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ADEME
AGENCE DE LA TRANSITION ECOLOGIQUE

THE SCOPE OF INTERNET OF THINGS (IOT) WITH RESPECT TO INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)

Technical Experts Committee

Executive summary

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FOREWORD

The technical experts committee on measuring the environmental impact of digital technologies was set jointly by Arcep and ADEME on December 2020. It aims at fostering a mutual understanding between telecom/ICT players and environmental players. Made up of technical experts working on a long-term horizon, the Committee may provide an independent technical recommendation/insight enabling to share views and to build up consensus on any technical topic/issue relating to the measurement of the environmental impact of ICT.

Chaired by Catherine Mancini (Leader Project Management at Nokia) also chairing the Fiber Optics Expert Committee and the Mobile Expert Committee set up by Arcep, the Committee includes experts from the following entities: Altice (SFR), Akamai, Amazon Web Service (AWS), Apple, APL, Bouygues Telecom, Cisco, DDemain, Eco-info (CNRS), Ericsson, GreenIT, Google, Huawei, Institut Mines Telecom, Institut Numérique Responsable (INR), Intel, Iliad (Free), LCIE Bureau Veritas, Microsoft, Meta, Netflix, Nokia, OVH Cloud, Orange, Qualcomm, Samsung, Schneider Electric and The Shift Project.

Committee program management: Arcep, ADEME.
Arcep/ADEME Report editors: Ahmed Haddad (Arcep), Charles Joudon-Watteau (Arcep) and Erwann Fangeat (ADEME).

NOTE

This report reflects the outcome of the Committee's validation. The Committee is thankful to the following invited experts for their review and contributions: Gillo Malpart (Mavana), David Bol (UCL Belgium) and Thibault Pirson (UCL Belgium).

This report is categorized within the following focus areas of the Technical Experts Committee:

- METHODOLOGIES FOR MEASUREMENT AND IMPACT ASSESSMENT
- KEY PERFORMANCE INDICATORS
- DATA

THE SCOPE OF INTERNET OF THINGS (IOT) WITH RESPECT TO INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)

SUMMARY

An increasing number of devices and appliances are now capable of network communication with their peers or with the Internet. Embedded connectivity becomes ubiquitous among a broad range of electronic devices, including Internet of Things (IoT), contributing to blurring the boundaries of the Information and Communication Technologies (ICT) and Entertainment and Media (E&M) sectors with the rest of connected products.

Clarifying the boundaries regarding connected devices is crucial to ensure a consistent accounting of the carbon footprint of the ICT and E&M sectors and how the effort towards net-zero target is balanced between sectors. Having a clear view on such blurred boundaries is also necessary from a resilience point of view. That is, to understand to which degree our digitalized society is dependent on connectivity.

The need to come up with recommendations for methodology development or guidance on this issue has been already identified in ARCEP/ADEME Committee Report published in 2023[1].

Consequently, this Report supports environmental studies' practitioners with guidance on how to gauge the role of connectivity within IoT devices and tentatively the broader set of connected products while leveraging on ITU-T Recommendations and other relevant standards. Gauging such role enables to categorize connected devices with respect to ICT and then to approach carbon allocation rules (to ICT) based, inter alia, on the connectivity's degree of influence on a product.

A consistent heuristic is developed on connected devices to draw boundaries and provide with respect to ICT a product clustering within IoT and more extensively connected devices.

The approach was carried out in several steps:

- Bringing a specific focus on what is an IoT device within connected devices;
- Identifying the potential factors that may impact the categorization of a connected/IoT device, justifying their relevance and proposing supporting technical approaches to characterize the role of connectivity on these devices;
- Combining the identified factors into a decision tree able to support a practitioner in the categorization task of a connected/IoT device and further on in the carbon footprint allocation task.

To support a definition of IoT devices' boundaries with respect to ICT and E&M and to capitalize on the proposed heuristic; several recommendations are proposed and deal with:

- Environmental performance labelling
- Economic or environmental statistics supporting public policies on IoT and connected devices

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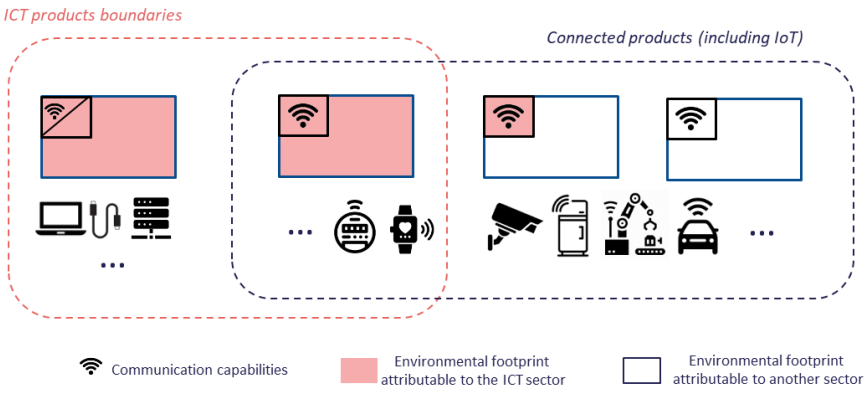
[1] Arcep ADEME Technical Experts Committee, ASSESSMENT OF THE ENVIRONMENTAL IMPACT OF THE ICT SECTOR: METHODOLOGICAL GAP ANALYSIS, April 2023 [https://en.arcep.fr/uploads/tx_gspublication/environment-impact-ICT-sector-methdological-gap-analysis_april2023.pdf]

- Public policies on carbon trajectory (supporting national low-carbon strategies for the digital economy)
- Assessing carbon footprint of IoT-based ICT solutions and connected products-based solutions
- Supporting a more detailed characterization of environmentally sustainable connected products



Another incidental aim of this Report is to address a wider audience, in order to take part in the technical acculturation of non-experts and foster a better understanding. For that purpose, some additional highlights are provided in annexes and appendices. The latter, supplement the implementation of the heuristic with technical guidance and examples. They also support the effort on clarification of how the ICT sector lies within the wider umbrella of what is popularized as the "Digital sector".

The outcome of the work item at its different steps is reflected in this report.

Any comment or suggestion for improvement are welcome and should be addressed to: ComiteExpertsMesure@arcep.fr

History

Edition	Approval	Title
1.0	2024-05-24	The Scope of Internet of Things (IoT) with respect to Information and Communication Technologies (ICT)

Keywords

Internet of Things (IoT), Connected products, ICT sector, Digital Economy, Product categorization, Sectoral carbon footprint allocation.

Report Citation

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Arcep at a glance

The Regulatory Authority for Electronic Communications, Postal Affairs and Print Media Distribution (Arcep), a neutral and expert arbitrator with the status of independent administrative authority (IAA), is the architect and guardian of internet, fixed and mobile telecoms and postal networks in France.

ADEME at a glance

At ADEME – France's National Agency for the Ecological Transition – we are firmly committed to fighting global warming and resource depletion. ADEME is a public establishment, under the joint authority of the Ministry for the Ecological Transition and the Ministry for Higher Education, Research and Innovation.