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Ensuring Quality of Experience for Mobile Data Services

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Whether mobile service providers are operating in developed or developing markets, they face the common challenge of managing the inevitable demand for increased bandwidth and the expectation of a flawless end-user experience.

Take, for example, the experience of one carrier that recently came to our attention. While evaluating innovative go-to-market campaigns to balance network usage and maximize revenues, they experienced various anomalies surrounding bandwidth capacity and deterioration of customer experience. A campaign to offer "best value" mobile data access rates in the evening backfired when bandwidth consumption rocketed and virtually brought the network to a standstill. The detrimental effect on regular subscribers was that they actually didn't get close to the "all you can eat" expectation, and perhaps more importantly, their business customers experienced a reduced quality of their premium services.

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What the carrier really needed was to proactively identify the potential variations in bandwidth consumption based on trend, geography, demographic and time-of-day, leveraging performance

intelligence from the many domains of the mobile infrastructure plus awareness of the subscriber-application connectivity, usage, and performance experience.

Mobile service providers must address a host of operational challenges in order to achieve the high levels of quality of experience (QoE) that prevent subscriber dissatisfaction and churn. Typically, these challenges require:

- Tool consolidation
- Cross-domain troubleshooting
- Meeting the expectations of high-value customers
- Maximizing return on backhaul investment

To address each of these challenges, service providers need a robust toolset that enables a holistic understanding of services and the resources supporting their delivery. A holistic approach of this kind provides an overarching view into the users' QoE and a comprehensive ability to troubleshoot issues impacting end-user services while, at the same time, enabling the provider to gather the information on service usage required to proactively plan and secure revenue streams.

Tool Consolidation

"Exploding demand for mobile data has created unprecedented financial and infrastructure pressure."

The majority of service assurance tools are designed to address either per-subscriber service monitoring, transport monitoring, or mobile infrastructure monitoring, but not all three at once. This results in a proliferation of tools, which makes assuring the end-user experience an increasingly difficult and expensive proposition.

To reduce recurrent capital and operational expenses, providers need to reconcile and consolidate overlapping tool functionalities to avoid the cost and delays associated with jumping between separate OSS toolsets. Instead of using tools that lack the ability to correlate actual service performance to the service and network topology, providers need a single, vendor-agnostic toolset that can address both end-to-end service and network management requirements, including subscriber awareness and transport monitoring.

Cross-Domain Troubleshooting

> **"Rightsizing while maintaining end-user QoE is a delicate balance that requires a pro-active and holistic approach."**

In today's mobile environment, each mobile service demands a broader scope of operational support. To meet this challenge and ensure the delivery of expected QoE, providers need real-time monitoring and reporting of every infrastructure entity along the service delivery path—from data center to mobile packet core, to the IP/MPLS backbone, radio access network and the Ethernet backhaul. With this holistic and proactive view of the health of the network infrastructure and the services and applications traversing it, providers can understand the relationships between resources, the services they support and the respective performance indicators. This enables the provider to proactively drill-down to identify and address service degradations before they impact end users.

Meeting the Needs of High Value Customers

In addition to ensuring that services are always available and meet end-user quality expectations in the consumer market, providers must also do everything they can to protect their high-value enterprise accounts by delivering the level of service these corporate customers are paying for.

This calls for a holistic, integrated network, service and application performance approach to assuring customer experience that provides data service and application experience of individual subscribers and corporate access, while also allowing engineers and operations teams to find root causes within their infrastructure entities (both mobile and transport). Comprehensive visibility to proactively monitor performance and capacity all the way from the data center to the multi-generation radio access elements, including transport entities in the packet-based backhaul (that typically cause localized service experience issues), is critical for ensuring QoE for high-value enterprise accounts. With this comprehensive visibility, engineers and operational personnel have the information they need to make decisions about dedicating priority bandwidth as well as to analyze and prioritize application traffic in a way that helps ensure a high-quality end-user experience.

As more and more corporate applications switch to mobility solutions, such as increasing machine-to-machine (M2M) offerings, operators need to provide

enterprises with visibility into their performance. Having the ability to provide custom reporting that verifies delivery of the level of service for which these corporate customers are paying will build trust and aid retention.

Maximizing Return on Backhaul Investment

The exploding demand for mobile data has created unprecedented financial and infrastructure pressure for mobile operators and service providers worldwide. The traditional approach of oversizing the network infrastructure has proven to be financially unviable and counterproductive to growing the revenue stream from data services while remaining competitive. Carrier Ethernet in the backhaul domain has been the right choice for service providers due to its flexibility and cost efficiency—but it does not reduce the need to rightsize the devices, interfaces and links to maximize the benefits that it brings. Rightsizing while maintaining end-user QoE is a delicate balance that requires a pro-active and holistic approach to assuring network and service quality.

Data traffic patterns of mobile consumers are extremely temporal, as the experience of the carrier in the earlier example illustrates. Holidays, events, and marketing initiatives can have a major influence on consumers' messaging, browsing, downloading, and streaming patterns. An accurate comprehension of traffic patterns requires deep analytics. Industry-proven concepts such as "busy day" and "busy hour" designations are crucial in determining the worst stress levels of the backhaul network. Hourly baselines, engineering benchmarks, and traffic forecasts based on historical data are indispensible in achieving the objective of rightsizing the network for the future. Being able to do all of this down to every sub-element (interface, class of service, and VLAN) is important in determining the patterns of each traffic type. An integrated network, service and application performance approach to network and service assurance provides the needed balance between cost-containment and customer experience.

Meeting the Challenges of Mobile Data Service Delivery

No matter where in the world they operate, service providers have to simultaneously meet the network bandwidth and service quality demands of both consumers and business customers while still making a profit. To meet these challenges, providers should equip themselves with the intelligence and topology awareness they need to manage their mobile end-to-end network infrastructures and application delivery environments. Having the right service assurance solution in place is critical to providing high quality services that will differentiate offerings, retain and add new customers and increase revenue.

About InfoVista:

InfoVista enables managed service providers, mobile operators, broadband operators and enterprise IT organizations to successfully make the transformation from infrastructure providers to service providers by helping them launch new and high-performance services, assure service performance, reduce customer churn, manage risks, invest appropriately, and control costs.

Our interoperable network, service, and application performance management products collect, process and correlate large volumes of heterogeneous data in real-time. These products transform quality of experience (QoE), and application, network and system performance data into actionable information. InfoVista customers using these solutions can manage perception of service quality, report on performance, optimize capacities and resources, and prevent and resolve problems before they impact their own customers and end users.

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