



CORASM Mobile Edge Operator Impact Case Study

Table of Contents

[1. Overview](#)

[2. Approach](#)

[3. Aggregate Results and More Time on Content](#)

[4. CORA ME 1.0 and CORA Shaping Libraries](#)

[5. What CORA ME is](#)

[6. CORA ME Security Overview](#)

[7. How CORA ME helps your network](#)

[8. Key Areas of Impact](#)

[9. Annual Savings and ARPU](#)

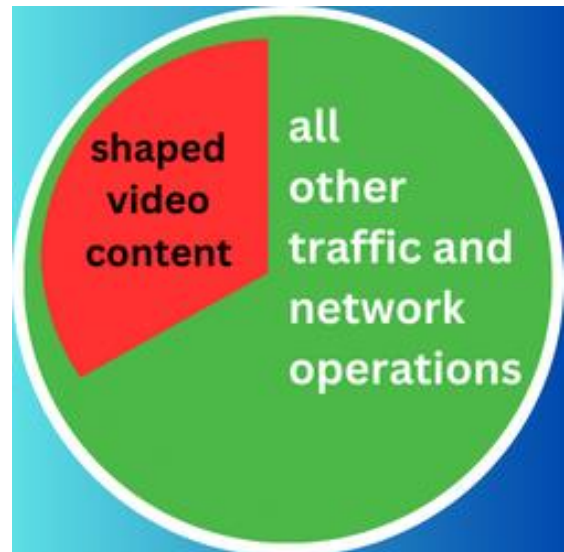
Overview

It is estimated that between 70% - 80% of data volume on wireless networks today is from streaming video. Video content is transmitted to mobile devices at the highest resolution possible, using copious amounts of data and energy. MNOs, armed at best with capital-intensive, legacy Quality of Service technologies developed for non-video content applications, are under pressure to deliver ever-increasing amounts data-intensive video content to handheld mobile devices connected to their cellular networks. MVNOs, who are largely at the mercy of their wholesale network provider, have little or no ability to manage data traffic.

Today's operators are faced with a perfect storm of trying to remain profitable while managing network traffic, keeping subscribers happy, and battling churn. Legacy QoS traffic managers are not designed for the problem. The growth of mobile availability could see this data consumption more than double and is projected to need more than 70% more power to meet consumer demands! CORASM Mobile Edge (ME) is the on-device solution that is implicitly designed to right-size video content for mobile devices using smart-shaping technology.

If 75% of your mobile network bandwidth is clogged with streaming video content that leaves only 25% for ALL other traffic and network operations.

If 80% of your subscribers are using CORA ME saving an average of 80% on streaming video data, you'll unburden your network by about 65%.



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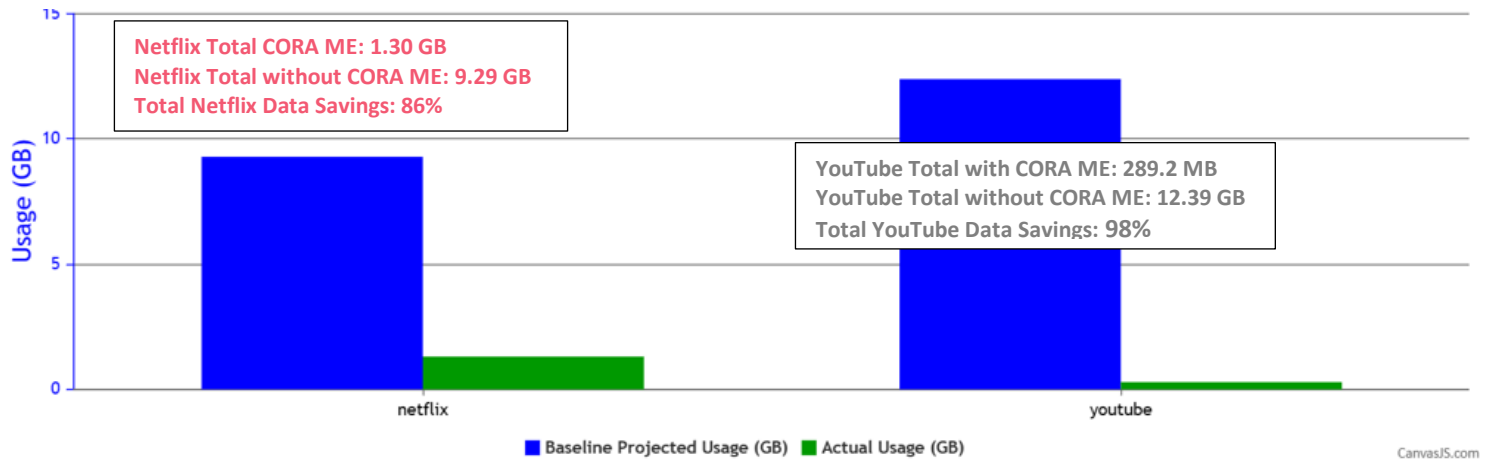
Approach

This paper shares the results of a CORA ME Test Drive with two carriers. One large carrier (~17M subscribers) and one small carrier (~150,000) testing on a mix of Android and iOS devices.

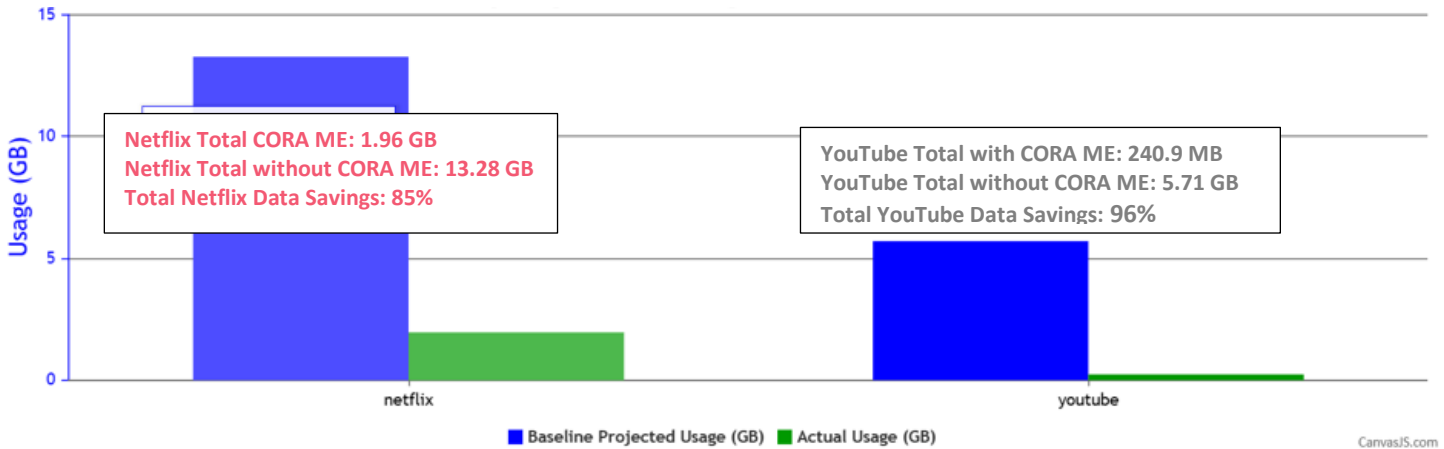
Aggregate Results Large Carrier

The graphs below analyze aggregate data for the full test with a large MNO reported by Sky Peak Technologies through our database analytics dashboard. Note: Projected Data Usage is the GB/hour extrapolated from published reports provided by Netflix and YouTube.

Aggregate Android Results



Aggregate iOS Results



Aggregate Additional Time On Content

Service	Additional Time (Hours)
YouTube	34.7
Netflix	6.9

Your subscribers will be able to watch hours more streaming video for the same amount of data for greater subscriber satisfaction!

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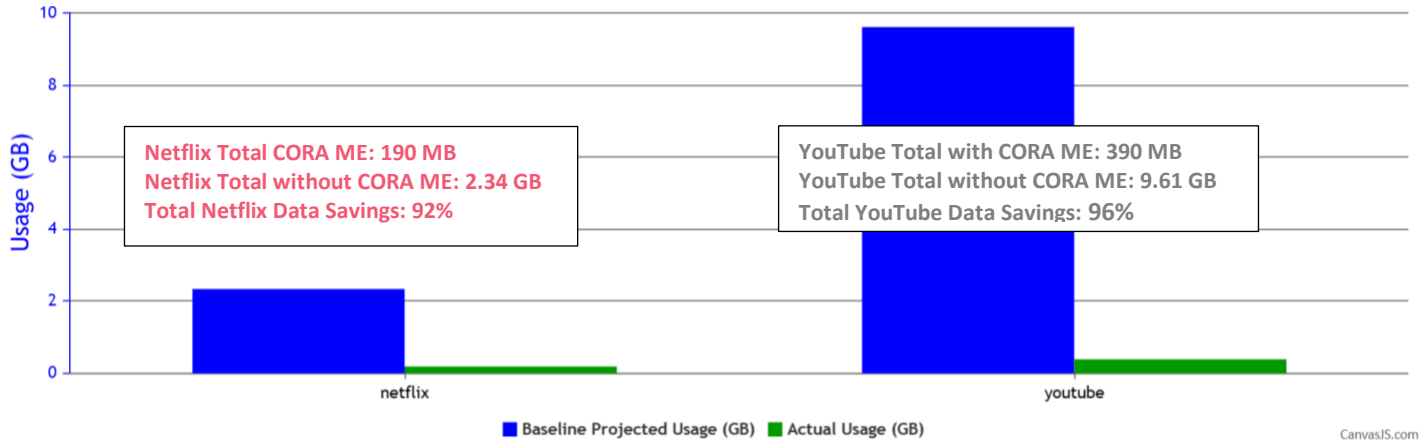


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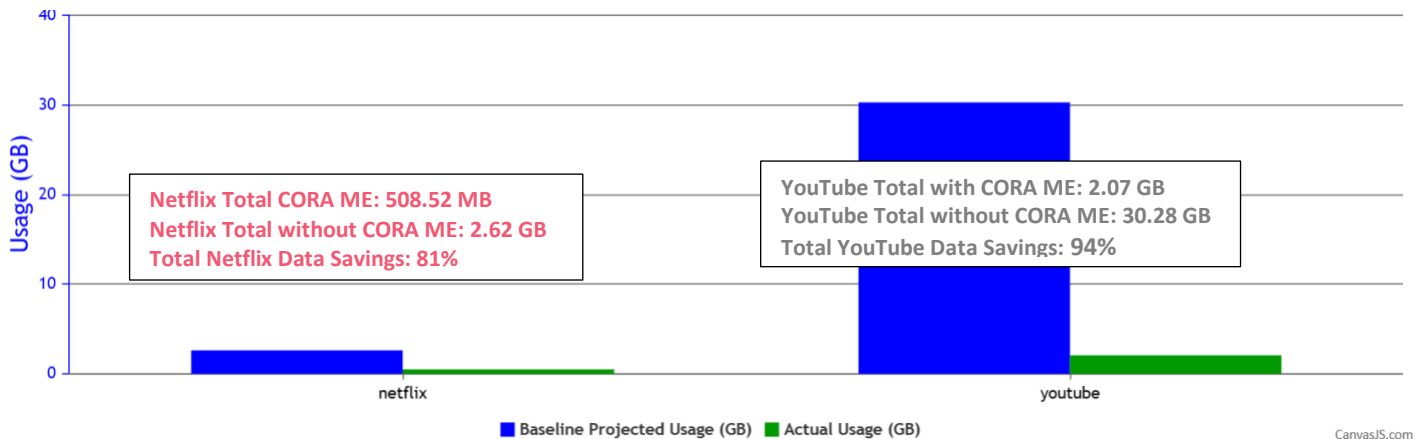
Aggregate Results Small Carrier

The graphs below analyze aggregate data for the full test with a small MNO reported by Sky Peak Technologies through our database analytics dashboard. Note: Projected Data Usage is the GB/hour extrapolated from published reports provided by Netflix and YouTube.

Aggregate Android Results



Aggregate iOS Results



Aggregate Additional Time on Content

Service	Additional Time (Hours)
YouTube	16.6
Netflix	9.7

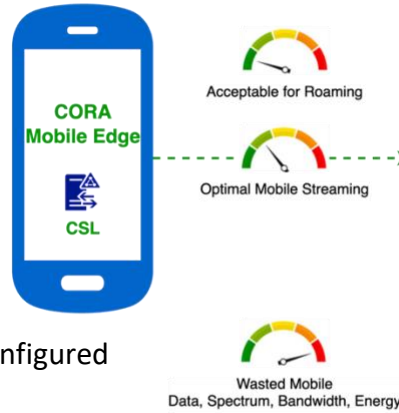
With significant additional time on content, even small Carriers can offer extra streaming video deals and compete with large Carriers!

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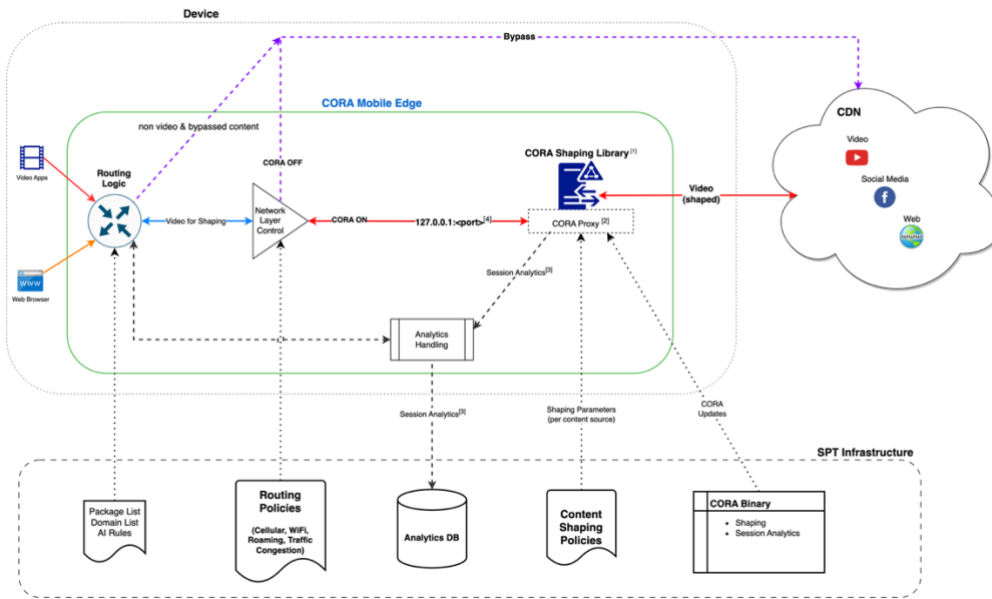
CORA ME 1.0 - On-device, Over-the-top (OTT) Video Content Optimization

CORA ME emerged as a solution for MVNOs that don't have on-network capability to provide **more content for less data** to its mobile subscribership. The solution also has value for carriers, WISPs and MNOs by improving **bandwidth, energy, and network processing** OpEx and provides revenue opportunities. As illustrated to the right, CORA ME does this by right-sizing resolution for the device form factor based on policies configured by the operator.



Resolution	Pixels	Data Usage (Mbytes / hour)
144p	256x144	30 - 90
240p	426x240	180 - 250
360p	640x360	300 - 450
480p (SD)	864x480	480 - 660
720p (HD)	1280x720	1,200 - 2,700
1080p (FHD)	1920x1080	2,500 - 4,100
1400p (QHD)	2560x1440	2,700 - 8,100
2160p (4k UHD)	3840x2160	5,500 - 23,000
4320p (8k FUHD)	7680x4320	9,000 - 45,000

CORA 1.0 Shaping Reduces Data Footprint by Adjusting Resolution to Acceptable Levels



CORA Shaping Library (CSL) is the “special sauce,” proprietary algorithms originally designed to run on iOS and Android handsets and pads. Due to market demand, CSL has been ported to Linux-based devices, including servers, routers, and gateways.

CSL can be compiled for other platforms and integrated using APIs for operators to manage content sources, levels of optimization for home network as well as during roaming and traffic congestion, and more.

CORA ME is NOT

- A wifi off-loader or browser-based compression tool
- A centralized QoS that is cumbersome and complex operating expense
- Hardware that requires Capex or additional infrastructure
- Punitive on-network throttling method

CORA ME Security Overview

- No remote VPN server
- No VPN tunnel
- No traffic transmitted off the device
- No personal identifiable information is exposed
- Completed an initial security assessment based on ISO27001:2022 and OWASP criteria

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How CORA ME's smart shaping helps your network -- *without being on your network*

- Requires no network installation or capital investment.
- Reduces the data footprint of streaming video 80% to 90% by utilizing algorithms that inspect health of each host connection individually and then applies gradual shaping. This smart-shaping results in fast loads and smooth UX while delivering the optimal resolution for the device, network health and Operators' settings.
- Unlike punitive throttling, QoS, and de-prioritization, CORA ME does not interrupt streaming video or degrade UX.
- Network agnostic and can even improve the video performance on the device when the device is on legacy networks or while roaming.
- Works with the device to deliver an optimal user experience by distributing optimization processes to the ultimate mobile edge, the device, instead of a centralized, single-point of failure network appliances.

CORA ME can positively impact mobile operations in four key areas

- **Revenue and Profitability:** By drastically reducing the data needed to deliver data-intensive content, we can cut costs significantly. For example, an Operator with 100,000 devices and an average data cost of \$1.50 a Gig can see up to \$600,000 a month in savings. Conversely, data savings can benefit revenue and profitability.
- **Reduction of Network Data Traffic:** Industry reports show that upwards of 80% of data volumes on networks today is due to streaming video. By reducing the amount of data needed to deliver streaming video by 80%, video becomes significantly less of a load on networks, thus freeing networks for other operations.
- **Relationship:** Increases customer satisfaction with most important customers by giving them more of what they want. Operator test results show that unlimited customers can avoid network de-prioritization altogether when using CORA ME. This also creates flexibility for more competitive data plans that are also profitable. (See first bullet)
- **Retention:** Lower data cost, less network congestion, and more streaming video content give operators the edge over churn, unlocking the winning combination for happier subscribers and increased Operator profitability.

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Annual Savings vs Cost of CORA Mobile Edge for Large Carrier with approximately 17M total subscribers

The chart below provides estimated data savings and potential impact to profitability.

Number of Active Devices (est. 50% of Base)	Average Monthly Data Usage per Device (based on worldwide average cost)	Assume 50% Monthly Data Burn is from Video	80% of Monthly Data Burn Reduced by CORA ME	Data Delivery Cost per Gb (based on worldwide average cost)	Monthly Data Delivery Cost Savings	Annual Savings
8,800,000	15 Gb	66,000,000 Gb	52,800,000 Gb	\$1.50	\$79,200,000	\$950,400,000
Annualized Cost of CORA Mobile Edge						
Annual License Fee	\$45,000				Estimated Net Annual Savings	
Annual Active Device Fee (8.8M x .10 x 12)	\$10,560,000				\$939,795,000	
Annual Cost of CORA ME	\$10,605,000				\$4.41 Increase in Monthly ARPU	

Annual Savings vs Cost of CORA Mobile Edge for Small Carrier with approximately 150K total subscribers

The chart below provides estimated data savings and potential impact to profitability.

Number of Active Devices (est. 50% of Base)	Average Monthly Data Usage per Device (based on worldwide average cost)	Assume 50% Monthly Data Burn is from Video	80% of Monthly Data Burn Reduced by CORA ME	Data Delivery Cost per Gb (based on worldwide average cost)	Monthly Data Delivery Cost Savings	Annual Savings
75,000	15 Gb	562,500 Gb	450,000 Gb	\$1.50	\$675,000	\$8,100,000
Annualized Cost of CORA Mobile Edge						
Annual License Fee	\$25,000				Estimated Net Annual Savings	
Annual Active Device Fee (75K x .15 x 12)	\$135,000				\$7,940,000	
Annual Cost of CORA ME	\$160,000				\$4.41 Increase in Monthly ARPU	

Let us do a personalized data savings review for you, to calculate how CORA ME can affect your ARPU.

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