

Saving Power Consumption using PSM for WiFi Devices

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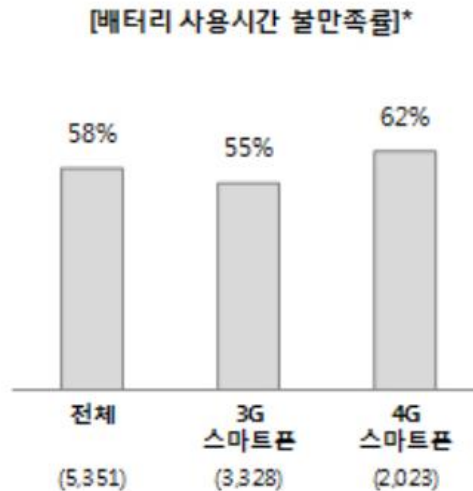
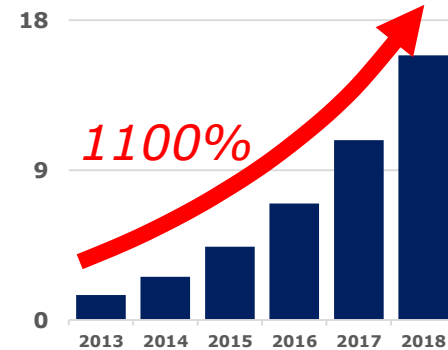
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LAB: Mobile Networking Lab

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Introduction

- Explosive increase in mobile data traffic
 - Expected to grow to 15.9 exabyte per month by 2018 *
- The most issued problem of smart phone
 - Battery Life



Top 5 Samsung Galaxy SIII Problems:

1. Microphone Malfunction – 50%
2. Battery Life – 15%
3. Device Gets Hot – 15%
4. Internet Connection Issues – 10%
5. Other – 10%

Top 5 Apple iPhone 4S Problems:

1. Battery Life – 45%
2. Can't Connect Wi-Fi – 20%
3. Bluetooth Connection – 15%
4. Siri Complaints – 10%
5. Other – 10%

Top 5 Galaxy Nexus Problems:

1. Microphone Malfunction – 55%
2. Battery Life – 20%
3. Can't Connect Wi-Fi – 10%
4. General Usability – 10%
5. Other – 5%

Top 5 Blackberry Curve Problems:

1. Random Reboots – 40%
2. Software Errors – 20%
3. Missing Applications – 20%
4. Memory Card Error – 10%
5. Other – 10%

Top 5 HTC Titan II Problems:

1. Screen Resolution – 35%
2. Can't Find Applications – 20%
3. Camera Quality – 15%
4. Battery Life – 15%
5. Other – 15%

Top 5 Nokia Lumia 900 Problems:

1. Tinted Purple Screen – 25%
2. Camera Button – 20%
3. Can't Find Applications – 20%
4. Battery Life – 20%
5. Other – 15%

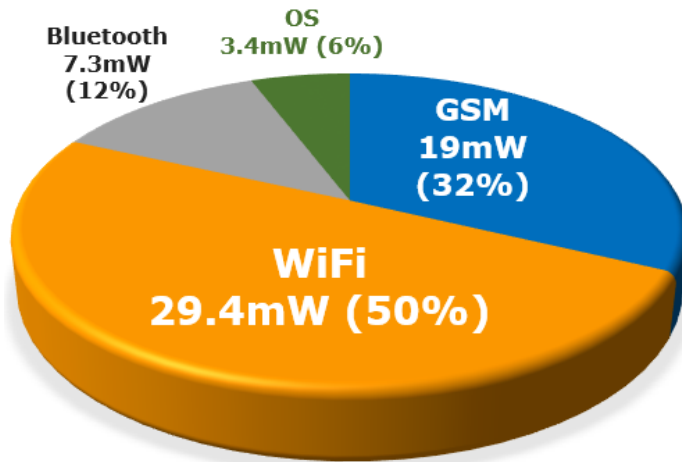
<http://www.fixya.com>

* CISCO, <http://www.ciscoknowledgenetwork.com/>.

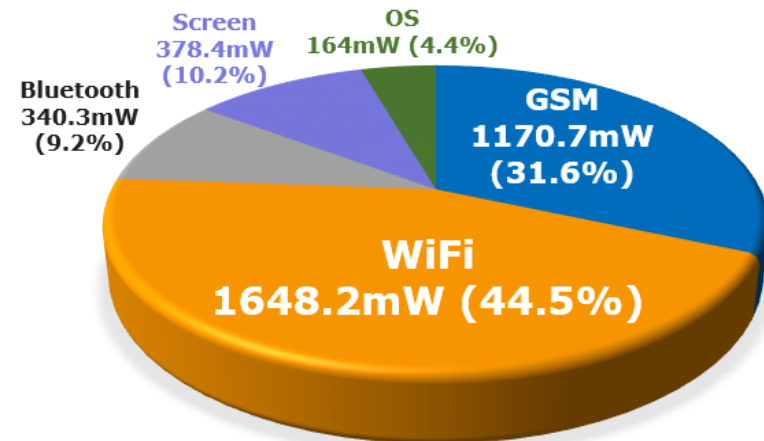
<http://www.mktinsight.co.kr>

Introduction

- WiFi is “Battery Killer”



Radios idle, Screen off



Radios active, Screen on

[Android phone's power consumption breakdown] *

* J. Tao, N. Guevara, and B. Sheng, "WiZi-Cloud: Application-transparent Dual ZigBee-WiFi Radios for Low Power Internet Access," IEEE INFOCOM, 2011.

What is PSM?

- IEEE 802.11 standard defines **Power Saving Mode (PSM)** to reduce power consumption.
- Two Power State

Awake	Sleep
High power consumption But Idle time can be exist	Low power consumption But cannot communicate

- Type of Power Mode
 - CAM (constantly awake mode) / Static PSM / Adaptive PSM

Project Description (1)

- **Purpose**

:: Saving power consumption for our WiFi devices' battery life
(ex. Smart phones, tablets, or watches)

- **Goal**

:: Implement the Power Save Mode into network simulator (NS2)
and improve legacy PSM algorithm.

Project Description (2)

● Method

- 1) Paper survey
- 2) WiFi PSM implementation using simulator, NS2.
- 3) Traffic pattern analysis using Wireshark which is the packet capturing program.
- 4) Discussion with advisor to find more efficient PSM algorithm.

Project Schedule

Date	Duration	To Do
3/14 ~ 4/3	3 weeks	Information gathering & understanding the topic
4/4 ~ 4/10	1 week	Requirements analysis
4/11 ~ 4/17	1 week	High-level design
4/18 ~ 5/1	1 week	Detailed design
5/2 ~ 5/15	2 weeks	Prototype implementation
5/16 ~ 5/29	2 weeks	Testing and debugging
5/30 ~ 6/5	1 week	Poster presentation & final report

THANK YOU !