ISO Open Consultation on resource-efficient software

iso.org

Introduction to
ISO Open Consultation

ISO (Sarah Parker / Stefanie Müller)

Welcome to ISO Open Consultation

What is it and why is it needed?

Discovering and tapping into stakeholder expectations of standardization at a global level.

Showcasing the benefits of standards and aligning with stakeholder expectations

ISO Open Consultation is an excellent opportunity to showcase standardization and the benefits of standards to a wider audience, to understand global expectations from standardization before investing in the standardization process.

Shaping ISO's engagement in emergent topics

ISO Open Consultation is a member-driven means of empowering the ISO community to prioritize topics for consideration by Council; you can help shape ideas and opinions into strategic, tangible actions, and help to optimize the position of ISO in these topics.
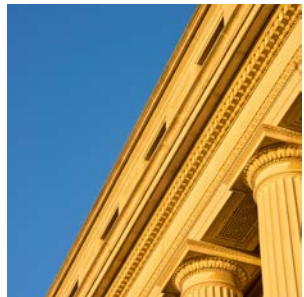
Open Consultation
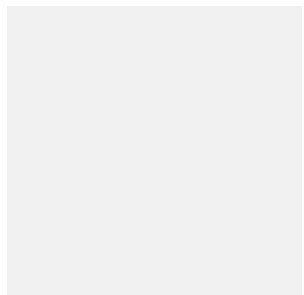## What will be the Output?
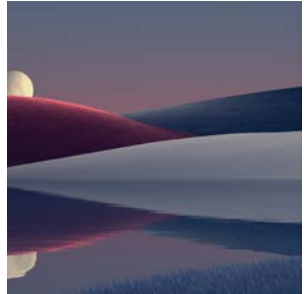
Landscape and drivers of change

Scope and dependencies, global perspective, relative importance, legal / regulatory, technological, social, ecological

Standardization landscape

Presence / absence of national and international standards, coordination & cohesion of international standards

Expectations of standardization

Consolidation of the value proposition of standards in the Council-endorsed field, including inter alia testing, quality, safety, interoperability

Stakeholder representation / key players

Government, business, academia, civil society

Consolidated user stories

Summary of key actors, interactions and desired outcomes that could be supported with standards in the Council-endorsed field
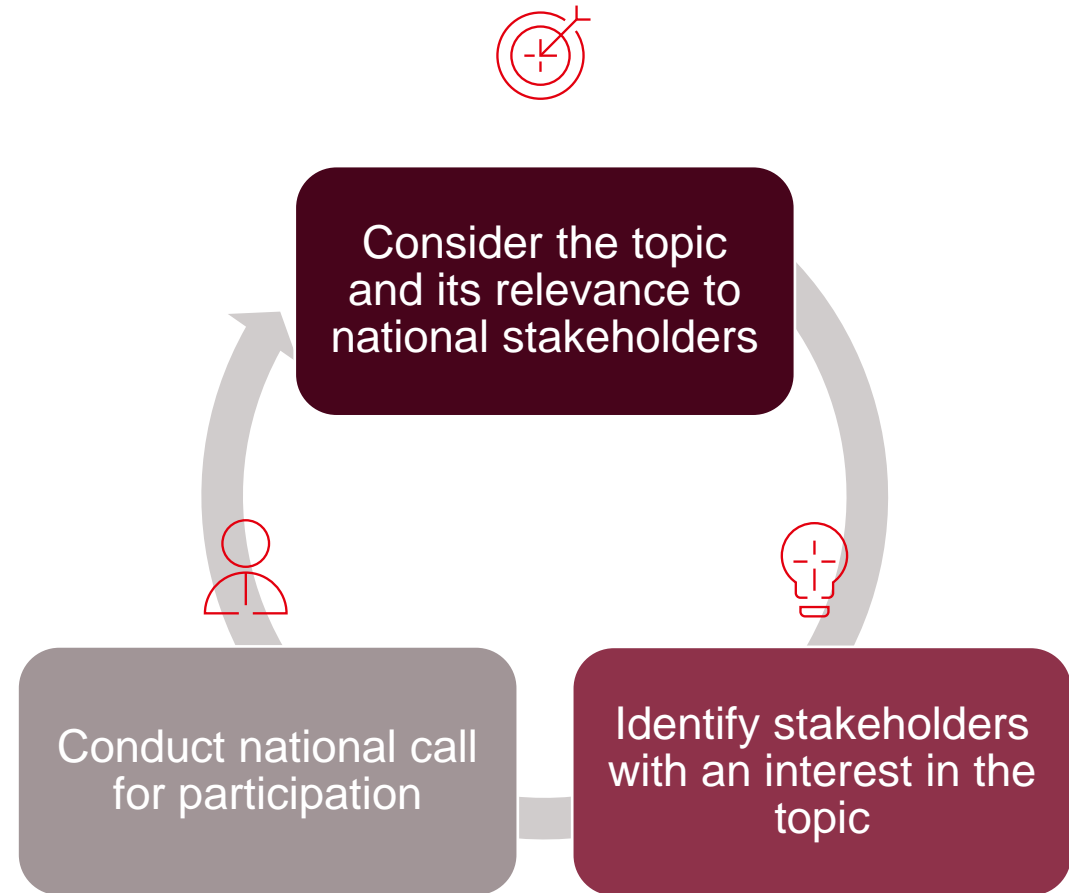
Recommendations for ISO action

CSC/SP: strategic partnerships, projects

TMB: technical committee structure, ISO/IEC Directives, new work items

The way forward

How to participate?

ISO Open Consultation is a means to **capture new stakeholders' expectations** of standardization in emerging topics **before making critical decisions** and multi-year investments in standards development work.

Consider the topic and its relevance to national stakeholders

Identify stakeholders with an interest in the topic

Conduct national call for participation

Introduction to resource-efficient software
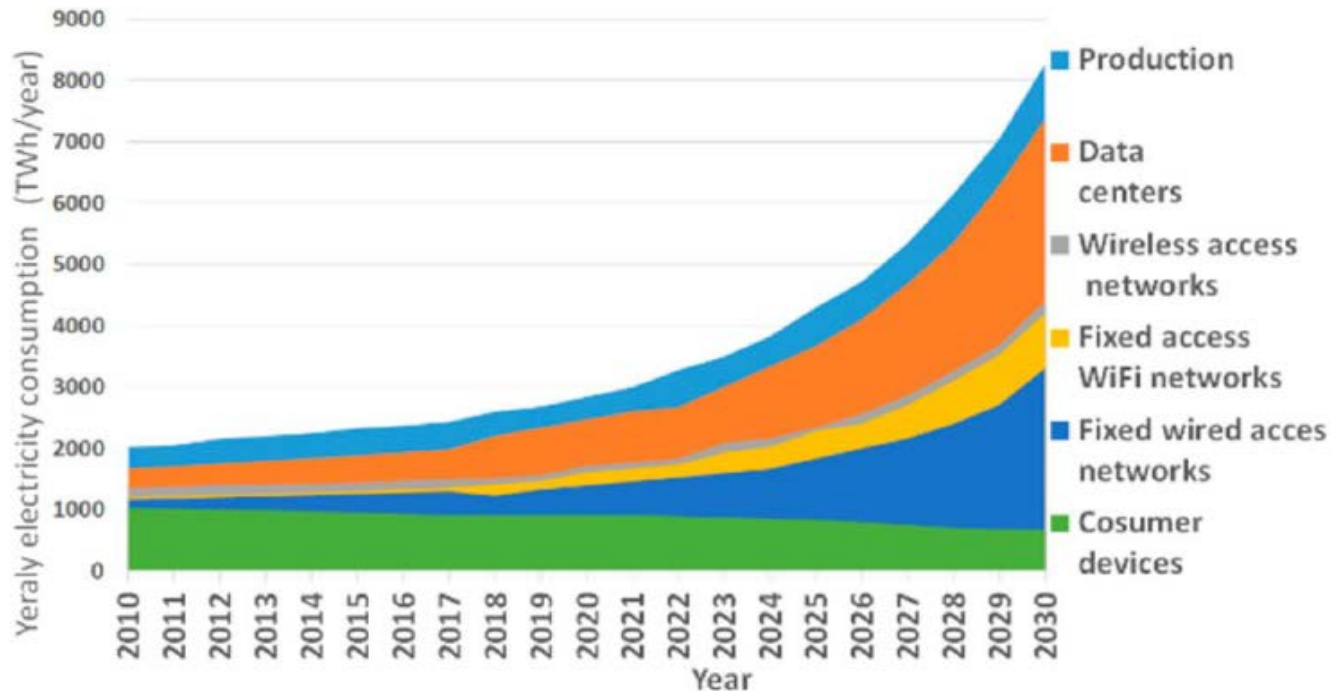
Thought Leaders (Verena Majuntke / Anna Zagorski)

Motivation

- ICT accounts for approx. 8-10 % of the total global energy consumption ([1], 2023)

- Data centers used 1-1.3% (240-340 TWh) of global electricity (IEA, 2023)

- Further scope: Radio Access Networks, Internet, IoT Devices, Smart Home …

Environmental influence data centers:

- Carbon Intensity Germany 2023: 354g CO_2/kWh → 85 billion kg CO_2

- Carbon Intensity China 2023: 492 g CO_2/kWh → 118 billion kg CO_2

[1]   Erol Gelenbe. 2023. Electricity Consumption by ICT: Facts, trends, and measurements. Ubiquity 2023, August, Article 1 (Aug. 2023), https://doi.org/10.1145/3613207

Energy demand – Worldwide trend (2019)

J. Lorinc et al., Greener, Energy-Efficient and Sustainable Networks: State-Of-The-Art and New Trends, *Sensors* 2019, *19*, 4864; doi:10.3390/s19224864
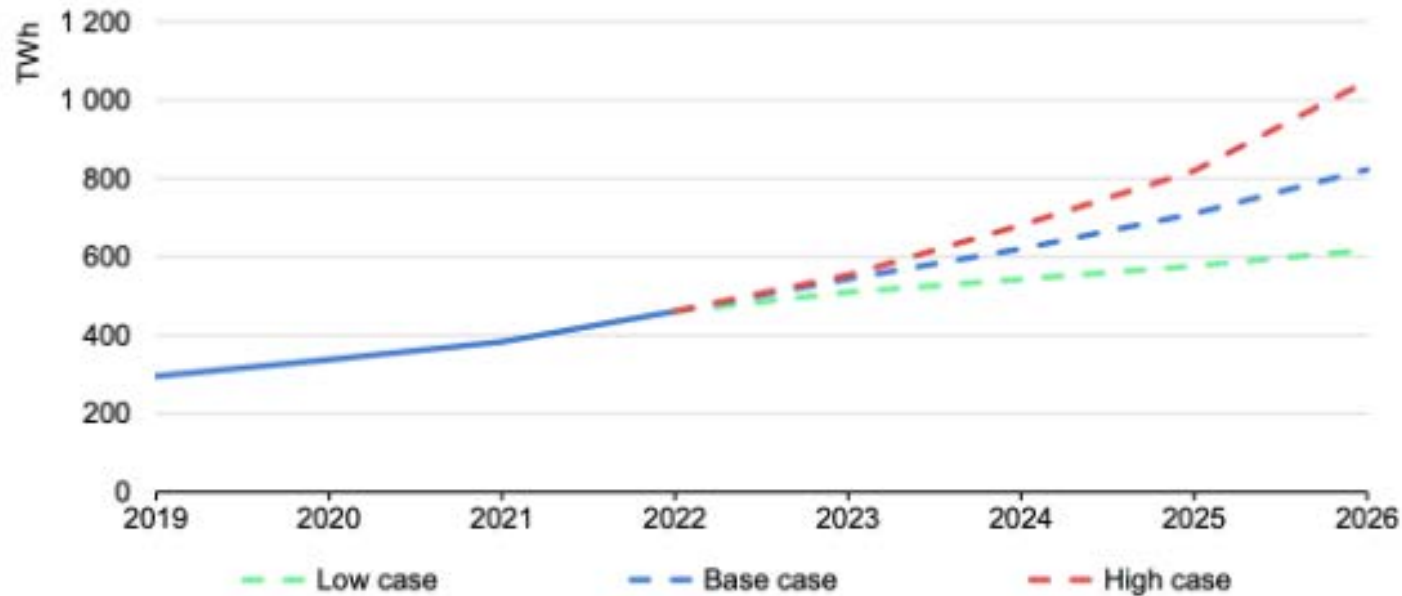
- The continuous digitalization has an increasing energy demand and thus a high environmental impact

- While energy efficiency has improved, energy demand is increasing

IEA - Forecast on the energy consumption of data centres worldwide

Global electricity demand from data centres, AI, and cryptocurrencies, 2019-2026

IEA. CC BY 4.0.

Notes: Includes traditional data centres, dedicated AI data centres, and cryptocurrency consumption; excludes demand from data transmission networks. The base case scenario has been used in the overall forecast in this report. Low and high case scenarios reflect the uncertainties in the pace of deployment and efficiency gains amid future technological developments.

Sources: Joule (2023), de Vries, The growing energy footprint of AI; CCRI Indices (carbon-ratings.com); The Guardian, Use of AI to reduce data centre energy use; Motors in data centres; The Royal Society, The future of computing beyond Moore's Law; Ireland Central Statistics Office, Data Centres electricity consumption 2022; and Danish Energy Agency, Denmark's energy and climate outlook 2018.

The IEA estimates that data centres, cryptocurrencies and artificial intelligence (AI) will consume around 460 TWh of electricity worldwide by 2022 and will double by 2026
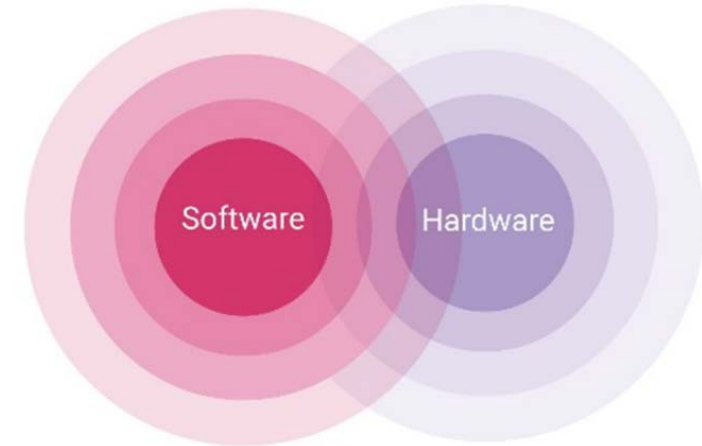
Software is the main driver of ICT's environmental impact

Software is the main driver of ICT's consumption of resources

- Software has a significant influence on the energy consumption of hardware

- Data-intensive formats

- Cloud dependencies

- Missing updates
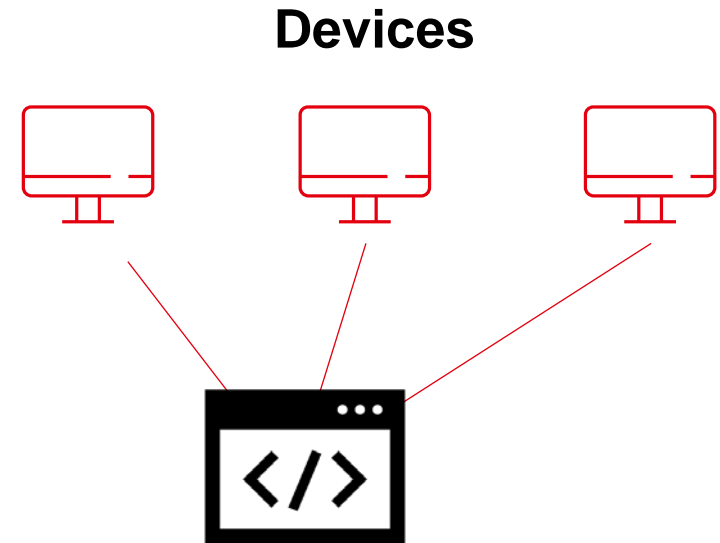
→ Software-related obsolescence

In 2013, the Greenpeace study stated that if new operating software had been used across the board, 50% of computers would have had to be replaced due to increased operating software requirements for the hardware

Example: Energy consumption of software

**306.500 MWh
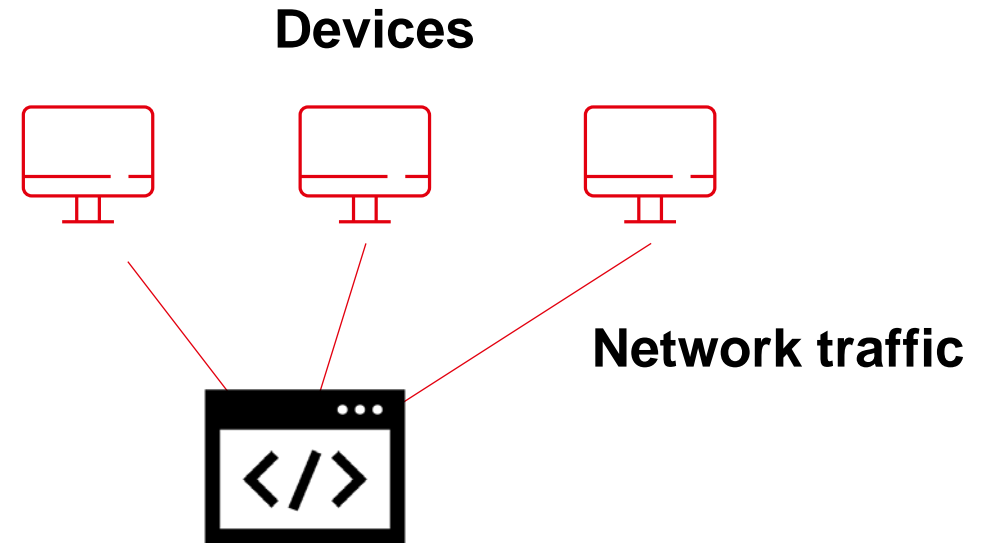for data centers in
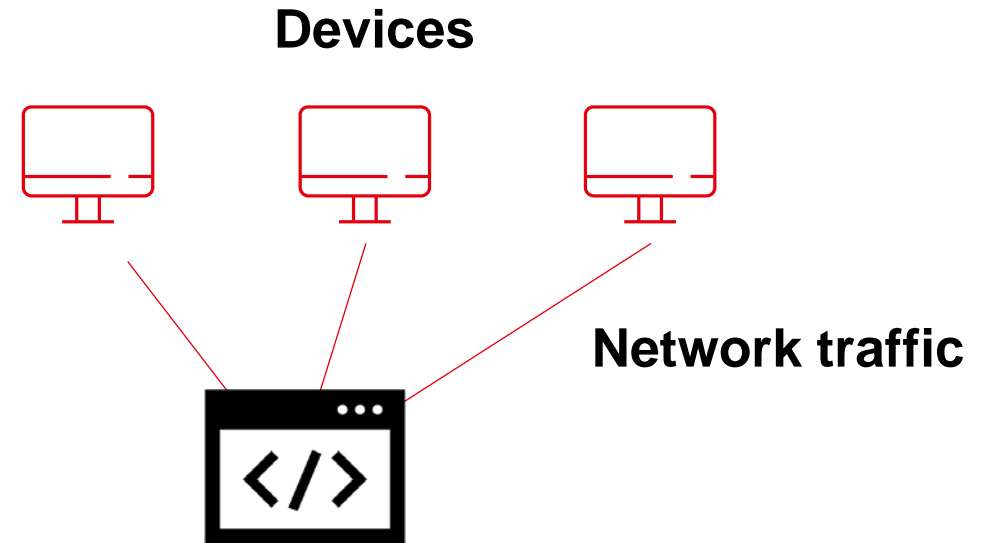2022[1]**

Example: Energy consumption of software

Devices

**306.500 MWh
for data centers in
2022**[1]

Example: Energy consumption of software

Devices

Network traffic

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306.500 MWh
for data centers in
2022[1]

Example: Energy consumption of software

Software Development Life Cycle
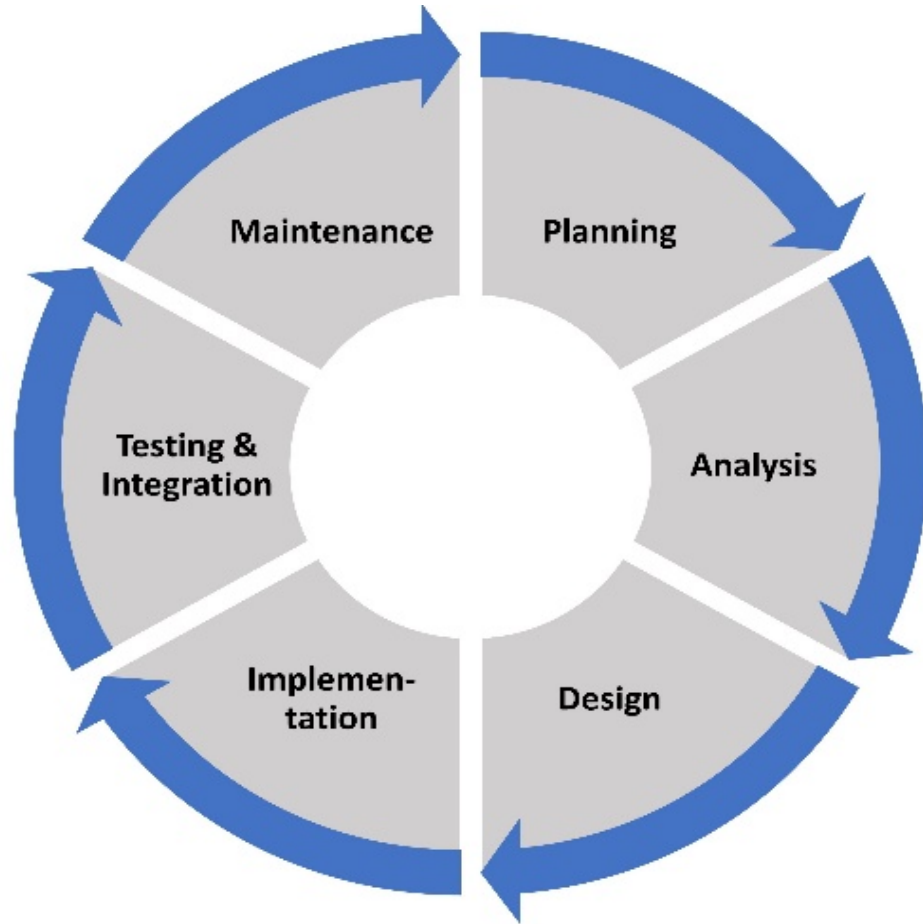
Devices

Network traffic

306.500 MWh for data centers in 2022[1]

Example: Energy consumption of software

Devices

Network traffic

Version 2   Version 4

Version 1   Version 3   Version 5

1970   today

years

**306.500 MWh
for data centers in
2022[1]**
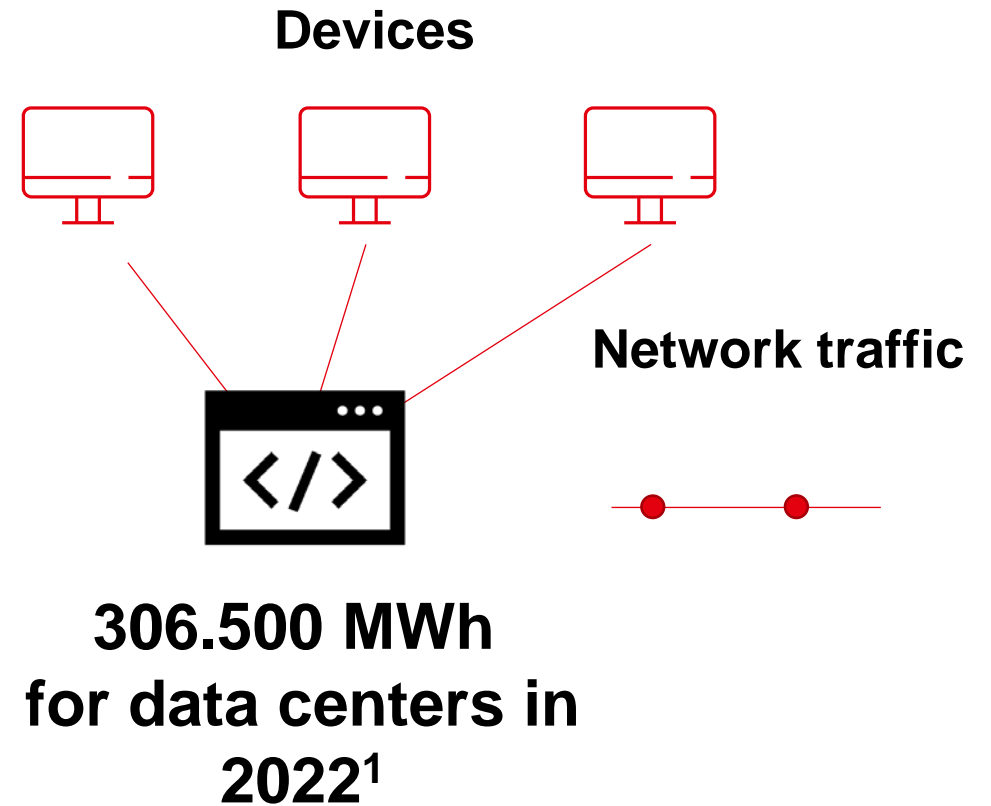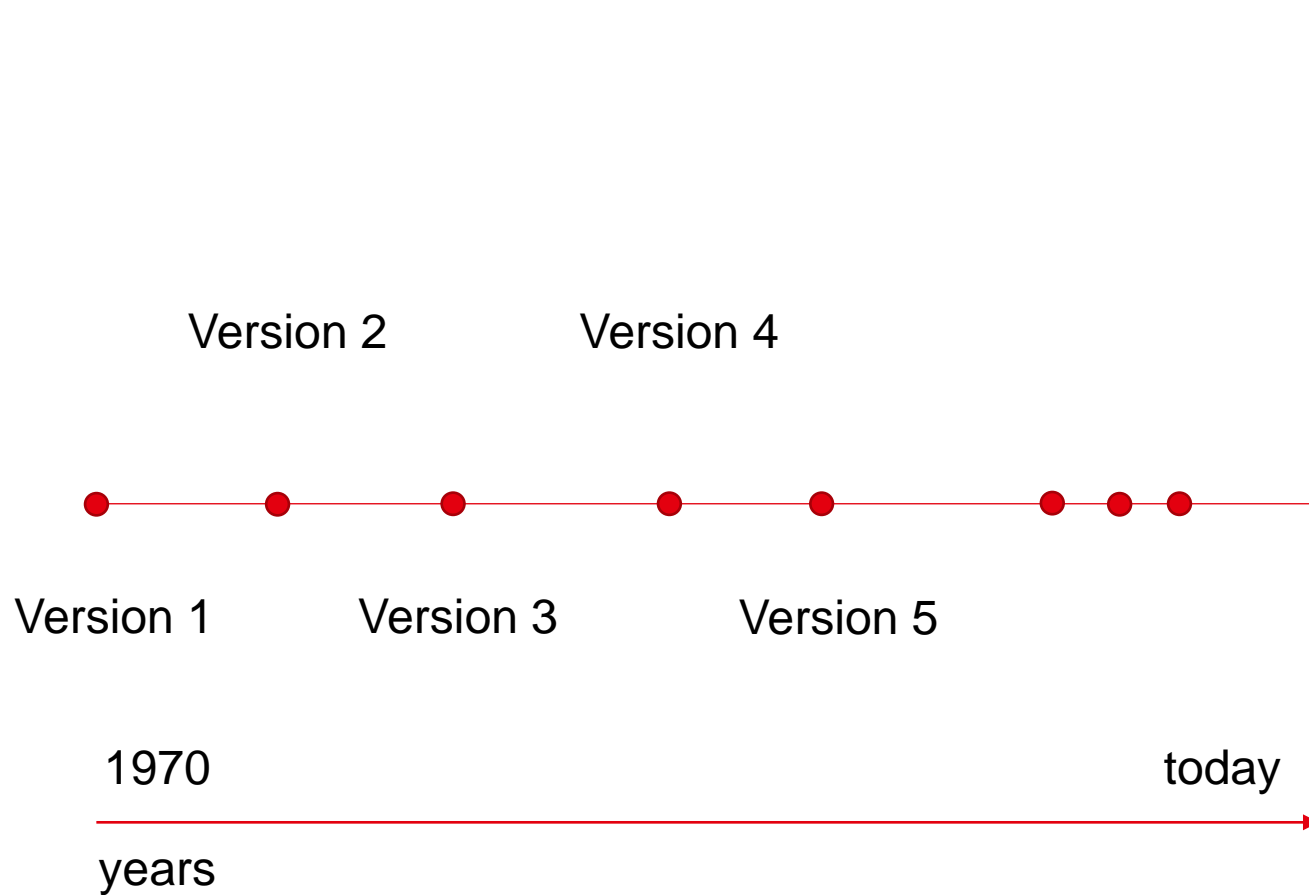
Huge savings potential through millions of software rollouts
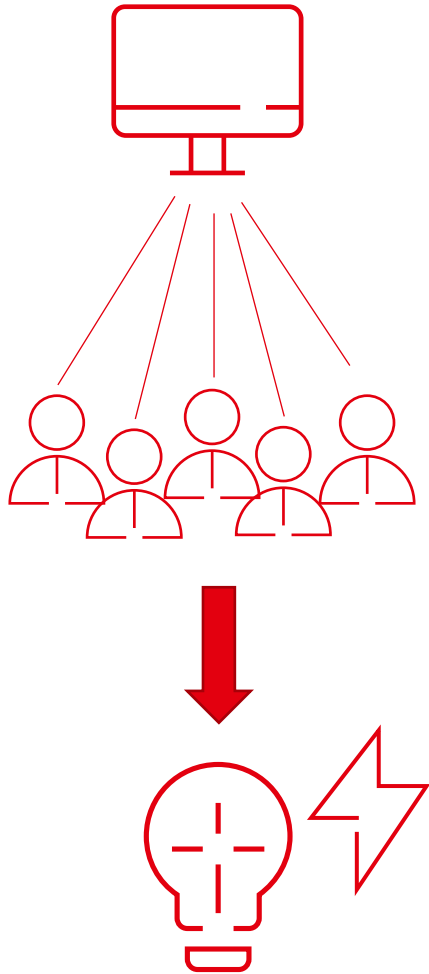
Even small savings of a few CPU seconds in resource-efficient software can result in enormous energy savings potential (of many MWh) and resource savings. As software is executed several times a day on many millions of computers, the scaling effects here are enormous.

Resource-efficient software → minimize environmental impact of ICT

Resource-efficient software

- **Precise definition of resource-efficient software** (hardware and natural resource type, efficiency, …)

- **Measurement and assessment** (e.g. Energy demand and hardware resources)

- **Transparency aspects** such as updates, data traffic, modularity, interfaces, license agreements

Relevant Stakeholders

Development

- **Developers**
- **Ops**
- **Product Owners**
- **Requirements Engineers**
- **Architects**
- **Testing**
- **...**

Enterprise

- **C – Level**
- **Sustainability Officer**
- **Sales**

Customer (B2B)

- **Product manager/owner**
- **IT – Manager**
- **Procurement**

Resource-efficient software

Academia

- **Researcher**
- **Students / Ph.D. students**
- **...**

Government

- **Digital departments**
- **Administration**
- **...**
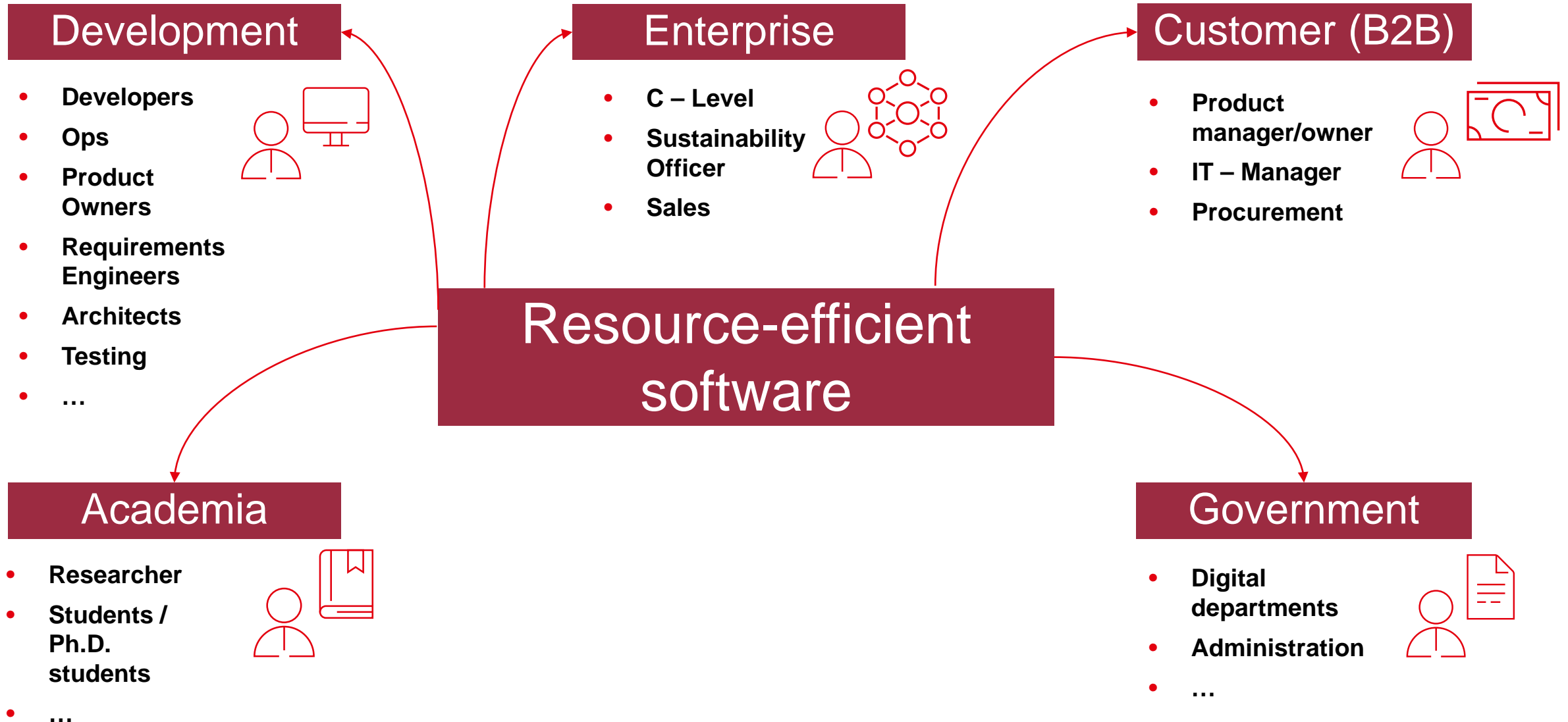
Introduction to next steps and schedule

DIN (Pauline Böhm)

Open Consultation
Major milestones

- ISO Members briefing
- National calls for participation
- Prepare initial discussion document for Expert briefing
- Open Consultation workshops
- Consolidate and prepare Open Consultation report
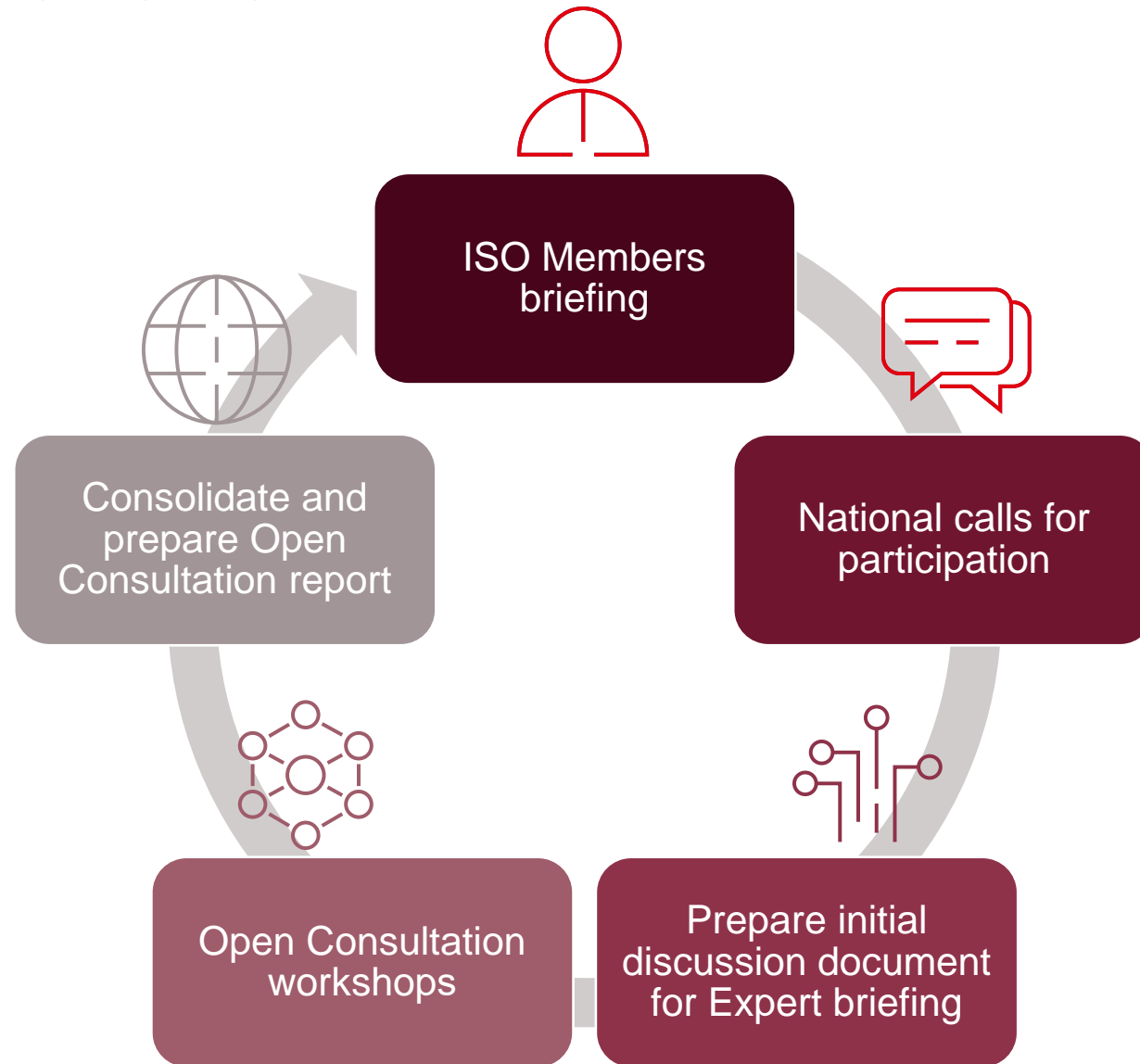
Open Consultation
Timeline

| Expert Registration | Expert Briefing & Presentation of IDD | **Workshop 1** Understanding and defining the challenge | **Workshop 2** Examining the standardization landscape | **Workshop 3** Ideating solutions and collecting recommendations to ISO | **Draft Report & Expert Commenting Phase** | **Final Meeting** Presentation, review and refinement of report | Final Report |

| October | November | December | January | March | April | May |

Schedule (preliminary)

Event	Date	Aim
Registration	until 11. November 2024	
Expert briefing	13 November 2024, 9:00-11:00 CET/ 14 November 2024,16:00-18:00 CET	Introduction to ISO Open Consultation
Workshop 1	9 December 2024, 8:00-12:00 CET / 11 December 2024, 15:00-19:00 CET	Understanding and defining the challenge
Workshop 2	20 January 2025, 15:00-19:00 CET / 22 January 2025, 8:00-12:00 CET	Examining the standardization landscape
Workshop 3	27 January 2025, 15:00-19:00 CET / 30 January 2025, 8:00-12:00 CET	Ideating solutions and collecting recommendation to ISO
Expert commenting phase on final report	March 2025 (tba)	
Final Meeting	April 2025 (tba)	Presentation, review and refinement of final report
Submission of final report	April / May 2025	

Thank you.

Making lives *easier*, *safer* and *better*.

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