# The Internet of Things Data Tsunami

*“And just like any company that blissfully ignored the Internet at the turn of the century, the ones that dismiss the Internet of Things risk getting left behind.”*
– Jared Newman, tech journalist

*“What the Internet of Things is really about is information technology that can gather its own information. Often what it does with that information is not tell a human being something, it [just] does something.”*
– Kevin Ashton, technologist known for coining the term “Internet of Things”

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The physical and digital universes have something in common: sheer size with respect to volumes that are so large that they require special measurement units. Once one gets used to these new dimensions, concepts like “large” and “small” take on new meaning.

Similar to the consumer data tsunami predicted by telecom operators in the early 2000s, the proliferation of connected and intelligent “things” will create a giant swell of data in the decades to come. Most analysts predict the following growth in terms of total data consumption worldwide:

- 8 ZB*/year between 2020 and 2022
- 16 ZB/year between 2022 and 2024
- 35 ZB/year between 2024 and 2025

*1 ZB (zettabyte) of data is equivalent to 1 trillion GBs (gigabytes). To put the size of 1 GB into perspective, it is equivalent to sending 30K emails, taking 1K digital photos, playing 34 hours of video games online or streaming a 2 ½ hour-long movie.

But a giant swell of data is not necessarily good news for everyone. Only a portion of this data will be useful for improving operational and business efficiencies. With larger volumes of data, more effort will be required to identify relevant and actionable insights that drive meaningful outcomes.

Hence, looking at this 4.5X increase in data volumes between 2020 and 2025, one immediate conclusion is that advanced data-analytics, machine-learning and Artificial Intelligence capabilities will no longer be merely a “nice-to-have”, but a “need-to-have” for businesses. Most analysts suggest the path to get there is a continuum of technological advancements from Assisted Intelligence, to Augmented Intelligence to Autonomous Intelligence – all facilitated by the Internet of Things.

**What is the "Internet of Things"?**
The term Internet of Things – also shorthanded as IoT – has been around for two decades. Most attribute the original usage to Kevin Ashton, co-founder of the Auto-ID Center at MIT, in a presentation to Proctor & Gamble in 1999. And, while the concept is relatively mature, the space has become much more topical of late. In fact, Deloitte's 2020 Technology Industry Outlook specifically mentions IoT as a major area to watch as we jump into the next decade.

But for all of the recent chatter around those three little words (and letters), there are still plenty of misunderstandings about what the term even means. In layman's terms, the Internet of Things is the universe of devices that are connected to the Internet and to each other. In today's world, this includes "smart things" such as tablets, phones, watches, cameras, sensors, robots, drones, scooters, cars, trackers, televisions – and even things like refrigerators, shoes and lightbulbs. The below image does a pretty good job of illustrating the concept for those with advanced visual acuity:

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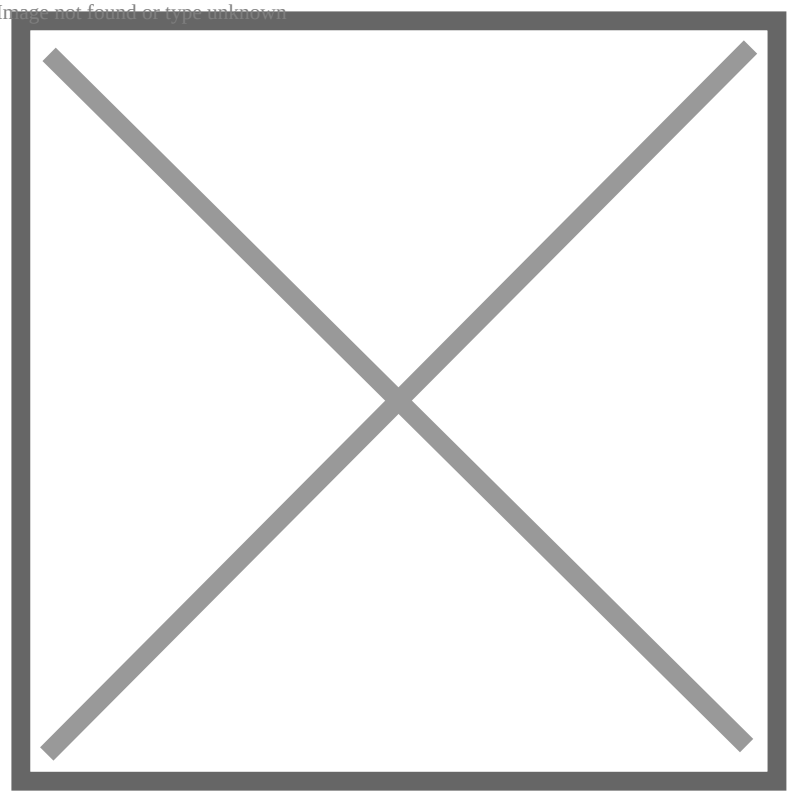

It doesn't take too long to stumble upon one of these "things" in everyday life and to understand that the projections for tremendous growth are not overstated based on how many devices are being connected to the cloud these days. In the rest of this article, we will discuss some of the key players and expected winners as the Internet of Things data tsunami continues to swell.

**Mobile Network Operators**
Large Mobile Network Operators (MNOs) such as T-Mobile, AT&T, and Verizon have traditionally built their core business on reaching consumers with data, voice, and SMS (i.e. text) offerings. For a long time, this was the largest and most profitable segment of the telecommunications space. However, with the proliferation of smart and connected "things," it is estimated that the number of connected IoT devices will explode to 80 billion by 2025, far surpassing the existing consumer opportunity. Some experts even estimate that the amount of data consumed will considerably exceed 35 ZB/year by 2025 (a number we mentioned above)

and reach upwards of 180ZB per year with an $11 trillion yearly global economic impact. One technological advancement that will likely have a major effect on accelerating this expansion is the rollout of 5G, a subject we wrote about back in March. Similar to how 4G and LTE has enabled higher-data use cases on consumer devices (such as video streaming), 5G will support the rollout of billions of connected “things”. Thus, global network operators investing heavily in 5G are bound to see a significant uptick in IoT-related business.

**Cloud and Digital Security Companies**

In 2017, *the Economist* printed an article claiming that the world’s most valuable resource is no longer oil, but data. Large and established cloud companies such as Microsoft, Amazon and Google are central to this thesis, and will continue to be hubs for the collection and storage of data from internet-connected devices. Consider the telematics data from your car, or the healthcare data from your Fitbit, or the streaming data from your tablet. All of that data is being collected and stored in the cloud and, as more devices come online, it will require additional data centers and cloud solutions. Considering that consumer and enterprise devices contain troves of digital information, security around this data is also becoming increasingly important and companies investing or developing in the digital security space will likely reap the rewards in years to come – assuming they can keep in front of the threats that evolve.

**Intelligent Connectivity Solutions**

Traditional network operators are limited by their ability to provide connectivity on a single network. Any device that travels out-of-network is subject to roaming rates that significantly increase the economics for a device staying connected to the Internet. This becomes an issue in a truly global world, where devices need to switch between multiple network operators. Intelligent connectivity solutions that are able to re-provision themselves onto different networks through eSIM or iSIM technology are likely to have a significant leg-up when addressing many of the core business challenges surrounding global deployments. While this technology is even younger than the Internet of Things space, first-movers that are able to partner with a global consortium of network operators will also be well-positioned to capitalize on the IoT boom.

**Energy Suppliers**

For global telecom operators, one of the highest operating costs has historically been energy. Currently, the telecom industry consumes about 2-3% of the global energy supply. With the potential increase in data consumption from the Internet of Things and 5G, some analysts suggest a higher density of base stations could result in 2-3 times more energy consumption. (As a side note, this clearly has very positive implications for natural gas demand going forward.)

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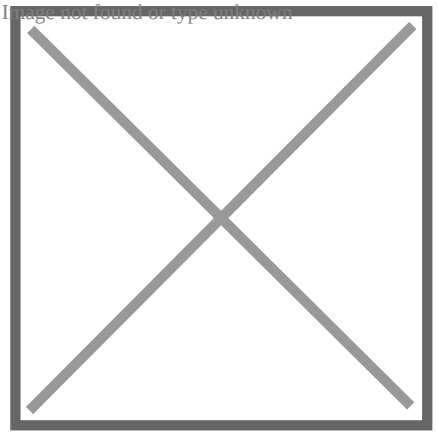

Others point to the fact that improvements in equipment efficiencies will offset any traffic

increases. While the jury is still out on just how much of an energy increase we'll see as the result of network densification, what's clear is many operators will continue to maintain older and less-efficient 2G, 3G, 4G and 5G networks while IoT data traffic surges.

**Edge Computing**

With an explosion of IoT devices, increased portability of computing power and AI-driven tools, edge computing is also projected to see significant growth over the next several years. According to Gartner, companies only generated 10% of their data outside of a data center or the cloud in 2019, but this number is expected to grow to 75% over the next six years. This will allow data from IoT devices to be analyzed at the edge of a network (and closer to the location where it is needed), before being sent to the cloud or a data center, which will improve response times and save bandwidth. Again, for those with more visual acuity, the below image visualizes the concept in greater detail. According to Deloitte, "The benefits of edge computing will extend to factories, distribution facilities, autonomous vehicles—essentially any situation where data must be processed locally versus sending it to the cloud or a data center."

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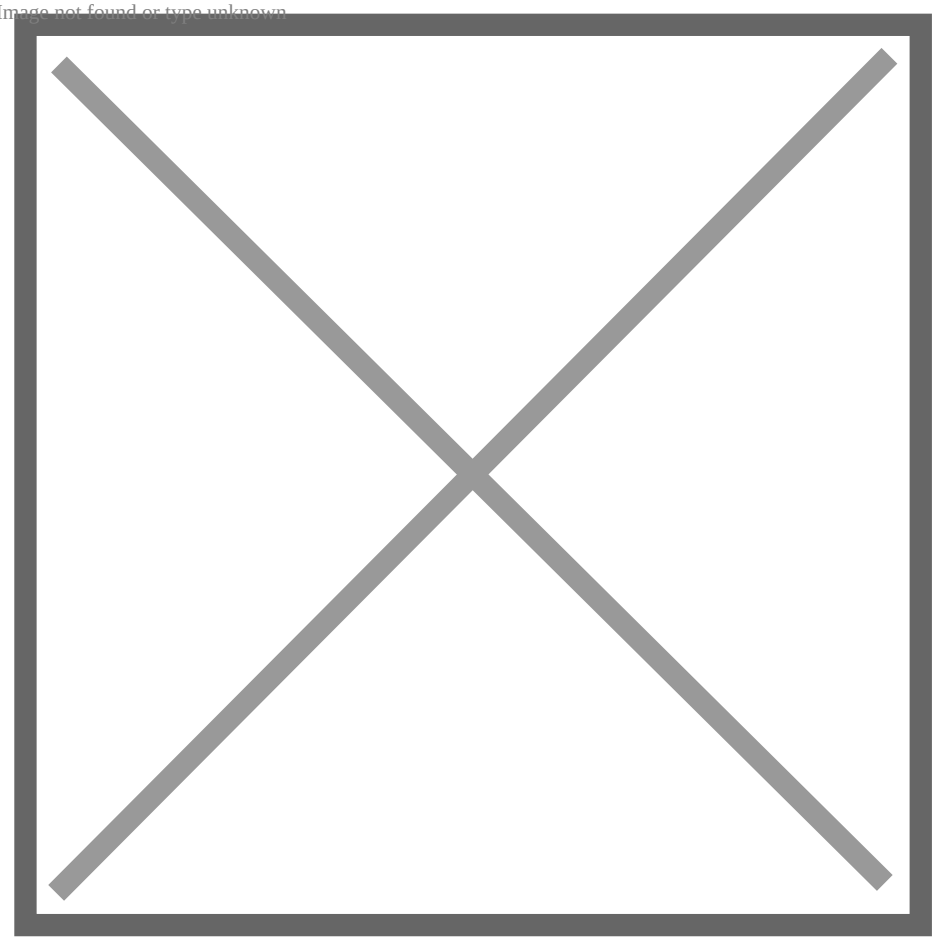

## Conclusion

Advancements in Artificial Intelligence, Machine Learning and Autonomous Intelligence will only accelerate the amount of data consumed in the decades to come. The explosion in the Internet of Things space will create vast opportunities for everyone from large telecom companies, to innovative start-ups solving connectivity and edge computing challenges, to energy companies, to established cloud and digital security businesses that are vital to the data-driven ecosystem. With the wind at its back, the Internet of Things data tsunami is bound to grow larger and larger– carrying along those who ride the tidal wave into the 2020s.

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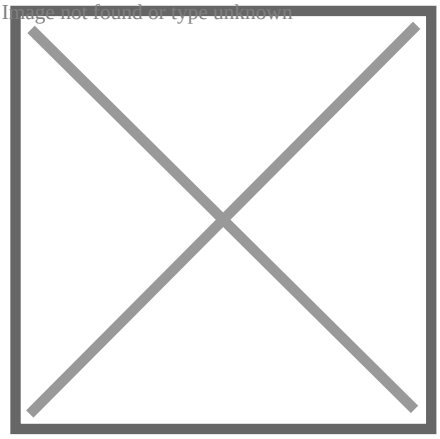

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## About the Author

Michael Johnston is the co-founder of **Teal Communications**, an intelligent IoT connectivity platform that also delivers hardware and software solutions for private-LTE and 5G deployments. In addition to serving as an Evergreen employee, Michael also acts as a business consultant to a Fortune 50 technology company and serves as a strategic advisor to **Nodesmith** , a platform for blockchain application development. To contact Michael, send an email to **mjohnston@evergreengavekal.com**.