

**Hewlett Packard
Enterprise**



AN ORIGINAL DOCUMENTARY

CONSCIOUSLY HYBRID

THE NEED FOR CONSCIOUS DIGITAL
TRANSFORMATION IN THE PUBLIC SECTOR.



FOREWORD

When the Cloud-First Policy was introduced in 2013, strategies were driven centrally by the government and were widely perceived to be the ‘right’ thing to do. It quickly became ‘fashionable’ to have a public cloud strategy. But, like any fashion, cloud strategies evolved as the realities of adoption came to the fore.

Public cloud might be the most appropriate solution in some cases, but there are certain workloads you cannot efficiently or economically move into public cloud. We believe technology professionals are beginning to see the value in being more agile and becoming increasingly comfortable with the notion that today’s decisions and strategies may need tweaks down the line.

A hybrid approach to cloud adoption can provide tangible benefits to these organisations, allowing them access to the most appropriate environment for their data and infrastructure, whether on-premises, in the public cloud or at the edge.

The appropriate IT infrastructure provides the foundation for emerging technologies. Public sector organisations could significantly benefit from infrastructure that evolves with them, scaling up and down as required, with little human intervention. Artificial intelligence could further transform cloud strategies. I’d like to see AI delivering actual returns, automatically moving workloads to where it is most cost-effective at that moment in time and providing efficiencies for users at the front end.

My advice to any public sector technologist embarking on a cloud journey is to identify the outcomes you feel you can deliver against quickly. For example, this could be moving analogue systems to a digital environment. Use this experience to develop your confidence, expertise, and working practices. Focus on the most appropriate environment approach, considering both your current technology challenges and long-term aspirations.

Finding the resource within your business to implement these changes is an industry-wide problem, with the digital skills gap exacerbating the situation. If you do not have the expertise in-house, DTP Group is here to support you at every stage of your digital transformation journey.

DTP Group is proud to continue its innovative journey with Hewlett Packard Enterprise, supporting the public sector to deliver the right hybrid toolset and accelerate conscious digital transformation, **for the good.**

**Howard Hall,
Managing Director, DTP Group**



THE UK PUBLIC SECTOR STORY

Digital transformation in the public sector is more important than ever. The COVID-19 pandemic has only accelerated the need for effective government and health services; with a drive toward connected, interoperability across the sector. However, the path to the ‘public sector of the future’ has been long, and somewhat turbulent.

Agile, scalable and flexible infrastructure creates the foundation for digital transformation. Legacy platforms within the sector, traditionally, have manually intensive operating models that are fixed and inflexible. Public cloud was identified by central government as a key enabler and introduced a paradigm shift in public sector IT strategies.

In a bid to accelerate digital-first citizen services and take advantage of the innovation the private sector had benefitted from for many years, in 2013, the government introduced the Cloud-First Policy.¹ The initial promise of public cloud offered the agility, scalability and flexibility to support the demands of digital transformation.

The race to the public cloud and the ‘one-size-fits-all’ methodology incited an accelerated pivot in digital strategies across the sector. However, albeit a success within some organisations, implementation of the policy was not without its challenges. Legacy infrastructure, digital skills, and

the readiness of procurement processes created barriers to adoption and, for many, impeded cloud strategies before they had even really begun. Arguably, the policy placed too much focus on ‘where’ data and workloads should be hosted as opposed to ‘how’ and the desired outcomes.

The effects of the Cloud-First Policy are still felt today, with many public sector organisations finding themselves, ‘Unconsciously Hybrid’ – an unplanned state of flux between public cloud, edge, and on-premises infrastructure. So much so, a freedom of information request issued in May 2021 discovered that, of the 400 public sector responses, 63% of organisations still do not have a dedicated cloud strategy.² Albeit it a staggering number, this perhaps highlights the inappropriateness of a cloud-first approach for public sector organisations and raises the point that public cloud is not always the most efficient destination for workloads and data.

Often, the lack of strategy is a result of attempting a ‘lift and shift’ approach before discovering that challenges around data sovereignty, security and legacy compatibility make ‘public cloud only’ an unviable option. The friction between Government-led guidance and the realities of execution has, in some cases, left cloud strategies disjointed and incomplete or at worst, completely stalled.

In the HPE Original Film ‘Consciously Hybrid’, we explored how the Cloud-First Policy was received, the challenges public sector technology professionals faced and why a Hybrid Cloud strategy delivers an end-to-end service in the most effective way.



INTRODUCTION TO THE CLOUD-FIRST POLICY



Implementing the Cloud-First Policy for all technology decisions was mandatory for the government and strongly recommended to the wider public sector. The policy redefined traditional public cloud mentality, citing it as a safe and affordable option for cloud adoption.

The policy shifted strategies away from racks, servers, and virtual machines to a focus on hyperscale functionality. However, strategy and execution are two very different things. The policy mandated ‘where’ workloads and data should be (public cloud) without prescribing how to do it. In many cases, it failed to anticipate the long tail of legacy ICT infrastructure, entrenched outsourcing and lacks of skills across the sector. It painted the art of the possible without addressing the steep mountain to climb to achieve it.

Despite this, for many, it initiated the change in thinking that was required – encouraging a culture of innovation with a credible stamp of approval to embrace a technology that had once been perceived as unsuitable and costly.

It also created a level of uncertainty and inertia. Public sector organisations’ traditional limitations around technology and legacy infrastructure often did not justify, nor require, training or expertise in cloud innovation. Therefore, initial Cloud-First Policy adoption strategies highlighted observable gaps in intention versus execution.

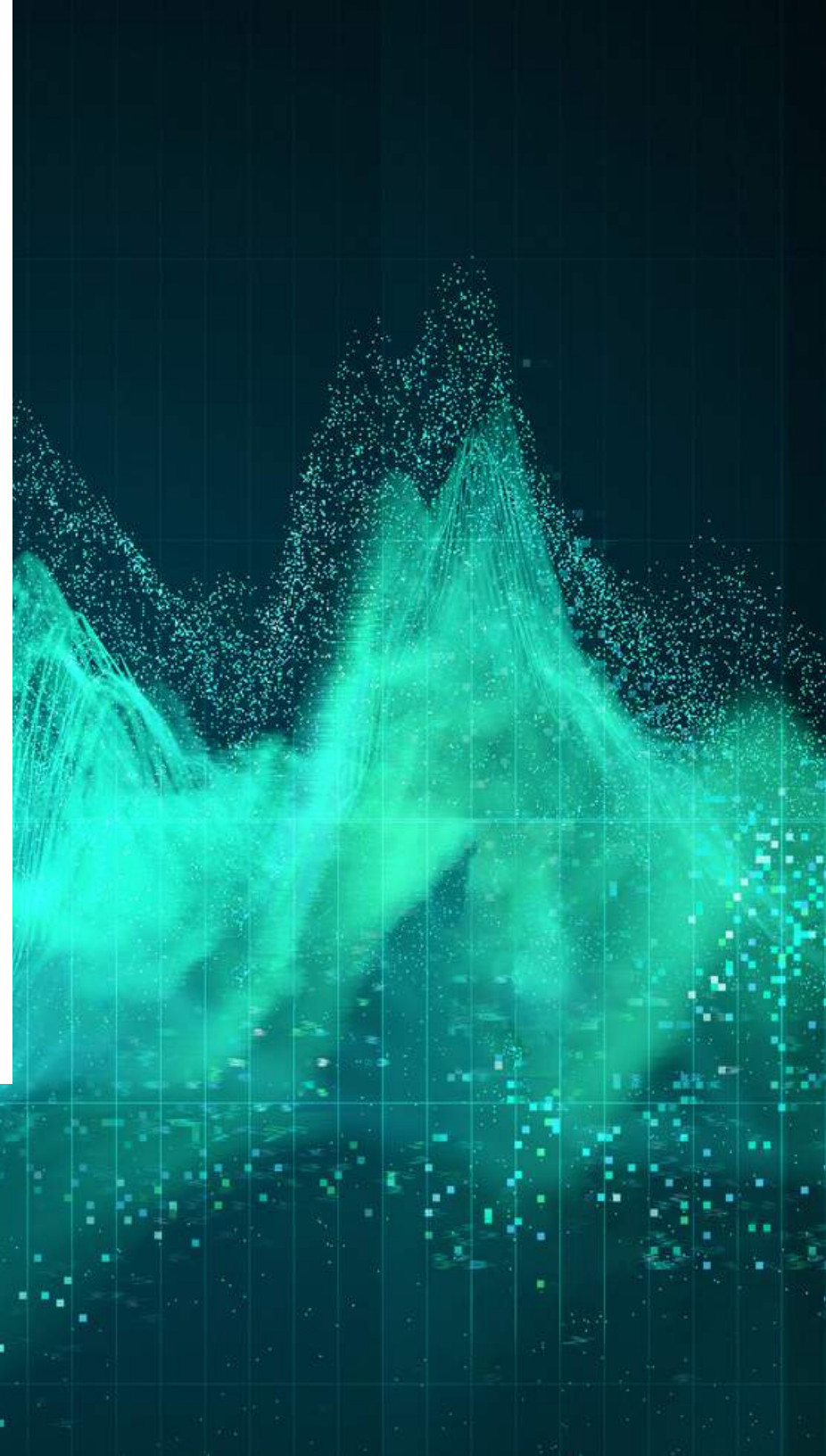
“ The Cloud-First Policy was challenging because it was asking all of us to adopt really different ways of working and to an extent, take the pain of that. Because, when you’re trying to implement it and you’re learning, you may not be able to get the right skilled people because everyone is trying to do the same thing. At the same time, we were being asked to keep the service up, without any problems and actually, not everything is going to work. In the early days, there wasn’t an understanding of that. It felt, perhaps, that some people, thought you could take things and simply move them into the cloud. When in reality, there is a lot more to it than that.³ ”

Tracey Jessup, Chief Digital Office at Parliamentary Digital Service

The Cloud-First Policy is yet to be fully adopted across the public sector, despite many organisations having invested a significant amount of time and money. The responsibility of spending the ‘public purse’ efficiently, often hampers any prospect of a ‘fail fast, learn fast’ approach to digital transformation. Technology professionals feel a sense of innate responsibility to commit to government-led policies and follow through on their publicly available digital strategy mandates.

Steve Holt, an independent consultant and former technology professional within the Ministry of Justice told us this was prevalent in the adoption of the 2013 Cloud-First Policy.

“ You get this sprawl of technologies, capabilities and services that are everywhere within an organisation and cloud costs get out of control, because they don't have the processes, the visibility and the understanding of what to do with those costs so cloud then looks unaffordable. Then they've also got the legacy debt that's on-prem. You end up with a bow wave of legacy debt that is unpatchable, with a huge amount of critical services on it. It probably costs millions to get out of it and the risk is high. Then you've also got a cloud platform, or multiple cloud platforms that you don't really understand why you're in them and it's costing you lots of money.”³



LEGACY INFRASTRUCTURE AND THE SPECTRUM OF DIGITAL DIFFUSION

There exists a wide spectrum of digital diffusion across public sector. Aside from the Government's digital exemplars, many organisations are running legacy technology that is fundamental to their infrastructure and IT operations. Take the NHS for example, there are healthcare organisations forging the path for innovation with life-changing AI implementations in medical imaging and diagnosis. In contrast, there are also many that are challenged day-in, day-out to keep critical services running. Leaving little to no time or resource available for innovation.

“ Public sector is an interesting place to be because solving the challenges that new policies bring, means you have to seek out new IT Solutions. If you look at large governmental departments such as DWP and HMRC, there is technology still in use today that dates back to the 1980's. Large transactional bodies were early adopters of mainframe technology because it was the only technology capable of solving challenges at that level – the tens of millions of people making transactions. Because this technology worked, there was no need to change it. Now, here we are 30 years later, and many organisations are still dependent on those old technologies. You end up with a computer museum, with every technology from every decade that is still in use today because they can't get off them and their services are reliant on them.³ ”

Russell Macdonald, Strategic Advisor, Public Sector



The 'Cloud Strategy' freedom of information request found that more than 70% of organisations' infrastructure and 73% of data remains on premises.² This is a stark indicator of the sectors' ongoing battle with legacy technology, meaning deploying innovation is no mean feat. A 'lift and shift' approach is not viable for moving these systems and workloads to the public cloud. Doing so can result in infrastructure that is more complex, cumbersome, and costly than before.

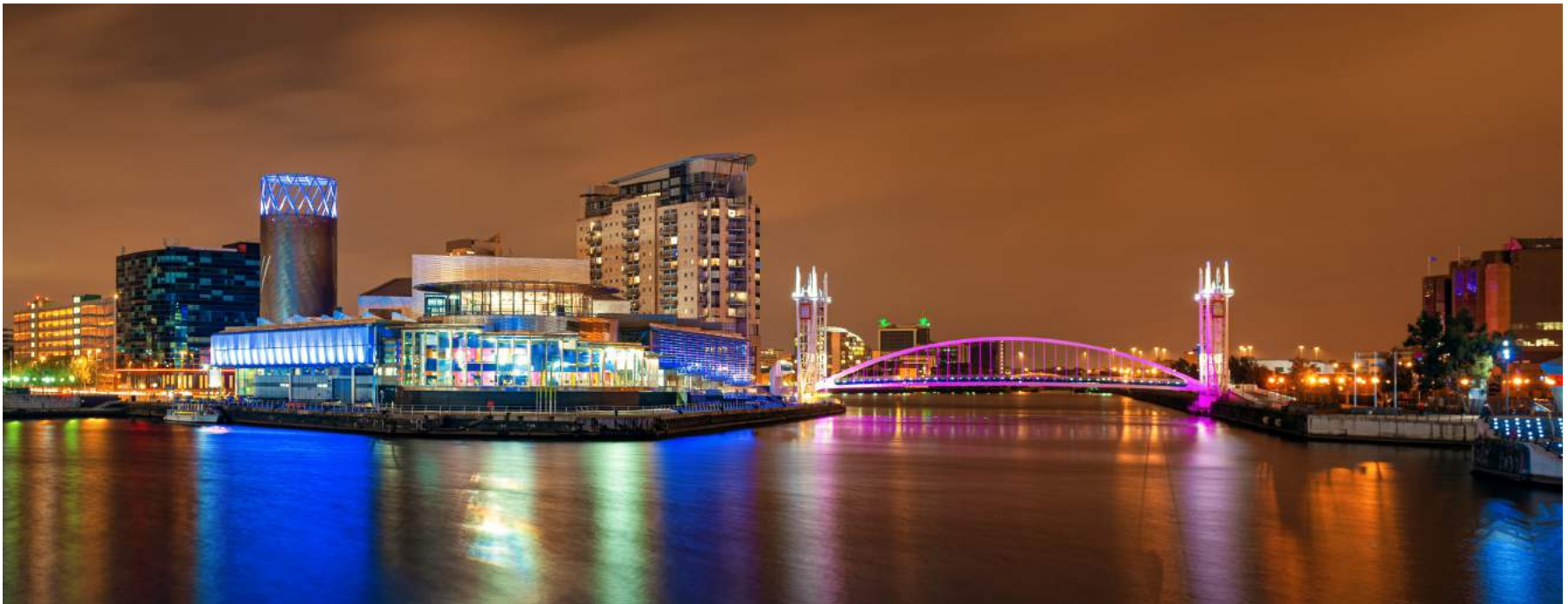
Plus, each organisation, such as healthcare and education, have unique critical applications that are fundamental to the delivery of citizen services. Electronic health record systems, for example, are vital but some solution providers are not yet cloud-ready. Public cloud strategies are competing against old technologies with limited, to no compatibility with the cloud, and must remain on-premises for the foreseeable future.

Compatibility is only one part of the problem. Often, workloads reside on-premise because they need to. Data sovereignty, data gravity, compliance and

security remain a key priority in public sector digital strategies and the public cloud is not always best suited to this. Governmental departments, defence services and healthcare, for example, house huge amounts of sensitive data; most will never be suitable for public cloud environments.

For many organisations this requires on-premises infrastructure. Meaning, more often than not, organisations found themselves with two operating models. A static model maintaining the legacy infrastructure and a new, agile operating model for cloud environments.

This need not be the case. A hybrid cloud model provides a cloud-like experience everywhere, regardless of whether data and workloads are in the public cloud, at the edge or on premises. Meaning sensitive data can remain on premise but be managed centrally with unified consumption metrics.



78%

OF PUBLIC BODIES STATE THEY HAVE
SERVICES THAT ARE UNSUITABLE FOR
PUBLIC CLOUD MIGRATION²

THE DIFFUSION OF DIGITAL SKILLS

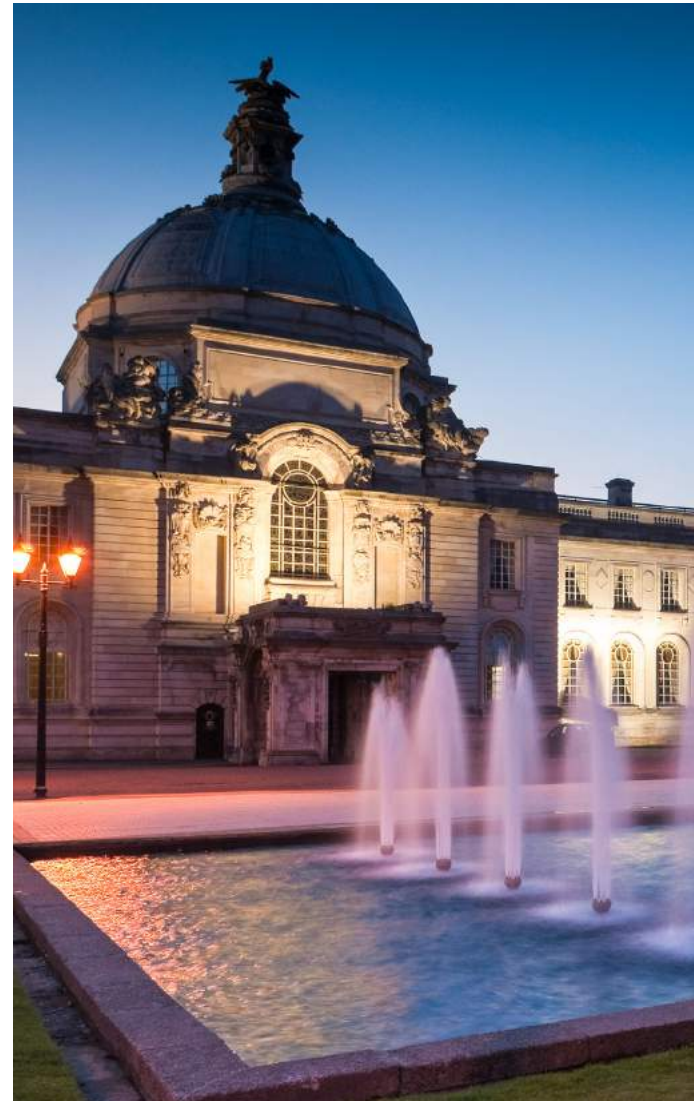
The traditional dependency on legacy infrastructure, and the convoluted adoption of cloud within the sector, has further impacted the digital skills gap. In our research we spoke to some amazingly talented individuals, including a number of forward-thinking, progressive technologists that are driving digital transformation in public services. However, unfortunately, research still suggests that 40% of organisations² have a lack of in-house digital skills and this is a barrier to transformation.


Arguably, there are many reasons for this. We heard, sometimes, public sector organisations can shy away from embracing emerging technologies to deliver differentiated citizen-focused services because they are (correctly) measured on efficiency and best value, as opposed to being driven by market conditions and innovation culture. This aversion to emerging technologies means that professionals skilled in these areas can tend to opt for careers in the private sector that involve emerging technologies with a fail fast culture. Simply not an option in the public sector.

Some say this has led to a significant digital skills gap as early career technology professionals often see more potential and remuneration in the private sector. Whereas late career technology professionals are generally unaffordable on civil service pay scales and are hesitant to take on the additional civil service responsibilities that come with senior roles.

“ There is absolutely a digital skills gap and that’s the case across every industry, that is not unique to public sector. As the vendors push their message and we get into technologies such as artificial intelligence and the internet of things, as much as they try to commoditise those products, and they are genuinely trying to make them simpler to understand, there are still a number of organisations that are experiencing a delay in getting up to speed.³ ”

Alex Hilton, CEO, Cloud Industry Forum





The digital skills gap is in part because the sector had traditionally acquired technology skills from contractors digital agencies, IT integrators and outsourcers rather than fostered and developed in-house. There are exceptions to this of course, and some of the larger central government departments are building their own technology transformation teams – a genuine positive step for the sector.

The government's Digital, Data and Technology (DDaT) function is helping cross-government professionalisation of technology roles and driving consistency. DDaT provides details of the skills needed to work at each role level within the public sector to encourage upskilling and training with transparency around role requirements.

Public sector professionals and consultants shared experiences in which technology suppliers have partially listened to a customer's challenges, and with perhaps little consideration for the overall strategy or transformation ambition, responded with an out-of-the-box technology solution. It is easy to get lost in translation and can result in overprovisioning and technology solutions that are not fit-for-purpose.

Darren Howe, Deputy Director Technology, Crown Commercial Services said:

“ *There is a requirement to educate, to develop and really get an understanding of emerging technologies.*

There is a significant requirement on suppliers to translate what that looks like and translate it into a language that public sector understands. There is far too much supplier jargon and public sector jargon – there needs to be a middle ground so that everyone understands what the emerging technology looks like.³ ”

PROCUREMENT FRAMEWORK CHALLENGES

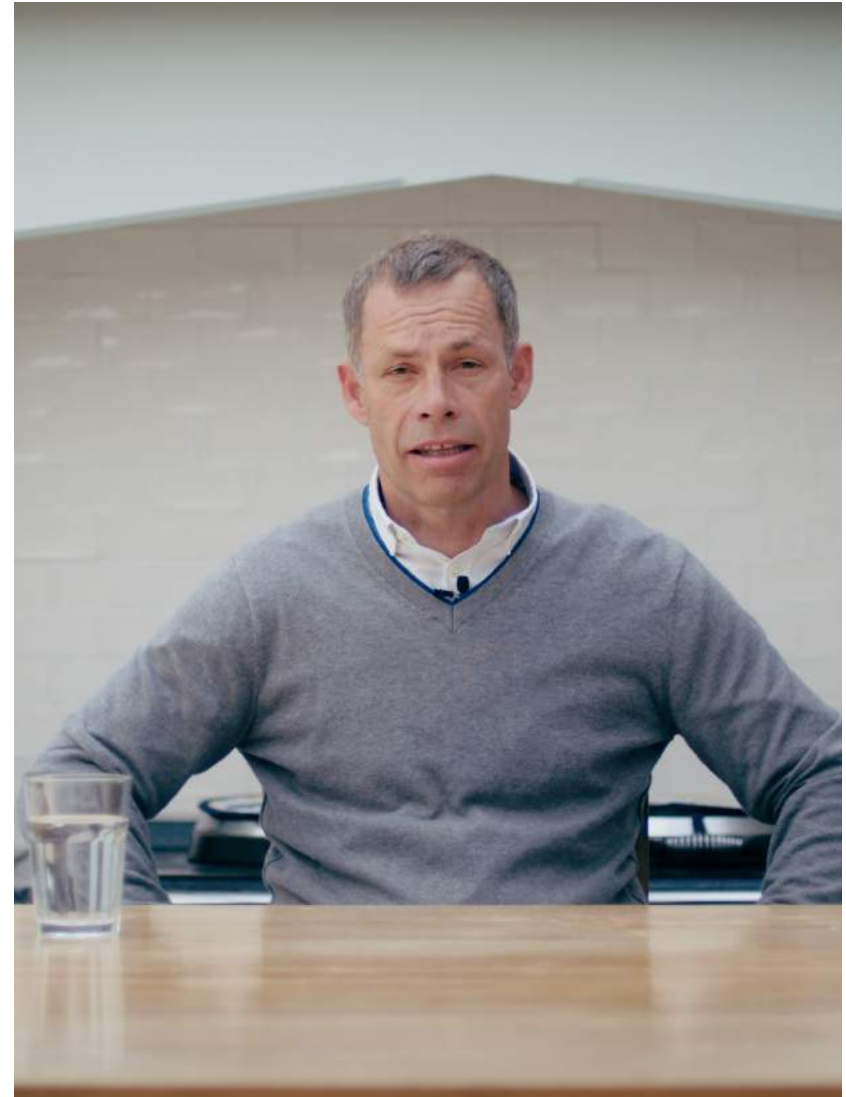
We heard one of the main drivers for the Cloud-First Policy was cost-reduction. However, this isn't always the case. A number of organisations we spoke with experienced spiralling costs due to a lack of visibility and understanding in their public cloud environment.

Alex Hilton, CEO of Cloud Industry Forum shared:

“ As far as the government's approach to the Cloud-First Policy, to be honest, what I think was driving that initially, was cost. It was seen as a big cost saving: “This cloud thing is going to save us millions in terms of our I.T. budgets.” The reality is that's not really the case. The cloud is not about saving money.³ ”

Individual cloud costs in isolation can look cheaper, however, it quickly adds up. Costs can accumulate if employees do not understand the implications of usage. Leaving systems running, or migrating data to and from the cloud, can see organisations surpass annual cloud budgets within a couple of months. A cloud-first approach, for many, does not fulfil the promise of cost-savings and efficiencies.

Similarly, procurement within public bodies is yet to align with the drive and desire for services led, OpEx based solutions. Legacy procurement practices tend to stifle innovation and result in a reluctance to engage with new suppliers. It is often 'easier' and less time consuming to renew contracts with incumbent suppliers.





“ Largely Government IT is still being procured in the same way, which is capital purchases over 3,5,7-year terms with depreciating assets. When public sector organisations go to market, they have to consider, ‘what’s the maximum capacity I need to procure’. That model means organisations are paying the maximum amount of money on day one, for an estimate on how much compute resource they are going to use. One of the major drivers for cloud was the ‘pay for what you use’ model.³ ”

Russell Macdonald, Strategic Advisor, Public Sector

Our research discovered that 61% of public sector organisations state that procurement policies are a barrier.²

Despite ambitions, the traditional CapEx model is inhibiting progress to move to on-demand, consumption-based technology which is fast becoming the de-facto approach to IT.

Tracey Jessup, Chief Digital Office at Parliamentary Digital Service said:

“ There is a challenge is around funding models. A lot of the public sector has a capital-focused overall funding model. That’s quite a traditional model and isn’t best suited to the cloud, resource based, serviced based model and that is still something the treasury is still working through with the cabinet.

There is a big focus amongst my colleagues, across certainly government departments, to work together to work with the Treasury to alter the green book so that it best meets what we need in the current cloud environment whilst hitting everything it needs to in terms of transparency for the public, and indeed, the Treasury.³ ”



61%

STATE THAT CAPITAL PROCUREMENT
POLICIES ARE A BARRIER TO CLOUD²

SUSTAINABILITY AND THE PROMISE OF PUBLIC CLOUD



Sustainability is no longer a ‘nice to have’, it’s a must have and the sector’s definition of sustainability is extending beyond widely recognised environmental topics into societal and economic impact.

Sustainability metrics are prominent in tender frameworks and supplier relationships across the sector. In 2021, the Government launched the Social Value Model⁴ to outline its social value priorities and provide a framework to measure and evaluate suppliers, contracts, and procurement processes.

The UK was the first major economy to embrace a legal obligation to achieve net-zero carbon emissions by 2050.⁵ The Government has set out ambitious plans for a Green Industrial Revolution in the UK. There will be £12 billion of government investment in a Ten Point Plan which will potentially attract three times as much investment from the private sector and will create and support up to 250,000 green jobs.⁶

“ The government set really aggressive targets overnight around being carbon neutral by 2050. And we’re starting to see that now in terms of the way customers are acting and the way they want to consume new services.

Every single tender that comes out now, there is a huge amount of emphasis on sustainability and a requirement for technology vendors and suppliers to demonstrate their sustainable credentials and not just in their solutions, actually, but also in terms of how they operate as an organisation.³ ”

Chris Burnett, Public Sector Specialist, HPE

With the cloud-first/cloud-appropriate policy still in full swing, public sector technologists are putting their faith in public cloud providers.

Matteo Dugand, an I.T. sustainability expert explains the impact of these technologies:

“ It’s very important to understand that digital technologies are not virtual; the cloud is not virtual. Data centres are not virtual. So, everything that sits behind digital technologies, cloud-based solutions, on premises data centres as well, are very material.

And once we acknowledge this, we can begin to understand that there is an environmental impact that is associated in general, with digital technologies.³



Russell Macdonald, a strategic advisor to the public sector also shared his views on sustainability:

“ The downside is that, by definition, hyperscalers, are hyper scale. And so, there are hundreds of thousands and millions of servers running all of the time. Whether you’re using them or not.

So, the idea that I can turn servers on and off when I’m using the cloud and gain a cost benefit is great but the underlying hardware that powers that virtual machine is still running.³



Matteo Dugand continues:

“ Moving from an on-premises solution to a public cloud solution, for example, literally just moves your emissions from, what we would call, scope one and scope two which are in-house greenhouse gas emissions to scope three, which are outsourced, greenhouse gas emissions in your supply chain.

From a very science driven perspective, moving from on-premises to cloud-based solutions is literally just moving your greenhouse gas, numbers from one accounting column to another.

And so, it’s not removing the problem at all, it’s just putting this impact in the hands of another organisation that you have less control on.³





Technology providers achieve their renewable energy and sustainability goals in many different ways. Offset programmes such as wind farms or conservation programmes are beneficial but, sometimes, not the most efficient in terms of sustainability; considering environmental, societal and economic impacts.

“ Not all cloud providers are transparent about how renewable their energy consumption is. For example, you may hear, ‘40 percent of our data centres run on renewable energy’ or ‘100 percent of our energy is renewable’. But that could be being achieved through offsets and not direct consumption of renewable energy. Some of the cloud providers have invested in wind farms and solar farms, which are in the same region as the data centres. That means it’s a bit of a postcode lottery in terms of where your workflow is located in the world and where the greenest energy is.”

Russell Macdonald, Strategic Advisor, Public Sector

It is increasingly important to explore and understand suppliers’ sustainability commitments and programmes. For example, at HPE, we are accelerating a zero-carbon future, from shifting toward the use of renewable power to fighting energy and IT waste through innovative products, services, and business models. Our circular economy model⁷ recycles and extends asset life to maximise end-of-use asset value and provide money back for other innovation projects; whilst reducing the impact on the environment.

Technology suppliers have a responsibility to adhere to the Government’s social value model and work with the public sector to achieve a more sustainable future.



THE UK ONLY HAS **9 YEARS** LEFT TO
REDUCE CARBON EMISSIONS BY **50%**⁸

DATA AND WORKLOADS IN THE RIGHT PLACE FOR YOUR ORGANISATION

When a public body embarks on a cloud migration strategy with the objective of decommissioning on-premises infrastructure in its entirety, there is a risk that any of the above challenges can slow or hinder the strategy altogether. This leads to a state of flux in which you are left managing both an on-premises and cloud environment. Organisations in this position have become 'Unconsciously Hybrid' and often find themselves with spiralling public cloud costs and the mounting costs of legacy on premise infrastructure.

A former technology professional within the Ministry of Justice and consultant, Steve Holt, shared his thoughts:

“ I won't say there isn't waste going on, there is terrible waste of public money and I think that gets lost a lot of the time.

You do really feel a sense of, not so much shame, but we've not got to the part of the public outcome that is going to benefit the citizen.”³

Alex Hilton, CEO of Cloud Industry Forum said:

“ Ultimately, the challenge around the use of cloud technology is the costs can spiral. The public sector at the start was saying 'this is our way out, to access emerging technology for a fraction of the price we were previously paying but that's really not the case.’”³





When faced with this challenge, there's often a level of reluctance to pivot and change the direction of strategy. Taking ownership of legacy decisions and admitting that, perhaps, the cloud-first approach hasn't benefitted an organisation's transformation can be difficult.

Darren Howe, Deputy Director Technology, Crown Commercial Services:

“ There is a level of reluctance when thinking about changing your strategy and whether you made the right decisions in the first place.

I don't think it's a bad thing, to accept that actually, we made an incorrect decision. We drove and pushed for a cloud environment, and it didn't work for us, it didn't give us the benefits we expected, being able to go back to the drawing board and rip up the strategy, rip up a business plan, rip up a project plan and start again, is probably in some cases is the right way to move forward and think about what the new world looks like.³ ”

The Government has acknowledged the Cloud-First Policy is not a one-size-fits-all strategy; having recently updated the direction to 'Cloud-Appropriate'.⁹

At HPE, we are encouraging public sector organisations to become 'Consciously Hybrid'. It's time to review policies, cloud and digital strategies with a critical eye and consider the right place for your organisation's data and workloads.

“ We’ve got decades of technology that’s still part and parcel of delivering services today. There’s a lot that needs to change, there’s a high mountain to climb in effect. But the reality is, the technology exists today, the capabilities exist today to deliver transformational services anywhere. It doesn’t have to be in the public cloud, it can be in your data centre in the mobile workspace.”

Russell Macdonald, Strategic Advisor, Public Sector

“ There’s no need for overprovisioning. There’s no need to put infrastructure on the floor that you don’t need today. That infrastructure used a huge amount of energy – you don’t have to do that, there are solutions out there that allow you to have the right size for what you need and only pay for what you need.”

Chris Burnett, Public Sector Specialist, HPE

There is a responsibility on suppliers and public sector technology partners to ensure they are supplying the right solutions and advice to help public sector organisations to spend the public purse efficiently to better outcomes for society, the economy and the environment. The traditional ‘technology hammer’ approach is only contributing to the challenge.

“ There is a sense of responsibility when working with the public sector because technology is such a power for good. It has so much it can offer, particularly in terms of public service delivery that we’ll need now but also that we’ll need in the future. There is a responsibility because we have to get this right so it’s not just from a technical point of view, but from a social, from an ethical from a legal point of view. All those issues have to be taken into consideration as well so that we can use technology that is going to be a real power for social good and a real power for change but to do it in a way that is right for everybody, and we bring everybody along with us on this journey.”

Sue Daley, Innovation and Emerging Technology Director, TechUK



CONCLUSION

It is widely accepted that taking a hybrid cloud approach enables public sector organisations to unleash the power of cloud and accelerate digital transformation to improve citizen outcomes.

We believe applications and data should be hosted in the right place, in the right sized environment, be it on-premises, at the edge or public cloud. A hybrid approach helps organisations to innovate faster with a cloud experience everywhere and avoid wasted resources and overspending.

HPE works with public sector organisations to bring agility to apps and data everywhere—edges, clouds, and data centres—eliminating complexity and silos, driving speed and agility with common tools, processes, and automation.

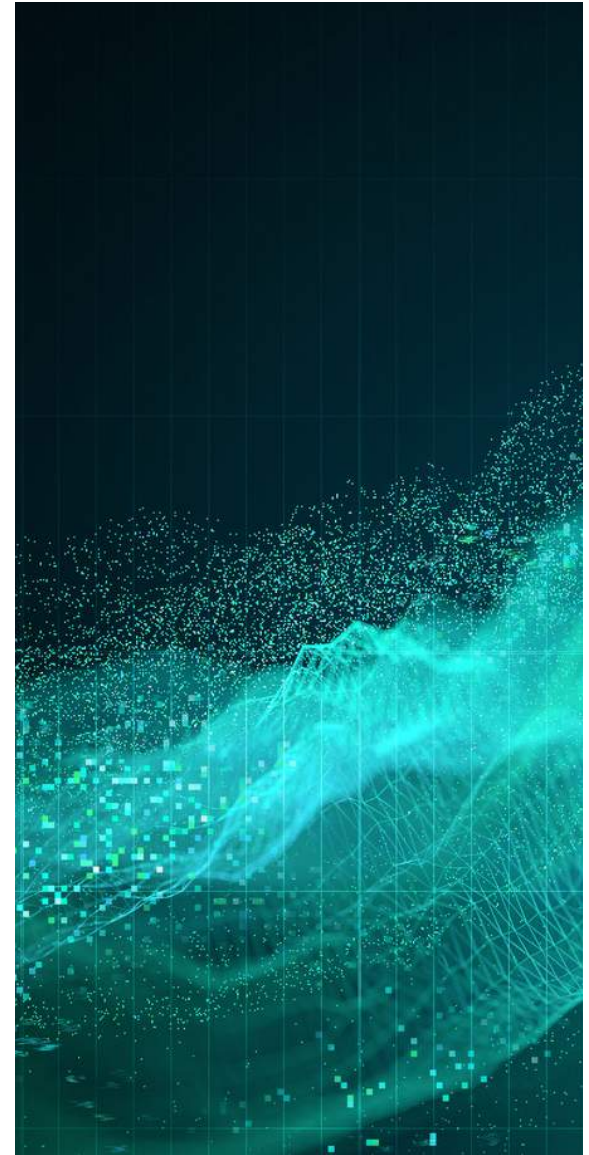
We'll help you address the non-cloud native apps and legacy infrastructure that is slowing you down and get you on the path to a unified, modern cloud strategy.

[HPE GreenLake Hybrid Cloud](#) is a multi-cloud, multi-stack managed service for public and private clouds that simplifies operations, reduces risk, and accelerates cloud adoption. With a consumption model, you always have the capacity to meet demand and pay only for what you use.

Our public sector research has highlighted there is no one-size-fits-all public technology solution. We are modernising public sector computing for the digital age across the entire computing landscape. Hyperscale public cloud is one instantiation of the modern computing paradigm, and departments should adopt public cloud, where appropriate, as part of their Consciously Hybrid strategy.

The computing landscape, and public sector requirements, are vast and varied. HPE is actively contributing to the development of the future of computing but enabling it edge-to-cloud to empower public sector organisation in their digital transformation journey.

We will continue to explore the 'real' challenges and deliver appropriate technology and advice that meet the needs of technology professionals.



Find out more

Hewlett Packard Enterprise is a global technology leader focused on developing intelligent solutions that allow customers to capture, analyse, and act upon data seamlessly from edge to cloud. HPE enables customers to accelerate business outcomes by driving new ways of working, unlocking insights, and increasing operational efficiency.

LEARN MORE AT

consciouslyhybrid.com



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1. You can find the Press Release here: <https://www.gov.uk/government/news/government-adopts-cloud-first-policy-for-public-sector-it>
 2. Research conducted by Dark Matter Media Ltd through a Freedom of Information request to 400 of public sector organisations in May-July 2021.
 3. Quote taken from video footage collected during the filming of the Consciously Hybrid Documentary, produced by Dark Matter Media Ltd, commissioned by Hewlett Packard Enterprise.
 4. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/940826/Social-Value-Model-Edn-1.1-3-Dec-20.pdf
 5. News story can be found here: <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>
 6. The Ten Point Plan for a Green Industrial Revolution can be found here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/936567/10_POINT_PLAN_BOOKLET.pdf
 7. The HPE Circular Economy Model, can be found here: <https://www.hpe.com/uk/en/living-progress/circular-economy.html>
 8. https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_1598

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