



The Wireless Last Hop

What is it and why is it important?



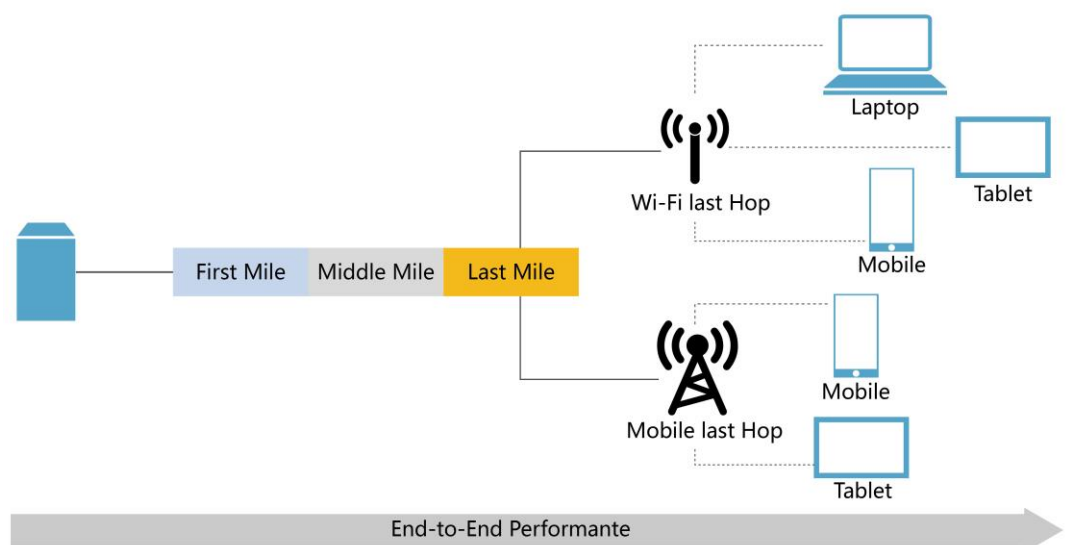
This white paper describes the “wireless last hop” and the growing issue of poor performance when the wireless last hop is included in the measurements. It also discusses an approach that consistently.

Traditional Performance Measurements

The traditional way of measuring end-to-end performance of a web page or a video file was to outsource the testing to 3rd party testing platforms like Keynote, Gomez, CatchPoint or Webpagetest.org. These automated testing platforms would have test agents deployed across the globe to download an object, web page or video file and record the performance results over time for whatever you were testing. The current testing platforms were designed to measure performance over the first, middle and last mile of the wired Internet – before wireless connectivity became the de facto standard.

The challenge with these testing platforms is that they do not include the newest leg in the end-to-end performance calculation – “the wireless last hop”. The tests were not designed to emulate congested wireless networks which are the reality of today’s Internet. This is changing slowly but it is difficult and expensive for these 3rd party testing platforms to set up Wi-Fi and mobile agents in remote locations. It is next to impossible to emulate the latency in these networks because they are independent of the Internet and have their own traffic patterns.

End-to-end performance is only as good as the slowest link on the way to the end user. The wireless last hop is a term that we use to describe the last segment of the path to the end user that passes across a Wi-Fi or mobile network. In most cases the slowest link is this wireless last hop. Your Internet connection can be blazing fast from where the content is originating, across the Internet to your wireless router, BUT if performance is poor across your wireless network then all the user sees is a poor user experience.



Why is the “wireless last hop” so slow?

Wi-Fi and mobile networks become congested and slow down for many reasons but one of the main reasons is latency that changes radically and constantly. This is caused by the “bursty” nature of traffic across these independent networks. When multiple devices access content across a Wi-Fi access point, the router becomes congested and normal TCP collapses. The current version of TCP was not designed to handle radically and rapidly changing network conditions. Mobile networks have the same problem with constantly changing latency and there is also the added latency of switching cell towers as you move out of range. Moreover, traffic across these networks is increasing much faster than the infrastructure to handle the added volume, so this problem is getting worse.

Wireless router companies and mobile carriers are constantly trying to improve their products to address rapid and constant latency changes and packet loss but this is still an ongoing problem. There needs to be a unique approach that seamlessly handles increasing traffic loads across these wireless infrastructures without TCP collapse.

The AppEx unique differentiator

AppEx can increase the end-to-end throughput performance from the data center or cloud – all the way across the mobile last mile to the smart phone you are holding or to the tablet or laptop running on your Wi-Fi network at home or at your local coffee shop. For the first time you can impact not only the first, middle and last mile but also extend this across the “wireless last hop”. Imagine delivering better performance all the way to the end device regardless of whether there was a wireless network or not. The other benefit that AppEx technology delivers is the ability to support more devices across a Wi-Fi network with consistently good performance.

How is AppEx deployed?

AppEx does all of this from the server-end or the edge of a cloud or CDN. The server-side implementation accelerates the traffic (20% - 300%) all the way across the Internet to the end user including the wireless last hop. This happens regardless of how the user device is connected to the Internet. AppEx can be deployed on a laptop for faster uploads as well.

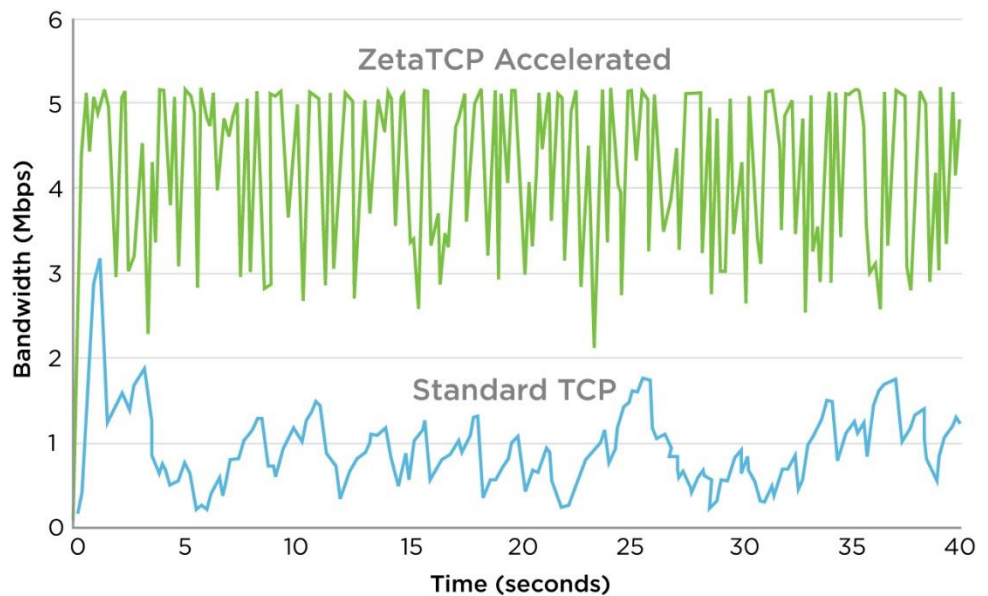
What impact does fixing the wireless last hop from the server-side have on everyday life?

1. Downloads happen much faster (software updates, etc.)

2. Videos are delivered at higher resolution with no buffering interruptions
3. Uploads are faster if AppEx LotClient is loaded on your laptop
4. Web pages can be delivered faster
5. More people in a household can have a good user experience
6. Fewer dropped data sessions on your mobile phone

What can AppEx do for mobile networks?

Any mobile application will benefit from the end-to-end optimization approach of AppEx. **ZetaTCP** will accelerate any type of content being delivered over the mobile last mile or even to a smart phone using a Wi-Fi network. Regardless of what happens before the content gets to the cell towers on the mobile network (caching, FEO, etc.) the content will be accelerated over any 2G, 3G or 4G network (either the mobile last mile or Wi-Fi network) to the mobile device. The result is a much better user experience on the mobile device, consistently with no interruptions.



These tests results were from a content delivery provider network to a wireless device. As you can see, the throughput to the client device is increased significantly.

Summary

It is not very often that a technology comes along that can be easily deployed in a large network AND can deliver a better user experience to the massive audiences that view content across that network, especially wireless and mobile networks, with nothing required at the receiving end.

The wireless last hop has become the slowest link between the content and the end user. The slow last hop has become a major problem in end-to-end performance measurements. Companies are trying many different ways to improve the rapidly changing latency on their networks to try and correct this problem but it is getting worse instead of better because the volume of traffic is increasing faster than the infrastructure to support it.

A unique approach is needed. AppEx technology was designed from the ground up to address the wireless last hop problem across Wi-Fi and mobile networks at the transport layer from anywhere on the network.

Contact AppEx today for more information and to discuss a free trial.



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