GradientGraph™ Analytics is a new optimization framework that provides administrators and operators of high-speed networks with a novel analytical platform to analyze, understand, and act upon distributed bottlenecks and flow performance. Based on a recent mathematical breakthrough on the understanding of the bottleneck structure of data networks, GradientGraph provides a new network model and advanced algorithms capable of characterizing with high precision the performance of bottlenecks and flows.

Due to the inherent topological structure of each data network, not all bottlenecks are of equal importance. The GradientGraph is able to capture the fundamental bottleneck structure of each network, revealing key operational insights such as the regions of influence of bottlenecks and the ripple effects of small perturbations in the network. It also provides a novel analytical framework to quantify such effects and make bottleneck-optimized traffic-engineering decisions. Because of the dualism between bottlenecks and flows, the same analytical framework provides a powerful platform to optimize flow performance. This includes the identification of flows that, while they may not be among the top heavy hitters in the traditional sense, lead to severe system-wide performance degradation due to their traversing of high-impact hotspot regions revealed by GradientGraph.

GradientGraph provides a new paradigm to qualitatively and quantitatively understand distributed bottlenecks and flows, enabling real-time traffic engineering, high-performance baselining, and a framework for high-precision network capacity planning.

### Features
- Analytical Dashboards for Network Optimization
- Visualization of Bottleneck Structures
- Network Performance Troubleshooting
- Congestion Analysis
- Locating Routing Misconfigurations
- Real-Time Traffic Engineering Recommendations
- Capacity Planning Suggestions
- Replay Bottleneck Structures
- Network Performance Baselining
GradientGraph Analytics provides an optimization environment composed of interactive dashboards. The dashboards reveal in real-time the bottleneck structure of a network, providing key insights towards understanding and identifying its high-impact bottlenecks and flows. The platform can compute bottleneck and flow gradients to help design and deploy optimal routing and traffic-policing actions.

### Network Performance Optimization
GradientGraph Analytics is ideal for:

- Organizations deploying large scale data centers that require bringing network utilization above 90% (up from the 30% common in traditional Internet architectures).
- Internet Service Providers and Telcos that strive for traffic engineering of their network to deliver the highest available performance to their customers.
- Organizations that rely on networks to transport large data transfers as part of Big Data infrastructures, such as public Research and Education Networks and private SDN Wide Area Networks.
- Content Delivery Networks that need to achieve critical levels of performance to avoid customer churn.
- HPC and Supercomputing infrastructures that rely on high-speed communication networks.

### Capacity Planning
GradientGraph Analytics can also be used to help network operators perform network upgrades from one generation of equipment to the next. Traditionally, capacity planning is performed by projecting future demand for network resources and scaling the network accordingly. GradientGraph brings a whole new perspective to the critical task of network upgrades: by allowing replay and accurate measure of the historical bottleneck structure of a network, operators can now design upgrade paths that are not only adequate for future traffic demand, but result in optimized bottleneck structures, leading to more cost-effective operation.

### Easy Integration
GradientGraph comes with a variety of plugins to enable a smooth integration with existing networks. Examples of integration plugins include NetFlow, sFlow, BGP-LS, OpenBMP, SNMP, Zeek, and Mininet, among others.

### Is GradientGraph Right for You?
GradientGraph Analytics in Action