

The background is a vibrant, futuristic digital landscape. At the top right, a satellite orbits in space. On the left, a tall communication tower stands against a dark blue sky. The center is dominated by glowing blue and green circuitry and data lines. In the foreground, a laptop displays a view of Earth. To the right, a rocket engine is shown in a dynamic, glowing state. The overall scene is a collage of modern and emerging technologies.

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# TFI Wireless Forecast Update

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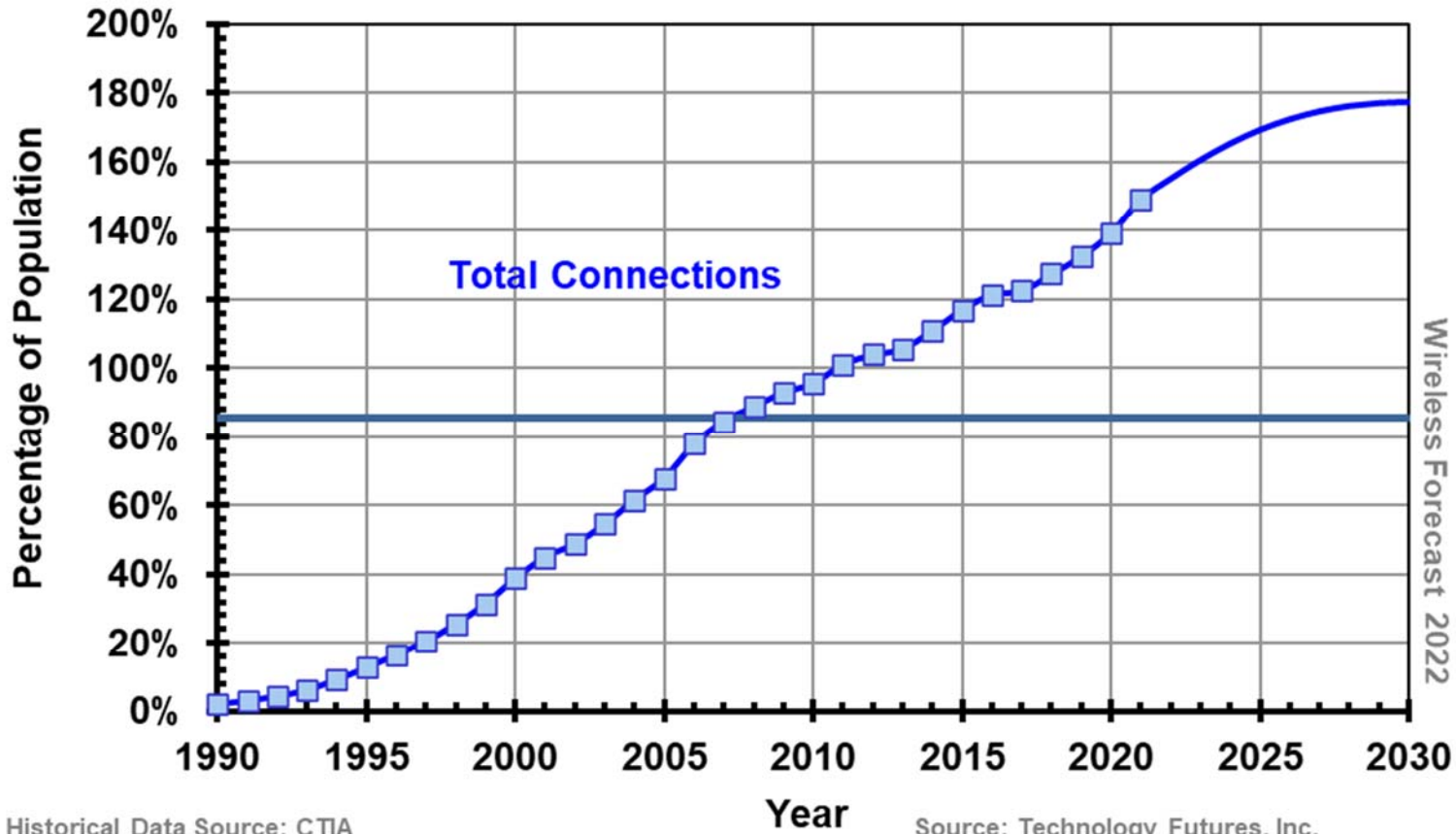
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## Wireless Universe?

- Wireless Voice – People
- Wireless Data – People and Devices
- Wireless Potential – All things fixed or mobile, person or machine (Internet of Things)
- We separately forecast standard connections and data only connections (such as connected cars, IoT devices and wearables)

# U.S. Cellular Connections



Historical Data Source: CTIA

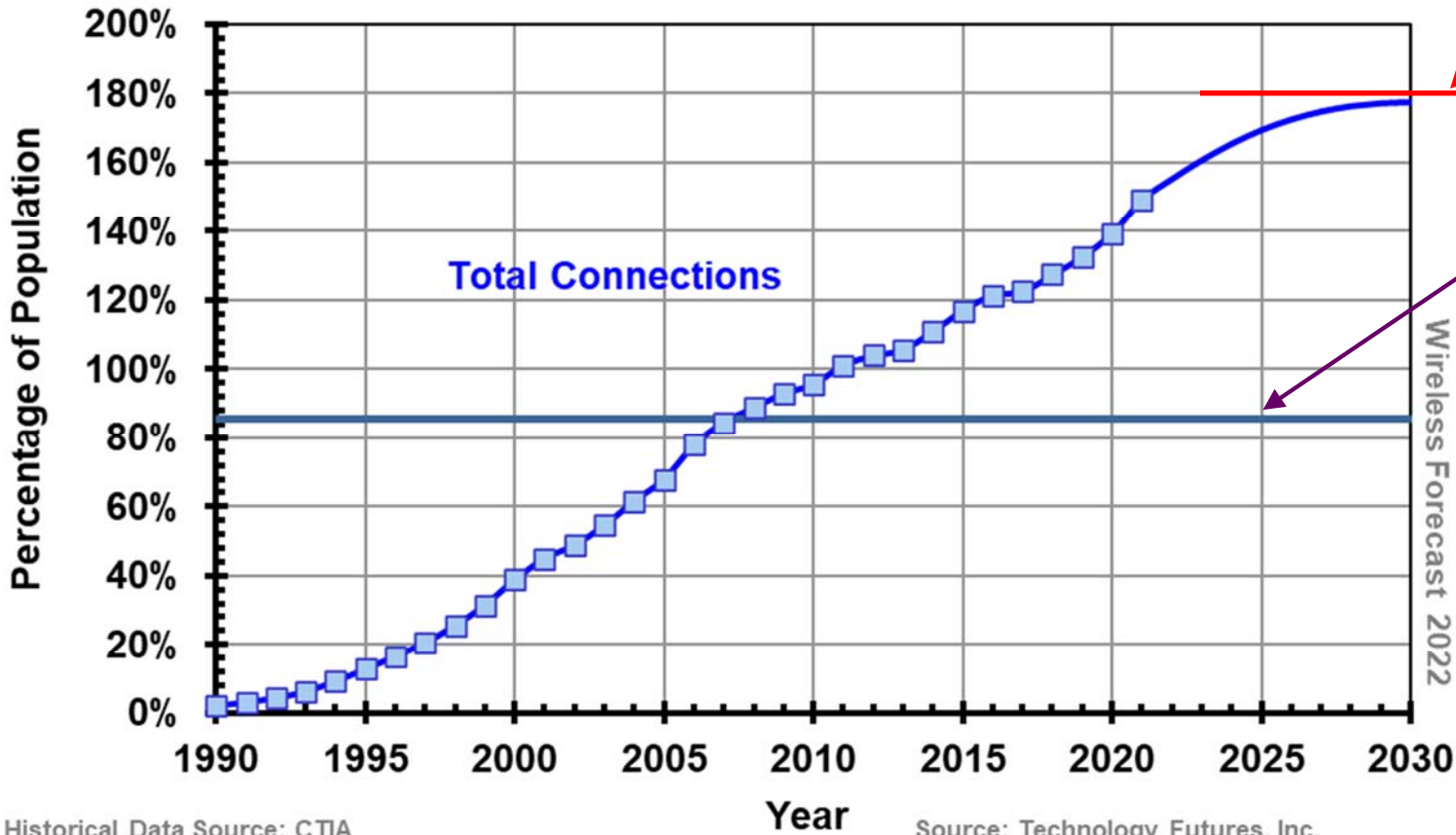
Source: Technology Futures, Inc.

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# U.S. Cellular Connections

*We really don't know what the limit is!*



*At YE 2020, 86% of population had cellphones so everything over this line are additional penetration after 2020, additional devices, or M2M.*

Historical Data Source: CTIA

Source: Technology Futures, Inc.

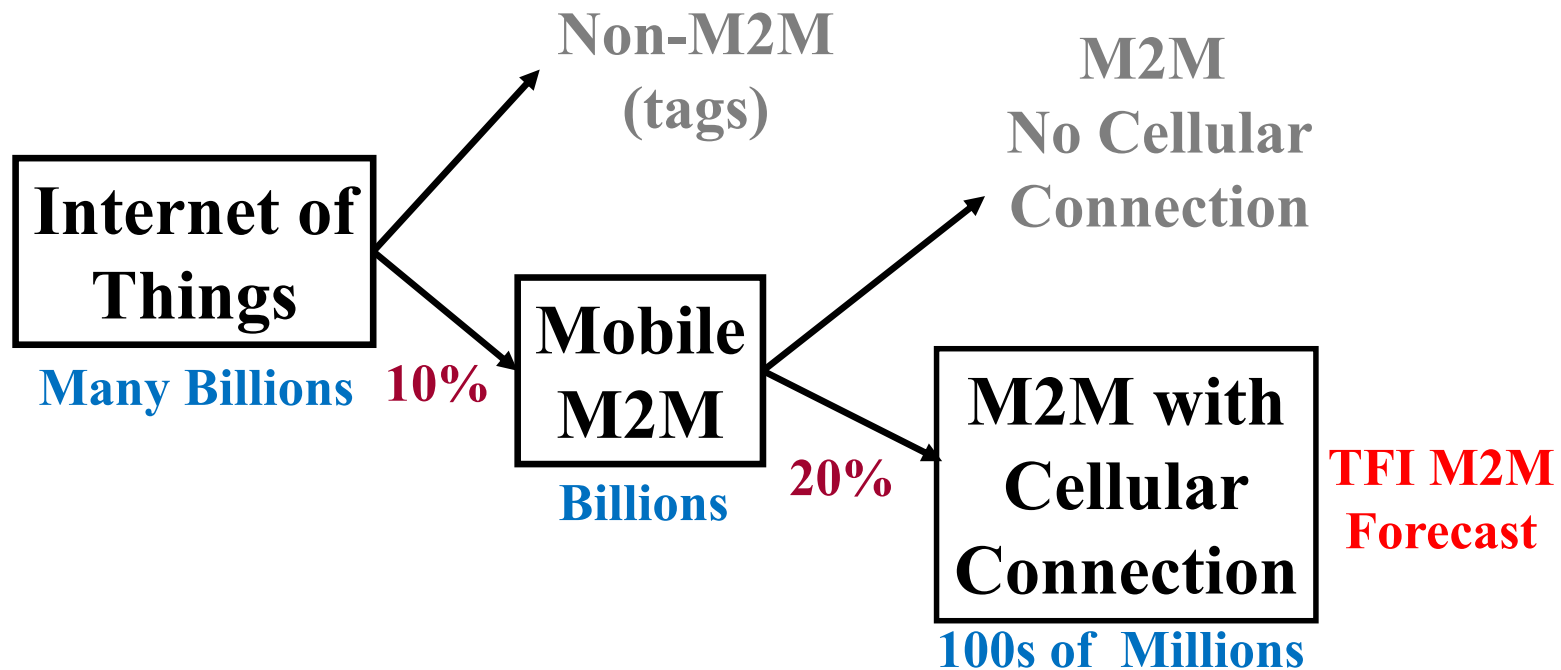
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## M2M (Data Only) Connections Vs Standard Connections

- M2M has vast range of bandwidth requirements.
- M2M often needs different geographic coverage.
- M2M needs low cost, low power solutions.
- 5G is designed for M2M from ground up.

# The IoT will include many items unconnected to the cellular network



*Based on GSMA estimates*

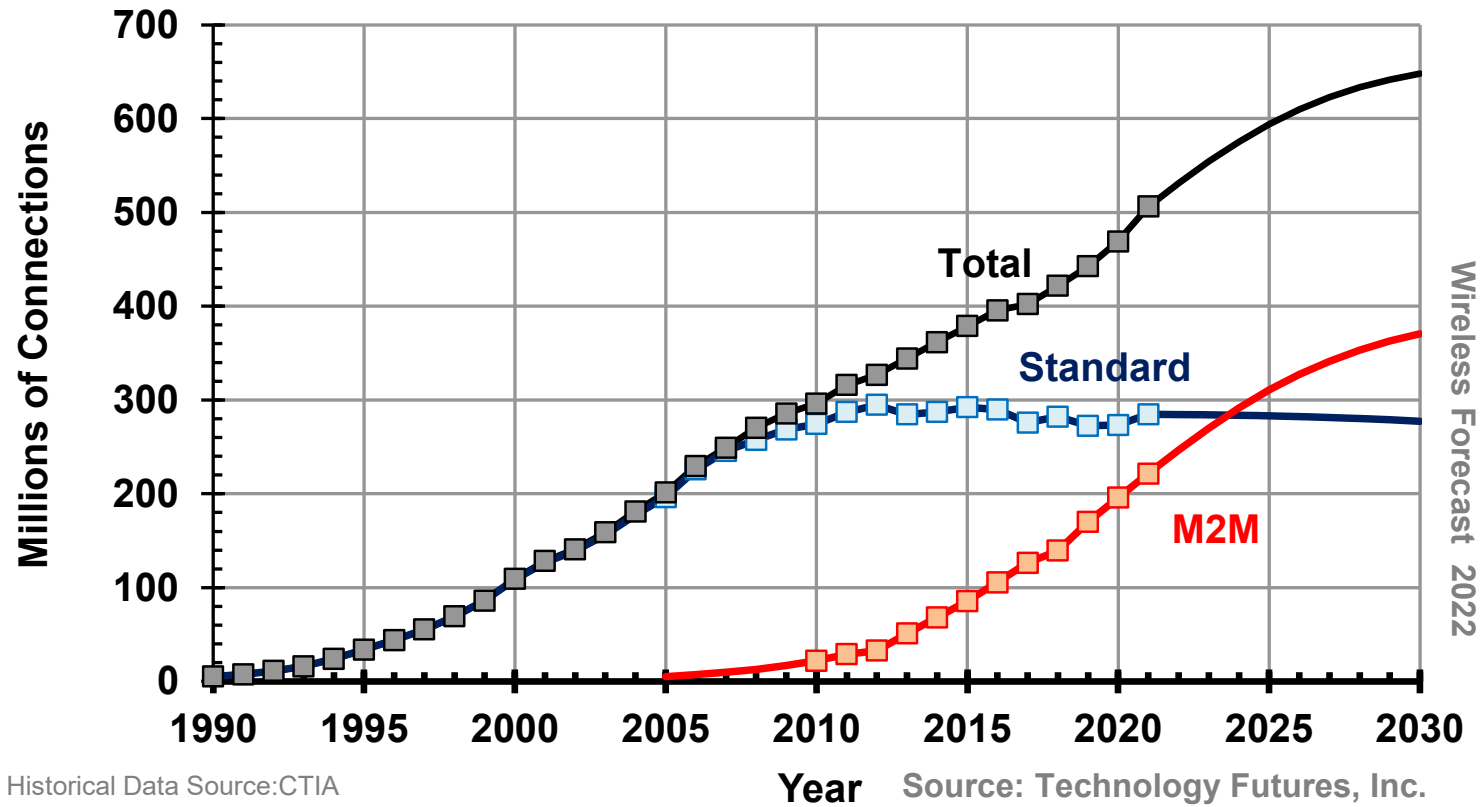
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## Forecast of Data Only Connections

- Historical data points are primarily from CTIA and carrier provided data.
- The YE 2022 the estimation is 246.5 M.



# 2022 TFI Wireless Connection Forecast

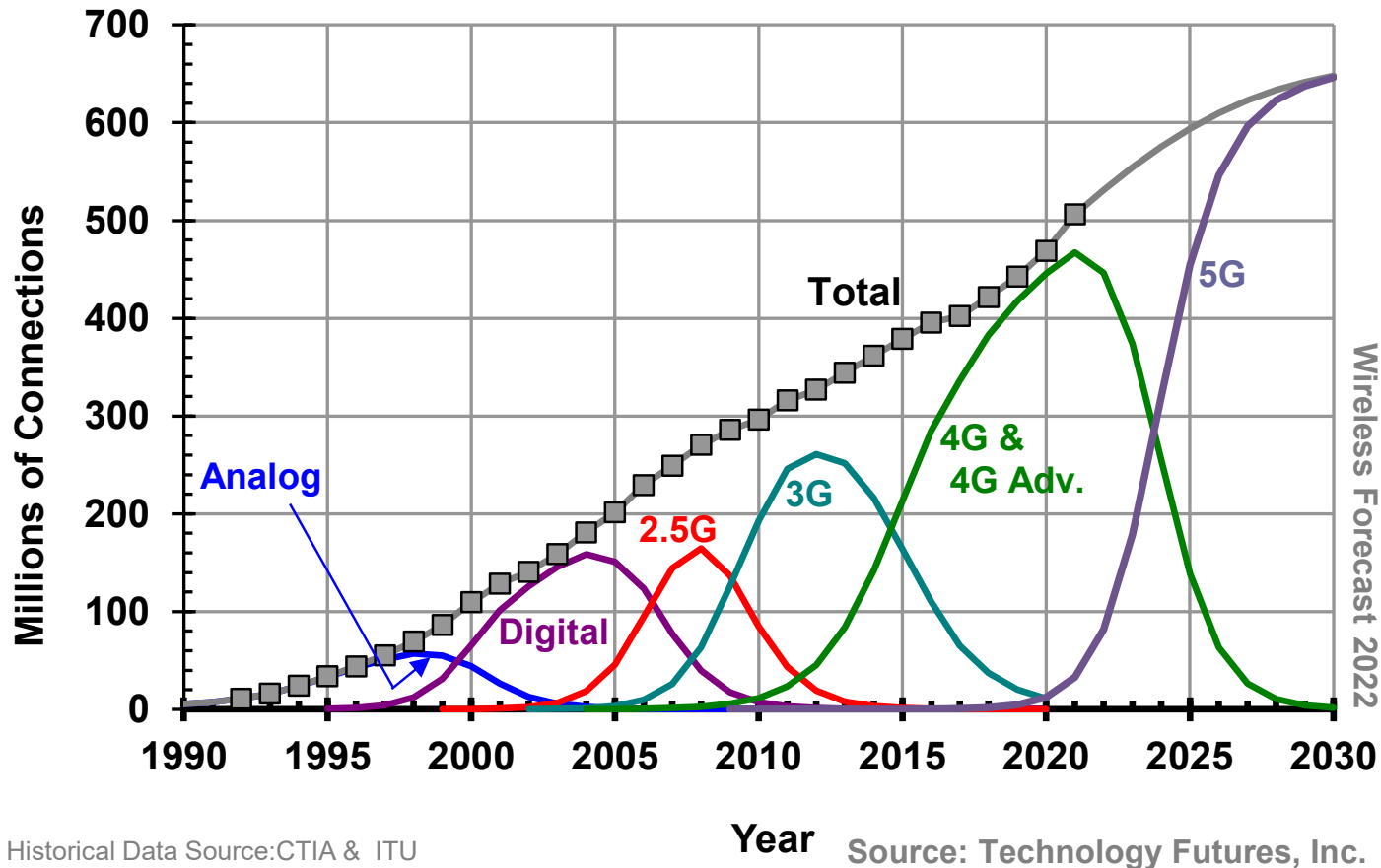


Wireless Forecast 2022

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# 2022 TFI Wireless Generations Forecast



Historical Data Source: CTIA & ITU

Year Source: Technology Futures, Inc.



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## Drivers for New Generations

- Mobile data traffic is growing much more rapidly than connections
- M2M connections are growing faster than standard connections
- Greatly improving cost/performance of newer technology

5G is the right technology at the right time

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