



# Carat: Before and After

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# Outline

- Carat
- Support Infrastructure
- Carat Application: Before and After
- Android Update
- iOS Update
- iOS issue: 9+ process list removed
- iOS issue: Bugs not allowed

# Carat

- Research project
  - Crowdsourced data collection
  - Produce high quality research
- But also public app
  - Needs to be useful to users
  - Needs to be attractive
  - So we keep getting data
- And Infrastructure to support the app
  - Data reception servers
  - Data analysis service

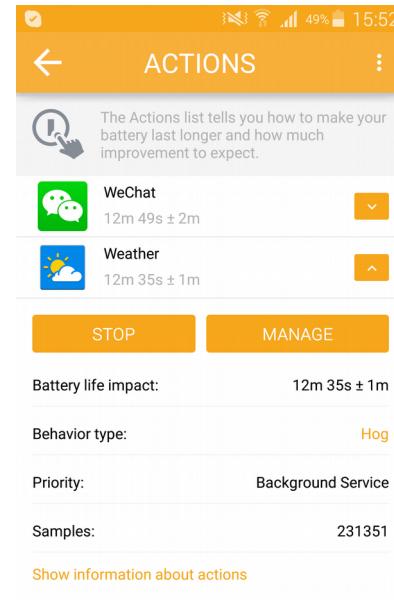
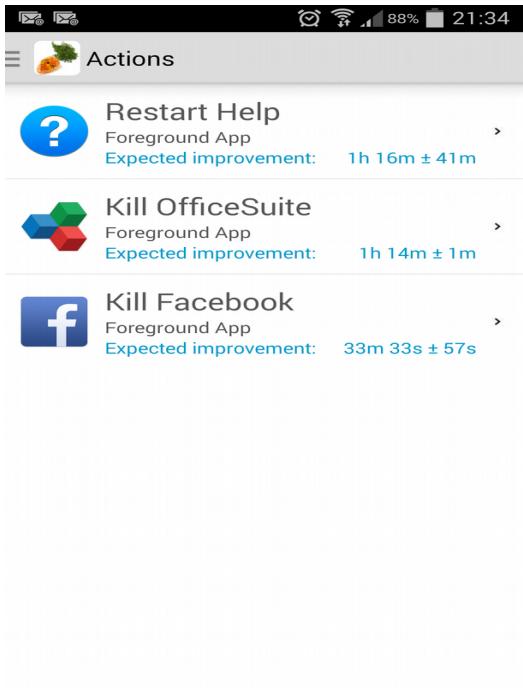


Carat Client is open-source:  
<https://github.com/carat-project/carat>

# Support Infrastructure

- 4 servers running Carat Protocol server
  - Protocol needs updates, servers need maintenance
  - Amazon sometimes kills the servers, backups needed
- Big Data Storage: Amazon S3
  - Relatively maintenance free
- Data Analysis Service
  - Automation, updates, new features for research and app purposes

# Carat Application: Before and After



# Carat Application: Before and After

Carrier 9:18 PM

## Energy Hogs

App	Battery Impact
iBART	38m 14s ± 8m 21s
Music~iphone	22m 6s ± 42s
Maps~iphone	12m 3s ± 43s
Skype	11m 6s ± 39s
Pandora	10m 17s ± 54s
Tiny Tower	3m 55s ± 2m 49s

Updated 1m 22s ago 1 Samples...

[Hide Apps](#) [Show Hidden Apps](#)

Actions My Device Hog Report Bug Report About

••• elisa 4G 11:30 93%

## BUGS

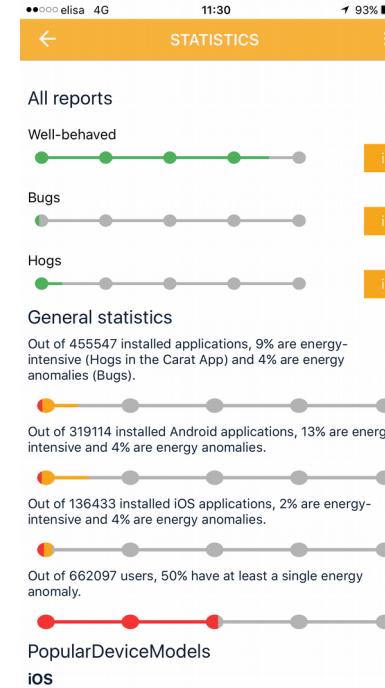
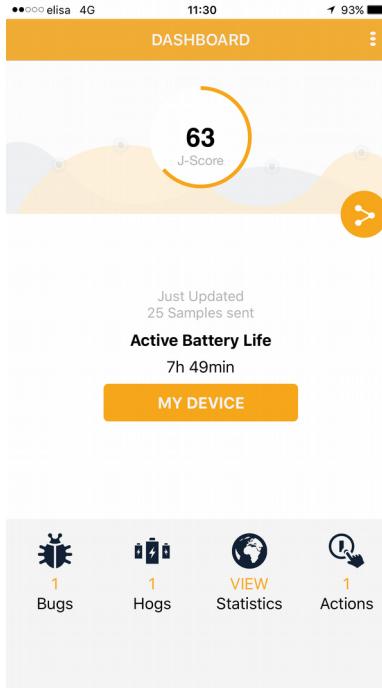
Bugs are apps that use a lot of energy on a small number of devices, including yours. Restarting a buggy app may improve battery life.

JUST UPDATED  
25 SAMPLES SENT

Weather Impact: 2h 51min ± 1h 16min

[HIDE/SHOW APPS](#)

# New Dashboard and Statistics



# New Questionnaire support

- [https://dl.dropboxusercontent.com/u/16721377/2016\\_07\\_01\\_8\\_01\\_56.mp4](https://dl.dropboxusercontent.com/u/16721377/2016_07_01_8_01_56.mp4)
- Allows giving users custom questionnaires without updating the app
  - Uses one extra Amazon EC2 server with additions to the Carat Protocol
  - Questionnaires defined in JSON and transmitted as Thrift objects

# iOS and Android Updates

- New UI design done by an external party
- Code is not easy to extend
- Hours of work to implement e.g. custom action items, new Carat Settings, Questionnaires
- Bugs were also present in the work
  - Even one causing Carat to use much more battery than it should
    - Energy Bug, exactly what Carat is supposed to detect ( ! )

# iOS issue: Processlist on iOS 9+

- Apple blocked access to the process list sys call in iOS 9
  - Workarounds exist
- Apple blocked access to most workarounds in iOS 9.3.3
  - WIP
- [https://www.dropbox.com/s/rvhirlv53phv8ho/ios\\_9.3.2\\_processlist.mov](https://www.dropbox.com/s/rvhirlv53phv8ho/ios_9.3.2_processlist.mov)

# iOS issue: Bugs not allowed

- Apple does not allow the word “Bug” in AppStore apps.
- *Safety - 1.1.6*
- *The app provides potentially inaccurate diagnostic functionality for iOS devices to the user. Specifically, your app purports to identify bugs and other anomalies on the iOS device.*
- *Currently, there is no publicly available infrastructure to support iOS diagnostic analysis. Therefore, your app may report inaccurate information which could mislead or confuse your users.*

# iOS issue: Misleading...

- So we removed mentions of “bug” or “anomaly” and got:
- *Safety - 1.1.6*
- *Your app's metadata contains misleading content or content that is intended to trick users into believing that your app actually provides the simulated functionality.*
- *Please remove or revise any misleading content for your app and its metadata.*

# Takeaways

- Maintaining an app and its support infrastructure takes a lot of work
- Apple is closing access to see running apps
  - Carat as we know it will not be possible on future iOS versions
- Android version still works as before
- Carat will still monitor phone settings and in the future recommend best settings for you

# Thanks

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