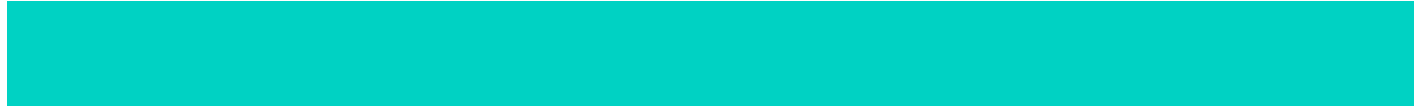


For revenue growth and new business creation of mobile carriers

# Traffic Management Solution



Realize to maximize QoE(Quality of Experience) and ROI(Return On Investment) on carriers' network

## Overview

### ■ Drastic QoE improvement with small investment

In recent years, mobile carriers are accelerating introduction and coverage expansion of LTE networks to cope with surging mobile traffic. However, in reality, it does not always satisfy the expected level of throughput, and QoE (faster display speed of web contents and fewer video stalls during video playback) degradation takes place because traffic concentration and network bandwidth fluctuation occur when users are moving one location to another. Traffic Management Solution(TMS) drastically improves QoE by leveraging NEC's proprietary data flow control technology as well as dynamically tuning system parameters for each unique user-flow based on traffic conditions. And TMS enables mobile carriers to improve QoE with small investment and maximize ROI on carriers' network.

### Overwhelming QoE Maximization Effect

■ The communication speed users experience can be twice as much fast by leveraging NEC's proprietary data flow control technology as well as tuning expertise.

■ Reduces the number of video stalls during video playback at congested area by over 90% in comparison by taking advantage of "Predictive Pacing Engine"

### Investment Minimization

■ Reduces traffic by 30% by combination of technologies such as video compression, caching, image compression and text compression.

■ The number of concurrent user connections in a congested area can be increased by over 200% without adding radio base stations.

### Revenue Maximization

■ Enhances the effect of traffic optimization by utilizing real-time visualization of traffic information for dynamic tuning of system parameters

■ Link visualized traffic information with SDN and realize efficient network operation by dynamically designing and reconfiguring network in accordance with traffic pattern (TMS to SDN).

### QoE Maximization

Optimization Without

Time-consuming to start playback.  
Oh.. stall again...

The number of video stalls during video playback

Decreases over 90%

Optimization With

Video playback starts faster and smoothly !!

### Maximization concurrent connections in congestion area

Maintain high QoE

**210 concurrent connections**

**Over twice !**

**100 concurrent connections**

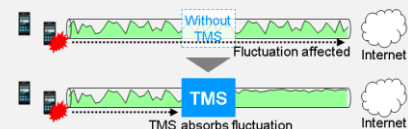
**Without Optimization**

# Traffic Management Solution

## Key technologies of Traffic Management Solution

### Data flow control and Tuning

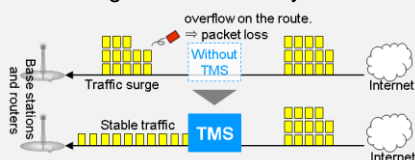
Split TCP session so that fluctuation in wireless network will not affect the Internet (can be seen as damper effect by analogy)



Improves the deterioration of throughput

### Predictive Video Pacing

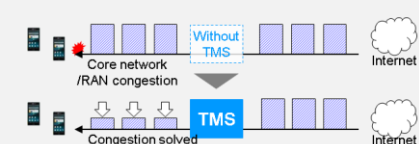
Pacing reduces packet loss (followed by retransmission) caused by traffic surge seen on a daily basis.



Reduces packet loss (followed by retransmission)

### Video/ Image/ Text Compression

Contents compression improves throughput by reducing incoming traffic to carrier network.



Reduces the total amount of traffic

## Solutions

### Traffic Reduction Solution

Minimizes CAPEX/OPEX by reducing traffic volume thanks to compression of video, image, and text contents

\* Components:

TMS Media Optimizer (Video/Image/Text Compression)

### QoE Maximization Solution

Realized faster and stable video playback by preventing throughput degradation caused by radio fluctuation by NEC's proprietary data flow control technology and tuning expertise.

\* Components:

TMS Media Optimizer (Video Pacing, TCP Optimization)

<Solution Schedule> \* Refer to the web page

Traffic Reduction Solution Traffic Information Utilization Solution Virtualized TMS TMS to SDN Solution

### Dynamic Bandwidth Optimization Solution

Optimizes user traffic by targeting particular users where QoE is extremely deteriorated due to various reasons such as shortage of bandwidth due to congestion and low throughput at busy our etc.

\* Components:

TMS Media Optimizer (Dynamic Bandwidth Optimization)

### Traffic Visualization Solution

Offers utilized information such as ROI effect, QoE analysis, system monitoring, and the trend for services and devices with traffic visualization in real time.

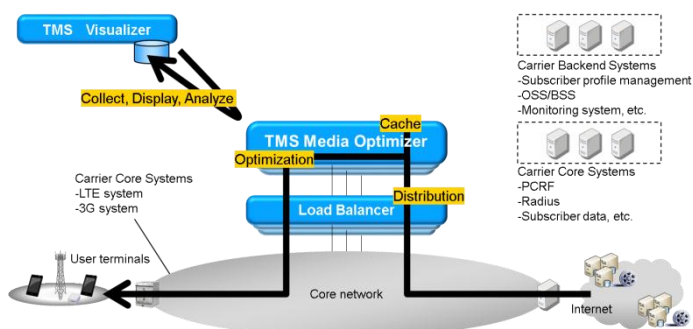
\* Components:

TMS Media Optimizer, TMS Visualizer

## Deployment into Network

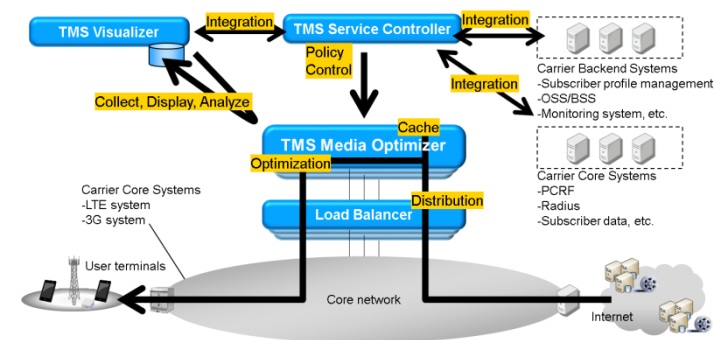
### Easy deployment without affecting other systems

Traffic control and deployment process, starting from incorporating the commercial traffic into "Load Balancer" first and then to optimization control and visualization, can be done without affecting the behavior of other systems in operation and accordingly making the deployment easier.



### Realize higher value-added service by collaboration with other systems

This solution can work with carries' core network systems as well as backyard systems, which realizes the highly value-added solution while effectively utilizing existing equipment assets.



※TMS: Traffic Management Solution

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