for sharing NMEA message data over modern boat networks today.

Is OneNet a Replacement for NMEA 2000®?

No. NMEA OneNet was designed to overcome protocol limitations in NMEA 2000/0183 and deliver all the benefits of accessing high bandwidth networks within a data security envelope. NMEA 2000 remains a priority-based real-time messaging protocol for vital system integration.

OneNet is an add-on that extends the capabilities of existing NMEA 2000 and other CAN networks, which are widely adopted as a global standard.

OneNet increases the capabilities of existing NMEA applications, offering redundant solutions, intelligent applications, and comprehensive analysis of vessel intelligence.

How does OneNet Benefit Equipment Manufacturers and Developers?

OneNet enables equipment manufacturers to create secure data servers, allowing third-party developers to create specialized solutions that cater to specific applications or regional solutions for boaters. By eliminating device certification guesswork and ensuring secure data pairing, OneNet makes it easier and safer for manufacturers to innovate, all while streamlining the setup process.

OneNet unlocks innovation at a low cost to the visionary application developer.

How does OneNet Benefit Boatbuilders?

For boatbuilders, OneNet offers a more robust and flexible networking inventory using off-shelf solutions and new OneNet devices in the future. OneNet empowers the boatbuilder to dictate how new networks can be designed eliminating the complexity of device integration and enhancing the value and functionality of their vessels.

How does OneNet Benefit Boaters?

OneNet promises a more integrated and homelike experience. It can simplify the management of onboard systems, improve navigation and safety, and enhance the overall boating experience.

What Marine Products are OneNet Certified?

Airmar Technology Corporation has achieved the world's first OneNet certification for its SmartBoat Solution. To learn more about certification and to apply for NMEA OneNet manufacturer and product codes, CLICK HERE.

As the industry adapts to this new standard, the benefits of more integrated, efficient, and advanced marine systems will become increasingly apparent.

OneNet Advantages:

1) Robust and Faster Data Exchange

OneNet, by utilizing Ethernet as its physical layer, has a much larger bandwidth than NMEA 2000.

NMEA 2000   (250Kbits/sec)
OneNet   (10Mbits/sec to 10Gbits/sec)

Results:

- **Support for Modern Vessel Systems:** OneNet's high bandwidth capability ensures it can easily support the demanding data requirements of modern vessel systems, including radar, high-definition video streaming, complex sensor data, and real-time navigation information. This robust data exchange ensures that all onboard systems operate smoothly and efficiently, contributing to enhanced safety, performance, and a positive user experience.

2) Increased Number of Marine Devices on the Network

NMEA 2000 is a CAN (Controller Area Network) Bus network and can accommodate approximately 60 physical devices per network section. An NMEA 2000 bridge is required to join network sections together. OneNet offers the capability to increase the number of addresses to support sensory increases on NMEA 2000 networks and integrate separate physical networks onto a OneNet network. This provides all facets of vessel monitoring to have a multitude of sensor diagnostic and replacement options.

OneNet is a LAN (Local Area Network). Device limitations are defined by the number of ports on a network switch and that can be extended indefinitely by adding more OneNet switches.

Results:

- **Scalability:** With OneNet, boaters and marine professionals can scale their networks effortlessly to accommodate more devices, ensuring that all systems, from navigation to security, are interconnected.
- **Simplicity:** The ability to extend the network by adding switches reduces the need for complicated bridging and segmentation, simplifying the setup and maintenance of onboard networks.
- **Cost-Effectiveness:** By avoiding the need for additional bridges and complex configurations, OneNet reduces both the initial setup costs and long-term maintenance expenses, making it a more cost-effective solution for growing marine electronics systems.

3) OneNet Realistically has no PGN (Parameter Group Number) Limits

NMEA 2000 is limited to 411 standard PGNs (without the NMEA obtaining a new allocation), and 512 proprietary PGNs. In contrast, OneNet does not have any meaningful PGN limit. This capability is due to OneNet's use of IP-based networking, which is the standard for Internet communications.

Results:

- **Unrestricted Compatibility and Integration:** The absence of meaningful PGN limits in OneNet ensures compatibility with a vast range of devices and systems. This flexibility makes it easier to integrate marine electronics with other onboard systems and internet-based services. Boat owners and operators can expand and upgrade their systems without worrying about hitting a limit on the number of PGNs, ensuring a future-proof and scalable solution.

4) Multiple NMEA Networks can be Joined Together

OneNet can join multiple NMEA 2000 networks together using its OneNet Gateway technology. This will allow smaller, localized NMEA 2000 networks to be created and then linked together using OneNet Gateways.

Results:

- **Unified Network Across the Vessel:** A vessel could have separate NMEA 2000 networks in the forecastle (bow), engine room, and bridge. By using a OneNet network to join these smaller networks, all systems can communicate seamlessly, creating a unified data network. With OneNet, distance between different sections of the vessel is no longer an issue or even a consideration, ensuring that all critical systems are connected and operational throughout the entire vessel.

5) Interoperability and Compatibility

OneNet ensures compatibility with a wide range of devices and systems, making it easier to integrate marine electronics with other onboard systems and internet-based services.

One of the core principles of the NMEA standards is to ensure that devices from

different manufacturers can work together seamlessly. OneNet continues this tradition by providing clear specifications that ensure compatibility across a wide range of devices and brands throughout the entire marine industry.

Results:

- **Seamless Integration:** By maintaining compatibility across various devices and systems, OneNet enables boaters to integrate new and legacy equipment without encountering compatibility issues. This results in a more cohesive and efficient onboard system.
- **Vendor Flexibility:** OneNet's adherence to NMEA standards ensures that boat owners and operators are not locked into a single manufacturer. They can choose the best equipment for their needs from a variety of vendors, confident that everything will work together smoothly.
- **Futureproofing:** With OneNet's forward-thinking design, the network is prepared for future developments in marine technology. This ensures that as new devices and services are introduced, they can be easily integrated, protecting the investment in the current system.

6) Power Implementation

Power implementation often adds complexity to large NMEA 2000 networks. High-power (high current draw) devices need to be powered independently, while low-power devices can be powered directly from the backbone. In larger installations, this can lead to the network power limit being reached, necessitating additional isolated power supplies to be added to the backbone.

Results:

- **Simplified Power Distribution:** The OneNet standard includes an option for devices to be powered directly from the OneNet switch using PoE (Power over Ethernet). This method allows for distributed device power, providing up to 25.5 Watts per device. The system can be easily expanded by adding more switches or PoE modules, reducing the complexity and cost associated with managing power for large networks. This approach streamlines power management, making it more straightforward to install and maintain extensive marine networks.

7) Enhanced Security

OneNet includes encrypted security features to protect against unauthorized access and ensure the integrity of data transmission across the network.

Result:

- **Robust Network Security:** In today's environment, network security is paramount, especially on commercial vessels where data integrity and protection against unauthorized access are critical. NMEA OneNet prioritizes security from the outset, employing a robust security model where users create a OneNet Secure Network. OneNet Applications are then added to this network through a process called 'pairing,' which establishes a secure, encrypted data network. This approach ensures that the entire system is protected against potential threats, providing peace of mind to vessel operators and owners.

In Summary

NMEA OneNet is the cutting-edge marine data standard that integrates Ethernet technology to unify NMEA 0183, NMEA 2000, and OneNet into a single, high-speed network. Leveraging IPv6, OneNet offers unparalleled bandwidth, enabling seamless data exchange, scalability, and integration of numerous devices without PGN limits. It simplifies network expansion and management, supports power over Ethernet, and ensures robust security. Designed to enhance interoperability and future-proof marine electronics, OneNet revolutionizes marine data networking with its flexible and comprehensive approach.