

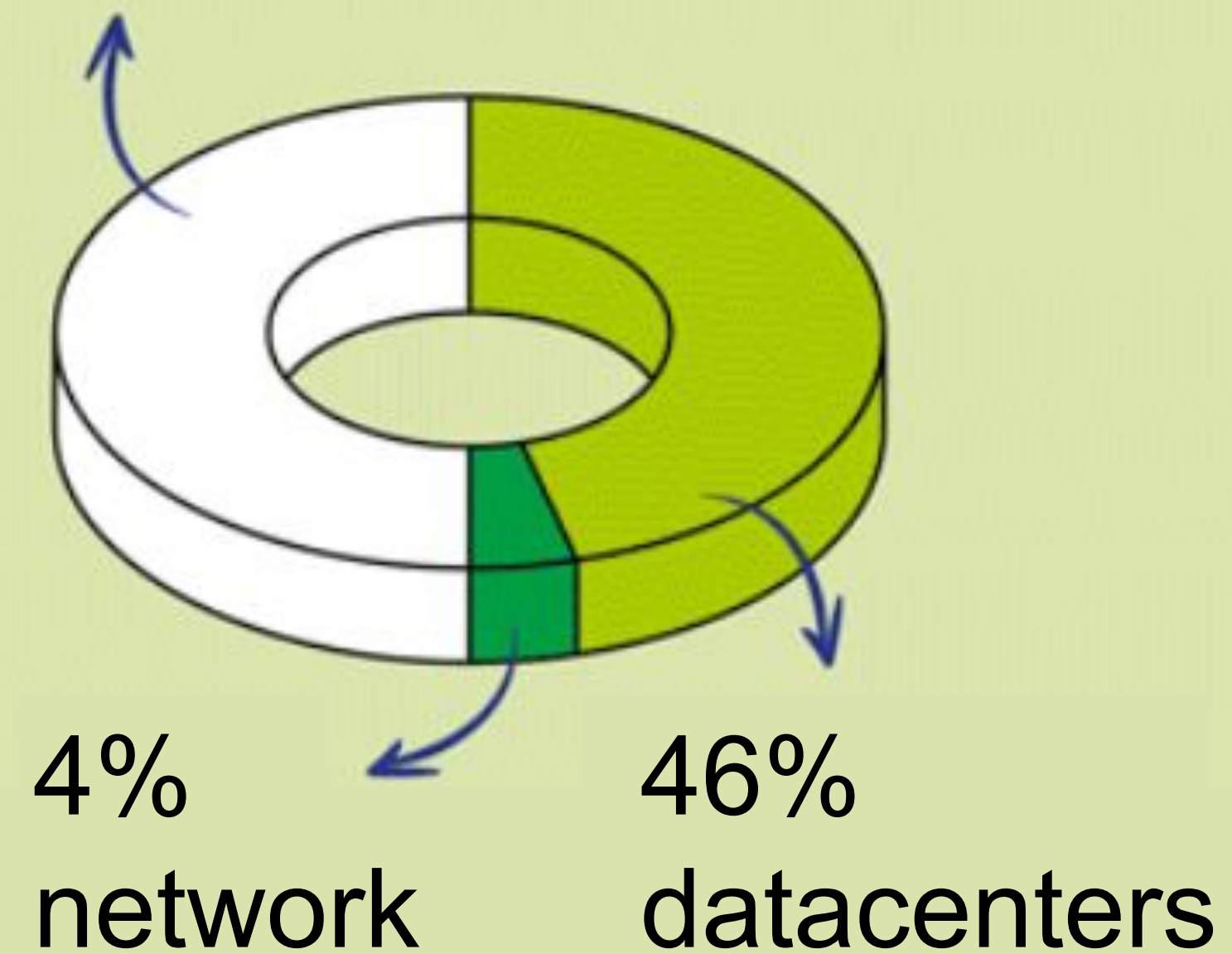
Ecodesign in mobile development with DevGreenOps





Devices vs Datacenters

50% devices
computers, smartphones, smartTV...



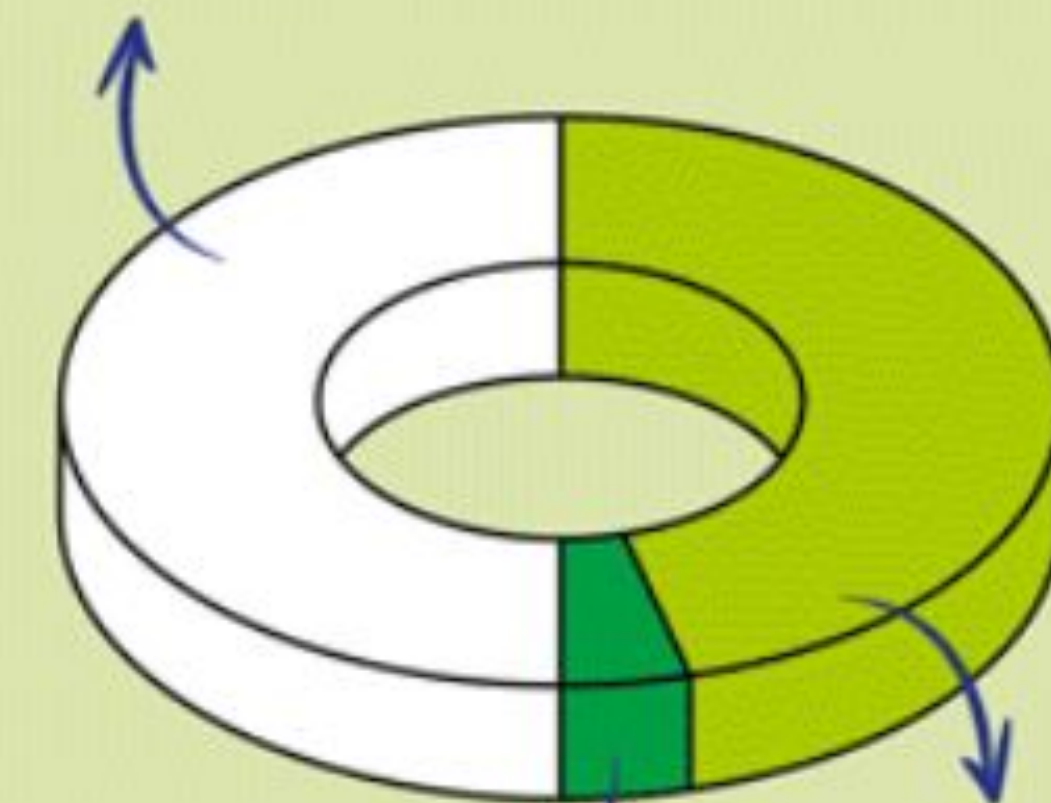
Ademe, 2025 (scope: France - 50%)
GreenIT, 2025 (scope: World - 54%)



Devices vs Datacenters

50% devices

computers, smartphones, smartTV...



4%
network

46%
datacenters

Centralized impacts
Homogeneous hardware



Centralized optimisations
Scalability

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Devices vs Datacenters

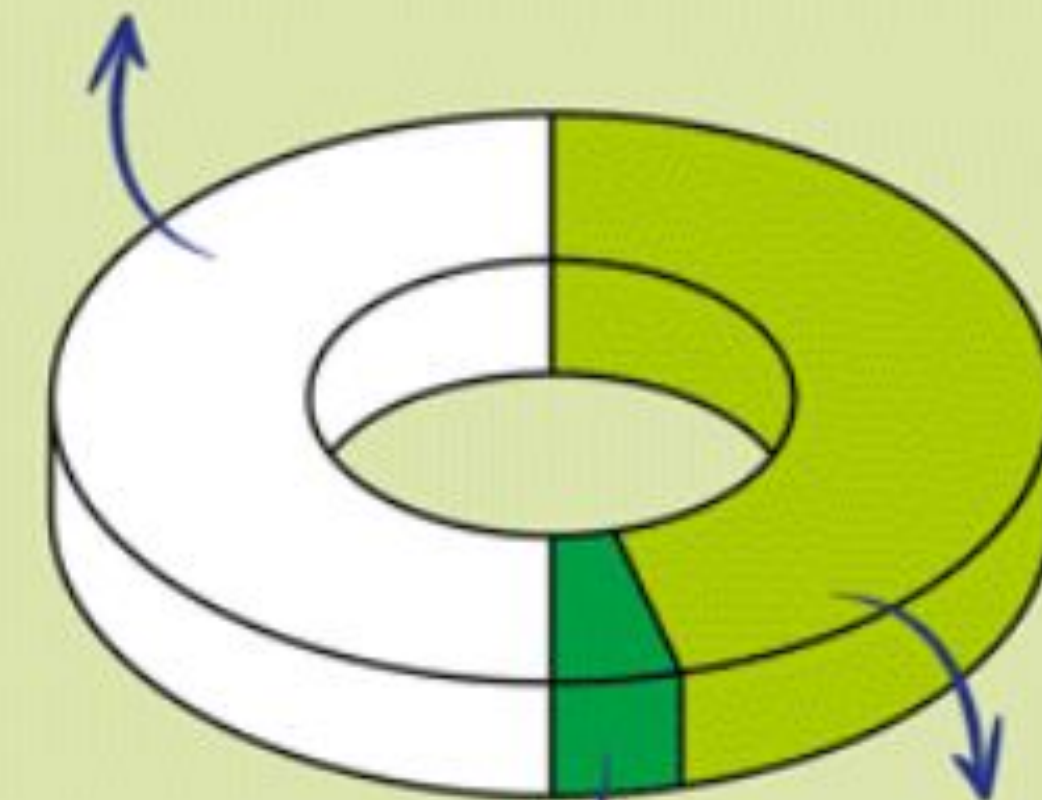
Decentralized impacts



Decentralized
optimisations

Billions of devices
Thousands of models
Millions of services

50% devices
computers, smartphones, smartTV...



4%
network

46%
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Centralized impacts
Homogeneous hardware



Centralized optimisations
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Ademe, 2025 (scope: France - 50%)

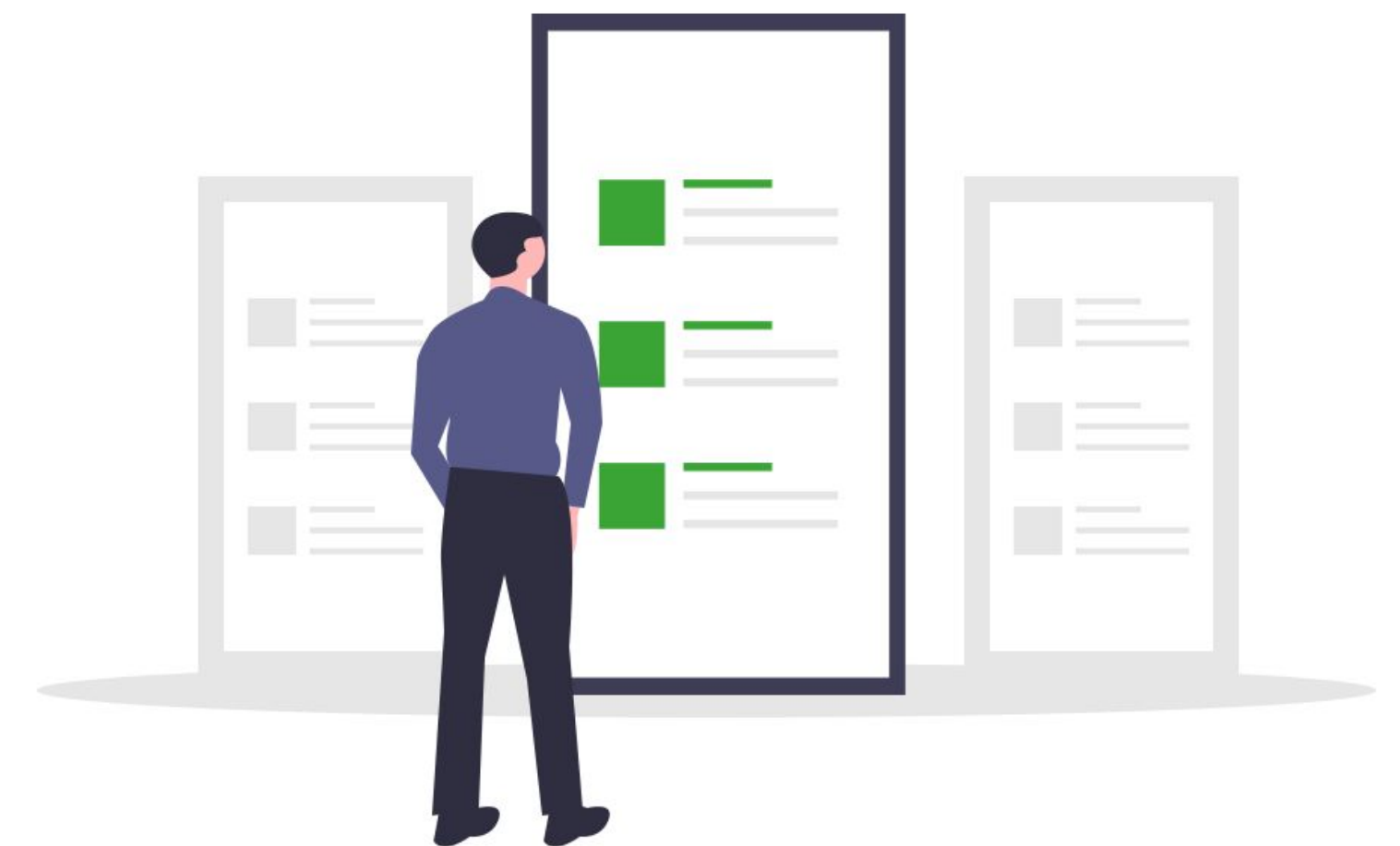
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Focus on mobile devices

Constraints of front-ends:

- Multi-features
 - Interactive
 - Diversity
-





Focus on mobile devices

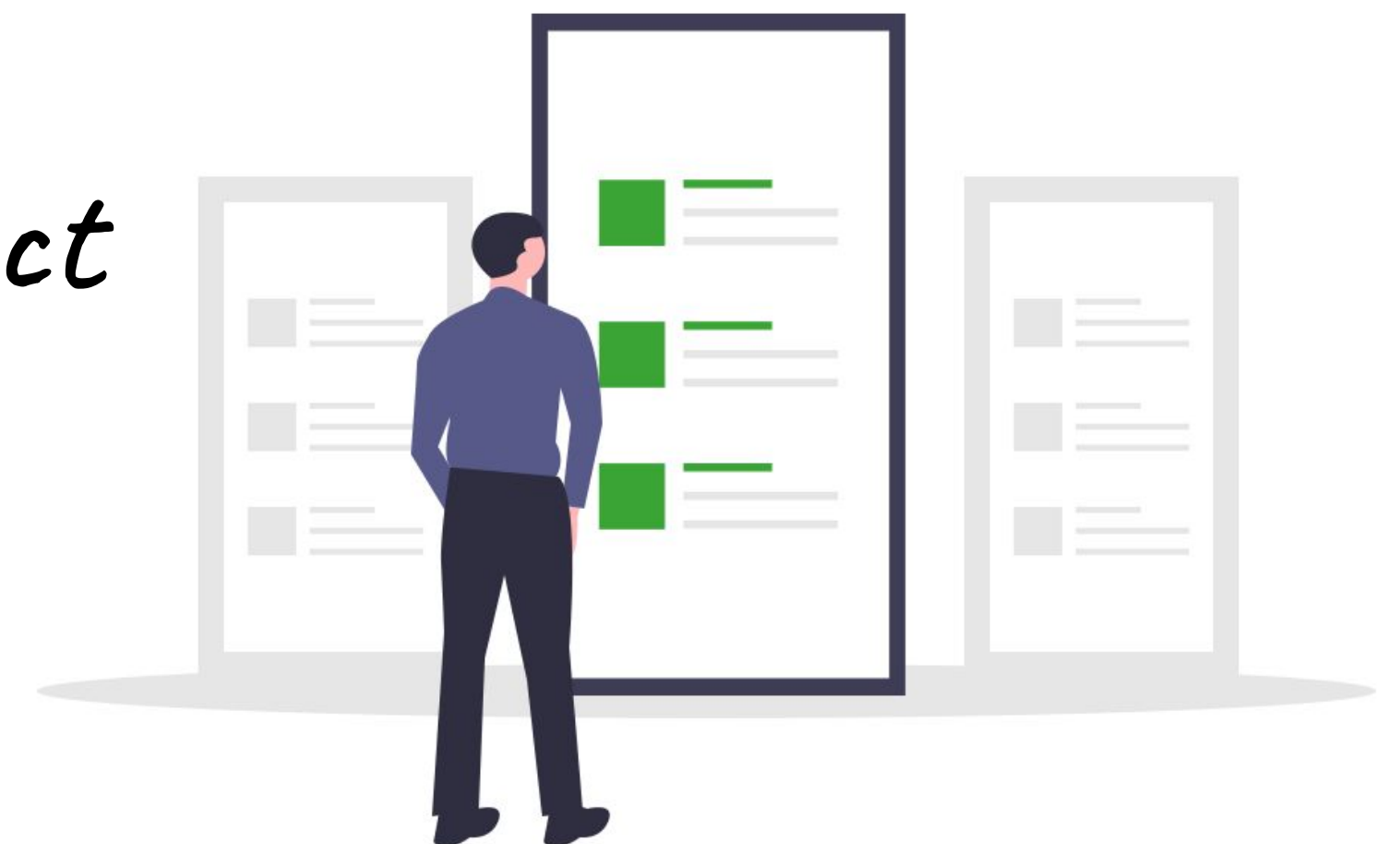
Constraints of front-ends:

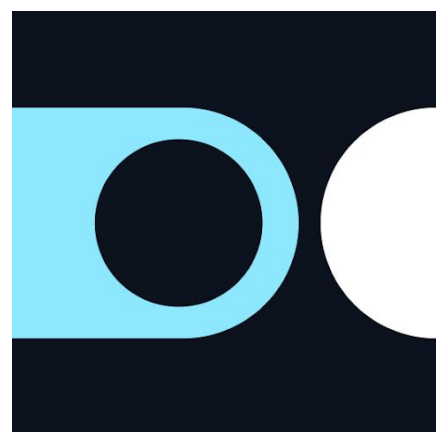
- Multi-features
 - Interactive
 - Diversity
-

Impact of software front-ends:

- Energy consumption → *20% of GHG impact*
- Hardware lifespan shortening (batteries) ↘
- Pressure on network & backends

80%





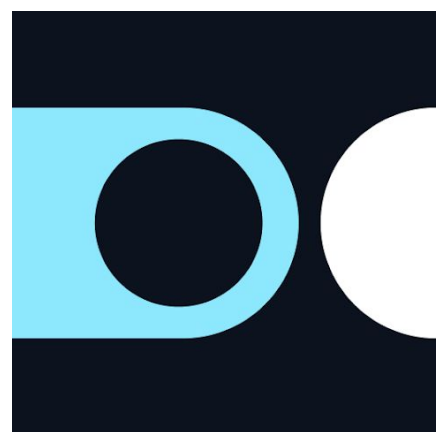
SNCF Connect

Application (Android/iOS)

30 million
yearly bookings

- -8 seconds /booking
- -300 KB /booking
 - (\approx -9TB/year)

-19% CO₂e /booking



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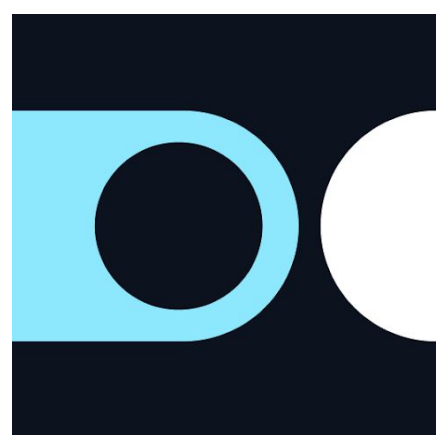
Paris 2024

Website

5 million
pages visited

- -31% battery use /page
- -43% data volume /page
- -30% net. request /page

-34% CO₂e /page
on the 20 most visited pages



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on the 20 most visited pages



Bouygues Telecom

Application (Android)

182 million
yearly journey

-36% CO₂e /journey
(\approx 693 tCO₂e yearly)



How to measure an interface?

Life Cycle Assessment (ISO 14044) → functional units

Looking up a transaction

*Functional
unit*

- Open the app
- Login
- Select an account
- Check a transaction
- Close the app



How to measure an interface?

Life Cycle Assessment (ISO 14044) → functional units

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- Select an account
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- Close the app

Click on app icon, wait for [criteria]

Type password after 2s

Click on account after 2s

2 swipes/s until [criteria]

Close the app after 5s

*User
journey*

network: Wifi, brightness: 50%

Automation and replicability

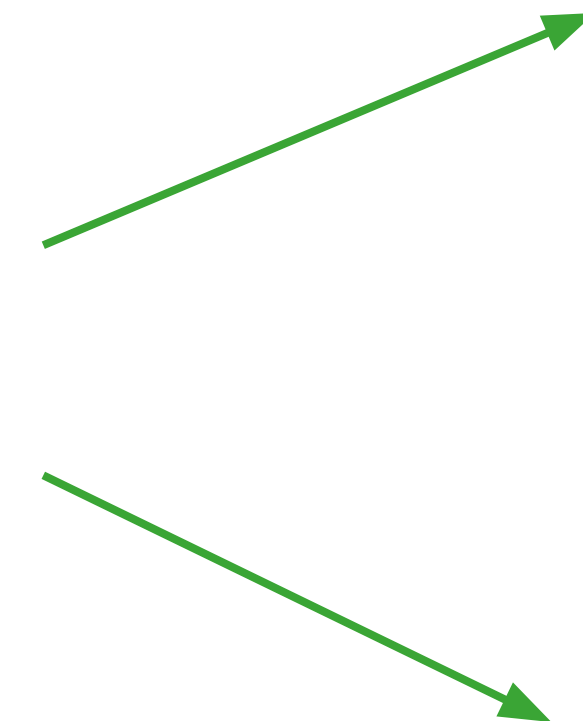
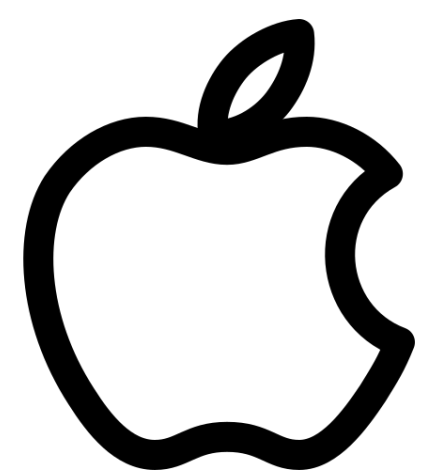
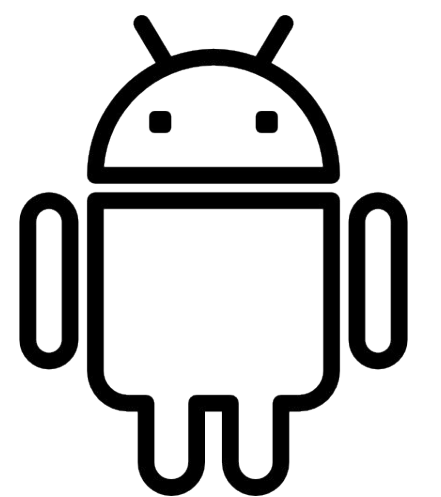
User journey:

*Step 1:
Open the app*

*Step 2:
Pause on Home*

*Step 3:
Navigation*

```
1  measureStart, LOAD_home
2  applicationStart, com.myapp
3  waitUntilText, Hello
4  pause,${PAUSEAFTERLOAD}
5  measureStop
6
7  measureStart, PAUSE_home
8  pause,${PAUSEDURATION}
9  measureStop
10
11 measureStart, LOAD_addEntry
12 clickByTextExact, Add
13 waitUntilText, Enter new name
14 pause,${PAUSEAFTERLOAD}
15 measureStop
...
... applicationCloseAll
```



Measure protocol

Test environment:

- **Physical devices only**
- Stable activity / idle power usage
- Battery within safe range



Measure protocol

Test environment:

- **Physical devices** only
 - Stable activity / idle power usage
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-

Monitoring:

- **Battery** discharge (mAh)
- Temperature
- Data usage
- All available metrics (CPU, RAM, ...)

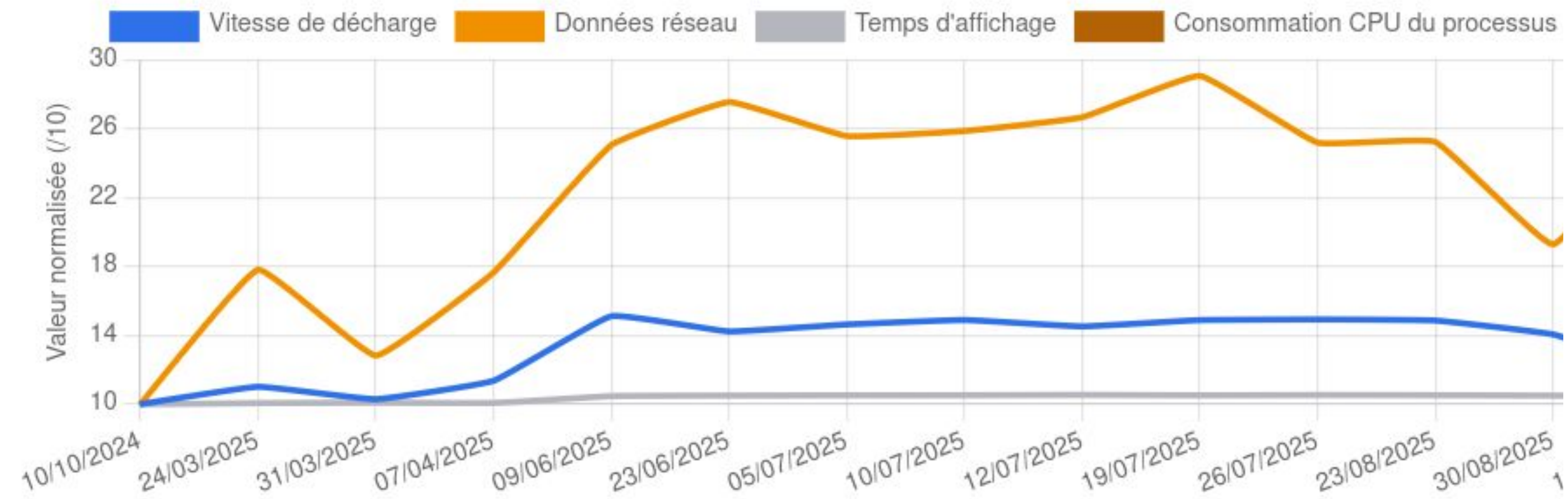




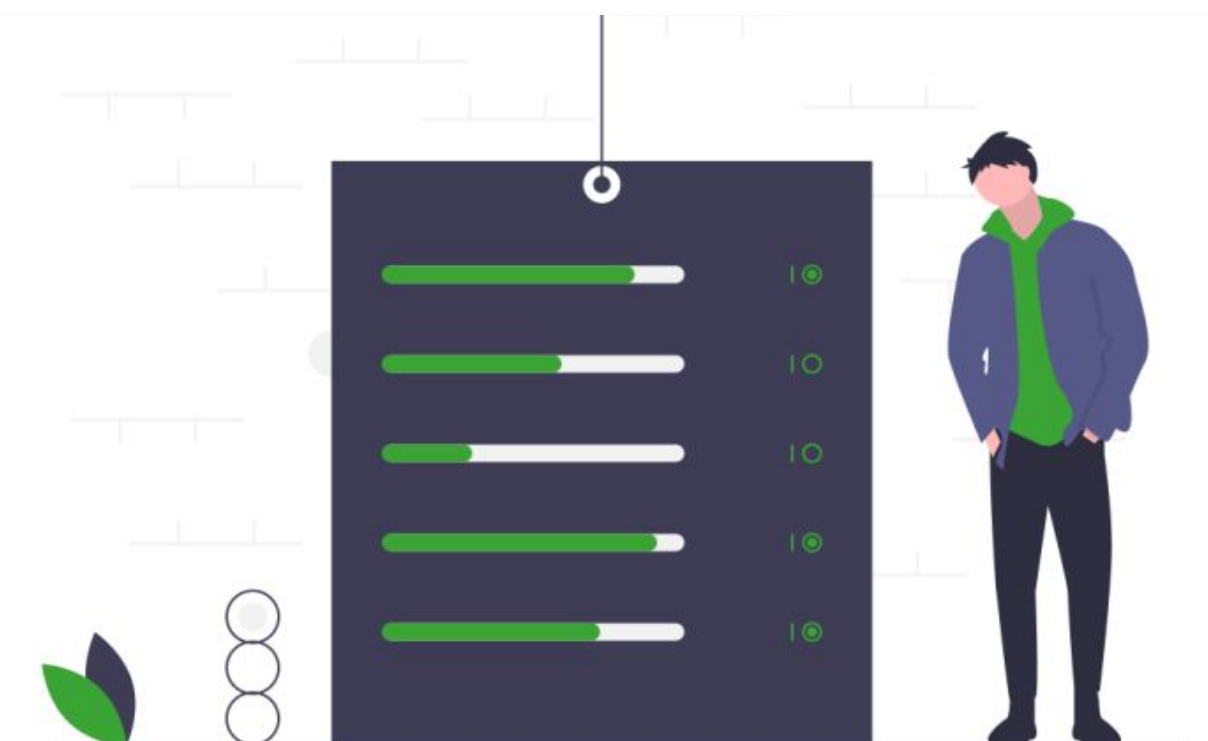
Results aggregation



Raw data



Over versions and within versions



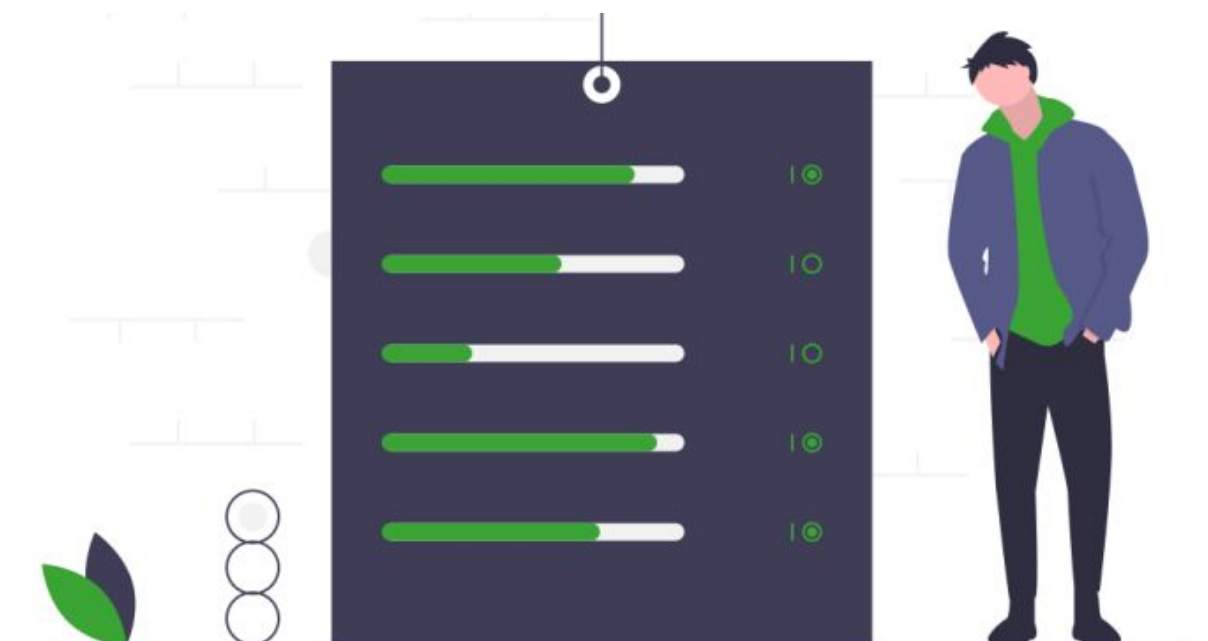
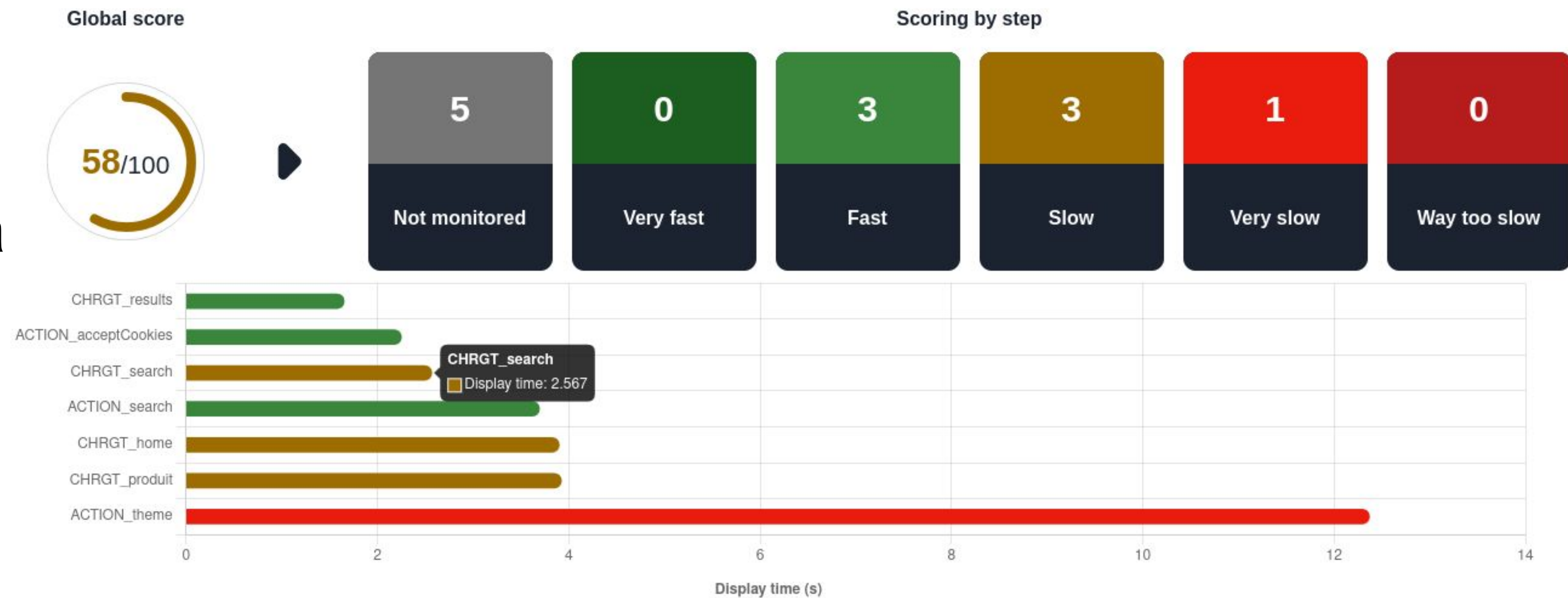
Results aggregation

Global & per step



Raw data

Ecoscore

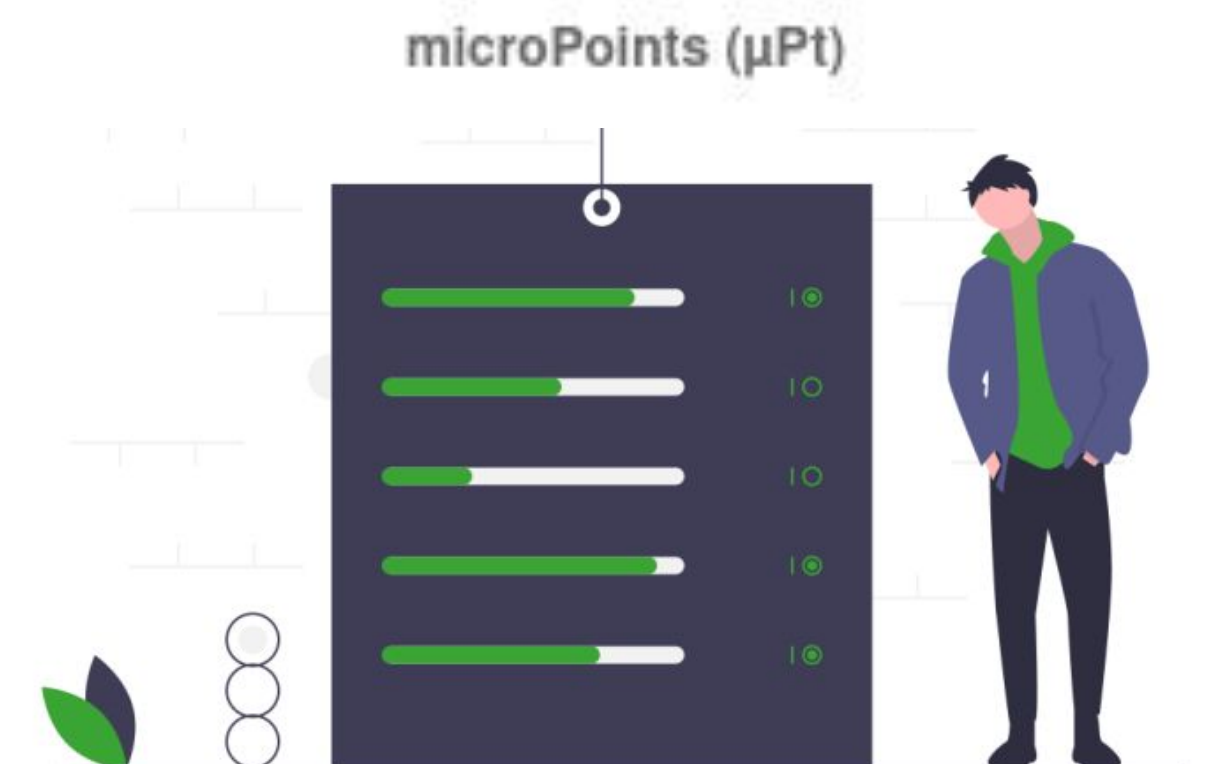




Results aggregation

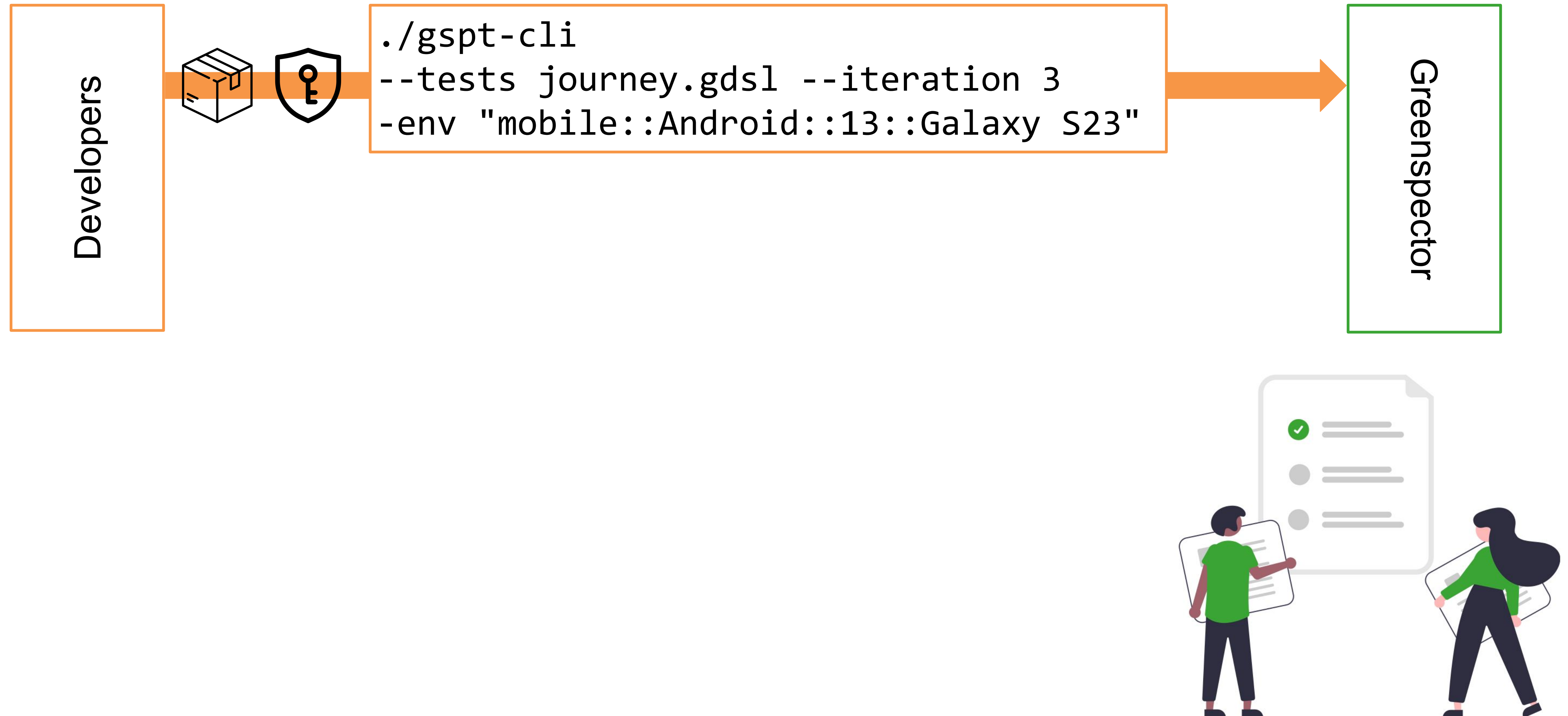


8 Impact categories

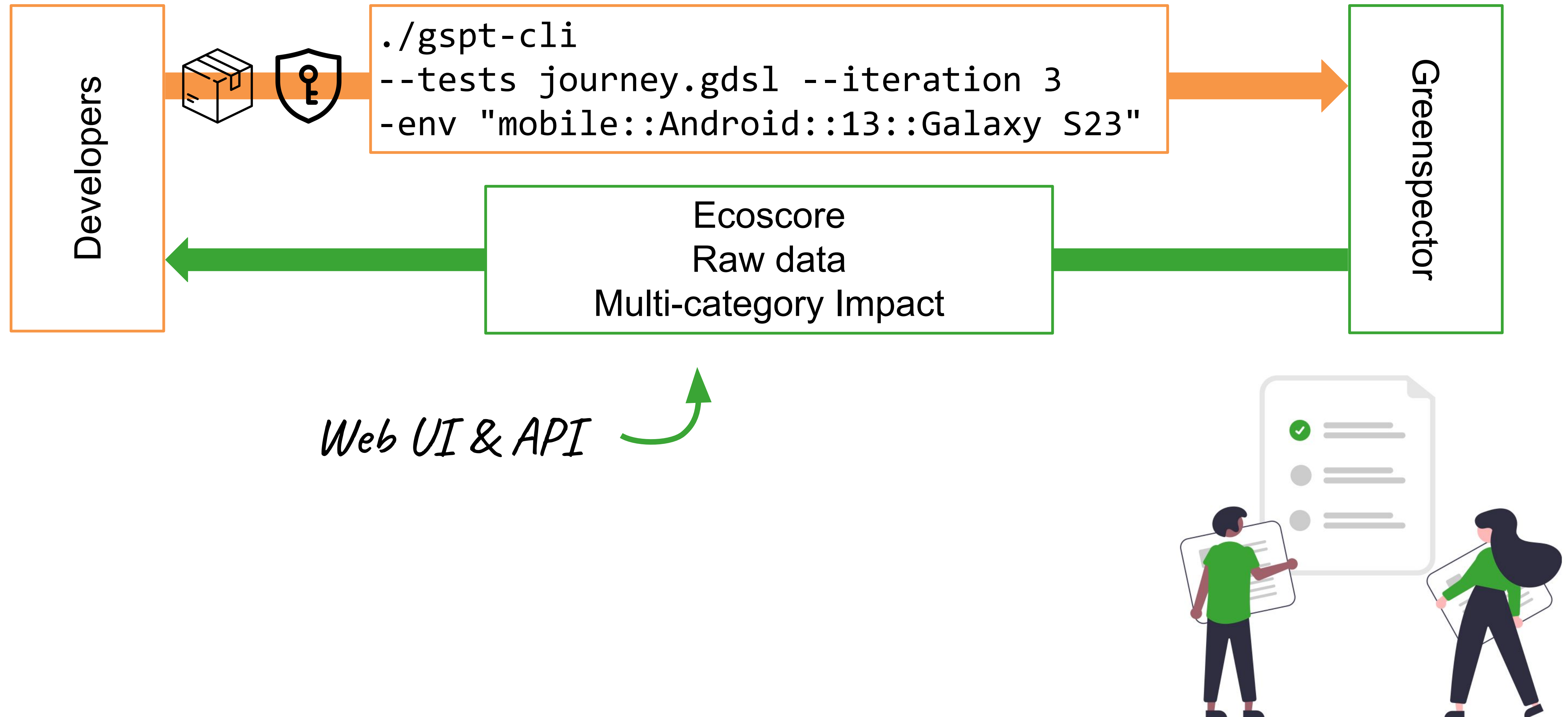




Integration: toward DevGreenOps

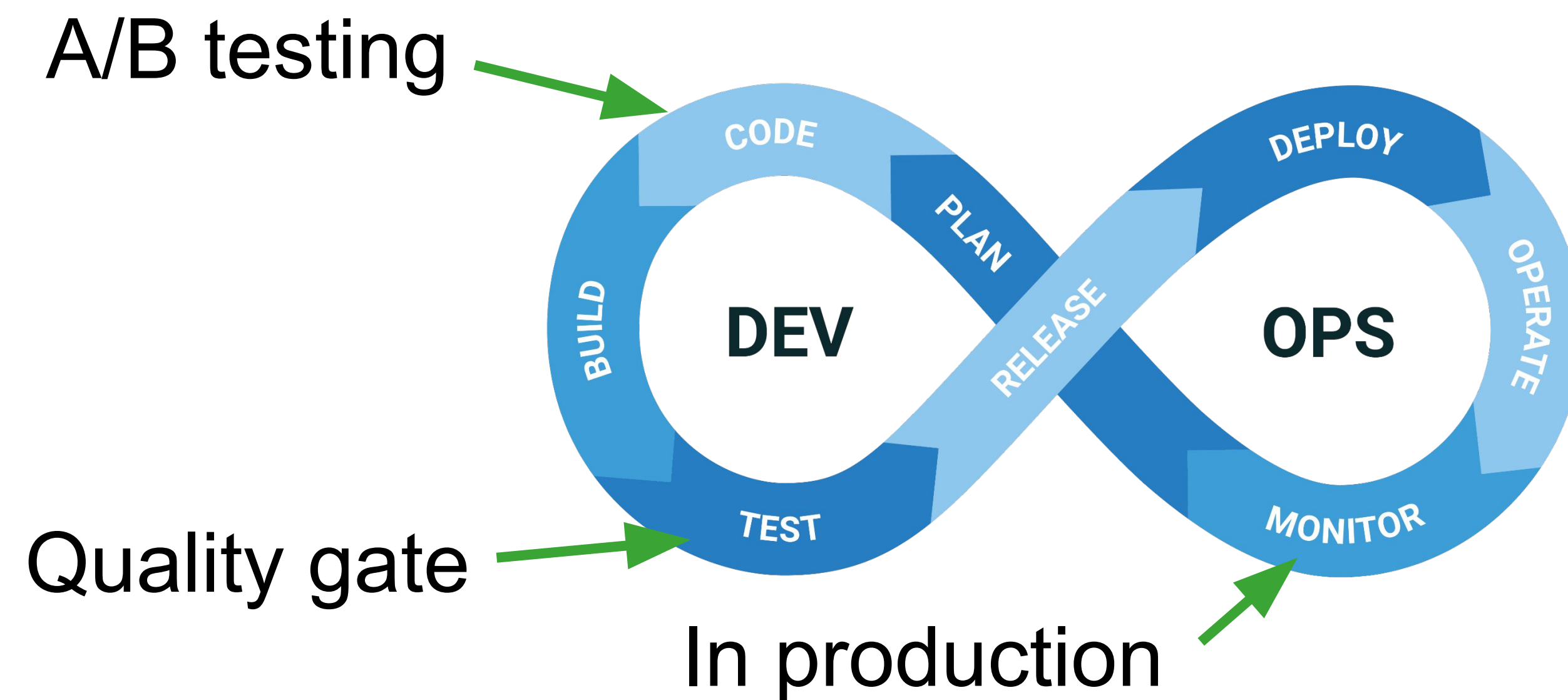


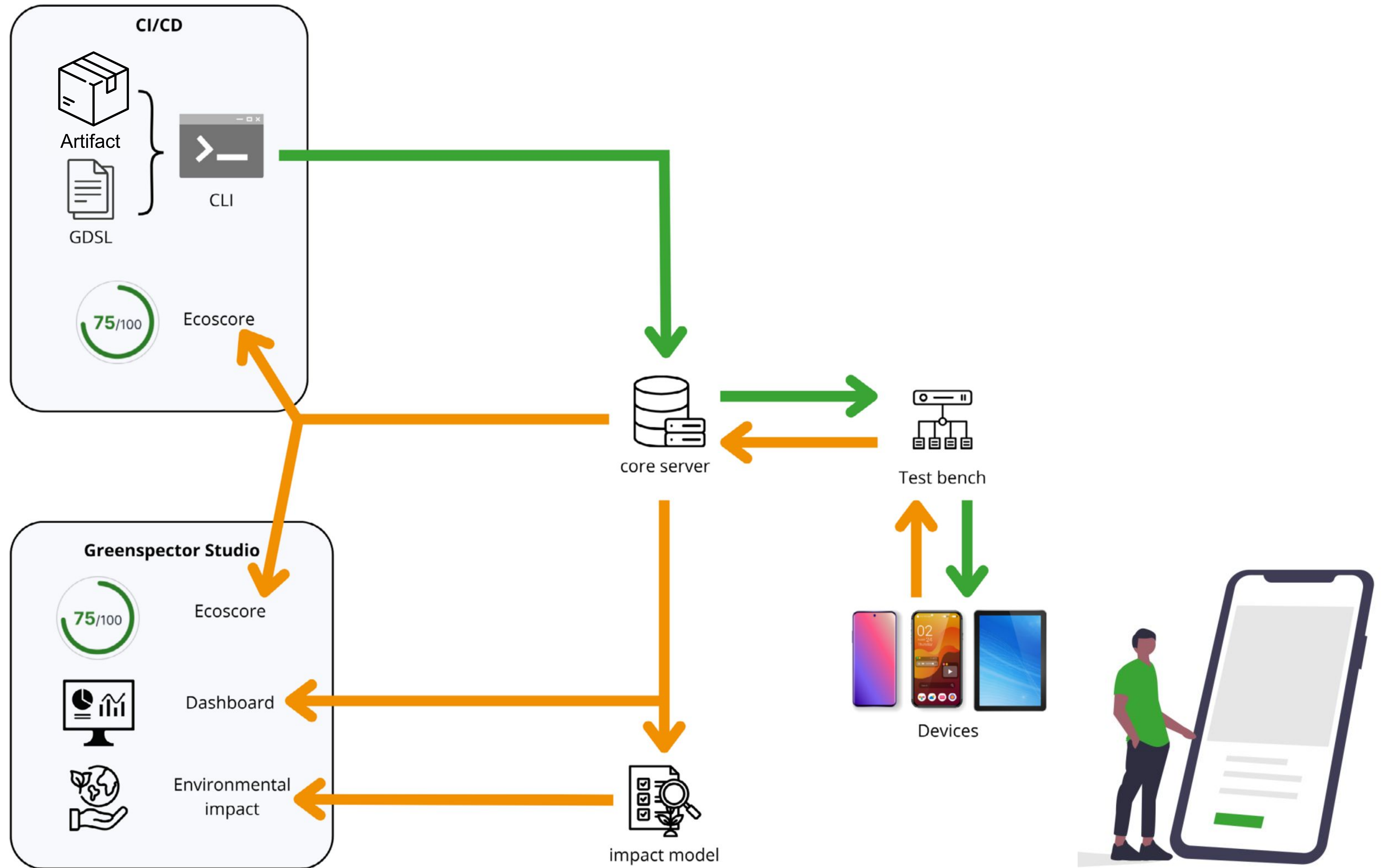
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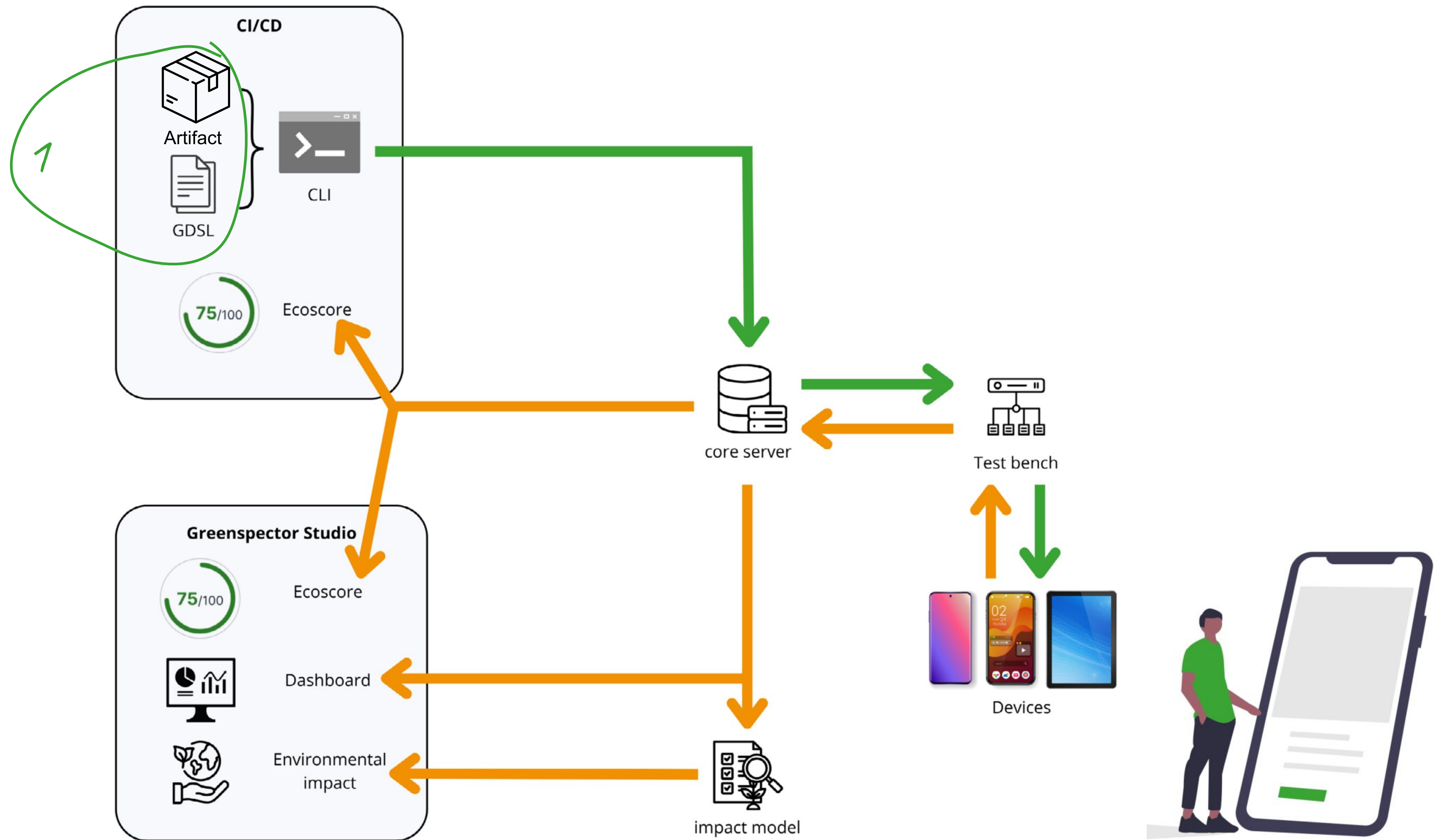


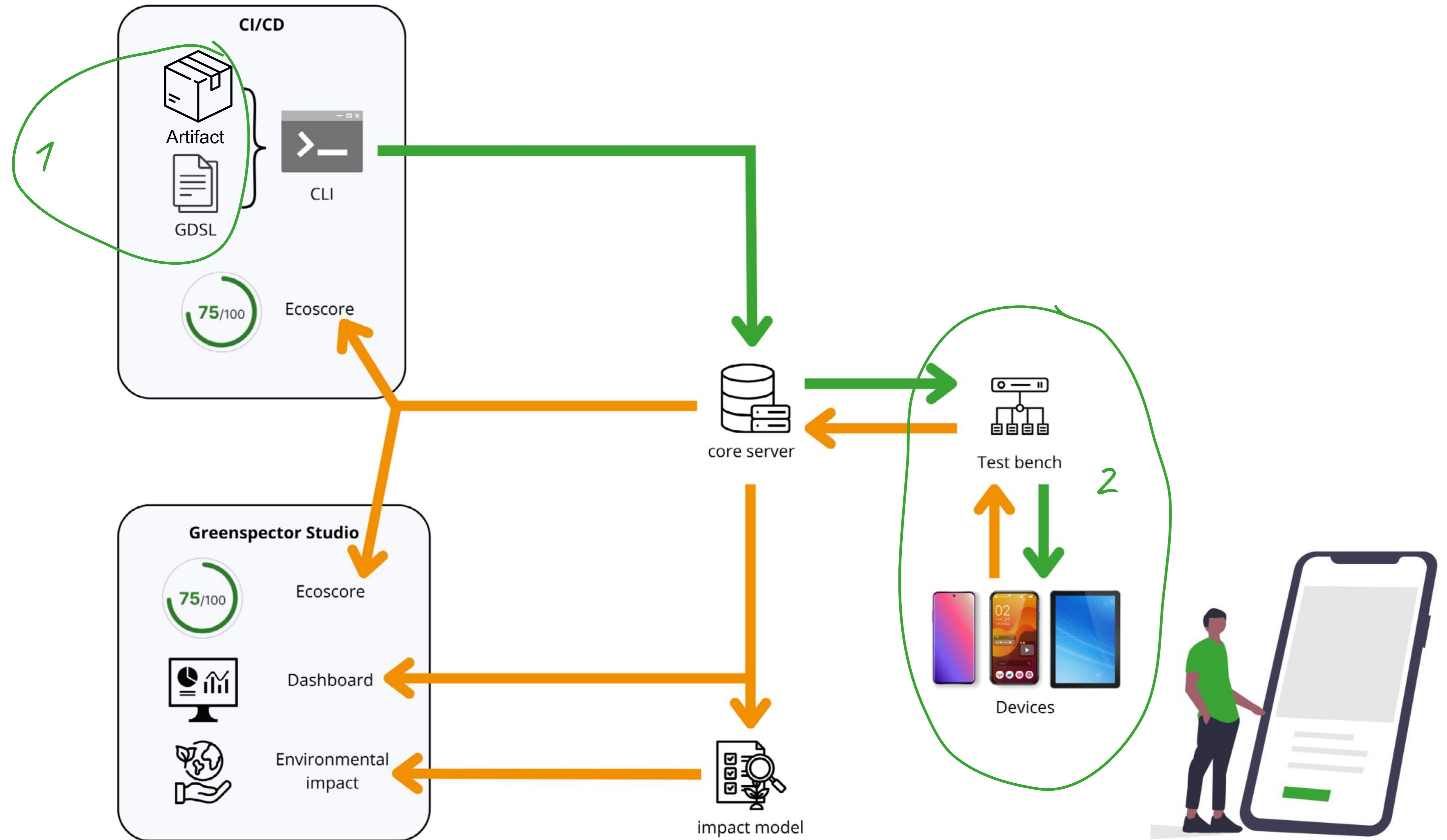


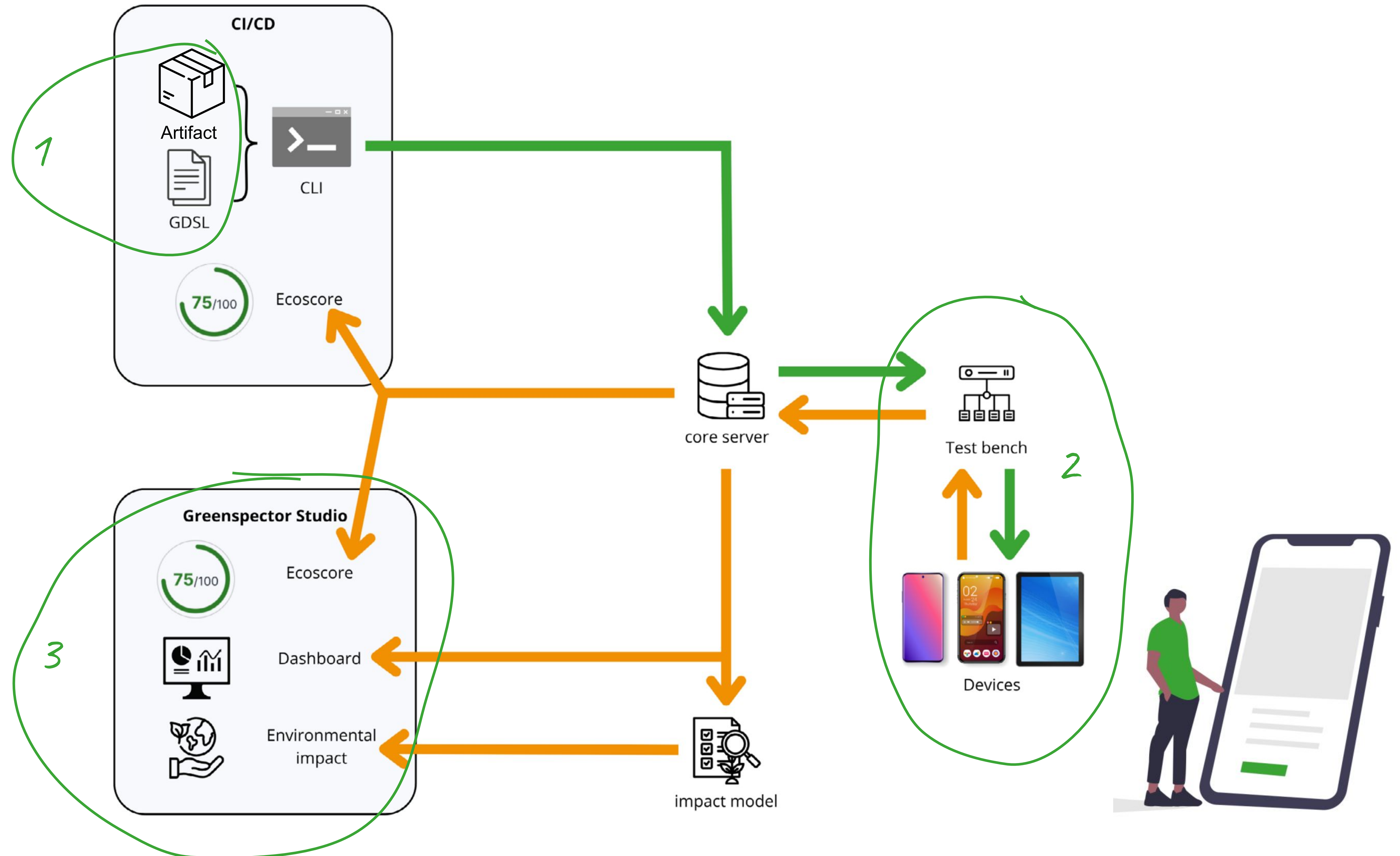
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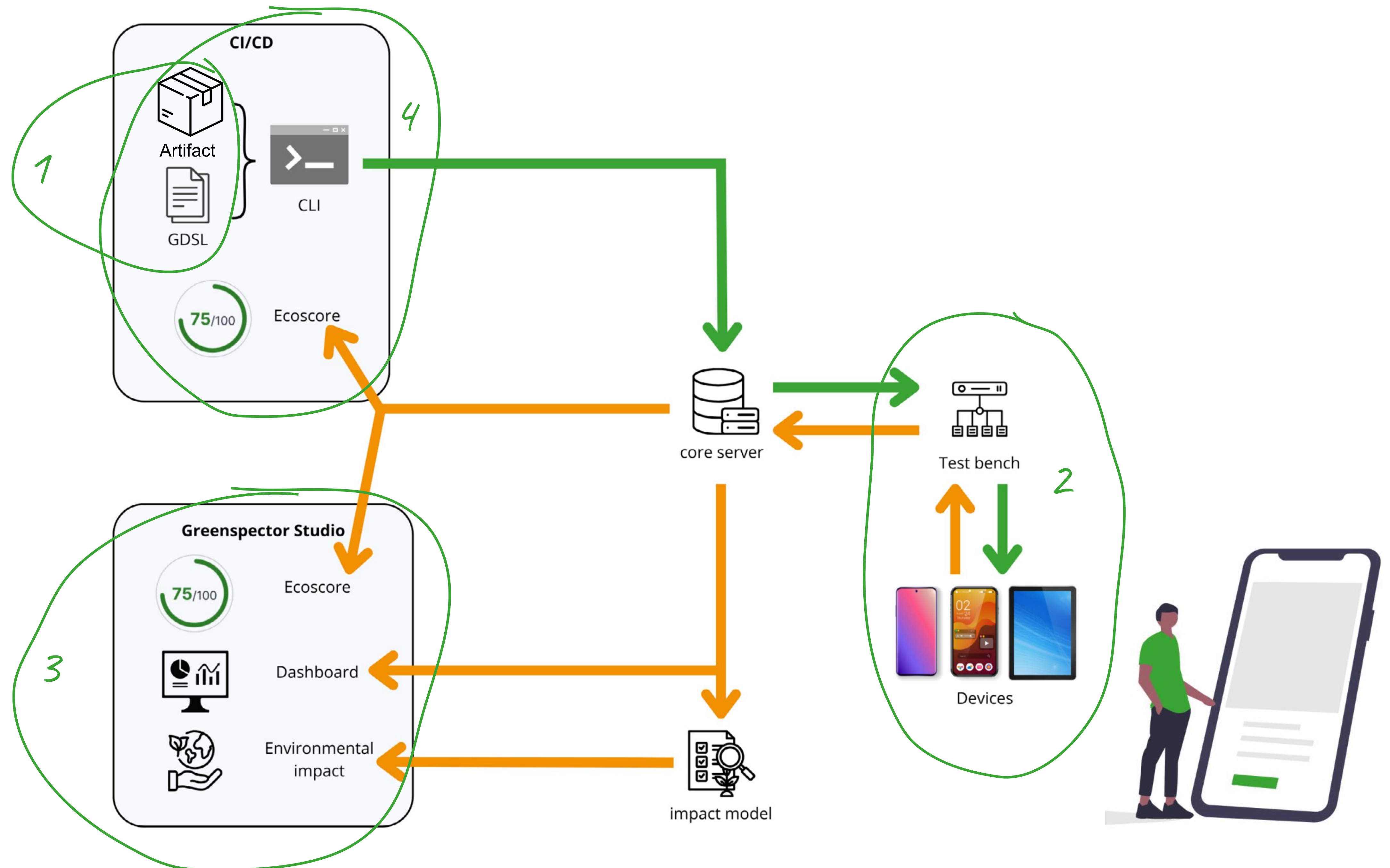














Contact

Edouard Guégain

eguegain@greenspector.com

+33 9 51 44 55 79

6 rue Rose Dieng-Kuntz

CS90729 – 44307 Nantes Cedex 3

www.greenspector.com