

Making Software Greener

Seeking a More Sustainable IT



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Good Morning everyone!

Thank you for the opportunity to come before you and share about Sustainable IT and how we can all play a role in reducing environmental impact and making software greener.

Who am I?

**Matt "Kelly"
Williams**



- Over 35 years IT experience
- International Speaker & Thought Leader in Sustainability, Cloud, and DevOps
- Creator of the Sustainable IT Manifesto
- Green Computing Foundation Advisory Board Member



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*Assisting
organizations and
individuals in
embracing and
implementing the four
pillars of Sustainable
IT:*

**Awareness
Consciousness
Enablement
Empowerment**



Sustainable IT is a series of practices and principles to:

- Reduce waste
- Reduce environmental impact
- Reduce cost



You might be wondering how sustainable IT differs from other sustainability initiatives.

Different individuals and organizations will look at it in different ways, but, in short, sustainable IT focuses on the impact which computers, phones, the internet, and all of the other modern inconveniences, such as social media, has on the environment.

The Problem



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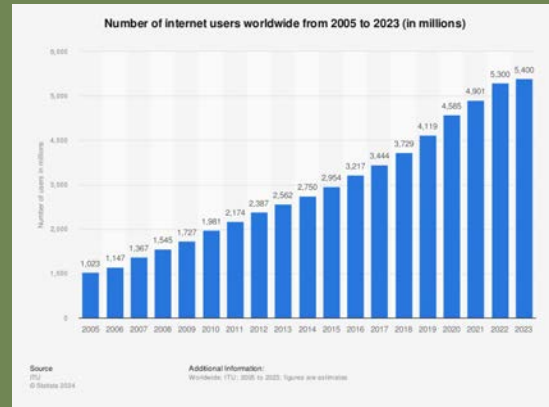
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Let me explain.... No, there is too much. Let me sum up. -- Inigo Montoya



There are ~5.4 billion internet users in 2023, a 45% increase since 2018.

ITU Statistics



number of internet users worldwide 2023 | statista

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The worldwide penetration of the internet is 66%, but there are vast sections of the world which have a lot of room for growth.

For instance, South Asia has over 1 billion internet users -- 800M of which are in India -- and has only 55% penetration. There's another billion users.

Global mobile penetration is 69.4% ... 94.6% of internet users go online using a smartphone.

How the world goes online in 2024 —
DataReportal – Global Digital Insights

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There were around 4.5B cell phones in use around the world in 2022.

And of the billion coming new users in South Asia, the vast majority will get on the internet via smartphone -- South Asia, alone, will account for over a billion new smartphones.

1.13 billion smartphones were shipped in 2023.

2024 smartphone market rebound:
What's driving the change

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A brand-new smartphone generates an average of 85 kilograms in emissions in its first year of use, with just 5% of its emissions coming from actual usage -- most of the emissions come from mining raw materials and the rest of the manufacturing process.

Americans, on average, replace their phones every 2.5 years.

More than 30 [chemical] elements are used to build a single smartphone... 1.53 billion units expected to ship in 2025

Smartphone Technology relies on Metals and Minerals | Resource Capital Funds

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Increased usage of rare earth elements in cell phones is projected to increase between 195% to 434% by 2030.

Lithium and Manganese use in cellphone batteries is expected to increase over 400% by 2030.

A 2kg laptop requires 400kg in raw resources

The Digital Collage - A workshop to
understand the impact of digital
technologies on the environment

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400kg in raw materials for one laptop.
Almost 900 pounds. The vast majority of
the environmental footprint of our
electronic gadgets comes at the start of
the lifecycle.

Microsoft's global water consumption increased 34% between 2021 to 2022 to nearly 1.7 billion gallons

A.I. usage fuels spike in Microsoft's water
consumption

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Often times people concentrate on carbon footprint -- but there are many more resources which are also affected.

Much of the world faces water scarcity and/or insecurity. Between 2 and 3 billion people experience severe water scarcity for at least one month each year.

And that number is just going to increase.

ChatGPT uses 16oz water for every 5-50 questions

A.I. usage fuels spike in Microsoft's
water consumption

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Complexity of the questions asked
ChatGPT accounts for the range of
impacts.

In 2020, Information and Communications Technology accounted for 3.5% of the total carbon footprint of the planet.

How smartphones are heating up the planet

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3.5% of global global carbon emissions is roughly the carbon produced by the airline industry globally. By 2025, it is predicted to double.

By 2040, Information and Communications Technology will account for 14% of the total carbon footprint of the planet.

How Green Is Your Software?

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Within 20 years, the global impact of IT will increase fourfold.

To put it into context, the global footprint of IT will be the same as the global airline industry.

Ok, but how does this affect my business? It's not an IT business.

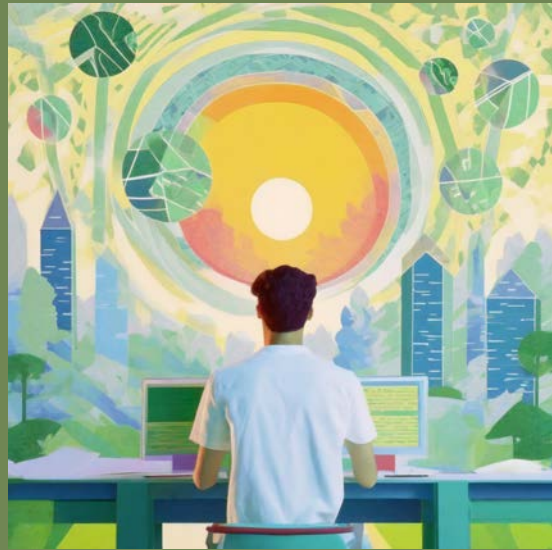
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Right now, you're probably sitting there thinking, "Ok, this is all well and good, but how does any of this affect my business? And even if it does affect my business, what can I do about it?"

*Every company
today is a
technology
company... -- Jacob
Morgan, Author of
The Future of Work*



A decade ago it was recognized that information technology and tech in general was so pervasive that every company, whether it realizes it or not, is a tech company. And the penetration of technology has only increased since then.

Sustainable IT is a series of practices and principles to:

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There was a study about a year ago in which engineers/developers and managers were surveyed as to why their organization should be interested in sustainability.

A majority of the engineers chose save the planet; managers chose cost reductions.

Different roles within an organization can, and will, have different motivators for pursuing sustainability.

Four Pillars of Sustainable IT



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It all starts with Awareness. Hopefully, after this morning's talk you are all a bit more aware of the problem.

Once aware, you can then become conscious of issues and how they manifest.

Once you are conscious, you can then gain the skills and ability to make changes to reduce the environmental impact.

Then, once a few small changes and improvements have been made, you can feel and become empowered.

Drivers of Sustainable IT

- Cost Savings
- Regulatory
- ESG Reporting
- Requirements for Doing Business
- Reputation
- Company Culture



Making Software Greener's Offerings:

- Education & Advocacy
- Workshops
- Audits
- Certification
- Best Practices & Sustainable Methodologies
- Consulting



*No man is an
island,
Entire of itself;
Every man is a
piece of the
continent,
A part of the main.
-- John Donne, No
Man is an Island*



Questions?



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Resources: Organizations & Groups

- [Sustainable IT Meetup](#)
- [Sustainable IT Manifesto](#)
- [Green Computing Foundation](#)
- [Sustainable IT](#)
- [Green Software Foundation](#)



Resources: Conferences

- 8 ESG and sustainability conferences to attend in 2024
- IEEE SusTech
- Events from May 6 - April 23 - Sustainable Tech Partner for Green IT Service Providers



Resources: Articles

- [Forbes: Why Every Company Is A Technology Company](#)
- [Every Company is a Tech Company — Here's Why](#)
- [Why Every Company Is a Tech Company](#)
- [Every Company Is Now a Tech Company - WSJ](#)
- [How and Why Every Company is a Tech Company](#)
- [Every company is a technology company, but most don't behave like one | TechCrunch](#)
- [If you think your company isn't a software company, you're mistaken, according to McKinsey | Fortune](#)
- [Why Every Company Is A Technology Company](#)



Resources: Articles

- [Raw Materials In A Laptop - Circular Computing™](#)
- [Raw Materials In A Laptop - Circular Computing™](#)
- [What Raw Materials are Used to Make Mobile Phones?](#)
- [Smartphone Technology relies on Metals and Minerals | Resource Capital Funds](#)
- [Internet usage worldwide – statistics & facts | Statista](#)
- [Just how bad is your phone for the planet -- and what can you do about it? | ZDNET](#)
- [Smartphones are warming the planet far more than you think](#)



Resources: Articles

- [COP26: How your mobile phone is contributing to climate change](#)
- [Why your internet habits are not as clean as you think](#)
- [Should we give up flying for the sake of the climate?](#)
- ["Climate crisis: The Unsustainable Use of Online Video" : Our new report](#)
- [Water scarcity | UNICEF](#)
- [Imminent risk of a global water crisis, warns the UN World Water Development Report 2023 | UNESCO](#)



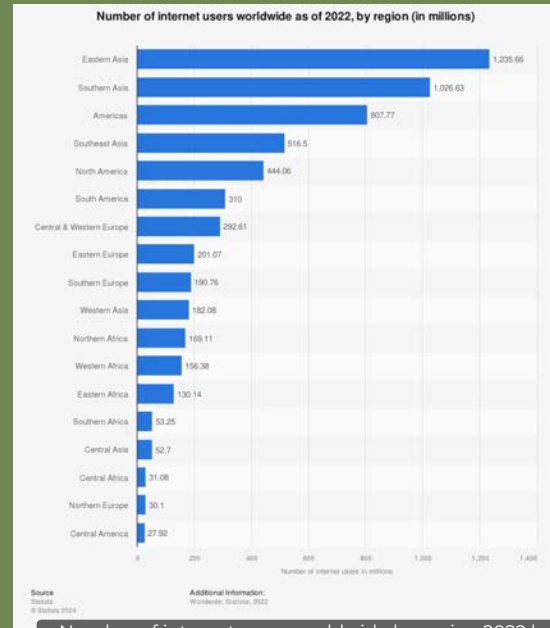
Additional Metrics

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Global Internet User Counts by Region

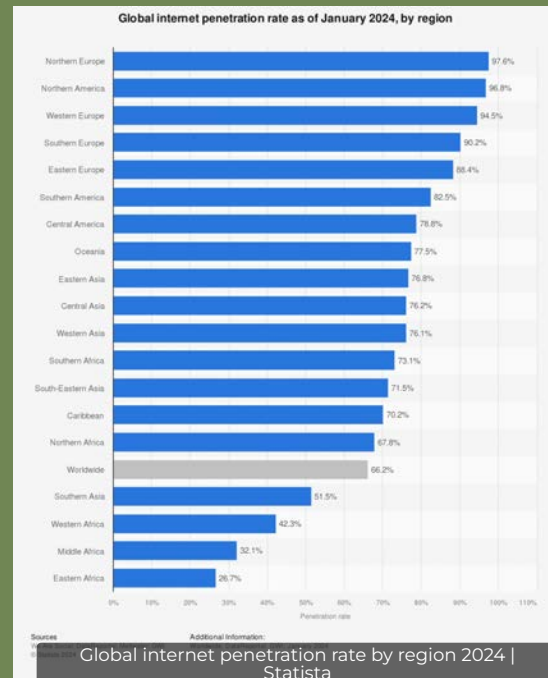


Number of internet users worldwide by region 2022 | Statista



Southern Asia has over 1B internet users as of 2022. Yet there is a lot more room for growth, as we'll see shortly.

Internet Penetration Rate by Region



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There are 800M users of the internet in India; more than any other country. Yet Southern Asia is at 51.5% penetration.

Africa will continue to see growth -- as of 2021 there was a 43% percent internet penetration, far lower than a global average of 66%.

[Internet usage in Africa - statistics & facts | Statista](#)