Is Edge Computing Changing the Digital Ecosystem?

The short answer is yes, edge computing is changing the digital ecosystem as a result of global situations that arose over the past few years. The pandemic had a big impact on the way in which businesses kept the lights on. Almost overnight, businesses needed to focus on digital connectivity to stay viable because their employees were working from home and their customers were using the internet more than ever to purchase goods.

The pandemic also made clear the fact that affordable and high-performing internet connections were sadly lacking. As one alternative for reducing the requirement for expanding internet capabilities, edge computing is becoming more prevalent. The edge computing market size in the U.S. was $691.6 million in 2021, and it is projected to grow at a 33.4% CAGR between 2022 and 2030.[1]

WHAT IS EDGE COMPUTING?

Edge computing is a type of distributed IT architecture where data is stored and processed at the edge of the network. The goal is to process data as close to its source as possible. It is different from cloud computing where data is moved from multiple locations and then processed in the cloud.

Today, the number of devices that connect to the internet and the volume of data that a typical business produces can make sending data to and from a central location less than ideal. The advantages of edge computing include:

- Avoiding bandwidth restrictions, latency issues, and network disruptions because data isn't traveling long distances on sometimes crowded networks

- Improved security and privacy because the bulk of the data isn't residing on a central server

- Cost avoidance because additional bandwidth won't be needed as quickly

- Scalability as edge devices can be added on an as-needed basis

HOW IS EDGE COMPUTING CHANGING THE DIGITAL ECOSYSTEM?

While edge computing is a relatively new concept, the predictions for growth of the technology signal an increase in adoption. As a result, there are several ways in which edge computing has and will change the digital infrastructure.[2]

1. IT Resources Become Decentralized

Moving away from a centralized computing approach allows your business to be more agile and gives you the opportunity to enter new markets. In addition, with storage and computing power close to the end user, the users' experiences are often improved, giving them capabilities they never had before.

An excellent example is how Chick-fil-A is using edge computing at the store level. A 2018 article written by the Chick-fil-A IOT/edge team explains how it works.[3] In summary, the fast food giant allows their locations to run analytics on smart kitchen equipment data. For example, the company can use the cloud to predict how many products should be prepared each day. Then, the individual locations can use real-time sales data to tailor the forecast based on the traffic at their location.

2. Application of Composable Infrastructure Increases

Composable infrastructure allows you to pool your computing resources and allocate them as needed. The resources then act as a service that can be managed centrally with software to ensure that resources are available at the right place and time.

One clear advantage to this type of architecture is that it significantly increases resource utilization. In addition, it's not necessary to reconfigure hardware to match the needs of your applications. It's also possible to provide interconnection between many providers. Connecting multiple carriers provides redundancy, increases system uptime, and helps to control costs.

3. Use of Network Neutral Colocation Increases

You know how devastating it can be if your IT systems go down. One potential cause for downtime is when the data center you're using is carrier specific and the network fails. There are no alternatives when the servers are running – and you can't access them because the network is down.

Carrier-neutral edge colocation data centers operate independently of any one carrier and allow you to connect to multiple colocation and carrier providers. That makes edge computing more reliable because alternatives exist, even if one data center is unreachable. You can run in one colocation center and backup in another. Switching between the two is possible due to the carrier-neutral infrastructure.

4. Increased Use of Peering for Internet Exchange Points

Internet exchange points (IXPs) can be used to allow network carriers, operators, and ISPs to exchange data directly. The IXPs' network switches route traffic among their member networks with no need for an intermediary network transit provider. Peering is the technique used to share IP addresses without an intermediary. In general, there is no cost for transferring data among member networks. This infrastructure typically improves network performance, increases resiliency, and reduces connectivity costs.

In some cases, large networks may set up peer arrangements with other large networks, but they may charge smaller networks. You may find it necessary to configure your routing protocols to choose the least costly route or the one that will reduce latency.[4]

5. Increased Use of Containers

Another way to support edge computing is through the use of containers.[5] Many of the applications that businesses want to run on the edge have a very low tolerance for latency, especially when the application is intended for real-time data analysis. Containers are lightweight and perfect for running on edge devices. Legacy applications that need to run on the edge can be containerized to make the transition easier.

In addition, containers can be implemented on any device with some minor restrictions – and thus can run on many types of hardware without porting the application code. Updating containers can be done in place, which again makes edge computing more effective.

6. Increased Use of Emerging Technologies

Emerging technologies like 5G, IoT, AI, and more are made to take advantage of edge computing. Edge computing is driving AI because, when applied at the edge, AI allows for improved decision-making due to the availability of real-time data that produces actionable intelligence. This is especially true in the manufacturing sector where edge computing can solve key business problems.

Another use case where AI is used with edge computing relates to the use of video cameras as a universal sensor. The cameras are being used to detect things like hardware defects, theft, or whether someone isn't wearing the required safety equipment. Manufacturers, for example, need the ability to react immediately to safety issues. In many cases, the latency of sending data to the cloud doesn't support that type of instant response. Edge computing aligned with emerging technologies is going to make the difference.

FINAL THOUGHTS

The pandemic forced many changes in the business environment. It's safe to say that before the pandemic, few business leaders would have envisioned the need for sending their employees home and ending up with a strong demand for hybrid workforces.

No one was excited about the need for such quick action to address issues like cyber security that they weren't prepared for. It put strain on IT departments because they had to scramble to find a way to support remote workers virtually overnight. But, some of the things that happened as a result of the pandemic have produced good outcomes in the business world. For example, the benefits of remote work are identified by workers in a number of ways.[6]

- Workers feel they are more productive.

- There are fewer distractions.

- Better work/life balance is valued.

- 69% of millennials would forgo some work benefits for more remote work.

And, a couple years down the road, IT leaders have found ways to address the issues related to remote work. They've focused on updating cyber security to ward off the flood of hackers taking advantage of the vulnerabilities that remote access to sensitive business systems generated.

The need for advanced connectivity is another one of those issues that most companies need to address. Sometimes, the cost of significantly expanding network capacity is cost prohibitive. That's where edge computing is emerging as a reasonable alternative, and its effects are widespread given how it is changing the digital ecosystem landscape.

If you have questions about edge computing or how it could be utilized in your organization, feel free to contact us.

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