IOT READY INFRASTRUCTURE
A BEST PRACTICE GUIDE TO IT

INTRODUCTION

In an increasingly connected world, IT is challenged to manage the exponential growth in device numbers and the big data exchanges they create. The concept of the Internet of Things (IoT) may have been around for a while, but it is only in the past five years that we have really come to appreciate what it involves and what impact it will have on business IT.

What, exactly, is the IoT? A simple definition would be to say a network of connected devices; but this doesn't quite go far enough. It is the presence of sensors within these devices that allow for the collection and exchange of data that makes the IoT.

Amidst the latest stories of connected kettles and hair brushes, it is easy to see why Business Intelligence is predicting the IoT will comprise over 34 billion devices by 2020 – that's an average of almost five per person on the planet.

However, it is business that is likely to be the biggest adopter of IoT as it seeks to lower operating costs, increase productivity and exploit new market opportunities.

The implications for data management are vast. With billions of devices collecting, sharing, storing and analysing data across the world, the workloads within data centres are going to increase significantly. With the increase in data volume will come new security, scalability and storage challenges.

According to a 2016 Cisco report, annual global IP traffic exceeded 1ZB (1 billion terabytes) in 2016; a number that is set to more than double by 2020. Two thirds of this data will be generated by mobile or wireless devices. The challenges presented over the past 5 years of BYOD and mobility will become magnified under the IoT.

At present, the majority of data centre traffic is generated by human users interacting with business applications. As the IoT evolves, and machine-to-machine (M2M) communications become more prevalent, it will transform the data centre.

"IoT deployments will generate large quantities of data that need to be processed and analysed in real time."

Fabrizio Biscotti, Gartner

HOW WILL THE IOT AFFECT YOUR INFRASTRUCTURE?

The short answer is more traffic. Lots and lots of it. At present, most organisations' data centres are designed with data distribution (data out) in mind – providing remote and mobile users with access to critical applications.

Under IoT, data centres will see a significant increase in the gathering and collation of information (data in). This will have implications not only for data centre storage capacity and scalability, but connectivity, bandwidth, security and data analytics.

An increase in connected devices will also impact on your enterprise networks. Where the number of connected devices used to correspond to the number of users, the increase in autonomous M2M communications will require increases in bandwidth, upgrading wireless access to 802.11ac and properly configured edge access devices.

Bandwidth has the potential to become a bottleneck again, so make sure you have the ability to scale up your connectivity to meet the new load levels. Poor network performance could result in latency or impact on service availability.

The knock-on effects of poor systems performance will be felt across the organisation; from workforce productivity to data integrity, systems availability to customer experience.

Some IoT devices will be more sensitive to service availability, or demand higher bandwidth to support real-time operations.

Consequently, your IT infrastructure will need to cater for the management, prioritisation, configuration and monitoring of a wide variety of devices.

Data Centre Infrastructure Management (DCIM) solutions have evolved to help IT manage the processes of data analysis and traffic flow management; in addition to the physical monitoring and management of assets within the data centre.

DCIM solutions provide IT teams with real-time intelligence about how the data centre is operating; from bandwidth usage and rack activity to individual workflows and power consumption. Data is captured and analysed 24/7 to optimise data centre performance and proactively identify and address issues before they impact on service availability.

The challenge comes in sourcing a solution that can work effectively with your current monitoring and management tools and provide a consolidated view of a potentially siloed IT infrastructure that features technology from multiple vendors. Therefore it's crucial that your infrastructure is IoT ready before embarking on any IoT projects. Neglecting to put these foundations in place first will inevitably lead to IT headaches further down the line.

HOW TO MANAGE BIG DATA

If the influx of big data to your data centre is likely to cause performance and availability issues, what are your options? You could invest heavily in upgrading your on-premises infrastructure, you could process more of the data at the edge of your network, or you could add scalability and capacity by deploying resources to the Cloud.

Investing in more on-premises computing and storage is unlikely to provide a long-term solution to your big data issues. For many organisations, creating a larger on-premises estate is not a viable option – there may simply not be the physical space to house additional equipment and frequently lack of connectivity services becomes an issue. While most organisations are moving burstable capacity to the Cloud, committing capital to a larger on-premises estate could be perceived as a step backwards to a time of greater expense and risk.

EDGE IT

Another way to limit the impact of big data on your data centre is to move some of the data closer to the edge of your infrastructure – closer to the connected devices and their users. By localising data, it is possible to remove some of the storage and processing burden from within the data centre itself

If everything is being delivered directly to the data centre, it requires a lot of bandwidth. It also has implications for data centre security, storage capacity and latency. By pre-processing some of the data outside the main site, you only need pass the most relevant information back to the data centre.

Big data is big, but it is not particularly clever. Processing at the edge allows for some intelligence to be added to the raw information before consolidating it and drawing valuable insights. Instead of delivering all your data to a central location, regional locations can be used to conduct some of the initial processing and forward the more relevant, structured data on to the main site.

HYBRID INFRASTRUCTURE

Hybrid offers the best of all worlds – the agility and affordability of public Cloud, combined with the compliance and security of private Cloud and the control and convenience of on-premises and colocation solutions.

The inherent flexibility and scalability of Cloud services means organisations can make the move to Cloud at their own pace. Trial services on a temporary basis, add services incrementally as legacy systems reach end-of-life and add capacity during periods of high demand without over-committing capital expenditure.

A hybrid approach to IT can help mitigate the risk associated with change. Running Cloud and colocation alongside legacy systems minimises the need for on-premises systems integration, reduces the overall investment risk and helps maximise returns on legacy equipment.

Cloud offers a way out of systems sprawl and the complexity that often plagues larger on-premises estates. Moving the right data and applications to the Cloud can generate immediate improvements in responsiveness, accessibility and resilience.

ARE YOU BIG DATA READY?

Connected devices generate vast quantities of data in a variety of formats. Before you can make the most of an IoT world, you need to be ready for big data. This extends beyond pure storage and processing capacity to bandwidth, process, analytics and IT management resource.

Are you able to analyse and prioritise the types of data being collected and only forward that data which contributes to a return on investment? Different devices and applications will generate different volumes and types of information. Not all of it will be relevant.

Do you have the bandwidth? Computers, cameras, phones etc. are already connected to your corporate network. In an IoT environment everything is connected; from temperature and pressure gauges to predictive equipment maintenance, CCTV network data to asset tracking.

As you add more devices to the network it can impact on bandwidth availability and latency. If your bandwidth is not easily scalable, this will limit the effectiveness of newly connected devices.

What about storage? With more data pouring into the data centre, you are going to need to either add storage and back-up capacity or become more sophisticated in terms of the type of data you want to store.

Do you have enough capacity to cope with the expected increase in data volumes? If your current estate isn't running at peak efficiency you may be able to find some more capacity through server consolidation or virtualisation.

If not, do you have the physical space in your data centre to add more? Does more on-premises equipment even make financial sense? Should you be thinking about Cloud or colocation services to add the essential scalability and agility you need?

Remember, an increase in server capacity or workloads will have a corresponding impact on data centre management overhead, power and cooling costs.

No organisation is going to need to store all the data it collects – some of it will have no value and some will only have transient or short-term value. Profiling data sources and types will allow you to define policies for data storage, archiving and recovery. By being more selective about the data you keep, you will be able to have more control over the growth in storage capacity.

OTHER CONSIDERATIONS

WIRELESS NETWORKING

Wireless is the backbone of the IoT, with most devices either connected directly to wi-fi networks or tethered to a wireless device using Bluetooth.

The gulf in performance between wired and wireless networks has all but disappeared. Where wireless was once seen as an expensive alternative to hard-wired networks, it has become the standard for new installations.

Where Bluetooth is preferred, it will become integrated into wi-fi access points to provide integrated connectivity. However, in the interests of quality of service and interoperability, it is unlikely that any of the other wireless technologies being considered will gain traction.

Adoption of Gigabit Wi-Fi access points has been growing exponentially and, with the release of 80211ac and 802.11ax, organisations are looking to take advantage of the increase in wireless bandwidth – typified by the ability to run multiple wireless streams, simultaneously, from the same access point.

The complexity of wireless enterprise networks demands a robust solution. One that allows for the monitoring and maintenance of devices with widely divergent lifecycles. As IoT networks evolve, they will need to cater for long-life devices that may retain outdated versions of firmware.

24/7 SUPPORT

The increasingly complex and always connected nature of the IoT requires 24/7 monitoring and support. Real-time data collation, analysis and reporting adds further complexity of workflows and can be challenging for an internal IT team that is already tasked will delivering more for less.

Keeping up with the demands of a large-scale, always-on IoT environment may be beyond the resources of most in-house IT departments. The increased volume of data and devices will need additional time, money and resource to manage effectively.

A colocation or Cloud services partner may be best placed to provide the scalability of resource and the round-the-clock monitoring and reporting necessary to keep your infrastructure operating at peak efficiency.

If your service provider is familiar with both on-premises and Cloud solutions, they will be able to deploy and manage a hybrid infrastructure that combines the best of performance, availability, scalability and security. Using infrastructure orchestration, they will be able to seamlessly integrate and manage IT components, whether they be housed on-premises or in the Cloud.

SECURITY

With complexity comes risk. The introduction of multiple connected devices creates multiple points of vulnerability within the network. Security will be a critical component within the IoT as every device represents a potential point of ingress for hackers or cyber-criminals.

The sheer number and variety of devices will make maintaining security patches a challenge. So, the use of advanced firewalls, user authentication and even encryption will be required to either isolate devices or secure the data they transmit.

Many IoT devices are designed to leverage Cloud-based application servers and analytics tools that reside beyond the borders of the organisation's network, which will introduce further security concerns.

Organisations will also need to ensure that long-life devices are supported throughout their lifecycle; that security is maintained for legacy systems as well as new devices.

PARTNERING FOR SUCCESS

As we move towards the IoT, organisations of all types are recognising the security, connectivity, scalability and capacity challenges a truly connected world presents.

Few, if any, will be in a position to effortlessly expand within an on-premises environment. Which is why so many are looking to colocation or hybrid Cloud service providers to deliver an IoT ready infrastructure.

Technology aside, the trend in recent years has been to maintain a lean in-house IT team and outsource specialist services as and when they are required. The problem is, with increased complexity and device sprawl, your valuable IT resource will spend most of its time fire-fighting or carrying out low-value maintenance and monitoring tasks.

Partnering with a service provider who offers a flexible, end-to-end service across multiple technologies helps achieve the right blend of in-house and third party support to balance risk versus cost.

By utilising a third-party service that forms an integral part of your overall strategy, you can address some of the wider challenges facing the business; such as adding customer value and improving user acceptance and satisfaction. By raising the profile of IT within your organisation you can also reposition it not as a cost centre, but as a creator of value and a source of revenue with a positive impact on the bottom line.

AVAILABLE FROM ONI:

- Managed Services & Support

- Hosting & Colocation

- Networking & Connectivity

- Back-Up & Disaster Recovery

- Cybersecurity Solutions

- Contact Centre Solutions

- Mobility & Collaboration

- Unified Communications