

# Multicloud Networking and NaaS Survey Report

October 2024



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## Key Findings of This Report

- **We conducted our 2024 survey on multicloud networking (MCN) and network-as-a-service (NaaS) in September and October.** The survey of 131 qualified IT and networking professionals reflects a critical need for MCN and NaaS technology.
- **A majority of respondents in networking and IT roles (95%) said there is a “critical” or “very important” need for MCN connectivity.** That number is an increase from the 90% measured in last year’s survey.
- **Major investment in MCN and cloud-native networking solutions is expected over the next five years.** 84% of respondents expected to invest in MCN and cloud-native technology at some rate, with 44% expected to invest substantially.
- **AI will fuel data connectivity demand at the edge, along with another major modern service, 5G.** Of those surveyed, 82% said the arrival of AI services will drive MCN and NaaS demand.
- **Most of our respondents to our survey believe that MCN will help simplify or accelerate adoption of hybrid or multicloud approaches.** Only 7% said they weren’t sure and only 2% said that it would not help.
- **Networking and MCN is needed for hybrid and multicloud environments.** A large majority of survey respondents (78%) believe MCN will help simplify or accelerate hybrid cloud and multicloud adoption.
- **Reducing the costs of cloud networking environments is a growing concern.** 68% of the survey audience ranked reducing cloud egress costs as “extremely important,” and 25% ranked it as “somewhat important.”
- **Managing applications and security across clouds is seen as crucial by end users.** A large majority of those surveyed (82%) said that abstracted MCN can help improve overall security and visibility of networks.
- **Top networking priorities include integration with cloud provider cloud-native constructs and increased use of public cloud networking infrastructure.** More goals include preserving investment in legacy infrastructure.
- **Some of the companies highlighted in this report:** Arrcus, Aviatrix, Amazon (AMZN), Cloudflare (NET), Cisco (CSCO), Digital Realty (DLR), Equinix (EQIX), F5 Networks (FFIV), Google (Alphabet - GOOGL), IBM (IBM), Iptential, Juniper Networks (JNPR), Megaport, Microsoft (MSFT), PacketFabric, Proximo, Versa Networks, VMware (VMW).

# Table of Contents

<b>Introduction: The Multicloud Infrastructure Revolution Marches On (with AI)</b>	<b>4</b>
What Does AI Mean for Infrastructure Exactly?	4
Infrastructure Is More Complex Than Ever	6
Background on the Survey	9
<b>MCN Background: The Evolution Is Here</b>	<b>10</b>
Cloud Networking Taxonomy	10
Hybrid Cloud Apps Drive Need for Integration	11
<b>Survey Findings: Key Drivers, Requirements, and Potential ROI</b>	<b>13</b>
What Are the Top Drivers?	13
Top Use Cases Include Integration and Consistent Policy	14
Driving Hybrid Cloud Strategies	16
Connecting the Clouds: Approaches to MCN and NaaS	18
Overlay or Underlay? Yes.	18
Security, Visibility, and Cost Control Rank Highly	20
MCN as a Key Enabler of Edge Applications and 5G	23
ROI Goals for MCN Are Diverse	24
<b>The MCN Landscape: Ecosystem, Startups, and Partnerships</b>	<b>26</b>
Key Stakeholders in the MCN Ecosystem	26
Ecosystem Activity: Key Upgrades and Partnerships in 2024	27
Outlook for M&A: What Will Happen Next?	29
The Next Wave in Cloud-native Networking	30
<b>Conclusion: What's Next for MCN and NaaS</b>	<b>32</b>

# Introduction: The Multicloud Infrastructure Revolution Marches On (with AI)

It's time to deliver the results of our annual end-user survey on multicloud networking (MCN) and network-as-a-service (NaaS) technology and services. This year's survey data has strengthened our view that networking will come to be regarded as the linchpin to multicloud and hybrid cloud strategies – as all distributed applications and data must be connected by secure, intelligent networks.

For those of you not yet familiar with the MCN trend, it's a new requirement among network and cloud architects to be able to securely connect multiple network domains – enterprise, datacenter, cloud, and communications provider – with a more integrated networking platform. The needs of these cloud networking platforms vary widely (we'll get into that later), but they range from application visibility to network security and policy.

What's changed in the past year? Interest and activity around AI, AI, and AI has, of course, accelerated. But be careful how you discuss AI with your chief technology officer, or he/she is likely to roll their eyes. The truth in the trenches of IT and cloud infrastructure is that the return on investment (ROI) remains unknown.

## What Does AI Mean for Infrastructure Exactly?

If you've been to a tech trade conference recently, you might have heard about AI. But we should keep our heads about it. AI will be very important in the long-term, but it's important to monitor adoption at the enterprise level. which is still cautious.

In fact, as I was writing part of this report, I had CNBC on in the background, and the CEO of Honeywell came on to talk about AI. I paused and turned up the volume. Here's what Honeywell CEO Vimal Kapur had to say:

"[AI] adoption is low. Customers are looking for more robust use cases. Awareness is high, adoption is low... but there will be an inflection point."

That's an interesting statement that shows some of the pushback in enterprise. Futuriom has identified many useful case studies in which AI is driving productivity gains. But it may be true that with the hype level so high, there is bound to be some pullback.

There are myriad challenges to deploying AI. The first is, of course, money. AI can be expensive.

And it's early, which means the ROI has yet to be quantified. Yet there are other challenges to AI and what it means for an organization's infrastructure:

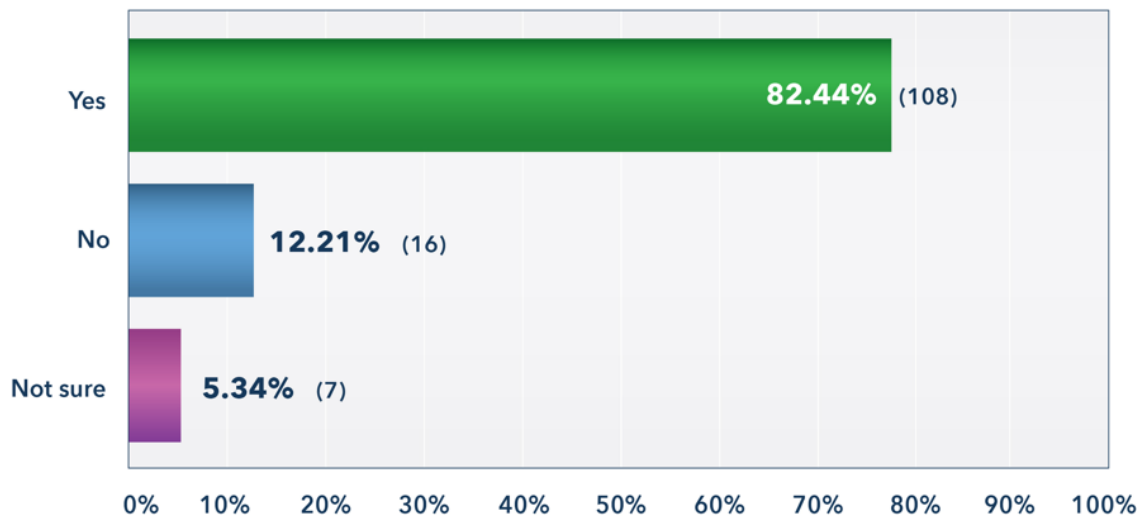
- Accuracy and safety
- Data provenance and privacy issues
- Supporting infrastructure
- Cost of supporting AI (data, infrastructure)

In the case of many professionals charged with infrastructure, this has implications for networking. Networks are required to connect diverse computing stacks together. Namely, how do you assure the safety and privacy of data that is being transmitted across your network to fuel AI models? More importantly, with AI being an outgrowth of existing applications, how do you connect resources together and scale the increased demand for data?

The data that will be used for AI will be everywhere, including multiple clouds and private datacenters. This will pose a challenge for many organizations.

When we asked respondents if they thought the arrival of AI services would increase the need for multicloud networking services, 82% said yes, while only 12% said no. A small minority of 5% said they didn't know.

### Do you expect the arrival of AI services to increase your need for multicloud networking solutions?



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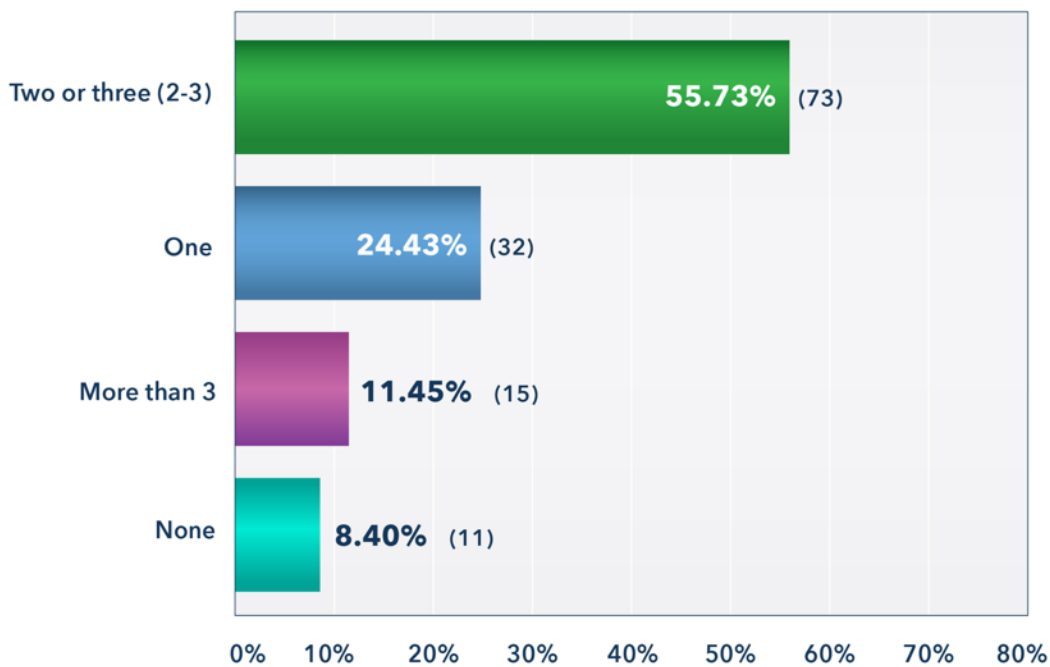
N = 131

## Infrastructure Is More Complex Than Ever

Toss AI on top of 5G services, data lakes, and IoT connectivity and what you get is a lot of thirsty apps and devices scarfing down data in massive quantities. But wait, there's more: These apps and services are more distributed than ever, in a diverse ecosystem. The networks must connect a wide range of cloud providers, content delivery networks (CDNs), service providers, and enterprises. These connections must increasingly be made on-demand, using automated connectivity technologies.

Networking professionals point out that multicloud networking will have to play a greater role in all of this, serving as a platform for transporting, securing, and managing data across multiple clouds and datacenters. As the chart from our survey below shows, the majority of organizations are using multiple public clouds.

### How many public cloud infrastructure services (Platform as a Service or Infrastructure as a Service) are you currently using?



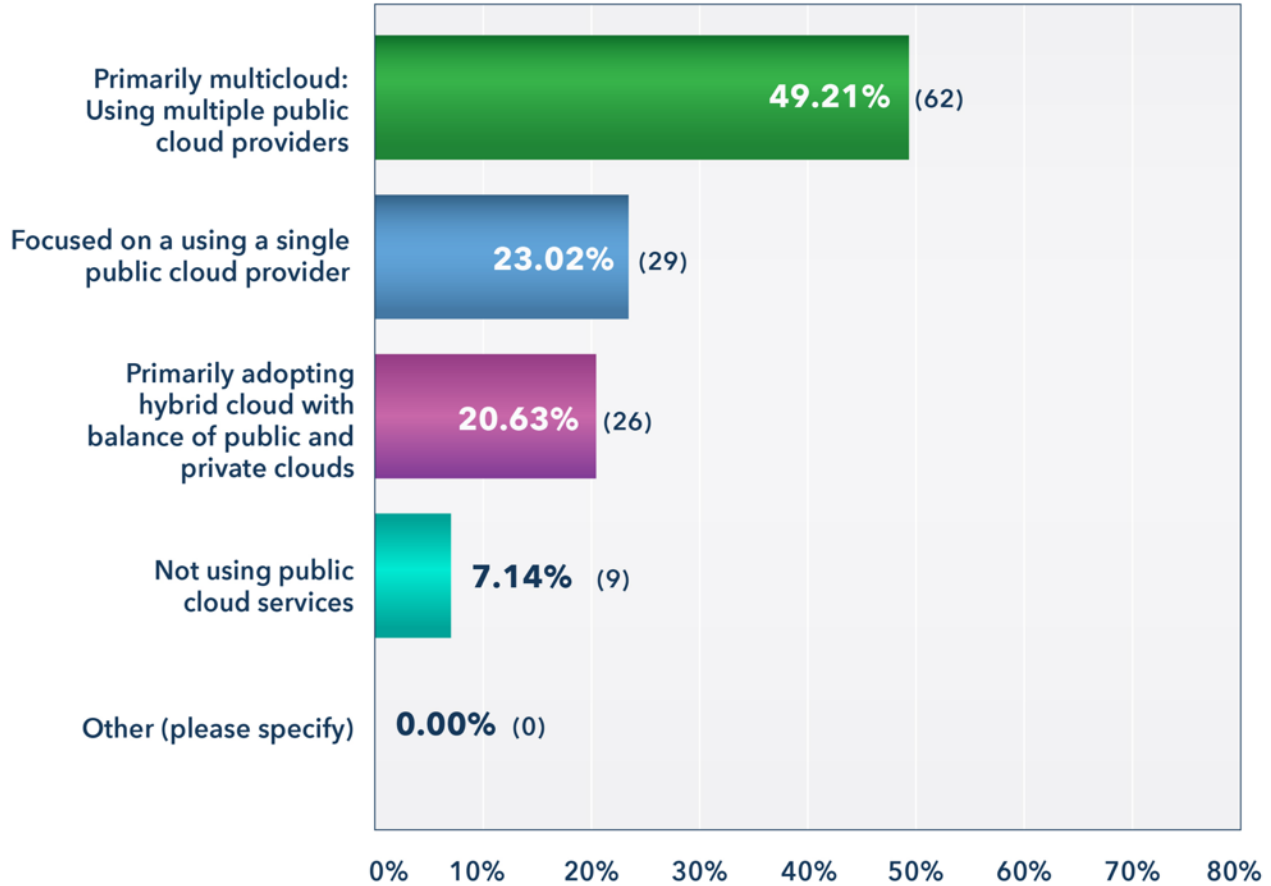
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N = 131

According to this year's survey, the largest number of respondents (49%) out of 126 responses said they are pursuing a multicloud strategy. Only 23% were focused on using a single public cloud service, 21% said they were pursuing hybrid cloud, and only 7% said they weren't using

cloud services.

### What is your organization’s primary strategy for using public cloud services? (select one)



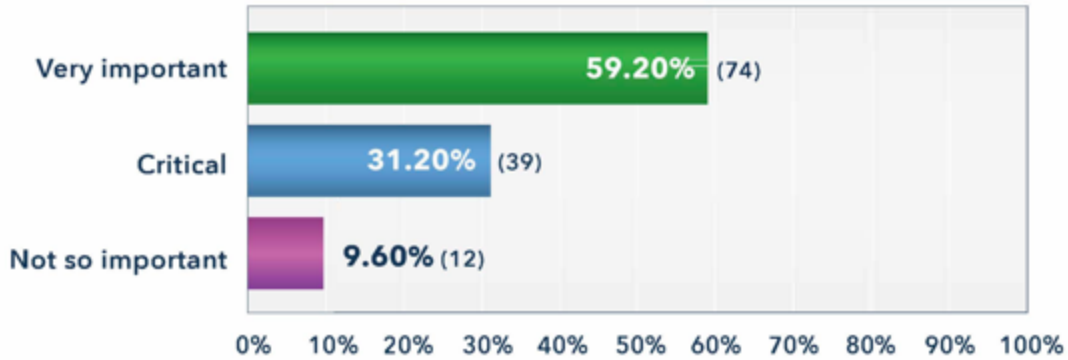
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**N = 126**

Futuriom’s proprietary research service, Cloud Tracker Pro, is tracking hybrid cloud and multicloud trends. What we are finding is the need for a more flexible and diverse ecosystem for connecting things on-demand—in short, multicloud networks. We’ll dive into the details in the next section.

Let’s quickly take a look at another question and compare the results to last year’s survey. Last year, 59% of respondents said it was very important to have seamless multicloud networking connectivity across diverse resources:

How important is it to have seamless multicloud networking (MCN) connectivity among your enterprise datacenter, edge, telecommunications provider, and public cloud services?

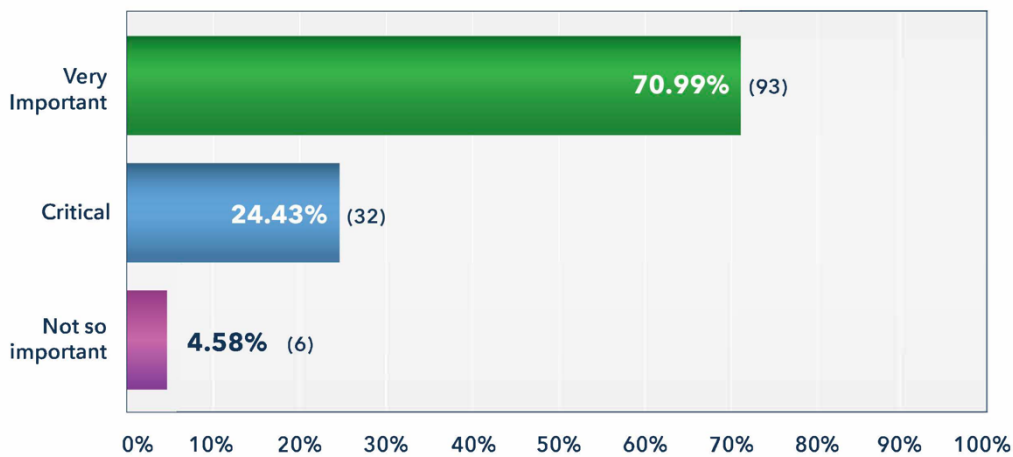


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Responses: **125**

This year, that number rose to 71%, a substantial jump. This indicates that the need for

How important is it to have seamless multicloud networking connectivity among your enterprise datacenter, edge, telecommunications provider, and public cloud services?



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**N = 131**

multicloud network solutions is growing—potentially driven by AI. Of the 131 that responded to the question, 24% said this connectivity was “critical” and only 5% said it wasn’t important at all.

## **Background on the Survey**

For this year’s survey, we reached out to networking, security, and operations teams using a targeted survey. The annual survey included responses from a total of 131 qualified IT and network managers (numbers vary by question because not everyone responded to all the questions). We filtered the responses by only examining responses from those that affirmed they worked in DevOps, IT, networking, or security.

All of the respondents were anonymous and based in the United States. Some of the respondents voluntarily supplied job titles. Some of the titles of the end users that filled out the survey included: CEO, CIO, DevOps Engineer, Network Engineer, Network Analyst, Manager, IT Manager, IT Business Analyst, Operations Manager, Senior Software Engineer, Architect, Telecommunications Engineer, and Senior Manager.

In the next sections, we dive deeper into MCN technologies, drivers, features, and needs – as well as some more general conclusions about the market for MCN based on our survey results and interviews.

## MCN Background: The Evolution Is Here

Before we dive into more survey results, let's look at how multicloud and hybrid cloud infrastructure is evolving. MCN and NaaS technologies can enable faster, programmatic networking connectivity among disparate networking domains. These technologies represent an evolution of software-defined networking (SDN), which evolved to programmatically deliver networking connectivity in datacenters and hyperscale cloud environments. The next step was to use a programmatic, SDN approach to connect enterprise branches to cloud environments or Web applications, using secure virtualized overlays – the software-defined wide-area networking (SD-WAN) movement.

While SD-WAN addresses many needs – such as enterprise branch connectivity and security – a more complete solution is needed to connect all networking domains: enterprise branch, datacenter, telecommunications, and cloud. That need has given birth to MCN and NaaS, which enable enterprise networking environments to build secure, virtualized networking fabrics to connect to any networking environment, across any environment, including enterprise networks, datacenters, public cloud infrastructure, and service provider infrastructure.

### Cloud Networking Taxonomy

Let's take a look at some of the industry taxonomy and nomenclature so it's clear what we are talking about.

As we have described, the distributed nature of the cloud has created networking silos. The easiest way to think of these silos is in at least four major buckets: traditional enterprise networking, datacenter networking, cloud networking, and telecommunications infrastructure. Now that distributed cloud applications have arrived, MCN helps build networks that can more seamlessly cross these borders and keep applications consistently connected.

Connecting diverse networking silos employs many technologies and methods. Here are several of the categories and approaches needed to be considered in building MCNs:

**Private cloud and datacenter:** A private cloud is a datacenter built with current cloud technologies that runs on-premises or is hosted and managed by an organization or an enterprise itself, rather than in a public cloud.

**Public cloud:** A public cloud is usually a distributed array of cloud resources and infrastructure run by a large platform-as-a-service (PaaS), infrastructure-as-a-service (IaaS), or software-as-a-service (SaaS) company, providing services to other organizations.

**Multicloud:** Enterprises might need services or resources from multiple IaaS or PaaS services, such as Amazon Web Services (AWS), Microsoft Azure, or Google Cloud Platform (GCP). In this case they need to connect their networking infrastructure to multiple public cloud infrastructures, all of which have specific requirements.

**Hybrid cloud:** When enterprises build distributed applications that share resources on both private and public cloud infrastructure, it is referred to as hybrid cloud.

**MCN technology:** MCN technology provides the capability to build a logical, software-defined, secure network for cloud applications across multiple private clouds, datacenters, and public clouds. This can happen at both the application layer as well as at the network layer – but preferably it should happen in both.

**Service provider infrastructure and NaaS:** Service providers – including communications service providers, cloud providers, and datacenter providers – supply global infrastructure and networking services to connect regions, points of presence (PoPs), and communications services such as 5G or networking. NaaS is a model in which networking or communications services can be purchased on demand, for example using dedicated Internet access (DIA) or Ethernet services to connect datacenter PoPs or public cloud onramps.

## Hybrid Cloud Apps Drive Need for Integration

MCN is built using software that provides virtualized networking services between any cloud service or infrastructure. It's all about using a programmatic software connection among the network silos, driven by automation.

That's evolving over time, but the key driver is distributed applications that reside in different parts of the infrastructure and require software-based connectivity. MCN and NaaS are enabled by some fundamental technologies that help connect integrated cloud networks, as described below:

**Application programming interfaces (APIs):** APIs have been a crucial element of datacenter and SD-WAN virtualization, and they will become increasingly important to connect MCN. APIs enable hardware or software to expose connectivity and configuration information in the form of code, enabling automation. Data APIs can be used to provide a steady stream of network telemetry and state information. The use of HTTP and Web software interfaces such as JavaScript Object Notation (JSON) and networking orchestration tools such as OpenConfig and NETCONF have been crucial to enabling the development of software-based automation of networking infrastructure.

**Infrastructure as code:** Tools coming out of the cloud world, such as Kubernetes and HashiCorp's Terraform, are enabling network elements to be managed and orchestrated directly from within the code of an application. Network connectivity and orchestration can be built into the code of

cloud applications. Integration of networking with infrastructure-as-code tools will be key to the success of MCN and hybrid cloud networking (HCN) efforts.

**Software overlays:** Networking software overlays, which can include secure tunneling technologies such as IPsec and Transport Layer Security (TLS), enable applications and networks to be segmented using software only, rather than requiring separate logical hardware-based networks. But overlays are sometimes just a Band-Aid. MCN will take this a step further by enabling deeper management, segmentation, security, and control of cloud networks using overlay and virtualization technologies.

**NaaS and cloud onramps.** Cloud NaaS is a growing solution for connecting networks in the middle mile – or to provide an express lane to a Cloud PoP, often referred to as a cloud onramp. As cloud infrastructure expands, NaaS implementations will grow in importance to connect infrastructure – for example, automatically connecting enterprise WANs and SD-WANs to cloud PoPs to provide specialized security services, or connecting disparate service-provider networks to the cloud or datacenter infrastructure and colocation facilities using Ethernet or DIA. This will present new opportunities for service providers as well as startups to build NaaS infrastructure to facilitate interconnections.

# Survey Findings: Key Drivers, Requirements, and Potential ROI

This year's survey once again confirmed a key trend: Many network professionals are concerned that networking could become the bottleneck to modern, distributed apps.

As we have described above, the MCN trend is driven by the growing need to connect a more distributed IT infrastructure. Data, applications, and infrastructure now exist in many places – enterprise datacenters, edge, and cloud – and technologies such as AI and Kubernetes mean that applications will become more distributed over time.

## What Are the Top Drivers?

One of the goals of our annual survey is to determine the top drivers as well as use cases for multicloud networking. Let's start with the key drivers.

This is a big question, with a large chart on the following page. We also allowed the respondents (131) to select multiple responses, so we could collect a wide array of needs (that explains why results exceed more than 100%). Unsurprisingly and similar to last year's results, the choices were widely distributed.

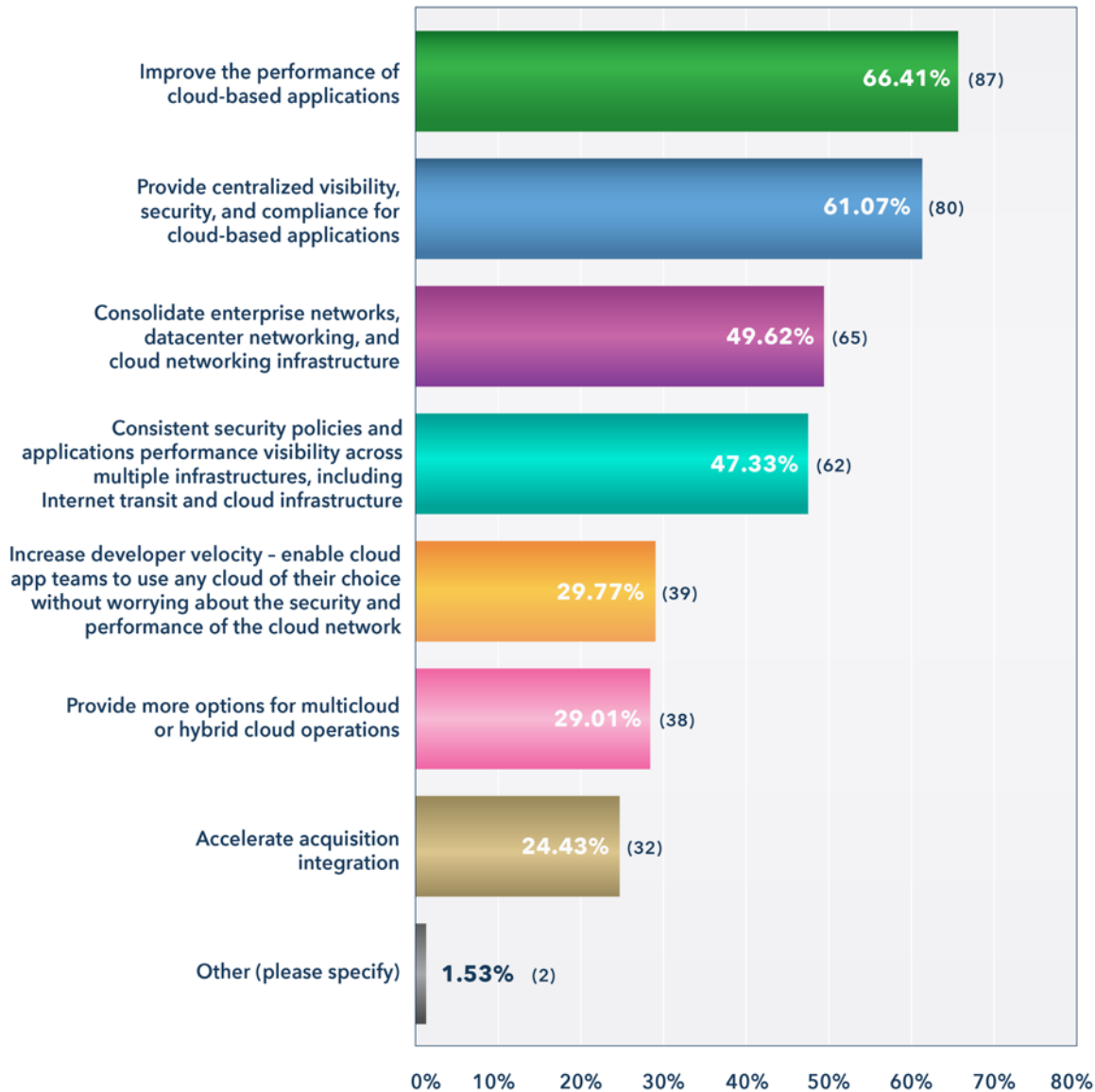
Let's divide the results into two tiers:

**Top Tier:** Respondents said key drivers include improving the performance of applications (selected by 66%); providing centralized visibility, security, and compliance for apps (61%); consolidating enterprise networks, datacenter networking, and cloud networking infrastructure (50%); delivering consistent security policies and application performance visibility (47%).

**Second Tier Drivers:** Increase developer velocity (30%); provide more options for multicloud and hybrid cloud operations (29%); and accelerate acquisition integration (24%).

The full results can be seen on the following page.

**What are the top drivers for building multicloud networking (MCN)?** (Select all that apply.)



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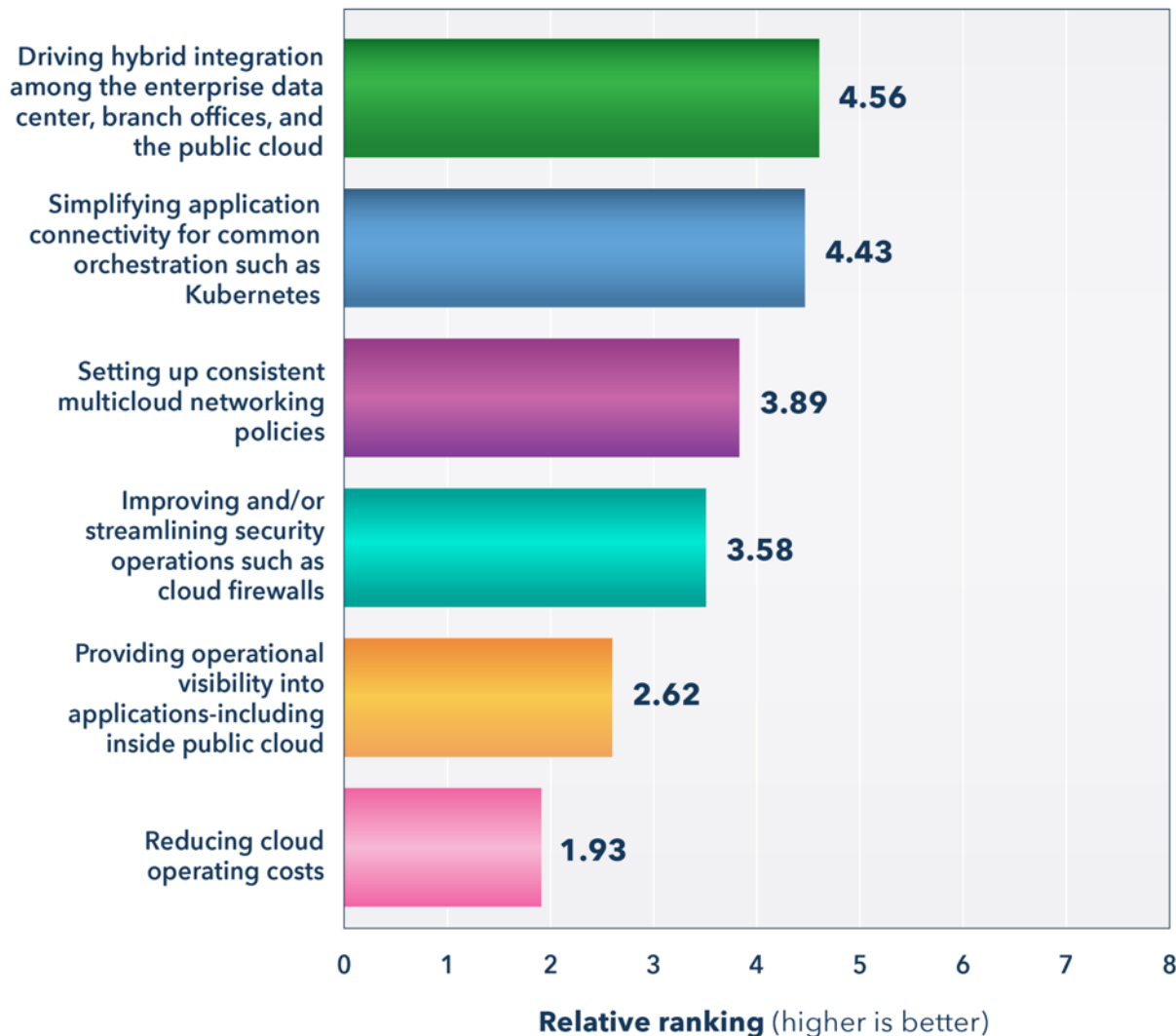
N = 131

**Top Use Cases Include Integration and Consistent Policy**

Managers of the growing distributed infrastructure will require more visibility and control of expanding, interconnected domains. At the same time, organizations are using more partnerships in infrastructure, often using NaaS services provided by service providers, datacenter providers, and cloud providers to build a global virtual infrastructure.

Our survey results reflect a broad need for responsive and automated MCNs that respond to these needs to provide connectivity for distributed applications, which require resources in many different types of compute, storage, and networking domains. Key use cases identified in the survey including driving hybrid cloud integrations (ranking of 4.56, where higher is better); simplifying application connectivity (4.43); setting up multicloud networking policies (3.89); improving and streamlining security operations (3.58); providing operational visibility into applications (2.62); and reducing cloud operating costs (1.93). See the results below.

### What are the top use cases for multicloud networking (MCN)?



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N = 131

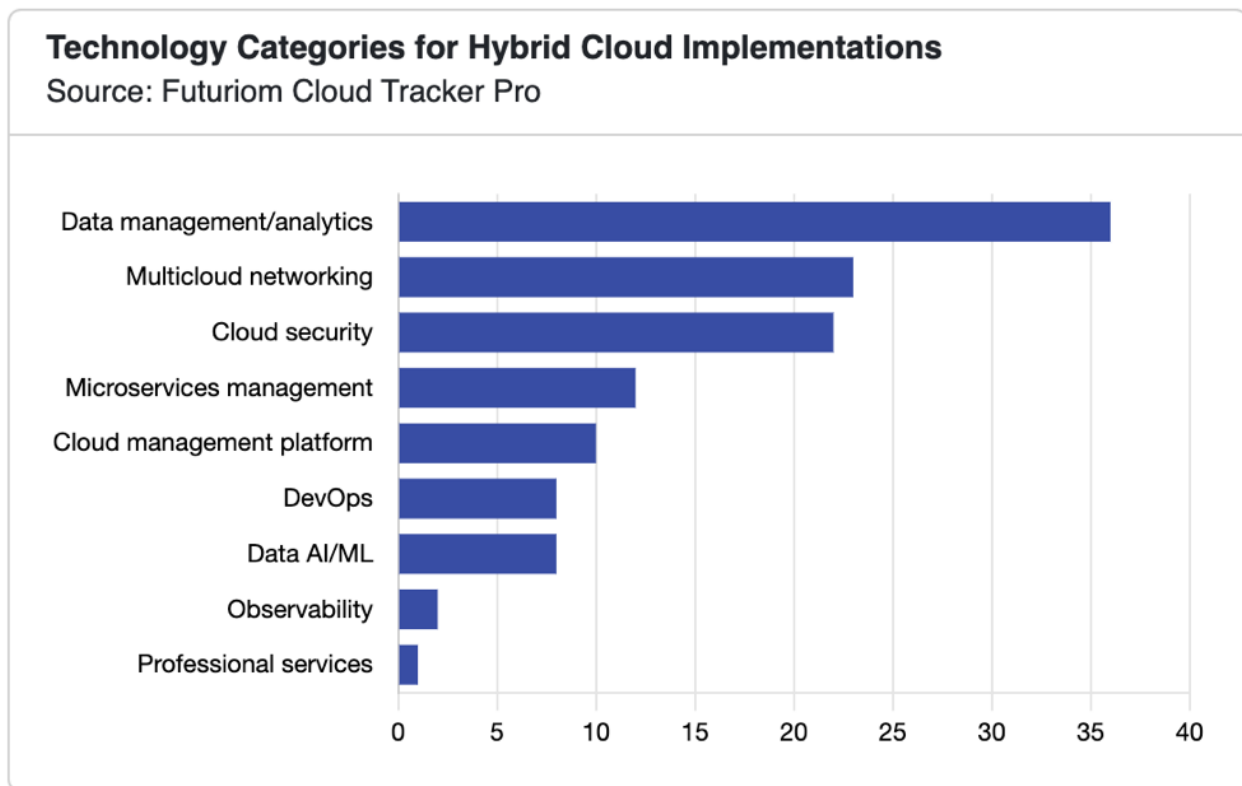
One thing we’d like to note: Although reducing operating costs was ranked low in this question, it surfaced as a higher concern in other questions about cloud egress costs, which we’ll address later.

## Driving Hybrid Cloud Strategies

Although many enterprises are using public cloud, recent trends indicate a shift back to private infrastructure in concert with public cloud services, or hybrid cloud. In our study of recent cloud deployments there are several reasons for this:

- Concerns about public cloud costs are driving enterprises to investigate how to leverage private infrastructure or traditional enterprise resources.
- Distributed applications as well as data sovereignty demands often favor deployments on private infrastructure.
- Distributed apps sometimes require a more flexible hybrid infrastructure that is connected to both public cloud and private infrastructure.

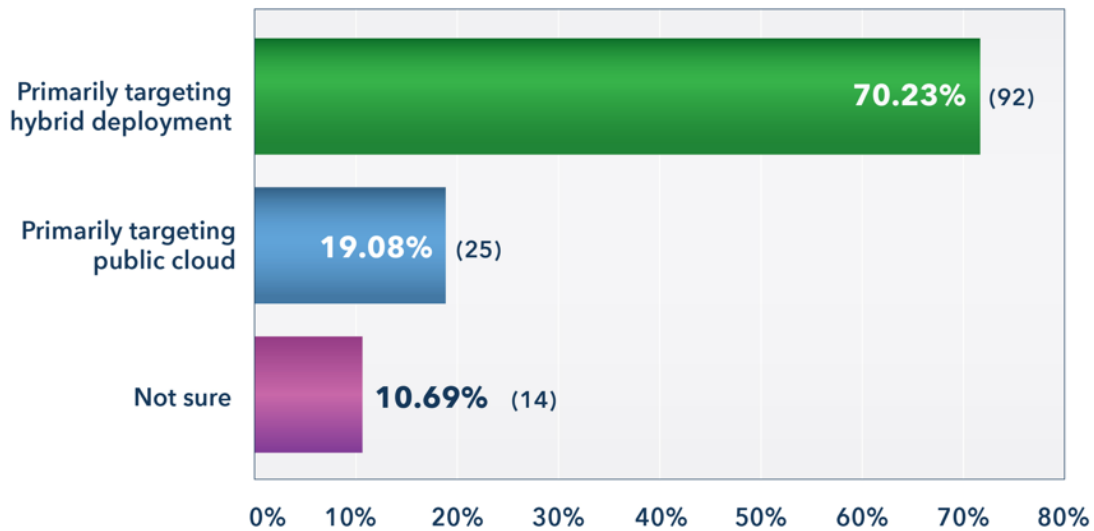
Futurium’s own primary research shows a growth of hybrid cloud initiatives developing in the real world. In our regular interviews and surveys, it’s become clear that multicloud and hybrid cloud are the wave of the future. For example, data from our own Cloud Tracker Pro services shows a groundswell in hybrid cloud activity among large global companies, including AstraZeneca, BMW, BP, Barclay’s, Deutsche Bank, Fidelity, IHG, Major League Baseball, Morningstar, Salesforce, and many others. See some of the highlights of this research in the chart below.



This year’s survey data once again confirms the trend toward more demand for hybrid infrastructure. When we asked respondents about their organization’s plans, 70% said they said they were primarily targeting hybrid deployments, while only 19% were primarily targeting public cloud. Only 11% said they weren’t sure.

This is a substantial increase from last year, when 58% said they were primarily targeting hybrid deployments, 26% were primarily targeting public cloud, and 17% weren’t sure.

**Does your enterprise have plans for a hybrid deployment (continued investments in on-prem datacenter combined with cloud), or are you planning to migrate most on-prem workloads to the public cloud?**



## Connecting the Clouds: Approaches to MCN and NaaS

Operationally, connecting public cloud services with other public clouds as well as enterprise networks is challenging. For network engineers and cloud architects, often the connectivity requires manual tasks, waiting for service provider paperwork, or dealing with complex issues such as overlapping IP addresses. Much of the complexity is added by the differing approaches of major cloud operators, who all use proprietary network technology.

One of the values of MCN is that it enables managers to build a single, logical network and automate connectivity, regardless of which network, cloud, or domain the organization is attempting to connect with. Multicloud services, including MCN and NaaS, are built to manage multiple clouds as one operational entity. This can be done with a combination of MCN services, including NaaS that can provide connection points or gateways inside of the clouds, frequently referred to as cloud onramps.

MCN is about providing a quicker way to connect IT compute, applications, and networking across diverse infrastructure. You can put this in a number of categories that we asked questions about, which include:

- Being able to elegantly connect large cloud and data resources with underlay (Layer 2-3) technology
- Integrating with cloud-native resources at the application or Kubernetes layer
- Improving the management, visibility, and security of operations across clouds and networking domains.

We used several questions to zoom in on these areas, so let's dive in.

### Overlay or Underlay? Yes.

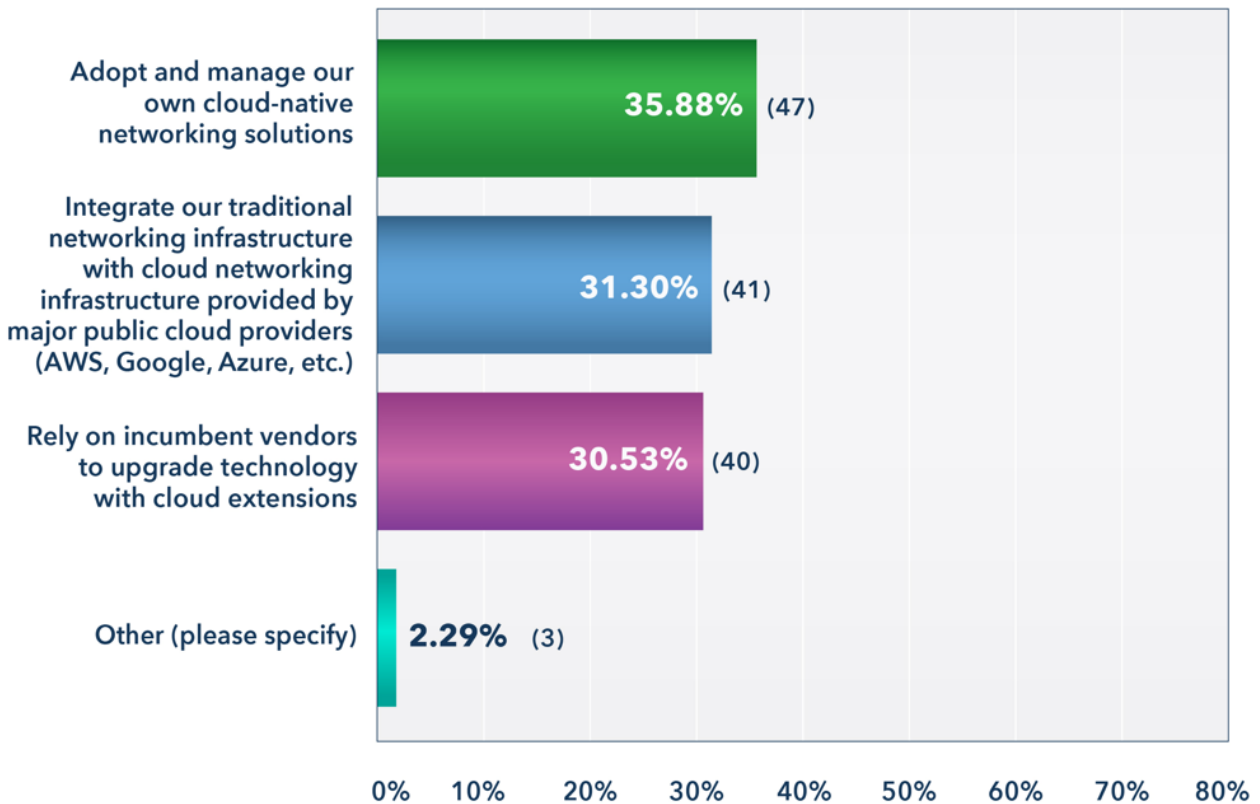
There are many different approaches by multicloud connectivity tools out there, whether it's enabling Layer 2 or 3 underlay technology, providing better visibility, or enabling better performance and security at the application or cloud-native layer.

The bottom line is that end users will likely need help in all these areas, and they may need multiple technologies and vendors. One solution might help automate connections with a cloud onramp at a datacenter, while others will ensure applications connectivity into Kubernetes environments across cloud infrastructure.

Let's start with the basic network infrastructure. When we asked what strategy companies are pursuing to connect their datacenter fabrics, we found diverse approaches. The responses were

balanced across managing cloud-native solutions, integrating traditional networking infrastructure, and relying on incumbent vendors to upgrade their technology.

## What is your strategy to integrate datacenter networking fabrics with public cloud services and cloud-native infrastructure?



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**N = 131**

It's important to zoom in on the approaches needed to connect various infrastructure resources. When we asked about the approaches being used, once again the answer appears to users are looking for these features. Whether it's leasing direct connections, using a cloud provider's regions within cloud infrastructure, or using a NaaS and colocation, these are all popular approaches to connecting multicloud resources.

## What do you consider the best approach to building underlay between cloud providers?



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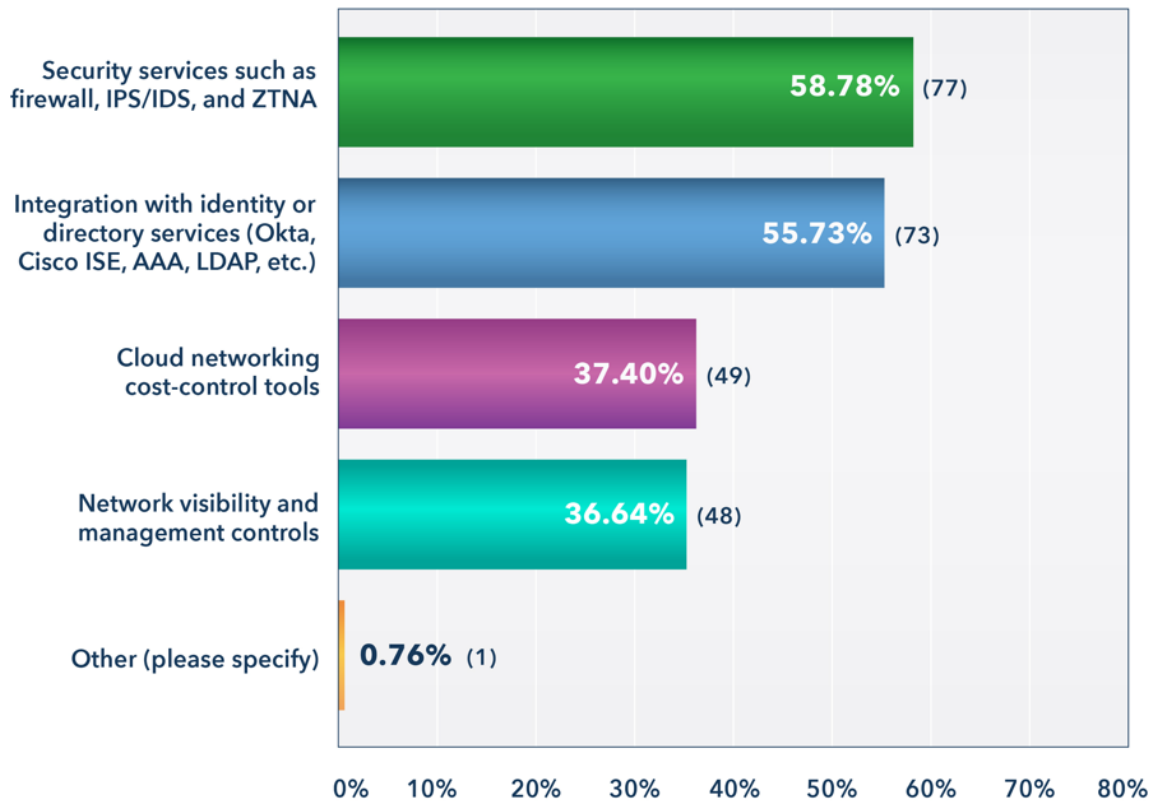
N = 128

The bottom line from these responses is, “Yes, we need help.” The customers would like solutions that give them many options for serving many different MCN connectivity problems.

### Security, Visibility, and Cost Control Rank Highly

Remember that “yes,” answer? It also applies to a variety of features and services that end users would like to see provided with an MCN or a NaaS service. Security services rank highest, along with cost control and visibility.

**Besides overlay connectivity, what other services do you want multicloud networking solutions to provide?**  
(Choose the top two)



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**N = 131**

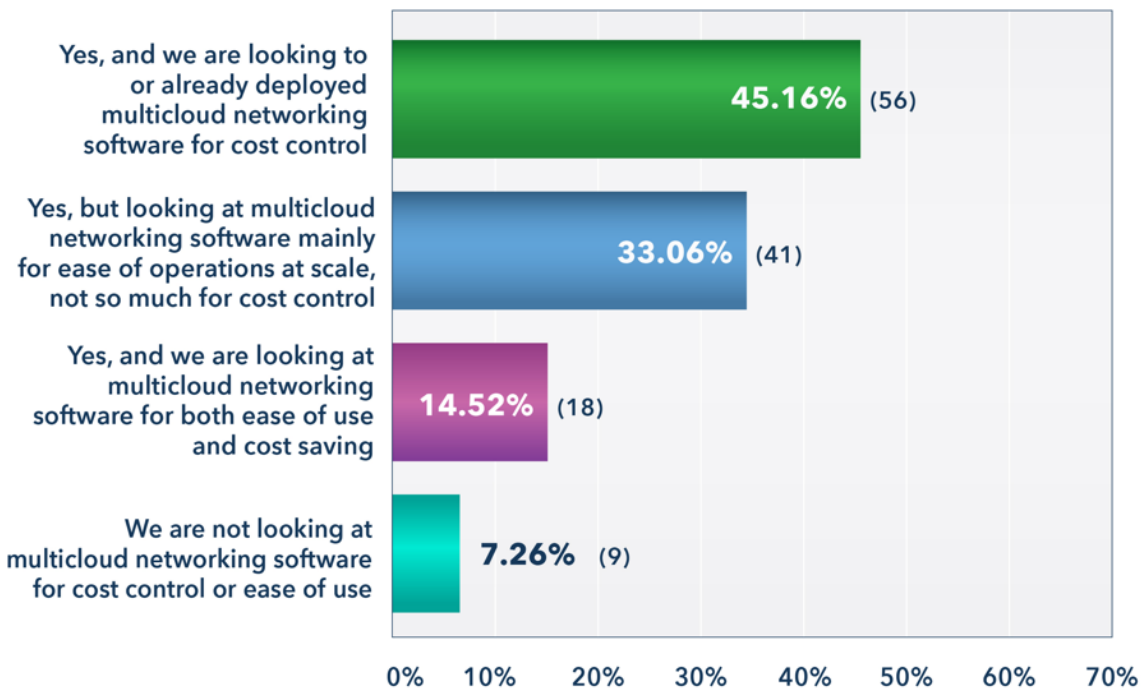
Last year’s question yielded similar results. These included security services (60%), directory integration (51%), and cloud networking and cost-control tools (41%). The demand for cost control is virtually the same, considering the margin of error.

It’s important to note that these types of features or services are not mutually exclusive. They are in fact available from an increased number of vendors and service providers. Security, cost control, and visibility frequently come together—it’s about gaining more control over the multicloud infrastructure.

Speaking of cost control, we mentioned that earlier. While it wasn’t ranked as highly in a different context, when we asked about controlling the costs of specific use cases such as NAT and egress data, cost control ranked very highly. For some background: The major cloud providers charge customers for using native NAT in their cloud, but some independent MCN services as well as cloud gateways can be used in a way that mitigate these costs. In addition, we sense growing frustration

from end users about the practice of major cloud providers to charge for specific data transit traffic, for example moving network data out of the cloud-provider network, which is referred to as egress. These issues also are coming up more frequently in our conversations with network operators about their challenges in cloud networking—NAT and egress costs rank at the top of their list of grievances.

### Are the costs of native cloud services based on pay-per-use (such as NAT gateway and egress data transfer) making you look at multicloud networking software for better cost control ?



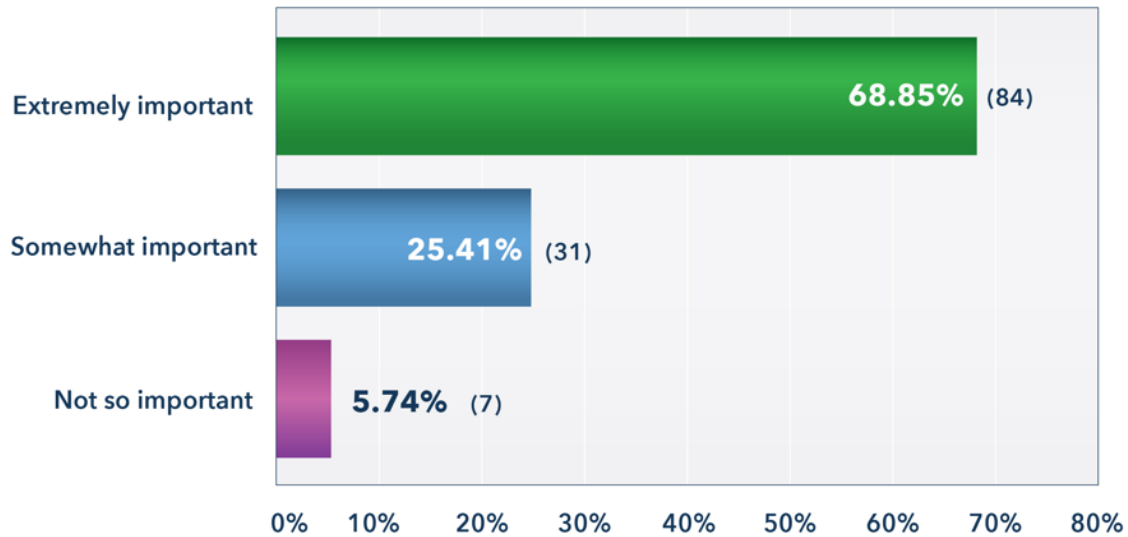
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**N = 124**

In the responses to another question about using multicloud networking to control cloud egress charges, 69% of the survey audience ranked this need as “extremely important,” and 25% ranked it as “somewhat important,” with only 6% ranking this need as unimportant.

It’s clear from these results as well as our discussions with networking professionals that the need to control cloud egress charges is rising in importance and is becoming an important feature of MCN solutions. The full results can be seen on the following page.

## How important is controlling cloud egress charges in your multicloud strategy?



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N = 122

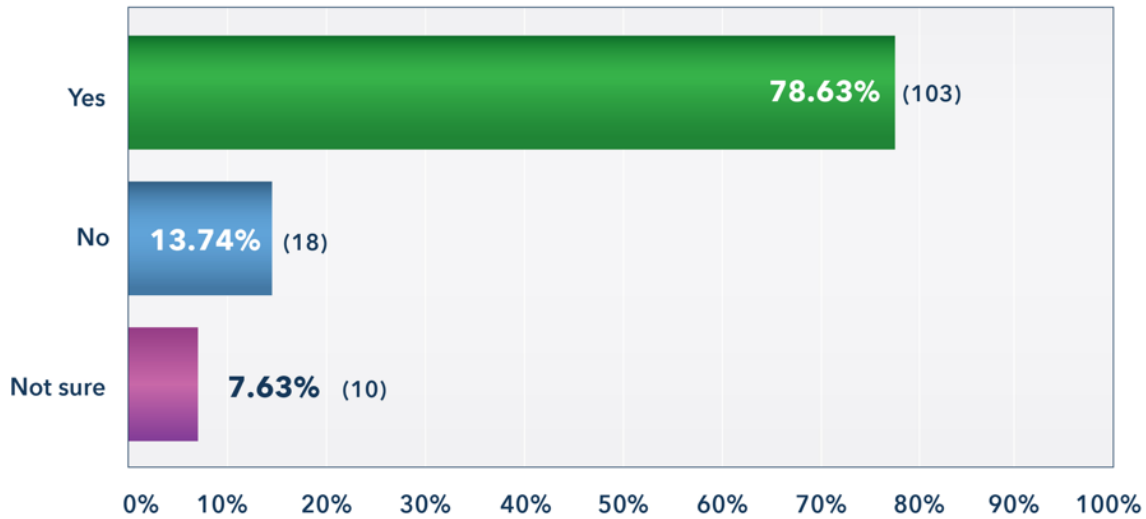
It's important to note, controlling egress charges can have several aspects, including visibility of egress charges as well as control over traffic flows to reduce charges.

### MCN as a Key Enabler of Edge Applications and 5G

In addition to delivering integration among datacenters and public cloud services, MCN is also playing an important role in connecting edge services to service provider networks. One of the largest needs is for 5G and other edge connectivity services including private wireless.

When the survey audience was asked about whether new services such as edge compute, 5G, and private wireless would increase the need for MCN, 79% said yes. That's up from 66% in last year's survey. One possible contributing factor is that demands for AI data appear to be boosting demand for solutions at the edge.

**Do you expect the arrival of new services such as 5G networks, edge compute, and private wireless connectivity to increase your need for multicloud networking (MCN) solutions?**



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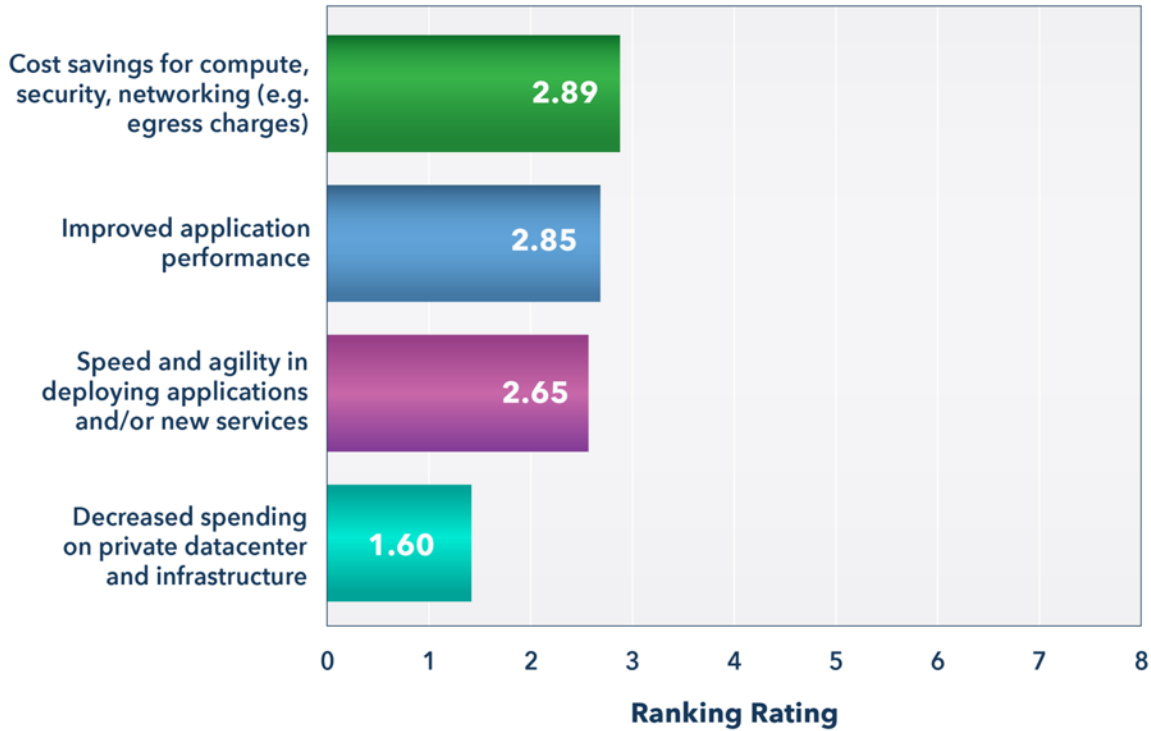
**N = 131**

**ROI Goals for MCN Are Diverse**

The survey results have expressed several key themes for MCN: End users would like to connect and manage connectivity among disparate infrastructure, as well as improve security and improve application performance. This year, as demonstrated by survey results as well as the growth in the ecosystem, we see MCN technology maturing and being adopted by the market. A key to its continued success will be demonstrating key ROI for customers.

Some of the ROI results we have heard about in discussions with practitioners include automating management, improving applications performance, speeding network connectivity, and controlling network costs for cloud networks. We asked about a few of these ROI benefits and you can see the results in the chart below (higher rating is better).

### What is the most important ROI (Return on Investment) metric used to evaluate your success in cloud investment? (Pick one)



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N = 131

# The MCN Landscape: Ecosystem, Startups, and Partnerships

As the survey results show, MCN is seen as a new technology platform architecture that can help streamline cloud operations, speed up cloud connectivity, and improve operations via features such as security and cost controls.

In the real world, this is no easy task. It requires careful coordination and integration across many domains and ecosystems. It also requires integrations and partnerships across the ecosystem.

Not only do MCN and NaaS capabilities cross organizational boundaries, they often involve tools and services from a variety of suppliers. It could require integration with a colocation provider, cloud provider, and enterprise network provider at the same time. The networking ecosystem includes a wide range of equipment and software OEMs, public communications network providers (telcos), public cloud providers, and colocation providers. These technology and service providers are involved in the building of MCN.

## Key Stakeholders in the MCN Ecosystem

We'll dive into some key developments in the ecosystem in a little bit, but here's our view of the providers and organizations that comprise the MCN ecosystem:

**MCN and networking technology providers (startups):** There is a significant group of startups being funded in the venture community to help solve broad and complex MCN and HCN challenges. Key vendors to watch include **Alkira, Aviatrix, Arccus, Graphiant, Itential, Prosimo, and Versa Networks**. More details on some of these companies are included below.

**Networking incumbents:** Incumbent networking and cloud software providers will continue to add functionality to their existing platforms to enable MCN. In some cases, these functions will be built organically. Futuriom sees incumbents continuing down the path of M&A to buy innovation. Key vendors to watch for M&A include **Arista, Cisco, HPE, IBM, Juniper, and VMware**.

One trend we have noticed over the past year is that the incumbents have become more focused on datacenter and hyperscale solutions to help scale AI, and they seem less focused on multicloud solutions. That presents an opportunity for MCN innovation.

**Telecommunications service providers:** Telcos see the opportunity for MCN and hybrid cloud services, and once again they are trying not to be relegated to "dumb pipe" designation. Their

opportunity lies in taking their global networking resources and integrating with cloud services and next-generation MCN provisioning tools to make it easier for customers to leverage cloud networks.

**Cloud PaaS and IaaS providers:** The largest cloud operators -- including **Amazon, Google, Microsoft, IBM, and Oracle** – have built large cloud networks that can be used by enterprises to build MCNs. By establishing a global network of PoPs that can be accessed by APIs, PaaS and IaaS operators can provide MCN connection points closer to the enterprise customer. In some cases, the cloud providers aim to be MCN providers themselves – by providing edge services that can be used by enterprises. Some examples include Google Cloud Anthos, AWS Regions and Zones, and Microsoft Azure Virtual WAN. While these MCN functions are useful for customers building inter-cloud networks, many of the public cloud infrastructure services are proprietary in nature. Futuriom believes that most larger enterprises will find these services useful to connect their MCNs to the public cloud providers, but many enterprises will want more control over MCNs that they build themselves.

**Content delivery networks (CDNs), cloud NaaS, and middle-mile services:** NaaS and CDN providers, like the cloud providers, have their own global networks that can be used by enterprises to build and connect MCNs. In contrast to some of the startup vendors that supply do-it-yourself (DIY) tools for building MCNs, many of these providers supply a NaaS service that enables the enterprise to outsource global networking services, often positioned in the “middle mile” of the global network. Some of the providers of cloud-based NaaS, middle-mile, and CDN services include **Alkira, Akamai, Aryaka Networks, Cato Networks, Cloudflare, Megaport, and PacketFabric**.

**Colocation providers:** Datacenter and colocation providers such as Equinix and Digital Realty have private cloud infrastructure and networking connectivity services that can be used to build MCNs. Because datacenter PoPs are often located in the same colocation facilities of public cloud providers, these services can be used as a bridge to MCNs – for example, by connecting local private resources directly to cloud services, with cloud onramps. Futuriom sees the colocation providers as playing a key role in MCN development. For example, the **Equinix** Cloud Exchange Fabric (ECX Fabric) provides software-defined network interconnection across a global infrastructure and public cloud PoPs. **Digital Realty’s** SX Fabric enables organizations to securely manage cloud networks and applications among PoPs. The large colocation and datacenter providers are likely to continue to make moves to enable more extensive cloud networking integration for customers.

## Ecosystem Activity: Key Upgrades and Partnerships in 2024

In 2024, we’ve seen the MCN ecosystem focus on feature upgrades, partnerships, and pursuit of the ever-present AI craze.

First up: MCN pioneer **Aviatrix** teamed with NaaS provider **MegaPort** to offer joint solutions for enterprises looking to streamline MCN and hybrid cloud infrastructure. The idea is to run Aviatrix's MCN networking over the neutral, third-party infrastructure offered by MegaPort to reduce costs and provide flexibility for hybrid and MCN workloads. This focus on providing connection points at colocation spaces is a strong trend, as enterprise customers would like to build connectivity into cloud network fabrics provided by the likes of AWS, Google Cloud, and Microsoft, as well as over private enterprise networks. MegaPort's network of connection points now extends to more than 850 datacenters in over 25 countries, and customers can broaden their options, add security, and realize better management, Aviatrix says.

But wait, there's more, Aviatrix has also partnered with **Equinix** to deliver Aviatrix Edge software across 25+ of Equinix's global International Business Exchange data centers. The combined solution leverages Equinix's Network Edge and Equinix Fabric to deliver high-performance encrypted connections across clouds. This is a perfect example of a key MCN use case, where enterprises can extend and automate their MCNs using neutral colocation facilities.

**Alkira** has had quite a year. The company appears to be expanding rapidly after announcing a \$100 million round of Series C funding in May. Alkira's Series C was led by Tiger Global with participation from existing investors Sequoia Capital, Koch Disruptive Technologies, and Kleiner Perkins and with input from new investors Dallas Venture Capital, NextEquity, and Geodesic Capital. Alkira has provided some interesting data about recent growth. Alkira says it has increased revenue 110% while doubling its roster of customers, which includes Chart Industries, Koch Global Business Solutions, S&P Global, Tekion, and Warner Music Group, to name a few. More than 20 of its customers spend more than \$1 million annually with Alkira, says management.

This year's big deal for **Arrcus** was a partnership with AI infrastructure leader **NVIDIA**. NVIDIA participated in Arrcus's new \$30 million funding round, which will be used to help grow and integrate the Arrcus Connected Edge (ACE) platform. Futuriom believes that MCN connectivity will be key to supplying connectivity to feed and enable AI models. The deal with NVIDIA follows a trend of smaller networking companies looking to leverage the innovation and power of NVIDIA's BlueField NICs and DPUs to build high-performance AI networks. Earlier in the year at the giant Mobile World Congress trade show, Arrcus announced a partnership to integrate their technologies to provide more efficient, cloud-native networking for edge applications such as AI and 5G.

**F5** is an important MCN player that has been methodically tying together many parts of its portfolio to enable distributed, multicloud security. This includes platforms for Distributed Cloud Services as well as cloud-native load-balancing solutions such as NGINX. A big move in the past year included the acquisition of startup Wib for API security. F5 integrated Wib's API security features as

well as integrated code testing and telemetry into its Distributed Cloud Services portfolio. This portfolio includes Distributed Cloud Network Connect and Distributed Cloud App Connect, which are SaaS-based services that connect, secure, and manage apps and networks deployed in hybrid and multicloud environments. And, of course, F5 is on top of AI. The F5 AI Data Fabric can take data telemetry from Distributed Cloud Services, BIG-IP, and NGINX to generate insights, produce real-time reports, automate actions, and power AI agents. F5's expansion of its integrated software approach appears to be paying off. In its September quarterly results, F5 grew software revenues 27.4% quarter/quarter (20% y/y) to \$228 million.

**Itential** is a unique integration and orchestration platform that can help enable delivery of NaaS across hybrid MCNs. It provides low-code and no-code integrations (for example, using APIs) to connect networking technologies in diverse domains such as enterprise, service provider, and SD-WAN. One of its key moves of the year included a partnership with **ServiceNow** to provide better operations in the service provider market. Called Itential for OMT, Itential's new software integrates ServiceNow Order Management with the Itential Automation Platform. Itential has promoted the idea of providing more open, accessible cloud-like automations for telecom networks. This type of automation will be key to enabling MCNs. ServiceNow is a huge player in service integration and automation, so this is an important partnership to watch.

**Prosimo** has been hitching a ride on the AI train. This year it announced its AI Suite for Multi-Cloud Networking, which will be included as part of Prosimo's multicloud networking platform. In the suite, Prosimo's Nebula assistant uses natural language to provide recommendations and accelerated root cause analysis for improving operations. The product also adds tools for managing cloud costs as well as AI infrastructure, including AI data guardrails. Prosimo has also featured in this year's growing discussion of "network observability" by putting observability into the MCN discussion as a multivendor, multicloud tool.

**Versa Networks** believes its Versa Unified SASE platform will help bridge the gap between cloud-native networks and traditional networks with advanced networking, consistent policy enforcement, automation, and optimized connectivity across clouds. In a recent partnership of note, Versa and **Microsoft** partnered to integrate identity-centric Internet access security with intelligent network connectivity to help secure transport over the WAN. This includes SD-WAN for Microsoft Entra, as well as SWG functionality. Versa's unique positioning among SASE vendors with a hybrid SD-WAN and security approach that can run either on premises or in the cloud makes it a good candidate for use as a secure connectivity solution for MCNs. It is especially widely adopted by service providers, who can offer the security platform as part of their WANs.

## Outlook for M&A: What Will Happen Next?

The venture market moves in waves, and MCN is the successor to the SD-WAN and SASE

movement, which enabled better automation and security of branch and WAN networks. We still think of the MCN movement as an extension of this virtualization movement to provide more extensive abstraction and security of networks across and into public clouds.

Other than Cisco buying Isovalent, there has yet to be a headline deal in MCN, but we expect that some are coming. The larger incumbent networking vendors such as Arista Networks, Cisco, HPE, and Juniper (HPE and Juniper are slated to merge by year end) have been focused on areas such as SASE, datacenter, and networking for AI—so they appear to have gaps in their MCN portfolio. Many of the incumbent solutions are targeted at “islands.” For example, it’s networking for campus, or networking for datacenter, or networking for AI. But what about networking for multicloud? For example, Cisco’s purchase of Isovalent addresses cloud-native and Kubernetes connectivity, but it doesn’t address MCN.

One small deal of note was Cloudflare’s acquisition of MCN startup Nefeli Networks. Most of the market observers we talked to said that Nefeli is mostly seen as a network orchestration provider, not a fully featured MCN service, so we see this deal as a feature tuck-in at Cloudflare.

Let’s make a prediction. We see a couple big-ticket acquisitions in the MCN market in the next six months, probably in the \$500 million-to-\$2 billion sweet spot. Anything over that would have to prove to be more transformative to an acquiring company.

So who are the leaders and the most likely acquisition candidates? You can see our full view of the leaders in the Appendix. Now that we are into our fifth year of this report, the playing field is relatively consistent. MCN is a bigger problem than SD-WAN, so it’s not like the SD-WAN and SASE bubble where there were more than 50 startups.

The most well-known MCN startups include Alkira, Arrcus, Aviatrix, Graphiant, and Proximo. Additional startups such as Itential add value to MCN by important integration and automation tools for the MCN market.

The bottom line: It’s likely still early in the MCN and hybrid cloud game. The established startups still have an edge and a head start on incumbents, and we think the demand curve will continue to build.

## **The Next Wave in Cloud-native Networking**

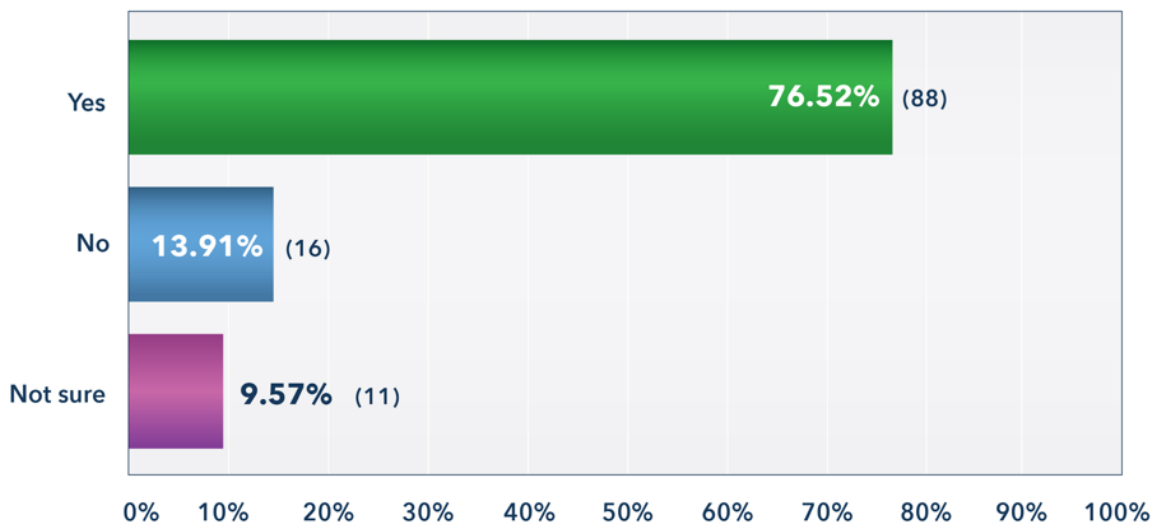
The term “cloud-native” is much abused, but you’re likely to see it surface more in MCN. You can think of MCN as bridging several different domains: traditional enterprise, colocation, and cloud-native environments. Cloud-native networking technologies are used to connect cloud technologies such as containers, microservices, and Kubernetes. They also connect and secure applications and data at the Linux kernel level, as in the case of technologies such as eBPF and Cilium.

Cloud-native technologies, however, are not always aware of nor compatible with traditional enterprise and MCN technologies, which is likely to become a greater area of interest for developers and cloud engineers. You can think of providing cloud-native technologies the capabilities to reach outside of their public cloud or datacenter environments to build application-aware networks. MCN can be used to bridge the gap between these worlds.

This trend may be a driver of one of the more significant deals in the space, **Cisco's** acquisition of startup **Isovalent**, a leader in cloud-native connectivity. The terms of the deal were not disclosed, but we've heard the deal was in the \$600 million-to-\$800 million range. Isovalent is a major contributor to open-source projects such as eBPF and Cilium. In addition, **F5's** acquisition of open-source Web server software **NGINX** has proven to be a powerful complement to its application-focused MCN solution, as it has been expanded to provide hybrid cloud application security. Meanwhile, **Aviatrix** has been investing in service-mesh capabilities with its contributions to another cloud-native open-source project, Istio.

When we asked our survey audience if they were tracking such developments, they said yes. A large majority, 77%, said they were following developments in cloud-native networking such as eBPF, NGINX, Cilium, and Istio.

### Are you looking at cloud-native networking and security technologies such as eBPF, NGINX, Cilium, and Istio to integrate with your multicloud networking solutions?



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N = 115

We expect to hear and learn a lot more about the interaction among cloud-native networking

technologies and MCN at the Kubernetes conference Kubecon in November.

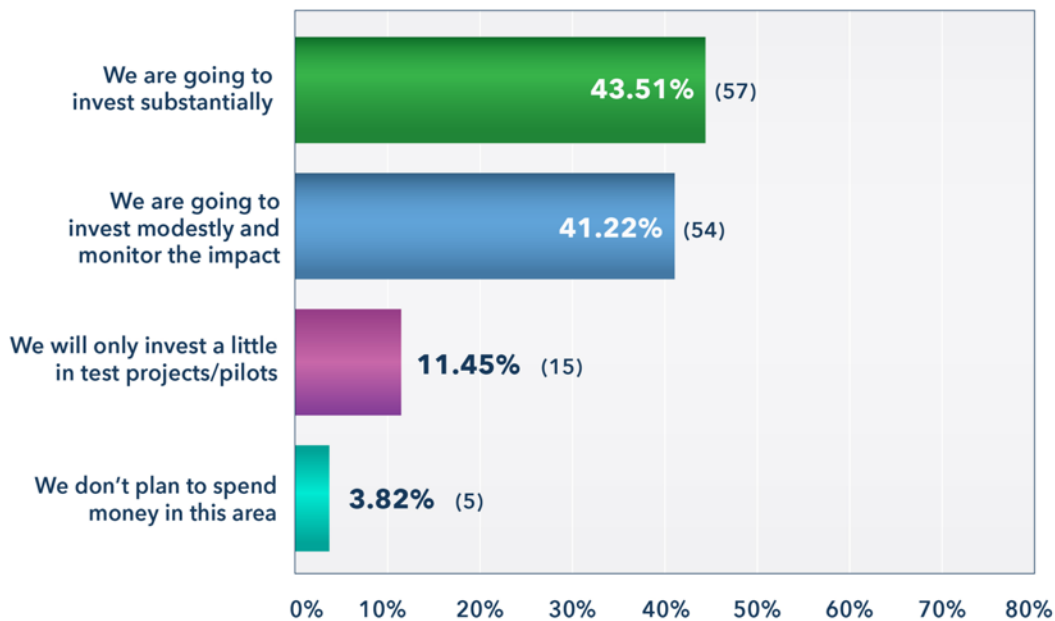
## Conclusion: What’s Next for MCN and NaaS

The data from our MCN survey, now in its fourth year, demonstrates clear trends of the rising demands placed on an increasingly complex and interconnected hybrid and multicloud infrastructure.

Networking operators are interested in using MCN tools and services to advance several goals – including integrating their networks with many different types of cloud services; gaining better network visibility and security; managing cloud and infrastructure costs; and driving into new hybrid cloud applications and infrastructure. Ecosystem activity is increasing, with cooperation among a wide variety of enterprise infrastructure enablers, colocation providers, and MCN companies. Futurium continues to see exciting innovation evolving in MCN tools and services to build one abstracted, logical network to connect end users, applications, and yes—AI!

Our survey indicates that 84% of survey respondents expect to invest either substantially or modestly in MCN and cloud-native networking, with 44% in the substantial camp.

### What is your expectation for investing in multicloud networking and cloud-native networking solutions over the next 1-5 years?



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N = 131

## MCN Technology Leader to Watch

### Itential

Itential is a network integration and orchestration platform that can play a key role in MCNs by providing no-code integrations (for example, using APIs) to connect networking and cloud technologies in diverse domains such as enterprise, service provider, Cloud and SD-WAN and leverage in building low-code workflows for orchestrating across distributed infrastructure. With Itential's cloud platform, operators can operationalize and orchestrate complex network configuration and networking tasks. The NetDevOps approach is key to bridging the gaps in multicloud environments. Led by CEO Ian Bresnahan, Itential has raised a total of \$30 million in funding from Elsewhere Partners and Tech Square Ventures.

<https://www.itential.com/>