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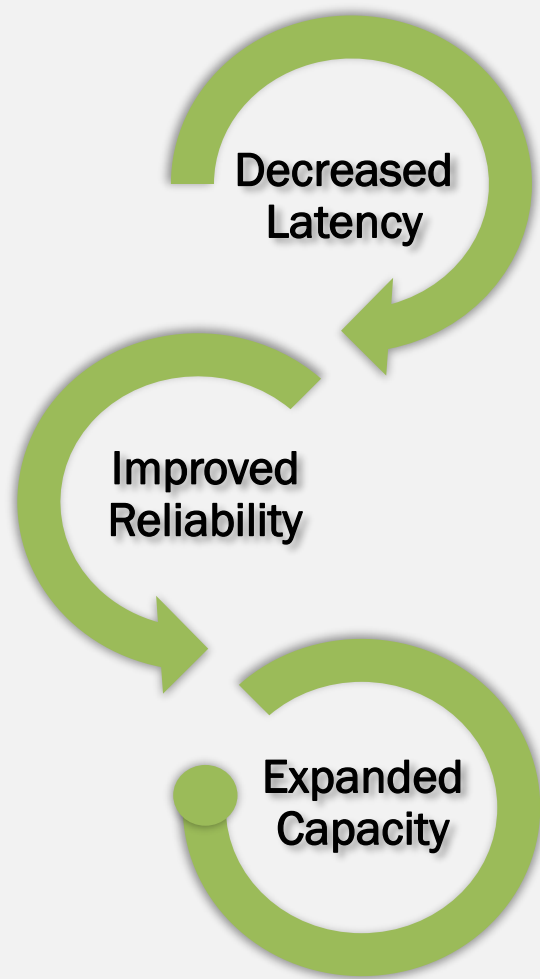
# UNDERSTANDING Technical Advancements of 5G

Technical advancements that emerged in the transition from 4G to 5G include decreased latency, improved reliability, and expanded capacity, all of which will support new connected capabilities across the homeland security enterprise.

4G Baseline

5G Standard

*Improvements in network capabilities from 4G to 5G enables massive Internet of Things (IoT) expansion and advances mission-critical capabilities*



## Decreased Latency

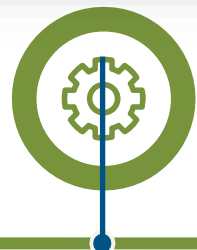
- 5G reduces the time required for data to pass from one point to another on a network by a factor of ten. This allows access to information and communications in less than one millisecond.
- This decreased latency will enable faster decision-making capabilities for connected systems such as autonomous vehicles.

## Improved Reliability

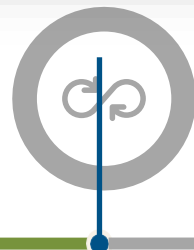
- 5G supports Ultra Reliable Low-Latency Communications (URLLC) service requirements, meaning that no more than 0.001% of 20-byte packets can fail to be delivered within 1 millisecond.
- This reliability is enabled by Channel Stacking and Spectrum Sharing, along with coverage redundancies and more seamless network handoffs to minimize the scope and frequency of network failures and allow information to be shared without restriction to any single frequency of the electromagnetic spectrum.

## Expanded Capacity

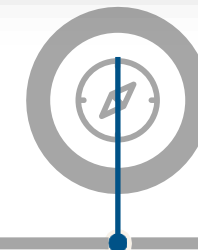
- 5G's increased network capacity and frequency management enable it to support one million connected devices per square kilometer, more than 100 times the capacity of 4G.
- Low-band 5G enables coverage to extend over longer ranges and better penetrate obstacles such as buildings.
- These capacities will support a major expansion of massive IoT systems, which would enable the collection, processing, and analysis of Big Data from a range of connected sensor devices in real-time.



**Understanding Technical Advancements of 5G**



**Comparing Applications of 4G, 5G, and 6G**



**Identifying 6G Focus Areas for DHS**