Taming the Complexity of Web-Scale IoT Applications

The Top 5 Challenges

A 2018 Global CIO Report

dynatrace

Intro

Based on a global survey of 800 CIOs, this report examines the challenges organizations face as they begin to explore and deploy Internet of Things (IoT) use-cases and web-scale applications.

The Internet of Things (IoT) is exploding across every industry, everywhere, starting a new chapter in digital transformation. As new use-cases for IoT continue to emerge, the digital experiences they enable will become increasingly critical to business success, connecting all aspects of human society. Enterprises are eagerly exploring IoT to find new revenue opportunities, drive product and service differentiation and establish new, disruptive business models. However, IoT also introduces exponential complexity to the IT environment. If this complexity isn't tamed, it has the potential to catastrophically impact software experiences.

Challenges Summary

01 IoT exponentially increases IT complexity

02 IoT problems have severe, real-world consequences

03 Performance blind spots put IoT strategies at risk

04 Digital experience expectations are expanding

05 Visibility into web-scale IoT applications is limited

Challenge One:
IoT exponentially increases IT complexity

As new use-cases for IoT continue to emerge and enterprises become increasingly aware of its potential, they are deploying a rapidly expanding ecosystem of sensors, edge devices, gateways and IoT applications. However, these ecosystems have many moving parts and generate huge amounts of data, which exponentially increases IT complexity and compounds the challenge of delivering a perfect user experience.

Adding to the burden, the growing use of smart-watches and a range of other wearable tech is set to elevate mobile performance management challenges to a whole new level. Enterprises will need visibility into the quality of the software experiences they're delivering on an increasingly diverse range of devices; most of which have yet to even be envisaged.

69%

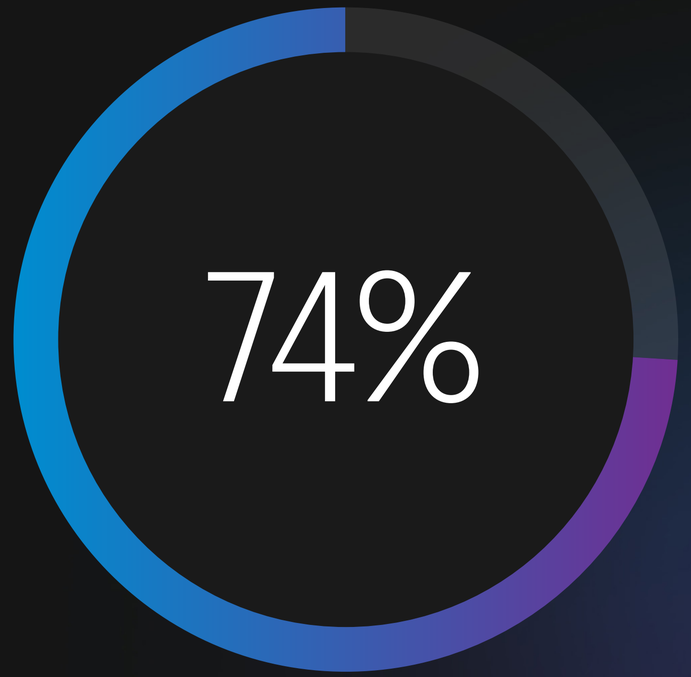
Percentage of CIOs predict that IoT will become a major performance management burden

64%

Percentage of CIOs are worried that spiralling numbers of wearables could soon make it impossible to manage mobile performance

Challenge Two:
IoT problems will have severe, real-world consequences

In most cases, IoT applications will be mission-critical, with a direct connection to business processes, or control over physical devices like cars and factory machines. In the increasingly connected world of IoT, business operations and revenue streams will come grinding to a halt if software doesn't always work perfectly. Worse still, digital performance problems could put human life at risk as IoT is deployed more widely in connected cars and healthcare devices. When something goes wrong, businesses will need answers, and fast.



Percentage of CIOs think that IoT performance problems will directly impact business operations and significantly damage revenues

Challenge Three:
Performance blind spots put IoT strategies at risk

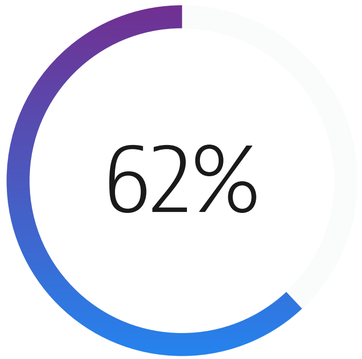
The exponential complexity within web-scale IoT applications and the distributed environments that underpin them is introducing an alarming number of new performance risks. Limited visibility into the IoT ecosystem and the dynamic nature of these complex environments is making it incredibly difficult for IT teams to manage user-experience.

Whilst much thought has been given to the security concerns surrounding IoT, many organizations have yet to consider the performance problems it introduces. This is creating major blind spots that increase the risk that IoT strategies will fail.

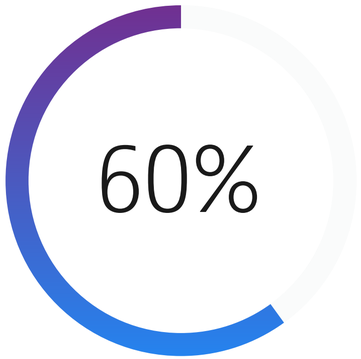
57% Percentage of CIOs think there is a risk that organizations could roll-out IoT strategies without having a plan or solution in place to manage its performance, with a further **21%** saying there is a major risk.

Challenge Three

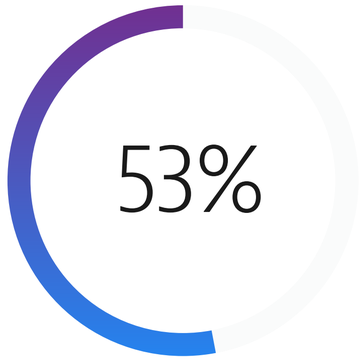
Challenges to managing complex IoT deployments



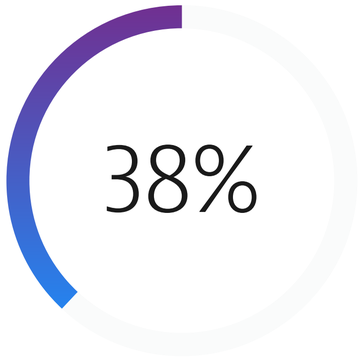
Ensuring that IoT device firmware updates and security patches don't have a negative performance impact



Having the ability to track application behavior on IoT devices as they interact with cloud services



Understanding the impact of IoT device performance on the user-experience



Mapping the rapidly growing IoT ecosystem as it expands

Challenge Four:
Digital experience expectations are expanding

As IoT becomes more universal and integrated in our daily lives, consumers will start to take the experiences it creates for granted. We'll just expect IoT to work, without ever thinking about the enormous complexity behind the services we're using. As a result, there will be more pressure than ever on businesses to ensure their software works perfectly, every time; to provide the faster, fault-free experiences that users expect.

70%

Percentage of CIOs worry that consumer and user expectations for faster, fault free experiences could soon increase beyond what IT teams are able to deliver

Challenge Five: Visibility into web-scale IoT applications is limited

In addition to managing the edge devices, sensors, gateways and web-scale applications within their internal IoT ecosystem, businesses will also need to account for factors that impact on performance outside of their control. For example, IoT experiences will be influenced by the reliability of the networks that connect them, the IoT platforms that drive them, and the cloud-based infrastructure compute platforms that power them. This multitude of dependencies within the IoT ecosystem leads to a convoluted and highly complex delivery chain that makes it difficult for IT to maintain control over the user-experience and identify the root cause when problems arise.

69% of CIOs fear losing control over the user experience as the IoT delivery chain continues to become more convoluted

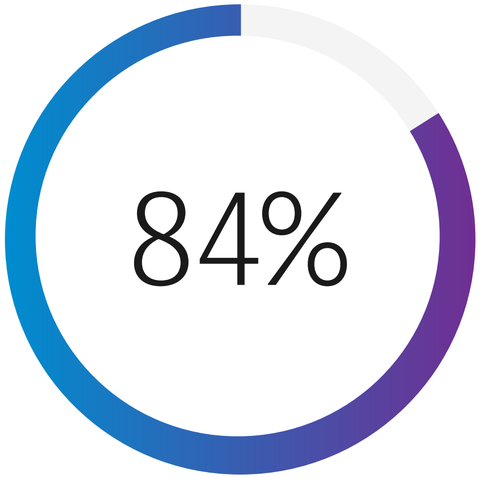
73% of CIOs worry that the number of third-parties and internal resources involved in IoT service delivery chains will make it incredibly difficult to identify who is responsible when performance problems arise

52% of CIOs say understanding the impact that IoT platform providers and network operators have on performance is a key challenge to managing user experience in IoT

75% of CIOs are concerned that problems within the platform or network layer that impact the performance of their applications could be hidden from them by an IoT service provider

Conclusion

If CIOs are to ensure that IoT delivers on its promise, it's crucial that it doesn't become a big performance blind spot. They need to find a way to maintain complete visibility and control over the entire IoT ecosystem; from smart devices and web-scale applications to the public cloud storage and compute platforms that process the petabytes of data being generated. The massive scale, enormous complexity and diversity of edge devices and data sources involved in IoT make this a herculean task that is simply beyond human capabilities. As a result, organizations will turn to Artificial Intelligence and automation to provide the answers they're looking for.



Percentage of CIOs that believe AI capabilities and the ability to automate most of the processes that support IoT deployments will play a crucial role in the success of their IoT strategies

How can Dynatrace help?

As businesses continue to explore and deploy IoT use-cases to drive success, Dynatrace is committed to helping them deliver perfect software experiences.

Traditional monitoring approaches, platform-specific solutions and home-grown tools simply cannot provide the insights needed to master the complexity of web-scale IoT and cloud environments. Dynatrace's software intelligence platform enables full-stack, end-to-end monitoring that delivers full operational insights into IoT applications and platforms.

Powered by AI, Dynatrace is fully automated and requires zero configuration. It automatically discovers the topology of entire IoT ecosystems, whilst its smart analysis and root cause detection provides actionable answers that help businesses instantly resolve IoT performance and availability issues. As a result, they have the freedom to explore the huge possibilities that IoT is creating, without fearing the consequences of complexity.

To find out more about Dynatrace and IoT click here.

Methodology

This report is based on a global survey of 800 CIOs in large enterprises with over 1,000 employees, conducted by Vanson Bourne and commissioned by Dynatrace. The sample included 200 respondents in the U.S., 100 in the UK, France, Germany and China, and 50 in Australia, Singapore, Brazil and Mexico respectively.