

Wi-Fi 7 is the proper Wi-Fi protocol of choice for products with a longer life span that need reliable connectivity.

Wi-Fi 7 Has Become a Requirement for Products with Longevity

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Introduction

Wireless SoCs used across a wide variety of consumer and industrial applications have evolved significantly over the past decade. SoCs now offer much greater processing power; NPU capabilities are increasingly included to run small inference models at very low-power consumption; and wireless connectivity is cutting edge rather than an afterthought that meets basic requirements. Wi-Fi 7 is a must-have for many consumer, commercial, and industrial products that will be in the field for many years.

Definitions

Some of the key terminology used in this paper is the following:

- » **System on a chip (SoC):** A SoC is a compact integrated circuit that includes multiple components, such as the CPU, other coprocessors and accelerators, memory, and input/output (I/O), in a single package. Modern SoCs often feature integrated AI acceleration, enabling them to handle complex processing tasks at the edge.
- » **Neural processing unit (NPU):** An NPU is a specialized processor optimized for AI inference workloads, allowing for efficient on-device intelligence and reducing the need to offload processing to the cloud.
- » **Hybrid AI:** This architecture leverages both local (on-device) and cloud-based AI processing, optimizing performance, privacy, and resource utilization by dynamically allocating workloads.
- » **Wi-Fi 7 (802.11be):** The latest Wi-Fi protocol, Wi-Fi 7, offers higher throughput, lower latency, and advanced features such as multi-link operation (MLO), which enhances reliability and power efficiency by allowing devices to operate across multiple frequency bands simultaneously.

AT A GLANCE

KEY TAKEAWAY

Wi-Fi 7 is a must-have for many consumer, commercial, and industrial products that will be in the field for many years.

Benefits

The convergence of Wi-Fi 7 connectivity and AI-native compute architectures delivers a range of compelling benefits for intelligent IoT deployments. These advantages address the most pressing challenges faced by industry stakeholders and position devices for long-term success:

- » **Future-proof device longevity:** By adopting Wi-Fi 7, devices avoid the pitfalls of obsolescence associated with legacy protocols. The cadence of new Wi-Fi protocols is about four years. By including the latest Wi-Fi protocol, companies can ensure that products remain relevant and deliver optimal performance throughout extended life cycles, which can range from five to more than 20 years. In industrial and smart home environments, where devices are often deployed for decades, future-ready connectivity is essential to maintain functionality and user satisfaction.
- » **Enhanced reliability and low latency:** Wi-Fi 7's MLO enables devices to maintain robust connections even in high-density environments. This is particularly important for real-time AI applications that demand consistently low latency, such as robotics, industrial automation, and smart home control systems. The ability to operate across multiple bands simultaneously increases reliability and minimizes the risk of dropped connections.
- » **Comprehensive sensing and intelligence:** The integration of diverse sensors, such as microphones; cameras; and vibration, light, chemical, and temperature sensors, with AI-native SoCs enables devices to sense, interpret, and act on environmental data. This unlocks new use cases across industrial, smart home, and enterprise settings, including predictive maintenance, environmental monitoring, and adaptive user interfaces.
- » **Privacy, security, and availability:** On-device AI architectures allow sensitive data to be processed locally, minimizing exposure to external threats and ensuring high availability, while hybrid AI expands this to the ability to do more in the cloud. This approach enhances privacy and security while maintaining the flexibility to leverage powerful cloud-based AI services when appropriate.

Collectively, these benefits empower stakeholders to deploy intelligent IoT solutions that are robust, efficient, and adaptable to evolving market demands. The alignment of advanced connectivity and compute is foundational to realizing the full potential of edge AI.

Considerations

While the adoption of Wi-Fi 7 and AI-native SoCs offers significant advantages, several factors must be carefully evaluated to ensure successful implementation and long-term value. These include the following:

- » **Cost implications:** Upgrading to the latest connectivity and compute technologies may increase initial device costs. However, these investments must be weighed against the long-term benefits of future proofing, reduced maintenance, and the avoidance of costly obsolescence. The total cost of ownership should consider both up-front and ongoing operational expenses. Furthermore, wireless SoCs with Wi-Fi 7 cost much less than the Wi-Fi 6 chips prevalent in smartphones and PCs, for example. Wireless SoCs can be designed to support two bands instead of three and typically use a 1x1 configuration rather than 2x2 MIMO.

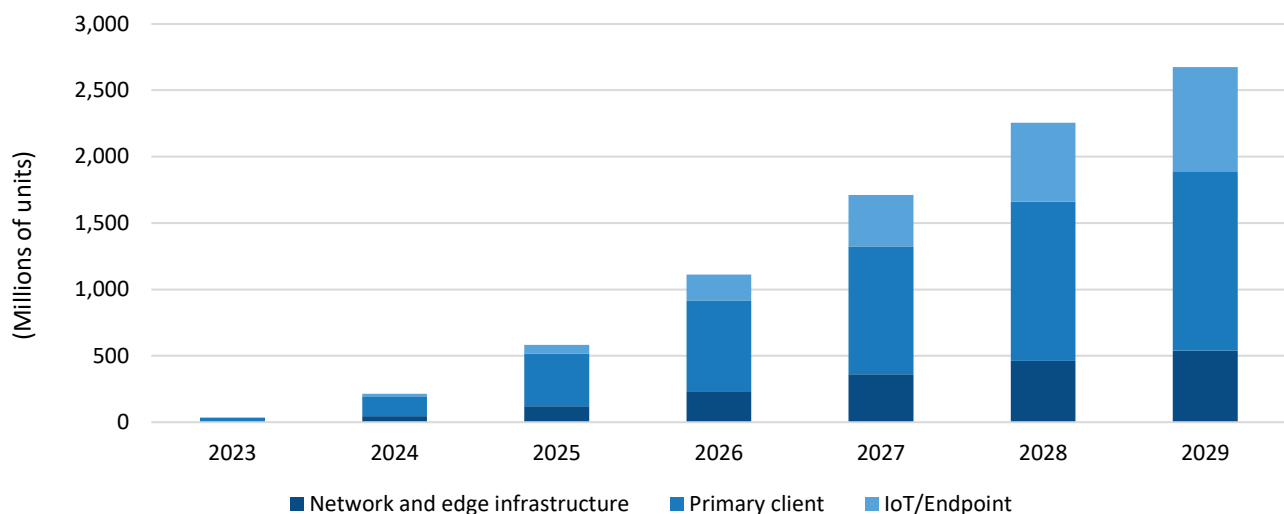
- » **Implementation complexity:** Integrating advanced SoCs, NPUs, and multi-protocol wireless stacks reduces design complexity by requiring fewer major chips. Cost and size are also reduced.
- » **User education and adoption:** Companies seeking wireless SoCs should consider the product's life cycle and life span. In just 10 years, the industry will likely be introducing Wi-Fi 10 chips. With Wi-Fi access points, routers, and gateways shifting to Wi-Fi 10, companies should consider how customers will view their products depending on whether they are using Wi-Fi 4, Wi-Fi 6, or Wi-Fi 7 at that point in time. The situation becomes even more jarring if the products are in the field for 15, 20, or 25 years. Product performance may increasingly fall short of customers' expectations, and product support may become increasingly difficult, if not impossible.

Trends

The intelligent IoT landscape is being shaped by several major trends that will influence technology choices and deployment strategies in the coming years. Understanding these trends is critical for stakeholders seeking to maintain a competitive edge:

- » **Rapid expansion of Wi-Fi 7 in IoT:** The share of Wi-Fi 7–enabled IoT products will grow significantly, with shipments expected to reach about one billion units per year by 2030, with a cumulative three billion in shipments at that point (see Figure 1). This reflects the increasing demand for high-performance, future-ready connectivity in a wide range of applications.

FIGURE 1: *Shipments of products with Wi-Fi 7 and newer protocols by system by ecosystem landscape*



Source: IDC, 2026

- » **Integration of AI-native compute in edge devices:** The inclusion of SoCs with integrated NPUs is becoming standard practice, enabling efficient on-device AI for real-time inference, privacy, and reduced cloud dependency. This trend supports the growing need for intelligent, autonomous devices capable of making decisions at the edge.
- » **Hybrid AI architectures:** The adoption of hybrid AI, which combines local and cloud-based processing, is accelerating. This approach addresses the dual imperatives of performance and data sovereignty, allowing devices to balance responsiveness with the ability to leverage powerful cloud resources when needed.
- » **Advanced sensing capabilities via wireless protocols:** Wi-Fi is increasingly leveraged not only for connectivity but also for sensing applications such as proximity and motion detection. This dual use of Wi-Fi expands the functional scope of IoT devices, enabling new applications without the need for additional hardware.

These trends underscore the necessity for companies to prioritize advanced connectivity and compute in their IoT strategies. The convergence of these technologies is setting new benchmarks for device intelligence, efficiency, and adaptability.

Conclusion

The evolution to Wi-Fi 7–enabled, AI-native IoT devices marks a pivotal shift in the edge AI landscape. By embracing advanced connectivity, integrated compute, and comprehensive sensing, industry stakeholders can future proof their deployments, enhance reliability, and unlock new value across diverse applications. The most important part of the wireless SoC is the Wi-Fi protocol. It is imperative that the product's Wi-Fi connectivity does not become too outdated toward the latter part of the product's life span.

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About the analyst



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Phil Solis is research director in IDC's Enabling Technologies team covering semiconductors in PCs, media tablets, and smartphones, and wireless and mobile connectivity technologies. Mr. Solis' core research area includes primary client processors across CPUs and integrated and discrete accelerators such as GPUs and NPUs. It also includes the evolution of wireless connectivity technologies and semiconductors across Wi-Fi, Bluetooth, UWB, cellular, and LPWAN.

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To understand how our latest Wi-Fi 7 SoC can help you design the next generation of Edge IoT devices, visit: <https://www.synaptics.com/syn765x>.



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