Bugu: An Application Level Power Profiler and Analyzer for Mobile Devices

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http://codegreen.cs.wayne.edu/bugu/

Motivation

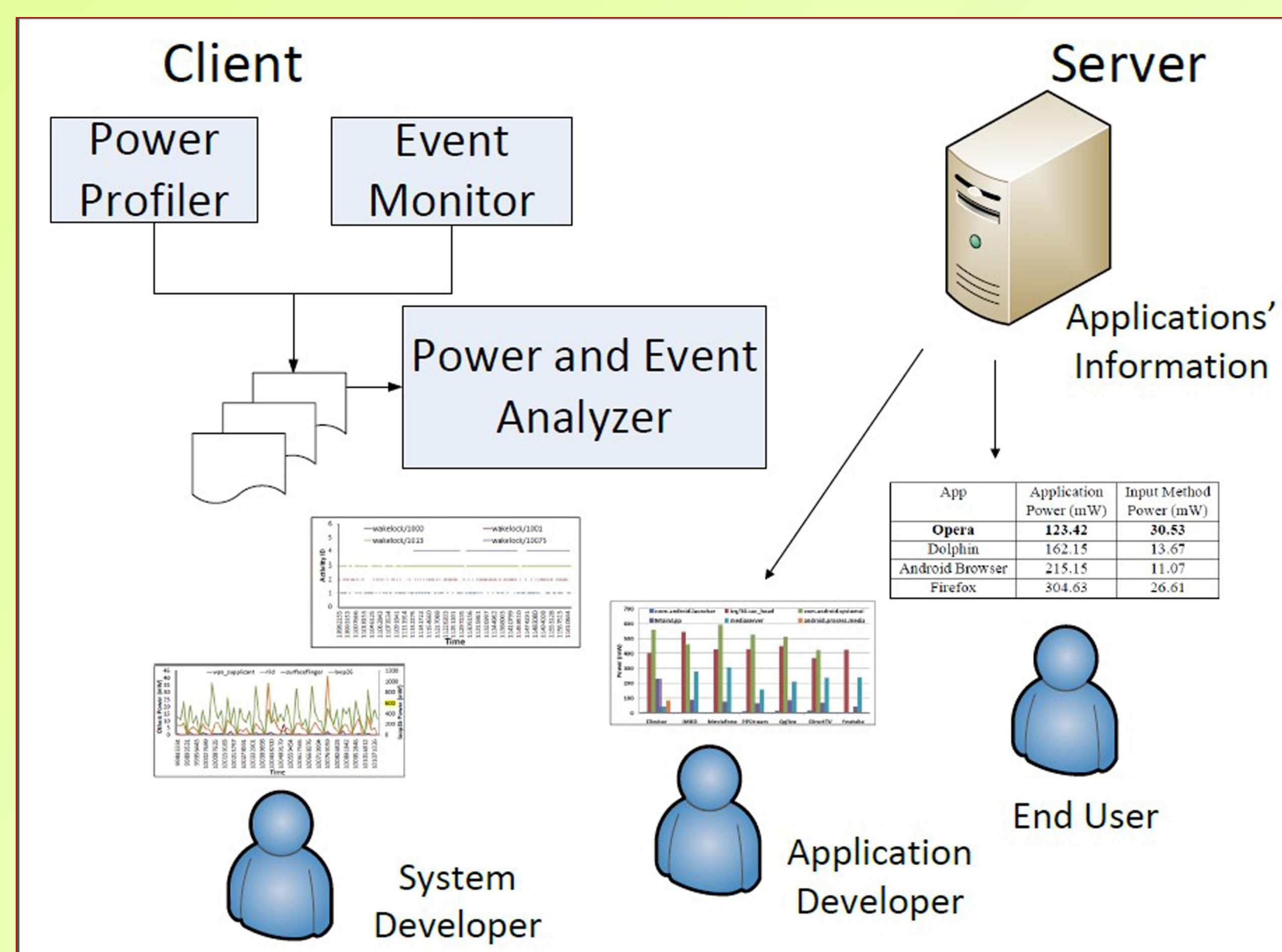Limited battery time **VS.** More and more applications developed

End users: For the same functionality, which application is more energy-friendly?

Application developers: Why my application consumes such amount of power?

System developers: How to save and effectively control system power?

Bugu Overview

End users: Bugu provides power information of apps with similar functionality so that users can choose and get the most energy-friendly one.

Application developers: Compare the power consumption with other apps and find out design drawbacks through event information of their own app.

System developers: System wide power variation information, which includes background processes, are logged for detailed analyzing.

The Bugu Service

Collecting app power information

Sharing app power information

Bugu DB
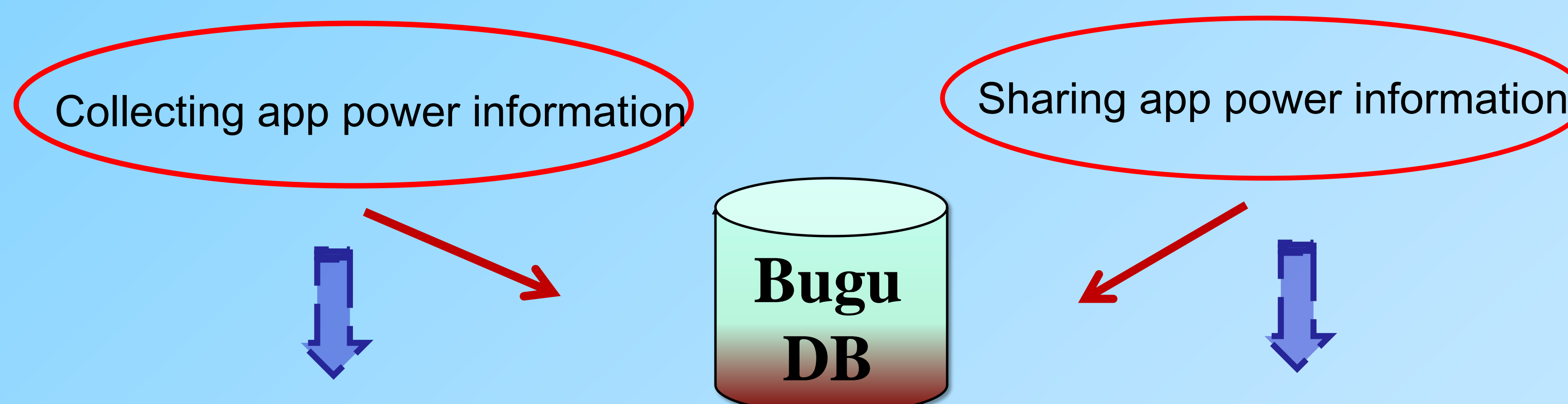
- Users directly input their applications' information to the Bugu submission page on the website (Device, AppName, Power) table

- The bugu client **automatically** processes the logged records and sends them to the server when users choose "upload" option (no private information)

- Bugu server periodically checks the submitted information, filters them and inserts the "new app" information to the database (we assume all the data are trustable)

- Users can search power information according to specific category, application name and their device type (Nexus S, Xoom …). By default, we show the popular searched ones

- For the same item (Device, AppName) stored in the database, we calculate average power

- Bugu returns **ranked** power info, it can get from website and bugu client

App	Power (mW)
Opera	123.42
Dolphin	162.15
…	…

Implications

- The daemon of Android radio service, **rild** ,generates a lot of wakelock even when the mobile device is not active

- Several **background** processes consume a large amount of energy. E.g., *irq/308-mxt224_* interrupt handler

- **APIs** for application design should be reevaluated from energy saving aspect, e.g., *wakelock* release

- The mobile OS needs a group of energy-efficient design strategies to **work together** for saving energy.

Ongoing & Future Work

− Make sure the submitted power information from users' are useful and trustable

− Improving the accuracy of Bugu

− Providing optimization suggestions for both system developers and application developers

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