

Cisco Unified Edge: Driving the Future of Intelligent Healthcare

Transforming healthcare with AI at the edge

Healthcare organizations are increasingly harnessing the power of AI at the edge to fundamentally reshape their operations and patient care models. This strategic shift moves beyond static data analysis to delivering dynamic, real-time insights and enabling automated processes directly where care is administered. The impetus behind this evolution stems from the critical need for instantaneous data processing, robust security measures, and highly individualized patient interactions at every point of contact.

An important facet of this transformation is the ability to customize patient care and augment clinical decision-making. AI at the edge empowers healthcare providers to collect and process real-time patient data directly within clinical settings, such as hospitals or outpatient clinics. This rich data stream, encompassing vital signs, advanced medical imaging, and electronic health records, facilitates the creation of highly customized treatment plans, provides instant diagnostic support, and enables proactive health

interventions. By performing this processing locally, providers can deliver bespoke care without the lag associated with transmitting all data to a central cloud, thereby ensuring that patient interactions are both fluid and highly relevant and sensitive patient data are kept local, which helps adhere to strict privacy regulations.

Furthermore, healthcare entities are leveraging AI at the edge to optimize clinical workflows and manage resources with greater precision. AI models can meticulously analyze vast datasets from across numerous facilities, scrutinizing everything from patient movement patterns to the utilization rates of medical equipment. This intelligence allows providers to strategically allocate beds, refine staff scheduling, and manage medical supply inventories more effectively. The cumulative effect is improved patient outcomes, significant waste reduction, and a more streamlined operational framework, ultimately enhancing both efficiency and the overall quality of care.



Trends and challenges

Edge AI for healthcare: the foundation for future care

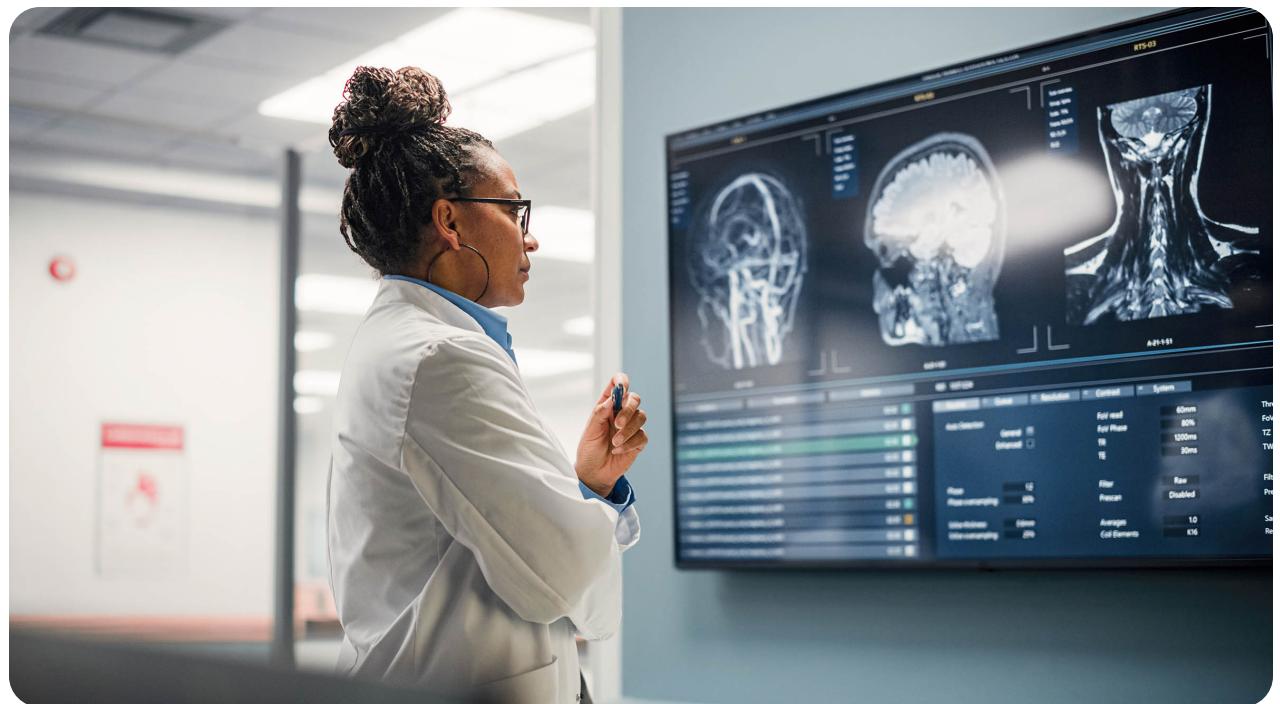
The healthcare sector is currently experiencing a profound paradigm shift, largely propelled by the transformative potential of artificial intelligence. Healthcare providers are increasingly keen to harness AI to deliver more personalized patient experiences, streamline clinical workflows, fortify the security of highly sensitive patient data, and unlock advanced diagnostic capabilities through the analysis of proprietary medical information.

This journey toward enhanced value, however, is fraught with complexities, demanding that organizations simultaneously modernize their existing edge infrastructure for traditional operations while building robust support for burgeoning AI workloads.

A significant hurdle to widespread AI adoption lies in the inherent limitations of current healthcare edge infrastructure. Predominantly composed of legacy systems, these environments were not conceived to accommodate the immense scale, rapid processing, and intelligent demands of real-time AI inference and agentic applications across a vast network of clinics, hospitals, and remote care settings. For example, consider an AI-powered diagnostic assistant embedded within

an emergency room. A single patient case, such as a suspected cardiac event, might prompt the AI to simultaneously access and cross-reference data from the patient's electronic health record, pull up relevant medical imaging from an archive, consult real-time lab results, and even query a knowledge base for the latest treatment protocols. Each of these actions, orchestrated by the AI agent to provide comprehensive clinical decision support, generates a far greater volume of network traffic and computational demands than simply retrieving a patient's chart.

Beyond these technical performance demands, practical challenges further complicate AI deployment. The lack of seamless interoperability between disparate products, inconsistent deployments across distributed sites, and a persistent shortage of specialized technical talent create considerable friction. This results in rigid, fragmented systems that can impede performance, introduce significant operational complexity in managing distributed healthcare edge deployments, and, critically, elevate security risks by expanding the attack surface, particularly concerning protected health information.



Security at the healthcare edge represents a critical vulnerability point. By bringing AI models, applications, and medical devices closer to the point of care, they also become more exposed to both physical and cyber threats. An expanding attack surface, reliance on disconnected security tools, and manual patch management cycles render healthcare facilities attractive targets. Furthermore, configuration drift across distributed locations silently erodes defenses, heightening the risk of patient data breaches and operational disruptions.

Perhaps the most pivotal, yet frequently underestimated, aspect of AI in healthcare is the decentralized nature of its services. While initial AI model training often occurs in centralized data centers, the crucial phase of test-time inference is increasingly migrating to the edge, establishing it as the new frontier for enterprise AI. A substantial majority of future AI workloads are projected to be inference-based, with a significant proportion executed directly at the edge within clinics, hospitals, and remote monitoring stations. This mandates a fresh approach that extends from the core data center to the furthest reaches of the network. The edge is poised to become the indispensable foundation for delivering scalable AI services in healthcare, where low latency, high throughput, stringent security, and cost-efficient operations

are paramount for real-time clinical decision-making and dynamic patient interactions. Healthcare providers must embrace a fundamental architectural re-evaluation, moving beyond mere incremental upgrades, to truly unlock the full potential of AI at the edge.

How it works

Cisco Unified Edge: the AI platform the healthcare edge demands

Building an AI-ready infrastructure, especially for the demanding healthcare edge, requires more than just high-performance compute. It necessitates a full system rethink that can seamlessly integrate into everyday clinical operations and drive them forward.

Cisco Unified Edge provides a comprehensive, AI-ready enterprise infrastructure designed to meet these demands. It delivers a unified, integrated platform that converges compute, networking, storage, security, observability, and centralized cloud management into a single, modular chassis built for edge environments. This approach transforms traditional server deployment by building AI-ready edge infrastructure, ensuring unparalleled operational agility and stopping the “rip and replace” cycle.

Key capabilities:

- **Future-ready performance:** Cisco Unified Edge offers modular, high-performance compute and networking nodes with GPU acceleration and Intel® Xeon® 6 Processors, optimized for demanding AI workloads and real-time analytics. Its modular design supports interchangeable compute and network nodes, allowing for easy serviceability and the personalization to any edge workload without compromise. This ensures investment protection across a 10-year+ lifespan by accommodating multiple generations of technology, effectively handling the massive data streams and increased network traffic generated by agentic AI workflows in healthcare.
- **Seamless, scalable operations:** achieve breakthrough operational simplicity at scale with a software-defined system and unified, fleet-wide operations. Centralized cloud management through Cisco Intersight® provides end-to-end visibility and AI-driven insights from the edge to the core. It enables zero-touch provisioning, automated day-0 to day-N operations, and pre-validated blueprints for rapid, consistent deployments and updates across hundreds or thousands of healthcare locations. Cisco Intersight fleet management capabilities democratizes

healthcare edge management, ensuring operational consistency and efficiency from a single pane of glass, and simplifies onboarding and upgrades for any scale of deployment. Plus, end-to-end observability with real-time analytics, including integration with Splunk®, provides deep insights across edge infrastructure, enabling rapid error detection and correction. This enhances reliability, reduces downtime, and lowers operational costs by providing a seamless operating model from core to edge.

- Security fused into the platform:** security is paramount for Cisco Unified Edge, especially in healthcare. It integrates multi-layered, zero-trust security embedded directly into the hardware and software, protecting critical patient data, medical devices, and infrastructure. This includes integrated physical and digital anti-tampering features with consistent security profiles and policies to prevent configuration drift across edge

systems at healthcare sites. Additional network segmentation, AI-model, and container security capabilities safeguard against evolving physical and cyber threats across distributed edge locations, enabling confident innovation at scale.

Powering healthcare with leading ISVs

Cisco is collaborating with several leading Independent Software Vendors (ISVs) to enable the seamless integration of specialized software with Cisco Unified Edge systems, ensuring that full-stack solutions are certified, scalable, and easy to deploy for specific industry use cases. For example, in healthcare, collaboration with ISVs facilitates personalized patient experiences, real-time diagnostics, secure data management, and efficient clinical operations.

Medical Informatics Corp. is a leading ISV providing solutions for managing and analyzing patient health data, including Electronic Health Records (EHR) systems, clinical decision

support, and population health management. Medical Informatics solutions can leverage local processing power to deliver real-time insights from patient data directly at the point of care, reducing latency for critical diagnostic information and enhancing the speed of clinical workflows.

AI4CMR specializes in AI-powered solutions for Cardiovascular Magnetic Resonance (CMR) imaging analysis, providing advanced tools for diagnosis, prognosis, and treatment planning for heart conditions. AI4CMR can perform computationally intensive image processing and AI inference closer to the imaging device in clinics or hospitals. This local processing significantly reduces the time required for image analysis, enables faster diagnosis, and minimizes the need to transfer large imaging files over potentially congested networks, thus improving efficiency and patient care outcomes.

Transforming healthcare with AI

Patient monitoring and diagnostics

- AI-enhanced medical imaging analysis
- Real-time vital sign monitoring and predictive diagnostics

Remote care and telemedicine

- AI-assisted telehealth consultations
- Remote patient monitoring platforms

Operational efficiency

- AI-powered resource allocation
- Automated workflow optimization

Learn more

Learn more at cisco.com/go/unifiededge.

The Cisco Advantage

The future of healthcare edge infrastructure

The healthcare industry is at a pivotal moment; the shift of AI to the edge is creating unprecedented opportunities for real-time insights, personalized patient care, enhanced security, and optimized clinical operations. However, this shift also brings significant challenges related to legacy infrastructure limitations, network bottlenecks, security vulnerabilities concerning sensitive patient data, and the complexities of managing distributed environments.

Cisco Unified Edge, with our technology partners, delivers a full-stack platform that converges compute, networking, security, storage, software, and management to address the challenges presented by AI at the healthcare edge. Cisco Unified Edge delivers modular, high-performance compute for AI workloads, centralized cloud-managed operations at scale, and built-in zero-trust security. Its flexible design supports evolving technologies, simplifies deployment and fleet management across locations, ensures real-time visibility and reliability, and safeguards patient data and workloads. With Cisco Unified Edge, healthcare providers can unlock the full potential of AI, driving innovation, enhancing patient satisfaction, and achieving meaningful operational efficiencies and improved care outcomes.

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