

Assessing the environmental impact of mobile applications: a measure framework toward DevGreenOps

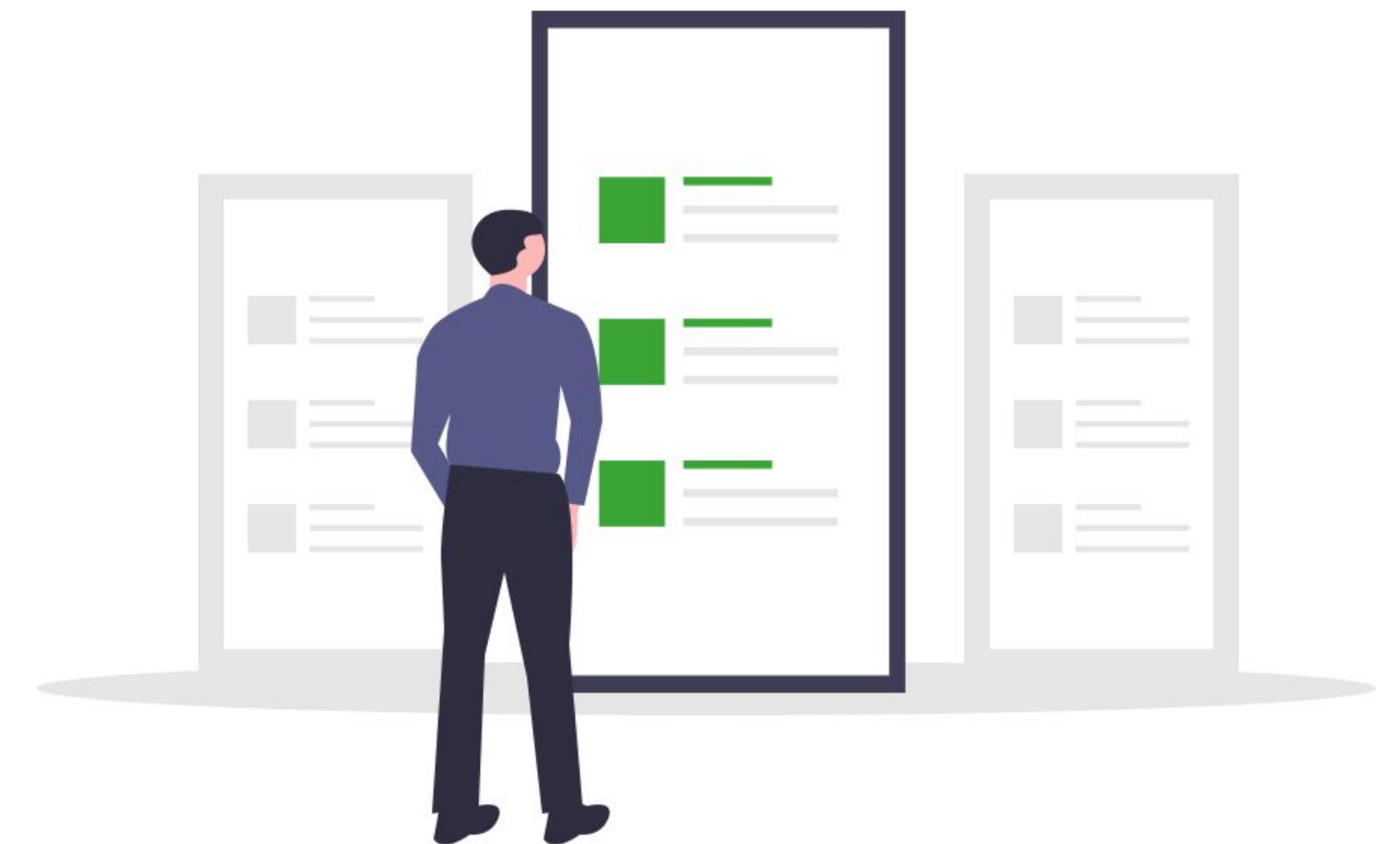




Why a new measure framework ?

Batch task :

```
start = read_RAPL()  
task()  
end = read_RAPL()  
print(end - start)
```



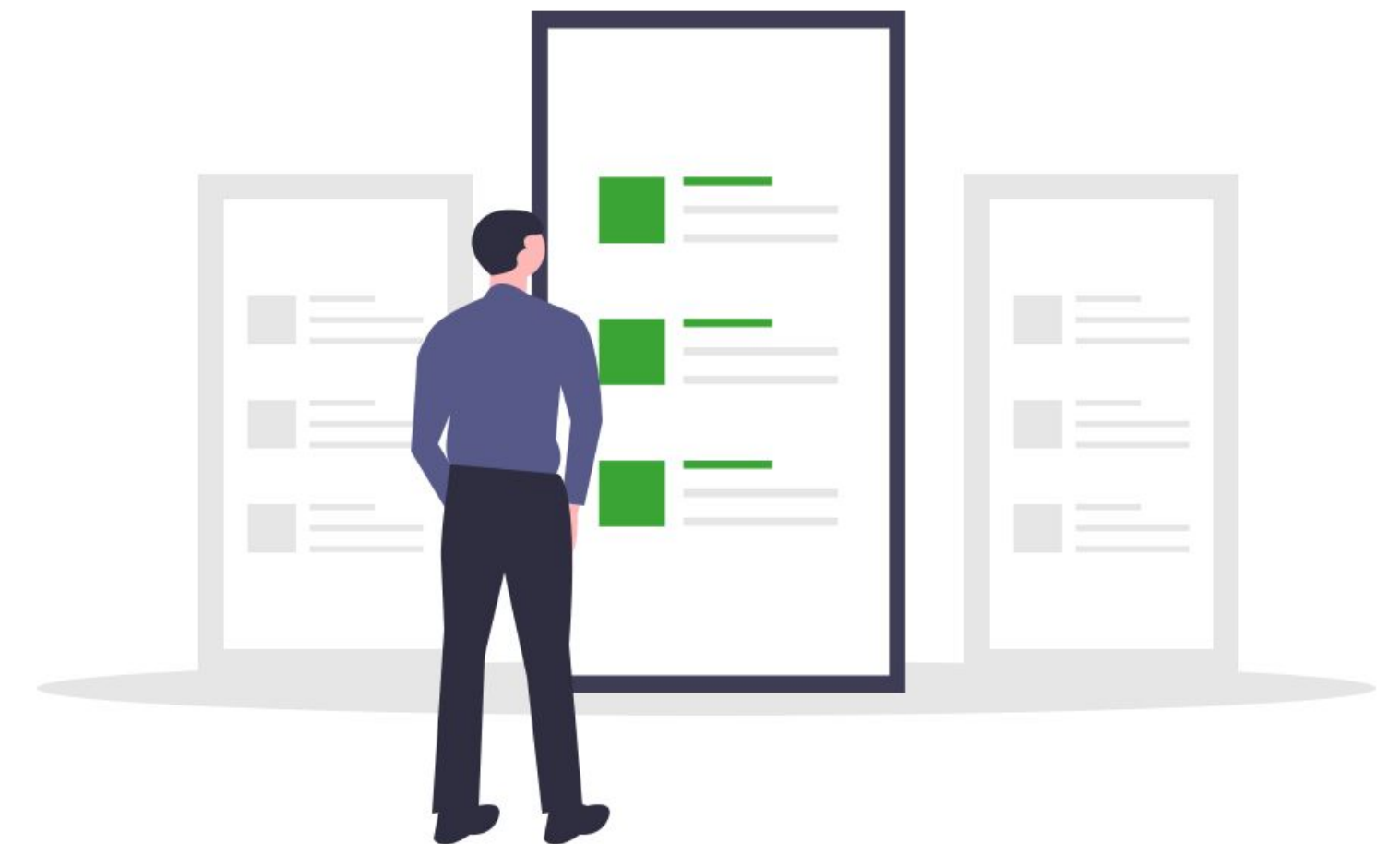
Why a new measure framework ?

Batch task :

```
start = read_RAPL()  
task()  
end = read_RAPL()  
print(end - start)
```

Mobile applications :

- Multi-features
- Interactive
- ~~One~~ A lot of apps





How to measure an app?

LCA (ISO 14044) → functional units

Functional unit: looking up a transaction

- Open the app
- Login
- Select an account
- Search for a transaction
- Close the app

*User
journey*

Functional unit: sending money

- Open the app
- Login
- Select an account
- ...

Automation and replicability

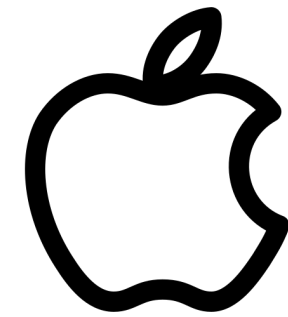
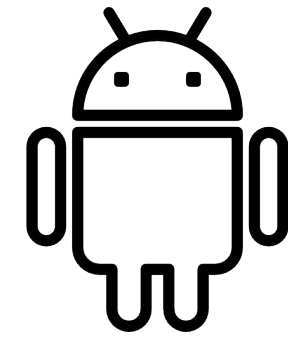
GDSL Script:

Step 1:
Open the app

Step 2:
Pause on Home

Step 3:
Navigation

```
1  measureStart, CHRGT_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, CHRGT_addEntry
12 clickByTextExact, Add
13 waitUntilText, Enter new name
14 pause,${PAUSEAFTERLOAD}
15 measureStop
...
... applicationCloseAll
```



Measure protocole

Stabilization:

- Physical devices only
- Stable activity
- Battery at optimal level
- Systematic reference measure (Idle)



Measure protocole

Stabilization:

- Physical devices only
- Stable activity
- Battery at optimal level
- Systematic reference measure (Idle)

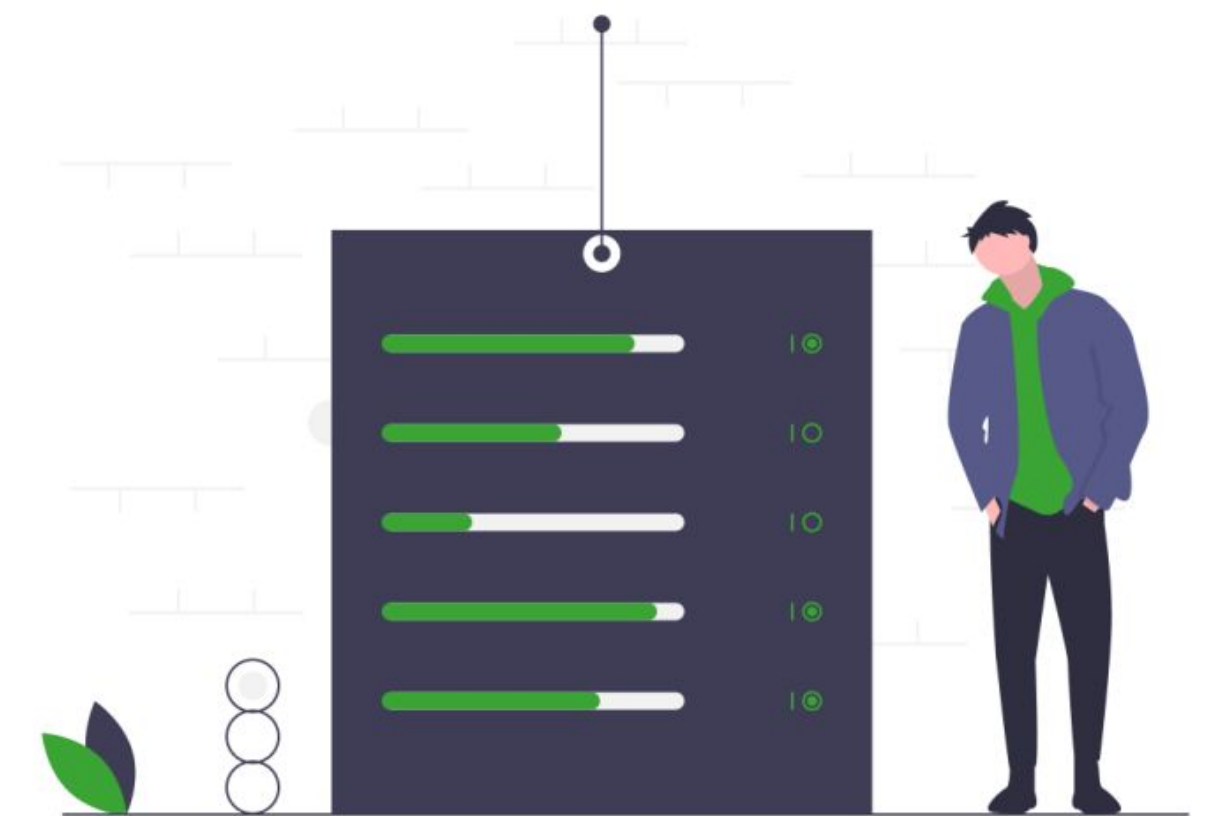
Monitoring:

- Battery discharge
- Data usage
- Available data (CPU, RAM, ...)





Results aggregation

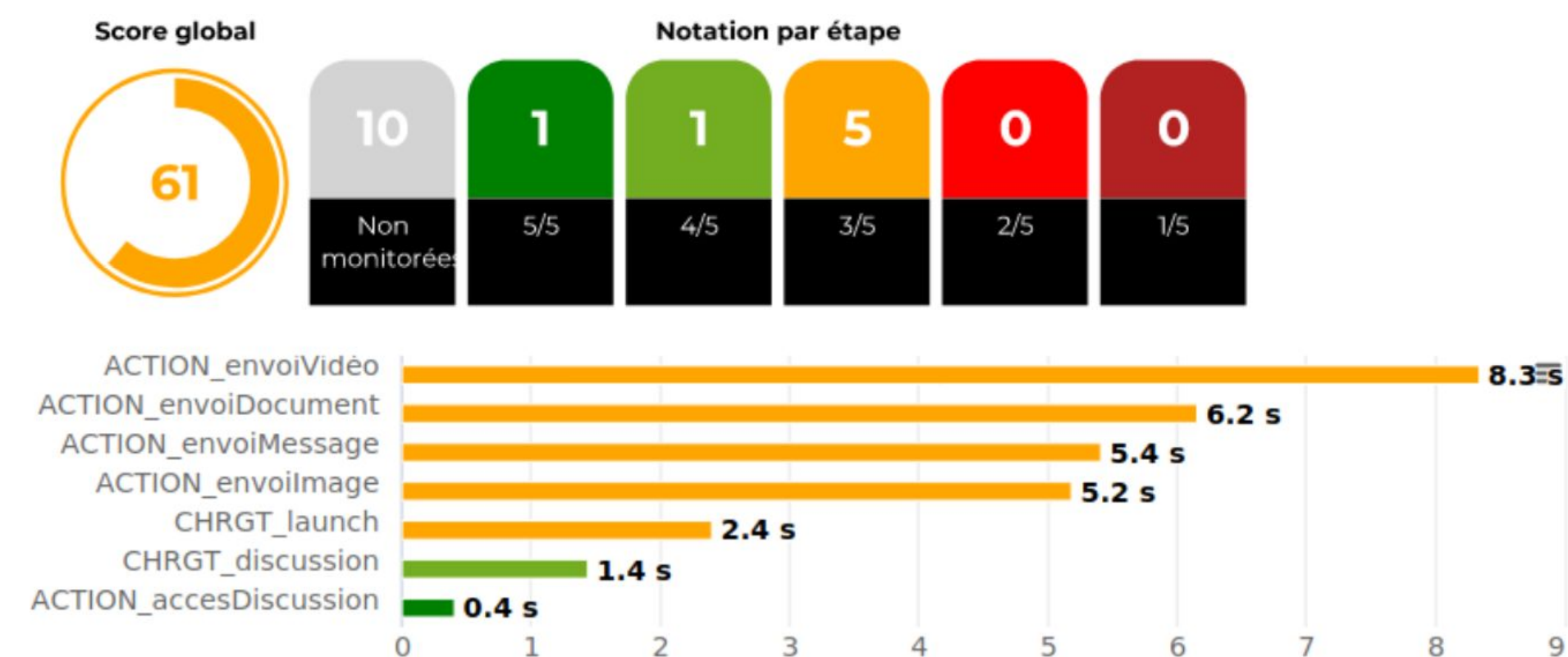




Results aggregation



Report + Ecoscore



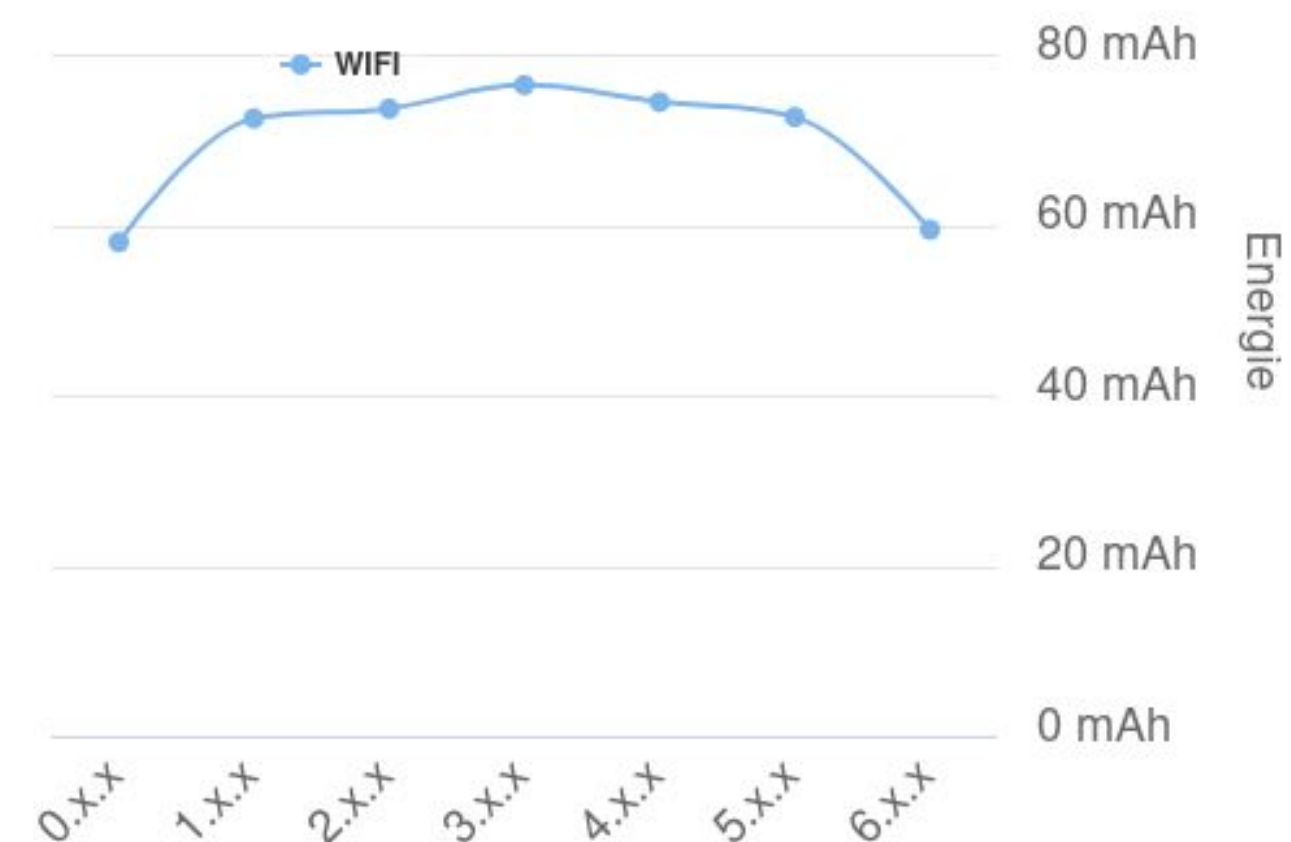
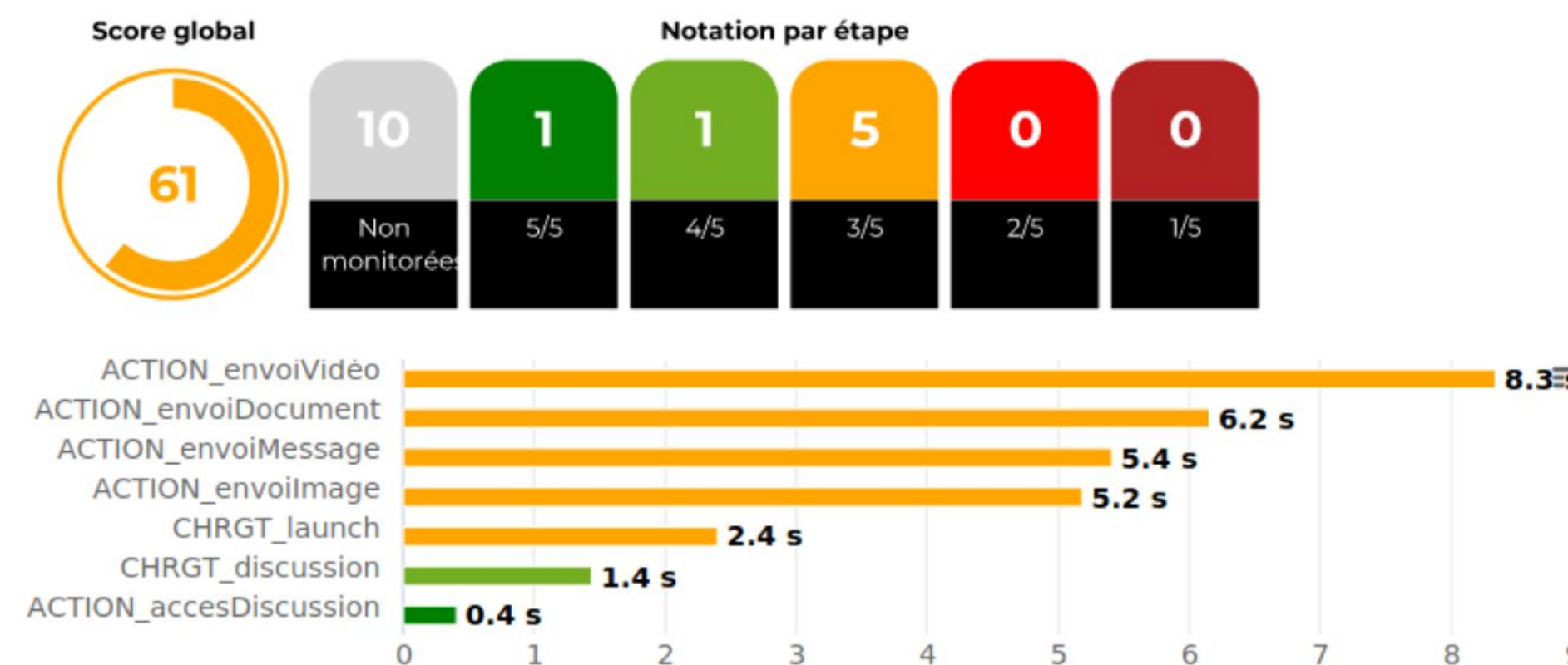


Results aggregation



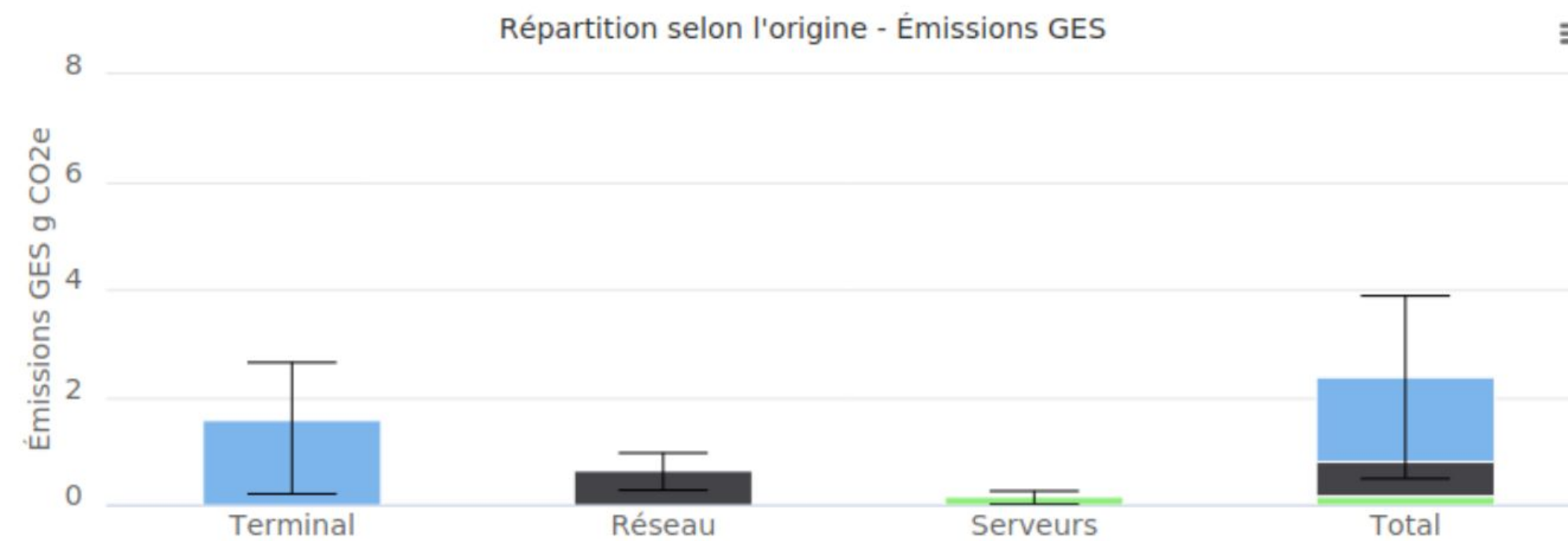
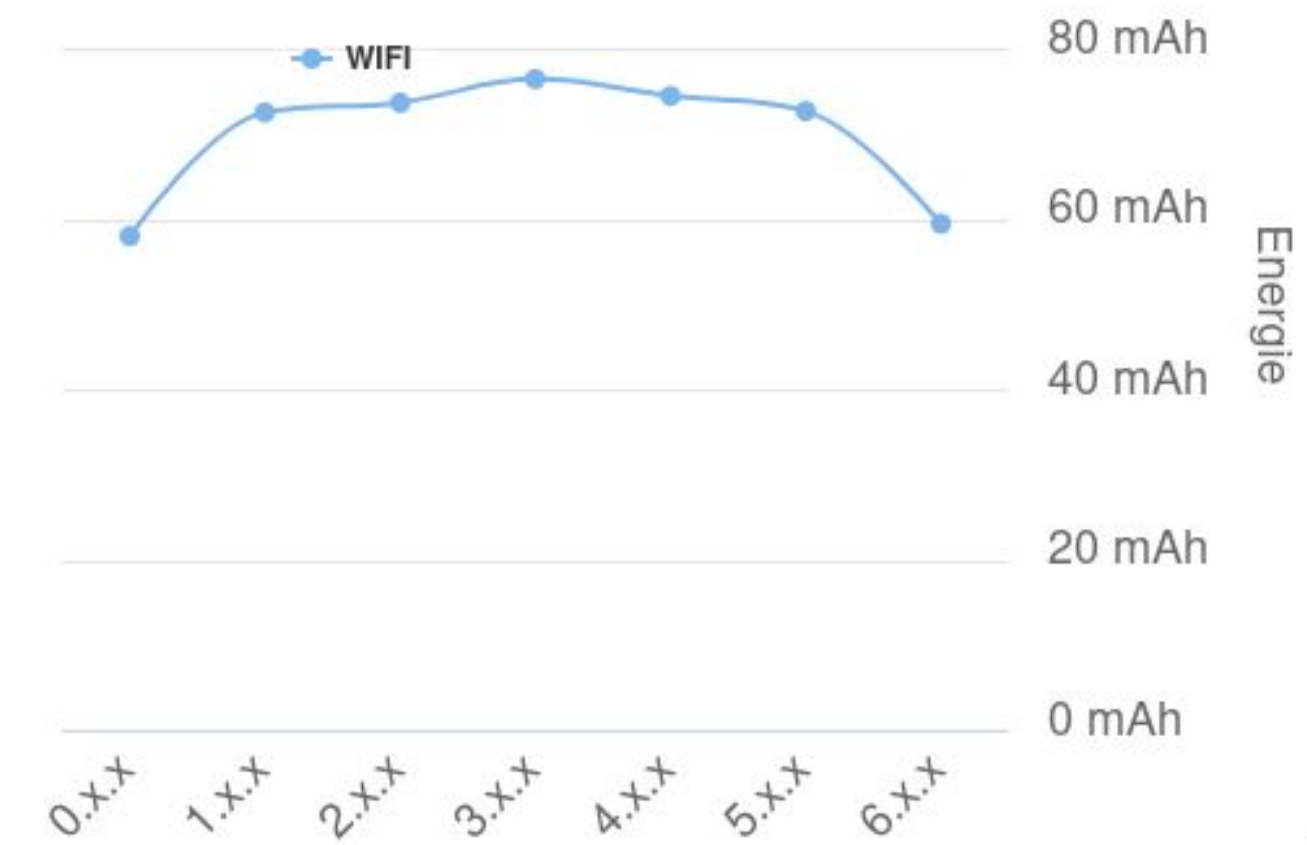
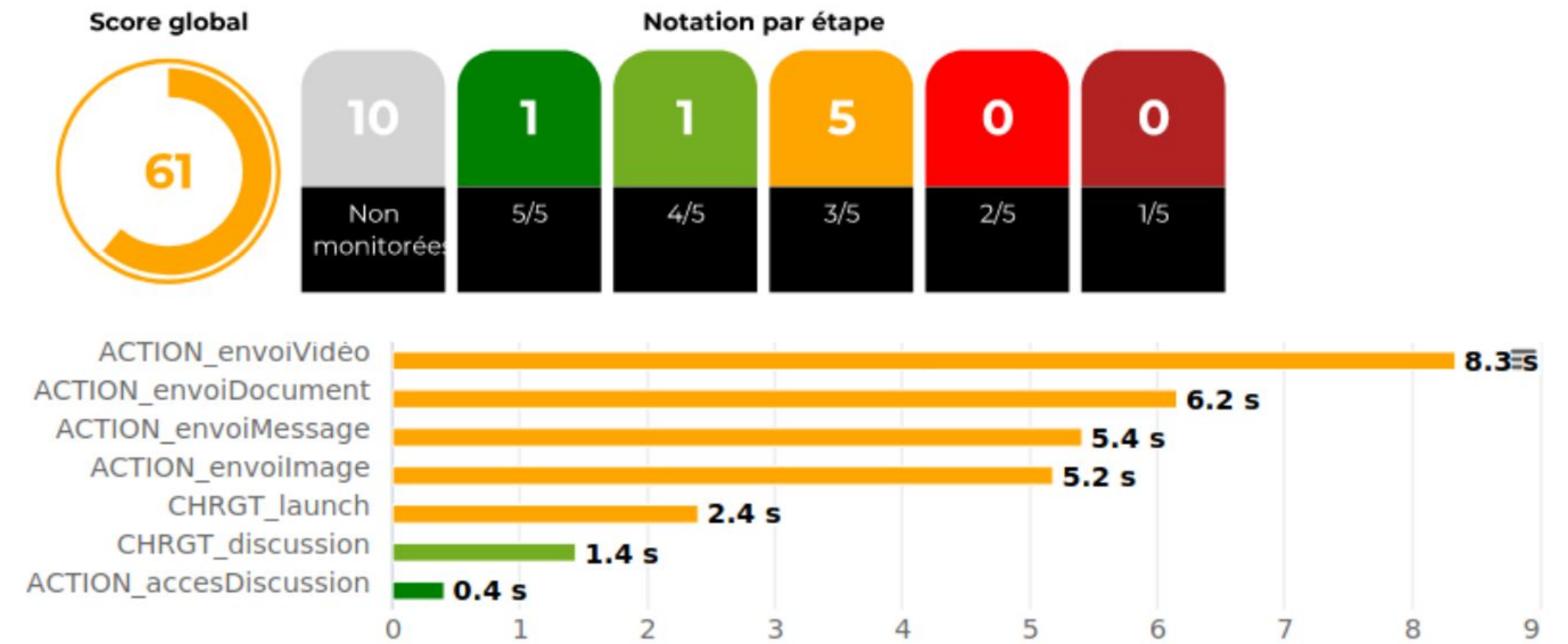
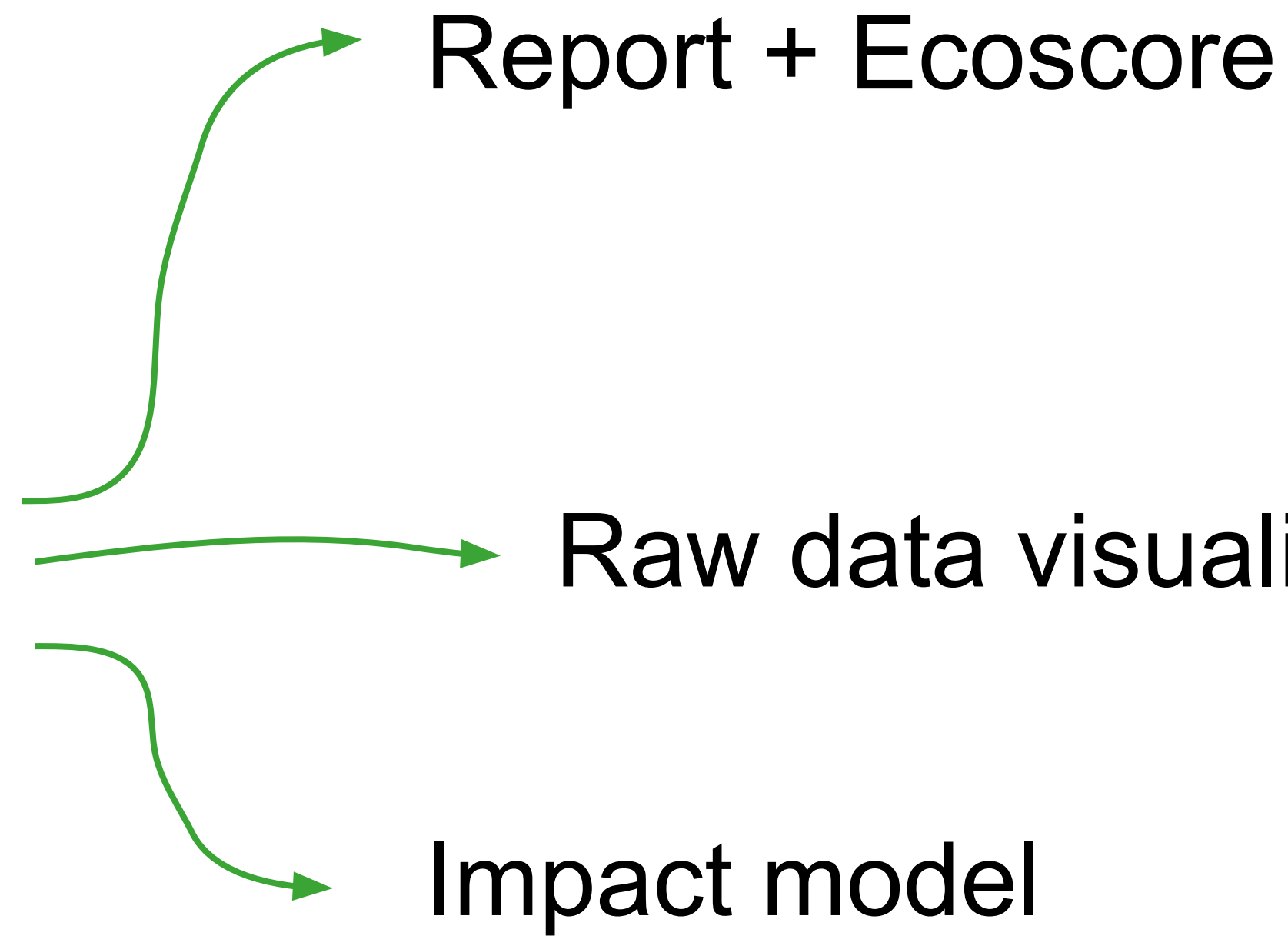
Report + Ecoscore

Raw data visualisation





Results aggregation





Integration

```
./gspt-cli initconfig --app "MyApp" --version "$version"  
./gspt-cli set-env -e "mobile::Android::13::Samsung - Galaxy S23"  
./gspt-cli --tests p1.gdsl --monitor "com.myapp" --iteration 3
```

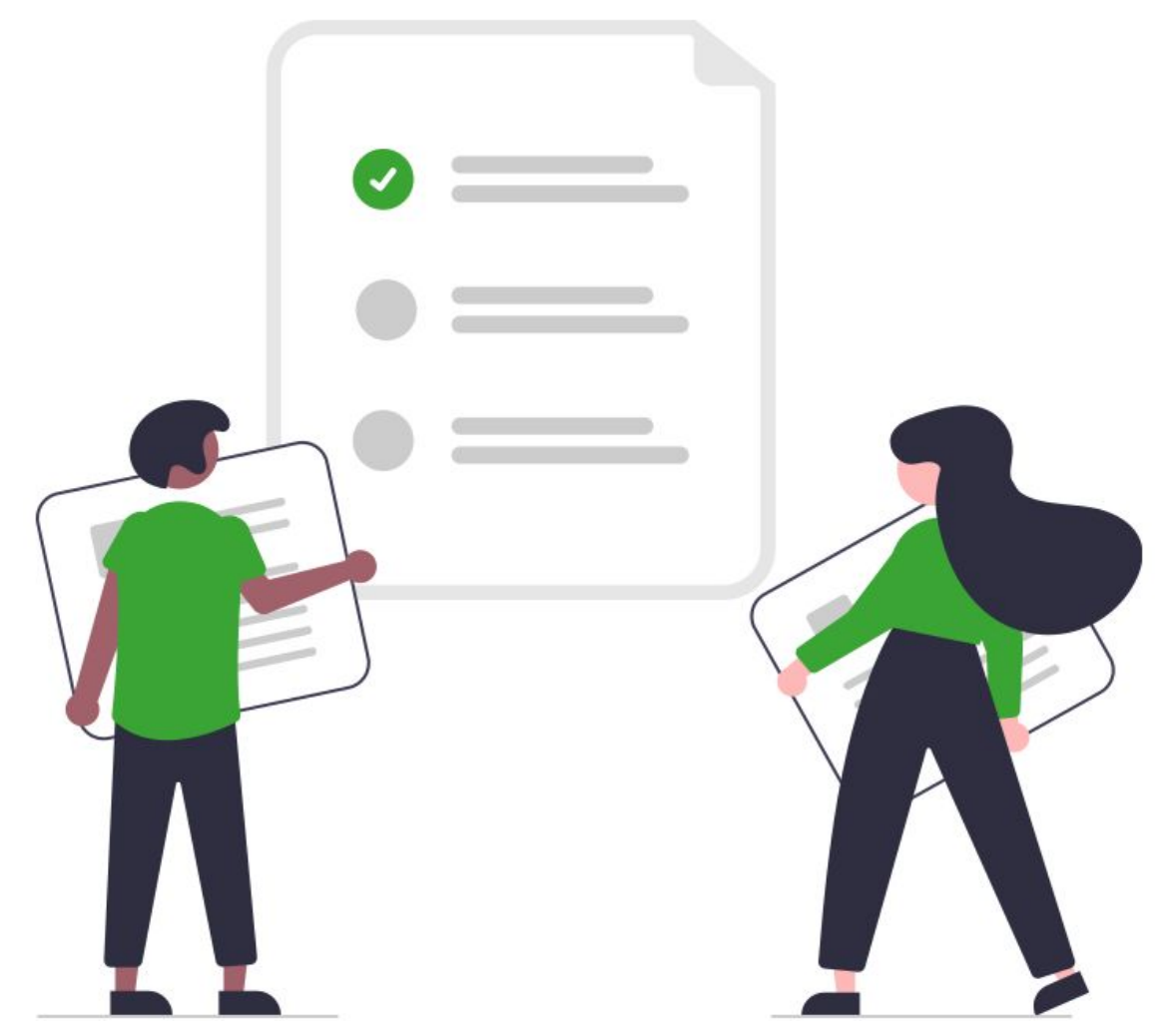




Integration

Test name

```
./gspt-cli initconfig --app "MyApp" --version "$version"  
./gspt-cli set-env -e "mobile::Android::13::Samsung - Galaxy S23"  
./gspt-cli --tests p1.gdsl --monitor "com.myapp" --iteration 3
```





Integration

```
./gspt-cli initconfig --app "MyApp" --version "$version"  
./gspt-cli set-env -e "mobile::Android::13::Samsung - Galaxy S23"  
./gspt-cli --tests p1.gdsl --monitor "com.myapp" --iteration 3
```

Test name

Target device





Integration

```
./gspt-cli initconfig --app "MyApp" --version "$version"  
./gspt-cli set-env -e "mobile::Android::13::Samsung - Galaxy S23"  
./gspt-cli --tests p1.gdsl --monitor "com.myapp" --iteration 3
```

Test name

Target device

User journey

App name

Iterations





Integration

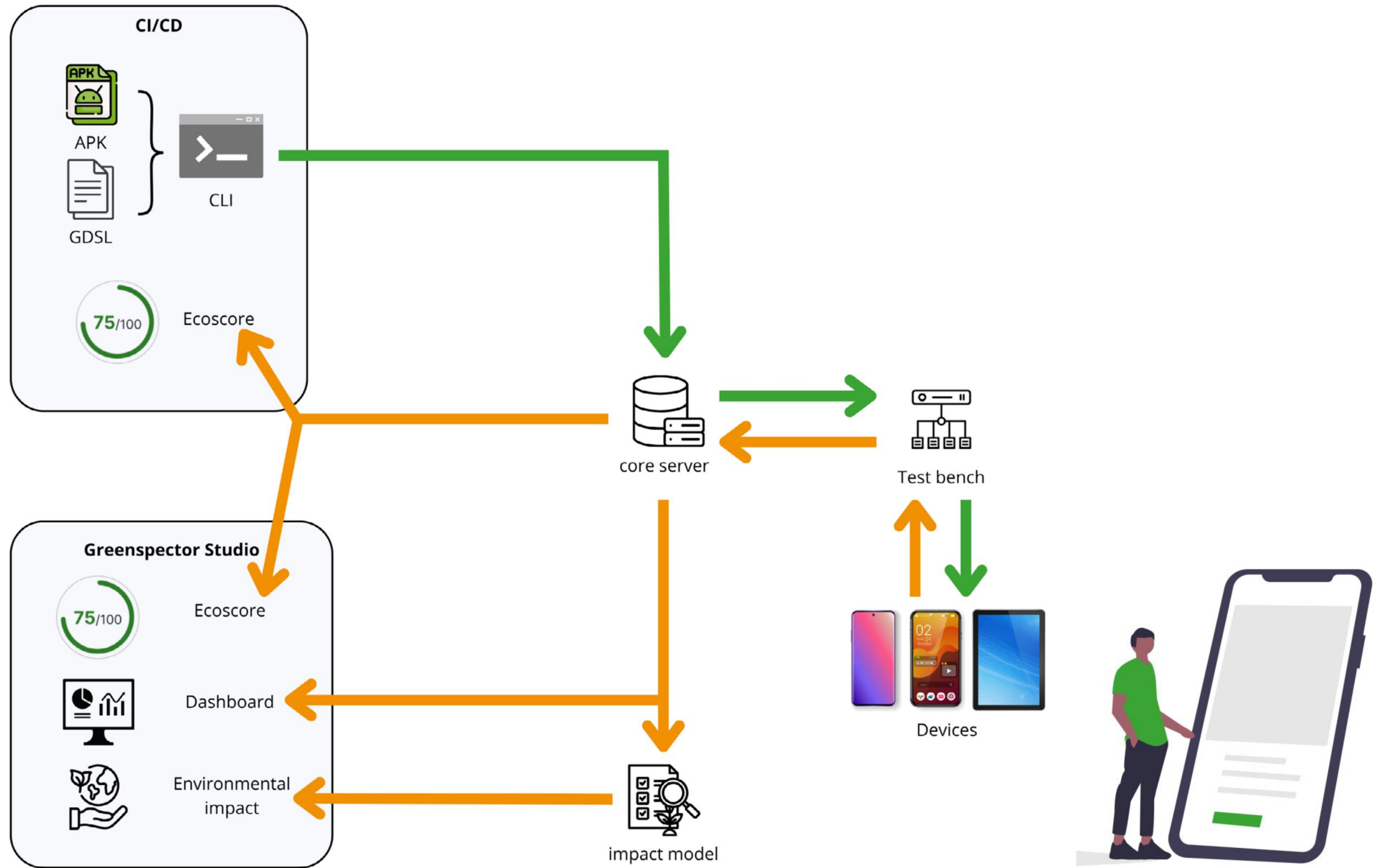
```
./gspt-cli initconfig --app "MyApp" --version "$version"  
./gspt-cli set-env -e "mobile::Android::13::Samsung - Galaxy S23"  
./gspt-cli --tests p1.gdsl --monitor "com.myapp" --iteration 3
```

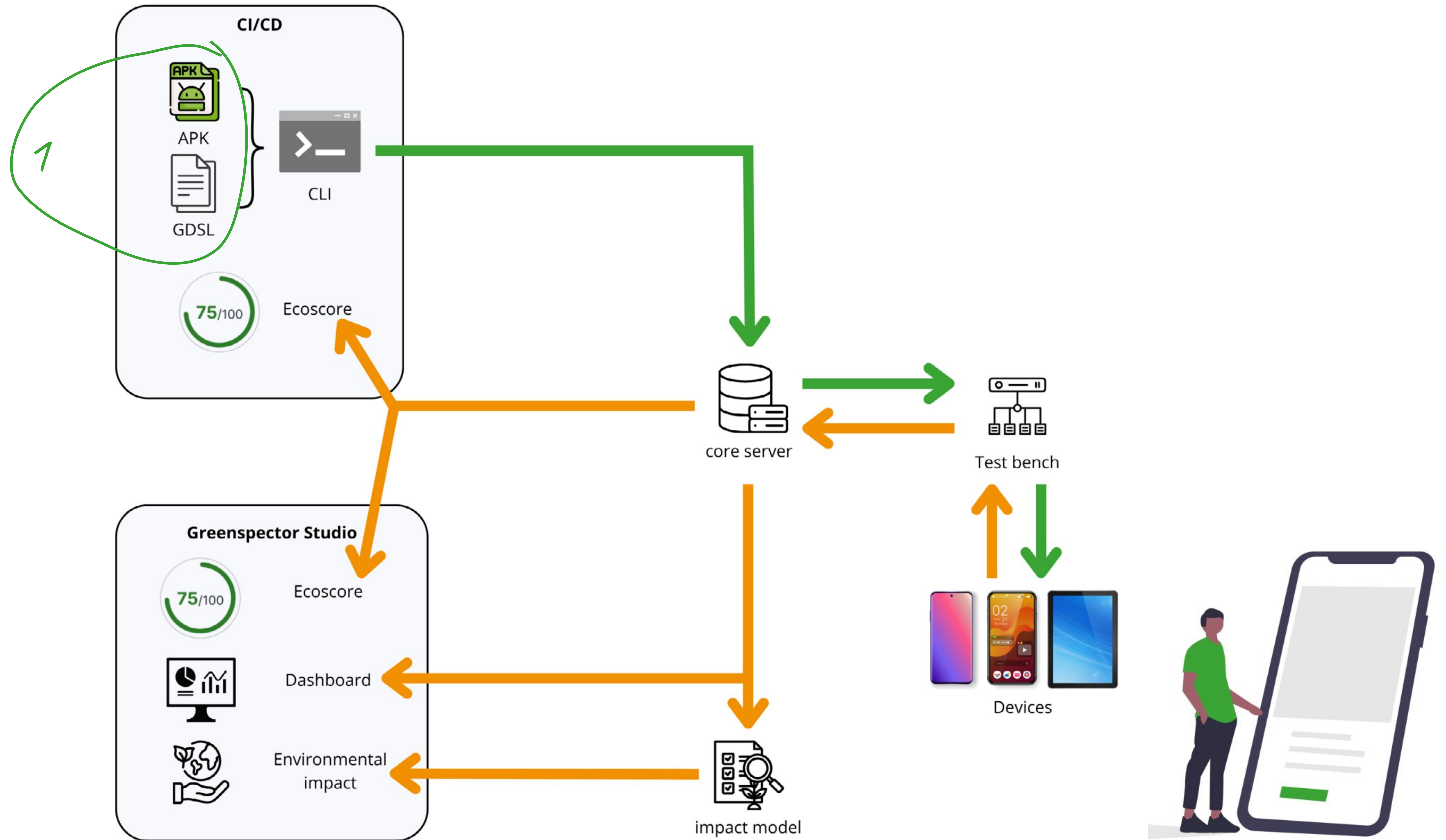
Test name
Target device
User journey
App name
Iterations

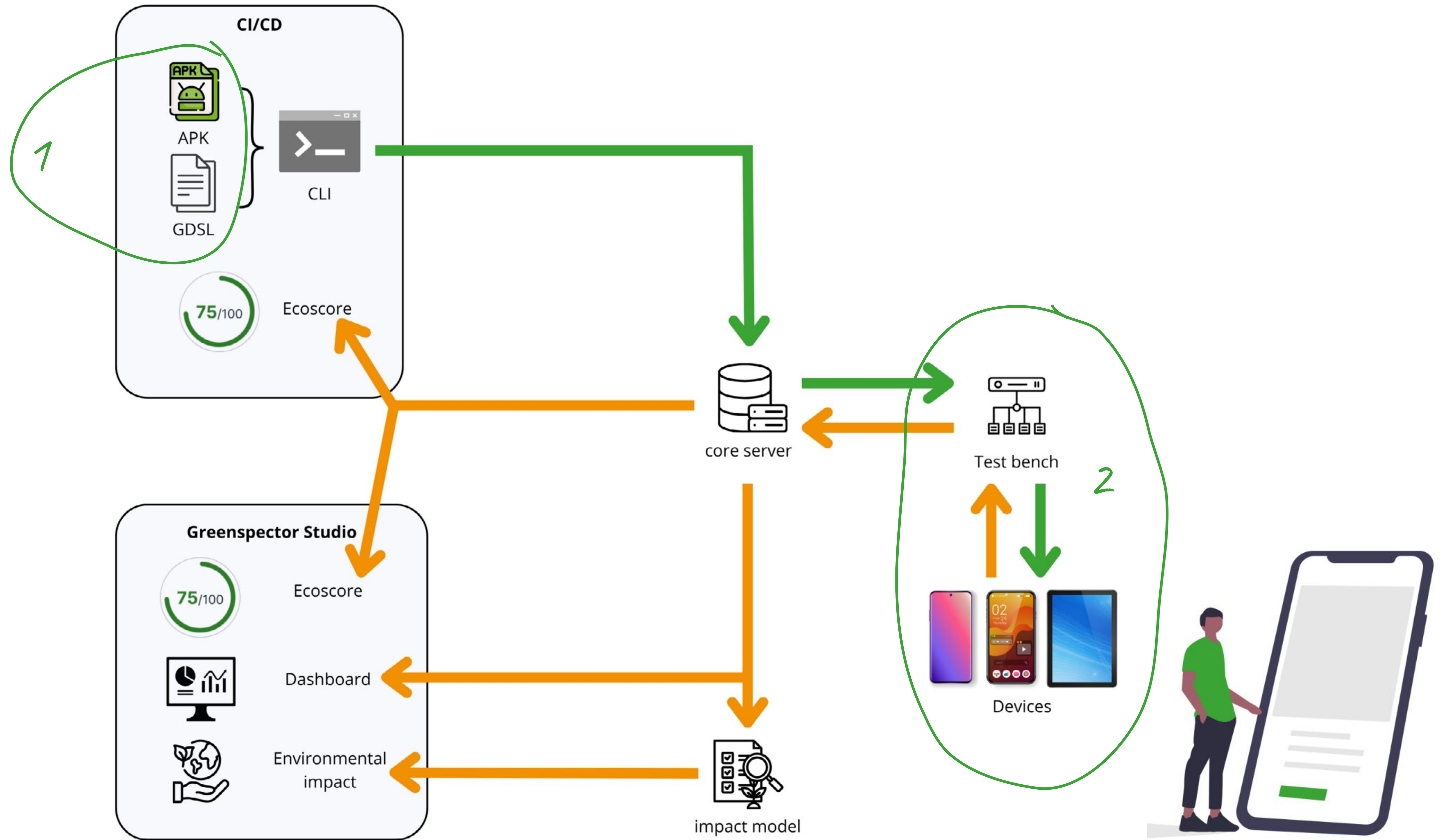


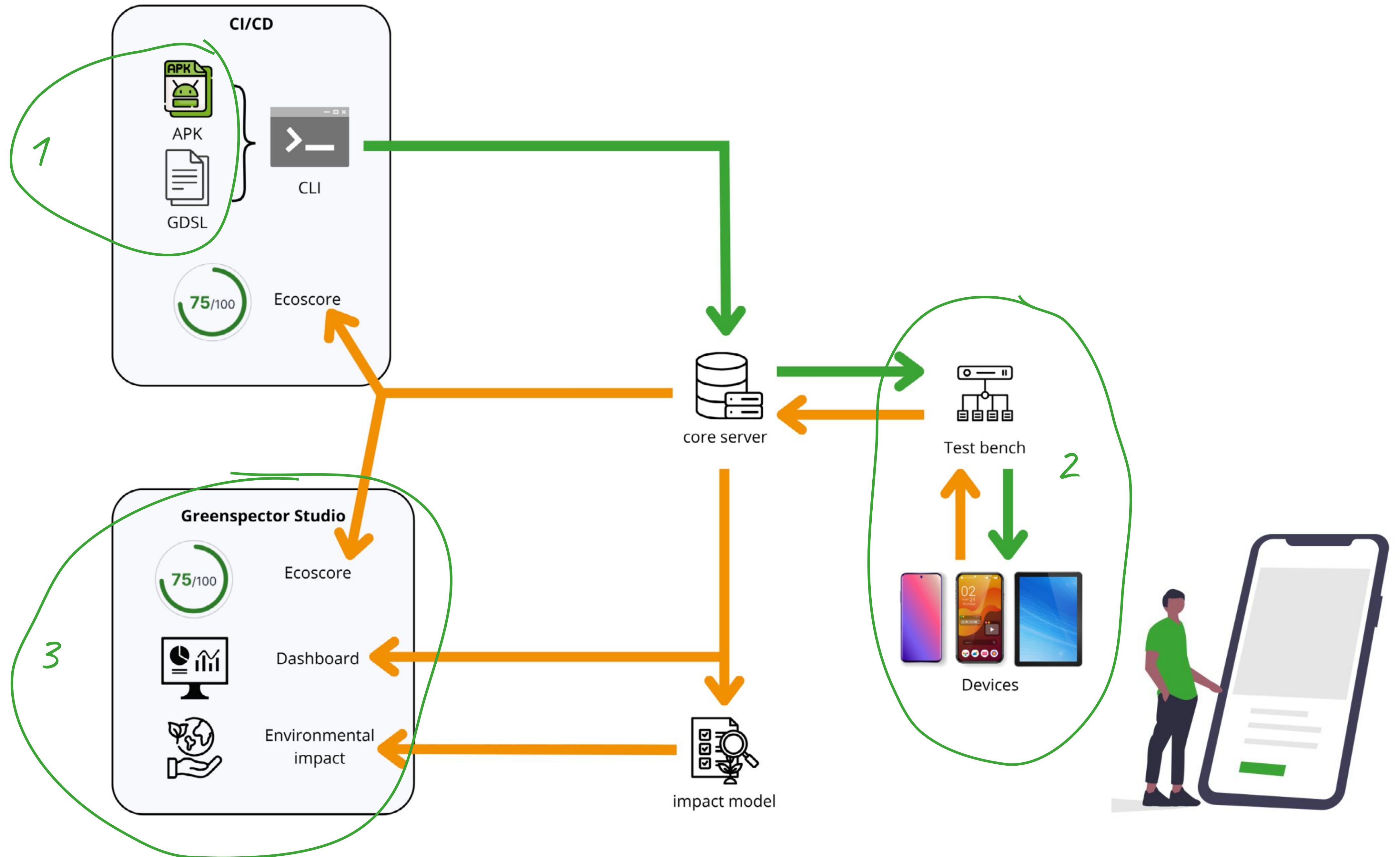
Report + Ecoscore
Raw data visualisation
Impact model
+
CI quality gate (Ecoscore)

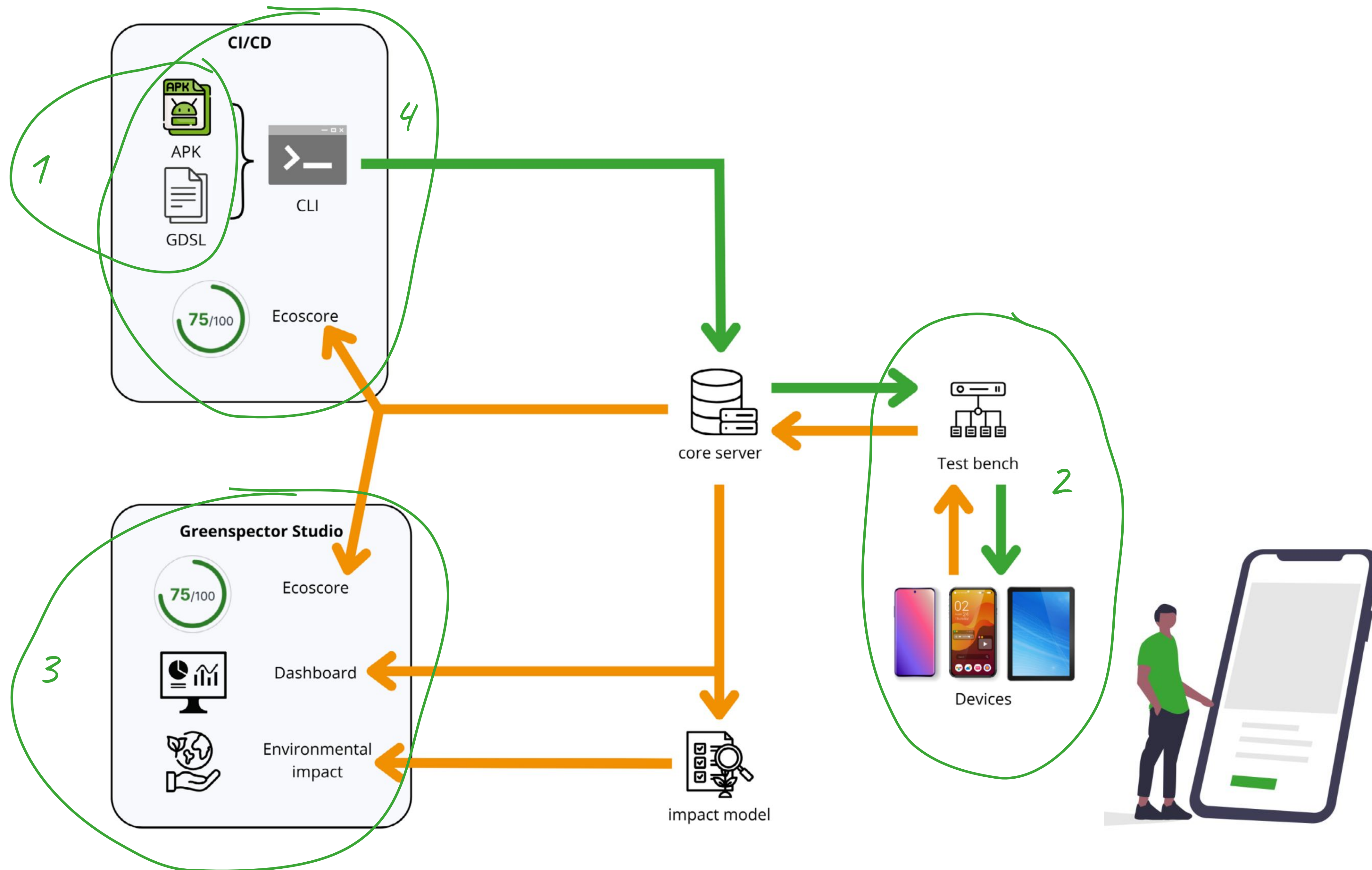














Contact 

Edouard Guégain

eguegain@greenspector.com

+33 9 51 44 55 79

6 rue Rose Dieng-Kuntz

CS90729 – 44307 Nantes Cedex 3

www.greenspector.com