Nowadays, Smartphones have almost ubiquitous presence.

They have powerful h/w: Quad/dual core processors, massive memory & highly interactive touch screen.

They are equipped with highly-dynamic Operating Systems and intuitive user interfaces.

They are increasingly being used to access critical and multi-modal online services.

Here, we present our analysis on power consumption of two smartphones while accessing such services.

**Introduction**

- Different online services are protected by different Identity Management (IdM) systems which use different architectures & protocols.
- In this experiment, we analysed the power consumption of these systems when accessed with two smartphones: HTC Hero & SAMSUNG Galaxy S2 (SGSII).
- The services were protected by four systems: username/password, OpenID, SAML & BrowserID and were accessed using four browsers (Android, Firefox, Dolphin HD and Opera Mobile).
- An app, called PowerTutor, was used to record power consumption in real-time.

**Motivation**

- Certain browsers are likely to consume more power than other browsers when used in the same settings to access the same service.
- On the other hand, the same services provided by different Identity Management Systems are also likely to have their own impact on the power consumption of a browser.
- It was difficult to collect power data due to the volatility of readings in the PowerTutor app. A built-in facility in the Mobile OS can do this job more efficiently.

**Methodology**

1. Choose phone & orientation
2. Run PowerTutor app in background
3. Invoke a browser
4. Access a service
5. Invoke PowerTutor app
6. Record power consumption

PowerTutor App allows to record accurate, real-time power consumption estimates by different apps while running in background.

**Discussion**

- Depending on browsers, power consumption varied a lot. Firefox was the most economical in SGSII, other places were taken by Android, Dolphin and Opera respectively in both phones.
- In SGSII, SAML was the most economical when the password was not saved while U/P was the most economical when the password was saved.
- In HTC Hero, SAML was the most economical in all modes except in landscape with password saved where U/P was the most economical.

**Results**

- **Results-1**: Comparison of different systems in portrait mode with password not saved in SGSII (Top) and Hero (Bottom).
- **Results-2**: Relative ranking of browsers in SGSII (Top) and Hero (Bottom). 1 represents the least power consumption & 4 represents the most power consumption.
- **Results-3**: Relative ranking of IdM Systems in SGSII (Top) & Hero (Bottom). 1 represents the least power consumption & 4 represents the most power consumption.