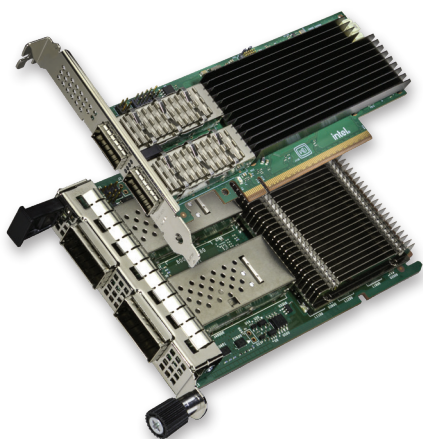


The Blueprint for Growth: Optimize Performance, Scale the Enterprise, and Secure the Platform

with Intel® Ethernet E835 Controllers and Network Adapters

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ETHERNET



Enterprises face relentless data growth, pervasive distribution of workloads, and rising expectations for real-time responsiveness. Applications that used to be centralized are now spread across cloud instances and edge sites, while virtualized network functions and streaming analytics demand predictable throughput, microsecond-class latency, and deterministic timing. These trends place structural pressures on infrastructure, with sustained line-rate traffic that stresses packet processing, jitter and timing requirements that complicate service-level guarantees, and heterogeneous deployments that increase operational complexity.

The choice of Ethernet is now a strategic win for the enterprise that pays dividends in power savings, security, and manageability. It can also improve server value with superior power efficiency that helps reduce TCO.

Energy and cooling budgets swell as port counts and throughput scale upward, and capital expenses grow when denser, higher-performance configurations force more complex network designs. Management and security overhead multiply as distributed environments expand, straining the fleet-level economics of delivering the scale and stability to turn the network from a cost center into a source of value.

The processor cycles consumed by routine network processing, interrupt handling, and packet steering introduce overhead that acts as a "CPU tax." Processor time spent on networking chores leaves fewer cycles for revenue-generating workloads, reducing effective compute capacity and inflating TCO. Improving CPU performance makes it possible for enterprises to extract maximum value from their compute investments. Eliminating the CPU tax is a central aspect of increasing network value by reducing costs while optimizing performance, efficiency, scalability, and security.

Growth Pillar 1: Optimize Performance and Streamline Infrastructure

Network performance and agility are necessary precursors for business innovation. Industrial-grade Ethernet provides the foundational fabric to meet those requirements, with the high-bandwidth, low-latency connectivity needed to support data-intensive applications. Standardizing on Ethernet eliminates the complexity of legacy protocols and creates a seamless, scalable environment that bridges the gap between on-premises hardware and cloud ecosystems.

Running networks on efficient Ethernet reduces network complexity and sets the stage for business growth compared to legacy technologies. This approach offers scalable high bandwidth, low latency, and superior manageability that streamline the network and lower TCO while improving server CPU utilization.

Beyond boosting speeds, this streamlined approach also simplifies network management and reduces operational overhead. With an efficient connectivity blueprint, businesses can rapidly reconfigure resources to meet shifting demands, ensuring that the network remains a catalyst for growth rather than a bottleneck to progress.

Business Case: Unlock Compute ROI and Infrastructure Efficiency

To make the full range of new revenue-generating services possible, enterprises must deploy high-performance networking across highly distributed networks to deliver high throughput and low latency anywhere in the environment. The Intel Ethernet E835 Series optimizes network resources through high-throughput, low-latency performance. Its hardware-based offloads reduce host CPU utilization, improving overall system efficiency and freeing up cores for applications.

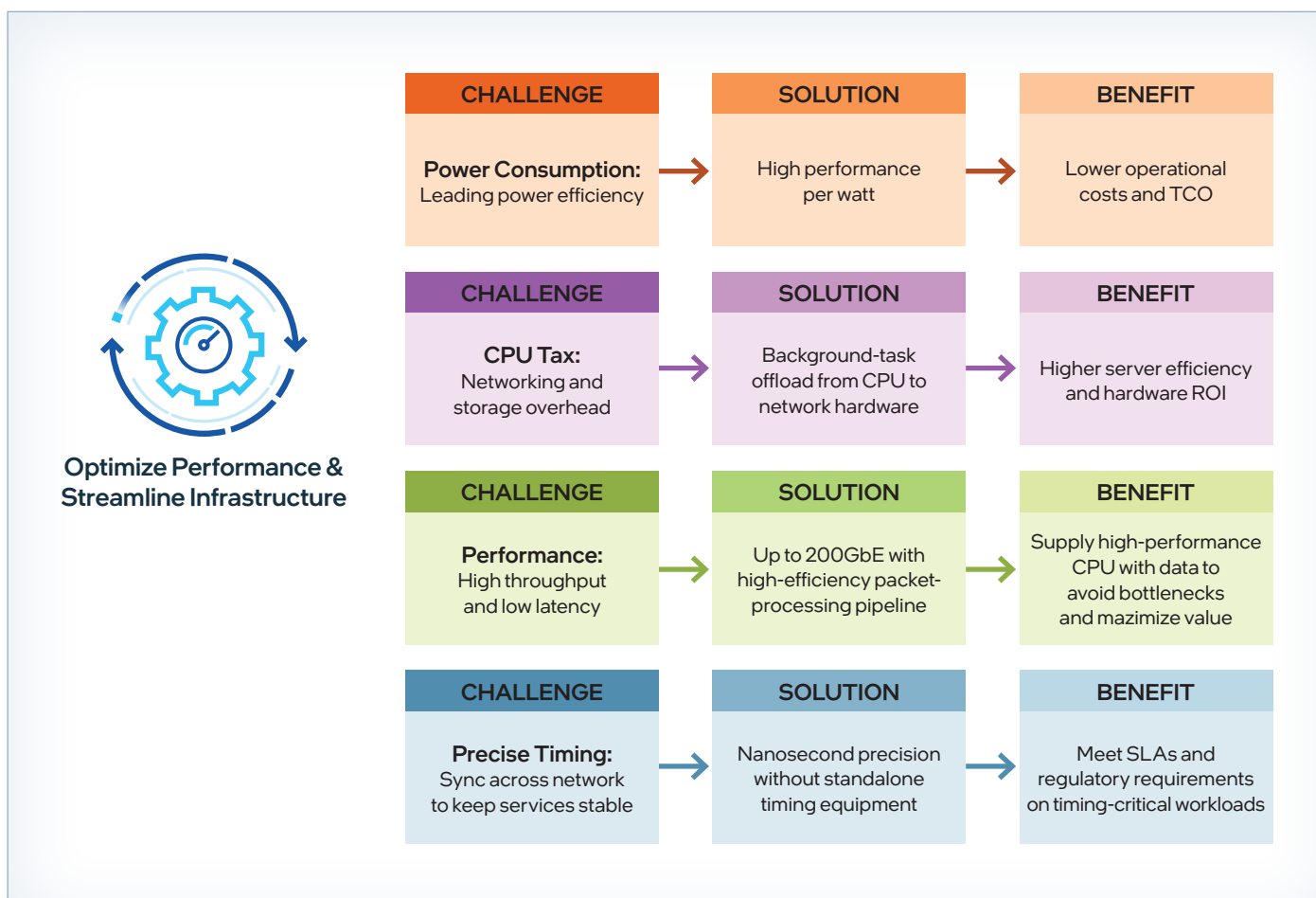
Additionally, the E835 is engineered for efficiency, consuming ~47% lower power than the NVIDIA Connect X6 DX (CX610146A)^{1,2} adapter and ~28% lower power than the Broadcom BCM957508-P2100G.^{1,2} That reduction delivers up to 1.9x higher performance per watt versus the NVIDIA adapter and up to 1.4x higher performance per watt versus the Broadcom adapter. At the same time, modern manageability features and a scalable architecture simplify expansion across the data center as demand grows.

Note: See backup for workloads and configurations. Results may vary.

The E835 delivers superior power efficiency with up to 1.9x higher performance per watt than NVIDIA Connect X6 DX (CX610146A)^{1,2} and up to 1.4x higher performance per watt than Broadcom BCM957508-P2100G.^{1,3}

The flexible family of Intel Ethernet E835 controllers and network adapters delivers speeds up to 200GbE, complemented by advanced packet-processing features that accelerate traffic further. By eliminating the CPU tax for network processing, Intel Ethernet also reduces that overhead and helps maximize the value and ROI of server hardware, which is the largest expense in the typical data center.

Intel Ethernet provides standards-based network timing using integrated capabilities that eliminate the need for expensive stand-alone timing devices to synchronize distributed workloads. Precision timing ensures that workload tasks split across the environment can be reassembled without error, data loss, or associated business losses and penalties, while improving TCO.



Technology Building Blocks for Performance and Streamlined Infrastructure

To help prevent server performance from being bound by the data path as processor core counts increase, the E835 improves bandwidth-to-core ratios by reducing the per-packet CPU tax, delivering higher usable bandwidth per core. Intelligent offloads run control logic such as segmentation and flow classification in network silicon instead of in software on the CPU, which increases performance (as well as energy efficiency) for high-value applications.

Advanced Remote Direct Memory Access (RDMA): Low-overhead data transfer

RDMA further drives data velocity up and latency down by bypassing the kernel networking stack, for copy-free data transfer that frees up CPU cycles. RDMA over Converged Ethernet v2 (RoCEv2) implements RDMA on top of UDP/IP, enabling routable, low-latency transport across lossless (or near-lossless) Ethernet fabrics. Internet Wide Area RDMA Protocol (iWARP) implements RDMA on top of TCP/IP to improve performance while supporting internet transmission with TCP reliability. This processing is offloaded from the CPU to the E835.

The E835 accelerates traffic by supporting RoCEv2 and iWARP for copy-free data transfer that improves throughput. DDP makes these implementations more effective with custom traffic profiles on a programmable packet pipeline.

Dynamic Device Personalization (DDP): Programmable control over packet pipelines

DDP complements RoCEv2 and iWARP, giving the E835 programmable control to reshape packet-processing pipelines, tailoring them dynamically to specific custom traffic profiles for storage, virtualization, 5G, or security workloads. Precise packet classification and steering reduces CPU parsing overhead and improves cache locality for higher-layer functions. These capabilities transform the E835 into a workload-aware accelerator that adapts to evolving infrastructure needs without hardware changes.

Precision Network Timing: Synchronize Distributed Processes and Systems

The E835 is engineered for timing-critical workloads. It provides nanosecond-level synchronization to ensure deterministic behavior across distributed architectures, including mobile core, fixed wireless access (FWA), cloud, and high-frequency trading (HFT). Key timing features include:

- **IEEE 1588 Precision Time Protocol (PTP)** enables precise synchronization of clocks throughout the network.
- **Precision Time Measurement (PTM)** provides tight synchronization between the host and network adapter.
- **Synchronous Ethernet (SyncE)** distributes deterministic timing signals over Ethernet fabric to support phase-aligned, low-jitter operation of network elements.

Accelerated Storage Traffic: Flexible Performance Gains Across Topologies

The E835 enables storage traffic performance over Ethernet as data grows without limit, while avoiding the complexity and cost of proprietary fabrics. NVMe over TCP (NVMe/TCP) takes advantage of the E835's architecture to deliver performance similar to local flash across the data center using standard Ethernet. The E835 also provides native VMware vSAN support to ensure prioritization and stability of storage traffic in virtualized clusters, including optimization for VMware hyper-converged infrastructure.

Growth Pillar 2: Scale the Enterprise Flexibly

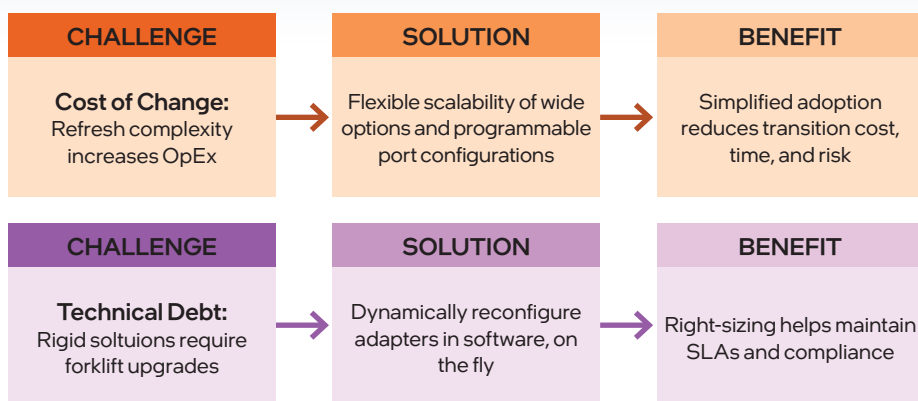
The ability to adapt to change gracefully and cost-effectively helps businesses make their IT infrastructures future-ready. At the heart of this flexibility is connectivity choice, which provides a robust and standardized framework for simplified expansion. By utilizing Ethernet with features that help simplify deployment as the primary backbone, organizations can rapidly integrate new sites, services, and cloud/edge environments without the need for a total architectural overhaul.

Intel Ethernet technology supports flexible, scalable deployment with open architecture and broad port-density options.

This modularity ensures that the enterprise can expand to take advantage of emerging market opportunities. Rather than being locked into rigid, proprietary setups, an Ethernet-driven strategy allows for a "plug-and-play" approach to scaling. This readiness significantly reduces time-to-market for new initiatives and ensures that infrastructure remains resilient and responsive, no matter how the business landscape evolves.

Business Case: Future-Proof Operations and Reduce Management Overhead

Network planning that sizes capacity with static architectures generally requires over-provisioning to avoid performance bottlenecks from usage peaks, which creates dramatic capital inefficiencies. Standardizing on the Intel Ethernet 835 Series eliminates that compromise with a versatile networking platform that meets shifting traffic requirements through dynamic reconfiguration, without over-provisioning. That flexibility also reduces OpEx by reducing the diversity of network equipment in service.



Technology Building Blocks for Flexibility and Scalability

Intel Ethernet E835 Series is built to adapt with a stable, unified platform that responds programmatically to changing requirements and conditions. It offers market-leading versatility, supporting the broadest speed and density combinations in the industry. The lineup of solution offerings includes E835 Series controllers, as well as OCP 3.0 and PCIe network adapters that deliver throughput up to 200 Gbps. Built for the software-defined enterprise, the E835 adapts programmatically to changing network conditions and requirements, reducing the risk and resource burden of ongoing technical change.

Deployment Agility: Reduced Implementation and Maintenance Effort

Networks can be continually optimized using the Intel Ethernet Port Configuration Tool (EPCT) to reconfigure port configuration and speeds as workload needs evolve, validating once to deploy anywhere without repeating the validation cycle. The E835 standardizes deployments, reduces operational complexity, and offers broad port-density options. It provides the flexibility to select the exact network interface required for specific deployment environments.



The E835 helps network engineers deploy connectivity on their own terms, future-proofing investments with broad OS support, rigorous interoperability testing, and assured availability over an extended product lifecycle.

Operational Continuity: Mitigate the Disruption of Change

Backward software compatibility reduces rework and protects existing investments by allowing the E835 to run alongside prior generations — including the E810 — with a single, unified driver. The E835 also delivers reliability by design to help maintain SLAs and regulatory compliance — with rigorous interoperability testing and comprehensive OS support. These measures help ensure that the E835 is deployment-ready as soon as it hits the data center floor and provides low-maintenance operation throughout its lifecycle. Crucially, this connectivity foundation offers broad OS and long product lifecycle support, ensuring that today's investments remain compatible and operational for decades to come, even as underlying technologies advance.

Growth Pillar 3: Modernize Using a Secure, Manageable Platform

Network security, visibility, and control prepare businesses to handle both critical cyber events and daily management complexity. Upgrading the network to meet modern, standards-based security and manageability requirements contributes to a streamlined, secure, and efficient infrastructure.



Modern Ethernet network hardware helps enterprises improve cybersecurity and compliance. Robust remote manageability with hardware level (silicon) root of trust, device and firmware attestation, comprehensive security safeguards, and support for the latest manageability protocols and standards streamlines operations, improves uptime, and reduces TCO.

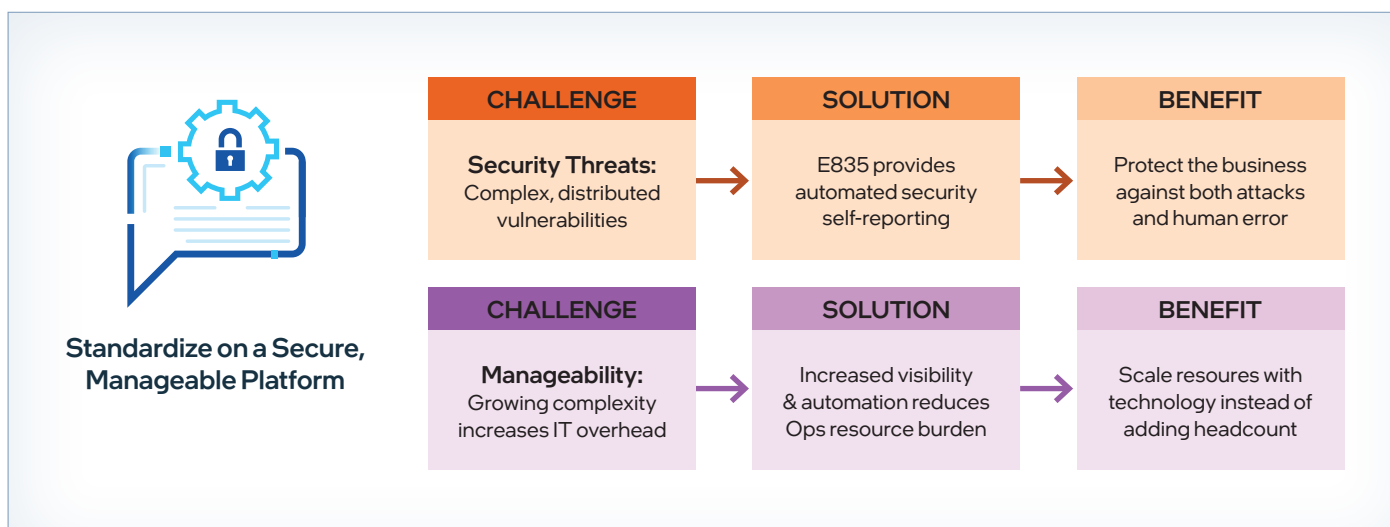
A critical component of network security is ensuring that data remains protected by hardware-accelerated encryption and tamper-evident safeguards, meeting the strict compliance needs of regulated industries. Central to this streamlined foundation is a comprehensive suite of manageability features, including support for the latest protocols and standards.

Ethernet products should offer robust remote management capabilities, enabling IT teams to monitor health and troubleshoot issues from any location. Ultimately, strategic selection of connectivity solutions ensures the infrastructure remains secure and efficient, reducing total cost of ownership while maximizing operational uptime.

Business Case: Protect the Platform from Supply Chain to Data Center

Network controllers and adapters are significant control points for management and security in the distributed enterprise that help reduce business risk from both human error and malicious attacks. The E835 advances that role with built-in security self-reporting that helps mitigate threats that range from configuration errors to unauthorized firmware changes, preventing operational interruptions, financial losses, and reputational damage.

Manageability advances in the E835 protect the bottom line by automating server provisioning, verifying hardware authenticity in real time, and maintaining 24/7 visibility into system health. Together, these capabilities drastically reduce the human overhead of infrastructure management while hardening the data center against cyber threats.



Technology Building Blocks for Security and Manageability

The E835 provides sophisticated security and control to support evolutionary network shifts such as zero-trust architecture, disaggregated compute, and highly automated management planes. Built on a foundational hardware trust anchor, these capabilities are predicated on verifiable integrity, hardware-rooted assurance, and standards-based manageability.

Verified Platform Integrity: Device and Firmware Attestation

Verified Platform Integrity enables device and firmware attestation in compliance with Security Protocol and Data Model (SPDM) Specification 1.1.2. This capability enables the E835 to prove its identity and operational state before joining a trusted environment using a verifiable certificate chain. Attestation allows orchestration systems, security controllers, and confidential computing frameworks to validate that the network adapter is genuine and uncompromised.

Hardware Root of Trust: Silicon Verification of Device and Firmware

The hardware root of trust built into the E835 architecture anchors both device identity and firmware verification in silicon, creating two secure boot options that prevent single-point compromise. The OEM verification signatures ensure that only authorized firmware objects, debug operations, and management actions can interact with the E835. This protects the control plane from tampering and blocks malicious firmware from executing.

Cryptographic Posture: Validated Modules for Protection Below the OS Level

The E835's cryptographic posture meets Federal Information Processing Standard (FIPS) 140-3 Level 1 requirements to confirm that its cryptographic modules adhere to rigorous US government standards. Secure boot and firmware validation utilize SHA-512 hashing and a true random-number generator (TRNG) to authenticate code and prevent unauthorized modification, neutralizing threats before they reach the operating system.

Future-Ready Manageability: In-Place Upgrades for Emerging Standards

Support for emerging management standards such as NC-SI 1.2 and PLDM offers readiness for future modernization projects without hardware refresh. The E835 supports NC-SI over both RBT and MCTP, enabling flexible integration, while extended PLDM T2, T4, T5, and T6 message support expands the range of device functions that can be discovered, configured, and monitored through standardized workflows.

The E835 enables web-scale, agentless automation including broad compatibility with Redfish Device Enablement (RDE). It also supports multiple physical layer options for MCTP, including PCIe VDM and SMBus/I2C. This allows management traffic to traverse a range of control fabrics.

Well-chosen Ethernet technology provides a strategic advantage with improved network performance, security, and manageability while reducing complexity and preparing for future growth.

Conclusion: Strategic Connectivity for a Competitive Advantage

Modernized networks are part of the foundation that business transformation is built upon. By prioritizing connectivity technology, organizations do more than just upgrade hardware; they secure a strategic asset capable of converting infrastructure into a source of long-term value.

- **Enhanced Network Performance:** A strategic Ethernet selection provides efficient features such as network offloads, throughput, and reliability required to support a wide variety of demanding workloads. This ensures that as data demands increase, the network remains a reliable facilitator of operations without becoming a bottleneck.
- **Operational Resilience:** By meeting modern, standards-based security and manageability requirements, including hardware-accelerated encryption and tamper-evident safeguards, businesses protect their most valuable data assets against evolving threats.
- **Reduced Complexity:** A comprehensive suite of manageability features and remote capabilities allows IT teams to monitor health and troubleshoot issues globally. This transition from reactive maintenance to proactive management streamlines operations and maximizes uptime.
- **Future-Proof Growth:** Selecting technology backed by long-term product lifecycles and modern protocols ensures that today's investments remain relevant tomorrow. This stability reduces the total cost of ownership and provides the scale needed to handle increasingly demanding workloads.

Ultimately, the choice of Ethernet technology is a choice about the future of the enterprise. By selecting a versatile and secure connectivity foundation like the Intel Ethernet E835, organizations ensure their infrastructure remains efficient, compliant, and ready to scale. This strategic alignment not only supports the immediate growth plan but can also reap a sustainable competitive advantage in an increasingly demanding industrial landscape.

Learn More

Intel Ethernet Products –
www.intel.com/ethernet



White paper – Maximizing Network Value:
A Competitive Analysis of Intel® Ethernet
E835 Network Adapter Efficiency and
Timing Capabilities ➤



Infographic – Maximizing Network Value
with Efficiency and Timing Benefits of
Intel® Ethernet E835 Controllers and
Network Adapters ➤



¹ Under load given line-rate bidirectional performance.

² Platform: Supremicro SYS-222HA-TN, dual-socket Xeon 6 B2B, six nodes, 2x Intel® Xeon® 6960P/node, 196 GB DDR5-4800, Rocky Linux 9.7; Settings: Hyper-threading off, turbo on, latency-optimized CPU/power tuning; Method: Netperf 2.7.0, April 2026, Bidirectional, eight client threads/direction, 64 KB TCP_STREAM/MAERTS messages; Validation: Checked Intel®, NVIDIA, and Broadcom driver/firmware settings; no driver tuning; Connectivity: PCIe Gen 5 x16, NUMA node 3, back-to-back 1m QSFP56 DAC; Result: ~370 Gbps payload throughput per adapter; Monitoring: Idle/incremental power and system temperature recorded; Part Numbers: Intel Adapter E835-CQDA2, Nvidia ConnectX-6 (CX614106A), Broadcom P2100G (BCM957508). Test by Intel April 2026.

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