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Enterprise




BRIDGING THE CHASM

**HELPING THE PUBLIC SECTOR
BECOME CONSCIOUSLY HYBRID**

PUBLIC SECTOR WHITE PAPER

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FOR THE GOOD.**



“Remember, the average tenure of a Secretary of State is less than two years, and so it’s no surprise that issues such as legacy IT are often deprioritised in favour of the new and exciting. This is despite the fact that currently around half of central government IT spend is on servicing legacy IT.”¹

**Rt Hon Steve Barclay MP,
Chief Secretary to the Treasury**

While many UK public sector organisations are increasingly embracing public cloud to enable digital transformation and improve delivery of online services for citizens, with G-Cloud spending topping £2bn in 2020², it is estimated that 70% of ICT remains on-premises³.

Furthermore, it is estimated that 50% of strategic supplier technology spend is on sustaining legacy ICT⁴. As a result, many new digital services deployed in the public cloud remain dependent on legacy ICT systems to deliver an end-to-end service to the citizen.

How can government departments mitigate the risks of legacy ICT, avoid increasing technical debt and manage the widening gap between ‘traditional’ and public cloud operating models?



CLOUD-FIRST DOES NOT MEAN CLOUD-ONLY

“Despite the growth of cloud strategies in the public sector, many organisations have struggled to move business critical applications to the public cloud, due to application entanglement, data gravity, security and compliance, and unpredictable costs.”⁵

**Sue Preston, HPE Vice-President and General Manager,
Services, Software & Consumption, UKIMESA**

Cloud computing introduces a new ICT paradigm that is self-service, pay for what you use, on-demand, scalable and elastic. This is more about how you consume compute services, than it is about where those services reside. At HPE, we often say that “cloud is an experience, not a destination”.

The public sector has tended to lag behind commercial organisations when it comes to adopting cloud, often due to concerns about security, shared tenancy, data classification and data privacy. It’s been ten years since the UK government first published its ICT Strategy⁶, which led to the “G-Cloud” Cloud Strategy⁷ and the launch of the Digital Marketplace. Departments were advised that 50% of all new ICT budgets should be spent on public cloud⁸, and adopted the ‘Cloud-First’ Policy with some setting the goal of migrating up to 80% of all workloads to public cloud (e.g. HMRC, ONS).

In the 2010s, early forays into public cloud focussed on the ‘art of the possible’ and opportunities to leverage the new cloud paradigm to drive innovation and transformation – such as ‘Big Data’, serverless, the Internet of Things – however in recent years the trend has been towards mass migration and getting to cloud as quickly as possible.

When it comes to mass migration to the cloud, Gartner first proposed the five R’s⁹ (Rehost, Refactor, Revise, Rebuild, Replace) to evaluate applications and determine the most appropriate migration treatment – each of the cloud providers has its own variation on this theme. Rehost, also known as ‘lift and shift’, is the most common approach and moves existing on-premises virtual machines to the equivalent cloud Infrastructure-as-a-Service (IaaS) offering, without needing to transform the application itself. On the face of it, this is appealing to organisations with legacy workloads as the cost of replacing or redeveloping the applications may be prohibitive. ‘Lift and shift’ might therefore appear to ‘leave sleeping dogs lie’ and reduce risk.

Cloud providers offer incentives to customers for ‘lift and shift’ migrations – such as billing credits, free introductory tiers and subsidised professional services – as they represent the path of least resistance to onboarding customers to the cloud, and thus deliver recurring revenues sooner in the engagement.





So after ten years of central government cloud policy, record spends on G-Cloud and with cloud providers offering incentives to migrate, why aren't all departments already there?

“Just taking legacy applications and moving them to the cloud—“lift and shift”—will not automatically yield the benefits that cloud infrastructure and systems can provide. In fact, in some cases, that approach can result in IT architectures that are more complex, cumbersome, and costly than before.”

Digital McKinsey: Insights – “Creating value with the cloud”

‘Lift and shift’ can be a viable approach for organisations with modern workloads which are already virtualised on-premises running the latest operating systems, databases etc., as these require little or no change, however the reality for most public sector organisations is that they remain dependent on legacy technologies with:

- Architectural incompatibilities (e.g. non-x86 hardware, proprietary);
- End of Service Life operating systems, databases and other components that are unsupported in the cloud;
- Older hardware, operating systems and dependent software for which there is no direct upgrade path available;
- Application dependencies on older programming languages which are not supported in the cloud;
- Tightly-coupled interdependencies with other on-premise systems;
- ‘Data gravity’ where applications are dependent on data that needs to remain on-premises;
- High spend on ‘sustainment’ with lack of funding for migration and / or transformation work.

In addition, the nature of public sector can present additional challenges in terms of security, policies and public perception:

- Critical National Infrastructure;
- Highly sensitive personal data;
- Higher, co-mingled or unidentified data classifications;
- Legislative, regulatory or policy constraints.

ICT strategy needs to consider the overall needs of the organisation, balancing investment between new digital initiatives in the public cloud and mitigating the risks of legacy workloads on-premises.



‘CONSCIOUSLY HYBRID’

When an organisation embarks on a cloud migration programme with the objective of decommissioning on-premises infrastructure in its entirety to realise cashable savings, there is a risk that any of the above challenges can slow or stop the programme altogether and jeopardise the business case. This leads to a situation HPE refers to as ‘Unconsciously Hybrid’ where instead of migrating from one environment to another, the organisation is unexpectedly left managing both - a growing cloud presence with increasing costs, as well as the (often fixed) costs of on-premises infrastructure and legacy contracts.

Instead, HPE advocates a ‘Consciously Hybrid’ strategy where the organisation intentionally aims to balance the ICT portfolio across public cloud, intelligent edge and on-premises in order to deliver an end-to-end service in the most effective way. This recognises that there is no ‘one

size fits all’ solution. There is very little to be gained from ‘lifting and shifting’ a decades old legacy system from on-premises to cloud, and conversely new digital initiatives that can be implemented directly in public cloud need not be unnecessarily constrained by an operating model that was defined in the pre-cloud era.

Modern infrastructure innovation is bringing cloud capabilities and benefits to the edge or on-premises – such as consumption-based pricing, infrastructure automation and software-defined data centre features – while providing the security of dedicated hardware hosted in the customer’s premise, Crown Hosting or other co-location facility. For those workloads that are not capable of being migrated to cloud, this addresses some of the constraints traditionally associated with on-premises hosting such as fixed costs, over-provisioning, poor patch compliance and a lack of agility and responsiveness to change.

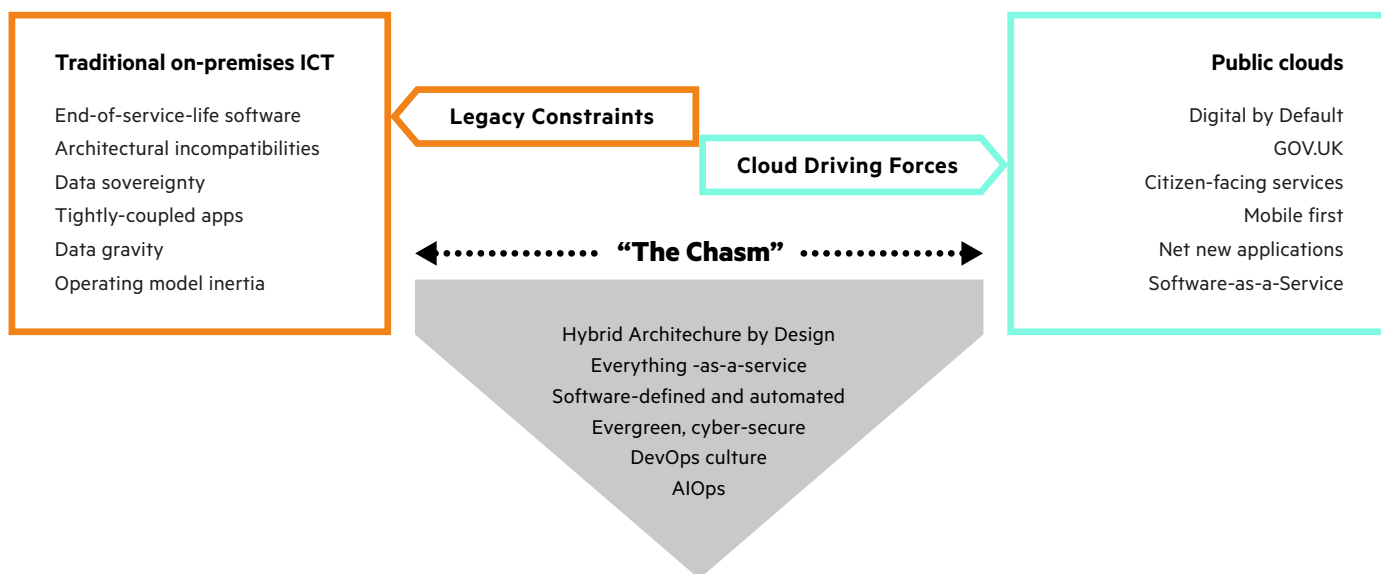
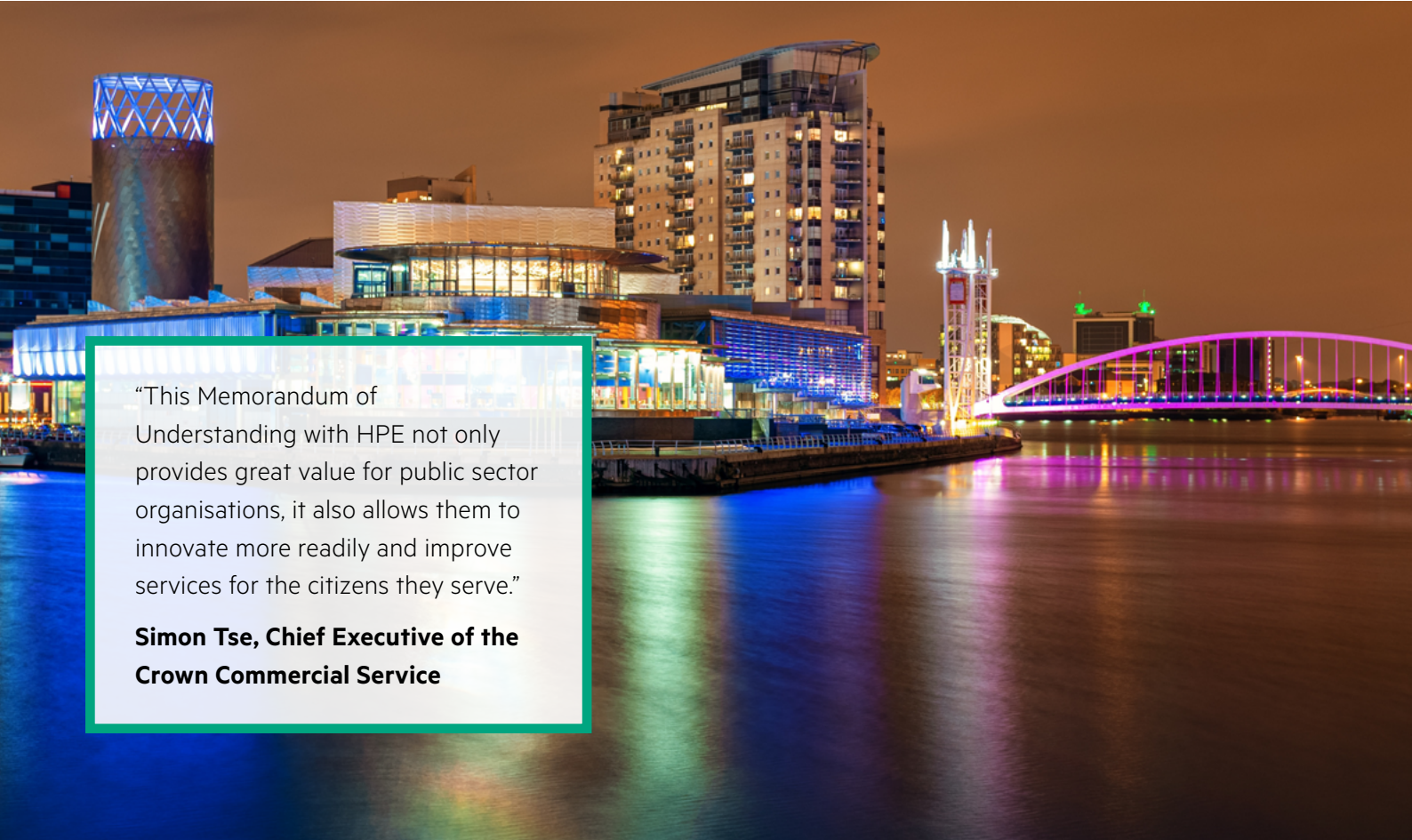


Figure 1 - "The Chasm" between traditional ICT and Cloud-First



With HPE Greenlake¹⁰, customers are able to provision on-premises infrastructure and pay for what they use on a monthly basis, with a minimum baseline commitment that is appropriate for their needs.

HPE installs “buffer capacity” in advance of it being needed to ensure that customers have room for spontaneous growth, while only charging for the resources that are used. This fundamentally changes the economics of on-premises infrastructure and aligns it more closely with the cloud paradigm, thus enabling customers to achieve better value for money by balancing their infrastructure provision across public cloud and on-premise hosting environments with greater cost transparency and flexibility.

A nighttime photograph of a cityscape reflected in a body of water. In the foreground, a bridge with a purple arch is illuminated. In the background, several buildings are lit up, including a prominent cylindrical tower with a blue and white lattice top. The water reflects the lights from the buildings and the bridge.

“This Memorandum of Understanding with HPE not only provides great value for public sector organisations, it also allows them to innovate more readily and improve services for the citizens they serve.”

Simon Tse, Chief Executive of the Crown Commercial Service

In August 2020, HPE and the Crown Commercial Service agreed a Memorandum of Understanding¹¹ which sets out pan-government pricing and standard terms for HPE Greenlake. In effect making it as easy to procure on-premises infrastructure on a consumption basis as it is to consume public cloud services, simplifying the buying process and increasing customer choice.



BRIDGING THE CHASM

As public cloud is becoming an increasing part of the public sector ICT landscape, it does not just represent a change in technology. The cloud paradigm changes how computing services are consumed and this impacts people, policy, processes, operating model and procurement.

The operating model for 'traditional' hosting and ICT outsourcing contracts often focusses on service stability, availability and reliability by constraining change. In some cases, the SLA for provisioning a new virtual machine might be several weeks which stifles agility and reinforces traditional concepts of static deployment and over-provisioning. Conversely, the public cloud environment promotes self-service, automation and DevOps concepts such as continuous integration and continuous deployment (CI/CD) which enable agility and flexibility to respond to new and changing business requirements.

Thus a natural tension exists between the policy drivers of Digital by Default and Cloud-First pulling workloads towards the public cloud, and the gravity of legacy workloads and inflexible ICT operating models. These opposing forces create a 'chasm' between 'new' and 'old' ways of working which continues to widen as cloud adoption increases and more traditional workloads get older, fall out of support and add to legacy technical debt.

If an organisation is to be Consciously Hybrid then it needs a strategic approach that bridges the chasm rather than attempting to leap from one side to the other. This involves changing the on-premises operating model to align with cloud principles and updating ways of working, policies, processes and staff development to take into account a hybrid ICT landscape.

“Every business is on a cloud transformation journey, but they're finding it more difficult than expected. And the biggest problem stems from one area – people. To be successful, you need to change from a legacy mindset to a new way of doing business. Your teams need to know how to organise, deploy and use the cloud.”

**Robert Christiansen,
HPE Chief Cloud
Strategist**



The risks associated with managing workloads which are unsuitable for cloud can then be mitigated through a modern operating model that supports automation (e.g. Infrastructure-as-Code and DevOps pipelines)¹², dynamic provisioning, consumption analytics¹³, continuous compliance¹⁴ and advanced operations (e.g. AIOps¹⁵). This is underpinned by composable / hyperconverged infrastructure and software-defined data centre capabilities that are API-enabled and capable of being programmatically orchestrated.

Thus a development team can just as easily deploy an application using their CI/CD pipeline on-premises as they can in the public cloud, apps teams can manage containers on-premise and in the cloud, operations have a consolidated view of the ICT estate and finance can analyse and recharge consumption of all ICT services.

The advantages are closer alignment between on-premises technology and cloud platforms, a holistic approach to managing end-to-end service delivery and a skills transition path for existing ICT staff that values their existing knowledge and builds on it to deliver higher quality services with a modern hybrid approach.



EVERYTHING-AS-A-SERVICE

“Everyone recognizes that customers want technology delivered as a Service, but they also want it on their terms. HPE’s unique approach to as-a-Service, which empowers customers with choice, flexibility, and control, is driving HPE GreenLake’s tremendous success. We will continue to invest aggressively in this opportunity, to capitalize on our market leadership, leverage our world-class channel and partner ecosystem, and deliver our entire portfolio, from edge to cloud, under the HPE GreenLake portfolio. As a result, we will reshape HPE and transform the market, with a new and better way to deliver as a Service.”

Antonio Neri, HPE Chief Executive Officer

One of the great attractions of cloud is the as-a-service model – fundamentally the ability to pay for what you use with utility billing whether it is Infrastructure-as-a-Service (IaaS) like Amazon EC2, Platform-as-a-Service (PaaS) like Azure Cosmos DB or Software-as-a-Service (SaaS) like salesforce.com. This removes cost barriers to entry for early adoption of new technologies promoting innovation, experimentation and responsiveness to new and changing business needs.

This need not be the exclusive preserve of public cloud, however, and at HPE’s Discover annual conference in 2019, CEO Antonio Neri announced¹⁶ that HPE will deliver its entire portfolio as-a-service within three years to reflect this change in how customers want to consume technology. This transformation is already well underway with HPE GreenLake revenues growing 80% year on year in 2020, despite the global pandemic, with over \$4.2 billion in total contract value for GreenLake to-date and 1,000 customers using the service¹⁷.

Traditional public sector procurement, which typically involves large up-front capital expenditure and a multi-year contract term, can perpetuate the legacy challenge by contractually building in over-provisioning (i.e. paying for assets before they are needed) and obsolescence (i.e. by the end of the contract the assets may be at or beyond end of service life).

With the ability to procure computing resources as-a-service, whether they are located in public cloud or on the organisation’s own choice of hosting, these risks can be mitigated by only provisioning (and paying for)

the resources that are necessary to meet the current needs of the business and passing the responsibility of maintaining and refreshing the underlying hardware to the provider as part of the service.

HPE commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study to examine the potential return on investment (ROI) that enterprises can realise by leveraging HPE GreenLake cloud services¹⁸. The purpose of this study was to provide a look into information gathered from organisations with years of experience using HPE GreenLake cloud services and evaluate the potential financial impact. The report shares some impressive statistics worth considering:

- 75% shortened time-to-market for deploying global IT projects;
- Capex savings of up to 40%, due to the eliminated need for overprovisioning;
- 60% reduction in support/professional services costs.

HPE GreenLake is not only about infrastructure. HPE is also providing an increasing number of Platform-as-a-Service capabilities as part of HPE GreenLake including SAP HANA, open source database services, container platforms and machine learning. These services are fully managed by HPE on the customer’s dedicated HPE GreenLake infrastructure. This allows organisations to deliver on a Consciously Hybrid strategy with the right mix of services on-premises, at the edge and in public cloud with all the benefits of consumption-based pricing, right-sizing and reduced legacy support costs.





SUSTAINABILITY

Sustainability, “Green ICT” and the circular economy are all increasingly important factors for public sector organisations as part of the Greening Government Commitments 2020-2025, UN Sustainable Development Goals and the 25 Year Environmental Plan.

Many organisations are considering migrating to public cloud platforms as a fast-track to achieving ICT sustainability goals, however not all cloud providers are transparent with the green credentials of individual data centres and regions, and those which do publish data identify that some regions are ‘greener’ than others due to the local power mix. For example, Google Cloud Platform matches 100% of its energy use with renewable energy globally through RECs¹⁹ or REGOs²⁰, while at the regional level data centres use 96% renewable energy in Oklahoma, where Google can match power demand with a nearby wind farm, compared with only 3% in Singapore where the majority of power is provided by natural gas. In Europe, its data centres are 40-60% renewable powered²¹.

Therefore, it is important that organisations do not place too much reliance on cloud providers to achieve their sustainability goals on their behalf, and particularly so in the public sector where the reality is that hybrid will be the predominant model moving forward.

As a technology company, HPE views addressing climate change not only as a moral imperative, but also as a business opportunity to innovate technologies to help our customers thrive in a carbon-constrained world. In 2018, HPE became one of the first IT companies to align its external reporting with recommendations set forth by the G20 Financial Stability Board’s Task Force on Climate-Related Financial Disclosures (TCFD), which links climate-related risks and opportunities with the financial stability of our organisation. The analysis revealed that the opportunities from developing technology solutions to facilitate a low-carbon transition outweigh the financial risks and present numerous business opportunities for HPE and our customers.

HPE’s Circular Economy approach drives more effective use of energy and materials, and enables customers to manage their ICT assets in a secure, compliant and environmentally responsible manner. Through Technology Renewal Centers (TRCs) in Andover, Massachusetts and Erskine, Scotland, HPE extends the life of technology where possible through Asset Upcycling Services and providing Certified Pre-Owned equipment to customers, responsibly recycling raw materials where appropriate. Circular Economy reports detail how customer assets have been refurbished or recycled to inform their own CDP²² reporting requirements.



ICT equipment that is powered-on in the data centre but not performing useful work, sometimes known as zombie equipment, is a known challenge and studies continue to find that 20–30% of servers in data centers are unproductive²³. This can particularly be the case with older legacy systems where the focus is more on uptime and stability than cost optimisation. Significant power savings can result from the removal and recycling of this obsolete ICT equipment from data centres, and replacing with an as-a-Service offering such as HPE GreenLake would avoid over-provisioning and thereby reduce the overall investment required by up to one third.

HPE products are designed to deliver the optimum level of power, storage and connectivity in exchange for the lowest input of energy possible, with performance per watt improvements demonstrated by the SPECpower_ssj2008 benchmark. Management tools such as HPE Intergrated Lights Out (iLO) and HPE OneView provide real-time thermal and power mapping and monitoring at the component level. From a design perspective, HPE designs products for longer lifecycles and to support upgrades, repairs and ease of recycling. Materials used in manufacturing are chosen for lower environmental impact, allowing HPE products to meet global regulatory requirements.

Thus, the Consciously Hybrid organisation can drive down energy use and associated greenhouse gas emissions related to on-premises infrastructure with modern, energy-efficient equipment, better monitoring and consumption-based services like HPE GreenLake which eliminates zombie infrastructure, drives up utilisation and delivers cost transparency and value for money.





CONCLUSION

Most organisations – be they public or private sector – have declared some form of cloud strategy, however as many as 70% of applications remain on-premises and in the public sector 50% of budgets are spent on legacy sustainment rather than transformation.

Cloud computing is undoubtedly the strategic direction of travel; however, it is not magic. Cloud is more about ‘how’ services are delivered, not where. It is an experience, not a destination. Simply migrating legacy workloads to cloud results in “your mess for less” without the benefits of adopting cloud-native principles and transforming the organisational operating model.

The benefits that many customers hope to realise when they move to public cloud – cost efficiency, simpler management, greater flexibility and agility, elasticity and scalability, experimentation and innovation, sustainability and carbon reduction – HPE is bringing to any location with its edge-to-cloud everything-as-a-service approach.

A Consciously Hybrid approach seeks to align the on-premises, edge and public cloud operating models more closely to bridge the ‘chasm’ between cloud-native and traditional infrastructure paradigms. Aligning the operating model across platforms puts customers back in control of their compute resources, and workloads

can then be deployed to the most appropriate platform according to business needs.

Being Consciously Hybrid also means considering how workloads and data can move from one platform to another, and how data is collected, stored and shared across a hybrid infrastructure – while still using each platform based on its strengths and not reducing to the lowest common denominator. HPE’s edge-to-cloud products and hybrid cloud expertise ensure that customers can make the most of their ICT investments whether on-premises, at the edge or in public clouds.

The race to the cloud is over. At HPE, we believe it is time to objectively review cloud strategies; forget the direction, failures and challenges of the past and choose the right environment for your workloads and data. Being Consciously Hybrid helps to alleviate data sovereignty, gravity and legacy issues, providing a scalable, reliable strategy to enable your digital transformation journey.

Our public sector experts are on hand to provide impartial advice regardless of your digital maturity, budget or legacy technology. Let’s become Consciously Hybrid.

We are HPE, we are here, **for the good.**



About HPE

Hewlett Packard Enterprise is the global edge-to-cloud platform-as-a-service company that helps organizations accelerate outcomes by unlocking value from all of their data, everywhere. Built on decades of reimagining the future and innovating to advance the way we live and work, HPE delivers unique, open and intelligent technology solutions, with a consistent experience across all clouds and edges, to help customers develop new business models, engage in new ways, and increase operational performance. For more information, visit: www.hpe.com/uk.

About the Author

Russell Macdonald is a Strategic Advisor in HPE's Pointnext Advisory and Professional Services business, aligned to UK Public Sector accounts. He is a member of TechUK's Central Government council and the British Computer Society. As an early adopter and technology evangelist, he has specialised in cloud computing since 2011 as a Managing Consultant with PA Consulting Group and a Global Principal Solutions Architect with Amazon Web Services. Prior to this, Russell was a Programme Manager leading large ICT transformation programmes in central government, law enforcement and transport.



- ¹ Chief Secretary to the Treasury delivers his first speech in the role, 28 July 2020: <https://www.gov.uk/government/speeches/chief-secretary-to-the-treasury-delivers-his-first-speech-in-the-role-to-thinktank-onward>
- ² Advice Cloud G-Cloud Sales: <https://advice-cloud.co.uk/spend-data/gcloud-sales/> filtered by 'Year of Reporting Period' = 2020, retrieved 15 February 2021
- ³ IDC Cloud Pulse 1Q19: Executive Summary <https://www.idc.com/getdoc.jsp?containerId=US45419119>
- ⁴ "currently around half of central government IT spend is on servicing legacy IT" from Chief Secretary to the Treasury quote referenced at the start of this article
- ⁵ HPE Press Release: "UK Government signs agreement with Hewlett Packard Enterprise to cut the complexity of cloud adoption", 18 August 2020: <https://www.hpe.com/us/en/newsroom/press-release/2020/08/uk-government-signs-agreement-with-hewlett-packard-enterprise-to-cut-the-complexity-of-cloud-adoption.html>
- ⁶ Government ICT Strategy, March 2011: <https://www.gov.uk/government/publications/uk-government-ict-strategy-resources>
- ⁷ G-Cloud Government Cloud Strategy, October 2011: <https://www.gov.uk/government/publications/government-cloud-strategy>
- ⁸ Government ICT Strategy, Strategic Implementation Plan: "50% of central government departments' new ICT spending will be transitioned to public cloud computing services by December 2015" https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/266180/govt-ict-sip.odt
- ⁹ Gartner first published "Migrating Applications to the Cloud: Rehost, Refactor, Revise, Rebuild, or Replace?" in December 2010 which were the basis for the "6 R's" (rehost, replatform, re-architect, repurchase, retain, and retire) that AWS recommends in its "Migrating to AWS. Best Practice and Strategies" e-book. Microsoft's Azure Migration Center retains 4 of the Gartner 5 R's, replacing Revise with Rearchitect. Google's "Migration to GCP: Getting Started" dispenses with the R's altogether but retains the spirit of them with "Lift and Shift", "Improve and Move" and "Rip and Replace".
- ¹⁰ Cloud Services delivered by HPE GreenLake: <https://www.hpe.com/uk/en/cloud-services.html>
- ¹¹ HPE Press Release: "UK Government signs agreement with Hewlett Packard Enterprise to cut the complexity of cloud adoption", 18 August 2020: <https://www.hpe.com/us/en/newsroom/press-release/2020/08/uk-government-signs-agreement-with-hewlett-packard-enterprise-to-cut-the-complexity-of-cloud-adoption.html>
- ¹² HPE GreenLake for Composable Infrastructure: <https://assets.ext.hpe.com/is/content/hpedam/documents/a00060000-0999/a00060332/a00060332enw.pdf>
- ¹³ HPE GreenLake Consumption Analytics: <https://www.hpe.com/uk/en/services/cloud-cost-management.html>
- ¹⁴ HPE GreenLake Continuous Compliance: <https://www.hpe.com/us/en/greenlake/compliance-monitoring.html>
- ¹⁵ HPE IT Automation and AIOps: <https://www.hpe.com/uk/en/solutions/it-automation-aiops.html>
- ¹⁶ HPE Press Release: HPE announces plans to deliver entire portfolio as a Service by 2022: <https://www.hpe.com/us/en/newsroom/press-release/2019/06/hpe-announces-plans-to-offer-entire-portfolio-as-a-service-by-2022.html>
- ¹⁷ HPE GreenLake Is At Your Service Infographic, December 2020: <https://paths.ext.hpe.com/c/at-your-service?x=YP6aVd>
- ¹⁸ The Total Economic Impact of HPE GreenLake: https://psnow.ext.hpe.com/doc/a00047694enw?jumpid=in_lit-psnow-red
- ¹⁹ REC: Renewable Energy Credits
- ²⁰ REGO: Renewable Energy Guarantee of Origin
- ²¹ "24/7 by 2030: Realizing a Carbon-Free Future", Google White Paper: <https://www.gstatic.com/gumdrop/sustainability/247-carbon-free-energy.pdf>
- ²² CDP is a not-for-profit charity that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts. <https://www.cdp.net/en>
- ²³ "New data supports finding that 30 percent of servers are 'comatose', indicating that nearly a third of capital in enterprise data centers is wasted", Koomey and Taylor, June 2015: https://www.anthesisgroup.com/wp-content/uploads/2019/11/Case-Study_DataSupports30PercentComatoseEstimate-FINAL_06032015.pdf

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