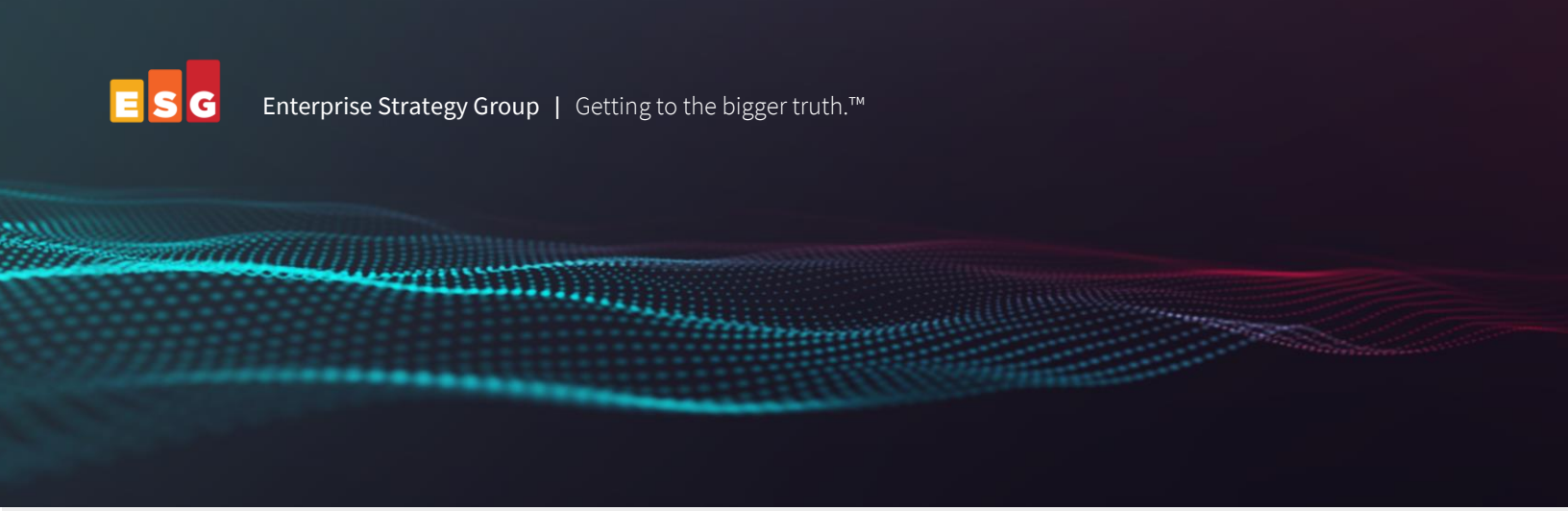

ESG WHITE PAPER

Accelerating 5G Deployments with Gigamon Visibility and Analytics Fabric (VAF)

Enhancing Quality of Experience with Cost-effective, High-performance, Secure Networks

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5G Is Gaining Momentum

It's easy to spot the considerable momentum around 5G, with heavy investments in 5G technology and deployments around the globe—especially in China, South Korea, and the US. While these initial deployments are being pressure tested in a number of early locations, now is the time for mobile network operators (MNOs) to ensure the appropriate monitoring solutions are being deployed to accommodate the anticipated surge in devices and network traffic.

To continue this momentum, MNOs must ensure these early deployments deliver the appropriate quality of experience and are also able to scale to accommodate future traffic.

Challenges Facing Mobile Network Operators (MNOs)

While 5G will inevitably bring numerous benefits to the market, this transformative technology will also create a number of challenges for MNOs—especially related to monitoring these new highly distributed environments at scale. Top challenges include the following:

Gaining Visibility over a Massively Scalable 5G Environment

5G will usher in new levels of scale across three primary dimensions:

1. Volume of traffic.
2. Number of connected devices.
3. Size and distribution of core and edge network functions.

With 5G enabling approximately 10x to potentially 100x more traffic, how will MNOs effectively handle that massive traffic increase? Perhaps a better question might be, what actually needs to be monitored? Every piece, or just select traffic? If the latter, how can organizations intelligently select and monitor each specific traffic flow?

In addition, over the past several years, the number of devices has significantly grown—not just mobile phones but IoT devices as well that will connect to 5G networks, driving an enormous amount of traffic. How will MNOs intelligently filter and sort these devices?

New innovations in network architecture, including containerization, as well as Control and User Plane Separation (CUPS), create new visibility challenges as well. How and where will MNOs deploy taps? How will traffic be correlated across different physical locations?

Automating Highly Dynamic and Distributed Environments

Prior generations of 3G and 4G technology were largely hardware-based appliances located in data center environments, depending on largely repetitive, manual processes. However, new 5G environments are highly virtualized and distributed across data centers and the edge because they are achieving new economies of scale. Manual processes will not suffice.

How will MNO organizations effectively manage highly distributed and complex, dynamic environments using existing staff performing largely manual processes? The costs of scaling staff would be cost-prohibitive, yet the cost of delayed response to problems and poor performance may cost even more.

Controlling Spiraling Costs of Effective Management Solutions

How can organizations cost-effectively monitor vast amounts of traffic? With the technology available today, the additional traffic generated by 5G would require a significant investment in monitoring probes and devices to collect the network

traffic generated. For example, if there were 10x the amount of traffic, these organizations would need to buy 10x the number of probes and 10x the number of licenses for the performance and security tools. Yet, MNOs will not be able to charge 10x more than 4G services. How can MNOs keep costs in line, while still effectively monitoring these rapidly growing 5G environments?

And even worse, if the choice is made to not fully monitor the 5G environment, how will this impact customers? If high-value clients begin to leave the service due to a poor experience, it will have even bigger consequences.

Ensuring Security at Scale

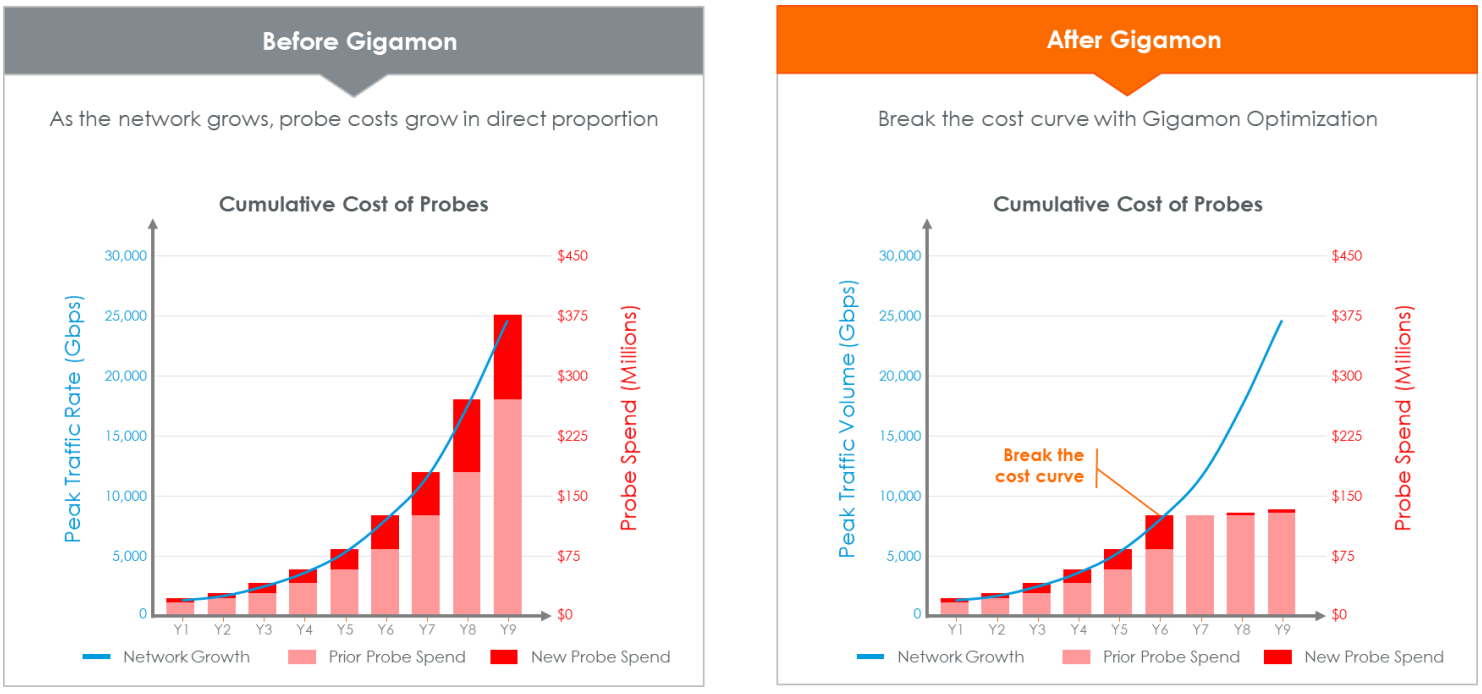
The security of business-critical and personal data has always been a top concern for organizations across industries. Ensuring security at 5G scale will be even more complex due to the higher volumes of traffic, the separated user and control planes, and the number and mix of IoT and other devices. How can MNOs deliver the appropriate levels of security for 5G networks, especially when they may be supporting real-time applications—and virtually all traffic will be encrypted?

Leveraging existing visibility and monitoring solutions for new 5G environments presents a number of significant challenges. Fortunately, Gigamon has recognized the impending problems created by 5G environments at scale and has created a solution to enable MNOs to deliver superior performance and security, without exponential growth in the monitoring budget. It does so by creating an intelligent visibility and analytics fabric.

Gigamon Visibility and Analytics Fabric

Since 2004, Gigamon has been a trusted partner and technology pioneer (with over 75 global patents) in the visibility fabric market for both enterprises and communication service providers. The company's years of experience working closely with major mobile network operators (MNOs) have enabled them to deliver an advanced, intelligent solution to not only accelerate 5G deployments, but also dramatically flatten the cost of monitoring these environments.

Figure 1. Example of Gigamon Projected Cost Savings



Source: Gigamon

Gigamon estimates that organizations leveraging intelligent data reduction technologies could dramatically reduce their 5G monitoring costs. See Figure 1 for an example of how data reduction technologies can dramatically control monitoring costs for 5G, without sacrificing quality. Gigamon states these charts are based on a real MNO case study at a tier-1 MNO with recognized best-in-class network quality.

The latest release of Gigamon Visibility and Analytics Fabric (VAF) includes the following technology:

Intelligent data reduction functions to accommodate the massive scale of 5G data. Gigamon has developed a number of traffic reduction techniques in GigaSMART to enable organizations to optimize monitoring activities including:

- Advanced flow slicing. Gigamon VAF also provides MNOs the ability to decide how much data or how many packets in a flow to send. MNOs could decide after several full packets to send the rest as just a partial slice. Alternatively, organizations could also drop the packets after a predefined number have passed. Gigamon claims that based on production deployments at real MNOs, this technique often results in a 75% reduction in traffic to the tools.

- 5G subscriber-aware whitelisting. Gigamon VAF will filter out all traffic not belonging to a predefined subscriber whitelist. For example, one group on that list may be all high-value subscribers that demand highest levels of performance. Using this approach, Gigamon believes it could take out as much as 99% of the traffic.

- 5G subscriber-aware sampling. With Gigamon VAF, organizations are able to filter out any traffic not belonging to a predefined sample list. For example, MNOs may want to ensure that a representative sample of different tier subscriber traffic is collected. Alternatively, sampling can also be performed randomly. Gigamon estimates this could result in up to a 90% reduction in traffic.

- Application-based filtering. Gigamon VAF can detect and direct application traffic to the appropriate tools. This would allow organizations to send mission-critical application traffic to the appropriate performance monitoring tools while simultaneously directing, for example, social media traffic to threat detection software. By intelligently filtering the appropriate traffic, organizations can ensure that security and network performance tools receive only relevant information. According to Gigamon, leveraging this technology could reduce traffic by up to 80%.

- Packet deduplication. Using Gigamon VAF, organizations will no longer receive duplicate traffic from different data collection points in the network. This means organizations will not have to pay to monitor and analyze duplicate data, thus significantly reducing unnecessary license and probe expenses and making the overall process more efficient. This ensures the right data goes to the right tool at the right time.

- Enhanced security. Ensuring that business-critical data and privacy is protected requires encryption. The Gigamon VAF includes TLS 1.3 decryption tools to perform the decryption of the encrypted traffic, offloading these services from other tools or probes, increasing their efficiency, and avoiding additional license fees.

The Value of a Gigamon Visibility and Analytics Fabric

Gigamon Visibility and Analytics Fabric will be a key enabler for 5G technology—allowing organizations to optimize performance and security monitoring, leverage the existing tool footprint to significantly reduce additional costs, deal with the scale and distributed nature of the disaggregated user and control planes, and mitigate risk. MNOs deploying Gigamon VAF can attain many benefits, including:

- Greater operational efficiencies leveraging automation. The level of complexity in these highly distributed 5G environments with Control and User Plane Separation (CUPS) requires intelligent, automated solutions. Organizations

cannot be burdened with the high cost of manual processes. Gigamon VAF enables existing staff to effectively leverage automation tools like Ansible to manage emerging and at-scale 5G CUPS environments.

- Reduced costs for management and security tools. By leveraging its intelligent data reduction capabilities, VAF helps to eliminate costly buildouts of probes or management licenses for 5G networks, allowing organizations to efficiently run a 5G environment reusing existing tool infrastructure.

- Ability to focus on high value clients. Organizations are able to leverage VAF's subscriber-aware capabilities to correlate data on their most important customers. This will be extremely important for MNO enterprise customers that are taking advantage of low latency 5G for real-time analytics or inference models (AI/ML), and MNO edge computing. Gigamon can also provide differentiated levels of visibility based upon network slice.

- Unified platform for 3G, 4G, and 5G networks, across physical, virtual, and cloud. MNOs can leverage a single Visibility and Analytics Fabric that extends across the entire MNO environment for the purpose of maintaining a high level of operational efficiency with a unified management platform.

Gigamon has pioneered visibility and analytics fabrics for over 15 years and continues to innovate. The latest VAF software releases provide extensive value for 5G environments.

The Bigger Truth

As MNOs continue to build out their 5G footprint, it will be imperative for them to put the appropriate monitoring solutions in place to accommodate the scale, distribution, and security expectations—all without breaking the budget. These solutions need to be implemented now while deployments are still limited in scope and operations teams have the bandwidth to deploy and become comfortable with these new technologies.

Having visibility into network traffic has always been important, but the stakes are even higher with 5G, as MNOs seek to monetize this technology with enterprise clients. Given the critical nature of the enterprise use cases, MNOs have to ensure they have the requisite levels of performance and security monitoring to satisfy very demanding customers. It will also be critical to do so in a cost-effective manner. The Gigamon Visibility and Analytics Fabric employs next-generation technology to ensure modern 5G networks deliver the appropriate quality of experience and remain secure at scale, while keeping monitoring costs in check.

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