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How 5G is Pushing Processing to the Edge

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Who Is Inseego?

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- U.S. based; Inc. 1996; NASDAQ: INSG
- Target customers
 - Service providers, Fortune 500 enterprise, consumers, government and first responders
- Patent innovations shaping mobile technologies
- Technology leader in intelligent device-to-cloud solutions
- Core member of 5G ecosystem
- 100% designed and developed in the USA

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The Edge What is it, and Why Is It Such a Hot Topic?



On-Premise





















The Importance of Edge Computing to 5G







Source: Ericsson Mobility Report



Real-World 5G Performance Expectations



Users' average 5G download speeds are much faster than 4G download speeds at all 5G operators



5G – The Greatest Innovation Platform Ever Built





Driving | V2x

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Remote Surgery

> Video **Multi-Casting**

Integrated **Smart City**

Virtual



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Edge Compute is Essential to Achieving the Promise of 5G



5G's low-latency promise

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The Device Edge is also a Great Companion to 5G



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Edge Processing Illustrated An Example

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The simplest (and most limited) VR system is a selfcontained headset or headset + smartphone



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5G promises data rates that can support real-time VR/AR applications





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This allows remote real-time computation and content delivery systems





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User equipment gets simpler and less expensive Augmented reality brings new challenges, as we are now mixing in the real(time) world



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direction

Communication becomes bidirectional, as video streams and other sensor data are brought into the processing



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Communication becomes bidirectional, as video streams and other sensor data are brought into the processing $\overbrace{55}{55}$

And suddenly latency matters a lot

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Edge Processing Illustrated—Virtual & Augmented Reality



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Edge Processing Illustrated—Virtual & Augmented Reality



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Yet, it would be most affordable and further optimized to keep more of the processing local.



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Although today's smartphones are very powerful, they are not designed for the (sustained) performance required by demanding 5G applications, such as AR





Edge Processing Illustrated—Virtual & Augmented Reality

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With functionality (personality) delivered from the cloud, a customer-premise or even user-worn device now becomes a bleeding edge extension to the edge cloud



No Limit to the Use Cases





What's Next - A Very Bright and 'Edgy' 5G Future





Key Things To Remember



- Achieving the performance promised by 5G requires more than a high-performance air-interface. It requires a high-performance endto-end solution architecture.
- 5G network operators are building edge-clouds to combat these bottlenecks particularly the internet.
- Spectrum is always a limited and potentially expensive resource, and hence it will often be essential to extend the "edge" all the way to the access device on the user-side of the link.

Resources / Additional Reading



5G Resources

3GPP https://www.3gpp.org/

RCR Wireless News https://www.rcrwireless.com/

Fierce Wireless https://www.fiercewireless.com/

The Ericsson Mobility Report https://www.ericsson.com/en/mobility-report 5G Edge-Compute / Applications

Remote Surgery https://www.businessinsider.com/5g-surgerycould-transform-healthcare-industry-2019-8

5G Americas https://www.5gamericas.org/5g-at-the-edge/

Data Center Knowledge https://www.datacenterknowledge.com/edgecomputing/mobile-network-trombones-are-way-outtune-5g-symphony

