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INSIGHT: How the 'Save the Internet' Act Breaks 5G

By Peter Rysavy

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The U.S. is in a critical race with China for 5G leadership, and Democrats in Congress are working to pass the "Save the Internet" Act, which would reinstate 2015 net neutrality rules. Wireless network engineer Peter Rysavy of Rysavy Research explains how these net neutrality rules fundamentally undermine 5G.

The House April 10 passed the Save the Internet Act, seeking to restore regulations on network neutrality.

The legislation (H.R.1644) is now in the Senate and a major lawsuit (*Mozilla Corp. v. FCC*) is also in play. If ultimately re-enacted, these regulations will break 5G at exactly the moment that the U.S is competing in the most important technology battle it has ever undertaken.

5G, just now rolling out in the U.S. and other countries around the world, hugely expands the range of possible use cases for wireless communications. Relative to 4G, 5G will support much higher throughput rates (a gigabit per second and higher), much lower communications delays, far greater capacity, and the ability to access much wider swaths of spectrum and at higher frequencies.

With these enhanced capabilities, 5G networks will be able to address far more applications, far more effectively, than previous cellular generations, including smart factories, autonomous vehicles, telemedicine, robotics, drones, augmented reality, virtual reality, and thousands, if not millions, of yet-to-be-invented innovations.

Many of these applications, however, will depend on ultra-reliable or ultra-fast connections, which can only be implemented through traffic differentiation and prioritization. A smart road wishing to inform an autonomous car of a jay walker in the middle of the street needs to send these packets with higher priority than somebody's television-program video stream. Unfortunately, the fundamental basis of network neutrality is that the network must treat all packets equally.

Negative Industry Consequences

This well-intentioned but simplistic approach to network management will have negative industry consequences, undermining both the business case for 5G deployment as well for new 5G applications that need specific network capabilities.

Different applications inherently have different quality-of-service requirements, which includes parameters such as throughput, delay, and packet loss. Today's popular wireless applications, such as email, social networking, web browsing, and audio/video streaming do not have stringent quality needs, and thus work reasonably well on 4G networks.But many of the applications envisioned for 5G are of a control nature, which means they need minimal delay and high reliability.

Others, such as remote surgery, will need dependable throughput. More spectrum and more bandwidth alone are not enough, especially as the load on these networks increases with users opting for wireless as their only broadband connection and the installation of billions of internet-of-things devices.

The good news is that 5G speci cations de ne a comprehensive network-management architecture, as well as a complementary architecture called network slicing, by which an operator can control the network on a granular level to support the exact needs of different use cases. The bad news, under a "Title II" for of network neutrality, is that the huge potential of these capabilities may never be realized.

Prioritization Does Not Mean Poorer Experience

Prioritizing one application over another does not necessarily mean a poorer experience for the lower-priority application. A video streaming application can tolerate considerable delay because the player buffers information, so a user watching a video will never notice some slightly-delayed data. The pedestrian, however, will notice when the car runs him or her over.

Because different applications have different needs, traffic management is not a zero-sum game. The goal of intelligent management is to maximize the quality of experience across the largest number of users and application types possible, allocating higher priority for those applications that need it while not adversely affecting those that do not.

Prioritization is a fundamental approach for optimally allocating resources in many demanding environments. Highways prioritize different types of vehicles. Airlines prioritize passenger seating and boarding. Teachers prioritize which students need attention. Doctors prioritize which patients they see when based on real-time circumstances. Networking needs are no different.

Given Republican opposition, the current bill in the Senate to restore Title II net neutrality rules, also called "Save the Internet Act," has little chance of passing this year. A bipartisan effort, led by Sen. Kyrsten Sinema (D-Ariz.) and Sen. Roger Wicker (R-Miss.), to develop a new net neutrality proposal is also underway. The greater chance of Title II reinstatement, however, comes from a lawsuit by Mozilla against the FCC's Restoring Internet Freedom order that eliminated the Title II-based 2015 rules, with a decision expected by this summer.

Reinstatement of Title II rules, or other rules or legislation in the future that do not properly recognize the crucial rule of network management will have unfortunate consequences. Banning prioritization or throwing into question exactly what prioritization might or might not be allowed will dissuade the investment and experimentation that the vast capabilities of 5G could enable.

Many are already concerned about how countries such as China could take the lead in 5G deployment, not only giving Chinese companies a lead in 5G capabilities but providing a rich communications platform for complementary technology development such as AI. One can con dently predict that Chinese regulators will not be throwing roadblocks at their 5G deployments.

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