BCS WEBINAR SERIES

Why we need responsible computing

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Date: 9 November 2021

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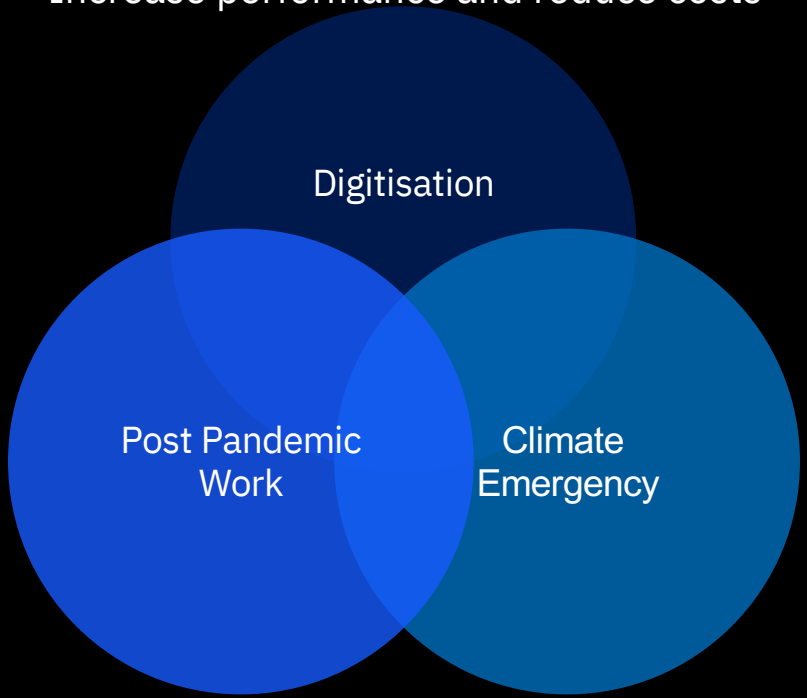
Three forces driving change

Increase performance and reduce costs



Attract the best talent

Reduce CO2 and environmental impact

Climate change is one of the biggest threats to humanity

Mitigation

- Reduce GHG emissions
- Remove GHGs from atmosphere

Adaptation

- Preparedness
- Risk management
- Resiliency and recovery

Extreme heatwaves
Longer droughts
More frequent tropical cyclones
Melting ice caps

$150 billion

Average cost in damages per year

100M+

Increase in population facing hunger

Factors that are accelerating climate action by companies

Investor pressure

Blackrock Doubles Down On Climate Pressure In The Midst Of Global Crisis

Climate Changed
Large Exxon Shareholder Starts Divesting Over Climate Change
Bloomberg

Exxon Directors Face Shareholder Revolt Over Climate Change
Bloomberg

Tesla's Sustainability Cred Is Being Challenged With Shareholder Proposals at Annual Meeting
BARRON'S

Shareholder climate rebellions surge despite coronavirus crisis
Investors pile pressure on companies including JPMorgan and Rio Tinto over global warming
FINANCIAL TIMES

Consumer pressure

40%
Purpose-driven consumers who seek products and services aligned with their values.

57%
Consumers willing to change purchasing habits to help reduce negative environmental impact.

75%
Consumers across generations state sustainability as a very important attribute (Gen Z, Millennials, Gen X, and Boomers)

Policy landscape

A European Green Deal
Striving to be the first climate-neutral continent

Ratified by EU parliament, Jan. 2020
Investment: €260B (2030), €1T (2050)

China's new climate pledge could cut emissions everywhere else too
Xi Jinping has announced the country's goal of going carbon neutral by 2060, but China's manufacturing heft will mean other nations will reap benefits too
WIRED

THE BIDEN PLAN FOR A CLEAN ENERGY REVOLUTION AND ENVIRONMENTAL JUSTICE
BIDEN HARRIS

What is the future of work?

New collar work

- Outcome led
- Unpredictable
- New business models

New working practices

- Agile
- Data savvy
- Creative

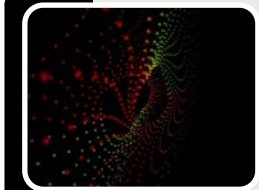
New Values

- Meaningful work
- Right metrics
- Inclusive

Three laws of digitisation

Whatever can be digitised will be

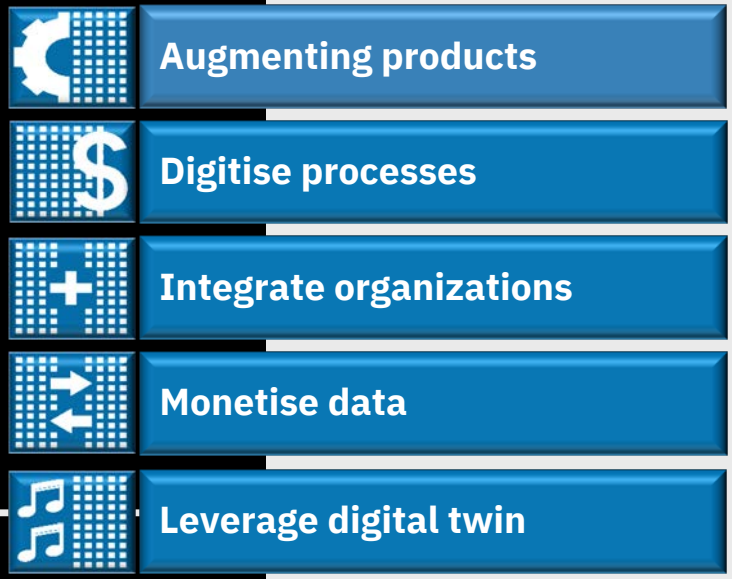
Digitalisation leads to free



Data allows new value

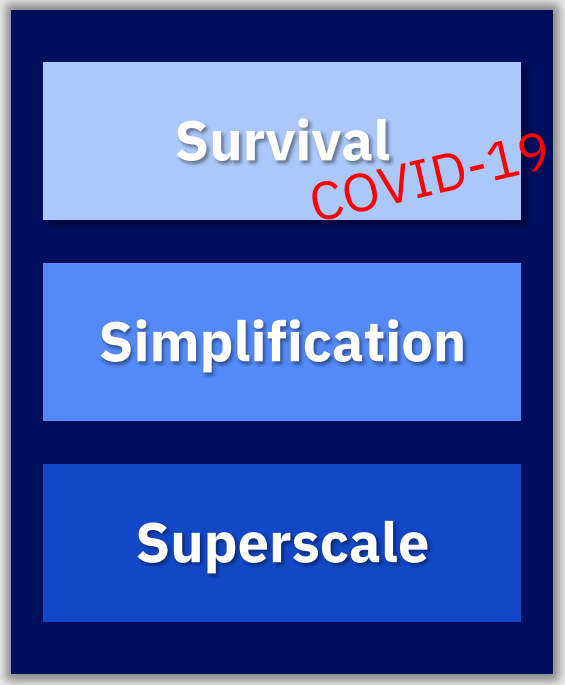
https://rashikparmar.wordpress.com/2018/06/22/be-digital-or-be-digitalised/

What are the trends in digitisation?



http://hbr.org/2014/01/the-new-patterns-of-innovation/ar/1

Digitisation priorities?



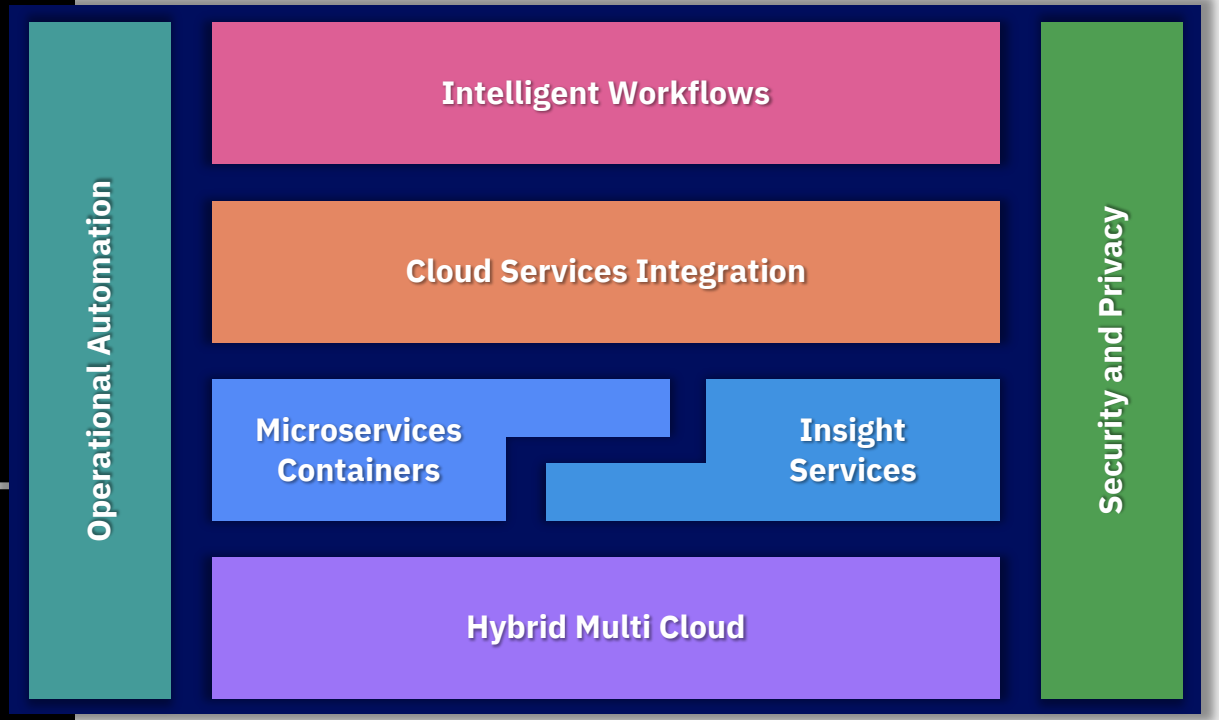
The ever-increasing pace of change, of new product cycles and unforeseen competitors challenges enterprises and departments to justify its benefits on an ever-ongoing basis. Focus on demand management and customer intimacy is pervasive in the customer basis.

While Processes and Ecosystems become increasingly complex on its own driven by regulatory compliance and complex supply chains many of our clients have set continuous simplification as a priority. Processes become inadequate for the required pace and it is virtually impossible to master the complexity.

In order to stay in business and prevail most of our clients strive for competitive advantage in selected domains as foundation for their strategy. The ability to adapt and benefit from new technology options for turns essential for the success of the company.

http://ibm.biz/ADPs3-0

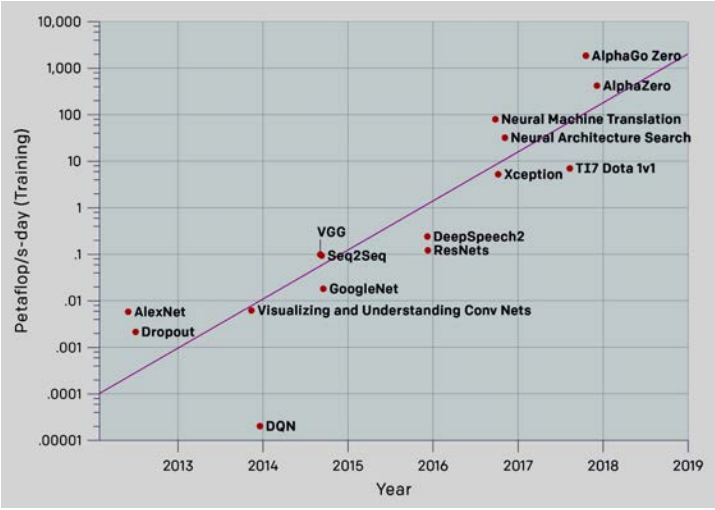
What technology investments?

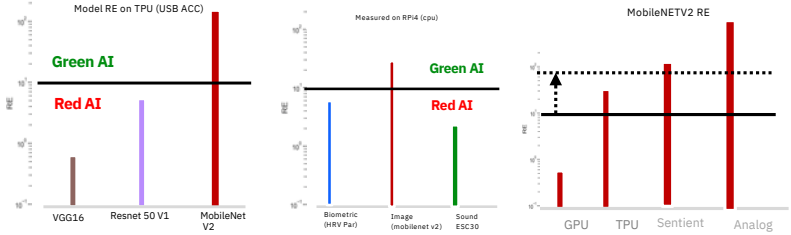


https://www.linkedin.com/pulse/architecture-decision-points-30-rashik-parmar/

AI - energy problem to be addressed?

The energy required for deep learning have been doubling every few months, resulting in an estimated 300,000x increase from 2012 to 2018





Step 1

Universal Metric: Recognition Efficiency

You can only improve after you started to measure!

RE = Accuracy * Cl / (Einf)0.5

Power measurements on edge

Compare multiple models on different systems

Can be used as a standard metric to define what is green or red AI

Step 2

Compare IR AI models on same system

Recognition Efficiency varies by >50x for different AI

neural network model on same hardware

Optimize neural network model selection

Once for all training ; lean libraries

Step 3

Soundly rate different complexity models (biometric, image, sound) (such as STAR rating)

Standardized measure of Green AI

Bar will rise up as new accelerators develop

Assess whether a model reached SoA maturity

Assess label quality in dataset

Step 4

Compare Same model on different systems

Hardware Acceleration and lean libraries

Low precision ASICs 8-2 bit

Sentient with tunable precision and dynamic delegation

Analog accelerators

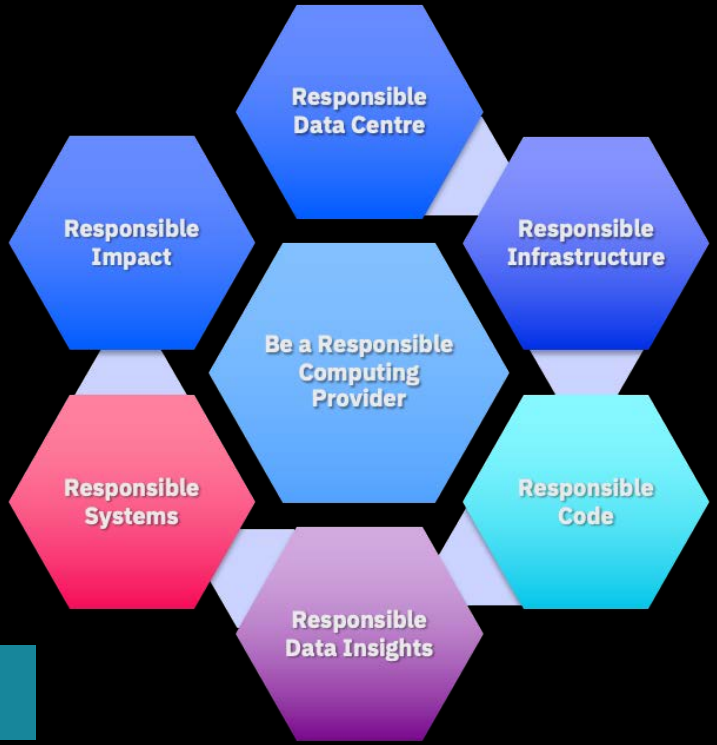
responsible.computing()

Based on the anxieties of over 100 CTOs
From am I doing enough to be more sustainable to are we being ethical in use of our data?

Distilled insights from IBM global experts
Best practices from IBM Research, IBM Development, IBM Services and Client Engagements

In collaboration with the Client Council

NatWest vodafone UNIVERSITY OF HELSINKI KPMG e·on Cognition Foundry



The responsible.computing() framework

The responsible.computing (framework) is built by a series of six hexagons that are interlinked.

Each of the succinct hexagons addresses a specific domain of responsible.computing ().
Organisations may select their most appropriate entry point. Several cross cutting themes like climate, ethics or use of natural resources are primarily attached to the dominant framework domain.

Data Center

responsible.computing (data center) considers the potential impact to the environment provided by an advanced modern data center.

Data Usage

responsible.compting (data usage) is the duty to deal with and have control over data, its lifecycle as well as being accountable for the mindful, effective and efficient usage of it.

Infra-structure

responsible.computing (infrastructure) considers the ESG of hardware, software and networks required to develop and deliver IT services and provides an actionable framework.

Systems

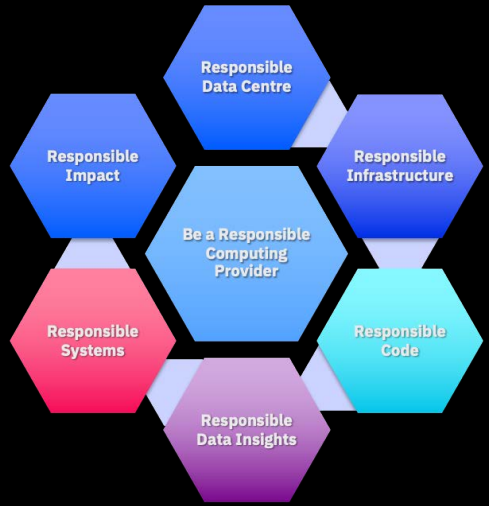
responsible.computing() companies must develop systems that everyone can trust and that also consider impact on the environment, individuals, society and the future.

Code

responsible.computing (code) is to be aware of the potential environmental, societal and economical impact a design, coding and architectural decisions can have.

Impact

responsible.computing (impact) is using technology to change the world for a better future.



Create a responsible.computing() culture

OUR MANIFESTO

Technologies and Innovations that drive positive impact for society at large

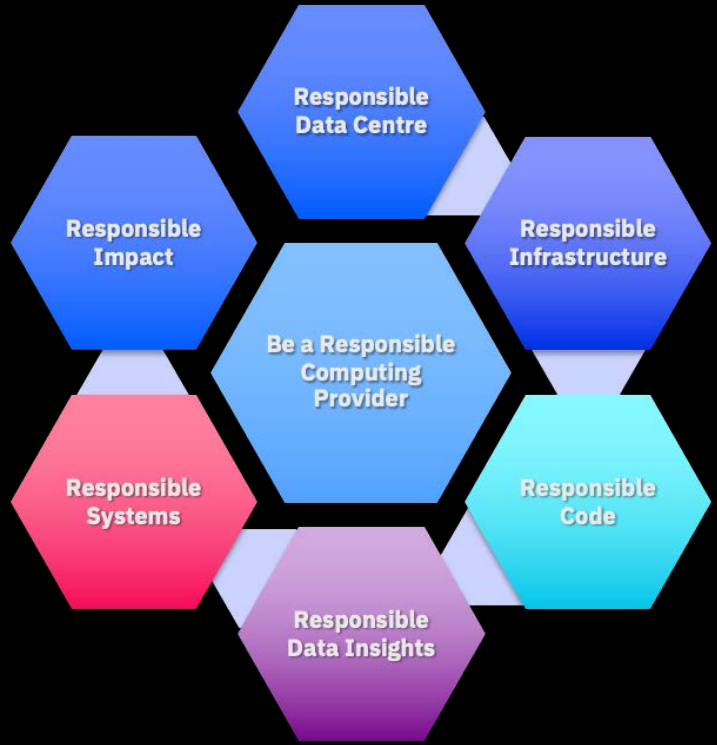
Inclusive systems that address bias and discrimination driving equality for all

Data is securely used in ways that drive transparency, fairness and respect for the users

Conscious code choices that optimize environmental, social and economic impact over time

Efficient use of available and future technology

Data Centers designed and operated with an emphasis on sustainability



Providing clear greenhouse gas emission details for the annual company report

Electricity consumption is greatest contributor to the bank's GHG metric

- Greenhouse Gas (GHG) Protocol provides standards, guidance, tools and training for business and government to measure and manage climate warming emissions
- Reported in annual company reports together with a variety of other metrics.
- Separated into Scope 1 (Direct), Scope 2 (Indirect) and Scope 3 (Other)

Figure 11: GHG emissions (S1-3) own operations

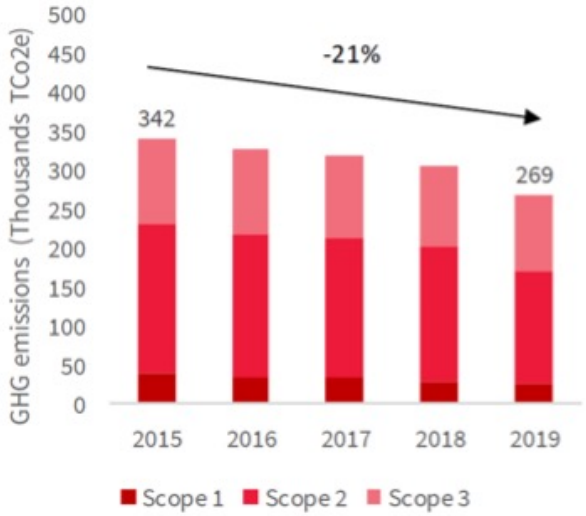
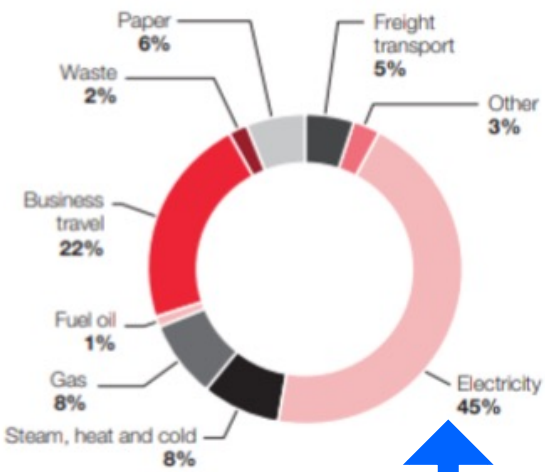


Figure 12: Split of GHG emission (S1-3) 2019



Source: Societe Generale Climate Report 2020

Cloud Advisor

Enable and improve customer transformation journey with sustainability embedded methodology and tools. Incorporate holistic multi-layer quantification model: datacenter, platform, workload.

Leading Health Agency

Methodology

Quantify current carbon footprint

Gain insight on risk

Legacy Customer

Move and consolidate

What/If assessment of potential savings

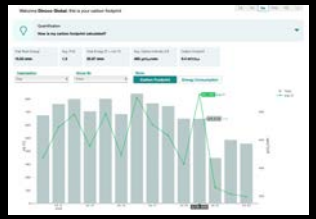
Transformation Opportunity

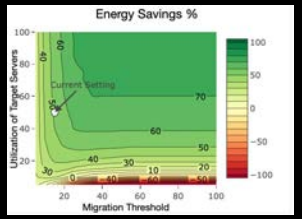
Application modernization

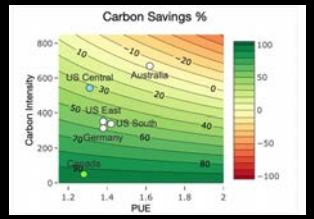
Assess saving with containers and OpenShift on selected platforms

Cloud native customer

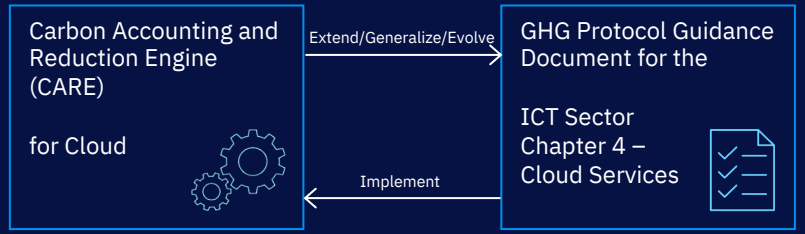
Apply optimized controller and more savings







Cloud Tenant Carbon Accounting and Reduction Engine



Responsible Data Center

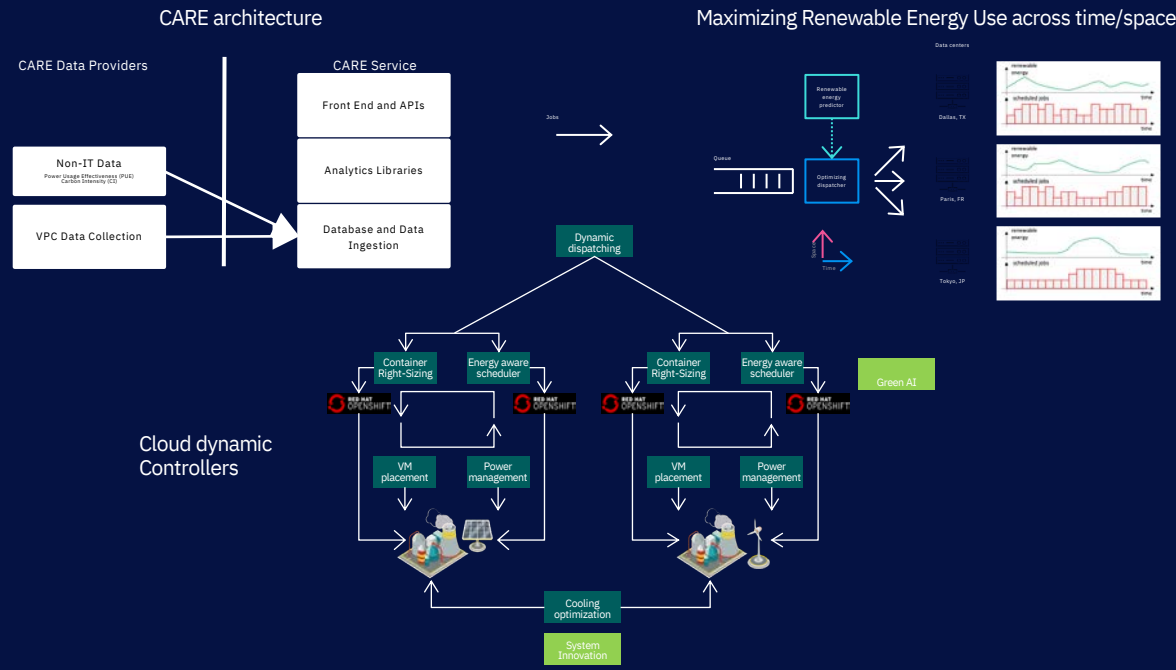
Goal:
Continuous programmable metering of tenant carbon footprint in compliance with GHG Protocol

Cloud Characteristics

- Multiple Tenants
- Multiple Services
- Resource Sharing

Cloud Tenant Carbon Accounting Goals

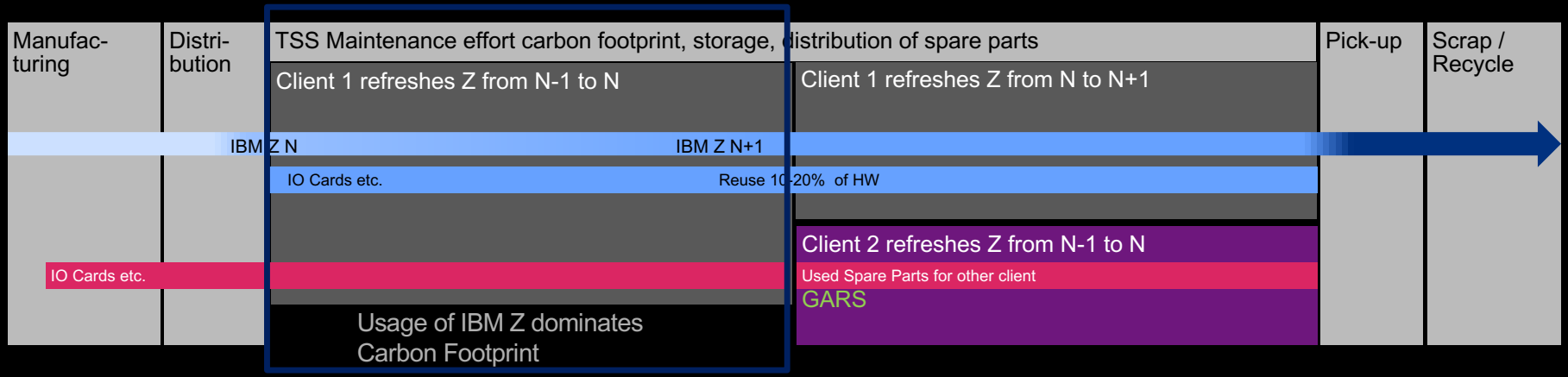
- Calculate energy and Carbon Footprint (CFP)
  - Per tenant
  - Per application
  - Per Service
- Programable, Dynamic
- Compliant with GHG Protocol Guidance Document for the ICT sector
- Insight and Optimization -> vertical scaling



Responsible Infrastructure helps reduce waste and lower carbon footprint for all IBM z Clients

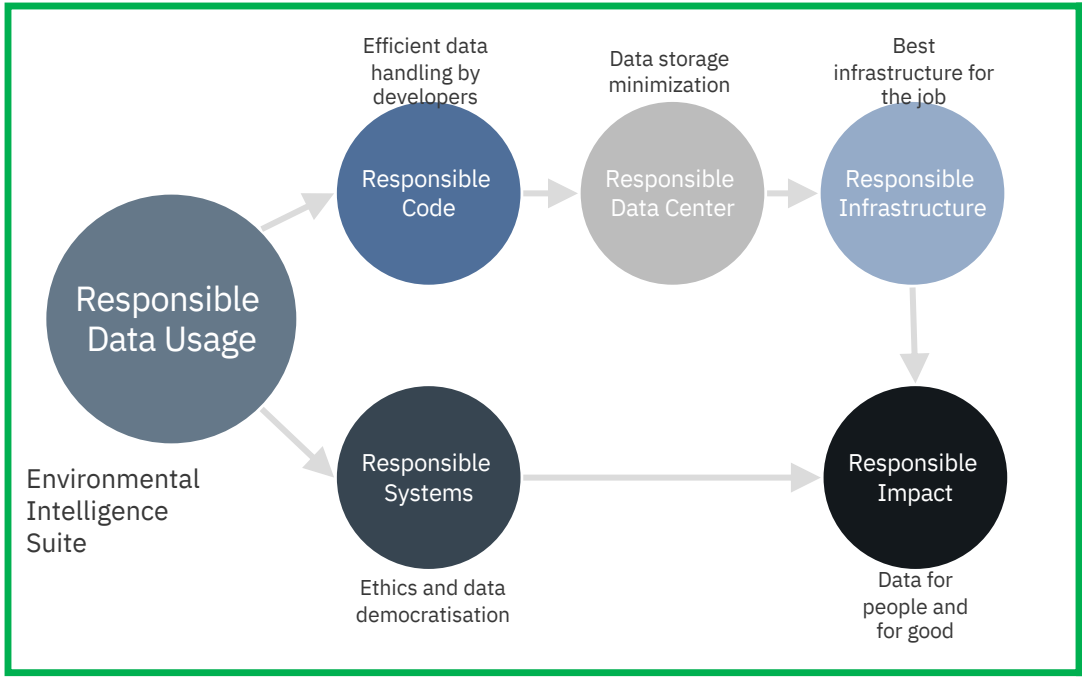
IBM Z is sustainable by design with the reuse of hardware and the ability to replace parts during operations. Some parts of an **IBM Z system** can be used for **8 to 12 years**

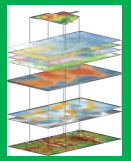
In contrast an **x86 commodity server** is usually replaced and scrapped in **3 to 4 years**



Openness and reuse change the way to create sustainable and responsible value from data.

Pathway to responsible.computing() through data.





Better Risk Management
Improve Resilience
Optimize maintenance
Optimize crew schedule and dispatching

Common Pitfalls

Usable baseline

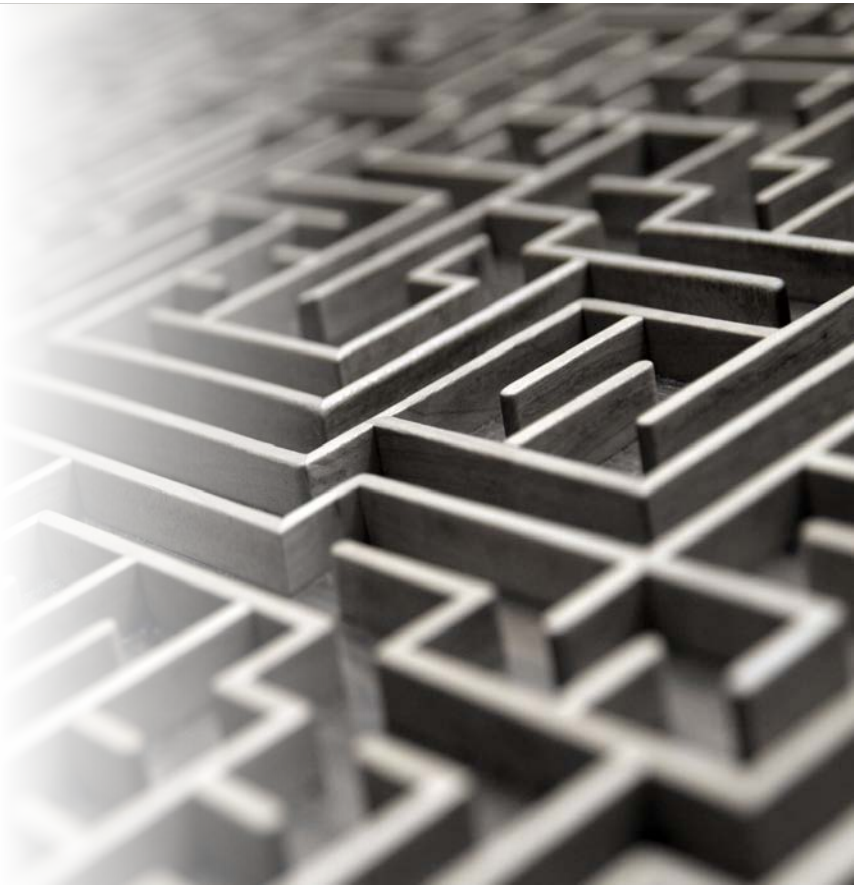
- Spending too long gathering the baseline data
- Lack of validation approach (rule of thumb calculations
- Missing major parts of the estate
  (e.g. partner or departmental services)

Dependency mapping

- Infrastructure, middleware, application, data dependency
- Technical debt remediation
- Aligning Business priorities

Overcoming inertia

- Cultural changes
- Authenticity of messaging and actions
- Imbedding into management system



Starting your responsible.computing() journey

Create compelling vision

- Build baseline
- Benchmarking against best practices
- Create vision

Establish sustainability culture change Programme

- Define roadmap
- Create responsible.compuitng() garage
- Appoint champions

Create proof points

- Garage and pilots
- Remediation at scale
- Evidence of impact through dashboards
- Continuous improvement

BCS #vITalworker campaign

- Our new campaign is highlighting, recognising and celebrating the incredible contribution that IT professionals are making during these unprecedented times
- Across our social media channels on LinkedIn, Twitter and Facebook we will be sharing and liking examples of the amazing contribution made by IT professionals using the hashtag **#vITalworker**

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At BCS, we’re on a mission to ensure everyone’s experience with technology is positive. It’s something we’ve been committed to since 1957.

We're 65,000 members in 150 countries, and a wider community of business leaders, educators, practitioners and policy-makers all committed to our mission.

As a charity with a royal charter, our agenda is to lead the IT industry through its ethical challenges, to support the people who work in the industry, and to

MAKE IT GOOD FOR SOCIETY

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