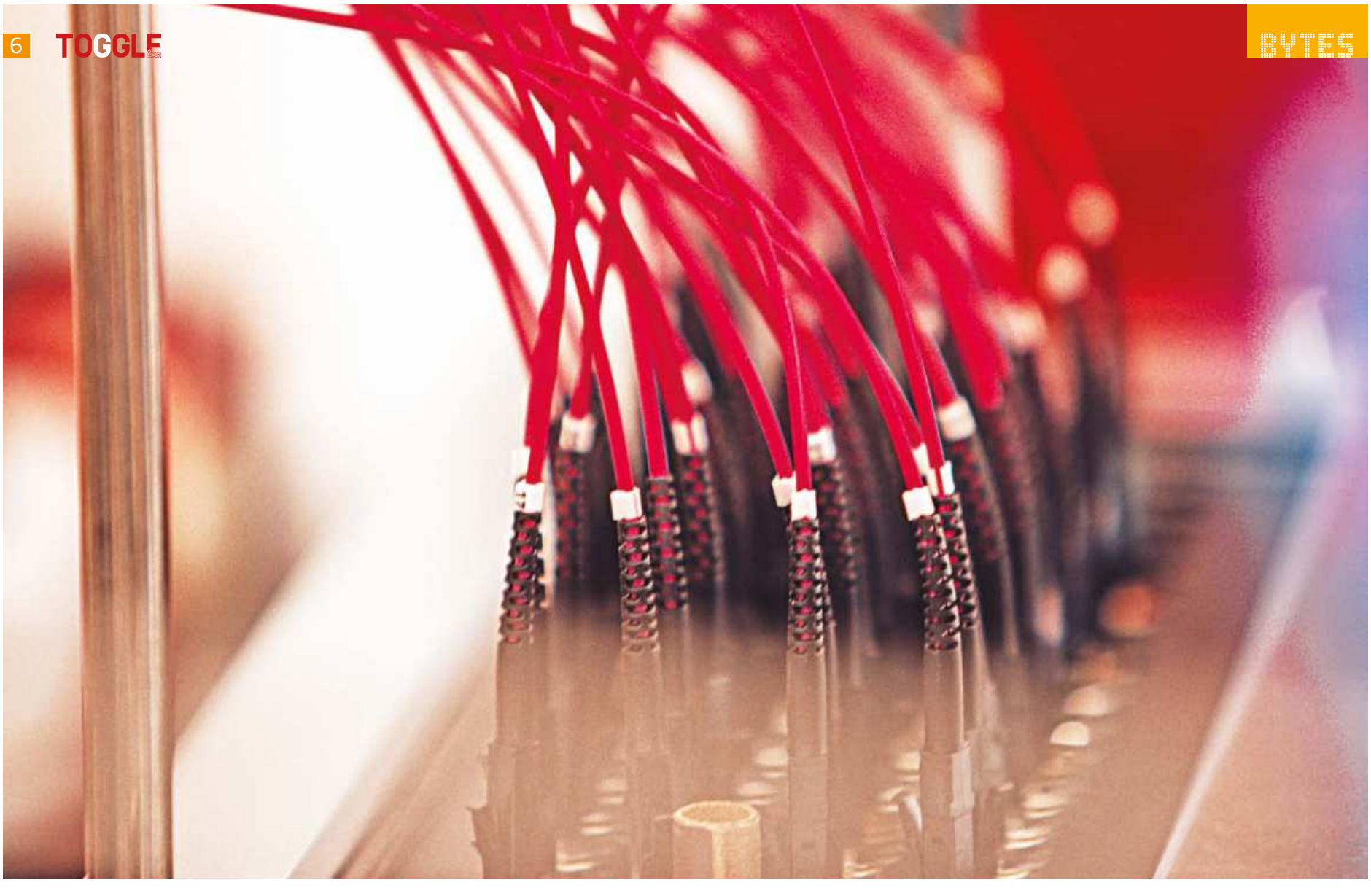

Edge Computing: Why it Matters

OROBI BAKHTIAR

Edge computing is transforming the way data is being handled, processed, and delivered from millions of devices around the world. The explosive growth of internet-connected devices – the IoT – along with new applications that require real-time computing power, continues to drive edge-computing systems.

Faster networking technologies, such as 5G wireless, are allowing for edge computing systems to accelerate the creation or support of real-time applications, such as video processing and analytics, self-driving cars, artificial intelligence and robotics, to name a few

What is Edge Computing?

At its basic level, edge computing brings computation and data storage closer to the devices where it is being gathered, rather than relying on a central location that can be thousands of miles away. This is done so that data, especially real-time data, does not suffer latency issues that can affect an application's performance. In addition, companies can save money by having the processing done locally, reducing the amount of data that needs to be processed in a centralized or cloud-based location.

Edge Computing was developed due to the exponential growth of IoT devices, which connect to the internet for either receiving information from the cloud or delivering data back to the cloud. And many IoT devices generate enormous amounts of data during the course of their operations.

Benefits of Edge Computing

For many companies, the cost savings alone can be a driver towards deploying an edge-computing architecture. Companies that embraced the cloud for many of their applications may have discovered that the costs in bandwidth were higher than they expected.

Increasingly, though, the biggest benefit of edge computing is the ability to process and store data faster, enabling for more efficient real-time applications that are critical to companies. Before edge computing, a smartphone scanning a person's face for facial recognition would need to run the facial recognition algorithm through a cloud-based service, which would take a lot of time to process. With an edge computing model, the algorithm could run locally on an edge server or gateway, or even on the smartphone itself, given the increasing power of smartphones. Applications such as virtual and augmented reality, self-driving cars, smart cities and even building-automation systems require fast processing and response.

Companies such as NVIDIA have recognized the need for more processing at the edge, which is why people are seeing new system modules that include artificial intelligence functionality built into them. The company's latest module, for example, is smaller than a credit card, and can be built into smaller devices such as drones, robots and medical devices. AI algorithms require large amounts of processing power, which is why most of them run via cloud services. The growth of AI chipsets that can handle processing at the edge will allow for better real-time responses within applications that need instant computing.

Drawbacks

However, as is the case with many new technologies, solving one problem can create others. From a security standpoint, data at the edge can be troublesome, especially when it is being handled by different devices that might not be as secure as a centralized or cloud-based system. As the number of IoT devices grows, it's imperative that IT understand the potential security issues around these devices, and to make sure those systems can be secured. This includes making sure that data is encrypted, and that the correct access-control methods and even VPN tunnelling are utilized.

Furthermore, differing device requirements for processing power, electricity and network connectivity can have an impact on the reliability of an edge device. This makes redundancy and failover management crucial for devices that process data at the edge to ensure that the data is delivered and processed correctly when a single node goes down.

5G and the future of Edge Computing

Wireless communication technologies, such as 5G and Wi-Fi 6, will also affect edge deployments and utilization in the coming years, enabling virtualization and automation capabilities that have yet to be explored, such as better vehicle autonomy and workload migrations to the edge, while making wireless networks more flexible and cost-effective.

Edge computing gained notice with the rise of IoT and the sudden glut of data such devices produce. But with IoT technologies still in relative infancy, the evolution of IoT devices will also have an impact on the future development of edge computing. One example of such future alternatives is the development of micro modular data centres (MMDCs). The MMDC is a data centre in a box, putting a complete data centre within a small mobile system that can be deployed closer to data -- such as across a city or a region -- to get computing much closer to data without putting the edge at the data proper.