computing research

RESEARCH PAPER

Is your infrastructure monitoring fit for the future?

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Executive summary

Enterprises are transforming for survival. Technology powered innovation is a constant, and the businesses who thrive in this climate will be those who embody a flexible, dynamic approach and deliver digital access to goods and services faster than their competitors. The Covid-19 pandemic has drastically accelerated the pace of change for business, both in terms of remote access and increased use of cloud computing in all its forms.

As applications have been migrated to hybrid, and multi-cloud environments and overall infrastructure have become more complicated, IT monitoring tools have struggled to keep pace. Many simply weren't designed for the environment that they now operate in, having evolved from the previous server-based era of computing. The result is a complex patchwork of monitoring tools. Some monitor different aspects of on-premises technology. Others come with hyperscale cloud providers – AWS, Azure and GCP. Some are very manual in nature, alert fatigue is widespread, reporting is historical and predictions about the future are nigh on impossible. The combined effect of these limitations holds back the agility and digital transformation that businesses need.

Computing surveyed 149 technical and business decision makers from large organisations employing a minimum of 500 people. All respondents were involved in their organisation's cloud strategy or implementation, with the survey sample drawn from a wide cross-section of UK enterprises, including the financial sector, government, retail, logistics and manufacturing.

This exclusive research sets out the reality of how monitoring is coping with infrastructure in flux, the challenges that may be experienced and the impact that complexity has on capacity planning, cost management and forecasting. We also test the hypothesis that IT monitoring has essentially become business process monitoring. Are businesses using intelligence from IT monitoring to optimise business processes? Finally, we discover how businesses are planning for the future. If cloud complexity continues to grow, how will businesses manage that complexity and align business and IT objectives as necessary?

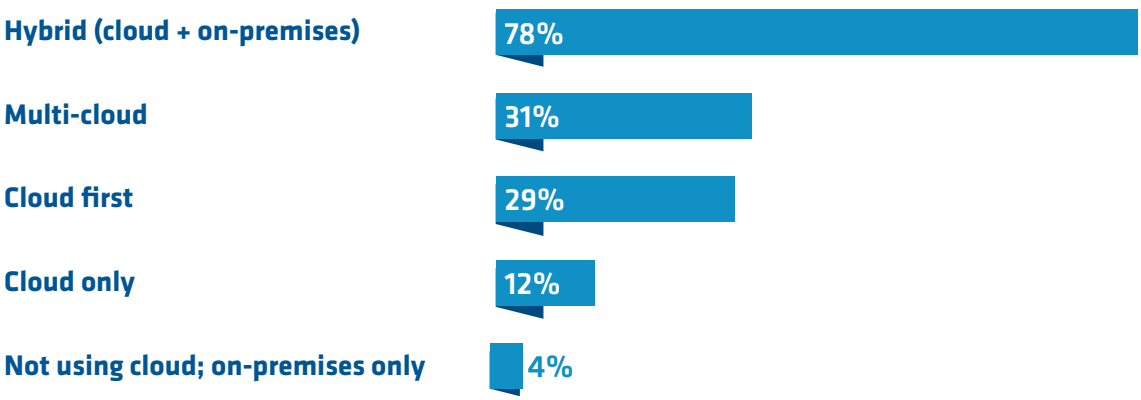
Key findings

- A hybrid of cloud (including multi-cloud) and on-premises infrastructure remains the most commonly used approach, by a huge margin.
- Cloud will account for an increasing proportion of this blend in the next three years. The Covid-19 pandemic has accelerated the pace of this transition.
- Over half of respondents report that greater infrastructure complexity has led to tool sprawl.
- Over a third of respondents are using up to seven separate monitoring tools, with more than one in five – 22 percent – dealing with more than eight tools.
- The most widely occurring challenges arising from tool sprawl are (in descending order) limits on visibility, overlapping functionality, excessive noise and alert fatigue, time-consuming maintenance and excess manual work.
- Around one-third of organisations represented have either already, or plan to, consolidate their monitoring tools.
- In terms of enabling strong capacity planning, cost management and forecasting, 44 percent were barely happy or downright unhappy with the performance of their current toolset.
- 78 percent are either unable to export intelligence from their IT monitoring solutions to optimise business strategies, budgets or processes, or require a great deal of input from data analyst/science teams to do so.

Complex challenges

Over the past few years, organisations have been migrating more and more applications and workloads to the cloud as cloud computing continues to transform enterprise IT. Most organisations have moved from cautious SaaS adoption for non-core business services to at least considering full modernisation of core business applications. Organisations have worked hard to imbue their infrastructures with the degree of agility that is necessary to compete in today's digital economy. That process has necessarily involved the scalability of cloud platforms. Figure One illustrates just how much.

Fig. 1: Which terms best describe your current cloud approach? You may select up to three options.



Furthermore, the pace of cloud adoption is accelerating. When asked how their use of cloud computing was likely to change in general over the next three years, 91 percent of those we surveyed said it was likely to increase. Zero respondents felt it was likely to decrease.

The Covid-19 pandemic has accelerated the pace of digitisation by profoundly altering the way that we work, shop, live and socialise. There's no going back now, and our survey has shown just how quickly businesses have adapted.

We also asked whether the pandemic has affected organizational digital transformation strategy. 40 percent state that the pandemic has increased the pace of transformation, while a further 16 percent say that it has accelerated drastically.

The pace of change – pre-pandemic and now – has added new moving parts to infrastructure at a phenomenal rate. The hybrid infrastructure underpinning the vast majority of organisations has become an incredibly complex blend of both permanent and transient instances and interdependencies. Fragile nets of point-to-point integration must be maintained. It's a delicate balance, which means it can also be easily upset.

We asked respondents whether their infrastructure had become more complex as cloud has accounted for an increasing proportion of that infrastructure. 38 percent agree somewhat and a further 14 percent agree strongly. Only 18 percent disagree.

Monitoring complexity

Growing complexity has many effects. Very few of them are good. Complexity can be expensive to sustain. Its inherent fragility makes it less reliable than a simpler model, and when failures occur, they can stack up rapidly. Complex infrastructures are also more vulnerable, as escalating numbers of security breaches suggest. It's harder to secure something that you can't see. When it comes to complex hybrid infrastructure, visibility is everything – and visibility means monitoring.

The diagrams below indicate strongly that there are a good many monitoring tools in play in most organisations.

Fig. 2: Does your infrastructure have individual monitoring tools in place [TW1] for...?

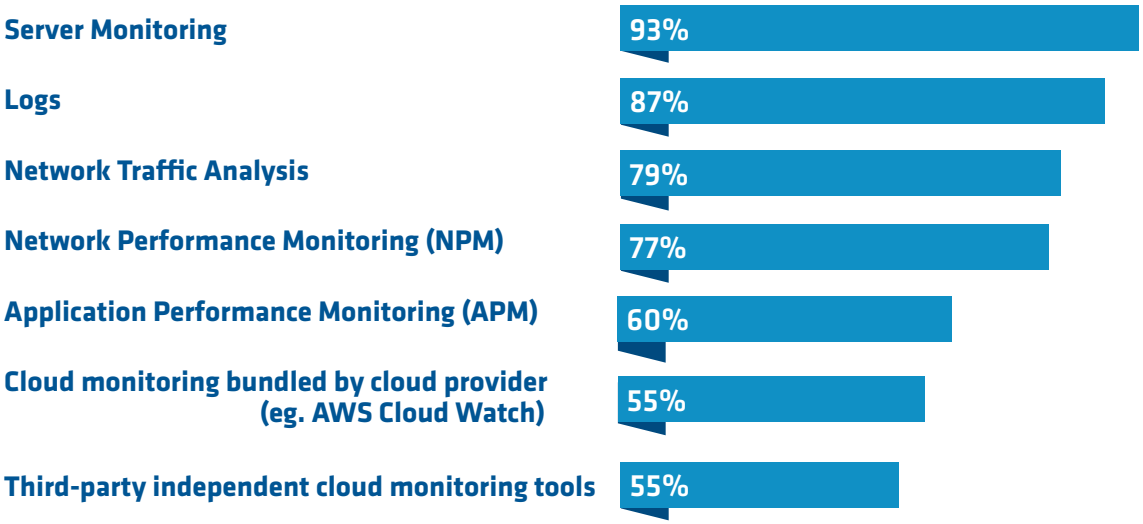
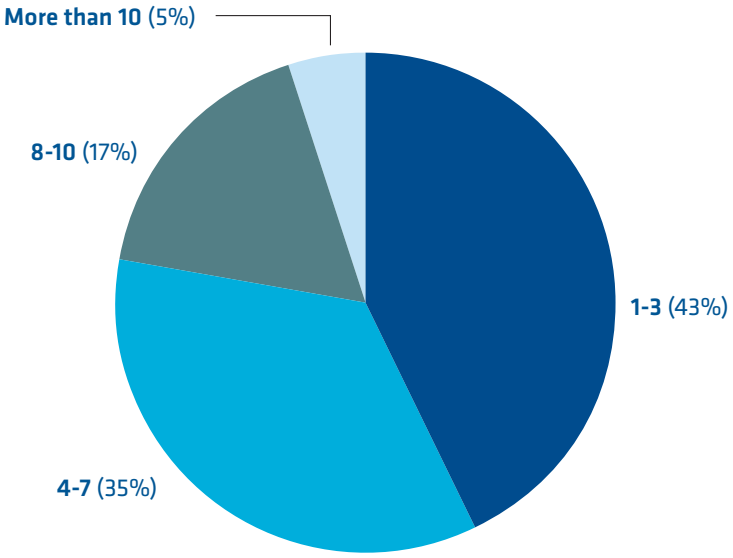


Fig. 3: Thinking of infrastructure monitoring tools such as Network Performance Monitoring, Application Performance Monitoring etc., how many tools are in regular use in your organisation as of today?



Our survey asked people the extent to which they agreed with the following statement: "The more complex our infrastructure becomes; the more tool sprawl becomes an issue." 37 percent agreed somewhat and 19 percent agreed strongly.

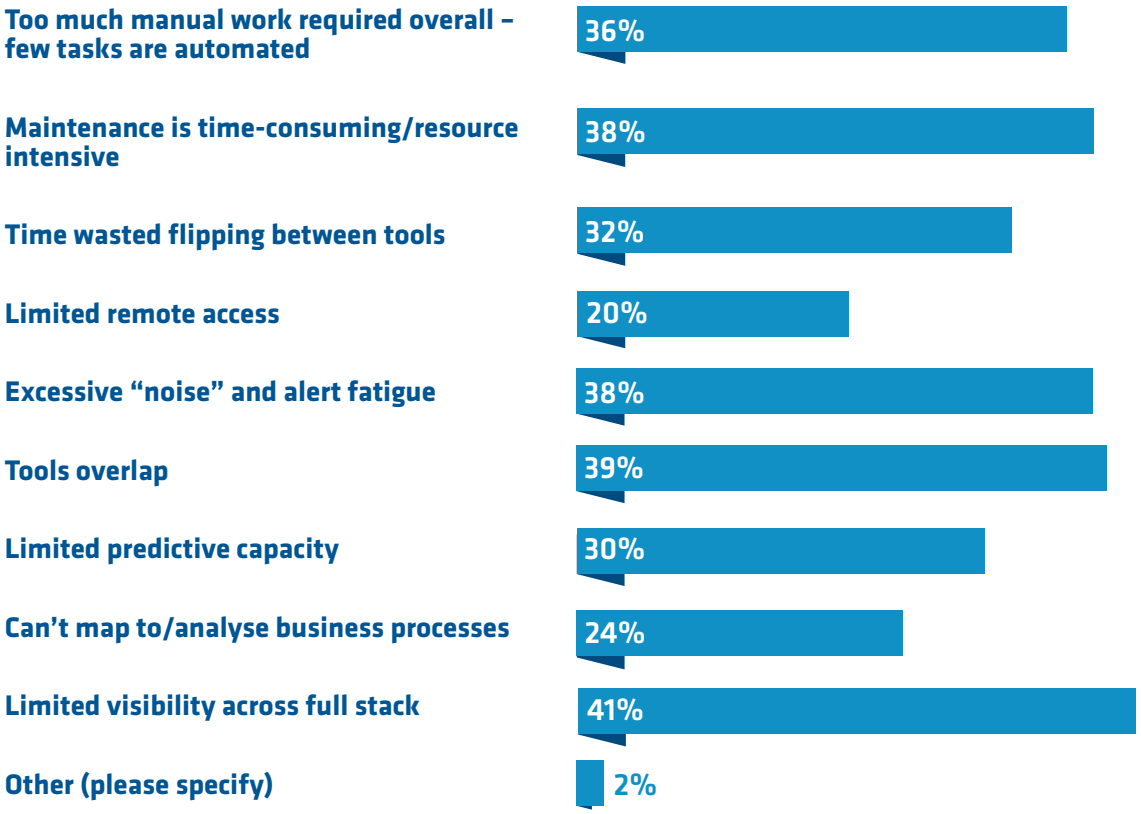
How have we ended up here? The path to proliferation is littered with good intentions. To keep costs down, some monitoring tools are free or developed in-house via open source. The cloud providers which make up an increasing proportion of infrastructure usually bundle their own monitoring tools into their service packages, so they seem like good value for money. In addition to this, monitoring tools likely to have been in place for some time such as Network Traffic Monitoring (NTM) or Log Management and Monitoring tend to have a long life span, and as new people join IT departments they sometimes bring their own favourites along with them. The outcome is an overlapping patchwork of monitoring functionality.

Many network and log monitoring systems were developed during the era of server-based computing. Front ends may have been adapted to some degree, but the underlying tool kit remains much the same – and fundamentally is unsuited to today's cloud-led era.

Too many monitoring tools....

Why does this patchwork of monitoring matter? Figure Four on page 7 gives us a better idea. First and foremost, visibility is obscured. Cloud instances can be spun up and decommissioned in the blink of an eye, so it can be difficult to monitor exactly what is connected to your network at any one time. This has consequences not just for performance, but even more so for security and compliance. Organisations tend not to have just one cloud either. Multi cloud strategies are growing in popularity. Indeed, research by *Computing* undertaken this year has established that multi cloud is where much of the growth in cloud services is likely to come from over the next three years. Organisations want and need to optimise the performance and the security of applications, workloads and data, and need to understand relationships and dependencies. None of this is possible if you have a partly obscured view of your infrastructure.

Fig. 4: Please indicate if you are experiencing any of the following challenges with your infrastructure monitoring.



Tools also overlap in functionality which is a waste of both money and time. Overlapping tools may also give out different readings of the same situation, complicating matter further. Lacking a single version of the truth is profoundly unhelpful when trying to resolve problems.

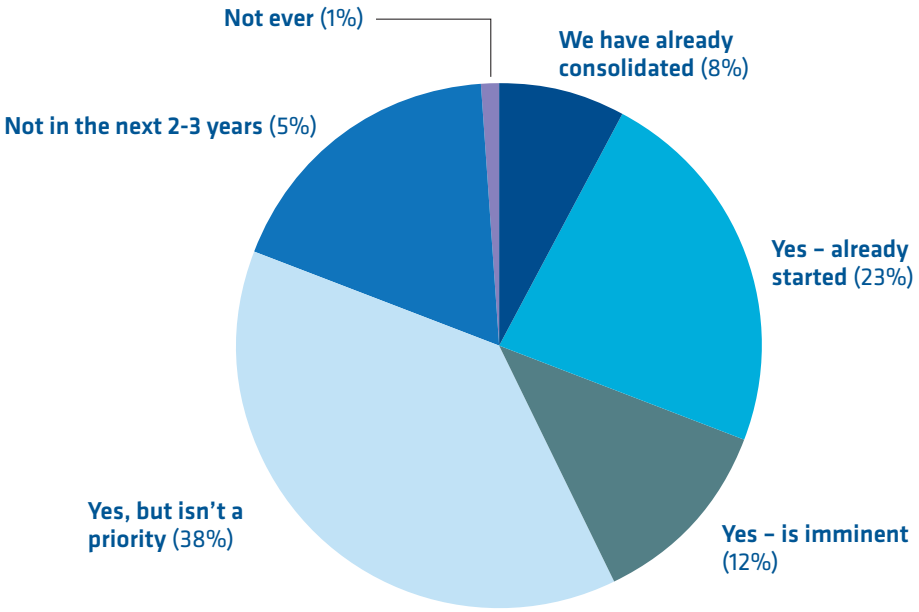
More tools also generate more alerts. Alerts need to be followed up, and this can take up an extraordinary amount of time if alerts from ten monitoring tools all have to be followed up on. If the strain on manpower becomes too great, alert fatigue becomes a real danger and increases the level of risk to which organisations find themselves exposed. Organisations may find themselves having to notify the authorities of a data breach which may have been preventable if only the relevant alert had been responded to in a timely manner.

The amount of manual work involved in monitoring is partly a product of the server-based origins of most of the tool sets. Manufacturers have augmented tools with automation functionality over the last few years, but automation clearly isn't being utilised to its full extent given how many survey respondents stated that they were still challenged by an excess of manual work. This likely directly contributes to other problems such as resource intensive maintenance and the sheer amount of time wasted toggling between different management interfaces.

Interestingly, almost 20 percent complained of poor remote access. This is an issue which has become decidedly more pressing throughout the course of 2020. We asked to what extent respondents agreed with the statement, "The Covid-19 pandemic has made us more aware of the limitations of our monitoring in terms of remote access from any device." Almost half of all respondents either partly or completely agreed, with a further 31 percent not having particularly strong feelings either way.

Unsurprisingly given the challenges, many enterprises are working towards consolidation. 8 percent of our respondents have already done so, 23 percent have started on consolidation, and a further 13 percent plan to do so 'imminently'. Nevertheless, consolidation is not a priority for many, which may be a sign that respondents are unaware of the benefits or possibility of doing so.

Fig. 5: Are you planning to consolidate your infrastructure monitoring toolset?



Aim high

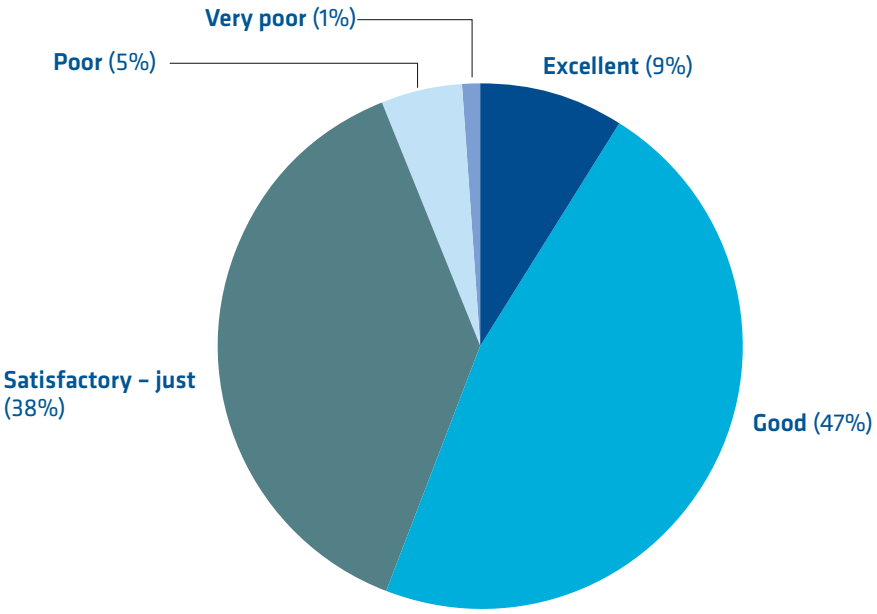
There are many use cases for monitoring tools other than the most basic functions of responding to events. Effective monitoring can be about far more than firefighting. What is needed is the application of content and analysis to establish not just why an issue occurred, but how similar or related ones may do so again, and how to prevent such incidents in the future. This analysis elevates monitoring to observability.

Automation in the context of IT Operations – AIOps – is a fundamental aspect of observability. AIOps eliminates many of the issues that organisations commonly experience in terms of alert fatigue, noise and the volume of manual work. Automation provides context and clarity, allowing teams to tune out the noise and focus only on where it matters.

A solution built on observability provides a view of infrastructure as a whole, as well as specific business processes in isolation. It is also about more than just the present. It should be at least partly about the future. Whilst observability should be able to provide a picture of utilisation across on-premise and cloud instances, it should also be able to provide an understanding of future demand based on trend analysis.

We asked respondents to rate the performance of their existing toolsets in terms of enabling strong capacity planning, cost management and forecasting. The results can be seen below. Whilst 56 percent described their toolset as either good or excellent, 38.5 percent described their toolsets as "satisfactory - just." With approximately 44 percent barely happy or downright displeased, the extent of observability as a whole is clearly very far from perfection.

Fig. 6: Please rate the performance of your existing toolset in terms of enabling strong capacity planning, cost management and forecasting.

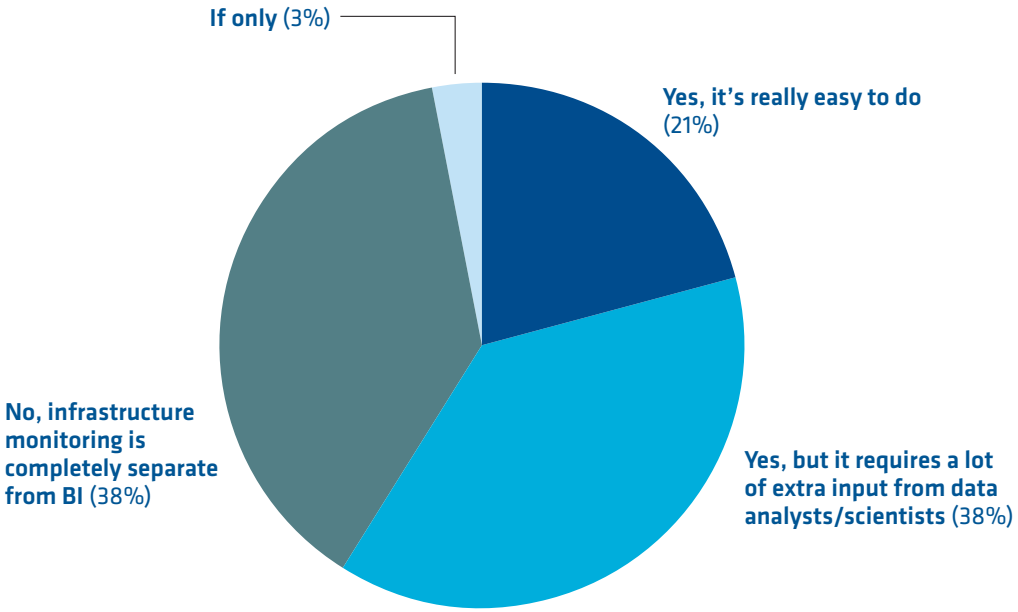


The ability to predict future usage requirements is crucial for accurate capacity planning. Predictive analytics should be part of any unified solution because organisations can then see where they are likely to experience bottlenecks.

Network capacity planning also has implications for cost management. However, a network monitoring tool's ability to contribute to cost management, and particularly when it comes to cloud costs, is a function of its observability. Given that 41 percent of respondents reported limited visibility across their full stack, it is reasonable to assume that the same organisations are also challenged with control of their costs. One of the most discernible trends in much of our research this year has been disquiet at unforeseen cloud costs. Cloud infrastructure is so easy to commission that in many businesses there are likely to be underused or idle cloud resources that are being paid for even though they are not actually required to maintain availability.

There is also the question of input into other business processes. Observability solutions should be able to make data visible via shareable dashboards and reports and enable the exporting of metrics relevant to the wider business. We asked whether respondents could use their present monitoring data to optimise business strategies, budgets or processes. Fewer than 22 percent stated that this was easy to do. The problem for the approximate 38 percent who can only export data with the help of data analyst/science teams is that this drastically delays time to insight. By the time analytics become available to those who need them, decisions are no longer being made in the time scale required by the business, who is trying to increase its agility.

Fig. 7: Do you use intelligence from your existing IT monitoring solution to optimise business strategies, budgets or processes?



Some of the organisations that we surveyed seem to have relatively modest expectations of their infrastructure monitoring – expectations that are likely to have been shaped by the era that many of the legacy solutions they are using were developed in. A unified observability platform encompassing metrics, logs and application data does far more than monitor. It applies context to the monitoring, which enables the analysis required to trigger the proactive responses necessary to power a more agile infrastructure.

Conclusions

Technology estates have evolved faster in the last five years than in the preceding three decades as ever greater proportions of them have been migrated to the cloud. The pace of change is likely to increase further as the pandemic accelerates the global shift to digital channels for most business transactions. More and more organisations have a cloud-first rule when it comes to new technology because they view cloud as the only way to achieve the scalability and flexibility that they need for ongoing – and increasingly fast-paced – digitisation. However, despite the growing role for cloud, the most popular infrastructure model remains a hybrid of cloud and on-premises.

The consequence of the combination of unprecedented cloud adoption, increased mobility and the need to maintain legacy systems has been more complex systems and a growing web of interdependencies.

This rapidly increasing number of moving parts has led to increasing numbers of tools being used to monitor them – NPM, APM, server monitoring, traffic analysis, cloud monitoring, and more. Complexity has led to tool sprawl and a messy patchwork of monitoring which is fundamentally unsuited to cloud-led infrastructure.

Limited visibility of infrastructure carries serious consequences for security and compliance as well as for the optimisation of application performance. Overlapping functionality, alert fatigue, an over-reliance on manual work and a lack of remote access functionality are all challenges facing the IT professionals we surveyed.

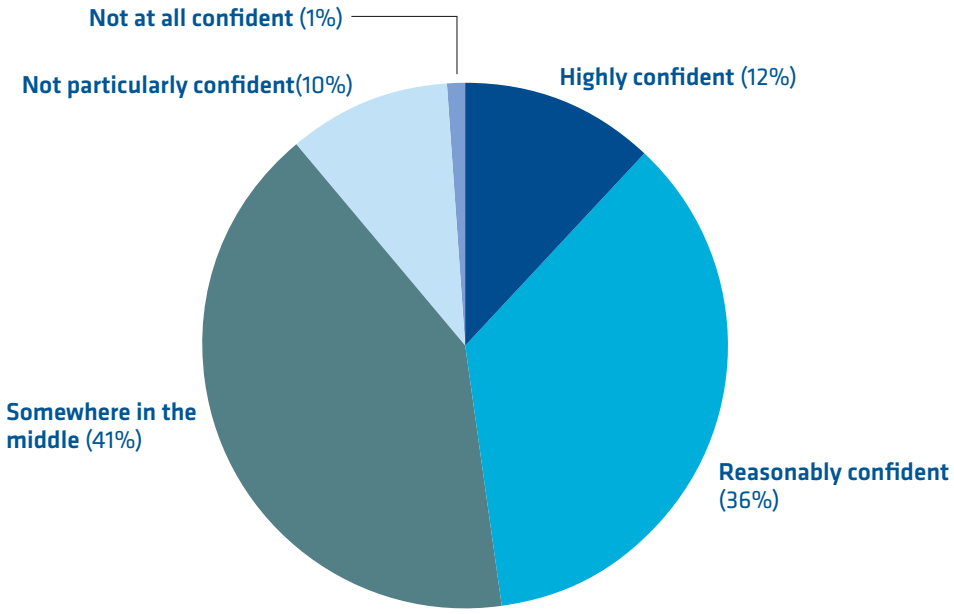
Many of the problems emanating from this complexity and tool sprawl can be resolved by reconsidering expectations of monitoring and more specifically, the greater application of AIOps to improve the observability of today's complex, hybrid infrastructures.

Agentless monitoring is likely to be a key component of observability as well. Instead of installing agents on every end point, in agentless monitoring a "collector" gathers the required information via APIs. This means that the transient infrastructure typical of DevOps environments is detected and monitored accordingly. Noise levels and alert fatigue can be reduced with dynamic alert thresholds, and workflows can be tailored to specific environments.

Despite the challenges being experienced across the board, 49 percent of the people we spoke to thought that their infrastructure monitoring was fit for the future. Given these challenges and their implications, this seems like an overly optimistic reading of the situation. This is probably why relatively few are planning to consolidate onto a unified monitoring platform in the near future.

Fig. 8: How confident are you that your infrastructure monitoring is fit for the future?

Around a third of those we surveyed had already moved towards consolidation of their tool sets or were in the process of doing so, which partly explains their level of confidence. However, it is



possible that low expectations of what these tools should provide also might explain respondents' overconfidence in the capabilities of their existing toolsets. Infrastructure monitoring responds to events. Observability predicts those events in the first place and allows for proactive responses before they even occur.

Forecasting is part of such a predictive capacity. For example, full visibility of cloud infrastructure is crucial if financial forecasting is to be accurate. IT monitoring is also effectively the monitoring of wider business processes. A hallmark of digital maturity is the alignment of business and technology objectives, with a greater incidence of hybrid, cross-functional teams organised around value streams. The alignment of these objectives is only possible if crucial data on the technology underpinning an organisation can be communicated in the time scale required. Being able to integrate telemetry data with processes via sharable dashboards and reports, paired with the capacity to export metrics to relevant BI tools, is a crucial component of any observability platform truly fit for the future.