

FlowVUE Flow Sampling

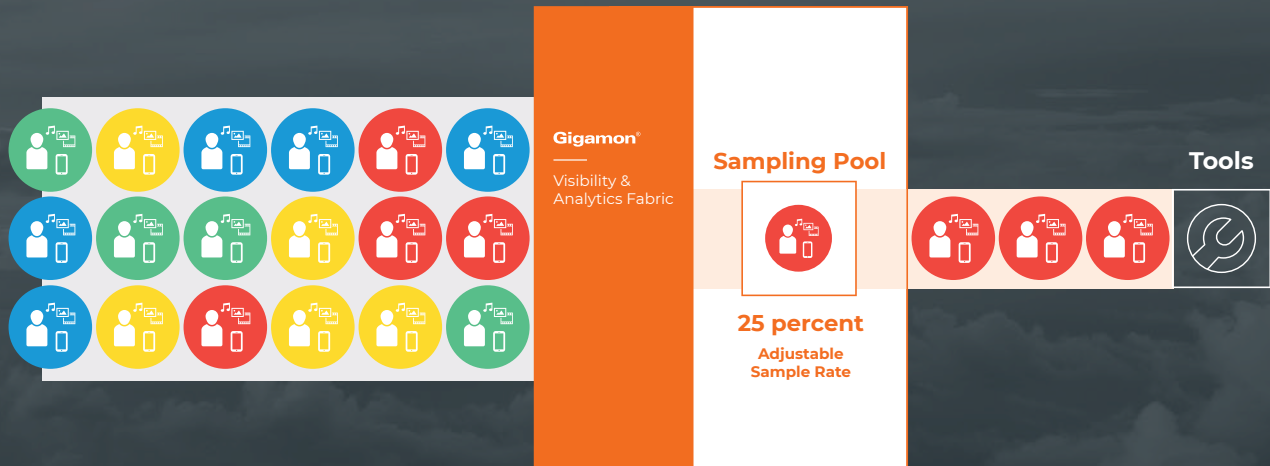


Figure 1. Sampling Traffic Flows with FlowVUE.

Challenges in Today's 3G & 4G/LTE Traffic Visibility

Mobile service providers are facing a deluge of traffic from their subscribers and the proliferation of smart-connected devices and mobile applications. Driven by "Big Data", it is becoming more difficult for the current tool infrastructure to sustain the levels of incoming traffic volumes to perform accurate analysis. Operators have been struggling with the scalability of their tool rail and tool processing throughput. Traditional approaches have left operators with few options: invest in prohibitively expensive tools or remain subject to the current tools which may pose limited visibility into subscriber traffic.

Traffic Intelligence and Management with FlowVUE™

The GigaSMART FlowVUE Flow Sampling application offers a unique IP- or subscriber-based capability that helps carriers turn Big Data into manageable data. The application enables existing tools to ingest traffic from the latest high-speed pipes by providing a representative view of traffic for diagnostic coverage.

FlowVUE allows for dynamic sampling of user endpoint (UE) devices' sessions, which by default is based on the UE IP addresses when FlowVUE is used on its own. The integrity of the flows is preserved by forwarding all the flows associated with the sampled UE IP to the probes and analysis tools.

In the case of mobile core networks, the GPRS Tunneling Protocol (GTP) is typically used to carry subscriber mobile data across a service provider's core network, referred to as GTP user-plane traffic (GTP-U) tunnels, which are set up, managed, and torn down by control plane communication (GTP-C in 3G/4G LTE networks or HTTP/2 in 5G networks). When used in combination with GTP Correlation or with 5G and CUPS Correlation, FlowVUE allows sampling of the sessions based on subscriber, device, network, or quality of service identifiers.

In contrast, traditional methods randomly sample packets without any correlation to the flows, which provides limited and incomplete visibility into user or subscriber behavior and experience. FlowVUE is able to intelligently reduce the amount of traffic while keeping the integrity of the data flows intact at a lower speed.

Leveraging FlowVUE, network operators can enhance quality of experience (QoE) monitoring by forwarding all of the control plane traffic to the tools infrastructure and only performing intelligent user traffic sampling (a configurable percentage of UE IPs or subscriber IDs) to get a representative view of application usage. Not all traffic is created equal. Certain traffic types have a higher incident rate of error or need greater monitoring. Other traffic types rarely need monitoring. When combined with other advanced GigaSMART filtering capabilities such as Adaptive Packet Filtering or Application Filtering Intelligence, network operators can further filter, replicate, and forward specific traffic flows of interest based on protocol and/or application identification for all or a subset of the sampled subscribers. This further reduces the volume of traffic to the tool infrastructure. The ability to sample a subset of end-user devices and transmit all the associated sessions of interest to the monitoring tools intelligently reduces the amount of data while enabling Big Data throughput processing with existing tool investment.

KEY FEATURES

Flow-aware sampling of user sessions:

- Intelligently filter and forward all flows “sourced” from a sampled set of end-user device IPs
- Flexible sample engine:
 - Sampling rate
 - IP addresses/Ranges
- Combined with GTP and/or 5G and CUPS Correlation:
 - Mobile subscriber identifier (e.g., IMSI, SUPI)
 - Mobile device identifier (e.g., IMEI, PEI)
 - Access point name (APN)
 - Quality of service class identifier (QCI)

Intelligent tracking of active user sessions:

- User-configurable timeouts to detect and replace inactive sessions
- Sampling of flows: Based on outer IP, inner encapsulated IP (inside, e.g., GTP), or mobile subscriber/device/network (when combined with GTP and/or 5G and CUPS correlation)
- Overlapping flow samples: Each tool can select and receive its own sample to fit its specific needs

KEY BENEFITS

- Turn Big Data into manageable data:
 - Enable network operators to selectively reduce traffic bound to monitoring and analytic tools
 - Get deterministic results at a fraction of the data rate
- Maintain ROI:
 - Mitigate rising tool costs by optimizing tool usage based on real-time reduced data volume
- Harness Big Data as a competitive asset versus an overwhelming burden:
 - Tailor pricing strategies based on usage patterns
- Enable network operators to build a tool rail where the right data is fed to the right tool from a single Visibility and Analytics Fabric™ (VAF)
- Allow sampling based on traffic type, so that specific traffic (e.g., VoLTE) can be acquired from the network and separated for distribution to designated tools

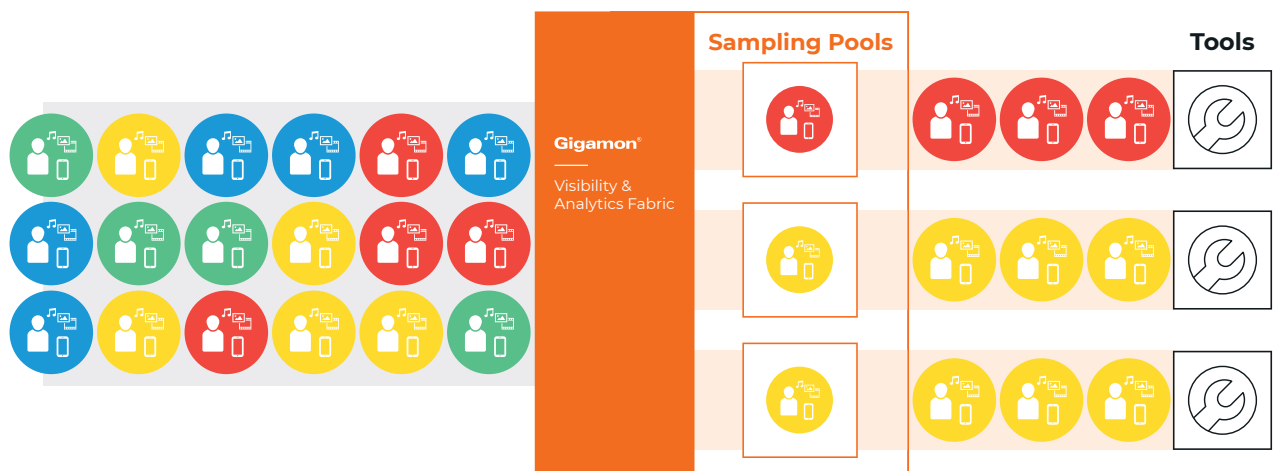


Figure 2. FlowVUE with overlapping flow samples.

Pervasive Visibility with a VAF

In this era of Big Data and exponential traffic growth, network operators have searched for a way to efficiently and effectively monitor performance and QoE for their users and applications, as well as identify and monetize new offerings. Converging on a single platform that not only simplifies and automates network traffic visibility but also provides built-in intelligence to address Big Data will shape how network operators choose to monitor and manage their network to provide better, faster connections, new applications, and new services, while increasing operational efficiency and network uptime.

Legacy approaches to monitoring have offered limited traffic visibility with limited filtering capabilities, are difficult and costly to scale and manage, and often require change orders or network downtime in order to adapt to the evolving network.

Gigamon Hawk provides the architecture and intelligence for network operators to create a monitoring infrastructure that is designed for the new era of Big Data and deliver pervasive visibility, awareness, and control from the converged edge to the cloud. Sitting between the IT infrastructure and the tools that need the access to data, the Hawk Visibility and Analytics Fabric provides a holistic approach to traffic visibility that includes:

Architecture Advantages: The GigaVUE® family of visibility fabric nodes offers the volume, port density, and scale needed to connect the right analytical tools to the appropriate large or bonded pipes. Tool trials are streamlined, new tools can easily be added or removed, and uptime is protected while downtime is prevented with a solution that is outside the production network and provides pervasive visibility.

Feature Advantages: Advanced filtering, packet manipulation and session-aware traffic identification reduce the amount of data arriving at each tool while ensuring that the data is formatted precisely for the tool's consumption. Each tool is optimized by not needing to parse the incoming stream or waste processor cycles on non-relevant data so it can focus on the more important task of data analysis for the relevant traffic.

GigaSMART Applications: Traffic and Application Intelligence applications provide effective monitoring of Big Data through the logical reduction of traffic so it is more suitable to connect to one or more instances of an existing speed tool at 1Gb, 10Gb, or 40Gb. Gigamon's Subscriber Intelligence (including GTP and 5G and CUPS Correlation) enables visibility at the subscriber/session level in order to maximize QoE and monetize services. The FlowVUE application intelligently manages Big Data traffic through dynamic session-aware flow sampling while keeping the integrity of the data flows intact.

About Gigamon

Gigamon provides Hawk, an intelligence Cloud Visibility and Analytics Fabric architecture that enables the management of increasingly complex hybrid networks. Hawk technology empowers infrastructure architects, managers, and operators with pervasive visibility and control of traffic across both physical and virtual environments, without affecting the performance or stability of the production network. Through patented technologies, centralized management, and a portfolio of high-availability and high-density visibility nodes, network traffic is intelligently delivered to management, monitoring, and security systems. Gigamon solutions have been deployed globally across enterprise, and service providers, datacenters and networks including over **80 percent** of the Fortune 100 and many government and federal agencies.

For more information about the Gigamon Hawk Cloud Visibility and Analytics Fabric architecture visit: gigamon.com