

Analysing Power Consumption of Identity Management Systems in Smartphones

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Introduction

- 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.

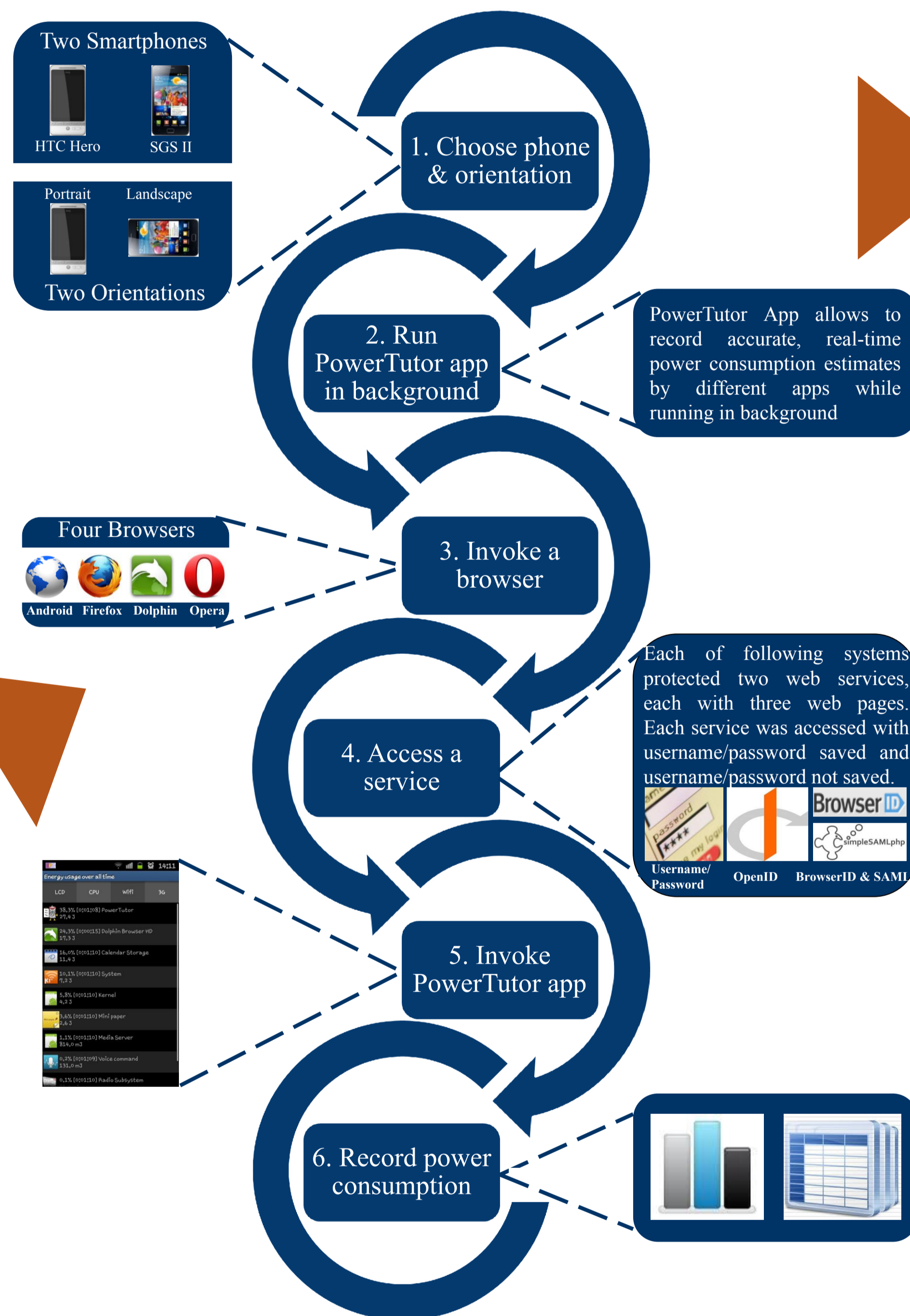
Motivation

- 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.

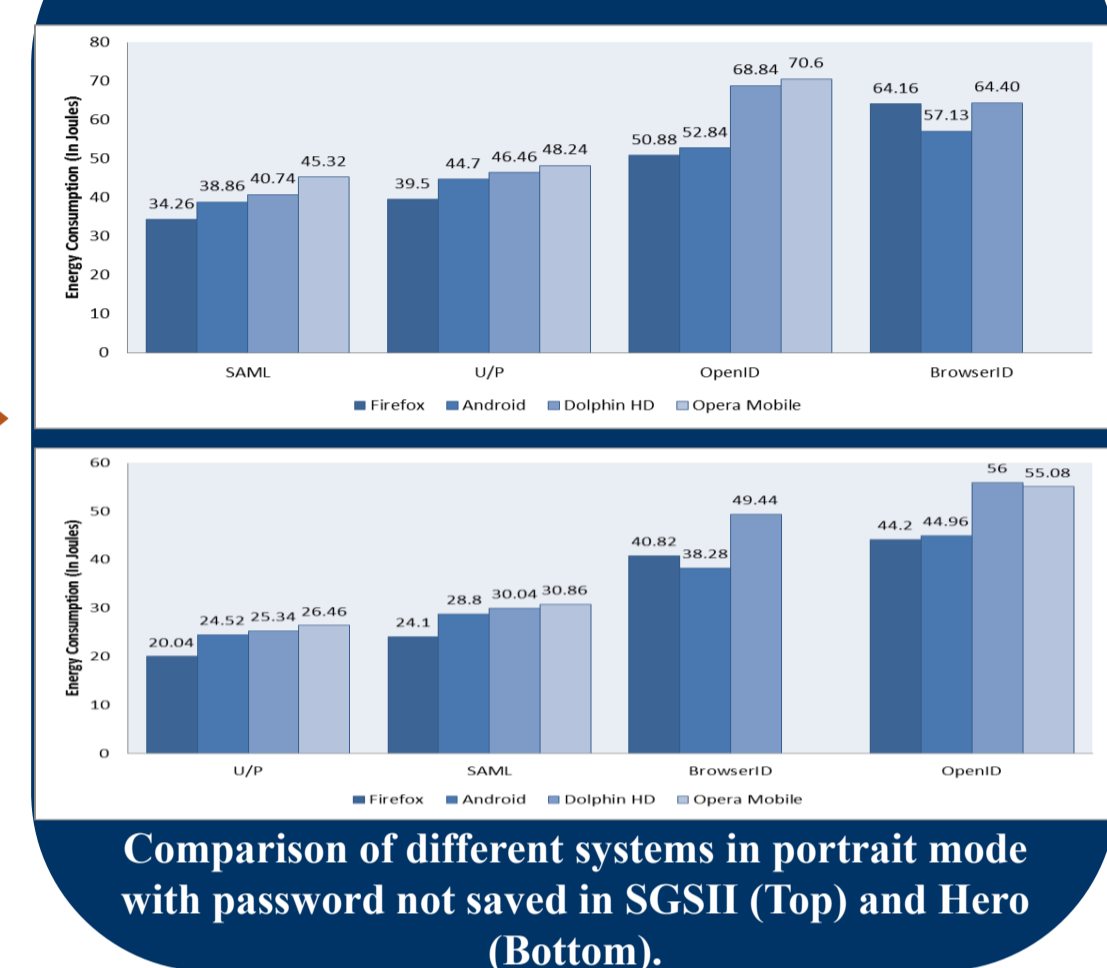
Conclusion

- 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



Results-1



Results-2

Legends: A → Android, F → Firefox, D → Dolphin, O → Opera, X → No Data

	U/P				SAML				BrowserID				OpenID			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Portrait	F	A	D	O	F	A	D	O	A	F	D	X	F	A	D	O
Landscape	F	A	D	O	F	A	D	O	A	D	F	X	F	A	D	O

	U/P			SAML			OpenID		
	1	2	3	1	2	3	1	2	3
Portrait	A	D	O	A	D	O	A	D	O
Landscape	A	D	O	A	D	O	A	D	O

Relative ranking of browsers in SGSII (Top) and Hero (Bottom). 1 represents the least power consumption & 4 represents the most power consumption.

Results-3

Legends: U/P → Username/Password, S → SAML, Op → OpenID, B → BrowserID

	1	2	3	4
Portrait with password not saved	S	U/P	Op	B
Portrait with password saved	U/P	S	B	Op
Landscape with password not saved	S	U/P	Op	B
Landscape with password saved	U/P	S	B	Op

	1	2	3
Portrait with password not saved	S	U/P	Op
Portrait with password saved	S	U/P	Op
Landscape with password not saved	S	U/P	Op
Landscape with password saved	U/P	S	Op

Relative ranking of IdM Systems in SGSII (Top) & Hero (Bottom). 1 represents the least power consumption & 4 represents the most power consumption.

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.