

Sydney, 8 November 2018 — Gartner, Inc. today highlighted the top strategic Internet of Things (IoT) technology trends* that will drive digital business innovation from 2018 through to 2023.

“The IoT will continue to deliver new opportunities for digital business innovation for the next decade, many of which will be enabled by new or improved technologies,” said Nick Jones, research vice president at Gartner. “CIOs who master innovative IoT trends have the opportunity to lead digital innovation in their business.”

In addition, CIOs should ensure they have the necessary skills and partners to support key emerging IoT trends and technologies, as, by 2023, the average CIO will be responsible for more than three times as many endpoints as this year.

Gartner shortlisted the 10 most strategic IoT technologies and trends that will enable new revenue streams and business models, as well as new experiences and relationships:

Trend No. 1: Artificial Intelligence (AI)

Gartner forecasts that 14.2 billion connected things will be in use in 2019, and that the total will reach 25 billion by 2021, producing immense volume of data. “Data is the fuel that powers the IoT and the organisation’s ability to derive meaning from it will define their long term success,” said Mr. Jones. “AI will be applied to a wide range of IoT information, including video, still images, speech, network traffic activity and sensor data.”

The technology landscape for AI is complex and will remain so through 2023, with many IT vendors investing heavily in AI, variants of AI coexisting, and new AI-based tools and services emerging. Despite this complexity, it will be possible to achieve good results with AI in a wide range of IoT situations. As a result, CIOs must build an organisation with the tools and skills to exploit AI in their IoT strategy.

Trend No. 2: Social, Legal and Ethical IoT

As the IoT matures and becomes more widely deployed, a wide range of social, legal and ethical issues will grow in importance. These include ownership of data and the deductions made from it; algorithmic bias; privacy; and compliance with regulations such as the General Data Protection Regulation.

“Successful deployment of an IoT solution demands that it’s not just technically effective but also socially acceptable,” said Mr. Jones. “CIOs must, therefore, educate themselves and their staff in this area, and consider forming groups, such as ethics councils, to review corporate strategy. CIOs should also consider having key algorithms and AI systems reviewed by external consultancies to identify potential bias.”

Trend No. 3: Infonomics and Data Broking

Last year’s Gartner survey of IoT projects showed 35 percent of respondents were selling or planning to sell data collected by their products and services. The theory of infonomics takes this monetisation of data further by seeing it as a strategic business asset to be recorded in the company accounts. By 2023, the buying and selling of IoT data will become an essential part of many IoT systems. CIOs must educate their organisations on the risks and opportunities related to data broking in order to set the IT policies required in this area and to advise other parts of the organisation.

Trend No. 4: The Shift from Intelligent Edge to Intelligent Mesh

The shift from centralised and cloud to edge architectures is well under way in the IoT space. However, this is not the end point because the neat set of layers associated with edge architecture will evolve to a more unstructured architecture comprising of a wide range of “things” and services connected in a dynamic mesh. These mesh architectures will enable more flexible, intelligent and responsive IoT systems — although often at the cost of additional complexities. CIOs must prepare for mesh architectures’ impact on IT infrastructure, skills and sourcing.

Trend No. 5: IoT Governance

As the IoT continues to expand, the need for a governance framework that ensures appropriate behaviour in the creation, storage, use and deletion of information related to IoT projects will become increasingly important. Governance ranges from simple technical tasks such as device audits and firmware updates to more complex issues such as the control of devices and the usage of the information they generate. CIOs must take on the role of educating their organisations on governance issues and in some cases invest in staff and technologies to tackle governance.

Trend No. 6: Sensor Innovation

The sensor market will evolve continuously through 2023. New sensors will enable a wider range of situations and events to be detected, current sensors will fall in price to become more affordable or will be packaged in new ways to support new applications, and new algorithms will emerge to deduce more information from current sensor technologies. CIOs should ensure their teams are monitoring sensor innovations to identify those that might assist new opportunities and business innovation.

Trend No. 7: Trusted Hardware and Operating System

Gartner surveys invariably show that security is the most significant area of technical concern for organisations deploying IoT systems. This is because organisations often don't have control over the source and nature of the software and hardware being utilised in IoT initiatives. "However, by 2023, we expect to see the deployment of hardware and software combinations that together create more trustworthy and secure IoT systems," said Mr. Jones. "We advise CIOs to collaborate with chief information security officers to ensure the right staff are involved in reviewing any decisions that involve purchasing IoT devices and embedded operating systems."

Trend 8: Novel IoT User Experiences

The IoT user experience (UX) covers a wide range of technologies and design techniques. It will be driven by four factors: new sensors, new algorithms, new experience architectures and context, and socially aware experiences. With an increasing number of interactions occurring with things that don't have screens and keyboards, organisations' UX designers will be required to use new technologies and adopt new perspectives if they want to create a superior UX that reduces friction, locks in users, and encourages usage and retention.

Trend No. 9: Silicon Chip Innovation

"Currently, most IoT endpoint devices use conventional processor chips, with low-power ARM architectures being particularly popular. However, traditional instruction sets and memory architectures aren't well-suited to all the tasks that endpoints need to perform," said Mr. Jones. "For example, the performance of deep neural networks (DNNs) is often limited by memory bandwidth, rather than processing power."

By 2023, it's expected that new special-purpose chips will reduce the power consumption required to run a DNN, enabling new edge architectures and embedded DNN functions in low-power IoT endpoints. This will support new capabilities such as data analytics integrated with sensors, and speech recognition included in low cost battery-powered devices. CIOs are advised to take note of this trend as silicon chips enabling functions such as embedded AI will in turn enable organisations to create highly innovative products and services.

Trend No. 10: New Wireless Networking Technologies for IoT

IoT networking involves balancing a set of competing requirements, such as endpoint cost, power consumption, bandwidth, latency, connection density, operating cost, quality of service, and range. No single networking technology optimises all of these and new IoT networking technologies will provide CIOs with additional choice and flexibility. In particular they should explore 5G, the forthcoming generation of low earth orbit satellites, and backscatter networks.

Gartner clients can learn more in the report "Top Strategic IoT Trends and Technologies Through 2023."

*For Editors:

Gartner defines a strategic technology trend as one with substantial disruptive potential that is beginning to break out of an emerging state into broader impact and use; or as a trend that is rapidly growing with a high degree of volatility, and that will reach a tipping point over the next five years.

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