Pushing bits from the cloud - Android and Push Notification (C2DM)

Lars Vogel – vogella.de

About me

Independent Eclipse and Android Consultant and Trainer

Team Lead and Android developer at SAP AG

Maintains http://www.vogella.de Java, Eclipse and Android related Tutorials with ~30 000 visitors per day

Why is push good?

Androids C2DM

The server side

The challenge

Data in the Cloud

Mobile Phone

Internet creates value for your application

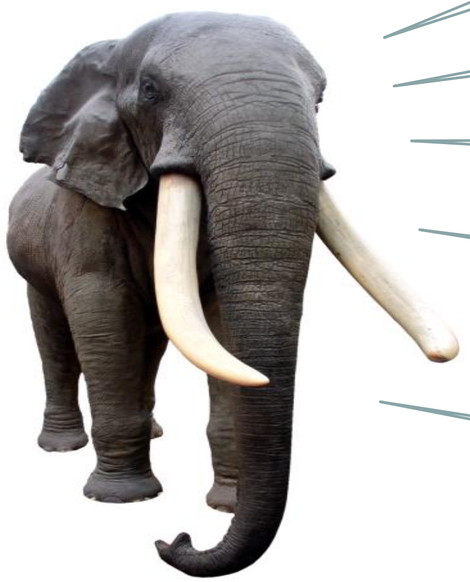
How to get data updates?

Getting the data

Polling

Pushing

Polling is easy to implement



No

No

NO

NOOOOO!!!

Yes

Data?

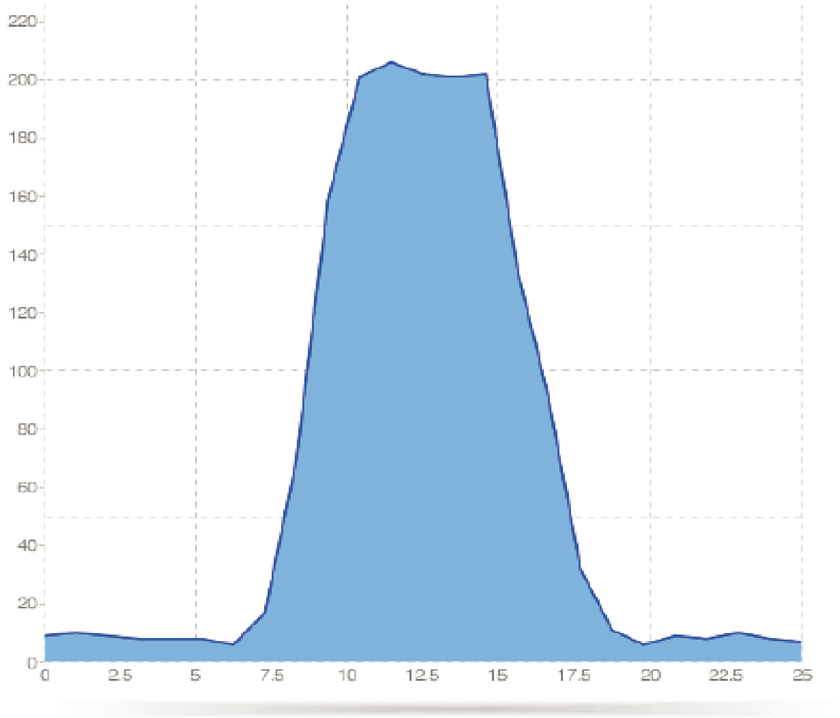
Data?

Data?

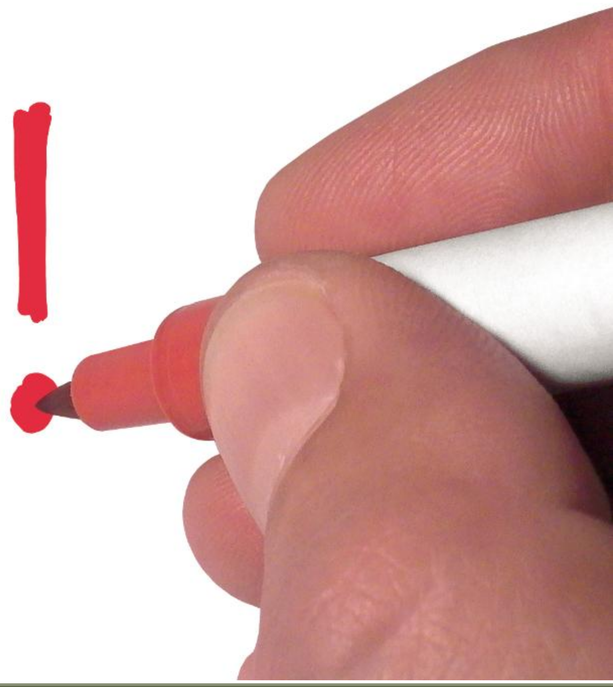
Data?

Data?

Impact of Polling on Battery



- Baseline: ~5-8 mA
- Network: ~180-200 mA
  - Tx more expensive than Rx
- Radio stays on for few secs
- ~0.50 mAh for a short poll
  - 5m frequency: ~144 mAh / day
  - 15m frequency: ~48 mAh / day



Source: Android development team at Google

An average battery has approx. 820 – 1150 mAh power

Polling every 5 min can consume 10 % of your battery

Nobody likes apps which reduce the battery life of the phone

Nobody likes apps
with stale data

Pushing

Server informs the phone once new data is available

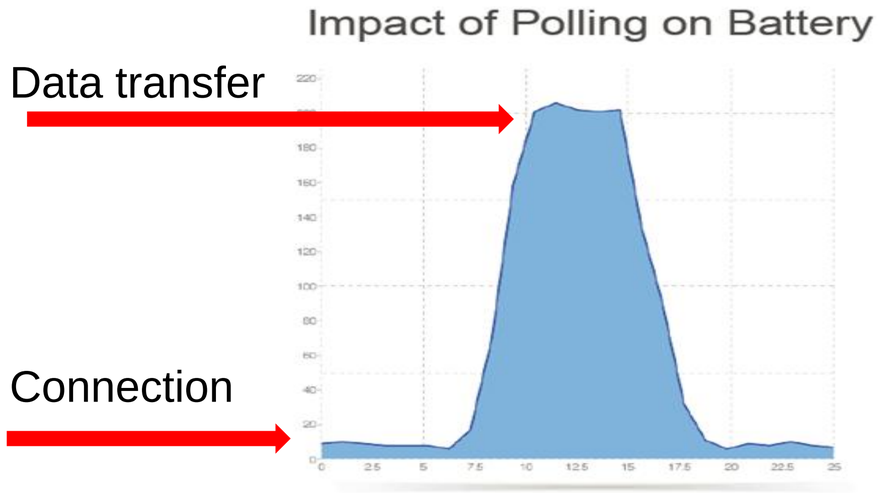
Androids C2DM

O'REILLY Android Open CONFERENCE

Why should a constant push connection consume less energy?

So why should that consume less battery?

- Connection is much cheaper then sending data
- .... and Market is anyhow holding a connection



Cloud to Device Messaging

Available for Android 2.2 (Beta – Invite only)

Requires the Market available on the device

Use existing Google connections

Use AlarmManager to keep the connection (Heartbeat)

What components do you need?


11:03 PM
Google
Maps
Gallery
YouTube
Market
Phone
Gmail
Browser
Voice
61°
Helping Grandpa Get His Tech On

Android App

Googles C2DM Server

Your application server

Trust - Everyone needs to know each other

Registration of the Server with Google

Googles C2DM Server

HTTP POST

Token

Your application server

Registration of the mobile device

Googles C2DM Server

Request registration ID

Unique registration ID

Android App

Server might send new registration ID

Let my server know

Sends Registration ID to server

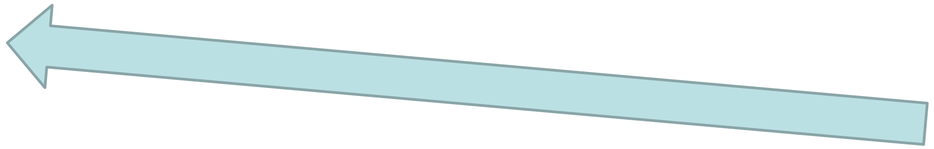
Android App

Server stores the registration ID

Now my server is registered with Google AND has at least one device it can send message to

C2DM is ready to be used

Sending messages



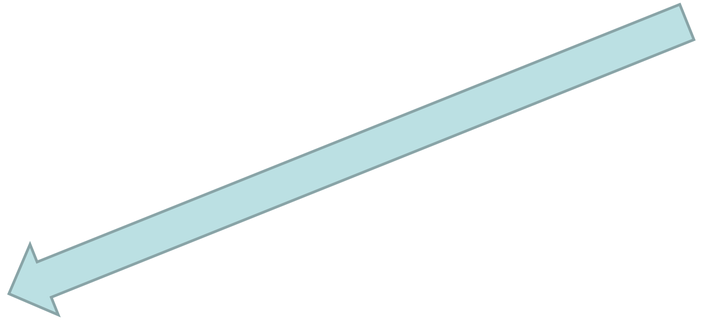
New HTTP Post message with registration id and authentication token *

200 – ok (with id==ok)
404 – get no auth token
503 – Retry with backoff

I hope Google treats my data confidential

Real Data is fetched from my server

Sends notification message to device



Reads the real data from server

Enforced by the message limit

C2DM push can send 1024 bytes of data

Message Receiver Code...

Further points

Best effort delivery: Google will try to deliver all messages but some might get lost

CollabsKey to ensure that old messages are overritten

Message limit per sender, approx. 200 000

Server implementation can be anything

curl, PHP, Python, C#, Scala,....

Android Developers like Java the Programming language

Your Java application server

from Guillaume Laforge and Patrick Chanezon http://www.slideshare.net/glaforge/google-app-engine-java-groovy-baby

Deployment of Java web application is....

Google App Engine

GAE allows you to host webapplications on the Google infrastructure.

Google App Engine

No Server maintenance

Super easy deployment

It automatically scales up and down

Computing power over time

GAE Key points

- Free to get started, ideal for prototyping
- Price was recently increased
- Supports subset of JPA / JDO for persistence
- Lots of additional services

API’s

Caching

Channel API (push to client, comet)

URL Fetching

Mail

Instant Messaging (XMPP)

Image Manipulation

User Management

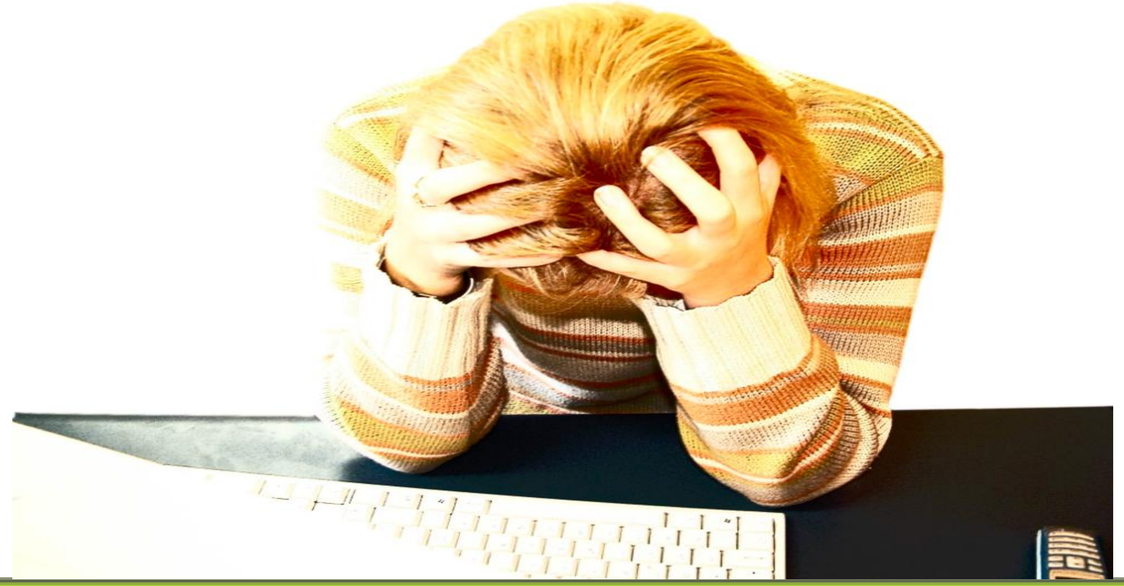
Background Tasks

Map (no Reduce)

XMPP (Chat)

Pull Tasks (new)

Building the app



Help is available

- Google provides some utility classes which helps setting up the mobile app

- Latest Google Plugin for Eclipse has a new wizard
- http://code.google.com/eclipse/docs/appeng_android_install_setup.html

Summary

- C2DM powerful and relatively simple to use
- Google App Engine makes prototyping
- Lets hope C2DM leaves beta soon and have a reasonable price model….

Picture Credits
Add the prefix http://www.sxc.hu/photo

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- Broken Glass 1046397
- Old Computer http://www.sxc.hu/photo/1028528
- Person with remote http://www.sxc.hu/photo/485640
- Victory fingers 906072
- Guy with a tie 877661

Futher information

C2DM Tutorial

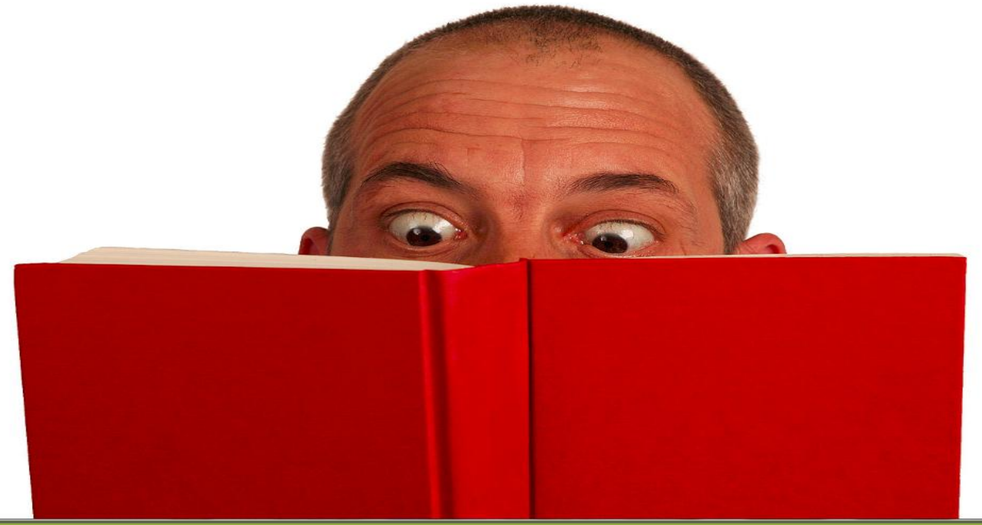
http://www.vogella.de/articles/AndroidCloudToDeviceMessaging/article.html

Google App Engine Tutorial

http://www.vogella.de/articles/GoogleAppEngineJava/article.html

Chrome to Phone Example

http://code.google.com/p/chrometophone/



Thank you

For further questions:

Lars.Vogel@gmail.com

http://www.vogella.de

http://www.twitter.com/vogella