Responsible Technology Playbook

Tools for the United Nations

United Nations

/thoughtworks

Contents

What is Responsible technology?

Responsible tech is a way of working that aligns technology and organizational behavior with the best interests of people and the planet. It explores and actively considers the values, unintended consequences and negative impacts of tech, and actively manages, mitigates and reduces risk and harm.

The reach of technology is extending into more and more sensitive and complex arenas, from targeting aid interventions to vulnerable groups or public health monitoring — to name just a few. It impacts the people we serve in their everyday interactions as employees, individuals and citizens.

As we navigate the digital age, the United Nations stands at the forefront of promoting a more sustainable and inclusive future. In line with this commitment, the way we use and manage technology must be guided by the UN mission and its core principles.

Responsible technology practices are more than just technical compliances; they are a manifestation of the UN's commitment to human rights, peace, equality, sustainability and more. Our commitment to Responsible technology practices will enable us to better utilize data and digital tools to improve lives, while preventing unintended side-effects and potential pitfalls.

The tools and techniques in this Responsible tech playbook help teams identify strategies to be more inclusive, aware of bias, transparent and to mitigate negative unintended consequences.

How to use this playbook

This playbook provides practical guidance on ways to adopt responsible practices within your team. You don't have to read it cover to cover, this book enables you to **discover practical actions from the perspective of your role at the UN or by specific topic areas of focus.**

UN Personas

We built this playbook with four roles in mind: policy maker, senior leader, project manager and developer. Discover how each role can incorporate Responsible tech practices into their work.

Awareness

This section will help you understand Responsible tech in general and the specific topics within Responsible tech.

Action

Explore the methods, tools, and frameworks of general Responsible tech tools and within the focus areas of Responsible tech.

Sustainable Adoption

Explore how to influence teams at the UN to adopt these practices with sustainable implementation recommendations and explore the tools that can enable your teams to embrace Responsible tech.

Appendix

Includes additional reference materials to further deepen your knowledge.

Who is this playbook for?

Across the UN diverse groups and roles build and influence technology projects and need to understand and embrace the Responsible tech mindset and focus areas. We have created four personas to provide examples and help readers understand how their role can engage with each tool, method and topic.

Focus areas
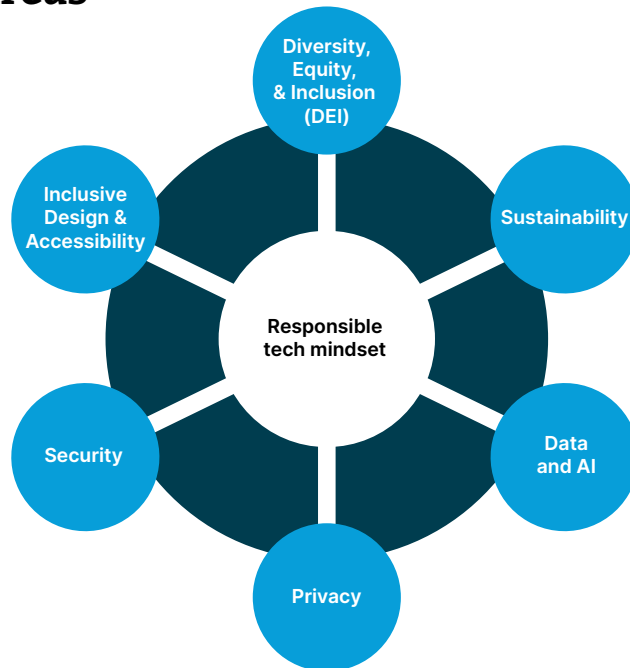
The Responsible tech focus areas are explored in detail later in the playbook, both in terms of awareness and action.

Introducing our personas

The following pages give a profile of each persona, including their awareness levels in relation to each of the Responsible tech focus areas.

Farim
is a senior leader

Teresa
is a policy maker

Emilia
is a project manager

Julius
is a developer

Farim

💼

Role: Senior leader

📍

Based in: Jakarta, Indonesia

Goals

- Maintain the UN's reputation by finding ways to identify risks and mitigate them relating to Responsible tech

- Create Responsible tech culture in UN and implement Responsible tech thinking internally and model externally

- Teams make Responsible tech centered decisions to develop value driven products

Challenges

- Bureaucratic hurdles such as cost increases

- How to make Responsible tech playbook long-lived with limited facilitators

- How to build Responsible tech into existing UN processes and governance

Success

- UN builds tech for internal clients and external stakeholders that reflects our mission, value and is sustainable

- A motivated, empowered and educated community gathers and grows to develop internal Responsible tech practice

- Teams are able to introduce new ideas and assess new products and features responsibly without additional investment or delay

Knowledge expected

Green software

Low ——————●———————— High

Privacy

Low ———————————●——— High

AI Ethics

Low —————————————● High

Security

Low ———————————●——— High

Accessibility

Low ——————●——————— High

Diversity, Equity & Inclusion (DEI)

Low ——————●——————— High

Teresa

💼

Role: Policy maker

📍

Based in: Geneva, Switzerland

Goals

- Manage risk and increase its awareness
- Make policy more practical and Responsible tech centered
- Wants scalable frameworks to assess any kind of future emerging technology

Challenges

- Hard to know how to take action and move on from theory
- Specific tech jargon usage means issues don't resonate with UN community
- Unintended consequences like policy non compliance may emerge due to rush to build or deploy new tech
- Preventing overwhelm when introducing new tools and concepts

Success

- Policies that are relevant, clear and are being adhered to
- Strike a balance: avoid risk while creating a reasonable process
- Decreased time to execute a product / project (or limited increase)

Knowledge expected

Green software

Low ———————————●——— High

Privacy

Low —————————————●— High

AI Ethics

Low —————————————●— High

Security

Low —————————————●— High

Accessibility

Low —————————●——————— High

Diversity, Equity & Inclusion (DEI)

Low —————————————●— High

Emilia

Role: Project manager

Based in: Nairobi, Kenya

Goals

- Deliver concrete tasks or recommendations to add Responsible tech to our work (checklist etc)
- Foster team buy-in and ensure the adoption of Responsible tech is baked in
- Have simple and clear guidelines and requirements on Responsible tech

Challenges

- Fear of adding significantly to budget or timeline
- New training requirements for an ambiguous methodology
- Explain to all UN constituents the importance of having Responsible tech mindset to build alignment

Success

- Increase speed to delivery
- Assuming accountability for Responsible tech to all of my stakeholders
- Trusted by stakeholders

Knowledge expected

Green software

Low ———————●——— High

Privacy

Low ——————————●— High

AI Ethics

Low ——————————●— High

Security

Low ———————————● High

Accessibility

Low ——————————●— High

Diversity, Equity & Inclusion (DEI)

Low ——————————●— High

Julius

💼

Role: Developer

📍

Based in: Valencia, Spain

Goals

- Provide education on Responsible tech and examples of Responsible tech wins and losses
- Create ways to check new data, tools, or tech for bias, accuracy, trustworthiness
- Deliver transparent guidelines on data collection, processing, storage, and destruction
- Provide information on energy consumption

Challenges

- Identifying risks related to work
- How to make algorithmic systems support human values
- Sometimes stakeholders don't agree with UN standards of security and cloud
- Julius is color blind and software developed with low contrast can be frustrating since he can't read the text and has to rely on his coworkers for help

Success

- Adoption of the Responsible tech practices and mindset
- Protecting our stakeholders macro to micro (from UN to Individuals)

Knowledge expected

Green software

Low ————————●——— High

Privacy

Low —————————————●— High

AI Ethics

Low —————————————●— High

Security

Low —————————————●— High

Accessibility

Low —————————————●— High

Diversity, Equity & Inclusion (DEI)

Low ——————————●———— High

Part one:
Awareness of
Responsible tech

"Senior leadership must get on board
to make impactful policies a reality.
The biggest hurdle to the adoption
of responsible technology is a lack
of senior management awareness."*

Source: MITTR research (*52% of respondents)
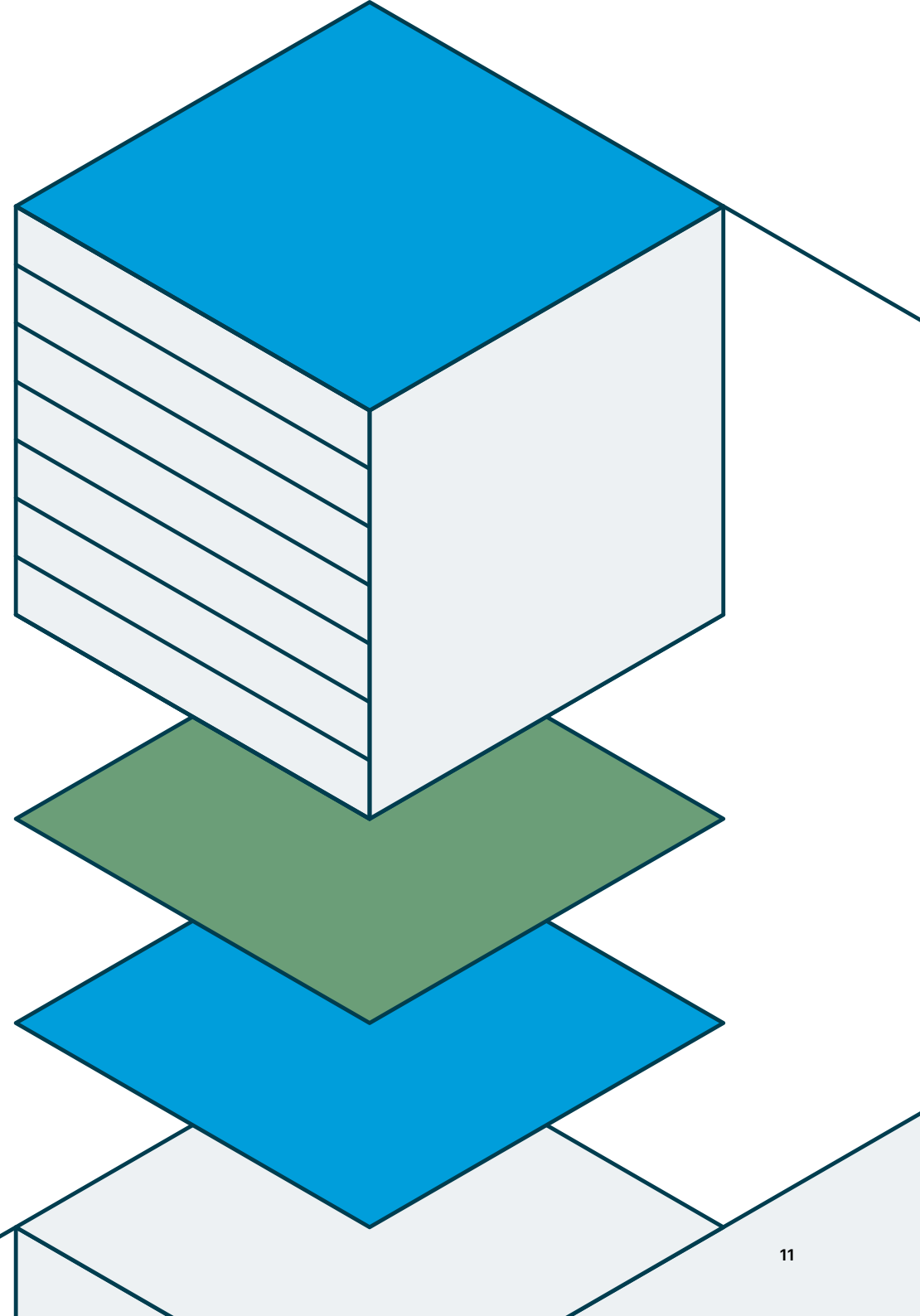
Adopting a Responsible tech mindset

Main challenges for a paradigm shift

"Thinking about society implies thinking about technology and vice versa. Both concepts are not separate objects but a single reality."

Dominique Vinck Professor, Sociologist, Author

Deconstructing the myth of tech neutrality and tech solutionism

Technology is neither neutral nor a magical recipe for humankind's challenges. Technology is a social construction that reflects all the complex and contradictory dynamics that shape our society. And needs to be understood in this complex sociotechnical perspective.

Opening the "Black Box" of technology

How technology is built and how it works remains inaccessible to the vast majority of the population and to public debate. Transparency, explainability, fairness and safety principles need to be implemented in each stage of technology innovation in order to amplify its positive impact on society.

Innovation pace and the time of democratic debate

The accelerated pace of technological innovation in contrast with the duration of a democratic debate calls for a balance between the massification of technology adoption and the need for precaution principles.

Technology sovereignty

The globalized but also increasingly centralized ecosystem of tech innovation brings new challenges for the international community. The UN has a unique role to play in this context.

Unveiling the implications of technological externalities

Technology, while offering solutions, also creates challenges with potential externalities that are often unseen and overlooked or not considered and owned.

Farim is a senior leader at the UN who wants to create a Responsible tech culture. He sees headlines in the news every day with examples of tech failing to consider people's privacy or invisible power structures leading to dramatic inequality and vulnerabilities. Farim recently read about how tech empowered disabled people to use a site and created a huge increase in adoption. He also learned of a mapping tool that gave away sensitive locations. Farim realizes that the people who build software are responsible for thinking of these factors and threats *before* they occur.

Emilia and Julius are part of Farim's team. They are planning to add new functionalities and data capture to enable more engagement among their users. However, if they are not aware of the potential harms and unintended consequences triggered by these actions, they could risk their users' privacy.

Have you ever wondered how the technology we build can affect others' everyday lives in harmful or unintended ways?

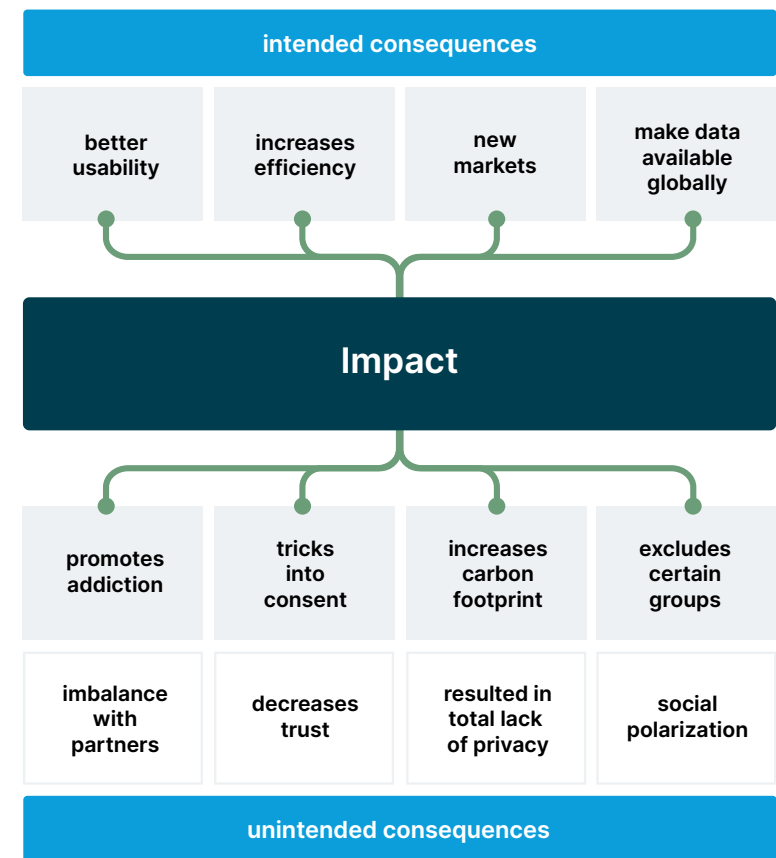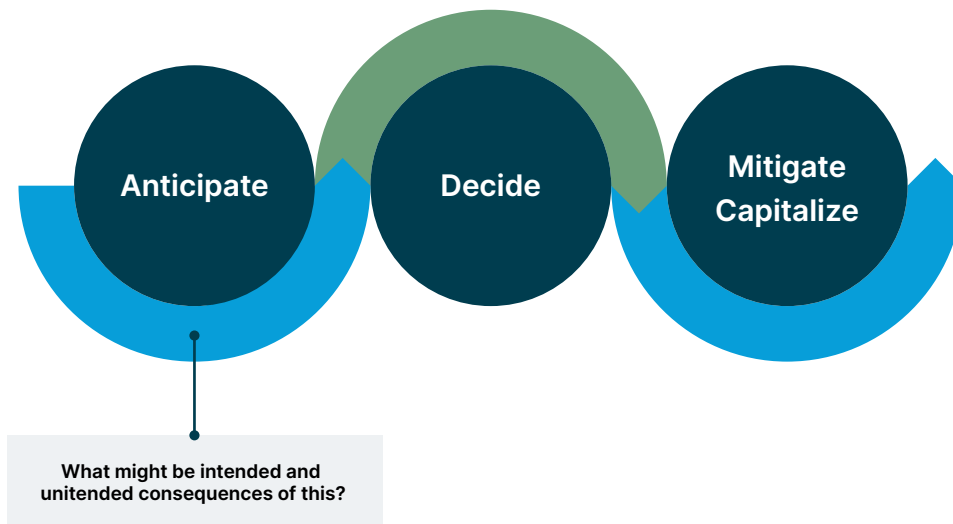| Farim	Teresa	Emilia	Julius

Farim is concerned about the negative impacts these changes may cause and asks to discuss and mitigate the potential risks of this product. The tools in this playbook will help them learn these methods as a team, and put them on track to creating safe, thoughtful and secure software.
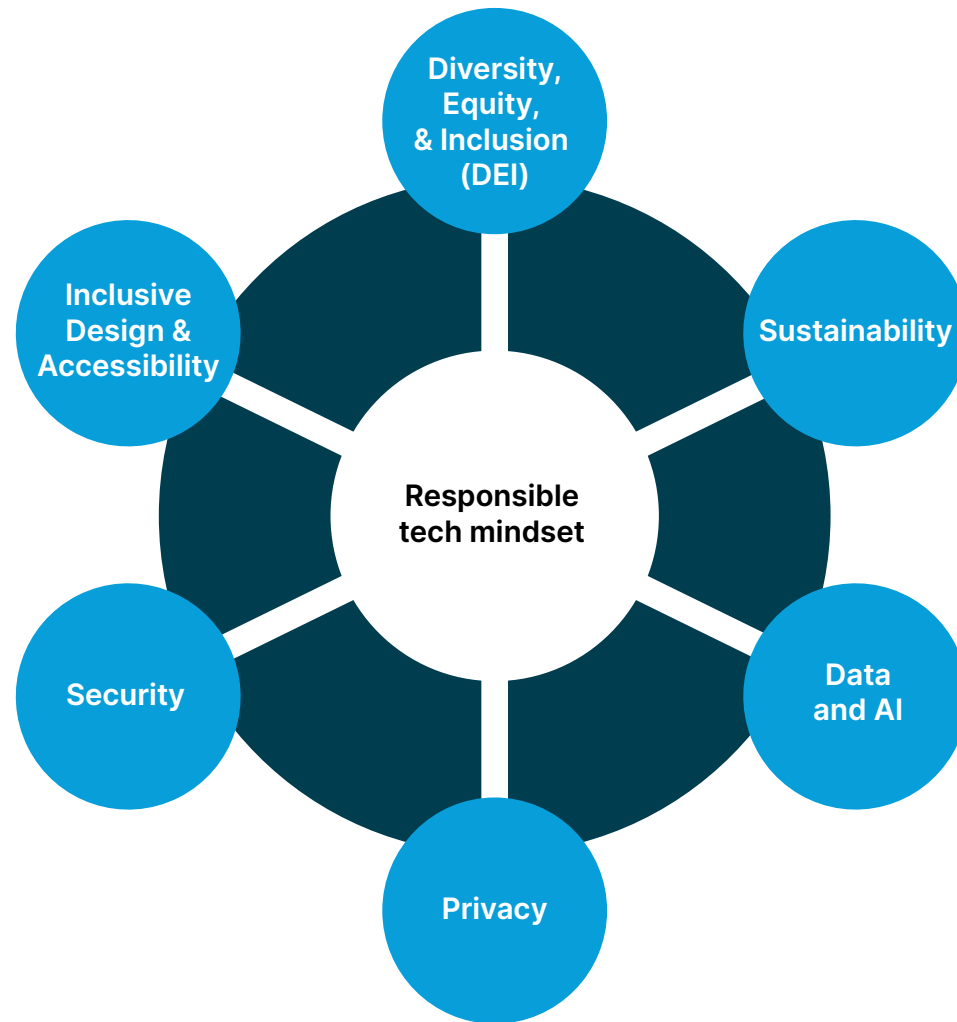
Technologists are great problem solvers...
but we're also great problem creators

Anticipate and think beyond: check for unintended consequences intentionally and systematically

At each stage, from conceptualization to execution, it's vital to anticipate unintended consequences. This can be achieved by posing questions about unintended outcomes of our decisions. To refine this process, various tools and methods are available. They aid in revealing biases and blind spots, improving our ability to foresee potential negatives and constructively improve the overall impact.

Anticipate — Decide — Mitigate Capitalize

What might be intended and unitended consequences of this?

intended consequences

| better usability | increases efficiency | new markets | make data available globally |

Impact

| promotes addiction | tricks into consent | increases carbon footprint | excludes certain groups |
| imbalance with partners | decreases trust | resulted in total lack of privacy | social polarization |

unintended consequences

Focus areas

Responsible tech methods provoke us to think, not just about what we build, but also how we build and what impacts it will have on the behavior of our users, their communities and society.

Awareness: Sustainability

Why the environmental aspects of tech matter

**Sustainability involves meeting the needs of the present generation without compromising the ability of future generations to meet their own needs.**

It encompasses environmental, social and economic dimensions. To guide global sustainability efforts, the United Nations has established Sustainable Development Goals (SDGs) to serve as a framework to address cross-cutting challenges such as climate change, clean energy and responsible consumption.

To build and operate software that stands the test of time, we employ best practices and sensible defaults throughout the value chain of software use. These practices encompass robust engineering principles, industry standards, and forward-thinking strategies to maximize the sustainability of technological solutions.

Climate change is the defining issue of our time and software directly contributes to greenhouse gas emissions. Fortunately, there is an opportunity to change how we build software and reduce the emissions produced by society's growing dependence on technology.

Technology that is designed to reduce the negative impact and increase the positive impact of human activity on the environment falls under the umbrella of green tech. Within that, climate tech solutions mitigate or adapt to the impacts of climate change by, for example, carbon capture to reduce greenhouse gas emissions, or helping communities and businesses prepare for the impacts of climate change. On the other side, clean tech solutions are technology or software that offer renewable energy and environmentally friendly alternatives to existing technologies to limit environmental effects.

Sustainability

Green tech

Clean tech

Climate tech
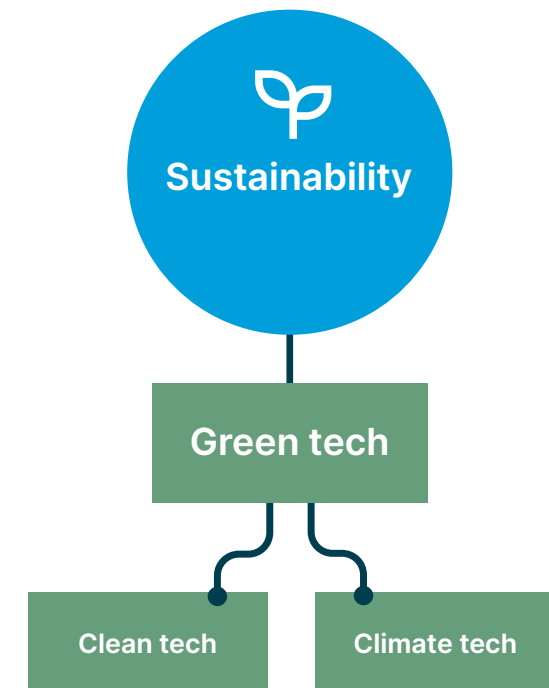
Go to Action on Sustainability >

Principles of green software

A core set of competencies needed to define, run and build green software.

When it comes to greening of technology — *making the technology itself more energy efficient* — these are the principles you can follow to apply **green software**:

Carbon Efficiency

Build applications to add the same value for you or your users, but emit less carbon.

Carbon Awareness

Build applications that do more when more energy comes from low carbon sources and do less when more energy comes from high carbon sources.

Energy Efficiency

Build applications to use the least amount of energy possible.

Measurement

Understand and utilize commonly used methods for organizations to measure their carbon emissions.

Hardware Efficiency

Build applications to use the least amount of embodied carbon possible.

Climate Commitments

Understand the meaning of common commitments and how to achieve them through various strategies and measurement procedures.

Sustainability in the UN context

In this playbook we are going to focus on clean tech, where there are multiple ways to address environmental sustainability.
We can leverage software to support emissions reductions efforts and we can build software in a way that limits its own climate impact.
For further information on this topic within the UN context, see the UNEP site.

Greening by technology

Driving sustainability by leveraging technology

We can use technology to address known issues and goals for environmental sustainability. This can include platforms to manage emissions metrics, manage supply chains, set and maintain net zero goals and targets, applications to encourage greener behavior, and more.

Greening of technology

Making the technology itself more energy efficient

We can build technology in a way that is less harmful to the planet, considering our data centers, hardware, cloud usage, and software. **Green Software** is software that carbon-efficient, emitting fewer greenhouse gas emissions by applying knowledge of how emissions are generated during the software development lifecycle and implementing best practices to design solutions that minimize that impact.

"To move the needle on climate change, it is imperative that companies take responsibility and ownership of their climate impact."

Teresa, policy maker

"In order to meet our sustainability goals, its essential that we both leverage technology and also make it more efficient."

Farim, senior leader

"Each aspect of the technology we build can take energy and carbon into account, so long as we prioritize it."

Emilia, project manager

"When we build software, we should treat reducing carbon emissions as a cross-functional requirement."

Julius, developer

Go to Action on Sustainability >

Awareness: Data and AI

Why data and AI matter

The emergence of generative AI tools makes it increasingly hard to distinguish between real and fake. Combating misinformation and disinformation in the age of big data and generative AI has to be a priority to 'trusted' organizations.

The release of public large language models has refreshed questions and concerns about the social impact of data and AI on the public information sphere, with particular impact in developing countries.

Censored big data

Censoring or redacting big data sets for research can alter conclusions drawn from disinformation research

Unequal access to data

Imbalanced access to big data sets hinders effective research of mis-and disinformation by independent bodies

Large language models

Large language models enable generation of mis-and disinformation at scale, with potential geopolitical impact

Platform regulation

Platform regulation risks ignoring or disrespecting cultural and social norms across the global community

Best practices for Data & AI

The United Nations seeks to lead by example, implementing best practice and addressing contemporary challenges with responsible data and artificial intelligence (AI) across the UN technology landscape. These issues include social, economic, political and environmental issues posed by the growing global impact of data and AI.

Promote inclusive representation and minimize the inequality of access to data and AI	Provide developing nations with technical assistance
Guide policymaking for data & AI, privacy, and property rights	Foster international collaboration on data standards and practices

Go to Action on Data and AI >

Data and AI in the UN context

Identifying data and AI challenges within the UN's ambit.

"As you are all aware, data and AI technologies contain enormous potential in addressing global challenges. However, if we are not careful, these benefits may not materialize or they may have unintended negative side-effects. Let's discuss how the UN can embrace these opportunities while addressing real-world risks."

Farim, senior leader

Gender bias and gender-based equity in data and AI

"Women are too often missing in datasets, yet women globally are benefiting from data and AI. Closing the data gap is a key priority".

Emilia, project manager

Access to high-quality and fair healthcare policies globally

"Healthcare solutions built around data and AI can help improve global healthcare, but as in the COVID-19 pandemic, AI-driven misinformation can undermine these efforts."

Teresa, policy maker

Education access and children's development

"AI can provide access to education opportunities in novel ways, but improperly or maliciously used, it can impede childhood development or teach bias."

Julius, developer

Awareness: Privacy

Privacy – why it matters

**Privacy is an important element of Responsible technology.
It is a basic human right, and a key enabler for diversity and inclusion.**

**Without awareness of privacy and an enshrined privacy culture,
it is impossible to maintain good privacy practices.**

Privacy helps us establish boundaries to limit who has access to our bodies, places and things, as well as our communications and our information. Privacy is codified in multiple laws in most countries, but it is also set by societal norms.

Privacy comes into play not just when we have direct access to personal data, or non-personal sensitive data that can risk harming types or groups of people, but also when we are building things which process these kinds of data or will have an affect on people's privacy.

Privacy best practices

Building on the UN data privacy principles, there are best practices to consider:

1	**2**	**3**	**4**	**5**	**6**
Lawful, fair and proportional	Transparent and specific	Data minimization and purpose limitation	Security and confidentiality	Accuracy and data quality	Retention limitation

7	**8**	**9**
Bear responsibility	Rights requests	Preventative data protection

Go to Action on Privacy >

Privacy in the UN context

"I need to translate privacy requirements into the technology I am working with."

Julius, developer

"We need to enshrine a privacy first culture to bake it into every level of the UN."

Farim, senior leader

"I need to engage with the privacy processes and guidance available to make sure my project team is compliant."

Emilia, project manager

"I want to ensure that our ways of working do not infringe on people's privacy, and amplify this basic human right."

Teresa, policy maker

Questions to keep asking

- **Are we allowed to use personal information in this way?**

- **How could this technology be misused?**

- **Is there a way we can mitigate any potential misuse?**

- **Could this use case be seen as intrusive?**

- **Is there a way we can mitigate this by making it less intrusive, or with a notice explaining why the data is used in this way, and how it's protected?**

- **Do we need to add extra functionality to facilitate people's rights?**

- **Is what I'm building secure?**

Awareness: Accessibility

Why accessibility matters

When the term accessibility was created, it was intended to design products and places with a focus on people with disabilities. However, the term accessibility is now broader and benefits other groups, such as seniors and children.

"If you do not intentionally, deliberately and proactively include, you will unintentionally exclude"

Joe Gerstandt Author, speaker

Today, digital accessibility refers to the practice of **preventing or removing barriers** that keep anyone from accessing, reading or writing digital content and interacting with digital features. We need to make sure that we are not creating barriers in our products and services and that our way of building technology includes everyone, not just a select group of people.

Have you ever tried to use a ticketing machine in a language you didn't understand or fill out a form and didn't know what information to put into a given field? Maybe you'll think: "this product wasn't made for me". Exclusion happens in everyday interactions with technology.

By applying best practices in accessibility, the ICT accessibility team mitigate the risk of unintentionally excluding people due to temporary, situational or permanent disability. When the ICT accessibility team is creating products, they want to avoid designing products that make people feel excluded and create products that are accessible to people – regardless of their gender, age, ability or location.

So it isn't enough to want to be inclusive and accessible: designing for inclusion starts with recognizing exclusion.

Go to Action on Accessibility >

Best practices for accessibility and inclusion

Here are three approaches for accessibility and inclusion that will help technology focused teams like Farim's, in support of the UN's Disability inclusion strategy.

Recognize exclusion

Exclusion happens outside of our mental models – when we aren't aware that it exists. Recognizing bias is key to recognizing exclusion.

Learn from human diversity

Exclusion happens everyday but sometimes we find ways to use inaccessible products. We're all experts in adapting and finding new solutions.

Solve for one, extend to many

Your team may start designing a product for a deaf person, for example, but we can extend the solution to benefit others too (i.e. captions are used by everybody not just by the deaf community).

Accessibility in the UN context

Farim, **Teresa**, **Emilia** and **Julius** have a growing interest in making the world more inclusive, but they have some assumptions about accessibility and don't know where to start. Here are three myths that they will likely encounter at some point.

Myth #1:
Accessibility is complex

People avoid talking about accessibility and inclusion for fear that they will say the wrong thing.

Tip: Ask questions and listen to what people with disabilities have to say. Seek talks, podcasts and articles by people with disabilities. This will help enhance your vocabulary for inclusion.

Remember: We are all human and sometimes we will use the wrong words that unintentionally hurt people. What matters is how you respond and what you do next.

Myth #2:
Accessibility needs to be perfect

When starting a new project, teams are afraid that the MVP won't be accessible to all since they don't have a lot of time for delivery.

Tip: There is no perfect solution to suit everyone.

Remember: Be curious and understand who you are building the product for and what their challenges are. Talking with your users is a good start to designing a product for human diversity.

Myth #3:
Accessibility only needs to be done at the beginning

Teams are afraid of not having enough talented people, time and money to make a sudden change in accessibility.

Tip: There is no perfect time to start adding accessibility, so start small with a few people and some investment.

Remember: Accessibility is ongoing. For every project, new and existing, you will need to iterate on accessibility and it's okay if you don't have all the answers right now.

Awareness: Diversity, Equity, Inclusion

Why diversity, equity and inclusion matter

Diversity, equity, and inclusion have the power to create social change and make better software products. By incorporating the perspectives of those from a variety of identities, backgrounds and lived experiences, we're better enabled to solve for the needs of the customer/user.

Thoughtworks defines the constituents of DEI as follows:

D

Diversity is understanding that everyone is unique, has multiple identities, and **recognizing our individual differences.**

E

Equity is the effort made to address systemic inequalities and barriers to achieve greater **fairness of outcomes.**

I

Inclusion is the effort made to **build a safe and respectful space for all.**

Especially those who might otherwise be excluded or marginalized.

Go to Action on DEI >

Best practices in diversity, equity, and inclusion

To understand the importance of building harm reducing technologies by, or on behalf of, the United Nations System Organizations, these are some principles to follow.

Promote global-first values

Encourage decision-making that considers the collective needs, perspectives and experiences of the global community over those that prioritize any one individual or group.

Foster inclusion and transparency

Provide forums that promote trust and transparency, which enable stakeholders to take informed decisions and actions.

Lead with curiosity

Practice generative listening as a means to open dialogue that creates room for collaboration and joint exploration in identifying challenges and solutions.

Be willing to learn and unlearn

Welcome new voices and perspectives that nurture learning and unlearning of societal and institutional biases.

Seek to empower partners

Cultivate partnerships that empower the actors closest to the problem to increase collective knowledge, power, and impact.

Promote equity and respect

Honor and respect the differences in perspective we all have on the challenges and solutions we believe will drive positive change.

Go to Action on DEI >

DEI in the UN context

"When designing tech solutions to solve global challenges, we have to look beyond our own horizons. Others may not experience the solutions the same way we do and may have different needs."

Emilia, project manager

Leading with curiosity, being willing to learn and unlearn

"Institutional and societal biases impact policy, creating outcome gaps. To redress these biases, we must first be curious, willing to learn and unlearn, as well as actively engage and listen to a variety of voices."

Teresa, policy maker

Foster transparency, trust and respect

"Effective teams are those that foster transparency, trust and respect. Promoting these behaviors honors the differences among us, enabling collectively informed decisions and actions."

Julius, developer

Global first perspective and empowering local partners

"Decisions often reflect who's in the room. Empowering those closest to the problem ensures solutions consider a wider range of needs and perspectives, leading to more sustainable outcomes."

Farim, senior leader

Go to Action on DEI >

Awareness: Security

Why security matters

Protecting the United Nations' data, resources, and reputation is vitally important. As the Organization stores, processes, and shares more and more sensitive information electronically, preventing breaches is paramount.

A risk-driven approach helps build secure, privacy-abiding and ethical applications. The risk based process starts with the determination of "value" of protected assets in order to determine adequate security requirements.

This value is a attributed by considering:

- Risk – The probability that a security breach will occur

- Impact – The severity of the consequences of a breach

We can use this information to prioritize our security efforts and protect the information that is most important to us.

For example, if we have a piece of information that is not confidential yet has a high impact if it is leaked, we will need to take extra steps to protect it, such as setting up access control and storing it in a secure location. On the other hand, if we have a piece of information that is not very confidential and has a low impact if it is leaked, we may not need to take as many steps to protect it.

Best practices for security

Confidentiality

Information is not disclosed to unauthorized individuals or entities

Availability

Authorized individuals or entities have timely and reliable access to information

Integrity

Information is accurate, complete and has not been modified or destroyed in an unauthorized manner

Go to Action on Security >

Best practices for security

More information can be found in the privacy sections.

"It is our responsibility to keep the UN's information safe from people who might maliciously use it. People might do bad things with information like steal your identity, steal your money or hurt you. This is particularly important as some of our users are among the most vulnerable populations. To avoid this happening, a risk-driven approach helps build secure, privacy-abiding and ethical applications."

Farim, senior leader

Confidentiality

"How do we make sure that information is not disclosed to unauthorized individuals or entities?"

Emilla, project manager

Integrity

"We need to ensure that information is accurate and complete, and isn't modified or destroyed by anyone that shouldn't have that access."

Julius, developer

Availability

"We shouldn't forget how critical some of our systems are for the people we serve. How do we ensure that the right people have access to information, reliably?"

Teresa, policy maker

Go to Action on Security >

Part two:
Action

"At its core, the notion of Responsible tech is about ensuring that everyone benefits from the deployment of technology. It relies on you... to not assume that your deployment of technology is a neutral decision and to validate that your use of technology doesn't exclude or disadvantage anyone."

Rebecca Parsons, Thoughtworks CTO

Action: Sustainability

Applying a GreenOps framework

To build software that is carbon-efficient and addresses green software principles, we must build best practices into our default ways of working. A way to implement this is through GreenOps.

GreenOps is a cultural practice that enables organizations to consider and optimize for carbon and energy as key metrics for data-driven decisions in technology and operations. By adopting a GreenOps approach, organizations can optimize not only their carbon footprint, but can also reduce costs, grow their capabilities and sustain carbon driven work. This approach will consider carbon and energy as cross-functional requirements throughout the development process.

The GreenOps framework revolves around the following green software fundamentals:

| Learn and understand	Measure and analyze	Optimize and reduce
In order to make sense of emissions metrics and why certain cloud services may be more or less carbon intensive, it is important to have a fundamental understanding of green software principles, emissions drivers and the broad domain of sustainability in tech.	After obtaining access to real time data and enabling casual monitoring via dashboards, the natural next step is to more deeply analyze spikes and trends and ultimately, identify opportunities to implement strategies to mitigate emissions and lower costs.	Through sufficient analysis, teams can start thinking about remediation strategies and sensible defaults that would be most fitting for their objectives, requirements, and infrastructure needs, and build a reference implementation for effective optimization.

Learn and understand

Measure and analyze

Optimize and reduce
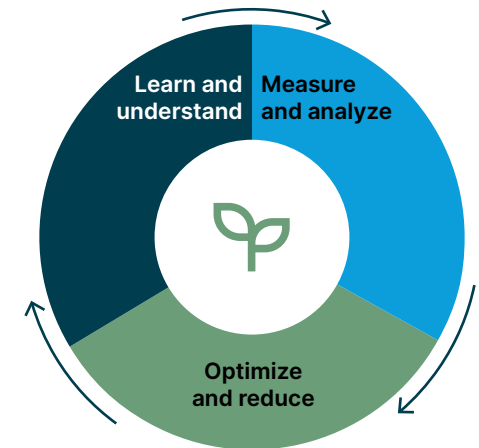
For more detailed information on how to apply GreenOps in a practical sense, reference A Forecast of Green Clouds Article

Additional resources on sustainable tech >

Note: Sustainability action at the UN should always refer to the work of the UNEP and include Green Procurement of Services.

Operationalizing green software

When looking to operationalize green software, we can leverage and prioritize a **GreenOps** approach. Along with the core fundamentals of the GreenOps cycle, this mindset shift and practice requires collaboration across a range of stakeholders, giving everyone a part to play in applying sustainable tech to their organization. You'll also need a governance structure that connects various developer <u>application teams</u> with other stakeholders such as senior leaders, product managers, and policy makers to enable and ensure continual buy-in, target setting and prioritization of sustainable and clean tech.

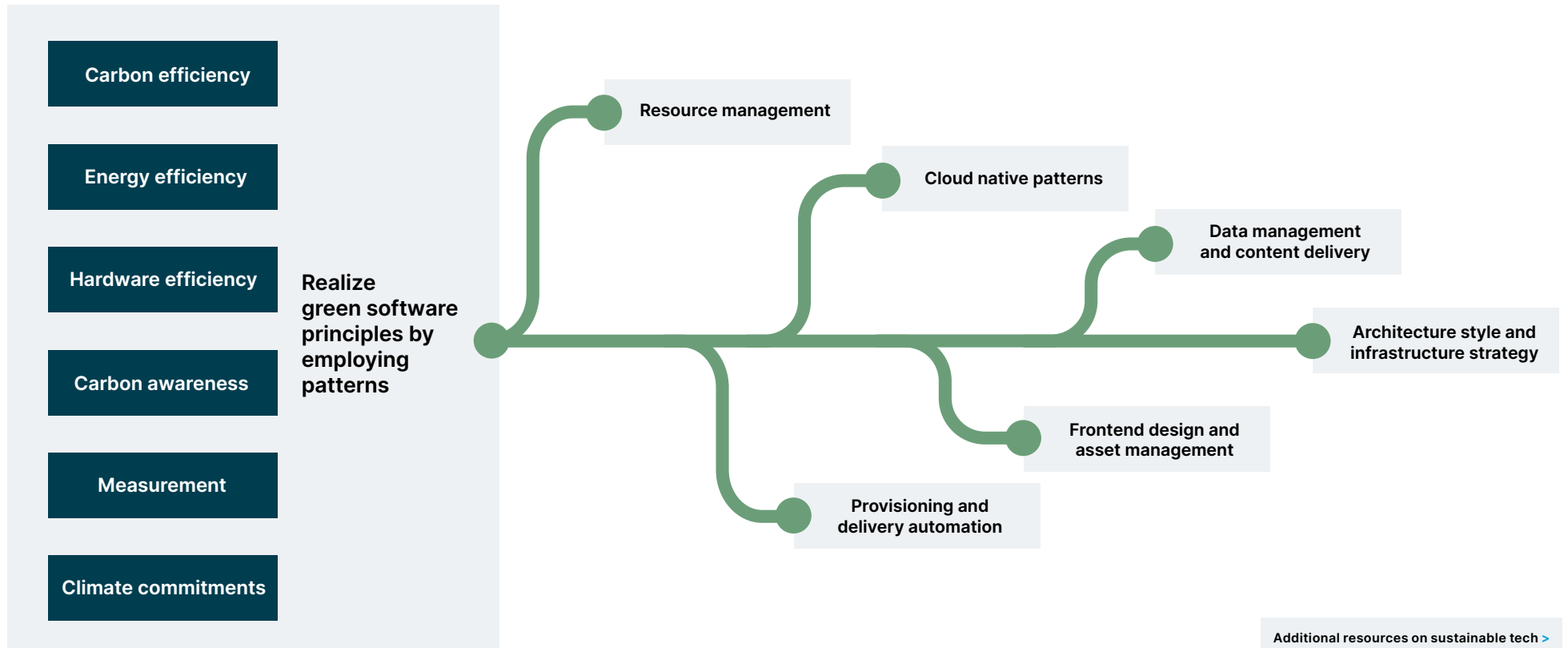| **GreenOps cycle**			**Operational enablement**	
Learn and understand	**Measure and analyze**	**Optimize and reduce**	**Prioritization, governance, and accountability**	**Targets, KPIs, and standards**
• Gain a fundamental understanding of green software principles and emissions drivers • Become knowledgeable of the general sustainability and tech domain	• Utilize measurement tooling to baseline infrastructure carbon emissions • Assess spikes and trends to identify opportunities	• Put in place sensible defaults for greener software • Implement green software patterns that reduce the carbon and energy of software systems	• Ensure teams have space for emissions reductions in their roadmap • Ensure teams have resources and support to make reductions • Bring in sustainability as a cross-functional requirement for application development	• Set goals for emissions reduction in tech organizations • Track commitments over time • Understand benchmarks, policies, and reporting standards
Who is responsible?	**Who is responsible?**	**Who is responsible?**	**Who is responsible?**	**Who is responsible?**
Farim Senior leader **Teresa** Policy maker **Emilia** Project manager **Julius** Developer	**Emilia** Project manager **Julius** Developer	**Julius** Developer	**Farim** Senior leader **Emilia** Project manager	**Farim** Senior leader **Teresa** Policy maker

Green software principles, patterns, and practices

Taking action on the **optimize and reduce** phase of the GreenOps cycle to address the climate impact of our software involves making changes that correspond to the core **principles** of what makes software green. These **patterns** of best practices explain how to apply principles in real-world examples.

Green software <u>patterns</u> can span across categories including software architectures and development lifecycles

Carbon efficiency

Energy efficiency

Hardware efficiency

Carbon awareness

Measurement

Climate commitments

Realize green software principles by employing patterns

Resource management

Cloud native patterns

Data management and content delivery

Architecture style and infrastructure strategy

Frontend design and asset management

Provisioning and delivery automation

Additional resources on sustainable tech >

Patterns and tools to help track and reduce emissions

Practical examples that developers can use in their software applications.

Patterns

Avoid tracking unnecessary data

From a carbon efficiency perspective, avoiding tracking unnecessary user data will reduce the overall workload for page loads and decrease overall page weight of the site

Relevant principles:
Carbon efficiency

Select a more energy efficient AI/ML framework

The underlying framework used for the development, training, and deployment of AI/ML needs to be evaluated and considered to ensure the process is as energy efficient as possible

Relevant principles:
Energy efficiency

Scale Kubernetes workloads

Scaling your K8s workload based on relevant demand metrics that drive scaling of your applications can reduce resource utilization, and therefore also your carbon emissions

Relevant principles:
Hardware efficiency

Practices

As **Julius** (developer) plans to process and track user behavior on his web application, he should avoiding collecting unnecessary user data which can be responsible for significant energy use and poor carbon efficiency. This can also present a significant violation of user privacy.

Another practice **Julius** can follow is to evaluate and select an energy efficient framework/module for AI/ML development, training and inference. Typically, AI/ML frameworks built on languages like C/C++ are more energy efficient than those built on other programming languages.

To achieve better hardware efficiency, **Julius** can implement a custom or autoscaler for his cloud-based K8s application, to allow scaling down to zero when there is no demand. When utilizing cloud environments, he can configure autoscaling groups via the command line interface.

Additional resources on sustainable tech >

Example patterns for additional personas to put into practice

Practical examples that can help enable the implementation of green software.

Patterns

Require carbon-aware processes

Carbon-aware time scheduling is about scheduling workloads to execute when the carbon intensity of electricity is low

Relevant principles:
Carbon awareness

Ensure open source adoption

In order to effectively measure cloud emissions, open source tools offer real-time cloud emissions data with daily granularity

Relevant principles:
Measurement

Form net zero targets

Work towards the abatement of organizational software emissions and offset any remaining emissions through carbon reduction projects

Relevant principles:
Climate commitments

Practices

Emilia (project manager) can define project requirements for applications to be **carbon-aware**, by time-shifting deployments using carbon intensity forecast data to calculate the best time to execute. She could advise development teams to source real-time data from sources like Electricity Maps to enable the implementation.

Teresa (policy maker) can make the decision to adopt open-source technologies like Cloud Carbon Footprint (CCF) to understand and visualize cloud emissions with data-driven insights towards carbon reduction. She can leverage these emerging technologies for the measurement of application emissions.

When driving to effect cultural change at their organization, **Farim** (senior leader) can move forward initiatives and **climate commitments** to achieve net zero targets and make decisions to purchase neutralizations like Renewable Energy Credits (RECs) to compensate for residual emissions.

Additional resources on sustainable tech >

Action: Data and AI

Six actions to incorporate data and artificial intelligence features at the United Nations

Actions and their owners:

1	**2**	**3**	**4**	**5**	**6**
Direction on data privacy	Action on data bias	Practical standards on ethical uses	Action as per system standards	Data access and inclusion	Data governance and responsible AI
Farim Senior leader	**Julius** Developer	**Farim** Senior leader	**Farim** Senior leader	**Teresa** Policy maker	**Emilia** Project manager

See **appendix** for additional tools

The following slides are about how Farim led his team of Teresa, Emilia and Julius to execute the six-step plan for data and AI.

Data and AI

Principles and patterns

This playbook details a number of initiatives that can help address data and AI issues, including the development of the Responsible Technologies' Ethics Framework and Sustainability Framework for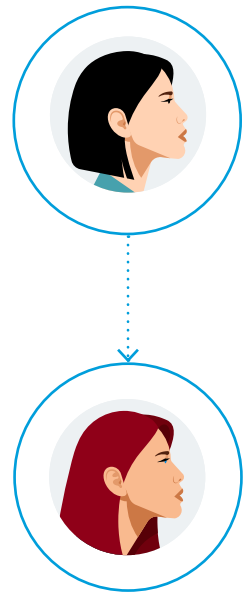 Emerging Technologies. Please familiarize yourself with the principles to guide the use of AI by UN agencies, published by the CEB.

Teresa
Policy maker

Designing AI with safety and reliability

Developing AI responsibly means understanding several social factors, such as customs and safety considerations for communities across the countries where the UN operates. Teresa researches these factors to understand how and when AI can be reliably used for the public benefit. She looks into the sources of the data used to train the AI, measuring any bias it might have.

Emilia (project manager) would love to use an AI chat-bot to be more efficient in her work day but she doesn't know if this AI is safe and reliable. So she talked with **Teresa** (policy maker) to help her understand if the UN has any policy related to AI safety and reliability in the area of concern.

Emilia
Project manager

Designing AI within social context

Responsible AI considers unintended consequences, through various social lenses. Emilia explores the application of the AI and performs a risk analysis to understand how different communities might be impacted by its use.

Data and AI

Methods of measure

DESA tracks 231 indicators to assess progress towards Sustainable Development Goals at the global, regional, and national levels. A key indicator is to measure the significant increase in the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts. There are many initiatives across the UN aiming to ensure that AI is used for the benefit of all, to address some of the world's most pressing challenges, such as poverty, hunger and climate change.

Now that **Emilia** (project manager) knows more about AI's safety and reliability, she is checking with **Julius** (developer) on what are the methods of measuring the effectiveness of AI that they can use on ChatGPT and other AI models.
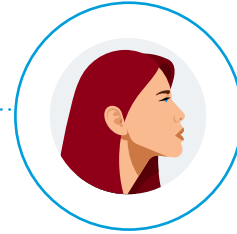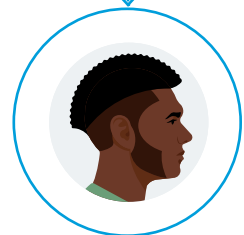
Teresa
Policy maker

Improved standardization

Responsible AI is a practice that helps the UN more confidently leverage AI. These practices promote responsible innovation through collaboration and can help to make AI systems globally accessible and inclusive internationally. Standardized AI systems can help mitigate the effects of bias, drive global collaboration and mitigate data privacy risks.
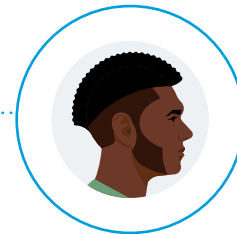
Julius
Developer

Increased transparency

Responsible AI means increasing transparency, including transparency regarding training data and their sources, transparency about how the algorithm is used, what biases might be present and what impacts it might have. Building trust in AI means working to make the AI explainable, fair, auditable, accessible and consistent.

Data and AI

There is a six-step action plan for ensuring responsible use of technologies from a Data and AI perspective. Follow the team as they explore these steps.
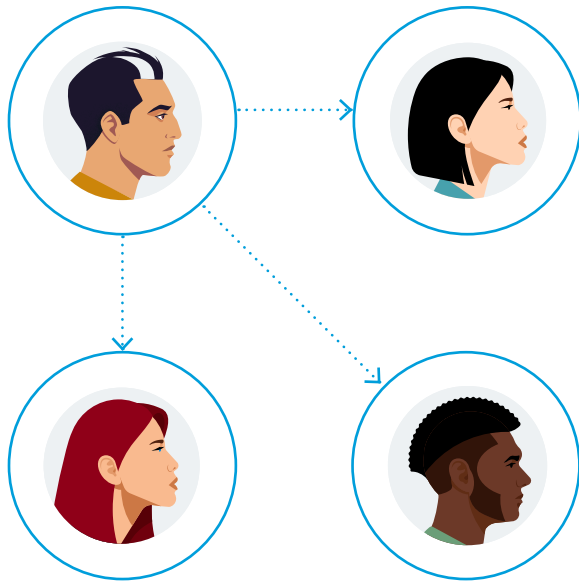
Farim (senior leader) doesn't know how to prepare his team to validate new AI solutions so he talked with **Julius** (developer), **Teresa** (policy maker) and **Emilia** (project manager) to prepare a plan to ensure responsible use of data and AI.

Farim
Senior leader

1. UN principles for data privacy

As the leader, **Farim** emphasizes how, as data is becoming increasingly pervasive in all our activities, it is important to follow these steps and the UN principles for protection and privacy of personal data. As a developer, Julius immediately incorporates changes on how the UN will treat personal data.
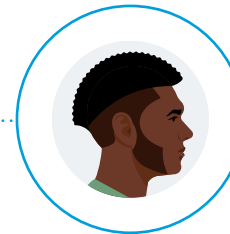
Julius
Developer

2. Action on data bias

The data used to train and develop AI systems can be biased, which can lead to these systems generating biased outputs, sometimes amplifying bias. **Julius** inspects the data to quantify relevant biases in training data and performs a risk analysis to monitor and mitigate its effect.

Data and AI

Six-step action plan for ensuring responsible use of technologies.

Farim (senior leader) was worried that they were not fully versed in how the UN standards apply to AI, so spent some time workshopping how the UN data protection and principles for the ethical use of AI apply to their work.

Farim
Senior leader

3. Practical standards on ethical uses

Leaders like Farim have ensured that the <u>"Principles for the Ethical Use of Artificial Intelligence"</u> are fully understood and applied within their teams. These principles include setting the data standards (data used to train and develop AI systems is accurate, reliable, and accessible).

4. Action as per system standards

Based on the The <u>UN's Principles on Personal Data Protection and Privacy</u>, UN teams should have control over their own data, and ensure that data is not used in a way that violates anyone's rights. These standards are based on international human rights law and principles of transparency, accountability and participation.

Data and AI

Six-step action plan for ensuring responsible use of technologies.

Emilia (was worried that some people may not benefit from data-driven technologies, so she raises the topic broadly for discussion.

Talking to **Teresa**, **Emilia** remembered that they should also ensure that new technologies and data are not disrespecting human rights and fundamental freedoms.
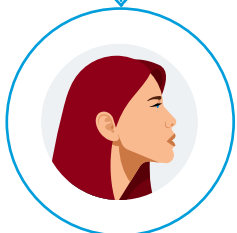
Having carefully reviewed the six-step action plan, **Farim** has made the decision to move forward with care to ensure that data and AI driven elements of tech are inclusive, responsible and sustainable.
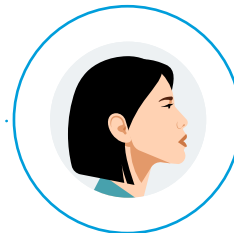
Emilia
Project manager

5. Data access and inclusion

The benefits of data-driven technologies should be accessible to all, regardless of their location, income, or other factors. It is important to address the digital divide and ensure that everyone has the opportunity to benefit from data-driven technologies.
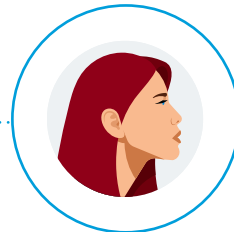
Teresa
Policy maker

6. Data governance and responsible AI

There is a need for effective data governance frameworks to ensure that data is used in a responsible and sustainable way. The UN is increasingly playing a leading role in ensuring that AI is developed and used in a way that respects human rights and fundamental freedoms.

Additional resources on Data and AI **>**

Action: Privacy

Applying data protection and privacy practices

To understand the importance of data protection and privacy for personal data and non-personal data in a sensitive context by, or on behalf of, the UN, these are some best practices to follow.

1
Lawful, fair, and proportional

Practice privacy by design with data protection impact assessments to ensure all processing has a legal basis and sets reasonable expectations

Who is responsible?

Farim Senior leader   **Teresa** Policy maker

Emilia Project manager   **Julius** Developer

2
Transparent and specific

Provide transparency through specifics in privacy notices of when, how and why you collect data on what is expected of them

Who is responsible?

Emilia Project manager

3
Data minimization and purpose limitation

Use and collect only the data you need, and don't reuse data for a different purpose without proper controls on what is expected of them

Who is responsible?

Emilia Project manager   **Julius** Developer

4
Security and confidentiality

Engage information security to assure new processing, and adequately train employees on what is expected of them

Who is responsible?

Farim Senior leader   **Teresa** Policy maker

Emilia Project manager   **Julius** Developer

5
Accuracy and data quality

Put measures in place to ensure data is of good quality, accurate, and kept up to date

Who is responsible?

Emilia Project manager   **Julius** Developer

Applying data protection and privacy practices

6

Retention limitation

Hold onto data only as long as it is needed, build in automated deletion or archive where possible

Who is responsible?

Julius
Developer

7

Analyze and mitigate risk

Be accountable with the appropriate governance. Ensure there is a well publicized responsible team who reports risks to the highest level

Who is responsible?

Farim
Senior leader

Teresa
Policy maker

Emilia
Project manager

8

Rights requests

Adhere to rights requests fairly and within the legislated timeframes. Set up a process with an accountable team for these requests

Who is responsible?

Teresa
Policy maker

Julius
Developer

9

Preventative data protection

Think about data protection at the start of new endeavors and enshrine necessary measures early

Who is responsible?

Farim
Senior leader

Teresa
Policy maker

Emilia
Project manager

Julius
Developer

Action: Accessibility

Five steps to address accessibility on your team / product

See resources section and appendix for additional tools

1

Assess your team's maturity on accessibility

Who is responsible?

Farim
Senior leader

Teresa
Policy maker

Emilia
Project manager

Julius
Developer

2

Identify existing accessibility failures

Who is responsible?

Julius
Developer

3

Prioritize and address failures

Who is responsible?

Farim
Senior leader

Emilia
Project manager

4

Build accessibility into the development lifecycle

Who is responsible?

Emilia
Project manager

Julius
Developer

5

Prevent building biased products

Who is responsible?

Emilia
Project manager

Julius
Developer

Accessibility is a shared responsibility. Regardless of the role you play on a team, you can help identify accessibility issues and define requirements for the future.

Assess your team's maturity on accessibility

Before you start implementing an accessibility culture in your team, you need to understand your team's maturity around accessibility.

If the team is **unfamiliar** with accessibility:

Start with the UN's disability strategy and a general understanding of what accessibility is, why it's important and who is being impacted.

- Cards for Humanity is a great tool and it will help you explore the different contexts and situations with your team

If the team is already **familiar** with accessibility:

Since the team already understands the importance of digital accessibility, they will benefit more from guidance or specific training for their role, best practices to test tools and others resources. Maybe they are just looking for someone to share a accessibility case which they can understand how they achieve their goal.

Julius (developer) spoke to **Emilia** (project manager) about his difficulty on developing some UI due to his color blindness. **Emilia** wasn't aware of her product's lack of good color contrast and realized that her team is not accessibility centered.

So **Julius** mentioned that, in a Lightning Talk, someone told him designing for inclusion starts with recognizing exclusion and that a good way to start is by mapping the team's maturity.

Tips

Try to look at what you and your team already know and you all need to know or learn based on your project challenges.

Tools used to find accessibility failures

Accessibility can be tested at any point in the product lifecycle. Teams can measure the current accessibility of their product and identify issues through manual testing, semi-automated testing and automated testing.

But remember, only 35% of the issues can be found by automated and semi-automated testing and the other 65% is found by manual and usability test.

1

Lighthouse:
provides a score and a list of errors that Google sees as important

2

Wave:
provides the quantity of issues, their type, localization and code; WCAG levels, and how to fix issues

3

AXE:
provides the quantity of issues with conformance levels, localization and tips. Includes a browser plugin that maps issues

4

IBM Access Toolkit:
provides a score, list of issues by conformance, localization, impacted users, how to fix and a spreadsheet

5

Manual testing:
keyboard navigation, screen reader and other assistive techs tested by product teams and people with disabilities
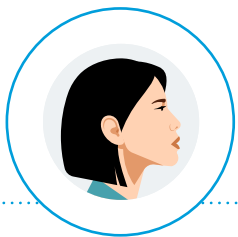
Emilia (project manager) and her team mapped their accessibility maturity and learning goals. Now they would like to learn how to find accessibility failures.

Tips

- To learn more about WCAG principles and success criteria please go to appendix

- It's recommended to use a few different tools and methods when testing accessibility to help uncover various user needs

- You can start learning how to test by using this testing website

- Read our accessibility handbook to learn more about keyboard navigation and screen readers

Identify existing accessibility failures

Julius is excited to start identifying accessibility issues on the sites he works on since he now knows how important it is to have software accessible to all.

To begin, he can leverage two tools (Google Lighthouse and IBM Accessibility Checker) on the UN site that he's working on.

Note: the difference in scores results from these tools assessing different things — it does not mean either tool is preferable.
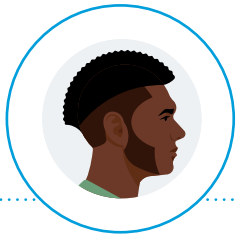
Julius tested two pages using Google Lighthouse and IBM Accessibility to see their score on both tools and map how many issues they need to fix to improve accessibility.

Google Lighthouse

69/100
Score mainpage

82/100
Score article: Addressing gender-based violence

10
Violations in total

IBM Accessibility Checker

77%
Score mainpage

85%
Score article: Addressing gender-based violence

335
Violations in total

Prioritize and address failures

How do the team start fixing the issues?
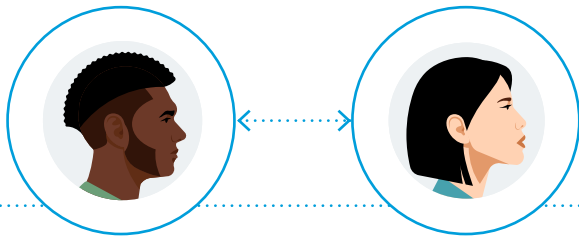
Julius (developer) met with his project manager, **Emilia**, so they could talk about their scope and how to start fixing the issues identified to improve their score.

Emilia and **Julius** would like to create a strategy to make the UN's site more accessible to everyone, but the scope is getting too big and they don't know where to begin. They identified some clear next steps to begin making progress.

Tips

- Choose several underrepresented groups to have a broader impact
- There is no one place to start, use data to guide you
- If your product already exists, consider starting with groups that have not been a priority to date

Step 1

Set clear standards and guidelines

UN staff are bound by: web guidelines, inclusive communications guidelines and UN web accessibility guidelines.

- Agree with your team on one common standard that you strive to be compliant to long term.
- **Externally, the most commonly used standard** for web accessibility is the Web Content Accessibility Guidelines (WCAG)

Step 2

Fit it to your product

Accessibility guidelines can be very detailed, which is good, but can be overwhelming. Here are some tips:

- Prioritize. For instance, if your web app doesn't contain any video or audio data — so you don't have to consider those criterion in WCAG
- Use the success criteria to help you prioritize the first standards and the next steps. Start checking level A issues since they are the most critical

Step 3

Create a checklist

Put all the criteria that you identify as relevant for your product in a checklist. Teams should use this checklist for accessibility audits on built features and for making sure new features are accessible.

- The Accessibility Checklist (WCAG) is a helpful resource
- You can also use the spreadsheet with the issues mapped generated by IBM Accessibility Checker

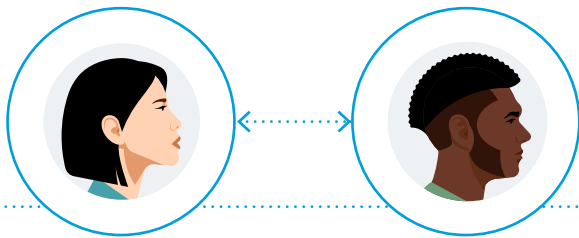# Build accessibility into the development lifecycle

How will Emilia and Julius include accessibility in their ways of working?

Emilia (project manager) and **Julius** (developer) want to work out how to keep accessibility as a regular cycle, not an annual check. They also don't want their team thinking that accessibility is extra work to do since they already need to focus on privacy, security and other standards.

Tips
- Having a champion in your team can help maintain an accessibility lifecycle
- Read our accessibility handbook to learn more about building accessibility in
- Some examples:
  - Julius is one example of a persona with disability
  - Disability user profiles: UK Government
  - Stories of web users: Web Accessibility Initiative

Step 1

Include accessibility criteria in existing ways of working

It can often be hard to get the work on accessibility prioritized. Accessibility is not a one-time effort but similar to security or usability, something you have to continuously work on.

It's best to find ways to include accessibility in your team's existing workflows so it's realistic to include in a normal working day. **The closer accessibility is aligned with your current way of working the easier it will be for your team to adhere to it.**

Look into what your team is already doing well and think about ways to include accessibility.

- **Include accessibility checks in acceptance criteria**
- **Create personas with disabilities.** If you use personas to design new features and plan for user needs, personas with disabilities can help your team keep accessibility in mind and avoid issues from the outset

These are just some ideas—what's most important is that you include accessibility in a way that your team can make it a continuous practice.

Prevent building biased products

Emilia and Julius are afraid to build biased products
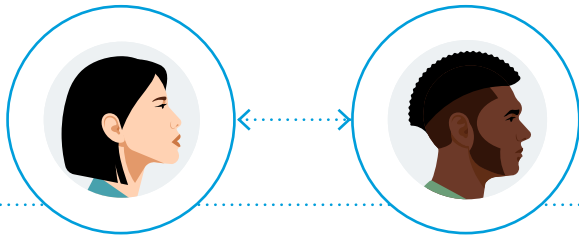
Emilia (project manager) and **Julius** (developer) don't know how to prevent biases when they are focusing only on accessibility. They are afraid to build biased products and spend time and money to fix issues that could be prevented if they knew how.

Step 1

Have a multi diverse team

When we put together a team with different backgrounds and perspectives, we are decreasing the chances of creating a product with bias. If this is not possible:

- Get input from another team or department

- Talk with your users, clients and stakeholders

- Engage with people from different countries, abilities and communities. The tool Learn from the Experts can help you and your team with the interviews/meetings

The most important thing is to brainstorm in a diverse group to reveal bias and uncover potential areas of exclusion. Learn more in the DEI section.

Step 2

Find biases

- Ethical Explorer can help. Emilia dedicates time to discuss the "exclusion card" with her team, map potential risks and issues related to accessibility and then brainstorm

- They can use Cards for Humanity to help them remember and explore different contexts and situations

- The Tarot Cards of Tech prompts the team to think about equity and access

How does Julius fix a level A issue?

Now that Julius has learnt about accessibility, he is looking forward to fixing issues
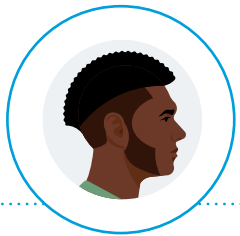
Julius (developer) would like to start with one example that is a quick win. So he searched for level A issues and found that some images were missing the alternative (alt) text tag. Without this tag, people who use screen readers won't have any information about the image.

Image description
Add an image description to explain the content of an image to those using screen readers by using alt="". Learn more about <u>Alt text</u>.

- **Normal images**
The alt text will depend on the context of the image and what message this image is trying to portray

- **Decorative images**
If the image is used strictly to make the page pleasant to the eye, and doesn't contain a link, then include the alt attribute, but leave it empty. For example, alt=""

- **Complex images**
A complex image could be a diagram, table, chart, icons, images as link or images with complex information. Provide a full description of the information portrayed.

This plant icon is a decorative image

Grow

"When we help others grow, we grow ourselves"

Issue
This is a decorative image, so it must have alt attribute as empty or the screen reader will read: "/icon-plant-4.svg, unlabelled image"

Solution
To fix this issue, Julius must add the alt tag empty like this:<img src="{source link here}" alt>

Tips

- Choose several underrepresented groups to have a broader impact

- There is no one place to start, use data to guide you

- If your product already exists, consider starting with groups that have not been a priority to date

Action: DEI

Three actions to incorporate DEI on your team / product

1

Build diverse and inclusive teams

Who is responsible?

Farim
Senior leader

Teresa
Policy maker

Emilia
Project manager

2

Build products with inclusion in mind

Who is responsible?

Emilia
Project manager

Julius
Developer

3

Measure for equity

Who is responsible?

Farim
Senior leader

Emilia
Project manager

DEI is a shared responsibility. Regardless of the role you play on a team, you can contribute to creating a diverse, equitable, and inclusive team and product.

Build diverse and inclusive teams

Emilia, project manager, is concerned about not being familiar with the problem area
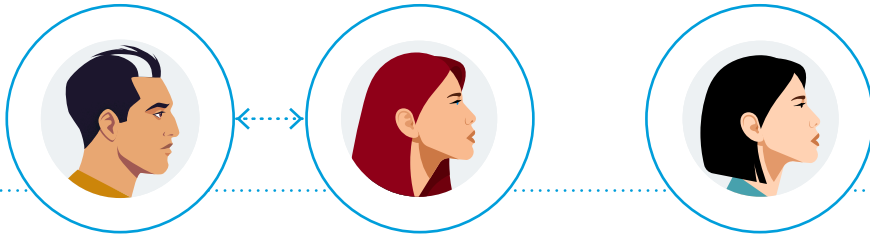
Farim Farim (senior leader) and **Teresa** (policy maker) are sponsoring a project to improve education outcomes for children in countries recovering from crises. They want to ensure that the project team working on the solution understands the unique barriers affecting them.

Emilia (project manager) has led UN equitable education projects, but recognizes that she may not have enough experience working on solutions tailored crisis recovery.

If the team is **unfamiliar** with the experiences to be redressed

Use research and data to demonstrate the differences in each population's needs and outcomes in relation to education, learning and job opportunities. Share some examples of underrepresented groups' perspectives and challenges. Proactively build a diverse team with varied project and lived experience, who can help to inform decisions and challenge biases when identifying solutions.

If the team is **familiar** with the experiences to be redressed

Delve deeper into the barriers faced by underrepresented groups. Create space for, and encourage people from those groups to raise their voice and share their perspectives and understandings of the challenges to be redressed. In parallel, motivate people outside those groups to research the challenges faced and share what they learn.

- The Ethical Explorer tool can help the team to reflect on exclusion and bias

Tips
- Empower people from underrepresented groups to raise their voice and share their perspectives if they feel comfortable
- Encourage the entire team to learn more about race, gender, class and disability challenges from those who suffer prejudice
- Challenge the assumption that underrepresented groups are the only ones responsible for changing the scenarios responsible for their oppression

Build products with inclusion in mind
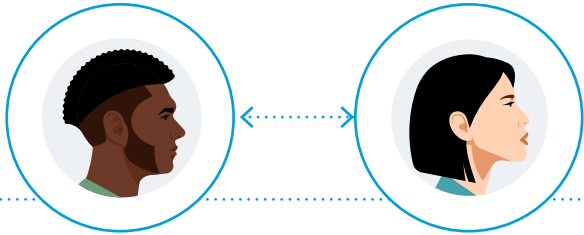
Julius (developer) was excited to learn more about accessibility, and felt that the team could use this knowledge to build inclusion into the development lifecycle.

Julius asked **Emilia** (project manager) for help in understanding when the team could discuss other inclusive design principles.

Tips

There are many ways to build with inclusion in mind:

- Consider if imagery of people is necessary. When it is, try using diverse depictions of people.

- Consider if gendered-language is necessary. When it is, be specific and intentional. When it's not, avoid defaulting to the gender binary, or assuming pronouns. Avoid using 'sex' (male/female) in place of 'gender identity' (man/woman/non-binary…)

- Overall, if your audience is known, be specific. If it's not, don't assume

Step 1

Consider who is the intended audience for your product

When creating a product, you likely have a clear picture of the populations and personas you are seeking to engage. Assess what aspects of your product design and experiences are specifically tailored to that population. Is that limitation intended or necessary?

Step 2

Consider the other populations that might use your product

Explore how people of other abilities, identities, experiences and needs might use your product, or use your product differently. Explore how decisions, experiences, or outcomes might change if the population changes. Assess possible consequences from not building with inclusion in mind for those populations. Are those consequences intended or necessary?

- The Consequence Scanning tool can help the team reflect on exclusion and reflect on bias

Measuring the equity of your product

Farim is unsure how to assess if the product is creating the right outcomes
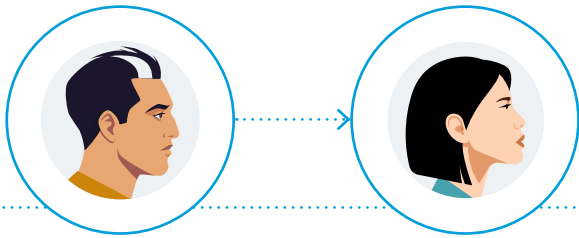
Farim (senior leader) wants to produce a report for UN stakeholders on a product being built, but is unsure how to determine if the product is generating the intended equity outcomes for the purpose and populations.

Farim asks **Emilia** (project manager) for help in understanding how to assess the product's performance, determine whether it's meeting expectations, and what should be prioritized next.

Step 1

**Measure for
equity of access**

Assess if your product is reaching the intended populations. You can do this by measuring the representation and distribution of your product's current population groups. This should be compared and contrasted with the potential total population your product could reach.

Step 2

**Measure for
equity of impact**

Assess if your product is creating equitable outcomes for each of the populations it's reaching. You can do this by measuring whether key outcome metrics are within the intended or desired range for each population. These key outcome metrics should be measured across the populations to assess whether disparities are being introduced or resolved.

Step 3

**Measure for
equity of experience**

Collect direct feedback from each of the populations engaged. You can do this by can conducting user research or interviews, gathering qualitative feedback and perspectives for each population group. The feedback collected should used to identify common patterns, or anti-patterns, in experiences across the populations.

If possible, all of these actions should be done continually throughout the product's lifecycle.

Action: Security

Five actions to build security into your digital products

1
Identify your security objectives using a risk based approach

2
Use threat modeling for risky features to understand security needs and determine adequate controls

3
Detect and remediate potential vulnerabilities

4
Determine and implement adequate access controls to ensure access is provided and maintained based on business need and principles of least privilege

5
Be prepared to respond and recover from incidents

Who is responsible?

Farim
Senior leader

Teresa
Policy maker

Emilia
Project manager

Julius
Developer

Who is responsible?

Emilia
Project manager

Julius
Developer

Who is responsible?

Julius
Developer

Who is responsible?

Emilia
Project manager

Julius
Developer

Who is responsible?

Farim
Senior leader

Teresa
Policy maker

Emilia
Project manager

Julius
Developer

Remember:
Security is a continuous activity, not a binary state. Building enough security into your products constantly is always better than leaving security behind.

Identify your security objectives using a risk based approach

Does your team know how to prioritise based on risk?

Security is a process to maintain a state of acceptable risk.

Emilia (project manager) understood that the product she is working on needs to be secure, but what does that mean for her product specifically? What are the key risks and objectives for security that her team needs to prioritize?

Why?
- We identify and assess risks and impacts in the context of the business so we can make reasonable decisions about investment in security
- If we don't adopt the risk-based mindset, we end up with either checkbox security or expensive paranoia, trying to eliminate every possible security risk, without understanding their severity

Identify the risk
- Develop a thorough understanding of the technical aspects and business services provided by the system
- Plan explicitly for the discovery of security objectives
- Use techniques such as threat modeling to draw out security risks
- Include security specialists and stakeholders responsible for the data and services in risk identification

Assess the risk
- Understand risk tolerance for different types of potential security issues
- Assess potential impact if something were to go wrong
- If you're looking at one problem, consider how it affects others

Manage the risk
- Decide what to do about the risk, based on knowledge from the assessment
- Put the right controls in place to reduce risk by adding features or stories to the backlog or putting operational processes in place

Threat modeling for risky features to understand security needs

Threat modeling helps us work out what the important next steps, or needs are for security around a particular feature or system
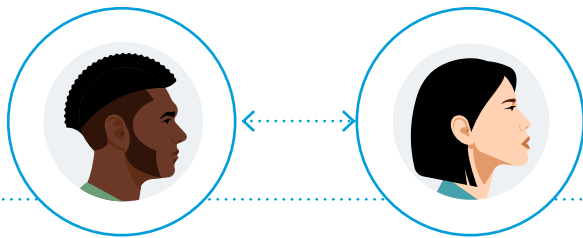
Julius (developer) is working on a risky feature and **Emilia** (project manager) suggested he runs a threat modelling session with the whole team.

Why?

- Each system is different. You need to think about what appropriate security looks like for your specific case

- As your software evolves, your system will change. Regular threat modeling helps the team keep on top of evolving needs

- Our goal is to find the highest value security work we can do, and get it into the team's backlog right away. We do this by applying threat modeling "little and often". We capture a new and different partial view of the system each time we do threat modeling rather than overthinking it.

There are many ways to do threat modeling, from formal frameworks to just gathering around a whiteboard.

Threat modeling is a structured activity to:

Activity	Question	Outcome
Explain and explore	What are we building?	A technical diagram showing how data flows
Brainstorm threats	What can go wrong?	A list of technical threats
Prioritize and fix	What are we going to do?	Prioritized fixes added to the backlog

Threat models also helps us define

- What we need to act upon
- What is in our scope to protect and defend

Keep in mind:

Threat modeling should be done little and often, in repeatable exercises to find high value items fast. There are many different ways to do threat modeling and it doesn't need to be an heavyweight or onerous process. This threat modeling method complements the determination of specific security requirements (level 1-3) as explained in the iSeek page on Information Security.

Learn more about agile threat modeling

Detect and remediate potential vulnerabilities

Use standard tools and approaches in your pipelines to detect and timely remediate potential vulnerabilities. Teams should apply operational hygiene through regular patching and monitor for and implement security advisory recommendations from relevant vendors.

Manage supply chain risk and vulnerabilities effectively by running automated checks in your software delivery pipelines.
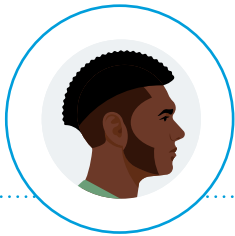
Julius (developer) knows that security vulnerabilities are a constant reality. He wonders how the team can identify the commonly known issues and vulnerabilities effectively.

Why?

- Vulnerabilities in software are discovered and disclosed continuously. Honest mistakes can lead to breach of software security protections
- There simply is too much to watch out for manually
- Automating the discovery of security vulnerabilities has become a critical component of secure software delivery

Automated vulnerability scans

- Check commonly known vulnerabilities in your code (OWASP Top 10), dependencies and infrastructure (CVEs)
- Patch and update automatically to keep your software supply chain protected
- Automate protection for secrets and credentials in your code base. They are a common entrypoint for attacks

Testing

- Prior to releasing a solution into production it must be security assessed by CSS
- Make use of tech stack specific tools for static and dynamic security testing to reduce the risk of missed vulnerabilities
- Write explicit security unit tests to cover key security functionality
- Automation does not eliminate the value of external penetration testing, as another layer of defense

Pay attention to access control around data
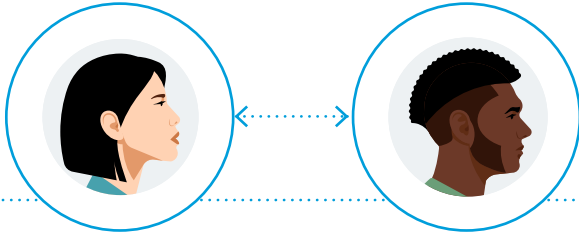
Emilia (project manager) and **Julius** (developer) are pairing to determine which users should have access to UN's services and data, and what features they can see. Since the software has sensitive data they need to take a granular approach

Why?
- Preventing a compromise of the confidentiality, integrity or availability of data is a critical concern
- Limiting who can access a set of data, what they can do with it and for how long, reduces the risk of data breaches and their impact and helps protect sensitive information
- Always ensure that your access controls are in line with UN policy and applicable legislation

Authentication.
How people gain access to data

- Ensure that you have appropriately strong authentication in place and follow standard authentication mechanisms
- Implement multi-factor authentication wherever possible
- Where available, use Organization standard federated access control or single sign-on

Authorization.
What people have access to

- Align privileges with roles which line up with the minimum access people need to perform a task
- Avoid granting blanket or broad access to everyone who uses a system
- For riskier actions ensure authorization is for the minimum time possible
- Perform regular access reviews to manage lifecycle and ensure current business needs are met. This means doing checks before granting access and removing access when it is not needed anymore

Data protection.
Where data is kept and how it's protected

- Never collect or store more data than you really need; the less data you have, the less you can lose
- Segregate data between environments. Do not use production data in any type of non-production environment
- Wherever possible have multiple layers of protection to account for the possibility of one of them failing
- Focus on making sure it's hard for data to leave the environment. This is often called data leakage protection

Be prepared to respond and recover from incidents
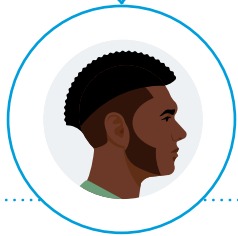
Teresa (policy maker) received an email from **Julius** (developer) warning her about a suspected security incident. **Julius** also asked what he should do to respond and recover from this incident.

A security incident is any activity that compromises the security goals of a system:

- **Confidentiality** is impacted when someone who wasn't supposed to have access to information gains access

- **Integrity** is impacted when information is changed in some way by an unauthorized individual

- **Availability** is impacted when access to a service or data is disrupted

Have a clearly defined incident response process:

- **Prepare:** Ensure everyone knows what is expected of them and has a written plan for incident response. Include key points of contact and expected behaviors

- **Identify:** Continuously evolve your security monitoring to alert you when systems behave in unusual ways. Establish clear notification channels to report when things seem odd

- **Contain, eradicate, recover:** Start by understanding the severity of the incident. Establish a response team including a security expert. Determine actions to stop the malicious activity without destroying evidence. Uncover and fix the root cause

- **Lessons learned:** After an incident, run a postmortem to uncover permanent corrective actions to improve your systems' and teams' security posture

Tips

- You can build systems to be more robust to incidents by rebuilding them often and in an automated way. Doing incident response drills regularly will help maintain and improve recoverability.

Why?

- Guarding your assets from harm includes identifying risk and protecting your systems.
  It is also important to be able to detect malicious activity and respond to it when it happens.

Part three: Resources

"While algorithms can scale up problems massively and exacerbate inequality, they can also do the opposite—as long as we explicitly train them to and insist that they must."

Kathy O'Neil, author of Weapons of Math Destruction

Managing and maintaining the shift to a Responsible tech organization

Implementing fundamental changes across large, distributed organizations requires a robust change management approach.

Advantages of effective change management

With intentional change management, employees feel prepared for the change, well equipped to change, and supported throughout.

- The key to managing change is to begin with the **end in mind** and design for change adoption.
- Clarity in role accountabilities promotes higher levels of **collaboration and cooperation**.
- A strong focus on **change communication** reduces cultural barriers.

6x more likely to meet objectives

5x more likely to stay on schhedule

2x more likely to stay on budget

10x increased adoption

Intentional change management
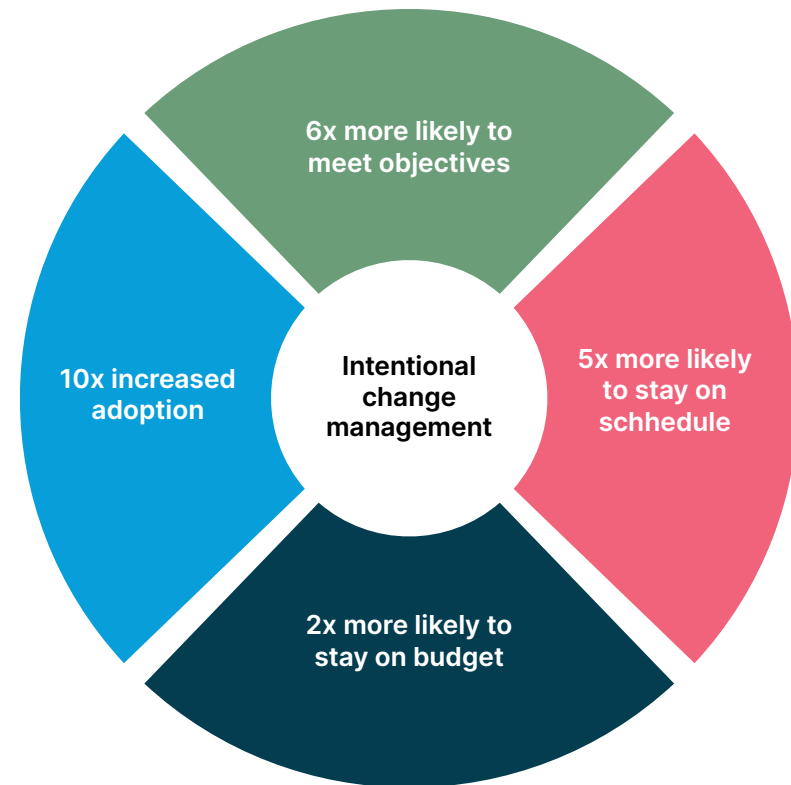
Sources: The Influencer by Joseph Grenny et al;
PROSCI Change Management data

Leading change at the UN with experimentation

Change management is a dynamic, **non-linear process** that unfolds within a complex structure. It is crucial to initiate **small-scale experiments** to swiftly gather feedback. Success hinges on **feedback loops, iterations, and adaptive adjustments**.

Experiments must be **time-bound, goal-oriented, and measurable for success**. Celebrating both successes and failures is essential for valuable learning.

Sequential processes, such as the UNLOCK Change Model, may not align with the complexity of this transformational change process.

Experiment   Experiment   Experiment

Continuously assess, analyze, anticipate, execute, measure success and refine change management approaches
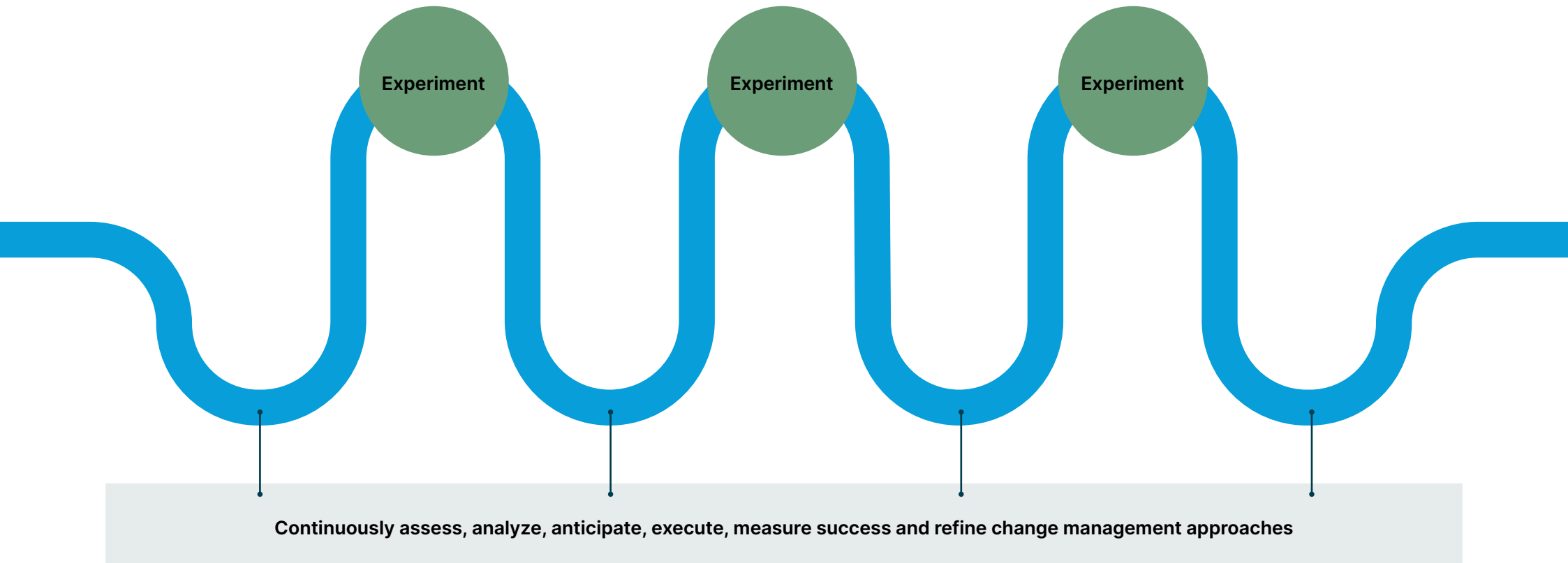
UN network of champions

A suggested model for implementing a Responsible tech network

UN Network of Responsible tech champions:

- Initiates and executes experiments
- Meets monthly
- Exchanges experiences
- Celebrates success and failures

Responsible tech leader:

- Act as examples and drive change within the UN Secretariat
- Create, manage and motivate the "UN network of Responsible tech champions"
- Campaign for change: tech salon, academy, town halls, lightning talks
- Give recognition: academy certificates, awards, appraisals, attention

Responsible tech champions:

- Become the Responsible tech champion representing one part of the UN
- Build separate "network of Responsible champions" for this part of the UN
- Manage experiments with the UN organization and be active in the "UN network of Responsible tech champions"

RT Champion at UNESCO

RT Champion at IMO

RT Champion at WHO

RT Leader at UN Sekretariat

RT Champion at FAO

RT Champion at OCHA

RT Champion at UNESCO
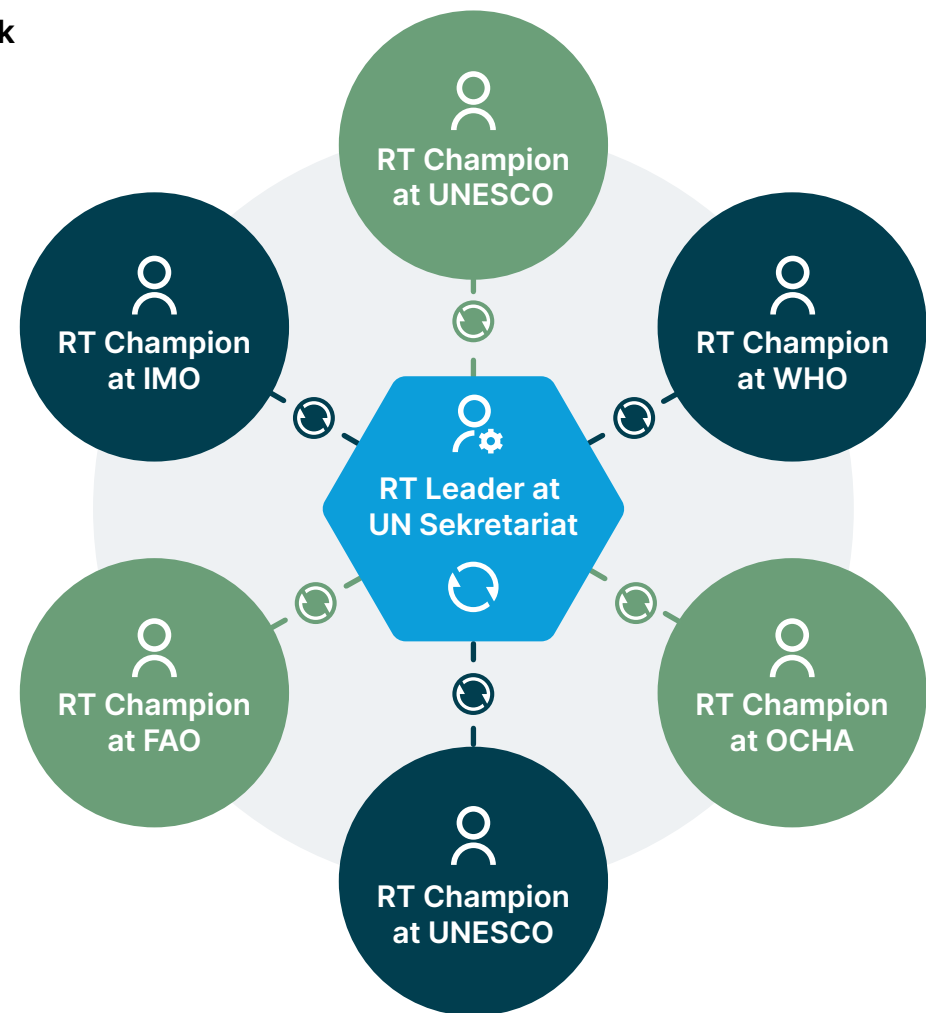
Three essential steps for a positive transformation

Phase 1

Prepare for change

- Define vision, goals, objectives and measures of success
- Define sponsor and develop sponsorship model
- Define roadmaps, meetings, showcases
- Define communications plan
- Define change champions
- Use "Fearless Journey Game"

Phase 2

Manage change

- Kick-off change initiative
- Kick-off "network of champions" for the UN and its subsidiaries
- Campaign for change: tech salon, academy, town halls, lightning talks

Phase 3

Sustain change

Give recognition: academy certificates, awards, appraisals, attention

- Celebrate and communicate success and failure
- Measure, analyze, reiterate change process, re-prioritize initiatives
- Regularly reshare and update the Responsible tech playbook

Gaming to learn: A game to solve to your real problems

The Fearless Journey Game isn't your typical **card game**. This game is designed to empower teams, enabling them to overcome their current challenges and reach their future goals.

It uses a set of cards, through which players can **collaboratively create a path that leads them towards success**.

This a low-risk way to hack team culture encouraging teams to look at well-known problems through new lenses, and to imagine new approaches using resources already at hand.

Index of tools and personas

	Starter tools			Other priority tools					Recently recommended tools	
	Consequence scanning	Tarot Cards of Tech	Ethical Explorer	Agile Threat Modeling	Data Ethics Canvas	Interpret ML	Responsible Strategy	Unintended Consequences	Cards for Humanity	Learn from Experts
Farim is a senior leader	✓	✓	✓		✓		✓	✓		✓
Teresa is a policy maker	✓	✓	✓		✓		✓	✓		✓
Emilia is a project manager	✓	✓	✓	✓	✓			✓	✓	✓
Julius is a developer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Tools to get started

**Unsure where to start?
Begin to explore by trying one of these three tools that we found useful to take the first steps. They are perfectly suited to get you started with the topic of Responsible tech generally and are suited to be used in an inception or start of a product.**
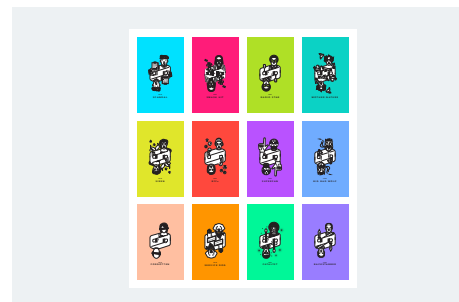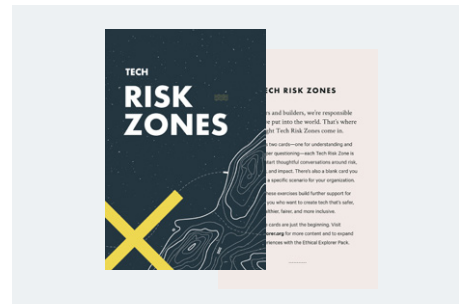
Ethical Explorer

The Ethical Explorer offers prompts (mostly based on the Ethical OS) and guidance which can be used in individual settings but also with the whole team and stakeholders. It helps start thinking about what ethics is and the various aspects of risk that might be relevant to consider with your product.

Consequence Scanning

Consequence Scanning supports teams to not only address the right questions but also empowers them to make the relevant changes. The structure will be very familiar and easily adaptable to any team that runs agile ceremonies such as team retrospectives.

Tarot Cards of Tech

Tarot Cards of Tech is a beautifully designed set of prompts that open up perspectives and help you to consider different view points. They pair well with creating "how might we" statements in ideation, and could provide great guiding questions to add to your processes.

Tools and frameworks in-depth

Agile Threat Modeling

By Thoughtworks

What is it?

Threat modeling is a risk based approach to designing secure software based on identifying threats and mitigations. Rather than creating and maintaining an exhaustive "threat model" we encourage teams to do threat modeling "little and often".

When should we use it?

Get your teams to all be in the habit of threat modeling every iteration. Bring the software delivery team together to brainstorm genuine security threats before they materialize.

Who should be involved?

Involve the whole delivery team in each session, which is to say both technical and nontechnical roles. For example, include business analysts and product managers to raise awareness and get the right risk perspectives. It can be the perfect opportunity to get insight from someone from the security team, but not required.
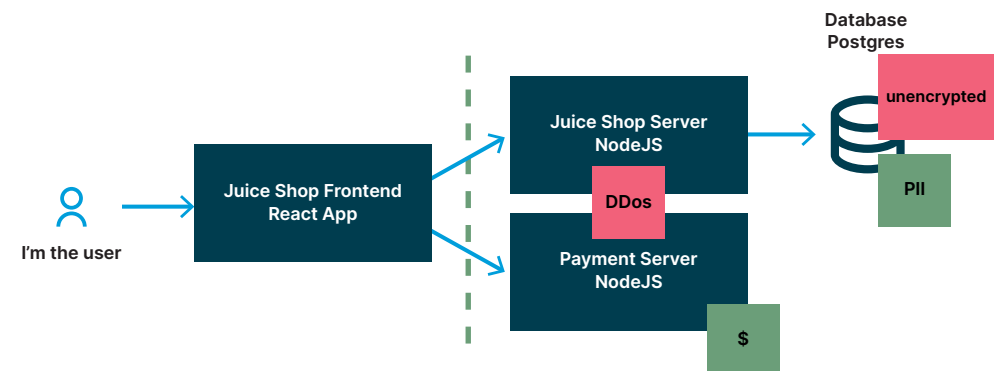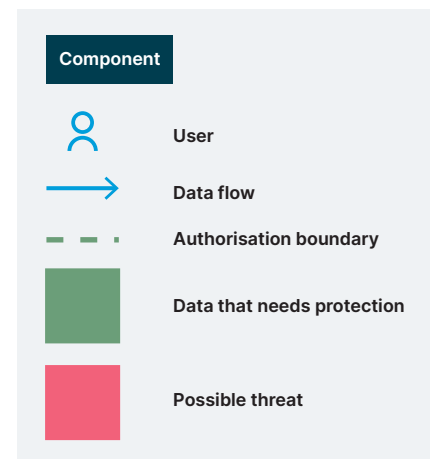
- Mitigate potential risks
- 1–2 hours per activity
- Interdisciplinary team

How does Agile Threat Modeling work?

1

Gather delivery team around a whiteboard for frequent, short threat modeling sessions asking:

- What are we building?
- What can go wrong?
- What are we going do about it?

2

Explain and explore by beginning to draw a 'lo-fi' technical diagram and include:

- Relevant components and users
- How data flows in different directions
- Label networks and boundaries
- Assets important to business value

3

Brainstorm threats using the STRIDE cards

- Coming up with ways to attack, break or frustrate a particular bit of software is threat modeling at its essence
- Capture the threats that are identified either on a board, stickies or online collaboration tool (ie. MURAL)

4

Prioritize and fix by sharing knowledge that is useful for prioritization

- Team should dot vote about three of the riskiest threats
- Identify which ones are the riskiest and document
- Take action by capturing steps to mitigate in your backlog

5

Wrap up and close

- Assign actions to members of the team
- Decide when the fixes could be implemented
- Try the method again once the initial fixes have been delivered

Thoughtworks' perspective

- Do not bite off too much at once! Pick an achievable scope
- Use the STRIDE cue cards to help brainstorm, and extend the cards with other dimensions (e.g. cards highlighted in this playbook)
- Make sure the actions go straight into the backlog

Explore further:

Full guide to Threat Modeling, including STRIDE cards (no download required)

Article by Jim Gumbley; Getting started guide

https://martinfowler.com/articles/agile-threat-modelling.html

Cards for Humanity

By Frog, a Capgemini company

What is it?

A set of cards that help you explore the different contexts and situations so you and your team can think out and design more inclusively. This tool will help to think about solutions that will meet the a wide variety of user scenarios.

Why use it?

It can help your team to think in different ways of solving issues for different people and contexts based on your product challenges. So it will help to prevent some biases and barriers in your product.

When?

It can be used at any time to practice your skills and understand different contexts. This tool will help in the ideation process so you can think out of the box while you're solving your product issues. This tool is also useful to help your team understand the importance of digital accessibility.

Who?

Involve your whole team to practice and benefit from understanding various context.
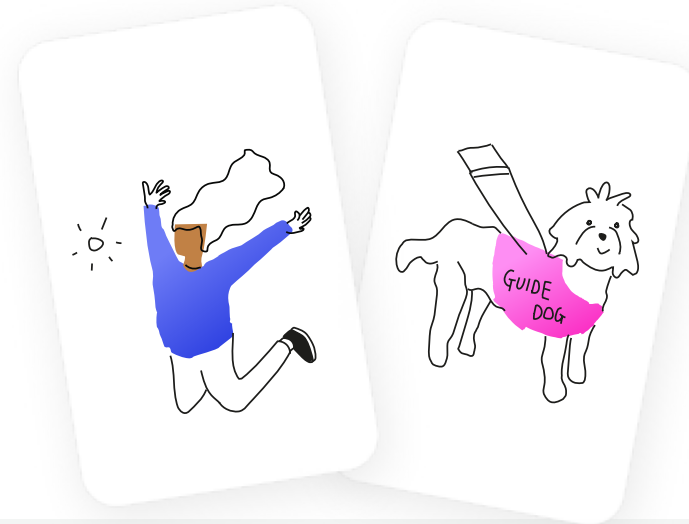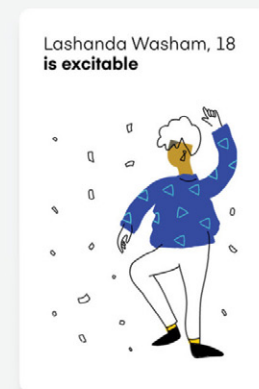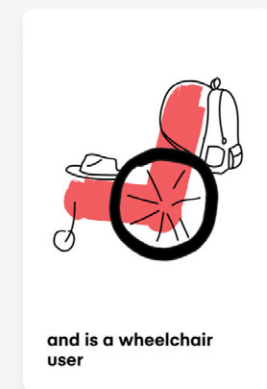
Mitigate potential risks

Open up perspectives

30 min to 1 hour workshop

Interdisciplinary team

How does Cards for Humanity work?

1

You can use Cards for Humanity to practice alone and also do a brainstorm workshop with your team

2

If you're preparing a workshop you can use a brainstorm template to create a copy or prepare your own. This activity typically takes about 30 minutes to 1 hour depending on how many people are participating

3

To start you'll click in "deal cards" that it will give you two cards, a persona and a trait. Together they make a random user scenario so you or your team can use it to test your product or to ideate solutions from different perspective

4

Click in "view needs" for each card to understand what you should consider in each scenario

5

You can swap out individual cards or deal again to get a new random scenario, this will depend on your strategy

6

Keep doing this until you feel comfortable with the solutions your team mapped or until the time is up

Tips

This activity will be more productive if you and your team understand what exclusions means and the types of disabilities. Remember, we need to first understand exclusions.

You can also use their plugin on Figma and use while you're designing interfaces.

Thoughtworks' perspective

The cards are a good way to help you and your team to avoid biases while you are ideation or improving your own product.

Explore further:

Cards for Humanity

Tool produced by **Capgemini** company

Consequence Scanning

By Doteveryone (now Open Data Institute)

What is it?

This kit provides workshop activities and materials that help teams consider the intended and unintended consequences associated with a technology or a service. It's a tool that can be used for all teams, across any domain. Participants should be as cross functional as possible: from technology, design, product, business, as well as users themselves.

It also provides a framework to prioritize issues teams might uncover as a result of the workshop.

In a structured session, the following questions are covered:

- What are the intended and unintended consequences of this product or feature?
- What are the positive consequences we want to focus on?
- What are the consequences we want to mitigate?

When should we use it?

It's designed to fit into the iterative agile process, so is suitable for multiple stages including the initial conception, roadmap planning and when new features are introduced.

- It's easy to use, with very comprehensive instructions
- Try to allow 1.5–2 hours for the session, otherwise it can feel rushed

Plug it into: vision, ideation, implementation, roadmap, or epic-level and project wrap-up (for sales follow-up) — make it a habit. It can become part of a team's normal activity, like a retro. The tool is reflective and well-balanced, action orientated, and team-empowering.

Who should be involved?

Core team, user advocates, collaborators such as technology or business specialists, senior product sponsors, collaborating senior stakeholders.
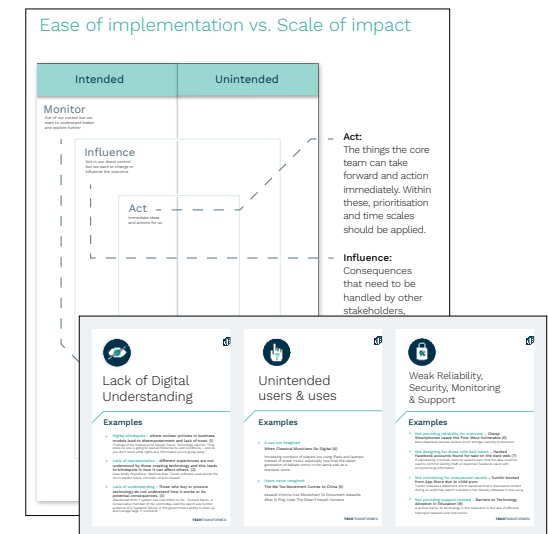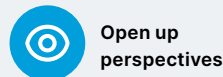
	Mitigate potential risks		Open up perspectives		1–2 hours per activity		Interdisciplinary team

How does Consequence Scanning work?

The method has two phases:

Phase 1

Ideation: Different questions and prompts to help uncover intended and unintended consequences (introduction, quiet time, affinity sorting and collecting).

Phase 2

Action: Sort outcomes into categories to help define an action plan (action sorting, dot voting, discussion and end).

Consider:

- If doing remotely, split into smaller groups and use a shared wall or whiteboard for each group. Choose a tool that accommodates real time collaboration

- Get different perspectives about your focus into the room. For example: people who have strong opposing views, or have experienced this 'feature', or who have never encountered it before. This helps drive out more richness in the analysis

Also include:

- How this relates to the UN's vision, mission and values

- Other tools or documents that support reflection and decisions

Thoughtworks' perspective

The prompts can be a little abstract and hard to connect to. Take time to collect the most relevant prompts so you can help participants relate. You can also use prompts from other tools such as **Tarot Cards of Tech**, **Ethical Explorer** and so on. However, it's an amazing Agile tool that fits well together with ceremonies such as retros and reviews.

The Agile Planning Onion

- Vision — At initial conception
- Roadmap — During roadmap planning
- Release
- Iteration — Every time a feature is introduced
- Daily

Consequence Scanning Recommended Structure

Phase 1 Ideation

1 Introduction Explain focus of event and post up intended consequences

2 Quiet time Ask participants Q1. Everyone takes quiet time to answer based on their expertise and experience

3 Affinity sorting Participants post up; similar ideas are grouped together

4 Quiet time Participants have another opportunity to add new consequences based on other posts

Phase 2 Action

5 Action sorting Sort the consequences into action categories – act, influence or monitor

6 Dot voting Once sorted, ask Qs 2 & 3. Everyone can vote all at once on the posts

7 Discussion What do the consequences you can act on mean for your product? Are there any quick wins? Assign responsibilities.

8 End Thank everyone for participating

Data Ethics Canvas

By Open Data Institute

What is it?

A collection of questions, which aim to prompt discussions so that teams consider how data is to be collected, shared or used.

Aims:
Find a balance between data 'fearing' and data 'hoarding'

- Consider impacts on people
- Encourage trust and be transparent

Outcome:
Produce a prioritized and assigned list of actions.

Why use it?

Helps to identify potential ethical issues in data usage, and what mitigating actions could be taken.

When should we use it?

Ideally at the start of a new project, but still helpful later.

Who should be involved?

Activity is best for a diverse group.
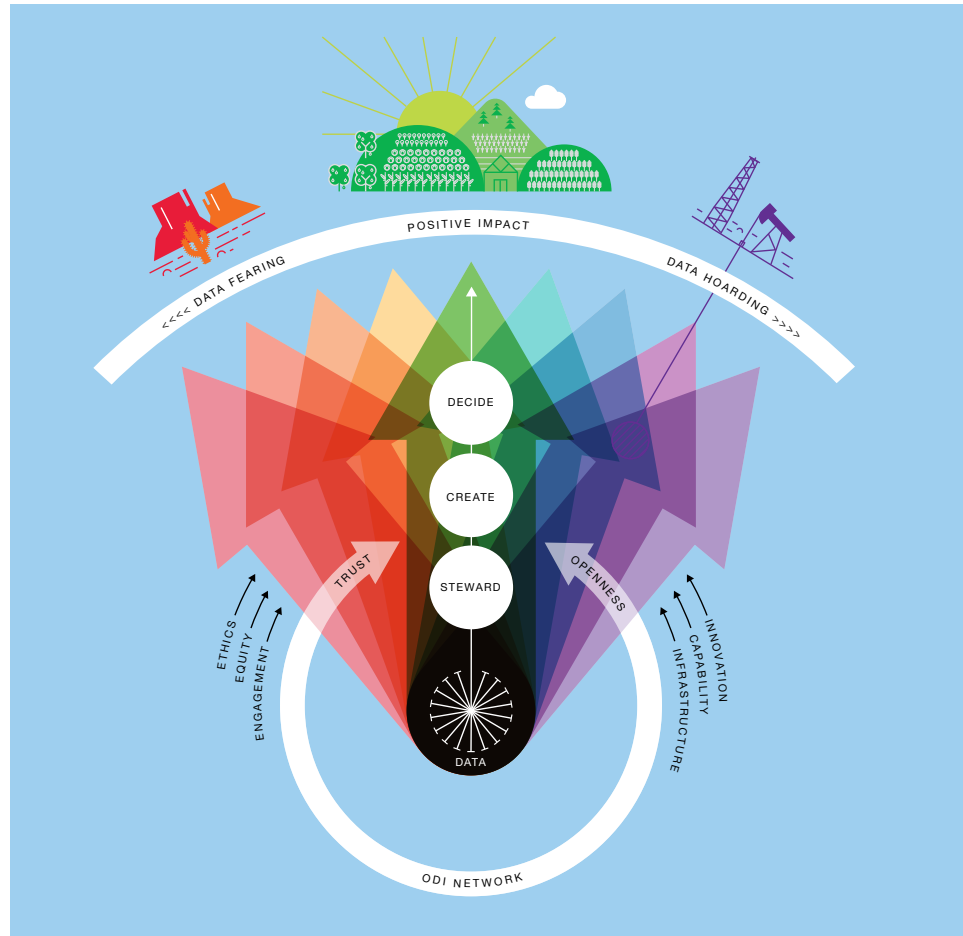
Mitigate potential risks	**Open up perspectives**	**1–2 hours per activity**	**Interdisciplinary team**

How does Data Ethics Canvas work?

You can start anywhere on the canvas and complete the sections in any order.

1

For each section, take time to consider your answers. It helps to note them on sticky notes and stick them to the sections as you go.

2

When you have completed the canvas, outline next steps and ensure there is a person responsible for each action.

3

Where you can, share and discuss your responses with others.

4

Share notes about the discussion more widely if you can.

Thoughtworks' perspective

- Document your notes and actions
- Complete the canvas in a group with a range of people
- Be aware of how power dynamics in the group might impact the exercise
- Revisit the answers and actions regularly

Explore further:

https://theodi.org/wp-content/uploads/2019/07/ODI-Data-Ethics-Canvas-2019-05.pdf

Produced by the **Open Data Institute**. Licensed under a Creative Commons Attribution-ShareAlike 4.0 UK International Licence

Ethical Explorer

By Open Data Institute

What is it?

A set of cards that help you explore the different risk zones that might arise from your software product. Using the metaphor of an explorer and risk zones as the terrain, imagine the current landscape that your own product or service resides in and scout the potential dangers that could lie ahead. It is similar to Ethical OS, so both methods should be tried and compared.

- Using metaphors and prompts to help you identify areas where your product has risks and the actions you can take to mitigate them
- Can be used in any domain

Why use it?

Encourages thinking beyond the normal project risks by providing questions that will open up discussion about identifying what those dangers could be and what to do thereafter.

When?

Could be used at any stage of product delivery, however the earlier the risks are identified the easier they will be to mitigate.

Who?

Should include senior stakeholders during earlier stages of a project, while it can also be used during any stage with a cross functional team (two or more people).
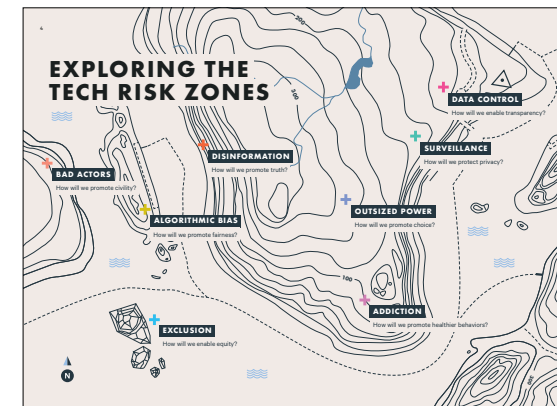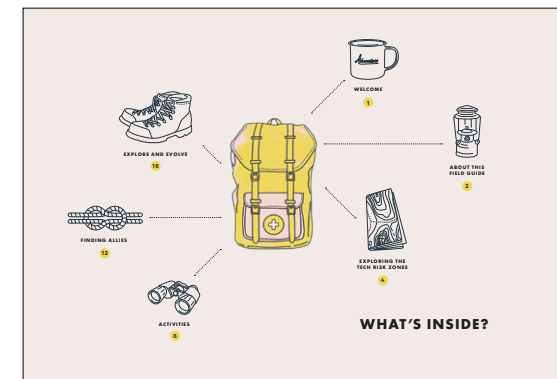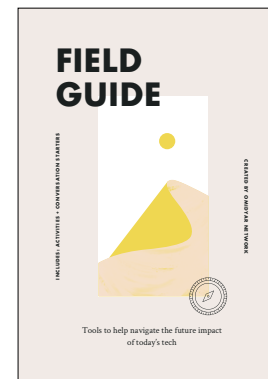
| Mitigate potential risks | Open up perspectives | 1–2 hours per activity | Interdisciplinary team |

How does Ethical Explorer work?

1

Start with a warm up exercise by having each participant go through the cards independently, and then share with the group an example of a product that has potential risk that could go under one or more of the risk zones.

2

Continue by getting the participants to think about which of the risk zones the product or service could fall under. Have them pick up to three of the zones.

3

Next, pick the top zone or zones chosen by the group, and begin to brainstorm using the prompts on the back of the cards.

4

Discuss the results and ask the group 'How could this affect the product/service over time? Which is most detrimental?'

5

Decide how to prioritize issues by dot voting: You might ask "Which has the most detrimental effects?" or "Which is easier to change?"

6

Brainstorm on ways to mitigate those issues as a group and steps toward those actions.
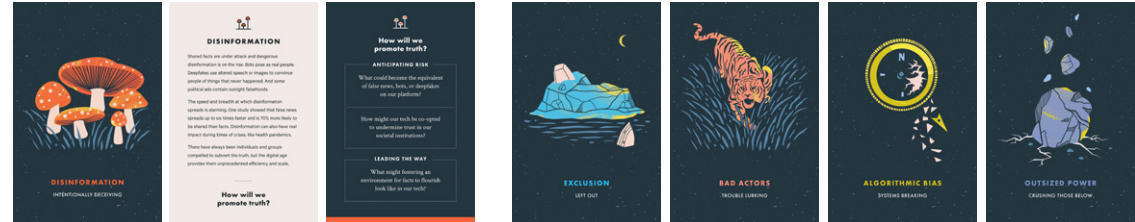
Thoughtworks' perspective

The cards are a good iteration to the EthicalOS, giving more guidance on how to apply it. Further, the imagery and metaphors used are well suited and encourage people to explore the topic. Various examples on how to apply the cards, whether tackling alone or as group activities, give a good grounding.

Explore further:

https://ethicalexplorer.org/download/

Tool produced by **Omidyar Network** and **Artefact**.

InterpretML

By Microsoft Research

What is it?

InterpretML is an open-source library that enables stakeholders to understand and explain the predictions of machine learning models. Its goal is to debunk the trade-off between predictive power and explainability. InterpretML provides state of the art methods (extending beyond LIME and SHAP) for demystifying an existing model's behavior, in addition to building brand new, transparent models.

InterpretML capabilities:

- Build 'glassbox' models that are explainable from the ground up and even editable by domain experts
- Users can also bring their own blackbox models and conduct post hoc explainability analysis
- Develop explanations for overall (global) model behavior as well as individual (local) predictions
- Drill down into subsets of predictions and conduct counterfactual (what-if) experiments
- Incorporate complementary frameworks for AI fairness such as Fairlearn and AIF360

Why use it?

For developers and data scientists, ML interpretability is often crucial for debugging models, ensuring responsible predictions, and even protecting against adversarial attacks. For management and regulators, these tools help clarify product trustworthiness and support auditing for regulatory compliance.
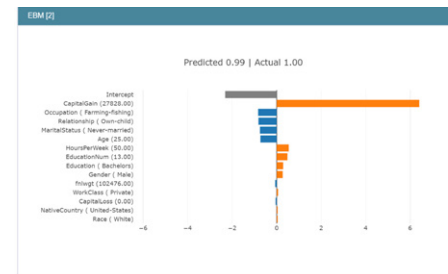
InterpretML: Local Explanation

When?

Especially vital for high-risk applications (e.g. safety-critical or impacting social inequality).

With whom?

Team members with Python knowledge and context about the data.
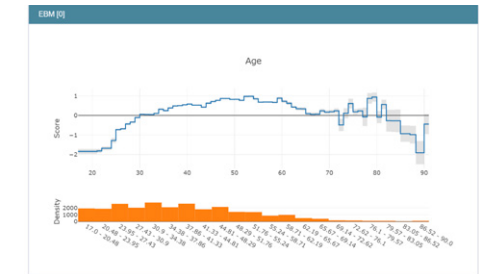
InterpretML: Explainable Boosting Machine (EBM) analysis

◎	**Open up perspectives**	🕐	**1–2 hours per activity**

👥 **Interdisciplinary team**

How does InterpretML work?

1

Follow the Getting Started guide for **InterpretML**.

2

Consider *starting with* InterpretML's glassbox models such as an Explainable Boosting Machine (EBM).

3

Alternatively, bring your own arbitrary model then run post-hoc blackbox explainers (e.g. SHAP Kernel Explainer) to analyze model behavior.

4

Analyze local and global explanations.

5

Using the InterpretML dashboard, conduct what-if investigations interactively by editing data points and visualizing new outcomes and explanations.

InterpretML: Investigating the impact of a feature (Capital Gains in this example) for predicting the income of an individual. Data sample proportions are also automatically displayed for each rule.

Thoughtworks' perspective

InterpretML makes Responsible AI convenient and accessible to stakeholders without advanced statistics knowledge, while still remaining technically rigorous. As interpretability can be relevant to issues of fairness, we recommend adding depth to your analyses and even algorithmically mitigating unfairness by integrating with fairness frameworks such as **Fairlearn** where applicable.

Explore further:

https://interpret.ml

Complementary Tools:
Fairlearn, **PRESC**, **Google What-If Tool**

InterpretML is licensed by **Microsoft** under the **MIT License**

Analysis and images based on the Adult Income Dataset from Dua, D. and Graff, C. (2019). UCI Machine Learning Repository [**http://archive.ics.uci.edu/ml**]. Irvine, CA: University of California, School of Information and Computer Science.

Learn from the Experts

By Microsoft

What is it?

Learn from Experts is a good activity to learn from people who experience disability or exclusion so your team can be prepared to understand what exclusion looks like and how it impacts people's routine.

Why use it?

It can help your team to get oriented in the beginning of the project and help them to be more familiar with exclusion, people with disabilities and underrepresented groups.

When?

In a design phase for a policy proposal, this tool will help to integrate the challenges and complexities of its implementation. The playbook will help to think systematically about the consequences of your actions (or inaction).

With whom?

Can include directors, pointees, and elected officials as well as junior employees and public servers that may be related to the tool or policy's design or implementation.

◎ Open up perspectives	🕐 30 minutes to 1 hour per interview	👥 Interdisciplinary team

How does Learn from the Experts work?

1

Before beginning, complete accessibility sensitivity training.
If your team does not have it yet, you can use those materials as reference:

   a. Disability Sensitivity Guide
   b. Disability Sensitivity Training

2

Interview people who have a variety of abilities and permanent disabilities that exclude them from activities.
If you already have done this before, try to map the group that you have less information about or that is extremely necessary for this project phase

3

During your conversations, make note of the following:

   a. What strengths and abilities do they show regularly?
   b. What is their motivation or goal for doing their daily tasks?
   c. What themes are similar between their permanent disability and those that are temporary or situational?
   d. What are the specific challenges of their interactions?
   e. How might you get the best sense of their daily interactions with people or technology?

Tips

Ask your network, peers, local academic community, or nonprofit organizations if they can introduce you to people with disabilities and neurodiversities.
Make sure that your team is using accessible softwares and giving the same experience/conditions for everybody.

Thoughtworks' perspective

The interviews are a good way to make your team more familiar with different perspectives and diversity. Further, it can be used to explore not just diversity but the user experience through your product and other similar products. There are plenty of examples and ways of asking questions so you could try to use this time to add some business hypothesis validation and map some personas.

Explore further:

Inclusive Microsoft Activity Cards

Tool produced by **Microsoft**

Responsible Strategy

By Doteveryone (now Open Data Institute)

What is it?

Seven questions that can be used as a starting point for decision-making and objective setting that will move your organizational, team or product behavior closer to the values you want to uphold. Facilitates how values might become real, by translating them into principles and measurable KPIs and cross-checking for unintended consequences.

A useful questionnaire that can carve out fundamental building blocks for other discovery and delivery methodologies like Lean Value Tree or OKR.

Why use it?

Understanding, clearly articulating, and committing to your organizational values is the first step to better business planning and more responsible metrics. Principles and KPIs can provide a guide for the collective responsibility of those within the organization for the products they put into the world.

When?

Project start (e.g. add-on to normal vision and mission session)

With whom?

Team and management.

Use as a starting point for decision-making and objective-setting to move closer to the values you want to uphold in the organization and/or project.

Responsible Digital Metrics

Responsible Strategy

TECHTRANSFORMED

Start with values

by: **doteveryone**
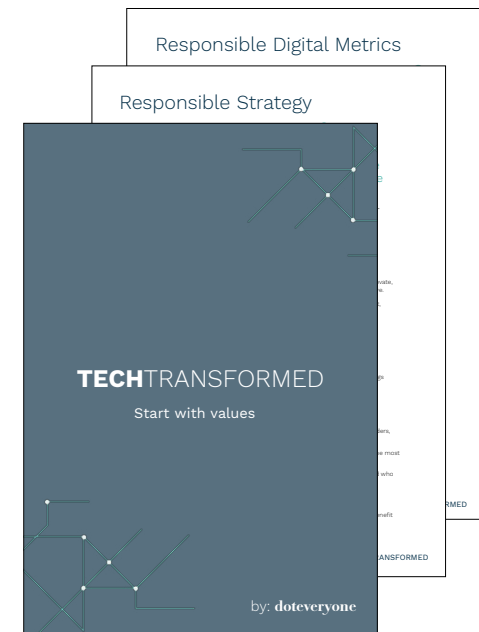
Unpack stakeholder values	1–2 hours	Interdisciplinary team	Senior stakeholders

How does Responsible Strategy work?

1

Most likely integrate into inception phase

2

Either do one-to-one interviews or give as "homework" to team

3

Collect answers in group session and consolidate

4

Document and make transparent going further in the project to underpin decisions

5

Review midway through the project.

Responsible Digital Metrics

Responsible Strategy

Understanding, clearly articulating, and committing to your organisational values is the first step to better business planning and more responsible metrics.

Below are questions that can be used as a starting point for decision-making and objective setting that will move your organisational, team or product behaviour closer to the values you want to uphold.

○ **What do you value most?**
Start internally, and pragmatically. This might be your craft, your ability to innovate, your colleagues and collaborators, the investment, or the opportunity you have.
And externally, what do you work the hardest to maintain? This might be trust, sustainability, reliability, or security. Or it might be reputation, profit margin, or pipeline.
How do these translate into values for your organisation that you can tell stories around?

○ **What behaviours do you value?**
What are the adjectives that describe the ways you or your team achieve things when you're at your best?
What do you look for and champion in others?

○ **Who do you value most?**
Who is most important to you — is it your shareholders, investors or stakeholders, your workforce, your customers or your clients?
If it's your customers or clients, then be specific about which segment: is it the most vulnerable, the most engaged, or the most profitable?
When you need to compromise, who do you feel comfortable benefitting, and who do you feel comfortable disadvantaging?

○ **What value do you create?**
If you know what you value, and who you value, then you need to ask what benefit you provide to those people.

TECHTRANSFORMED

Thoughtworks' perspective

- Creates deep understanding of underlying organizational principles and values
- Groundbreaker for further facilitation
- Identify KPIs connecting progress on vision to value
- Good to include early in the process as well as with key-stakeholders
- Be aware, the open question format needs to be structured and condensed

Explore further:

Question sheet: https://www.tech-transformed. com/download/1008/

Review your values and metrics: https://www.tech-transformed.com/strategy/

Produced by **Doteveryone** (now maintained by the **Open Data Institute**).

Tarot Cards of Tech

By Artefact

What is it?

The Tarot Cards of Tech are a brainstorming exercise to encourage creators to think about the true outcomes technology and products can create, from unintended consequences to opportunities for positive change. Each card contains a provocation, covering topics such as:

Usage. How could your product impact cultural habits and relationships? How could your product be used in ways (or by people) you haven't considered?

Equity and access. What users are excluded? What would their experience be like?

Scale and disruption. What would using your product 'too much' look like? What would you change if your client was Mother Nature?

Why use it?

To expand your thinking on the impact your product / technology can have from differing perspectives, to drive teams to make intentional decisions.

When?

This tool would be great at early stages of product ideation (e.g. during an inception). Could also be used at the 'inception' and 'epic' level.

With whom?

Include the whole team — including stakeholders.
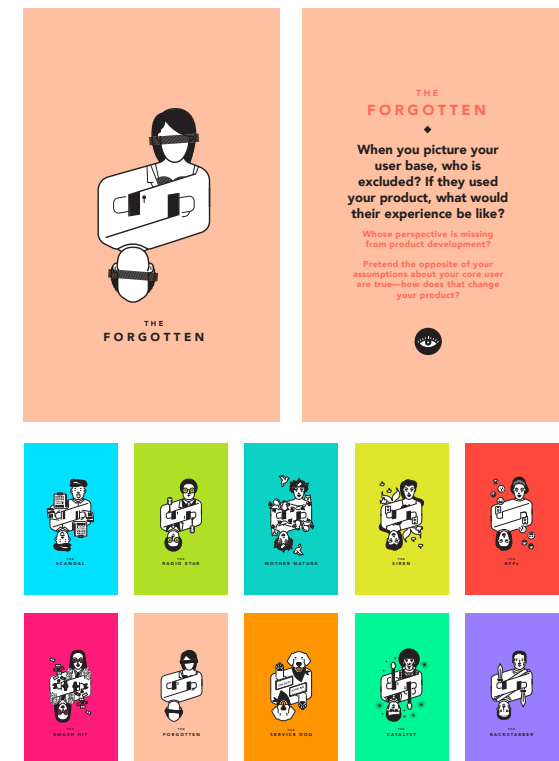
Open up perspectives	1–2 hours per activity	Interdisciplinary team

How do the Tarot Cards of Tech work?

This is a brainstorming exercise, intended to generate conversation so teams think bigger picture and longer term about the products they put out into the world.

1

Download and print the cards.

2

Break into smaller groups – we divide up the cards among the groups by theme.

3

Pick a card and read to the group–card contains a provocation to help teams see a product from different perspectives.

4

Discuss the questions it poses, taking notes (for playback!)

5

Share back with broader group, and remember to capture any actions out of the discussion.

You may want to consider:

- Breaking into small groups and holding a playback discussion
- How will you take actions based on your findings — make a plan
- Pick the most relevant cards and do a deep dive

How could you apply this?

- During design process, or persona creation
- For strategy or new ideas, especially during design sprints
- Brainstorming negative consequences
- Out of the box thinking / out of the ordinary
- Noticing blind spots
- Identifying edge cases/behavior

Thoughtworks' perspective

It's a short session, easily possible, and the cards provide a good range of provocations. At times the cards could do with more clarity but do well to trigger conversations. Ensure there's a balance between 'worst-case scenarios' and 'good opportunities' — even though the 'evil' cards like Backstabber seem to generate more thinking and conversation.

Explore further:

(cards available)

http://tarotcardsoftech.artefactgroup.com/

Produced by **Artefact.**

Unintended Consequences

By Hiper Island

What is it?

In this workshop, groups examine the unintended consequences of new technologies and use those to inspire potential business opportunities. The workshop builds on the idea of "unintended consequences" as a starting point for generating ideas. It looks beyond the common understanding of new technologies, challenging participants to discover unexpected potential and how it might be harnessed. For instance, Instagram was created as a virtual photo album for smartphones, but through the human connection between the people who use it, it has the potential to affect something as deep as our grieving and healing process, as a recent example of this widowed writer shows.

https://www.nbcwashington.com/news/local/griefstagram-could-be-the-future-of-mourning-on-social-media/29415/

Why use it?

Use this tool to demonstrate what happens when products are not built responsibly. This tool will convince your team to consider ethics, create sense of urgency to look at potential areas in your solutions and make ethics a priority in your organization.

Open up perspectives	**1–2 hours per activity**	**Interdisciplinary team**

How does Unintended Consequences work?

1

Begin by organizing the team into small groups of three to five. Introduce the purpose of the activity by sharing an example or getting the groups to share their own, relating stories about unintended consequences in technology.

2

Give groups five minutes to create a list of at least five new technologies or businesses, such as Netflix, Instagram, Google Maps, etc. To add a level of challenge, have participants list only technologies widely used by demographics other than their own. Write them down on sticky note (one per sticky note).

3

Next, brainstorm. For each new technology everyone should speculate on at least three unintended consequences. Encourage people to think creatively and stress that there are no wrong answers. Each group shares their ideas after ten minutes. Example: Netflix and binge-watching

4

In smaller groups, think of a new model for each unintended consequence. For the Netflix example, a new model might be free shows when users only watch one per day. Again, there are no bad ideas. Share back after 12 minutes.

5

Ask the participants to reflect on the most unexpected and most viable new business model and why? They can also reflect what this exercise taught them about ideation and new business models.

Thoughtworks' perspective

- You can run this workshop to uncover some of the possible ramifications of your new business plan or idea
- To do that, in step two, skip listing new technologies or businesses, and explain your solution to the group, including your identified challenges
- After this workshop, many patterns emerge regarding how technology or business can potentially harm society. Participants generally reflect on their new business model, but not on unintended consequences of them. As there are not many tools that bring this discussion to the fore, particularly in connection with business models, this is a big plus

Explore further:

http://toolbox.
hyperisland.com/
unintended-
consequences

Produced by
Hyper Island.

Further methods and materials

Polarity Thinking

Most ethical practice will lead to tensions between competing values. These polarities (sometimes also called wicked problems, complex problems, dilemmas, paradoxes, tensions etc.) cannot be solved like a conventional "problem," i.e. working out which of the two options is the "solution" and then going for it. Instead, they need to be managed in a "different" way. Methods and mindsets based on Polarity Management, which was made popular by Barry Johnson in the nineties, can help with this.

Explore further:

Polarity Thinking Polarity Mapping Overview by Neesa Sweet

http://braidedrivergroup.com/wp-content/uploads/2011/04/Polarity-Thinking- Overview.pdf

Barry Johnson (2014). Polarity Management: Identifying and Managing Unsolvable Problems. HRD Press.

Hands on POLARITY THINKING - Leveraging Difference for Innovation by Coreative

https://www.wearecocreative.com/pot-of-gold

Humane Design Guide

The Human Design Guide by Center for Humane Technology explores how we can build technology that doesn't exploit but does support us. A worksheet to help you take meaningful steps towards designing a more humane product and to identify where investing in a deeper understanding of human nature will yield further benefits. It leads you through an assessment of the six human sensitivities and helps you take action with your team. It has two pages, one to assess the current state of your product and one to ideate on.

While the worksheet isn't the answer to all problems, the whole field around Humane Design is an important field to be aware of.

Explore further:

https://humanetech.com/designguide/

Humane by Design (https://humanebydesign.com/) provides a resource that provides guidance for designing ethically humane digital products through patterns focused on user well-being.

Speculative design / provocations

This is especially interesting for designers. Normally, design and designers are problem solvers, focused on making a product better or more beautiful, or to make a process more efficient, but here, instead of solving problems, they pose them.

Design is used to imagine how that future might be entirely different, to make scenarios experienceable that help to illuminate (or make visible) moral, ethical, political and aesthetic problems. How does this idea work for a black guy? A white woman? For a child in a wheelchair? For a very rich — or for low-income family? Who else is going to be touched by this innovation?

Bracketing

Bracketing is a method used in qualitative research to mitigate the potentially deleterious effects of his or her presuppositions, biases, assumptions, theories, or previous experiences.

This method can also be used during the development process. Designers and developers make notes, like architecture decision records (ADR), whenever they sense that one of their own biases might have influenced their decision. Such a list can then later be be used for a wider discussion as well as to check and alter algorithmic outcomes.

Explore further:

https://uxplanet.org/can-speculative-design-make-ux-better-design-trend-4-4-ce8d13148e5d

Explore further:

https://www.researchgate.net/publication/257924681_Bracketing_in_Qualitative_Research

Participatory design methodology

Previous examples have mostly been tools, whereas participatory design is more of a methodology and philosophy of how to design. The main takeaway is participants being far more involved — more than just asking them what they want, in PD users are owners of the content and process. This recognizes that users are the experts, we are facilitators helping them get their answers and ultimately they should have more power in product design.

Explore further:

https://en.wikipedia.org/wiki/Participatory_design

Other approaches to explore

Our guide is not a definitive list, and there are a growing number of methods and tools available. **Continue your journey of Responsible tech development by exploring these additional tools and resources.**

- AI blindspot cards by MIT Media Lab — Identifying blindspots during planning, building and deploying of an AI product

- AI ethics cards by IDEO — a collection of questions, methods and examples that help interdisciplinary teams stay human-centered

- Ethics Canvas by the ADAPT Centre for Digital Content Technology — adapted from Alex Osterwalder's Business Model Canvas

- Equity-Centered Community Design field guide by Creative Reaction Lab — An equity-centred problem solving process focused on co-creating with the community

- Future Wheel by Jerome C. Glenn — Brainstorm the tertiary unintended or unforeseen effects of a product

- Inverted behavior model by Katherine M. Zhou — Invert BJ Fogg's behavior model by designing for the unintended behavior

- Ethical and rights-based AI approaches by BKC for Internet & Society — a map of the various AI principles and guidelines

- Consideration cards by Katherine M. Zhou — helps to identify negative collateral and undesirable side-effects for users

- Privacy by Design by Ann Cavoukian — it calls for privacy to be taken into account throughout the whole engineering/design process

- Green Patterns: Helping users make more sustainable choices by Tim Frick

- Systemic Design Framework by UK Design Council

Conclusion

The future is our responsibility

As you can see, Responsible tech is not the work of a single individual or team. It requires collective action, collaboration and multidisciplinary perspectives. By observing how the personas and focus areas reflect on the UN's current challenges, we can foster a more inclusive dialogue, building a vibrant and transformative ecosystem which empowers us all.

We encourage you to take this playbook as a starting point in your journey and embark on this mission together. We have a role to play at the forefront of this dynamic and complex technology shift.

Please explore the additional materials, connect with passionate individuals, and contribute in the learning communities dedicated to Responsible tech.

By taking part on this movement, you are helping to create a future where technology serves humanity and the planet as a whole.

Appendix

In this appendix, you will find additional information and resources to dive deeper into the Responsible tech topics.

Lightning talks

Thoughtworks ran a series of lightning talks for the UN related to Responsible tech topics. Here are the links to access them.

Speaker	Video	Slides
Cameron Casher	Clean Tech 101: Green Software Principles	View the slides
Alexander Steinhart	Intro to Responsible Tech	View the slides
Nagarjun Kandukuru (Nag)	AI & Algorithmic Bias: Cautionary Tales	View the slides
CeeCee O'Connor	Designing Tech with Values	View the slides
Julien Deswaef	Social Change & Responsible Tech	View the slides
Nina da Hora	Responsible AI: Prioritizing Ethics and Accountability	View the slides
Matthew Johnston	The Impact of AI on Accessiblity	View the slides
Julia Bezerra de Souza Godeiro	Digital Acessibility: Where to Begin	View the slides
Kelly Cronin	Responsible Tech & ESG Reporting	View the slides
Erin Nicholson	Data Protection	View the slides

Blogs

Data and AI

How to build explainability in a machine learning project

If we want to use algorithms responsibly, we need to prioritize explainability

Gender-inclusive products

Gender-inclusive language in web apps

Gender-inclusive language in digital products part 1

Gender-inclusive language in digital products part 2

Security

Free for Open Source Application Security Tools

A Guide to Threat Modelling for Developers

Towards a secure path to production

Hostile tech: Confronting challenges in security, ethics and privacy

Books

- Practical Data Privacy (by Katherine Jarmul)

- Building For Everyone: Expand your market with design practices from Google's product inclusion Team by Annie Jean-Baptiste

- Mismatch: How inclusion shapes design by Kat Holmes

- The technology trap (by Carl Benedikt Frey)

- Handbook of tech ethics (by Armin Grunwald)

- The myth of digital democracy (by Matthew Hindman)

- Technosystem — the social life of reason (by Andrew Feenberg)

- Future Politics (By Jamie Susskind)

Additional articles

- The Role of Ethics in Modern Digital Business
- How to build explainability in a machine learning project
- If we want to use algorithms responsibly, we need to prioritize explainability
- The responsible organization
- How to drive sustainability through responsible tech in your organization
- The journey to becoming a responsible tech organization
- Microsoft Inclusive Design
- IEEE's Ethically Aligned Design: Prioritizing Human Wellbeing with Autonomous and Intelligent Systems
- Guide to Responsible Tech: How to get involved and build a better tech future by All Tech is Human
- Teaching responsible computing playbook by Mozilla
- The business case for AI ethics by All Tech is Human
- A general ethical and humane tech reading list

Sustainability: Additional information

Green software principles

Carbon efficiency

Being carbon efficient is about building applications that add the same value for you or your users but which emit less carbon.

Greenhouse gases are a group of gases contributing to global warming. Carbon is often used as a broad term to refer to the impact of all types of emissions and activities on global warming. CO_2eq is a measurement term used to measure this impact.

The international community, in groups such as the UNFCCC, has come together to limit the impact of global warming by reducing emissions, aiming for a 'preferable' lower limit of 1.5°C. This was agreed through the UN IPCC in 2015 in the Paris Climate Agreement and is monitored at the regular COP event.

Everything we do emits carbon into the atmosphere, and our goal is to emit the least amount of carbon possible. This constitutes the first principle of green software: carbon efficiency, emitting the least amount of carbon possible per unit of work.

Energy efficiency

Green software practitioners take responsibility for the energy consumed by their products and design them to consume as little as possible.

Electricity is a proxy for carbon, so building an application that is energy efficient is equivalent to building an application that is carbon efficient.

Green software takes responsibility for its electricity consumption and is designed to consume as little as possible.

Quantifying the energy consumption of an application is a step in the right direction to start thinking about how an application can operate more efficiently. However, understanding your application's energy consumption is not the only story. The hardware your software is running on uses some of the electricity for operational overhead. This is called power usage efficiency (PUE) in the cloud space.

The concept of energy proportionality adds another layer of complexity since hardware becomes more efficient at turning electricity into useful operations the more it's used.

Content from learn.greensoftware.foundation

Hardware efficiency

The hardware used in the process of creating your software is an important element to consider for a Green software practitioner.

Embodied carbon is the amount of carbon pollution emitted during the creation and disposal of a device.

When calculating your total carbon pollution, you must consider both that which is emitted when running the computer as well as the embodied carbon associated with its creation and disposal.

Extending the lifetime of a device has the effect of amortizing the carbon emitted so that its CO2eq/year is reduced.

Cloud computing is more energy efficient then an on-premise server as it can apply demand shifting as well as demand shaping.

Carbon awareness

Carbon awareness means understanding that the energy you consume does not always have the same impact in terms of carbon intensity.

Carbon intensity varies depending on the time and place it is consumed.

The nature of fossil fuels and renewable energy sources means that consuming energy when carbon intensity is low increases the demand for renewable energy sources and increases the percentage of renewable energy in the supply.

Demand shifting means moving your energy consumption to different locations or times of days where the carbon intensity is lower.

Demand shaping means adapting your energy consumption around carbon intensity variability in order to consume more in periods of low intensity and less in periods of high intensity.

Content from learn.greensoftware.foundation

Measurement

A total amount of emissions is only one metric that describes the state of a software application. To make the right decisions, you need to look at many different metrics.

The Greenhouse Gas (GHG) protocol is a metric for measuring an organization's total carbon emissions and is used by organizations all over the world.

The GHG protocol puts carbon emissions into three scopes. Scope 3, also known as value chain emissions, refers to the emissions from organizations that supply others in a chain. In this way, one organization's scope 1 and 2 will sum up into another organization's scope 3.

Calculating software-driven emissions using the GHG protocol is possible but can be difficult for open-source software.

The Software Carbon Intensity (SCI) Specification is a metric designed specifically to calculate software emissions and is a rate rather than a total.

The functional unit of measurement, to determine how the software scales, is not prescribed in the SCI and you should choose something that reflects your application.

Climate commitments

The terms "net zero", "carbon neutral", "carbon negative" and "climate neutral" have been used interchangeably with the primary objective to remove, reduce and prevent carbon emissions.

There are a number of methodologies commonly applied to help in the overall fight against climate change. These fall into the general categories of carbon elimination (also known as 'abatement'), carbon avoidance (a.k.a. 'compensating'), or carbon removal (a.k.a. 'neutralizing').

Abatement includes increasing energy efficiency to eliminate some of the emissions associated with energy generation.

Compensating includes the adoption of renewable energy sources, sustainable living practices, recycling, planting trees etc.

Neutralizations refer to the removal and permanent storage of atmospheric carbon to counterbalance the effect of releasing CO_2 into the atmosphere.

An organization can call itself Carbon Neutral when its total emissions are matched by the total of its emissions offsets through carbon reduction projects.

Content from learn.greensoftware.foundation

Sustainable tech: Additional resources

Tools	Resources	References	Methodologies
Research, tools, code, libraries, and training for building applications that emit less carbon into our atmosphere	Value resources including trainings, catalogs, lists, and references to gain a fundamental understanding of Sustainable Tech and Green Software	Reading, insights, reports, and presentations to reference or broaden knowledge around new and emerging topics	Standards, specifications and methodologies that are commonly used and adopted to measure and understand carbon emissions
• Cloud Carbon Footprint (CCF)	• Green Software For Practitioners Course by GSF and Linux Foundation	• 2023 State of Green Software Report	• Greenhouse Gas (GHG) Protocol Standards
• AWS Customer Carbon Footprint Tool	• Green Software Principles Learning Platform	• Forecast of Green Clouds Article	• Software Carbon Intensity (SCI) Specification
• Microsoft Emissions Impact Dashboard	• Green Software Patterns Catalog	• Getting to Grips with Green Cloud Article	• CCF Methodology
• Google Carbon Footprint	• Awesome Green Software List	• Perspectives: Digital Sustainability	
• Scaphandre - Power Measurement	• W3C Sustainable Web References		
• Carbon Aware SDK			
• CO2.js			

A future we want:
Responsible tech for a sustainable world

In the midst of the technological revolution, the need for careful, responsible management of technology is paramount. Technology serves not only as a tool but also as a reflection of our societal dynamics.

Aligned with the United Nations' ethos, our 2030 SDG goals and UN Global Compact, our playbook advocates for the responsible use of technology. This means harnessing its transformative power to foster sustainability, equity, and fostering synergies among various stakeholders.

Responsible tech (RT) is a mindset that aligns technological innovation with human rights and public governance. It actively promotes social justice, inclusivity, and democracy, while being cognizant of potential risks and seeking to mitigate them.

We must remember that every technological decision we make has far-reaching implications for our global community. Hence, the UN encourages adoption of these Responsible tech guidelines as part of our collective responsibility towards an inclusive, sustainable digital future.

RT is more than technical compliance; it is a reflection of our commitment to human rights, peace, and equality. It ensures our digital advancements serve the broader UN values, improve lives, and mitigate potential pitfalls.

In conclusion, Responsible tech aligns our digital actions with our overarching mission: to foster a peaceful, just, and sustainable world.
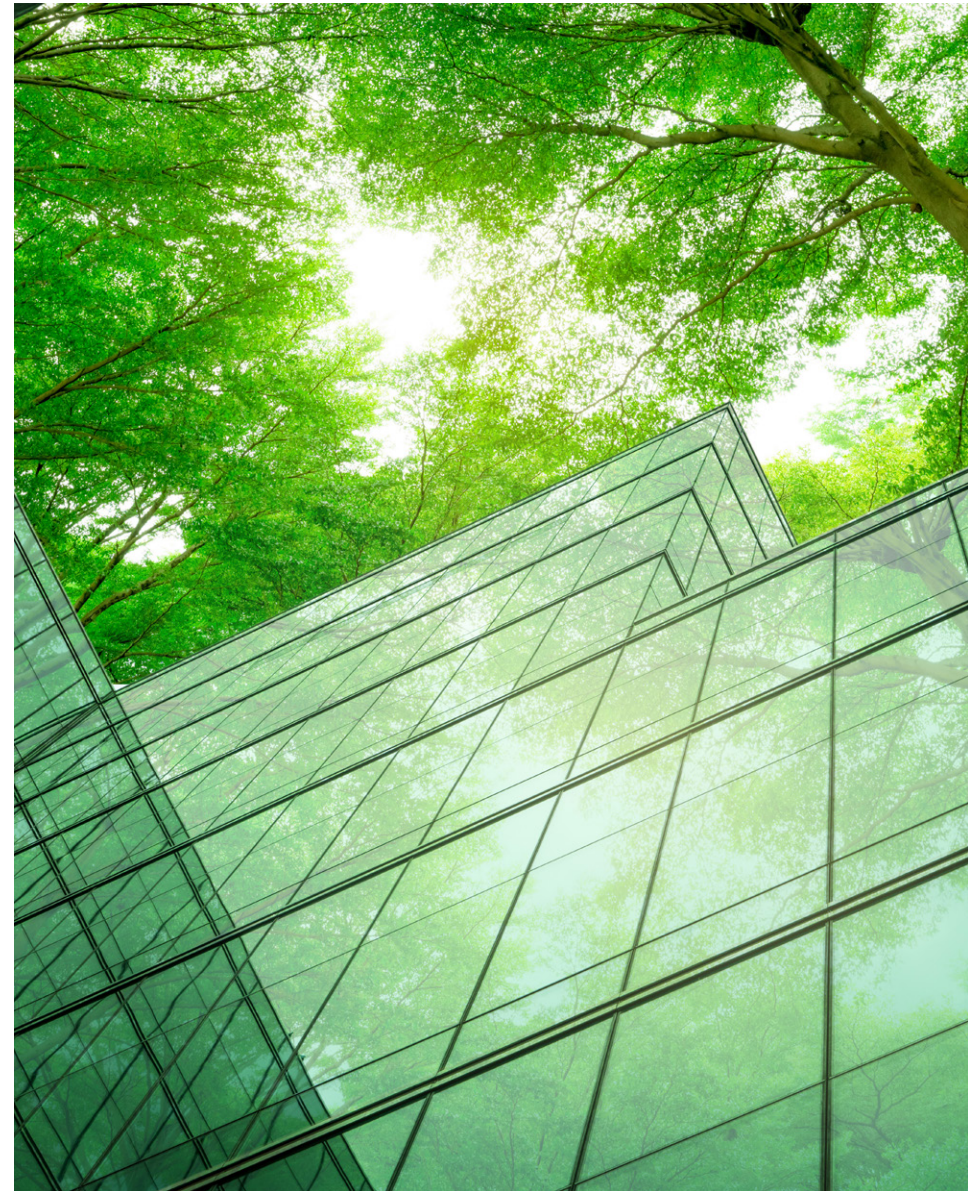
Data and AI: Additional information

Additional principles for consideration

Framing data ethics in social justice

Working with the Alan Turing Institute, the Global Partnership on Artificial Intelligence has researched data justice. Whereas conventional practices focus on technical solutions to harm remediation, data justice frames the study of technical ethics, including data and AI ethics, by "interrogating the social structures, human choices, and sociotechnical practices that lie behind the myriad predicaments arising out of an ever more 'datafied society'". This approach is more suitable for an international lens on data ethics.

The research identified six pillars of data justice:

1

Power: including geopolitical, cultural, economic and decision-making power

2

Equity: including analyses of historically entrenched patterns of domination and discrimination

3

Access: including open access to data sharing, access to innovation programs and access to forms of justice

4

Identity: Including harmful or reductive classifications, intentional or unintentional omission and erasure

5

Participation: including transformational inclusiveness and democratized data

6

Knowledge: Including interrogating expert authority and emphasizing interdisciplinary approaches

Challenges in the data and AI supply chain

Farim (senior leader):

"Data has the following cost: the collection, processing, and storage of data — all of which have an economic, environmental, and social aspect."

Julius (developer):

"Large-scale AI models are often trained using data labeled by low-paid workers in global south countries."

Emilia (project manager):

"Non-renewable resource extraction continues to increase, as demands for high-performance processing and storage grow."

Open challenges for responsibly and sustainably developing AI

Assessing copyright and intellectual property factors in AI training sources, including developing consent-based approaches, including for personal data.

Making visible the hidden labor required to train large-scale models, including understanding the social, economic and psychological consequences of labeling work.

Quantifying and normalizing the impact of dominant or hegemonic languages in existing online content, and the impact this has on minority and marginalized linguistic communities.

Measuring the environmental and ecological risks of collecting data and training large-scale models, including carbon emissions and raw materials extraction for computer components.

AI readiness: Data and people

AI has the potential to benefit society in manifold ways. From using predictive analytics for disaster risk reduction to leveraging translation software to break down language barriers, AI is already impacting our daily lives. Yet, there are also negative implications, especially if proactive steps are not taken to ensure its responsible and ethical development and use. Through an AI Readiness Assessment, UNDP is making sure countries are equipped with valuable insights on design and implementation as they progress on their AI journey.

The intersection between AI, data and people

AI-powered tools on the market are often touted based on their benefits – not their shortcomings. However, as seen with the latest example of ChatGPT, questions around responsible and ethical use become important.

As highlighted in UNDP's Digital Strategy, by design, technology must be centred on people. Digital transformation, including AI innovations, must be intentionally inclusive and rights-based to yield meaningful societal impact. For instance, while governments can leverage AI to improve public service delivery, consideration must be given to various layers of inclusion to ensure everyone can benefit equally.

Security: Additional information

Security objectives workshop

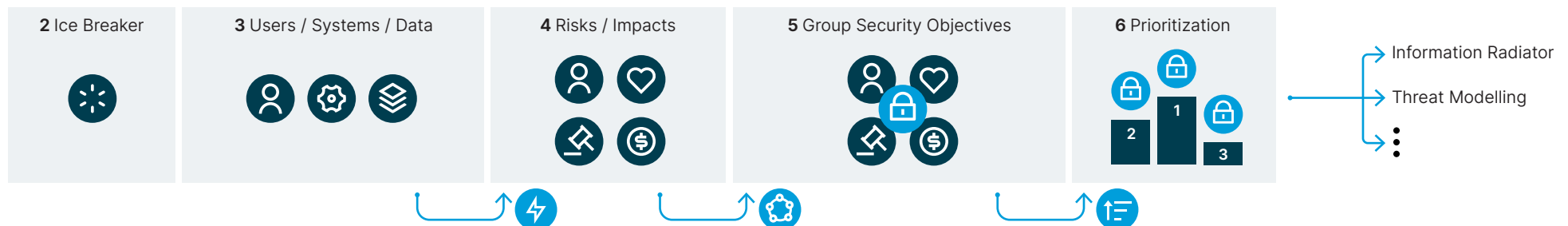### Discovering security objectives

Purpose

Place the project within context of organization's risk objectives to...

- Align with:
  - The concerns of key stakeholders
  - The organization objectives
  - Relevant compliance frameworks
  - Interested parties, authorities and governance bodies
- Build a shared understanding of acceptable vs. unacceptable risk

Workshop design

1. Review the users / systems / data in the services being analyzed

2. Brainstorm some potential risks and their impacts on users / reputation / legal / financial in the format of an objective

3. Group and clarify security objectives.

4. Choose the top five(ish).

Security Objectives

| 2 Ice Breaker | 3 Users / Systems / Data | 4 Risks / Impacts | 5 Group Security Objectives | 6 Prioritization |

Information Radiator

Threat Modelling

Accessibilitity: Additional information

Additional tools

**There are a lot of amazing accessibility tools available.
Here are some additional ones that we recommend checking out.**

**Accessibility aware
component tests design**

One of the many places in the
software delivery process to
consider accessibility requirements
early on is during web component
testing. Testing framework
plugins like chai-a11y-axe provide
assertions in their API to check
for the basics.

**Intelligent guided
accessibility tests**

Intelligent guided accessibility tests
are one category of tools that help
test if you've done the right thing
without needing to be an expert
on accessibility. These tools are
browser extensions that scan your
website, summarize how assistive
technology would interpret it and
then ask you a set of questions
to confirm whether the structure
and elements you created are as
intended. We've used axe DevTools,
Accessibility Insights for Web
or the ARC Toolkit on some
of our projects.

**Accessibility
annotations in designs**

Tools that help communicate
accessibility annotations in designs
help teams consider important
elements like document structure,
semantic HTML and alternative
texts from the beginning of their
work. Figma offers a range of
accessibility notation plugins:
The A11y Annotation Kit, Twitter's
Accessibility Annotation Library and
the Axe toolset's Axe for Designers.

**Axe
Linter**

Tools like axe-core scan code
for accessibility issues in your
pipelines, the axe Linter VSCode
extension helps find them even
before that, while writing code. The
vast majority of accessibility issues
fall into categories that could be
prevented by automated testing and
using live feedback linters like this.

Permanent, temporary, situational disability

We are all likely to experience some form of disability — temporary or permanent at some point in our lives.

Permanent

Disabilities that **will not** change or get better over a period of time

Temporary

Disabilities that **will change** or get better over time

Situational

Scenarios where one needs **similar** accommodations

Touch: Examples

Permanent	Temporary	Situational
Born with one arm	Broken collarbone	Holding a baby

See: Examples

Permanent	Temporary	Situational
Born blind	Wearing glasses or contacts	Sunlight on your screen

To learn more

Accessibility handbook

This handbook will help you in your learning phase around digital accessibility and how to add digital accessibility in your work day

Link to access the accessibility handbook

A practitioner's accessibility handbook

For product teams

/thoughtworks

WCAG Principles

When testing accessibility in your site you first need to review WCAG before mapping issues. WCAG (Web Content Accessibility Guidelines) are a set of **international widely accepted standards** for making web content more accessible. They provide a **set of testable criteria** we can measure against.

The WCAG standards are organized under four principles know as POUR:

1

Perceivable

Information and user interface components must be presentable to users in ways they can perceive

2

Operable

User interface components and navigation must be operable

3

Understandable

Information and the operation of the user interface must be understandable

4

Robust

Content must be robust enough that it can be interpreted by a wide variety of user agents, including assistive technologies

Success Criteria: WCAG

In addition to organizing Issues by principles, WCAG also sets our success criteria. These criteria help teams understand which issues are more critical. Start by fixing level A issues. You can use WCAG Guide to help with levels and rules.

A

Level A is the bare minimum and usually considered unacceptable for actual accessibility.

AA

Typically products strive for Level AA conformance as it is also the standard by which most legal requirements are judged.

AAA

Makes it possible for the most people to have greater web access. Although, is the most difficult to achieve. It is recommended in some areas where necessary.

User research

- A common trap when developing products is to design for the "average user", this excludes a significant portion of your potential users.

- Inclusive design however, requires that you design for the edge cases, and through doing that, you provide an experience that meets the needs of everyone.

- Given that it can be time-consuming to conduct research with people that cover the entire spectrum, we can take advantage of existing data available from agencies such as government census and the World Health Organization.

Target

Over 65

Mobile users

Disabled

Distracted