

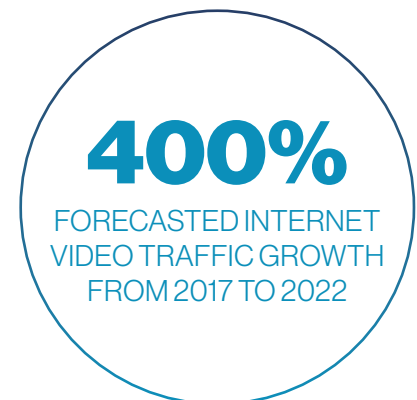


NEXT GENERATION ROUTERS: IS YOUR BROADBAND NETWORK READY?

PREPARING FOR
THE EXABYTE ONSLAUGHT

INTRODUCTION

The overwhelming growth in internet traffic (primarily video) shows no signs of slowing down. According to an annual forecast conducted by Cisco's Visual Networking Index, internet video traffic will grow 400% from 2017 to 2022. This massive demand for video is forcing broadband providers to constantly add more and more network capacity (and costs), without receiving additional customer revenues. Obviously, this is not a sustainable business model.



HARDWARE ROUTERS

Cisco launched its first router 50 years ago and networks today are still based on Cisco hardware, in addition to hardware routers from Juniper, Nokia, and others. However, network demands have changed dramatically in the past 50 years and will continue to evolve rapidly.

This rapid evolution is fueling the transition from rigid hardware-based networks to more flexible networks built in software. If the most recent past is any indicator, network demand will always exceed expectations, and relying on a hardware-centric network model designed years ago for small increases in voice traffic will not suffice.

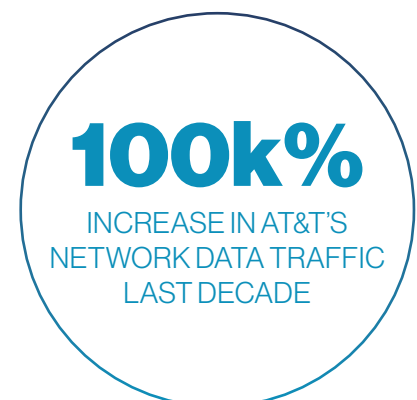
As a result, the use of hardware routers is declining. According to IDC (a global market intelligence firm), the combined enterprise and service provider router market growth in the United States declined 11.1% in 2018*.



A SHIFT TO SOFTWARE

In the past decade, data traffic on AT&T's network increased a staggering 100,000 percent. Initially, AT&T kept up by adding more complex, expensive proprietary routers and switches. However, that soon became infeasible as it was too expensive and time consuming.

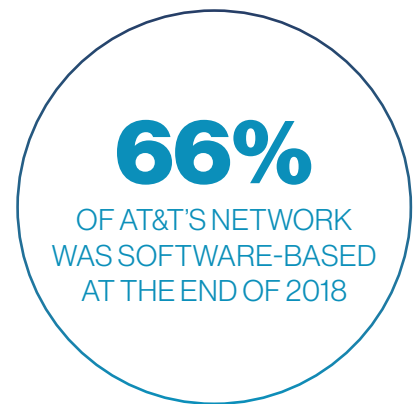
To cope with the tsunami in data traffic (and rising network costs), AT&T made a strategic decision to transform their hardware-based network infrastructure to largely software-based to lower costs and speed innovation. Through network ►



* IDC Quarterly Router Tracker Report

virtualization, AT&T began to replace the functions of complex pieces of hardware with software and run that software on commodity servers. This has enabled AT&T to add capacity faster and roll out upgrades at internet speed.

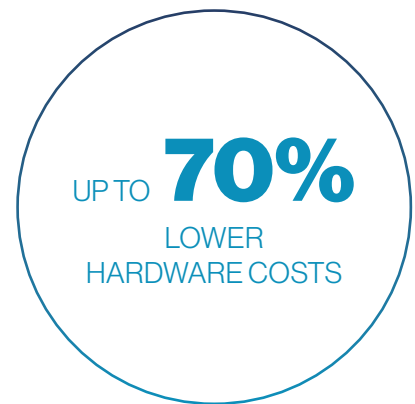
Drawing a line in the sand, AT&T said 75% of its network would be software driven by 2020. At the end of 2018, AT&T announced it was well on its way to reaching its goal with almost 66% of its network software-based.



SOFTWARE-BASED ROUTERS

As part of the transition to software-based networks, AT&T and other service providers are replacing expensive, proprietary hardware routers with software-based (or virtual) routers. Running on commodity hardware, virtual routers deliver maximum flexibility while lowering costs and eliminating vendor lock-in. Cost savings include much lower hardware costs (up to 70%) and significantly fewer installations/truck rolls.

According to Allied Market Research, the global virtual router market is expected to grow at a compound annual growth rate (CAGR) of 24.4% from 2018 to 2025, and the growth rate is expected to be even higher for service providers. This growth is being driven by the need for greater network capacity and agility, along with the need to reduce expenses.



PERFORMANCE IS KEY

Hardware routers have been known for both high performance, and high costs. However, with advances in server hardware performance, virtual routers are replacing hardware routers by delivering traditional routing features and functionality with similar performance at much lower costs. Hardware routers were once required for high throughput requirements, but with advances in high-performance networking and DPDK (Data Plane Development Kit) technology, software routers can now deliver similar performance (along with greater flexibility).

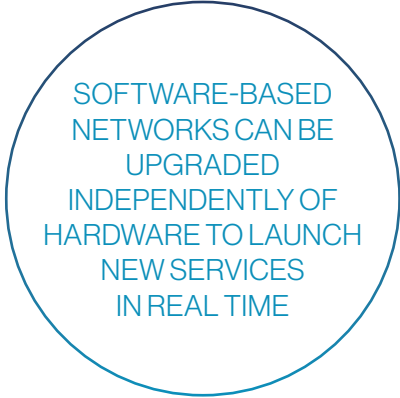


NETWORK FLEXIBILITY AND SCALABILITY

Customers are continuing to demand new services and expect those services to be available on-demand. For hardware-centric networks, creating and rolling out new services requires new hardware with long installation times and expensive integration efforts. In contrast, software-based networks can be upgraded independently of hardware to launch new services in real time, leading to faster times to market and lower costs.

Virtual routers can also supplement hardware routers when service providers need to introduce new services quickly, without disrupting existing services and the hardware routers that support them. Virtual routers can also be used as a low-risk way to expand into new markets and geographies.

The ability to easily and quickly scale up bandwidth and new services is a major advantage of virtual routers. IDC's Rajesh Ghai, Research Director of Carrier Network Infrastructure, said "IDC does expect virtual routing to ride the curve of NFV deployments and grow at a rapid pace over the foreseeable future."

A circular callout graphic with a thin blue border. Inside the circle, the text is arranged in six lines, all in blue, uppercase letters.

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HARDWARE MANUFACTURERS AND VIRTUAL ROUTERS

Given the current and expected future growth of virtual routers, it's no surprise that many hardware router manufacturers have released virtualized, software-only versions of router functions. However, hardware router manufacturers still want to maintain their hardware margins, even when selling virtual routers. No one wants to destroy a high-margin business (including hardware router manufacturers).

VIRTUAL ROUTER USE CASES AND CONSIDERATIONS

Service providers are now using virtual routers in multiple use cases, including virtual Provider Edge (PE) routers to support IP/MPLS virtual private networks services, and virtual Broadband Network Gateways (vBNG) to support residential broadband services. ►

For service providers that haven't yet transitioned to virtual routers, there are several important factors to consider when evaluating virtual router vendors.

PURPOSE BUILT SOFTWARE

The traditional network model was to increase network capacity by adding physical (and usually proprietary) network appliances, which is time consuming and costly, and will not keep pace with exploding bandwidth demand and internet video traffic. Service providers should evaluate vendors not tied to the traditional hardware-centric network model.

The future of networking is software running on commodity servers, and service providers should look for virtual router solutions from companies with software and networking expertise.

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PERFORMANCE AND SCALABILITY

Given the overwhelming growth in internet traffic, performance and scalability are key factors when evaluating virtual routers. Highly scalable virtual routers will typically capitalize or build upon DPDK packet processing technology and service providers should also look for virtual routers that can scale with additional cores, so if you need greater performance, you can simply add more cores. Software-based routers should also support advanced routing protocols.

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LOWER COSTS AND EASE OF IMPLEMENTATION

Ultimately, network operators want virtual routers to lower costs and create a more agile network infrastructure. In addition to overall cost savings, service providers should also consider virtual router vendors that enable them to start small, with minimal initial investment. Keeping costs low (while corresponding revenue ramps up) is a key for any successful service provider.

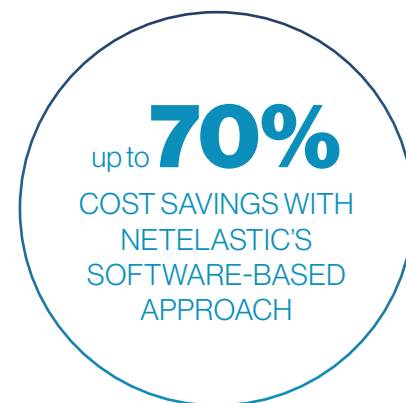
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NETELASTIC VIRTUAL ROUTERS

Based on input from service providers large and small, netElastic virtual routers are built with a highly scalable network architecture with decoupled control and data planes that can be scaled independently based on network and end-user demand. With this scalable network architecture, broadband providers can handle network traffic in the terabits.

netElastic's software-based approach and industry-leading scalability can also help service providers save up to 70% in costs compared to hardware-based solutions. A "Pay-as-you-Grow" licensing model minimizes upfront costs and enables providers to align costs with services revenue, which is critical in today's hyper competitive environment.

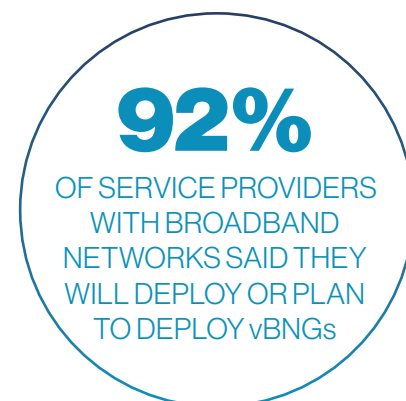


NETELASTIC VIRTUAL BROADBAND NETWORK GATEWAY (ACCESS ROUTER)

As a testament to the benefits of software-based networks, an IHS Markit survey revealed that 92% of service providers with broadband networks said they will deploy, or plan to deploy Virtual Broadband Network Gateways (vBNG).

To help service providers capitalize on this, netElastic's vBNG is designed to deliver unmatched performance and scalability with a highly optimized data plane and patented packet processing techniques. Virtual BNG can be deployed for very small subscriber bases (e.g. a few thousand) all the way up to millions of subscribers. vBNG also takes advantage of the ever-increasing power of white-box servers to provide the elastic scalability that carriers need.

netElastic vBNG is also easy to operate with a web-based Manager that provides comprehensive visibility and monitoring, and also simplifies troubleshooting to increase customer satisfaction and lower costs.



CONCLUSION

Virtual routers are very effective alternatives to hardware routers given their many benefits, including lower total cost of ownership, and greater network flexibility and scalability. Unlike physical routers, which need to be bought, configured, and installed to meet unexpected demand, software-based routers can be elastically scaled to easily and quickly meet unexpected demand.

The demands on telecom networks are changing rapidly and software-based networks can free service providers from the constraints and costs of hardware routers, and lay the foundation for the network of the future.

To find out more about how
you can increase your network flexibility
and scalability with netElastic virtual routers,
please contact sales@netelastic.com