



UniqServ™

User-Aware Traffic Management
for Mobile Backhaul Optimization

The Mission: Ensuring Mobile Subscriber QoE

Demand for mobile broadband is skyrocketing, driven by accelerating smartphone penetration, proliferation of data cards, and a new breed of delay-sensitive services. With these increased traffic and service demands, mobile operators face the challenges of cost-effectively improving service delivery and securing subscriber Quality of Experience (QoE).

Mobile broadband subscribers have high expectations. Accustomed to the speed and reliability of fixed broadband, they are simply unwilling to accept lower QoE from their mobile devices.

Guaranteeing user experience for millions of subscribers running bandwidth-hungry, smartphone-based broadband applications has become mission critical for mobile operators - and a key factor in the struggle for subscriber retention.

The Mobile Backhaul Challenge

Mobile backhaul network congestion events dramatically degrade end-user data rates and service performance, negatively impacting QoE.

To improve QoE and more effectively control network resources, mobile operators have adopted intelligent, subscriber-aware traffic management solutions in the radio segment and core network. However, in the backhaul – the major source of network congestion – implementation of advanced, user-aware traffic management has been, until now, impossible.

Operators are actively seeking solutions that address the backhaul congestion challenge. Adding infrastructure capacity is a simple but costly solution, resulting in excessive CapEx and OpEx. An alternative solution is throttling subscriber bandwidth with Deep Packet Inspection (DPI) at the mobile core network. However, DPI in the core is unaware of real-time traffic load in the backhaul, and throttling is based solely on general peak hour traffic patterns. Thus, with no real-time awareness of actual backhaul load and shared resources usage, DPI throttling may prevent congestion in some cases - but only at the price of reduced network utilization.

Existing backhaul traffic management solutions are based on coarse service classes, not advanced user awareness, as required by today's subscriber-centric networks. To deliver enhanced QoE and effectively monetize mobile broadband services, a new backhaul traffic management paradigm is needed.



UniqServ™

A New Paradigm in Mobile Backhaul Traffic Management

Celtro's UniqServ™ is a leap forward for mobile operators in the battle against backhaul congestion. UniqServ delivers subscriber-aware traffic management designed specifically for the mobile backhaul.

Traditional traffic management in mobile backhaul networks is based on the Differentiated Services architecture (DiffServ). DiffServ is a coarse-grained mechanism, relying on service class based prioritization and differentiation. Under DiffServ architecture, all users of the same class use a single queue. When these multi-user queues are congested, racing conditions develop among the various user TCP flows, resulting in packet drops, sharp throughput oscillations, and drastically lower QoE.

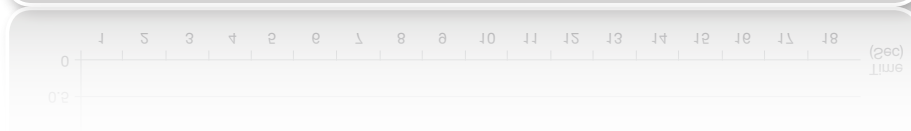
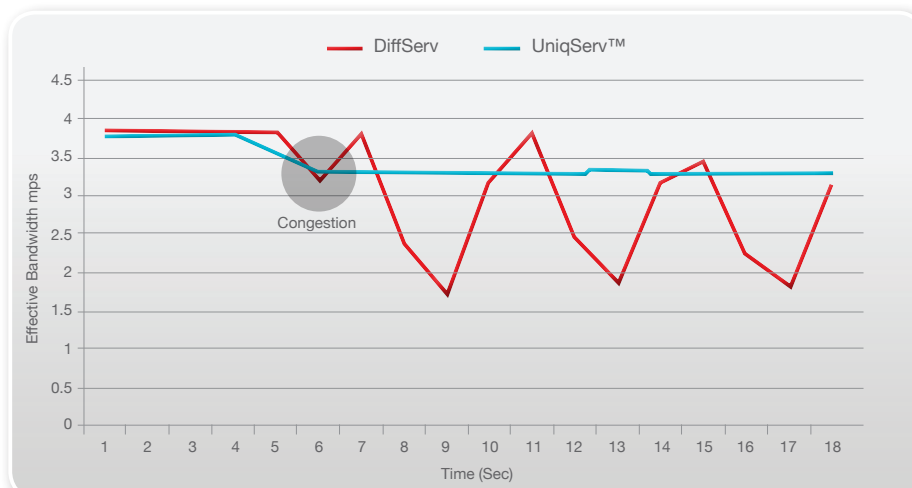
UniqServ from Celtro is based on a patented user-aware traffic management model for the mobile backhaul, in which each user is managed in a dedicated queue. UniqServ enables the backhaul to identify individual user flows and manage their backhaul priority according to flexible subscriber-centric policies. During congestion events, UniqServ prevents racing conditions among TCP flows and maximizes user bit-rate and QoE.

The graph below compares a single user bit-rate when using DiffServ and UniqServ during a backhaul congestion event. The graph shows how DiffServ-based solutions result in sharp drops and oscillations of end-user bit-rate, which significantly degrade QoE, while Celtro's UniqServ maximizes user throughput and QoE.

The Benefits

- **Enhanced Subscriber QoE** - UniqServ enhances user experience with faster file and page download and superior video performance
- **Maximizes Network Utilization** - UniqServ maintains high network utilization throughout congestion events, in contrast to the sharp utilization decline during congestion in DiffServ-based architectures
- **Enforces Fair Usage** - During congestion, UniqServ throttles heavy users and enhances the performance of normal users
- **Delivers Service Differentiation** - UniqServ classifies and prioritizes traffic on a per user basis for optimal service delivery and user QoE
- **Offers Rich Backhaul Reporting** - UniqServ provides detailed real-time and historical reports on backhaul performance and usage per link, subscriber or application
- **Lowers Network Expansion Costs** - UniqServ's superior backhaul and QoE performance is matched by DiffServ solutions only with expensive capacity expansion

UniqServ™ versus DiffServ performance during a congestion event





About Celtro

Celtro provides innovative mobile backhaul optimization solutions using intelligent traffic management technology. Designed solely for mobile backhaul networks, Celtro's solutions improve subscriber Quality of Experience (QoE), lower backhaul expenses and increase network efficiency. Mobile operators worldwide choose Celtro to help enhance customer satisfaction and streamline backhaul network investments.

Celtro's solutions are commercially deployed by more than 50 top-tier global mobile operators in Europe, Asia, Africa and Latin America.

For more information please visit: www.celtro.com

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