

# WarpEngine™ Cell Tower (CT)

## Overview

The Internet is a busy data superhighway driven by the rapid growth of wireless devices and cloud computing applications. At the heart of this transformation is video content. Maintaining a good user experience for real-time applications such as video is a common industry-wide challenge, especially over LTE networks.

Badu Networks has developed GTP Optimization technology that improves data throughput to provide a good user experience for cellular customers. It achieves this without the costly upgrades associated with cellular tower enhancements.

## Use Cases

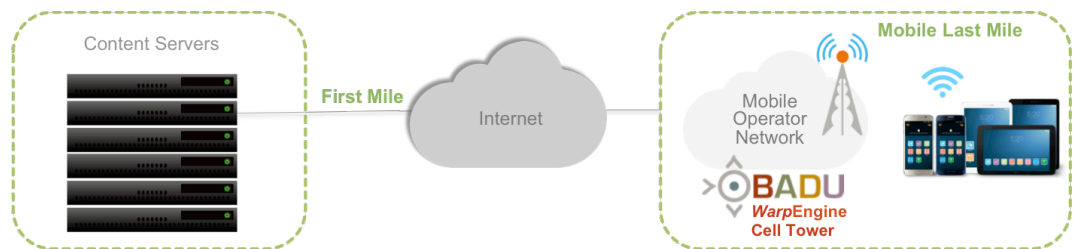
WarpEngine™ CT is ideal for deployment for the use cases below:

- Mobile Operator's LTE RAN network to improve end-user quality of experience.
- Mobile Operator's LTE core network to improve throughput for Mobile Last Mile.
- LTE DAS (Distributed Antenna System) deployments to improve effective coverage area and throughput.
- Mobile LTE cell sites such as RDUs (Rapid Deployment Units) and COWs (Cell on Wheels) to handle high-traffic scenarios.

## WarpEngine™ CT – GTP Optimization Proxy

WarpEngine™ CT is a scalable network optimization proxy appliance that processes GTP sessions with little to no overhead. It is deployed at LTE cell towers and optimizes uploads and downloads for smartphones associated with that particular cell tower.

Performance for WarpEngine™ CT depends on network variables such as round trip time (RTT), packet loss %, available bandwidth, size of content, and other factors. It is based on Badu's WarpTCP™ technology, which was developed specifically to perform well in mobile and wireless networks.



# Benchmarks

The *WarpEngine™* CT benchmarks were measured on a live production LTE network. *WarpEngine™* completes downloads in half the time compared to Standard TCP.

# Free Trial

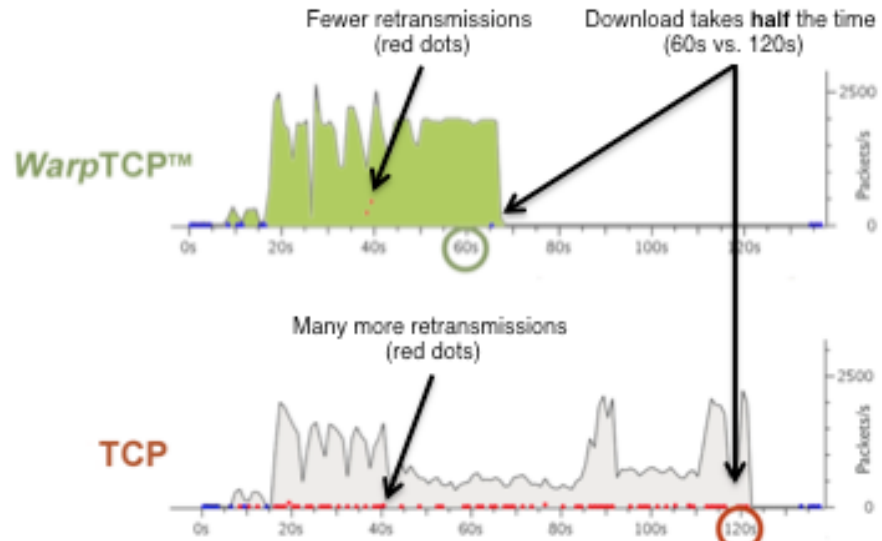
Discover the benefits that *WarpEngine™* delivers by asking for a free 30-day trial. Visit our website today and click on the “Free Trial” button at the bottom of the home page for your free copy of the software. It is risk free and easy to test.

## WarpTCP™ — Smarter Congestion Control

TCP protocol was invented 35+ years ago, however it was never designed for use in massive cloud infrastructures or wireless networks. It was architected with guaranteed delivery in mind, not speed. Given the jittery nature of wireless networks, TCP often overreacts to congestion and network variations. The result is a drastic drop in throughput, causing a poor user experience.

*WarpTCP™* is a set of intelligent algorithms that maximize TCP throughput in the face of network variations such as delay, jitter, packet loss and random bandwidth fluctuation. It was especially designed to maintain high TCP throughput in wireless networks such as LTE and Wi-Fi. Compared to competing solutions, *WarpTCP™* does not overreact to temporary or false-alarm congestion, minimizes re-transmissions, and recovers faster from a congestion event.

## Benchmarks – WarpEngine™ CT on LTE Network



## Summary

*WarpEngine™* CT is a scalable and transparent appliance that can be easily deployed in large-scale infrastructures. It includes support for cellular GTP protocol, NEBS compliance; dual-hard drive and dual-power supply and NIC bypass features. It is ideally suited for deployment at LTE cell towers to improve video content and end user experience.



Improving the mobile experience

## Technical Specifications

Feature	WarpEngine™ Cell Tower (CT) Edition
Chassis	2U, custom depth of 9.16"
Optimized WAN capacity	1Gbps
Memory	16GB DDR4 SDRAM
I/O slots	<ul style="list-style-type: none"><li>Supports up to two full-height, half-length x8 PCI cards – OR –</li><li>Two x8 PXE-E slots</li></ul>
Storage	Dual Hot-plug 2.5" SFF disk bays Onboard server cartridge SSDs External storage via PCI-E or iSCSI
Embedded NIC	Dual Port 1Gb
NIC Adapter Options	1Gbps dual-port bypass: <ul style="list-style-type: none"><li>Copper (RJ45)</li><li>Single-mode Fiber LX (LC)</li><li>Multi-mode Fiber SX (LC)</li></ul>
Power supply	Dual, redundant, hot-plug 550W AC power supplies
Cooling	Embedded fans
Temperature	Operating: 0°C -55°C
Relative Humidity	95% non-condensing
Power Supply	-48 VDC input, high efficiency
Telecom Environments	NEBS Level 3
System Dimensions	233mm (L) x 352mm (W) x 88mm (H)
Management	WarpAdmin™ web-based management tool to monitor TCP sessions and throughput as traffic flows through appliance.

### Badu Networks

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## Product Ordering Information

WarpEngine™ Cell Tower 1Gbps – Ordering Part Numbers:

<b>WE-1GC-2B-2C-U1</b>	1G Copper with NIC bypass
<b>WE-1GC-2B-2LXLC-U1</b>	1G Fiber LX (single mode) with NIC bypass
<b>WE-1GC-2B-2SXLC-U1</b>	1G Fiber SX (multi-mode) with NIC bypass



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