

## Managing and Assuring Hybrid Networks: Navigating the Path to a Virtual World

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As recent as five years ago, Software Defined Networking (SDN) and Network Functions Virtualization (NFV) solutions were looked at as the future of networking, viewed as a more efficient, streamlined, and cost-effective way to operate global networks, with the promise of huge cost savings. It has taken some time, but SDN and NFV solutions are no longer anticipated network technologies of the distant future, and are projected for major growth in the next few years.



**SDN Market Projection:** [Research and Markets anticipates](#) that the global SDN market will expand at a compound annual growth rate (CAGR) of 53.13 percent, from a U.S. \$3.270 billion industry in 2016 to a U.S. \$42.157 billion industry by 2021.

**NFV Market Projection:** [Technavio predicts](#) that the global NFV market will grow by a CAGR of 33 percent by 2020.

Both of these virtualized network solutions are currently being deployed across global networks, but the road to solely virtualized networks [could still be a half-decade away](#).

## Benefits of Shifting to Virtual Networks

Enter the hybrid network solution, which fuses legacy networks (physical infrastructure with manual processes) with SDN and NFV (virtual networking with automated processes) solutions to provide a blended network that will serve as a bridge to the eventual completely virtual network solutions that have been prophesied over the last number of years.

Operators need not wait for the days of completely virtual networks to experience the benefits that virtual components can bring to their networks.

### Increased Network Reliability

Having a virtual network segment allows operators to automate mission-critical network operations, which boosts network reliability because automation reduces the possibility of human error. As long as automated processes are configured with the right settings, tested and maintained, hybrid networks will perform with higher reliability rates than legacy-only networks.

### Increased Network Efficiency

This benefit ties in with reliability, as the more reliable your network is, the better the overall network efficiency will be. Hybrid networks allow certain functions to operate under automation which in turn lessens the possibility of human error and eliminates the manual processes associated with legacy networks.

Automation processes can be configured to identify issues within the network and immediately begin mitigation procedures, which vastly reduces time to resolution metrics and yields increased customer satisfaction. If an issue were to arise in a legacy network, the network operator would have to be notified of or identify the network issue and then manually mobilize and communicate with its mitigation team members to resolve the problem via manpower efforts. These manual

mitigation processes can take anywhere from hours to days to complete, depending on the complexity of the issue, meaning much more down-time and unhappy end-users for legacy operators.

### **Predictive Capabilities**

Closed loop automation can predict and prevent faults within the network, which is something that is not possible to do with legacy-based networks. As mentioned, not only can closed-loop automation predict issues, it can immediately act upon them, vastly reducing issue mitigation time and boosting network uptime. Having a virtual component to your network can allow you to “guarantee” service for customers, which a completely legacy-based solution cannot truly do.

### **Cost Reduction**

All of the above benefits factor into reduced network operations costs, but there is also a hardware component to cost reduction in the hybrid model. Virtualization is a powerful technology of scale that allows for the enhancement of storage, bandwidth configurations, etc. without major investment in additional physical hardware because it operates in a cloud environment. For example, companies that are operating under the hybrid network model may only need 4 servers to duplicate the efforts that their legacy-only counterparts would need 100 servers to complete.

Let’s explore a potential real-world example of how a hybrid network model can positively impact customers. A streaming company wants to broadcast a live event and doesn’t want its bandwidth limitations to be affected by the legacy network and processes that it runs on. With a virtual network, this company can utilize automation to fluctuate the bandwidth as needed throughout the live event, with automated billing. If they were to rely on manual efforts, they would have to purchase the highest level of bandwidth up-front to ensure service was not interrupted, because changing bandwidth levels on a legacy network is a manual, less than instant, process. The fluctuated bandwidth allows the customer to pay only for the bandwidth they actually use, instead of the anticipated bandwidth usage, providing massive cost savings.

## **Challenges of the Hybrid SDN/NFV Model**

There are a number of reasons why a jump from legacy networks to virtual ones cannot happen overnight. In fact, it will likely take several “iterations” of hybrid network solutions that feature varying splits between legacy and virtual network assets before full-fledged virtual networks are operating with little to no legacy network hardware and processes. In addition to this, network operators are more comfortable than ever with SDN and NFV, but are still “testing the waters” with these technologies, meaning that a full dive into networking without some sort of legacy component would be a big gamble to make at this time.

One of the main challenges that operators face is finding the right balance between legacy and virtual to make up their hybrid network solutions in a way that does not negatively impact the day-to-day experience of their customer base, but improves the day-to-day experience for network end users. At this point in time, providing closed-loop automation on SDN and NFV is possible, but no one has the ability to implement that type of efficiency within a legacy network. So legacy networks have to be manually driven, while virtual networks are driven by automation, making hybrid networks an imperfect solution, but the best possible option at the current moment.

For simplicity’s sake, operators need to visualize both sides of the hybrid network in a way that allows their single operations team to view it in a single pane. It isn’t cost effective to have two different operations teams (one for virtual and one for legacy), so it’s critical to have a simple, holistic way of viewing the performance of the entire hybrid network.

## **Global Adoption of the Hybrid Model**

The benefits of SDN and NFV are clear to telecom operators, evidenced by their relatively unified leap to virtualization, at least among the Tier 1 crowd. In fact, it’s less of a leap and more of a

tentative stroll across the bridge to digital; most Tier 1 service providers are at least exploring the possibilities, with viable business cases for the shift in hand. We anticipate that the forerunners will fully transition within the next three to five years, maintaining hybrid models in the meantime, and it's safe to say that many operators will stick to hybrid for at least the next five years. This is good news for mobile virtual network operators (MVNOs), which can move forward with SDN and NFV initiatives since the carrier infrastructure they rely on is already being upgraded.

As for Tiers 2 and 3, though, the situation gets trickier. Tier 2 operators are at somewhat of a standstill when it comes to SDN and NFV. For the most part, they're determining if the return is worth the very substantial upfront investment, but they – like nearly every operator – appreciate the growing importance of virtualization, not only in boosting network reliability and efficiency while lowering operational costs, as outlined above, but in simply keeping up with the competition. Tier 3 providers, by and large, simply do not have the financial resources to invest in the transition at this time. If they could reallocate or raise the funds for this effort, it would go a long way toward setting them apart from the pack.

## **The Way Forward**

Operators of any size can best address the challenges hybrid models present by visualizing all aspects of their networks — legacy and virtual — in one platform and maintaining guaranteed service quality throughout the transition. During a potentially tumultuous time for a service provider's customers, these two actions are vital to ensuring that client networks aren't negatively affected.

Together, network visualization and service assurance are the key to rapidly deploying a host of virtual network function (VNF) based services, such as SD-WAN and vCPE. With telecom networks demanding more agility and flexibility by the minute, investing in virtualization and the best tools to manage it is quickly becoming less of a choice for operators — and more of a necessity.