

# 5 Key Data Center Trends for 2024

The currents driving change in data center networking



# 2024 will be a landmark year for AI.

AI is all over the news. Its consumer applications have been impressing everyone since OpenAI launched ChatGPT to the public in November 2022, and more and more business applications for AI hit the market every week. At most companies, AI is no longer a fun project for the R&D group—it's a stakeholder-mandated must-have. Data center leaders need to determine how they can meet their organization's AI goals.

While AI is the hot new trend, it isn't part of every trend in data center networking. Other motions in data center networking will continue to play out—the modernization of legacy network management systems, sustainability, and repatriation of applications from public clouds to the private cloud, for example. Still, AI in the data center—both AI for IT operations (AIOps) for data center networking and designing, deploying, and operating data centers purpose-built for AI and machine learning (AI/ML) workloads—will be a huge driver of trends in 2024. Let's get started.

## TREND #1

### Enterprises choose: On-premises, cloud, or hybrid AI?

The need for AI/ML compute resources is strong, but should they be on-prem or in the cloud?

Five to 10 years ago, enterprises rushed to the public cloud, enticed by promises of greater flexibility and lower costs. But many eventually realized that public cloud isn't as simple and cheap as it first seemed. Call it "cloud regret"—countless companies repatriating workloads back to private, on-prem data centers.

Considering these lessons learned, networking leaders are now more thoughtful when deciding between on-prem versus the cloud when determining the best way to host AI workloads. On-premises data centers have distinct advantages for hosting AI workloads—including greater control over infrastructure for customization and optimization, leading to potentially lower operational costs. Of course, building out a GPU cluster is expensive, so optimizing GPU usage while minimizing idle time is critical. On-premises deployments can offer lower latency and higher bandwidth—both critical for real-time processing of large datasets—while also addressing data sovereignty and security concerns.



An aerial view of a city skyline, likely New York City, with a green bar overlay at the top. The image shows a dense urban landscape with various buildings and a large park area in the foreground. The sky is clear and blue.

## TREND #2

# Sustainability takes center stage

AI/ML workloads are power-intensive. Infrastructure vendors are designing and building more efficient gear, but the rigorous demands of AI model training are pushing power requirements up—from 10kW to over 100kW per rack in some cases. This creates enormous power and cooling demands.

In 2024, we expect renewables to become more important. Data centers that are 100% renewable-powered will soon be the standard rather than the exception. And data center build plans will look even more closely at geography—cool climates with access to solar, wind, and hydro power. Some co-location customers are even being asked to BYOP (bring your own power) to the facility. Innovative cooling methods that minimize power consumption, like liquid immersion, will become more common.

## TREND #3

# Data center network management gets cloudier

Cloud engineers will keep moving in on the traditional network engineers' turf—for good reason. Scaled-up, reliable private infrastructure with complex workloads can't be run from the command line alone.

While old-school network tools will survive—legacy systems die hard, as networking leaders know well—cloud skills will be used to run not just public clouds, but also private infrastructure. Network engineers won't need to become software developers to survive, but they will need to be fluent in cloud tools. Traditional networking tools that seamlessly integrate with cloud technologies will thrive, while bulky, siloed, old network management systems that aren't integration-first will wither.



## TREND #4

# AI Ops moves into the data center

With explosive growth in applications and workloads, keeping end-user experiences consistent is more crucial than ever. Up to this point, AI Ops in networking has centered around security and simpler use cases in campus and branch environments. Now it's creeping into the data center.

AI Ops adapts and learns in real time, enabling more dynamic and intelligent network management. The first big use case in the data center network will be predictive maintenance and troubleshooting. AI Ops tools will look for patterns that typically foreshadow problems and proactively notify IT with recommended changes to prevent performance degradation or outages.

When problems do occur, AI Ops will actively perform the troubleshooting steps normally taken by a network operator and present the results, reducing mean-time-to-repair—and just as importantly, mean-time-to-innocence. AI-driven, large language models will be incorporated in virtually every interface, enabling operators to rapidly navigate complex systems to get answers about everything from current network state to configuration changes and recommended upgrades.





A vertical image on the left side of the page shows an aerial view of a city, likely New York City, with a blue network overlay consisting of glowing nodes and connecting lines. The network lines are semi-transparent and connect various points across the cityscape, which includes skyscrapers and green spaces. The overall color palette is dominated by blues and greens.

## TREND #5

# AI Ops is raising the bar for multivendor network automation

The combination of AI and Intent-Based Networking (IBN) will enable network teams to finally achieve their automation goals and assure high application performance and availability.

According to **research from Juniper and EMA**, two-thirds of enterprise network teams view AI Ops capabilities as “essential” for their data center network automation strategies. They know that AI Ops and IBN is a match made in heaven. IBN acts as an abstraction layer, interpreting high-level user intent into specific network configurations—no matter the underlying vendor technology. AI builds on that IBN abstraction and introduces machine learning capabilities that allow the system to continuously adapt, learn from evolving application traffic patterns, and proactively identify anomalies or issues not explicitly defined in the original intent.

Once this combination is widely adopted, expectations will rise sharply. Operators will expect to be able to express their intent and requirements in natural language, to assume that multivendor setups will work seamlessly, and that their tools will recognize and adapt to changing conditions and proactively address potential issues, regardless of the underlying vendor tech stack.

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Enterprise network teams that view AI Ops capabilities as “essential.”

# The best way to stay one step ahead? Think three steps ahead.

Staying ahead of networking trends will help your business thrive in 2024. Juniper will be pushing the envelope right alongside you, integrating AIOps into the data center, making private infrastructure easier to operate, and helping you design, deploy, and run AI data centers. Learn more about Juniper data center solutions [here](#).

## About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security, and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability, and equality.

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