

FUTURE  
AT HEART

WHITEPAPER  
**CLOUD FOR SUSTAINABILITY**





# 1 A Growing Concern

Climate change is top of everyone's minds right now, and for good reason. We can see the damaging effects all around us, within our own lives, and the scientific consensus is now unmistakable. The recent IPCC report, which went to every government on Earth, made it clear that climate change is man-made, is affecting us all and will lead to catastrophe if it is not kept within reasonable limits.

The world came together in November 2021 at the COP 26 conference to agree (for the first time) on some dramatic measures, which include the systematic reduction in coal and other fossil fuel usage. They also failed to do as much as the scientific community believes we can and must, leaving yet more work to be done over the next few years and at the subsequent (now annual) COP conferences.

There are 5 key factors that have changed the ground rules for sustainability in business, and have made the topic much more urgent than before.



**Consumers** expect companies to make better environmental performance a key priority.



**Investors** will not put money into businesses without long-term strategies for emission-reduction and real sustainability.



**Reporting** into environmental performance is now mandatory in most jurisdictions, and is enforced with increasing strictness by regulators.



**Employees** increasingly prioritise companies with a proven commitment to sustainability and are not interested in working for those with a poor environmental record.



**Suppliers** need to give proof of their own environmental track record in order to do business with large enterprises.

Let's take a closer look at two of the most influential of these drivers for change: the actions of ordinary citizens as consumers and

influencers, and the rapidly changing role of financial bodies as investors and consultants.

## Public Opinion

People are developing their views at speed, and we can see how political and business decision-makers are still playing catch-up with public opinion, which has been focused on sustainability and environmental performance for many years now. Large brands have in some cases suffered due to perceived poor attitudes to the environment, and "green" businesses have grown fast in recent years, as priorities change.

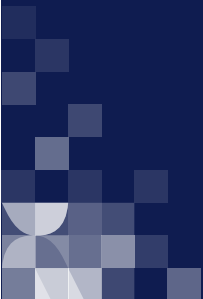
It is more or less impossible for commercial bodies NOT to have a strong position on the environment, and this reality is now a fact

of life for any company that wants to build loyalty and develop long-term business plans. The business importance of changes in public opinion are clearly shown in a recent Corporate Social Responsibility (CSR) survey carried out for the Rainforest Alliance. This shows that 90% of consumers want to buy from companies with serious policies on social and environmental issues, and 73% (that number is higher in developing countries more at risk from climate change) expect businesses to take measurable steps to address such issues.

## Economics and Finance

Financial bodies are not known for being sentimental, and that has led to decades of distrust from environmentalists, as banks and investment bodies have been seen as more part of the problem than the solution. One of

the most dramatic changes in recent years has been something of a volte-face by the investment community- and some business sectors are now scrambling to understand the implications of this.



**In recent years we have seen some major developments in economic thinking. The Circular Economy aims to define ways to reduce waste (even eliminate it in some cases) both by such practical actions as improved recycling and strategic changes that prevent environmentally harmful actions being taken in the first place. Doughnut Economics, which is increasingly influential among public sector planners and product/service designers, aims to define a true "habitable space", once we take into account both replenishment of natural resources and social requirements. The ring of the "doughnut" is thus defined as the only area within which growth is permitted. The 5 Capitals theory expands on long-established economic ideas to give a monetary value to Nature (natural capital), People (human capital) plus Society, Finance and Manufacturing. Striking a balance between these makes it possible to take a more balanced approach to sustainability.**

The growing popularity of these more broadly-based, nuanced economic views has strongly challenged the previously dominant "Vienna-Chicago" model, in which corporations were defined as having a duty only to their shareholders and not to any other factor or sector of society. That approach has been in decline for a long time, and this is being

reflected now by a major change of sentiment among business investors, with many equity management businesses now defining sustainability as a basic requirement for long-term investment. Blackrock, the world's largest equity manager, has now written to CEOs to make it clear that they will not support any future investment plan that is not clearly





sustainable. This may have a larger impact on changing practices and outcomes than political agreements.

Significantly, we can see that effective policies towards sustainability do feed through into better results. From the same CSR survey quoted above, we see that 98% of businesses with clear CSR policies achieved business improvements as a direct result. Outcomes range from better reputation, higher profitability, lower costs and more efficient production. In fact, products with proven sustainability credentials grew between 5 and 6 times faster than the rest. Certification, providing objective assurance to partners and customers, enhances these benefits.

The more we measure market performance, the clearer it becomes that strategies for business and operational sustainability are definitely not optional extras: they are basic necessities for the future of any business. Change is happening all around us, and the pace is accelerating fast. The question now for major enterprises is how to make these strategic developments become a source of opportunity for them- and not a threat.

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## 2 Sustainability and the Cloud

So far, we have seen how economic theory, public pressure and financial strategies are all driving enterprises to place sustainability at the heart of their thinking and planning for the future. This places their IT choices under the spotlight for two reasons.

- First, we need to make IT systems, platforms and infrastructure deliver much better environmental performance.
- Second, we need to become more expert at using IT as a driver for improving enterprise environmental standards.

Moving to Cloud is seen by many C-level decision makers as being both financially and environmentally responsible. There is a widespread belief that Cloud will make you both more profitable and more green, almost as a matter of course. How does this approach work out in practice? Let's ask the hyperscalers for their point of view- it is quite instructive.

Large Cloud providers, known to us all as hyperscalers, have developed a collaborative approach to managing cybersecurity jointly with their clients, and now they are taking the same approach to sustainability, as well. In a strategic partnership with any of the hyperscale providers, the basic division of responsibilities takes place at the "virtual environment" level. The hyperscale provides an overall environment, that includes the landscape, core systems and basic services. The client is responsible for their own private space within this landscape. If we compare this to a physical landscape, it is as if a city planning and development department has provided a location that is guaranteed to meet certain agreed environmental performance standards. What a client does within that location, however, is up to them. The hyperscaler guarantees "sustainability OF the Cloud" but the client must guarantee their "sustainability IN the Cloud".

Data storage needs are still rising on a sharp curve as more image-based data is moved and stored, while the introduction of blockchain (especially with “proof of work” as required by many crypto transactions) is adding still further to demand.

What does this mean in practical terms for all the large enterprises currently either actively moving their systems, services and applications to Cloud, or planning to do so in the very near future? We believe it is a necessary reminder that the Cloud is not automatically environmentally positive.

Large providers can assure us that their environments are sustainable: the hardware, server farms and other power-hungry devices are shared, after all, and therefore likely to be more efficient than the thousands of corporate IT landscapes, with dedicated hardware and devices, that are being replaced. Yet there is no rule to say that the individual private spaces each enterprise leases on the Cloud will be more sustainable than any other IT

environment- there are actually some contra-indications. Moving paper transactions to cloud leads to an exponential increase in the actions carried out online. Data storage needs are still rising on a sharp curve as more image-based data is moved and stored, while the introduction of blockchain (especially with “proof of work” as required by many crypto transactions) is adding still further to demand.

And yet... We are quite certain that Cloud does have the potential to drive the green agenda further and faster than ever, precisely because of its shared nature, and we need it to deliver on the promise of corporate sustainability as fast as possible. We need to make Cloud part of the solution, not the problem: so how can we do that?

## Terminology and what it really means

Let’s start by trying to be clear about terminology. In figure 1 below we see that “Sustainability” and “Green” are not precisely

the same things, even though they are mutually supportive and closely aligned.

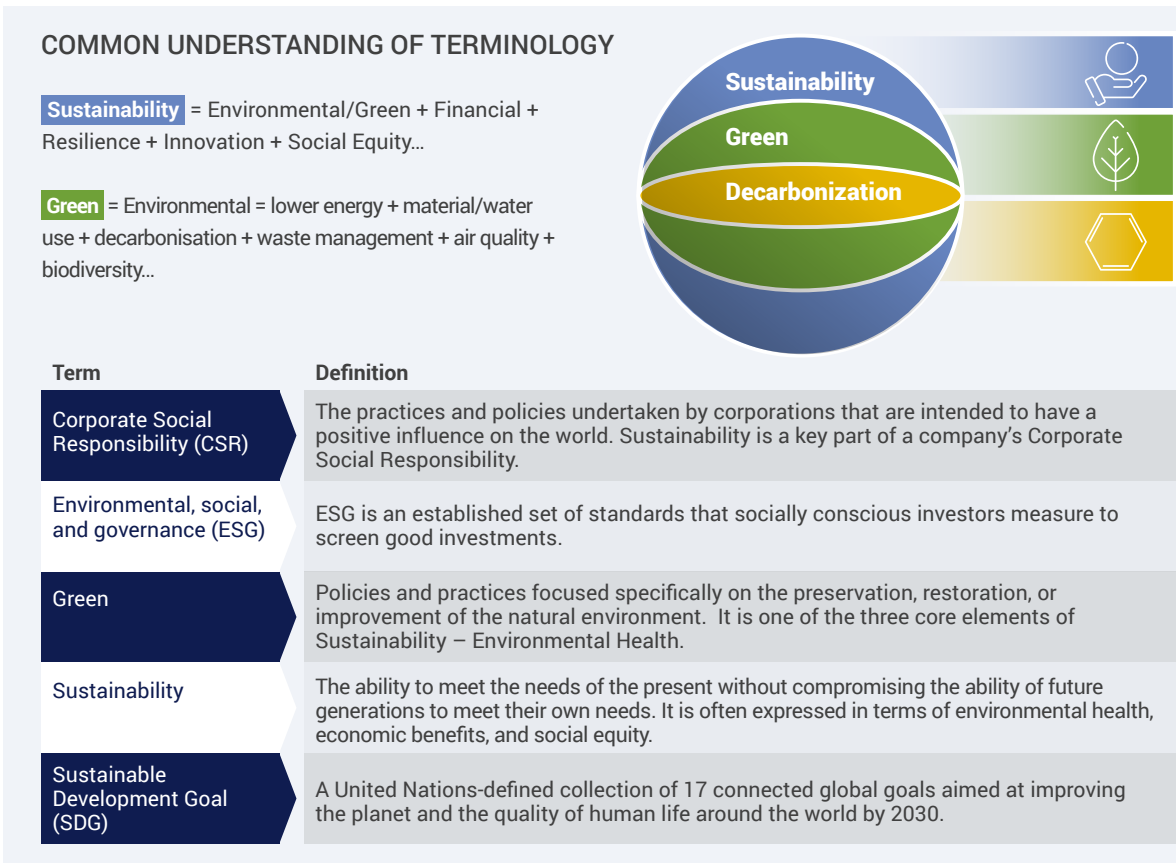


Figure 1: Green sits within the wider concept of Sustainability.

Sustainability is the key factor in determining investment decisions, and for a most compelling reason. There is no point in being a strategic investor in any business that does not have a long-term future. Unless business plans are truly sustainable, there can be no assured future for that enterprise.

**Sustainability**, therefore, includes governance and corporate responsibility, social equity, and even such factors as commitment to innovation. Under this heading we place CSR (Corporate Social Responsibility) and also ESG (Environmental,

Social and Governance), which is becoming an essential tool for investors, in particular.

**Green** is included within Sustainability but is tightly focused on the core environmental factors, such as reducing use of energy and other natural resources (water, as a key example). It incorporates decarbonization, which is specifically related to cutting waste, reducing impact on the biosphere through air and water pollution, while addressing core processes to make them more environmentally responsible.

## Greener IT- with Cloud

Moving to Cloud does not automatically make your IT green, but we strongly believe that Cloud can create the conditions that make transformation possible. By this we mean both transforming your IT to make it more efficient and environmentally high performing, and transforming your business through IT, using IT as a tool to drive positive change into the organisation, processes, ecosystem, business relationships- everything, in fact.

So how do we maximise this opportunity to achieve higher levels of sustainability for your business, while decarbonising and making your operations more environmentally responsible? Cloud should offer a range of new options as standard, including:

**Vendor agnostic.** There should be no technology lock-in when you move to the Cloud. Now you can monitor performance dynamically and make sure that the choices you make around software, toolsets and methods are optimised for environmental performance, and can be changed when better options appear.

**Sustainable architectures.** The emergence of Networked Cloud, in which the network itself is intelligent and programmable, is creating an inherently more efficient architectural approach. We expect to see Application Architecture in the Cloud evolving continuously, which should lead to constant improvements in operational efficiency. These should feed through into reduced energy consumption, lower emissions and improved sustainability across all core measures.

**Platform transformation.** Cloud creates the opportunity for collaborative development of efficient, best practice platforms that can be adapted, customised and shared by enterprises in most industry sectors. This not only saves time and money, by making it unnecessary to “reinvent the wheel” all the time, it also leads to improved operational efficiency, lower energy usage and reduced emissions.

**Sustainable Software.** Cloud is accelerating the use of low code and no code options for development, often on an ecosystem and collaborative basis. There is now a general trend towards “greener applications”, leading to more sustainable shared development, enabled by Cloud. We believe this will deliver better environmental outcomes as Cloud becomes more networked and collaborative.

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### 3 The NTT DATA Point of View

So far in this paper we have set out two key points. First, moving to Cloud can act as the catalyst for transformational change across the entire business. Second, your IT strategy can be a vital tool for making your entire organisation more environmentally friendly. In the rest of this paper we will start the process of exploring the practical steps that can be taken by any enterprise, in any sector

to use Cloud transformation as a driver for higher levels of sustainability and immediately improved environmental performance. Before looking at the change journey in more depth, let's take a top-level view on the core offerings that NTT DATA has developed to support the process of Green Change from initial thinking to comprehensive action plans.

NTT DATA works with clients from the earliest stages of planning and strategizing, with three service offers ready for implementation, in collaboration with client decision-makers. **Green Cloud Foundation** addresses core thinking across the business, identifying potential business impact, natural start points, awareness raising and advisory services for green computing. **Green by Design** enables us to work with clients to build effective strategies and execution plans for Green Operations, Sustainable Architectures and Green Software Engineering. Finally, **Green By Cloud** enables clients to move on from initial sustainability actions to maximise the potential of Cloud for "Green Innovation", developing original methods for environmental improvement, while recording, analysing and evaluating sustainability KPIs.



Our view for using this consulting toolset to drive practical change is summarised in figure 2 below:

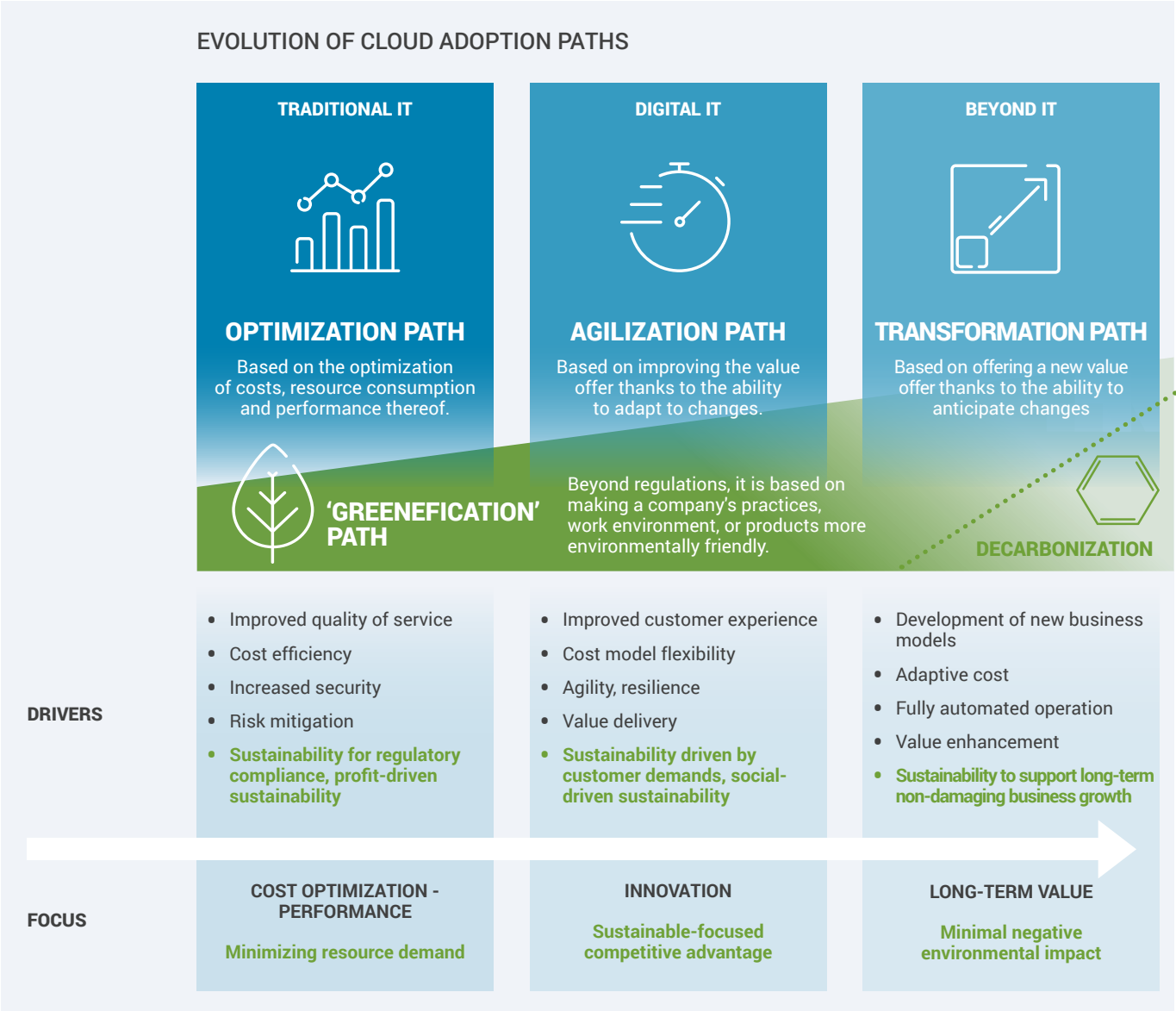


Figure 2: from doing the same things better to doing different things, in a different way!

## Stages of Change

NTT DATA believes that organisations determined to transform through (or by) IT will go through three different stages of change, as shown in figure 2, though we should note that all businesses are different and will start at different levels of maturity. It is possible to explore these different paths sequentially, as a step by step approach to an ultimate goal, or to execute these changes at the same time, in different parts of the organisation. Let's explore this approach in more depth, both from the organisational and the IT viewpoint.

**Optimization** covers the work that can be done during the period when IT remains broadly in its traditional configuration. Some enterprises see this as their priority goal, while even those that have a truly advanced and ambitious vision for the future will inevitably start here. The optimization stage has a strong focus on reducing costs, improving efficiency, cutting risks (and faults), while meeting compliance and regulatory requirements. In this context, sustainability is seen as a regulatory issue more than anything else.

This is where we focus on how to reduce costs and use of resources within the IT function, itself. At this moment corporate IT is a large user of energy, creates a great deal of waste in the form of carbon emissions and often toxic hardware components. Green IT looks for ways to combat the carbon footprint of the IT function, itself, cutting energy requirements, combatting waste and avoiding duplication and unnecessary redundancy.

**Agility** is the natural next step, once “as-is” technology has been thoroughly optimized. This represents an important step forward, where the enterprise seeks to use IT as a tool for making the entire organisation more responsive, faster-moving and flexible. The focus here is on starting to develop new value propositions and offers, driving innovation as a top priority, improving user/customer experience and cutting out all aspects of waste. Sustainability here is certainly not a “box-ticking” exercise but about improved positioning, stronger CSR performance and stronger brand.

At this stage the task becomes how to use IT in a smarter way to drive better resource management, together with a dramatic cut in emissions and waste, right across extended value chains. The sustainability targets set by the UN and now seen as mandatory in

governance terms includes the duty for enterprises to track the environmental performance of suppliers and partners, even where no direct control is exercised. Green IT is now very much about the total performance of the business itself, and requires continuous performance improvement against all environmental indicators.

**Transformation** reflects a higher level of maturity, in which the business is using its new and more advanced IT capabilities within the cloud to change how the organisation is structured, thinks, acts and sees the world. Here we expect to create new business models, based on digital native outlooks and behaviours and take a path of adaptable evolution, with and ahead of the market. Sustainability here is a way of life, seen as critically important for long-term growth.

At this stage we expect to use IT in the Cloud as a driver for positive innovation, in which services, offers and value propositions, together with the ways in which these are delivered, are also continuously scrutinised and improved. The goal is to identify ways in which offers can be produced and taken to market while both progressively reducing carbon impact and enhancing customer experience.

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To go green, you need to set up a dedicated, strongly focused process. And then just do it. Today. Or tomorrow. As soon as you can.

**Going green.** This development path implies an increasingly strong commitment to sustainability in all its forms, and yet it is possible to move IT into the Cloud and optimise without necessarily becoming truly “Green” in the way you operate and behave. Figure 2 shows that Green evolution is on a related yet separate path from broader transformation. In other words, you do not have to go through the three stages described above before you can start to think about becoming more green. To go green, you need to set up a dedicated, strongly focused process. And then just do it. Today. Or tomorrow. As soon as you can.

You will have more opportunities to become a green organisation as you transform other parts of your business, but the relationship is one of mutual support not dependency. Green IT is a key factor in making innovations become market reality, bringing environmental awareness and understanding into the heart of design and development. The ability to mobilise ecosystems via networked cloud will provide access to richer sources of ideas and innovative thinking, and this should accelerate the “greening” of products from now on.

In the rest of this paper, we will give you our take on how to make the changes, deliver the right results, and start to add value to your business as you do so.


## Where do you start?

Most organisations will implement Green IT either as part of their ongoing journey to Cloud, or as a next step, having already moved at least some of their IT to cloud.

We believe that aiming for improved environmental performance, leading to greater sustainability, should be an integral part of any corporate Cloud strategy. The starting point may be different, however, depending on where

an enterprise currently stands on the Cloud adoption path and on its level of Cloud maturity.

Once in the Cloud, we expect to see a stronger focus on continuous optimization across the three ESG areas: environment, social, and governance, aiming to drive down resource use and emissions, while improving agility and customer experience. This is likely to require a more or less non-stop review of assets,

An abstract graphic at the top of the page features a complex network of green lines and dots, resembling a molecular structure or a digital network, set against a dark background.

Enterprises need to have a strong Green IT approach no matter where they are, but the approach will differ, depending on the starting point, and some of these differences may be quite important.

partnerships and performance indicators, with constant reverse engineering in process design, service offers and value chains.

Early in the Cloud journey the strategic focus may be rather different, as the business works on its roadmap to transformational change early in the process. We are likely to see a stronger emphasis on advisory services at this earlier stage, with fundamental differences in the choices made for investment in technology and business structures.

Value chains and ecosystems, for example, can be designed with the Green agenda top of mind, and reverse engineering of established systems and processes will hopefully be less in evidence. This is not to say that there is a “right or wrong” way to do this. Enterprises need to have a strong Green IT approach no matter where they are, but the approach will differ, depending on the starting point, and some of these differences may be quite important.

## Effective engagement, measurable outcomes

This is the principle that informs development of the practical toolset we use to develop and deliver what we believe are the three key components for successful implementation of Green IT.

**Consulting.** This is where expert help from the outside is likely to be needed for support in designing the roadmap to change. At this point we identify in real detail exactly where the business stands today, using the Sustainability Dashboard (to be covered a little later), and can plan the fastest, most direct route to an IT strategy that is inherently Greener and fosters improved environmental performance for the whole business.

**System design.** The ultimate goal of Green IT is to reduce emissions and waste across wider value chains, and this means we need

to improve the entire system landscape for the business and its ecosystem. There will be greater emphasis on Sustainable Software Engineering in the future, which means placing environmental performance at the heart of application design. Applications will be carbon and energy efficient as a function of their core design, while being able to enhance the efficiency of the hardware required, enhance network design to reduce the distance data has to travel, and have the ability for step by step optimization built into their design. Moving to networked cloud helps in this regard, as it permits reduced traffic (through greater use of intelligence and hyper-automation at the Edge), and cuts duplication (by thinking on an ecosystem basis).



**Platforms.** Visualisation tools enable us to identify exactly how the collaborative platforms on which businesses depend in the Cloud are performing moment by moment, based on a wide range of Green IT indicators. This reflects the most important change that Cloud brings to every enterprise, enabling a single control plane to optimize all aspects of performance right across the entire organization. The rise of true Enterprise Cloud enables this level of enhanced visibility

and management, leading to continuous performance improvements.

The NTT DATA approach to sustainable change is designed to be intensely human-centric and extremely practical in its nature. We aim always to work with the realities of how teams operate and how individual people think, are motivated and act. That's the key to our engagement approach.

**The four key stages of our engagement model, from first contact on, are these:**



**1. Awareness Meetings, which are always conducted at C-level, and bring together all relevant senior decision-makers to build a common understanding, while establishing strong communication channels for the future.**



**2. Experience Workshops, in which multi-disciplinary teams come together to make sure everyone has the same, accurate understanding of current adoption levels, and to set/agree priority targets.**



**3. Adoption Roadmaps, which are developed by the expert NTT DATA consulting team, building on output from workshops and in collaboration with stakeholders in the client organisation, reflecting decisions agreed in the workshops.**



**4. Innovation Workshops, which bring together collaborative teams drawn from different functions and sectors of the business to develop creative, innovative ideas for future implementation, once the Green IT journey has started.**

Applications will be carbon and energy efficient as a function of their core design, which means being able to enhance the efficiency of the hardware required, reduce the distance data and networking requirements and have the ability for step by step optimization built into their design.

This engagement model provides our consulting teams with a proven set of methods for accelerating discussions, reaching strong, robust decisions and building consensus across complex organisations. The ability to build and manage teams in a fluid, constantly changing environment is essential because, in the future, all of us will be using shared platforms and services.

We need to understand our own position and role within these platforms, and we also need to see exactly how the platforms as a whole are performing. This means we have to be clear about the standards achieved by hyperscale cloud partners, together with the impact of specific applications, services and ecosystem providers.

We also need to understand the role of DevSecOps, as more and more of our service development activity happens online, with ecosystem partners, some of which we may not know in great depth. The role of technology tools, such as digital twins, in reducing time and power usage, will also be important, and all these factors go to create a vision of the entire integrated development, management and delivery platforms that we depend on.

Green is just a word unless we can measure and report on exactly what is happening at every level and location in the Cloud. As "traditional" Cloud evolves into next Gen Networked (or Distributed) Cloud, the opportunities for efficiency and speed will grow, but so will the sheer complexity that we need to measure.

## Sustainability Dashboard

No strategy or policy has a chance to succeed without effective measurement, and that is why we are upgrading our Sustainability Dashboard to include Green IT measurements. This is the proprietary tool, developed by NTT

DATA for client use, that is designed to track and measure progress, providing a continuous view on performance against a wide range of KPIs. The dashboard is shown in outline form below, in figure 3.



Figure 3: from journey to Cloud to achieving Green IT in the Cloud.

The Sustainability Dashboard defines a series of KPIs that enable enterprises to measure their current position, identify priority targets for change and dynamically upgrade their measurements as they progress.

In the first stage, we look at the KPIs that measure the effectiveness of your move to Cloud, in terms of business performance factors, such as time to set up new projects, deployment speed and costs.

In the second stage, we highlight the KPIs that reflect wider Sustainability performance. Finally, in the third stage, illustrated in figure 3, we show not only sustainability but the specific KPIs that relate to Green IT. These

extend beyond the boundaries of an individual business and also take into account third party and value chain performance.

By using tools such as this very detailed dashboard, business leaders, decision makers and all other relevant personnel can see where they stand against a specific KPI at any one moment, and can map changes in performance, related to business or technology policies and actions.

We never forget that implementing Green IT is in itself a major change programme, and requires effective, accurate and proven management tools, backed by detailed reporting, to ensure efficient management of the process.

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## 4 Next Steps

**We have collectively made a lot of progress in recent years. Sustainability and environmental performance are not only huge issues for public opinion but are also top priorities for C-level executives and for corporate finance. There is also growing awareness (though there is still a lot of work to be done here) around the role of IT, both as a major energy user and emissions creator, and as a driver for positive change.**

That's why we need to be clear that there are always two issues in discussing Green IT as a concept:

- How to make IT itself more efficient, less wasteful and more green, and...
- How to find ways to use IT as a driver for better environmental performance and greater sustainability across individual businesses and entire, extended value chains.

The move to Cloud does not automatically lead to better environmental performance, just as it does not instantly lead to cost reduction. Moving to Cloud opens the potential for positive change, a much greater potential than is available outside Cloud. Translating the potential into both more sustainable business models and greener organisations is where the challenge lies.

Cloud, environment, sustainability, reputation, investment, becoming digital native, handling complex ecosystems: these factors and others come together to create a perfect storm of boardroom challenges.

We have at least opened a debate around all these points, and we recommend the following priority actions:

**Start (or accelerate) your move to Cloud now.**

Once again, we are not suggesting that Cloud will automatically make your business greener, but we DO say that you cannot transform either sustainability or environmental performance without moving to Cloud. By making best use of Cloud's ability to scale, accelerate development, cut down use of resources and avoid duplication, you will make faster progress than you can ever hope to do on your own and from your own resources alone.

**Know your start point.** As we have seen throughout this paper, we are very much aware that the journey to Green IT and Green Cloud will differ, depending on where you stand today. Every organisation is different, and though it is necessary to follow broadly similar paths to a greener and more sustainable future, you need to create your own unique roadmap, so knowing where you are right now is a necessary requirement.

**Measure accurately at every stage.** You need tools that will help you to track progress all the way through the journey. Our Sustainability Dashboard enables you to map developments in ways that make best sense for business management: through relevant, measurable KPIs. In moving to Cloud, in monetizing Cloud opportunities and in monitoring environmental performance: we use the same tool and the same dashboard, but with different views, depending on your current priority. Practical, down to earth tools of this kind are essential for tracking progress and finetuning your policies.

**Find the right partners.** Enterprises are facing challenges that in many cases will be outside their experience. Their investors and customers expect to see pretty radical changes in the way they operate, develop products and interact with the market. Supply chain issues are more problematic than ever, while the need to meet tough regulatory demands and keep costs under control are also driving operational changes.

Cloud, environment, sustainability, reputation, investment, becoming digital native, handling complex ecosystems: these factors and others come together to create a perfect storm of boardroom challenges. Enterprises need to access new skills, different capabilities, innovative ideas, and they are not going to be found inside the business. The right partners will make the difference between success and failure in this extremely difficult period.

**Turn Green IT into a critical business benefit.**

Improving environmental performance, going Green, in fact, is a basic necessity due to public demand, investor expectations and the need to rethink operations for a different future. You have to do it, in other words, but you should also want to do it. Greening your IT by investing in Green Cloud is the best decision and likely the best investment you can make at this time.

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Once you make IT less resource hungry, less dependent on long-term vendor relationships, you are well on the way to making your entire organisation more agile, scalable, flexible, free from high fixed costs, better able to innovate at speed and deliver at scale anywhere and anytime. Green Cloud is the key to long-term competitive advantage, as much as it offers the potential for long-term sustainability.

Both to achieve economic sustainability and avert the worst predictions of extreme climate change, we need to embrace the potential of Green Cloud as fast as possible. Let's talk in depth, and soon.





## For More Information



To find out more about how Green IT can help your organization, contact your NTT DATA representative or visit:  
**[www.nttdata.com](http://www.nttdata.com)**

