

the
GORILLA
GUIDE[®] to...



Navigating Networking and Connectivity

How the Cloud Has Enabled the
Work-from-Home Explosion

CARY KOSTKA

Navigating Networking and Connectivity

By Cary Kostka

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Introduction: Converging Paths



The challenges faced by IT networking departments over the past two years have brought about many changes in how organizations view their network architecture. Forward-thinking CIOs continue to invest effort into changing their IT thinking processes from reactive to proactive. In addition to reducing stress on staff and budgets, this will now include the desire to converge multiple network paths into a centrally managed architecture.

Organizations will see their networks defined by agility, availability, and flexibility. With pandemic-induced changes now well entrenched, improved monitoring will fall under the network management microscope. However, solutions will need to become diversified and may require more outside-the-box thinking in response to a global chip shortage. This shortage is expected to last through the middle of 2023 and to slow hardware innovations and upgrades.

This Gorilla Guide® To... Navigating Networking and Connectivity, Foundation Edition, is here to help CIOs, business IT leaders, and networking professionals successfully navigate emerging technologies now and into the future.

Anyone with network responsibilities will benefit from this book: network admins and engineers, IT architects, CTOs and CIOs, and others who need their networks to run smoothly, reliably, and efficiently.

The latest developments around the world of networking are exciting and contain advancements in logical areas. Let's take a tour of these changes and how they can have a positive impact on your organization.

How Is Networking Being Impacted?

As the business world shows signs of returning to pre-COVID normal, recent innovations and lessons have given IT professionals a new sense of direction. The forced transition into hybrid cloud-based network models has triggered a tsunami of ideations to help them better create and support the networks their users rely on. Many of the same earlier networking and connectivity trends put into action will continue to mature. This maturation of networking functions, from hybrid-cloud management and edge computing to 5G and the Internet of Things (IoT), will bring exciting new options into IT departments in 2022

The transition toward a centralization of cloud-based network architectures continues to promote secure and seamless connectivity.

It's important to understand how the changes in these spaces can help IT departments continue to support a hybrid workforce through faster, more reliable network connectivity. This will help an IT organization maintain its traction in the cloud while continuing the initiatives of virtualizing network functions.

Hybrid Cloud Networking Continues to Make a Strong Business Case

Cloud-based networking will continue to take center stage. With the hybrid work model anticipated to expand, business leaders and users will expect the cloud to morph in the same way working and business practices do. Continuing to give a high level of support while adding additional network functions to their IT stacks will be a high priority for IT professionals. There are a few notable advances in hybrid network management that will make expanding and supporting cloud-based networks easier for IT departments, enabling even more opportunity for improvements that boost the productivity of their user communities.



Cloud-based networks will continue to dominate the networking landscape. Although cloud-based appliances may have similar attributes to physical network appliances, the distinct differences must be noted as a plan of management is developed.

THE RIGHT TOOLS MAKE THE IT CRAFTSMAN

The transition toward a centralization of cloud-based network architectures continues to promote secure and seamless connectivity. The virtualized networking of the cloud remains capable of supporting both hybrid workers and the increased volumes of data produced in today's businesses. Tools continue their steady evolution to making it possible to effectively manage cloud-based networks in a hybrid network environment. A few examples of the tools you want now are:

- **Cisco Workload Optimization Manager (CWOM):** This tool provides users with full visibility into multiple cloud stacks that can include on-premises networks, multiple cloud vendors, and virtual hybrid network environments. It works by providing real-time analysis of costs, compliance configurations, and workload consumption. The AI-driven tool is then able to automatically allocate resources when and where they're needed the most. CWOM also provides topographical mapping to help you quickly identify interdependent network relationships within the environment.
- **Microsoft Azure management tools:** The inclusiveness of this set of tools is one of its greatest strengths. There are three tools that prove to be especially important in hybrid network management:
- **Azure Monitor Network Insights** gives IT professionals a clear view of health and performance metrics. This includes diagnostics and logging for the tracking of network security groups, traffic, and connectivity.

- **Connection Monitor** is the replacement for Network Performance Monitor. This is a unified communication tool that provides administrators with end-to-end monitoring in hybrid networking scenarios.
- **Network Watcher** is a centralized monitoring platform that enables IT professionals to identify and remediate issues on any device on their networks without having to remotely connect to the specific device.
- **VMware CloudHealth:** CloudHealth provides multiple sets of tools that can work with all of the major cloud networking solutions on the market. This offering allows your IT networking professionals to consolidate monitoring streams from all of your cloud-based and on-premises networks, giving you a singular view into the inner workings of your network. This makes changes to configurations, performance, and security consistent regardless of source.

The intuitive functionality provided by these tools is giving network administrators and architects more power to manage their endpoint network devices. Hybrid cloud management tools such as these blur the borders between the physical world and the cloud or virtual world (see **Figure 1**).

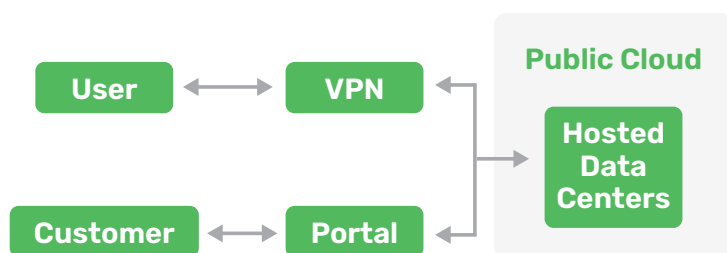


Figure 1: Physical view of an optimal hybrid cloud network

MICROSERVICES AND POLY CLOUD GAIN A FIRM FOOTHOLD IN CLOUD DEVOPS

The enhancements that have been added to hybrid cloud and on-premises networking provide powerful options for cloud computing. Microservices have matured into being a viable and sought-after option for organizations both already invested in cloud networking and those organizations looking to begin their transition to the cloud.

Microservices offer IT networking professionals enhanced ability to use containerization in building out their cloud network infrastructure. Applications can be deployed quickly while staying segmented in well-defined areas of your IT infrastructure. This growing trend is seeing an adoption rate of almost 80%, and this is expected to continue its climb in 2022.

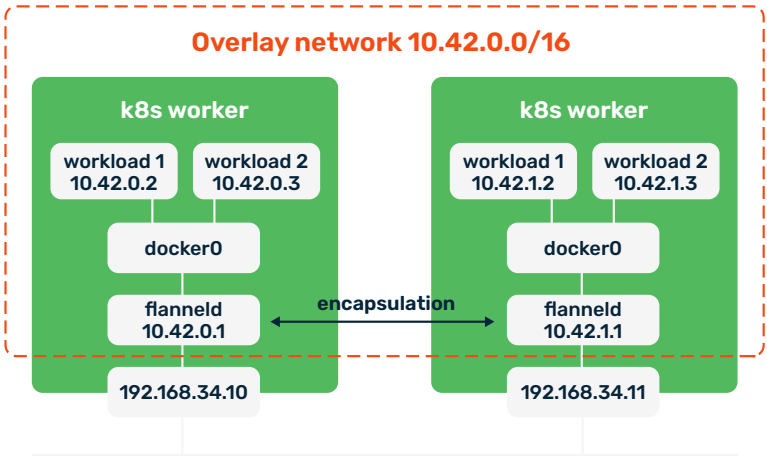


Figure 2: An example of a typical Container Network Interface (CNI) configuration Source: Rancher

Platforms, such as Kubernetes, have arrived on the scene to offer help and flexibility for network architects. For example, the Container Network Interface (CNI) plugin (see **Figure 2**) allows for the ability to place a network interface into the container network and establish applicable network routing as required.

The enhancements that have been added to hybrid cloud and on-premises networking provide powerful options for cloud computing.

The combination of these two is where the Poly Cloud model steps into the picture. Poly Cloud is the trending method for using multiple cloud providers. But instead of harnessing all of them for general purposes, each cloud is used for a particular project. For example, Office 365 can be used as your productivity suite of choice, while AWS can be leveraged for its data processing power.

NETWORK AUTOMATION AND THE ARRIVAL OF SMART INFRASTRUCTURE

The subject of automation is one that will remain on the lips of IT executives for a long time. This is now a fundamental key of network operations and will become, if it's not already, a central point in how you manage both on-premises and cloud networking functions. Adding the appropriate tools and

utilities to help manage daily health and maintenance tasks, monitoring, or proactive alert remediation accomplishes two key goals in network management.

First, it eliminates many of the manual network management tasks that have been known to be caused by outages due to human error. This may arguably be the biggest factor driving the automation of networks and the push toward smart infrastructures in the enterprise, as well as in businesses with smaller IT footprints.

Second, network automation allows IT organizations to provide and manage more services and bandwidth than previously possible. Applications, data, and services are all delivered faster, while organizations enjoy the ability to expand or retract networking services on an as-needed basis. And with the market for network automation expected to top \$16 billion in 2022, this trend is one that cannot be avoided for long.

Network automation is the foundation for a smart infrastructure, the use of which is expected to increase by 40% in 2022, [according to Forrester](#). A smart infrastructure is one that uses a managed data analysis loop to improve how IT staffs manage networks and responds to changes in systemic demands. With automation in place, network engineers can spend their time implementing network improvements that are based on concise data, thus helping their organizations gain an edge in productivity.

This opens up IT organizations to improve how they manage all points of network connectivity and the way in which their cloud resources operate. Secured access and support for

mixed workforces will see more avenues for optimization. Edge computing can take a page from IoT strategies while using enhanced Wi-Fi and 5G connectivity options to reduce network congestion and make network resources truly available for anyone, anywhere.

Mobil Connectivity Through 5G Affects How We Work

Issues with home bandwidth will continue to be a concern of IT departments. While many users have worked diligently with ISPs and their respective IT support teams to stabilize remote connectivity, there are still areas for improvement. IT teams have worked to add power to their corporate networks, often allocating additional bandwidth for VPN systems to improve latency.

The continued expansion of 5G cellular networks, and the increased adoption of Wi-Fi 6, has given IT networking teams more tools to put in their pockets. The overall improvements seen in this space have allowed more users to enjoy network response times similar to those experienced in the office.



As powerful as 5G networks are, many areas are experiencing rollout delays. Shortages in labor and technology, especially in semiconductor chip markets, will limit the expansion of 5G in 2022.

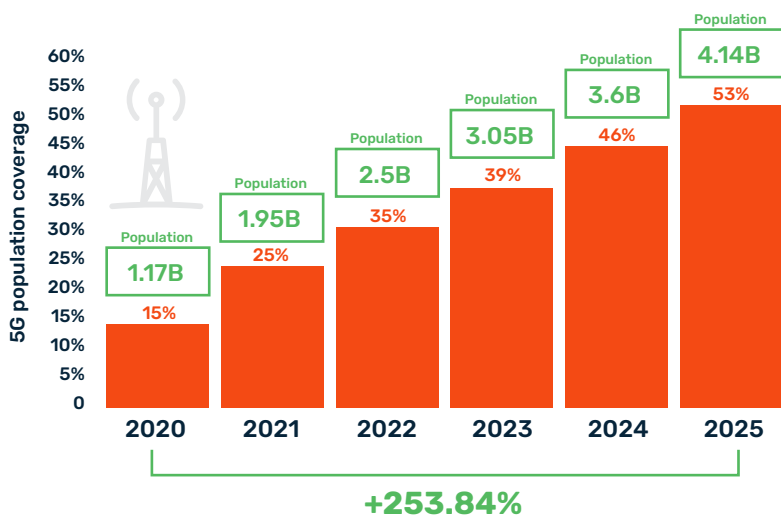


Figure 3: Projected rollout of 5G technology between 2020 and 2025

Source: Bankr

The build-out of 5G technology throughout the United States will continue, though it will do so at a slower rate. It's still anticipated that 5G networks will be available to 53% of the world's population by 2025 (see **Figure 3**). Its potential to provide remote users with additional connectivity options will continue to draw a watchful eye from IT departments.

For many users still working from home, 5G connectivity has provided those within 5G coverage areas with a viable alternative to in-home networks. The improved stability that 5G networks offer over LTE networks, as well as many home Wi-Fi networks, along with its low latency and high bandwidth, has helped remote workers bridge the technology gap between office and home office.

The expansion of 5G through the traditional carrier model and cutting-edge means, such as Elon Musk's Starlink project, presents a powerful tool for an increasingly important computing platform.

THE IMPACT OF 5G ON EDGE COMPUTING

It's safe to say that the modern network is one that is flexible, reliable, and scalable. The modern network must now allow access to systems that cross multiple potential scenarios, from legacy on-site or co-located data centers to cloud-based infrastructures that span multiple vendors or even continents.

Edge computing has continued to make inroads in the daily discussions about how to improve data accessibility and network responsiveness. Once thought of as fringe technology, the pandemic has thrust edge computing into the spotlight as a viable and powerful option for gathering, securing, and using data.

An IDC report notes that edge network deployment is expected to grow by 40% in 2022, with over 60% of network resources expected to be implemented at the remote edge or a host provider location.

The growth of 5G will allow for businesses to better configure their network infrastructures to maximize the positive impact of edge computing in their organizations. The bandwidth and reliability of 5G will allow IT departments to combine the use of IoT and edge computing to create a seamless path for business users to any information they need.

WI-FI 6 BECOMES THE WI-FI STANDARD FOR NOW

The sixth generation of Wi-Fi, Wi-Fi 6, offers an improved way of connecting homes to the Internet and business users to their corporate networks. Like 5G networks, Wi-Fi 6 helps put an end to bandwidth limitations in the home and to improve home-office network connectivity.

The Wireless Broadband Alliance (WBA) reports that 83% of broadband providers and manufacturers will have switched to Wi-Fi 6 by the end of 2022, making Wi-Fi 6 the de facto standard for the near future. However, the usage of Wi-Fi 6 may be short-lived, with the arrival of Wi-Fi 7 at CES 2022.

Like 5G networks, Wi-Fi 6 helps put an end to bandwidth limitations in the home and to improve home-office network connectivity.

But Wi-Fi 6 is not just for home use. Business offices are implementing Wi-Fi 6 hotspots and integrating them into business networks. This provides a mobile, collaborative feel to the workplace environment without the worry of inadvertently dropping file transfers or video calls. And when offices are in range of 5G networks, Wi-Fi 6 can be configured to use these 5G networks as a realistic business continuity step.

Network as a Service Reveals a New Path Toward the Future of Networking



The adoption of Network as a Service (NaaS) is expected to grow by over 40% annually over the next five years. This projection may surprise many IT networking professionals, as they're skeptical about the ability of NaaS to truly adapt to the constant change in an enterprise network.

THE UPSIDES TO NAAS

Despite the skepticism, there are valuable use cases that indicate NaaS is in fact ready to tackle the challenges of IT networking. The ability for organizations to almost instantly add the latest network technologies, either through an on-demand or a subscription-based model, is one of the top reasons businesses consider NaaS. The capability to quickly add pieces—such as Poly Cloud, software-defined WAN (SD-WAN), or secure access service edge (SASE)—with next to no risk is an attractive option.

NaaS offers the scalability IT departments seek in order to retain the proactive stances they were forced to adopt since the start of the pandemic. The operational options that NaaS provides give organizations the ability to fine-tune business continuity plans and to expand network functionality with little notice required.

COMMON NAAS CONCERNS CAN BE QUICKLY ALLEVIATED

Some concerns, such as long-term costs and the potential disruptions of making a switch, will continue to be used as points against using NaaS. However, the majority of these issues can be managed. Depreciation schedules can be coordinated to put NaaS resources on the same subscription or replacement schedule as other cloud-based on physical devices. And, the very nature of NaaS means that systems can be stood up in parallel to an existing system, making the change literally as simple as flipping a switch from one to the other.

It is important for any organization to take a look at NaaS to determine where NaaS would provide the most benefit and what it would entail to execute the transition. While many organizations want to wait until their next infrastructure refresh to add NaaS into the mix, the simple fact is that network technology changes too rapidly to keep your network running optimally and with the perfect balance of security and functionality without some NaaS components in place.

NaaS will continue to position itself as a hot trend in 2022, as IT executives and networking professionals seek ways to remain ahead of the curve. NaaS will offer consistency in the services it provides and will give an IT organization the ability to quickly shift gears while limiting the resulting overhead costs for the services.

Networking and Connectivity Focuses on Hybrid Work

The continued focus in the networking space will be centered on maintaining a workforce that remains mobile. Security, scalability, and lowered latency will be the keys that drive business success throughout the year.

Cloud-based networking services, such as hybrid cloud and NaaS, will take the lead in networking efforts this year. Network engineers will continue to find multiple new monitoring tools that can be used to build and maintain the seamless networks they must now support. The latest developments in 2022 will continue to provide innovative ways of enhancing the business resilience strategies that help businesses remain agile in any situation.

As you've seen throughout this Gorilla Guide, networking and connectivity will continue its march forward into a new era. Networks will continue to grow larger, with more moving pieces than ever before. The complexity of the modern network will continue to morph into an entity that requires the best tools and in-depth, methodical planning.

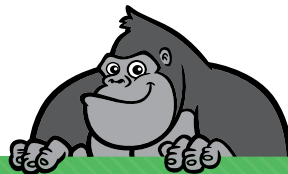
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