



Sobriety and Performance of your Digital Services

Measure, Understand, Improve

S1 2023



Greenspector



Expert in Sustainable IT since **2010**



Our activities:

- **Editor** of a professional software suite for digital teams
- **Expert Services:** audit, measures, training...



*A mission-driven company
Labelled by the Solar Impulse Foundation*



Credentials



Internal “Digital Sobriety Certificate” to support **engagement and emulation** among digital squads



Battery life **increased from 3 to 11 hours** in a critical mission for the French army



Employee savings web portal and applications (4M monthly users): Audit, recommendations, re-measure to check progress



Target a **30% carbon footprint reduction** in the streaming video service

Finance



Retail, e-commerce



Public sector

Media, Corporate



Mobile solutions for employees



The environmental impact of IT is a growing issue

Digital already accounts for almost **4% of carbon emissions**

and it is growing fast: **+6%/year**

To face this challenge - and to meet their customers expectations - organizations must provide **digital services that have lower impacts.**

This means providing digital services that **consume less energy and resources** when they are used.

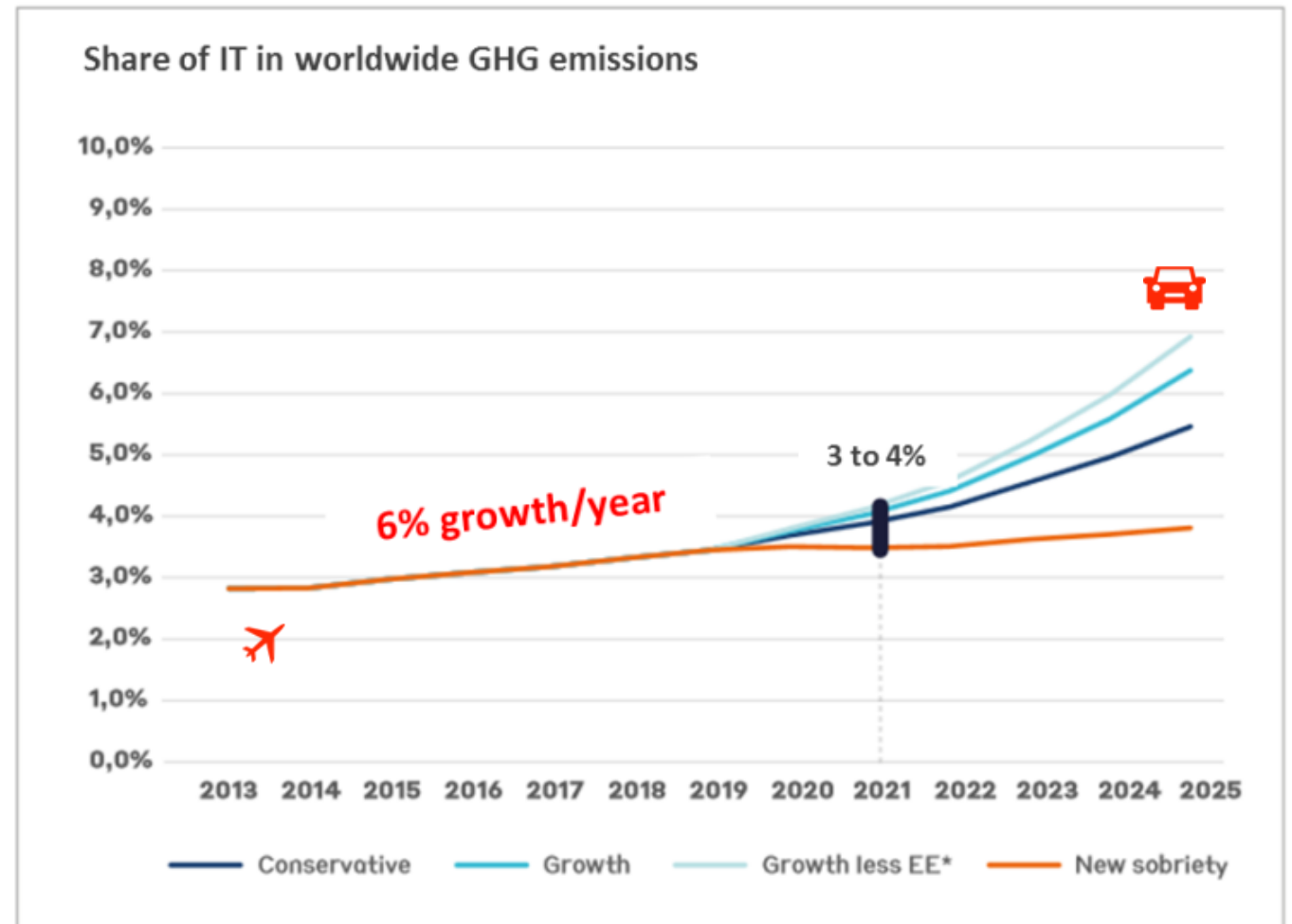


Figure 1 : Évolution 2013-2025 de la part du numérique dans les émissions de GES mondiales (The Shift Project – Forecast Model 2021)

* Growth less Energy Efficiency (traduction : croissance avec un ralentissement des gains d'efficacité énergétique)



Our approach to meet new expectations: digital sobriety



Digital Sobriety

Put the consumption of energy and resources under control



Ecology

Reduced environmental impacts



Performance

Faster and smoother user experience



Inclusiveness

Usable services, even in constrained conditions

Our methodology for evaluating the environmental footprint

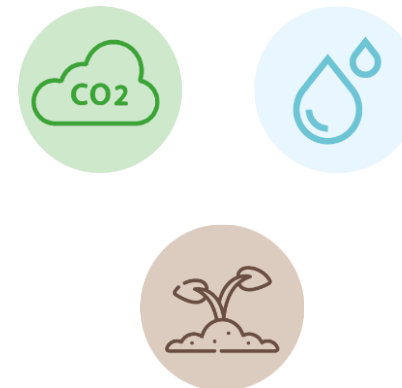
#1 Measure

Energy and resources consumed when the service is used



#2 evaluate

Environmental footprint from the measurement results





#1 Measure

Our solution for the actual **measurement** of energy consumption and IT resources on real devices.

#1

Define use cases and automate journeys

#2

Measure on the test bench devices

#3

Analyse, manage and improve



#1 Measure

Step 1. Describe the User Journey

- ✓ Write new tests with a powerful dedicated language (GDSL)
- ✓ Define parameters and measurement conditions: network, brightness...
- ✓ Launch manually or from your **Continuous Integration** process
- ✓ Or start by a standard **benchmark test** for quick and easy assessment

Automatic Test as Users Do

```
#NewTab
clickById,com.android.chrome:id/menu_button
pause,1000
clickByText,New Tab
pause,1000

#URL_Wikipedia
measureStart,URL_Writing_Wikipedia
clickById,com.android.chrome:id/search_box_text
pause,2000
enterText,www.wikipedia.org
measureStop,

#Launch_Wikipedia
measureStart,Launch_Wikipedia
pressEnter,
pause,30000
measureStop,
```



...

Step 2. Measure on a dedicated test bench

- ✓ **Real devices**, hosted and controlled by us, readily available for reliable measurements
- ✓ Adjustable **network conditions**
- ✓ Various **security levels** available (IP whitelist, VPN, private bench, on-premises bench, local devices...)

Technical Metrics

- Energy
- Data
- Response time
- CPU
- Memory...

At process level or platform level

Environmental Metrics

- GHG Emissions
- Land Use
- Water Footprint

With Client / Terminal /
Server repair and
Manufacturing / Use phase

Profiling Metrics

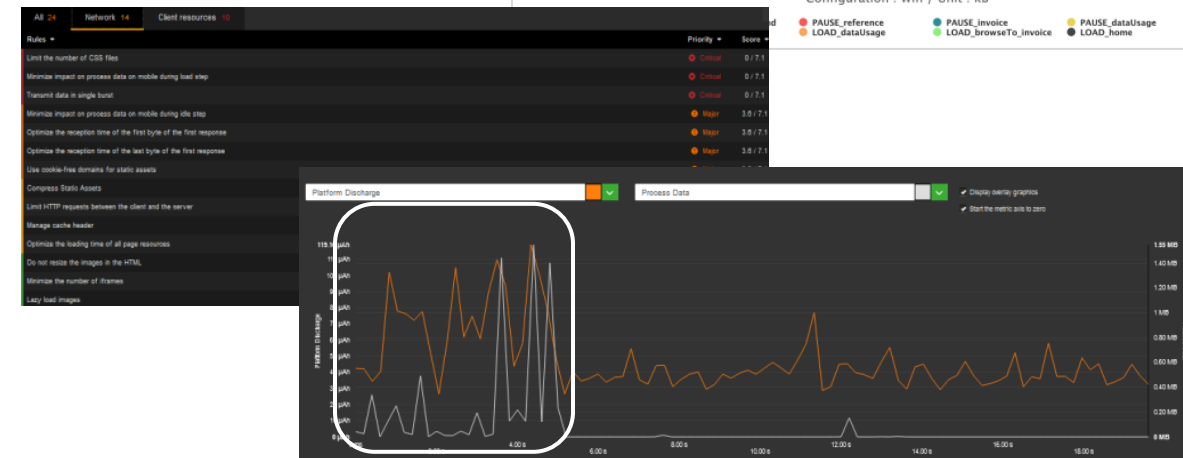
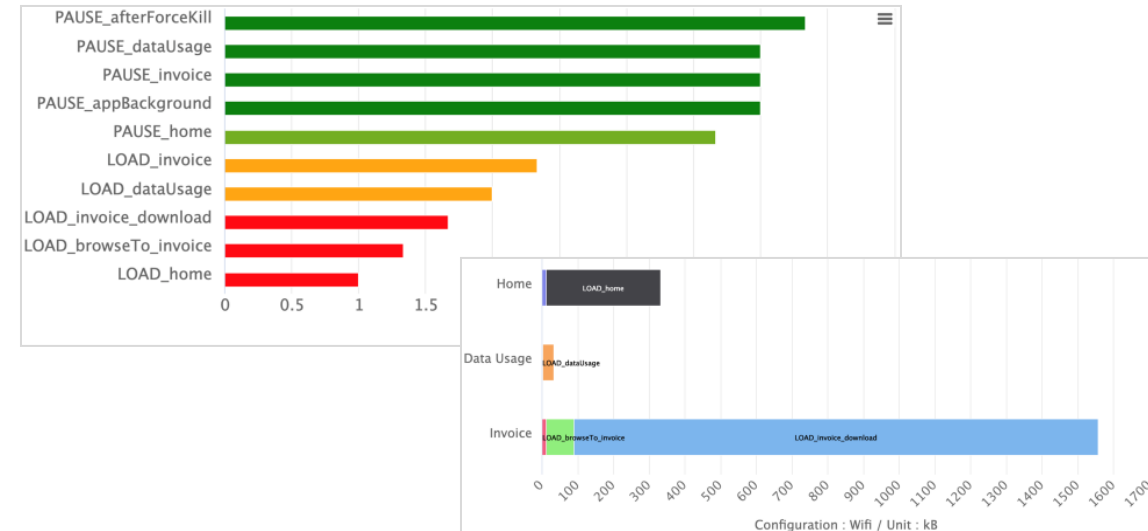
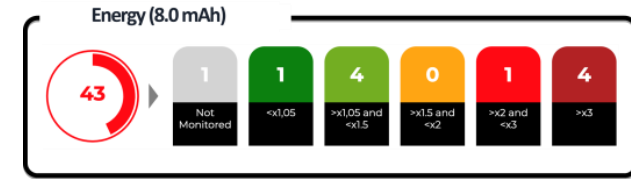
- Android
- Views Number
 - Open SSL
 - Activities...

- Web
- Queries
 - TTFB...



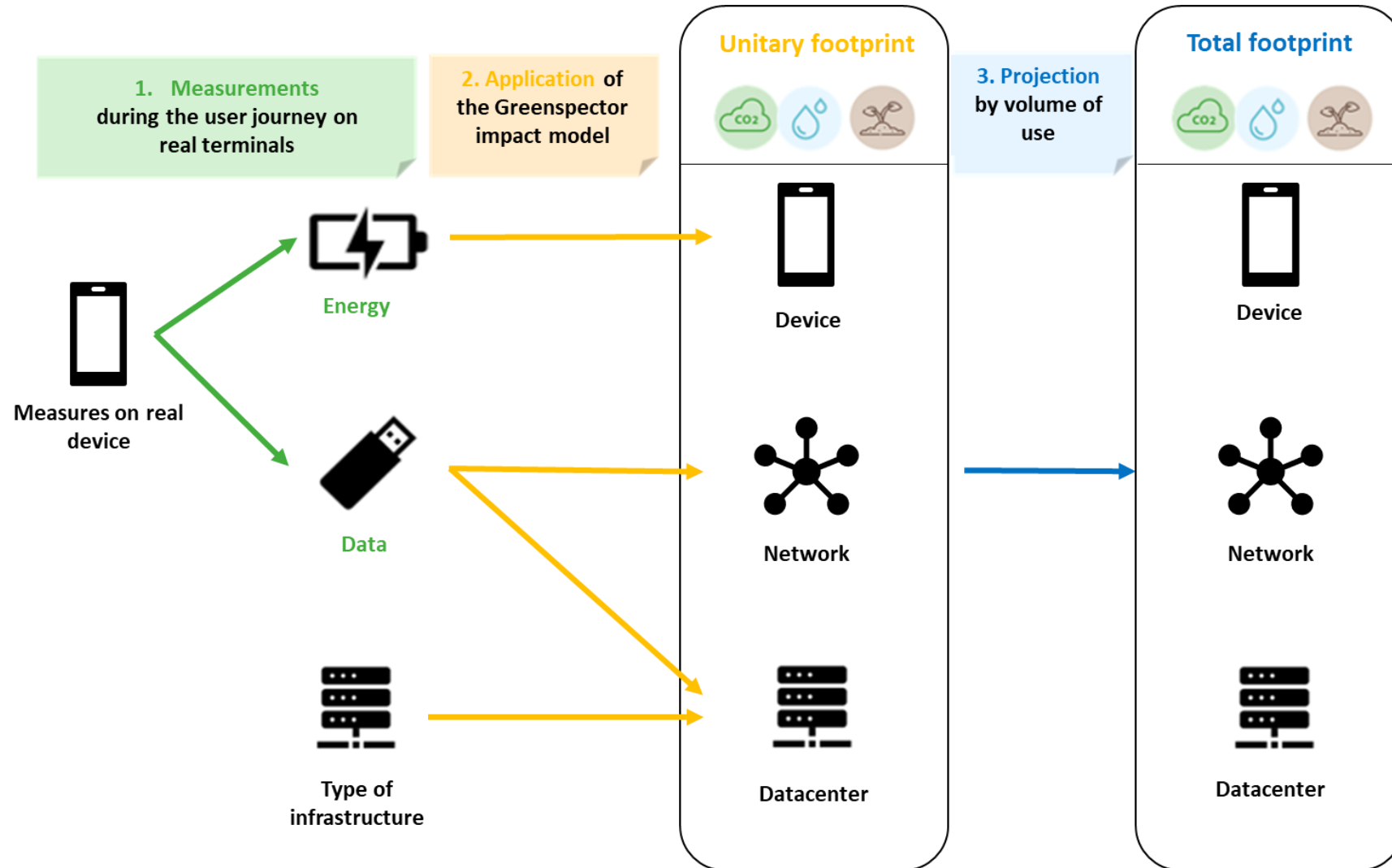
Step 3. Analyse and Manage

- ✓ Dashboard with metrics and impact KPIs for management
- ✓ Deep dive in the Metering data for understanding
- ✓ **Threshold** warnings
- ✓ Analysis and correlation on all indicators
- ✓ Prioritization suggestions
- ✓ Define and manage consumption budgets...
- ✓ All data is available through APIs



Methodology for evaluating the environmental footprint

1. From measurement results on a user device, a projection on the 3 tiers...



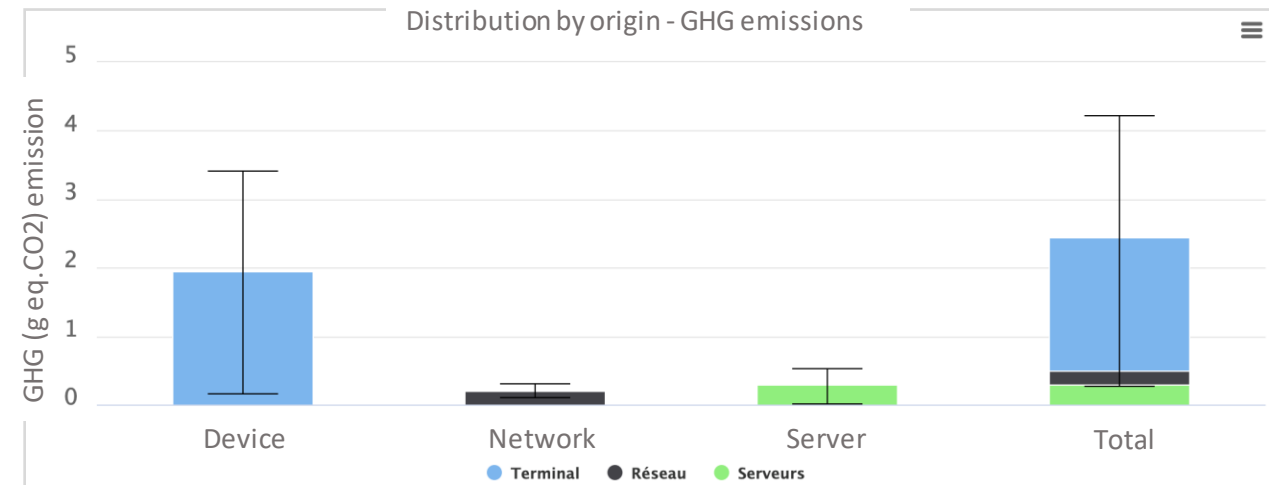


#2 Evaluate

Methodology for evaluating the environmental footprint

2. A robust impact model: impact factors determined over the life cycle of equipment, propagation of uncertainties, etc.

- **Simplified LCA methodology** (ISO 14040)
- Including **all phases of the equipment life cycle**
- Based on **several dozen scientific sources** compiled by our team
- Full model with propagation of **uncertainties**



Methodology for evaluating the environmental footprint

3. ... with 3 impact indicators, to go beyond CO₂



GreenHouse Gas Emissions (GHG)

Expressed in g eqCO₂

as commonly used, indicate the intensity of the **impact on climate change**



Water Resource

Expressed in Liters

as defined by the [water footprint network](#), is an indicator reflecting **water consumption** (blue water) and the **number of pollutants used** (greywater). It does not take into account the local scarcity of resources, but it is a meaningful indicator.



Land Use

Expressed in m²

as originally defined by [Heijungs et al. \(1992\)](#), is a reflection indicator of the **impact on biodiversity**. It is not the most comprehensive (usually independent of time, but it is the most used currently).



How we support our clients

License

Fully integrated into your digital factory

Greenspector Enterprise Solutions License

Add our tools in your CI/CD and be autonomous in your improvement of sobriety



Expert Services

For your existing applications

Greenspector Label Program

Assess the footprint of your mobile and web applications, drive change

For your new projects

Greenspector Eco-Build

Integrate an eco-design approach into a new project



Greenspector Enterprise Solutions License

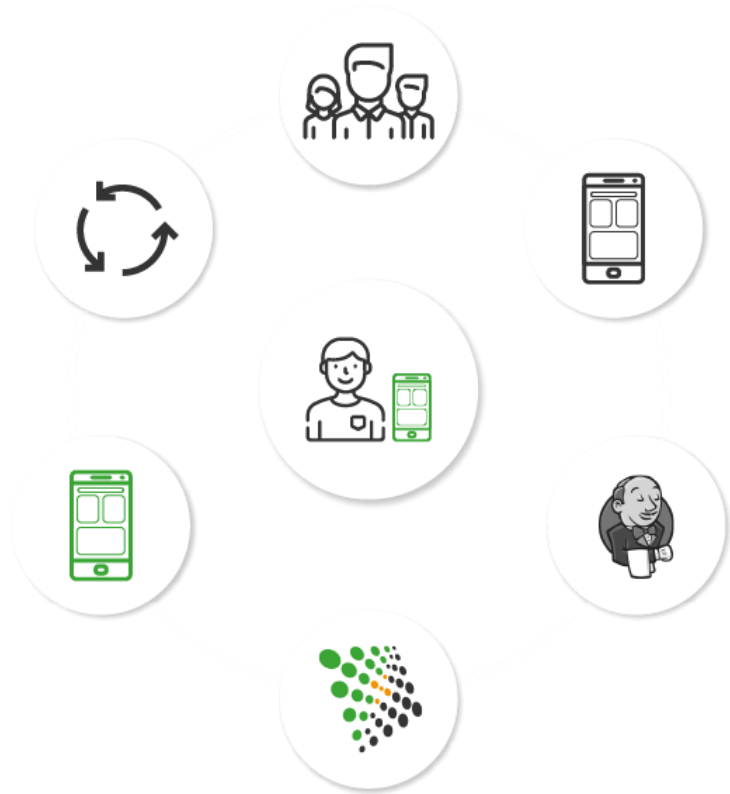
Nos outils au cœur de votre usine numérique. Mesurez, comprenez, améliorez !



Your turn to act: the Greenspector Enterprise Solutions licence

Measure at the heart of your software factory, understand, improve

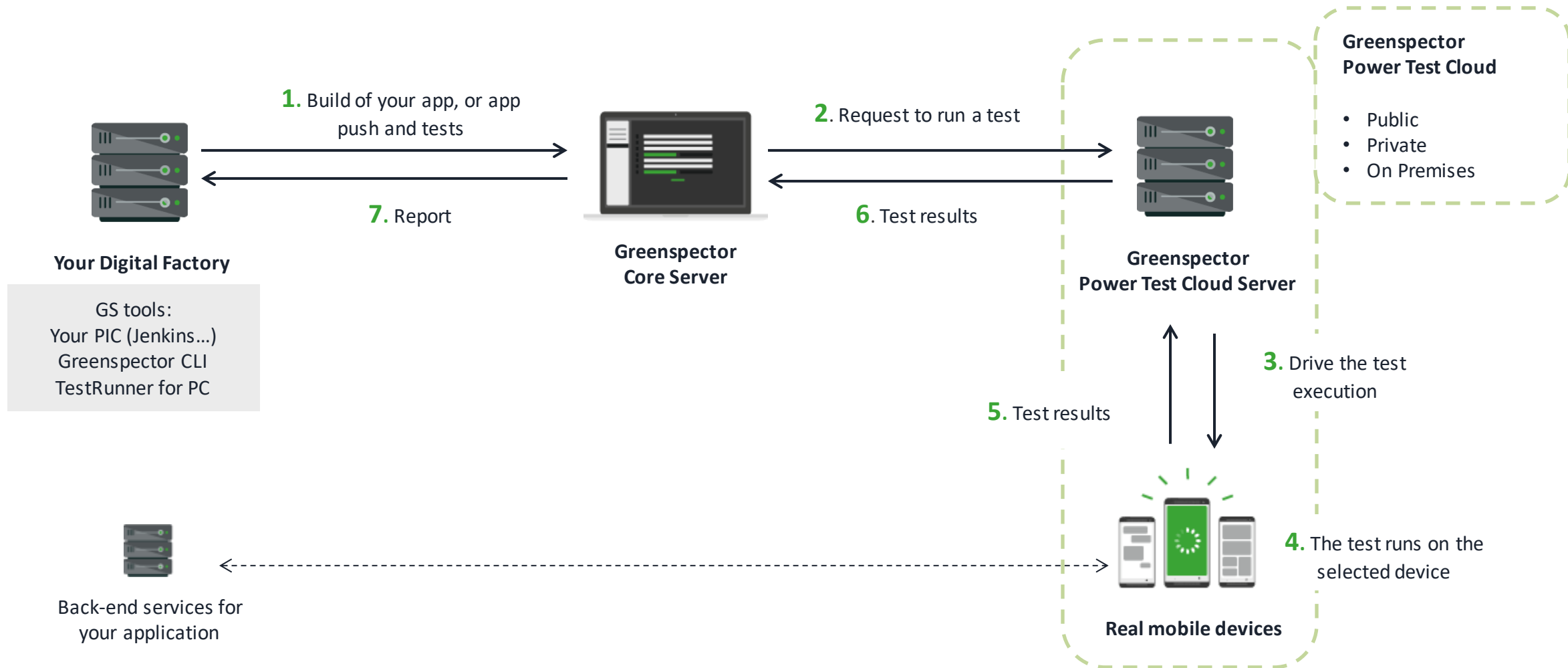
- Ideal for monitoring indicators in a **continuous integration approach**
- **Measure to anticipate**, at any stage of the project cycle, from design to production
- Can be **integrated with CI tools** (Gitlab CI, Jenkins...)
- Range of architectures from SaaS to On Premises
- Installation, training and coaching by our consultants





Greenspector Enterprise Solutions licence

Measure continuously in your CI/CD process



Label Program: Audit App Scan - a first step

Knowing your impacts and improving the user experience

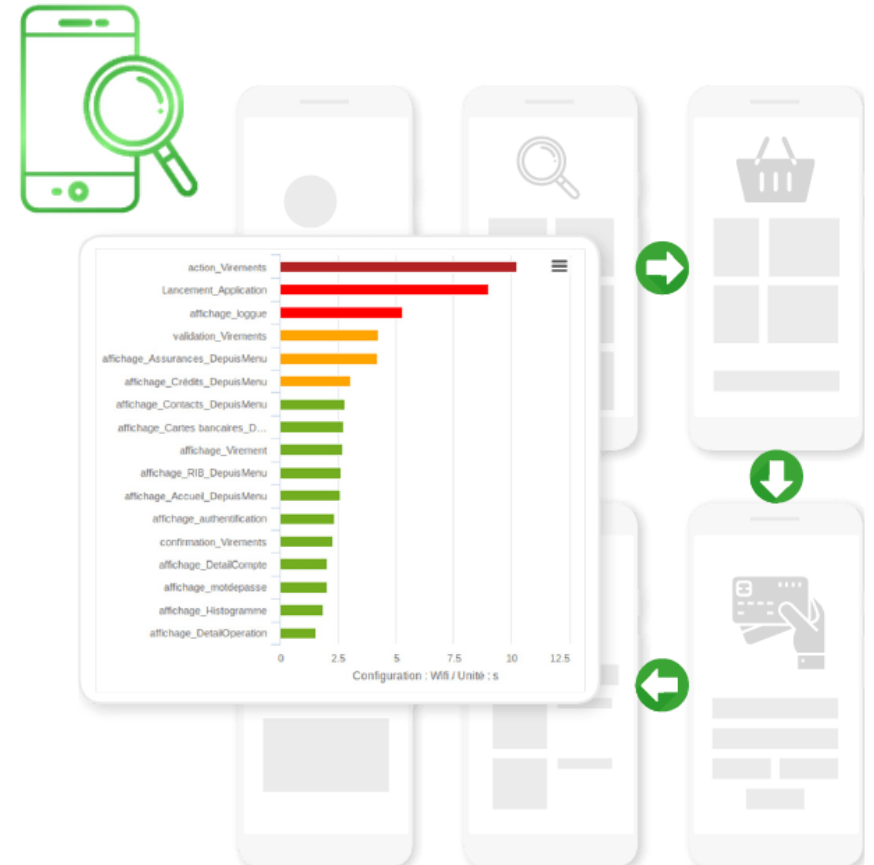
1. You describe the **user journey**

2. We measure the application during this journey

- Thanks to automated tests
- On the terminals of our test bench, in real network connections
- On your application as a black box, without access to the source code

3. Our consultants provide you with a **detailed report**

- **EcoScore** and **environmental impacts**
- As well as - if it is deserved! - our **Certificate** of Digital Sobriety
- And **detailed findings** allowing the prioritisation of **progress actions** by your project team



New projects : Greenspector Ecobuild

Successful ecodesign of your project with a focus on results

1. We support you **throughout the project**
2. On two necessary and complementary axes
 - Requirements, objectives, conception, design: to **anticipate**
 - Measuring the results: to **observe**
 - At each sprint, you have the keys to **steer the project** towards its target
3. A **final evaluation** validates the result





They did it

Clients success



Label Program: a **certificate** to encourage your teams and publicise your commitments

Orange Bank

Android & iOS customer applications

“Orange Bank app gets Greenspector Silver Label”



<https://www.orangebank.fr/blog/actualites/l-app-orange-bank-obtient-le-label-argent-de-greenspector>

Crédit Agricole Technologies & Services

Apps & Web, business and customers

“Building eco-responsible digital products with Smart'Use”



<https://www.credit-agricole.com/chaines-d-infos/toutes-les-chaines-d-info-du-groupe-credit-agricole/a-la-une/ca-ts-construire-des-produits-digitaux-eco-responsables-avec-smartuse>

Bouygues Telecom

“My Smartphone Footprint” application

“My Smartphone Footprint, awarded silver label by Greenspector”



<https://www.corporate.bouyguestelecom.fr/bouygues-telecom-lance-lapplication-mon-empreinte-smartphone-pour-sensibiliser-a-la-sobriete-numerique/>



SNCF CONNECT: an ambitious overhaul

Our offer: App Scan for Android and iOS

The SNCF has decided to overhaul its OUI.SNCF e-commerce application **used by several million people to book their train tickets**. In addition to the major functional challenges involved in transforming it into a genuine MaaS application, SNCF Connect&Tech has identified the following areas of work :

- A **user path** to be optimised
- **Data volumes** to be reduced for better use in mobility
- An **environmental footprint** to be reduced

Our consultants have audited the Android application before it went live. Specific recommendations were made (geolocation management, app opening, etc.), leading the SNCF teams to undertake improvement work.

Two months later, a new measurement was carried out to verify the gains made:

- ✓ **19% less CO2** on the TER (regional train) booking path
- ✓ A user journey shorter by **8 seconds**
- ✓ **300 kb less data** for each booking
- ✓ 2 applications certified Silver level, for Android and iOS



10:36 AM · 18 juin 2022 · Twitter for iPhone

"From the design phase and throughout the project, our requirements included performance control associated with a sobriety approach. With Greenspector, we were able to associate a measurement with it, work on optimisations while continuing to educate our employees on the subject, with a very encouraging result."

Sébastien Gobin, Tech & Products Quality and Production Manager



Smart'use: a label for digital Products

Our offer : Label Program



Crédit Agricole's Technology & Services team wants to encourage progress in its Product Divisions for both customer and employee applications. Issues :

- Dissatisfied users because **applications are too slow**
- **Data volumes too high** for agency networks
- **Environmental responsibility** to be integrated into the approach

Together we have defined an approach and criteria for internal certification, leading to the Smart'Use label.

Our Expertise and Measurement Centre carries out diagnostics or simple measurement campaigns at the request of any Product Pole or Squad.

- ✓ Web and Mobile products are **evaluated and labelled** by an [internal label](#) called « Smart'Use »
- ✓ Progress is encouraged by **emulation between teams**
- ✓ The contractual arrangements are clear and flexible for the Products teams





Bouygues Telecom: from diagnosis to continuous improvement



Our offer: App Scan (Android, iOS, web) then license deployment

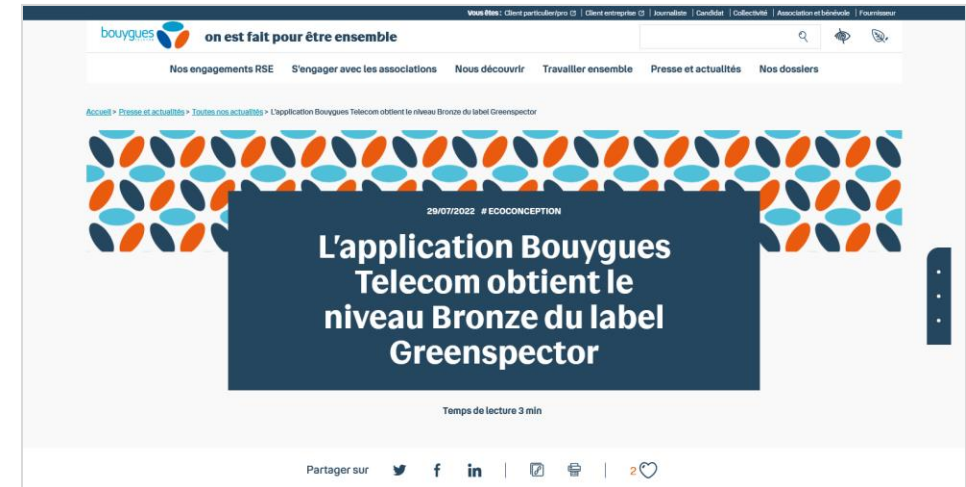
For Bouygues Telecom, the mCare application and the web customer portal are at the heart of the relationship with **several million customers**. During the redesign of the mobile application, strong challenges were expressed:

- The **user journey** needed optimisation
- **The will to eco-design** the application, supported by impact measurements

Greenspector consultants audited the application being redesigned and made recommendations for its improvement.

The user journey, with a much more efficient design, was accompanied by optimised implementation choices.

- ✓ **A new application awarded our "bronze" label** as soon as it goes into production
- ✓ The Front Office & Digital Omnichannel Department is committed to continuous improvement by **deploying the Greenspector Enterprise Solutions licence**.



"In order to be consistent with Bouygues Telecom's CSR commitments, the teams called on Greenspector, a recognised expert in sobriety and performance of digital services, to audit this new version of the Bouygues Telecom application."



Orange: Corporate Communication controls its impacts



Our offer: Web monitoring and expertise

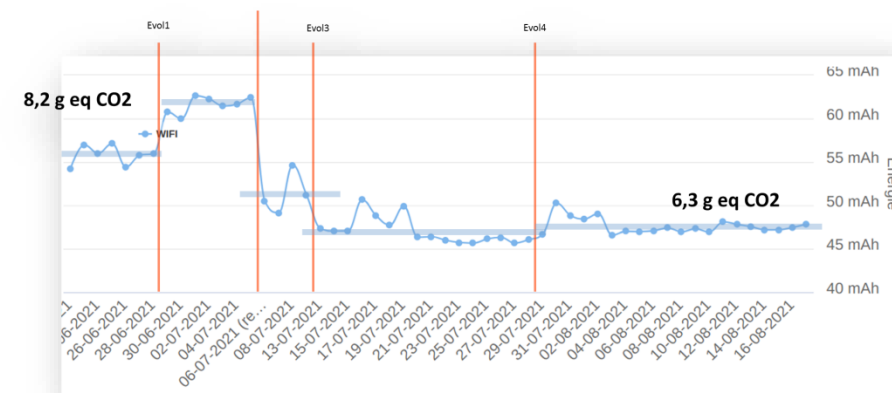
The Orange Group Communications Department is responsible for the quality of the corporate website, the Group intranet and other internal and external communication channels. Its challenges:

- **Aligning the Group's communication channels with the company's CSR ambition**
- In a rigorous process of **continuous and long-term improvement**
- And **eco-design the 2021 IAR** (Integrated Annual Report)

After an **initial audit** leading to a progress action plan, we set up **daily monitoring** of the 10 main pages of the www.orange.com website, as well as the Group intranet.

As for the IAR, our teams provided expertise and measurements alongside the Shareholder Relations Department to support the digital agency in charge of creating and developing the site.

- ✓ Daily monitoring allows for a fine follow-up of changes, and **precise and rapid corrections**
- ✓ **Targeted measurements** allow significant gains by selecting the best video player, image compression solution, etc.
- ✓ As for the [RAI 2021](#), its impact is **55% lower** than the 2020 report!





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#1 Measure

Our innovation: direct measurement on real devices

Real measures for real progress

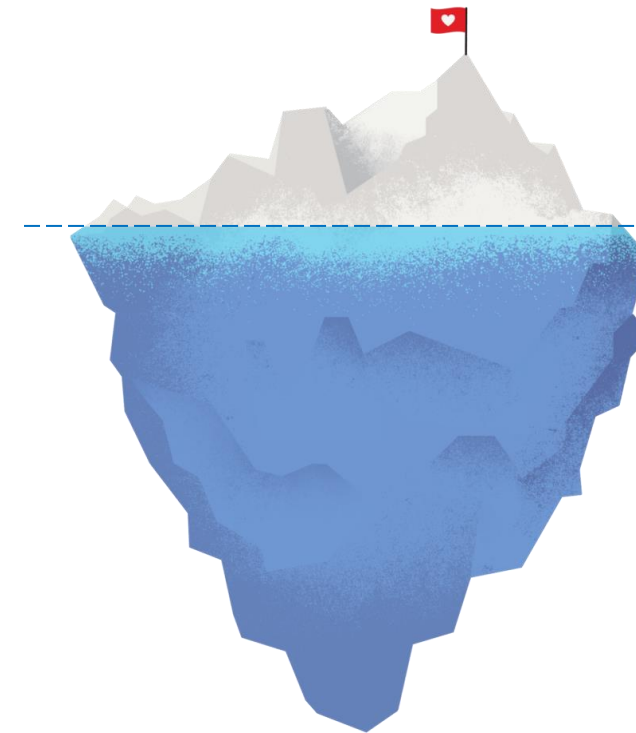
The right information to make the right decisions...

- Can you find out the CO2 emissions of a car by looking at the size of its tyres?...
- Can you find out the impact of software from secondary indicators?...
- According to the latest ADEME/ARCEP study (link), on average **78% of the carbon impact occurs on the user terminal.**
- Only measurement on real devices allows us to know the consumption of resources, and therefore the real environmental impact, of a software.
- As a result, it is the only way to take effective progress actions and, above all, the only way to do so **without the risk of working at cross-purposes.**

... on complex systems

Only by measuring consumption can we know, and therefore control, all the causes of a software's impact, for example:

- Resource-intensive **libraries**
- All the **sensor** demands on the user's device (CPU, GPU, network antennas, Bluetooth, etc.) and the resulting energy consumption
- The impact of the chosen **colours** (dark mode for example)
- A small **JS script** that triggers intensive processing
- The presence of a Trojan horse for crypto-currency calculation, integrated by a **third-party library**
- And so on.



Progress achievable through the application of "good practices" and the monitoring of 2nd level indicators

Rewarding, fairly easy, but not very effective

Progress achievable through piloting with direct measurement

Rigorous, efficient, and sure to tackle the real problems

An example: An experienced eco-design consultant creates a website for his client. He is delighted to achieve near perfection: **rated A by EcoIndex.fr, rated A/A/A/A/A on WebPageTest!**

But when he measured the energy consumption with Greenspector, he was dismayed: **the site over-consumes!**

The removal of a graphic animation element in JS, undetectable except by real measurements, has made it possible to **divide energy consumption by 2, thus greatly reducing the impact of the site.**

Without this measure, the issue would never have been detected, and eco-design would have remained an illusion...