Gi LAN SIMPLIFICATION

Every day, mobile users consume more data due to an increasing reliance on smartphone apps and streaming video. This trend is only anticipated to accelerate with the advent of 5G. As a result, service providers are beginning to design and deploy new service architectures that rely on recent innovations such as network virtualization, containerized services, and cloudified edge deployments in order to deliver the scalability and performance required to compete effectively. In addition, service providers need these modern deployments to enable new business models and monetize these massive infrastructure investments.

To manage and secure the rapidly growing traffic load, service providers deployed many distinct and important network functions in the Gi LAN—a footprint in mobility networks that sits between the packet gateway and the Internet. S/Gi LAN refers to 4G LTE networks specifically but this document will use the term Gi LAN to cover 3G and 4G LTE networks. In 5G networks, this functionality is at the N6 interface between the User Plane Function (UPF) and the data network. These network functions range from traffic management, network security, DNS services, policy enforcement, carrier-grade NAT, and others. In most cases, service providers have had to rely on multiple vendors to deliver these Gi LAN solutions. In addition, until recently these have been dedicated hardware devices, but the rise of network functions virtualization (NFV) has led to the gradual transition to virtualized appliances running on common server infrastructure (COTS).

As a result, service providers still face considerable cost and complexity to deliver and operate these Gi LAN network functions, even as they have become virtualized. In fact, these challenges are compounded exponentially as service providers move these functions closer to the network edge (as they seek lower latencies), and the number of deployments increases while the footprint is more limited. These daunting costs prevent service providers from taking on other important network projects or focusing more on network quality and innovations that could be game changers to the organization.

In order to respond effectively and free up resources, service providers need to consider leveraging a platform that unifies common network functions in dedicated hardware or virtualized software instances. This approach can help to simplify the design, deployment, and operations for these critical Gi LAN network services. F5 offers a differentiated portfolio of network functions and platform options that meet the needs of service providers as they evolve to this new 5G world.

BUSINESS CHALLENGES

To meet important business objectives, such as the transition to 5G networks, delivery of new services to customers, and capacity upgrades to meet data consumption demands, service providers have embarked on rearchitecting their networks and deploying new technologies. They are relying on new technology for these architectures such as network virtualization, containerized services, and cloudified edge deployments. At the same time, without planning, service providers may continue to accumulate the same technical debt as before and not solve some of the critical issues that have plagued them in the past.

A key part of the service provider network is the Gi LAN—the footprint that sits between the packet gateway (PGW) and the Internet—where important network services are applied to the network traffic. These network functions range from traffic management, network security, DNS services, policy enforcement, carrier-grade NAT, and others, and have traditionally been provided by a number of specialized vendors with dedicated hardware appliances.

The operational complexity that results from this daisy chain of disparate devices makes managing the network very challenging. Service providers need to deploy and operate different hardware and software devices with separate network management systems, and integrate all these products and solutions together, in order to achieve their desired business results. Any innovations or new services may require managing the capacity, connectivity, and subscriber-level policy for the Gi LAN network traffic traversing this footprint, which can be a nightmare.

In addition, this device sprawl in the Gi LAN has resulted in significantly higher operating and capital costs to procure, deploy, provision, and support over time. The high total cost of ownership to support this infrastructure results from the devices themselves to the rack space, power and HVAC, support contracts, and training for Ops teams. The architecture was justified by adopting "best of breed" solutions for each network function, but the result has often been less than ideal.
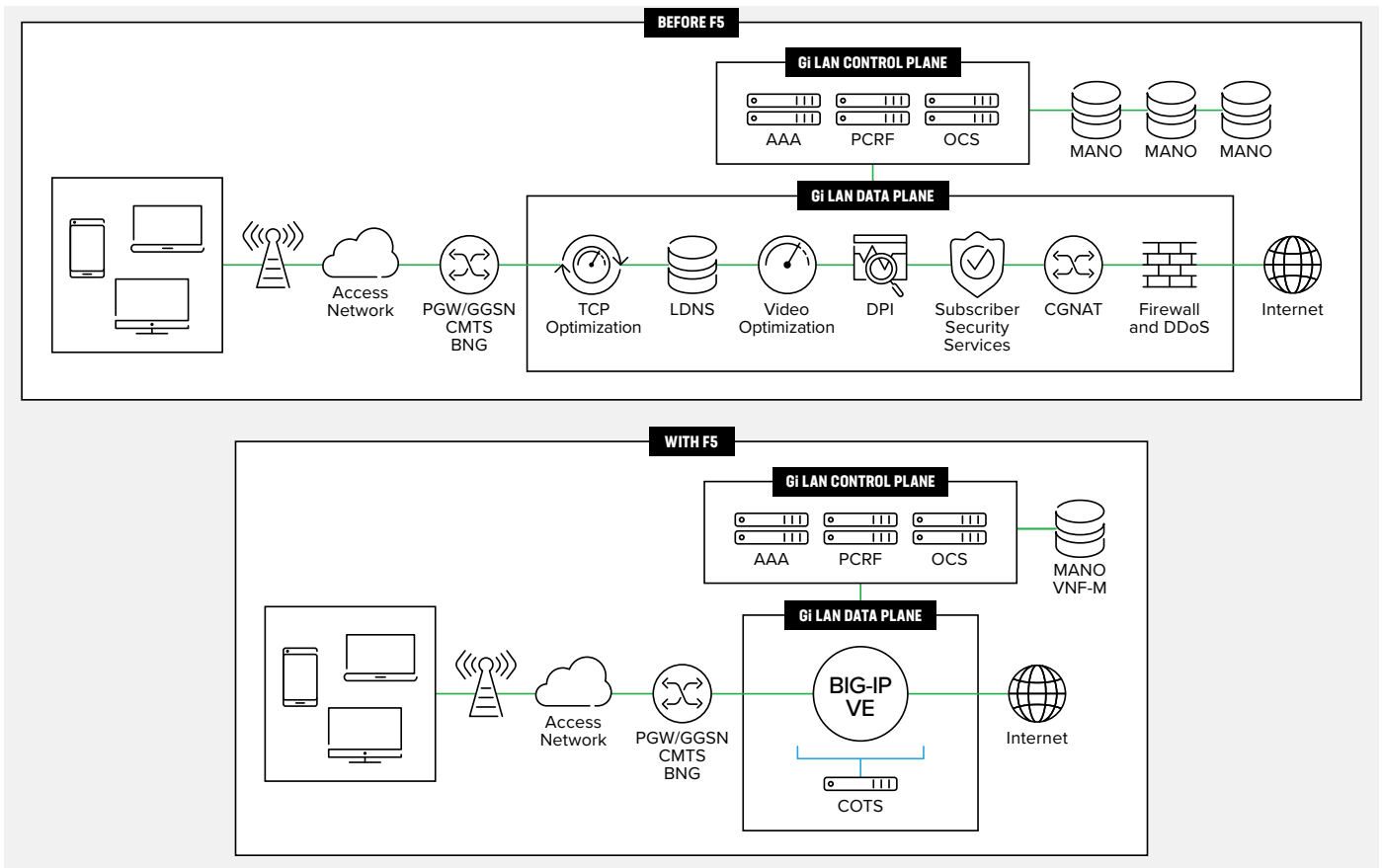

Figure 1: The F5 approach simplifies the design, deployment, and operations of critical Gi LAN network services.

Unfortunately for mobile operators, network functions virtualization (NFV) has not been the panacea to these challenges in the Gi LAN as hoped for, and service providers have been disappointed to experience that many of the costs persist and the ambitious promises of NFV have not yet been realized. The hardware device sprawl is being replaced by virtual appliance sprawl with no real gain for service providers. In fact, operators now must perform more core systems engineering and testing to maintain this new software on COTS platforms.

This creates a challenge: designing a network architecture that is at once full-featured, flexible, and high performance.

F5 SOLUTION

Service providers need to consider leveraging a platform that unifies common network functions in dedicated hardware or virtualized software instances. This approach can help to simplify the design, deployment, and operations for these critical Gi LAN network services.

F5 offers a differentiated portfolio of Gi LAN network functions and hardware (BIG-IP) and virtualized platforms (BIG-IP Virtual Editions (VE)) that meet the needs of service providers as they evolve to this new 5G world.

With this solution, service providers can:

- Provide intelligent traffic management and local DNS services, for customizable subscriber- and network-aware traffic steering solutions.
- Deliver carrier-grade NAT (CGNAT) services and migrate networks from IPv4 to IPv6.
- Secure their networks from volumetric attacks with ISCA-certified security solutions.
- Provide subscriber aware policy enforcement, Traffic Classification, TCP Optimization and URL Categorization.

The F5 solution is based on high-performance, highly scalable, carrier-grade hardware and/ or software that integrate key Gi network functions into one platform. Adding and removing these services is easy, and the unified framework means there is a common technology to understand and manage—so you can significantly reduce TCO by deploying far fewer devices and streamlining your network.

Network functions virtualization (NFV) technology, which is designed to create a virtualized environment for core network services, requires the virtualization, abstraction, programmability, and orchestration of services to create a flexible and dynamic ecosystem. The F5 Gi simplification solution enables service providers to implement NFV technology by virtualizing key components within the Gi network. By deploying a common, shared set of commercial, off-the-shelf (COTS) hardware to run various functions—network functions as well as software—hardware costs can be reduced while multiple services are deployed dynamically. In addition, operators can use centralized management and analytics solution to easily deploy, provision and manage the Gi LAN network services.

With this comprehensive integrated solution, service providers can significantly lower capital and operating costs by deploying fewer point solutions and server infrastructure and simplifying the Gi LAN architecture and operations. At the same time, service providers can increase network availability and performance. Service providers also achieve greater service agility, as they can launch new services without any network downtime. A virtual Gi LAN allows for innovation, improved subscriber Quality of Experience (QoE), and lowered costs.

BUSINESS BENEFITS

F5 solutions provide a unified platform to efficiently deliver network services in the Gi LAN.

Service Providers can now:

- Reduce their capital and operating costs and achieve 40 to 60% savings.
- Accelerate business agility with a far simpler services delivery architecture.
- Leverage key NFV capabilities to virtualize and dynamically scale services.
- Tailor innovative services to subscriber preference and usage.

F5 solutions also provide greater subscriber and application visibility and control to support the creation of new revenue opportunities.

SUMMARY

Given all the change that service providers are currently experiencing—from 5G transitions to network virtualization—finding ways to simplify the deployment and management of Gi LAN network services is a compelling opportunity. F5 offers service providers a unified platform, deployable as hardware and virtual appliances, that integrate common Gi LAN network services ranging from traffic management to CGNAT to network firewall.

This integrated services platform enables service providers to reduce the number of vendors, network devices, and management systems in order to streamline operations and deliver a more advanced services architecture. As a result, operators can significantly reduce their costs, accelerate new services deployments, and improve availability and performance of their network and applications.

For more information go to f5.com/solutions/service-providers.