

Meltdown: Lessons Learned

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Introduction

- <http://www.phfactor.net/at/> has everything you need to follow along and try the app.

Motivation

- I have a lot of sites I want to keep an eye on, a few I want to always read, and many more to keep in my peripheral attention.
- Apps like Flipboard, Currents and Zite are magazines.
- I want a fast app for a LOT of feeds. Like 1,000 of 'em.
- I have Fever running, but there wasn't an Android app yet.

The other motives

- The app store is your new resume.
- “You need to have at least one app in the store” - Kathleen
- I want visibility on Github and LinkedIn

Use cases and stories

1. I have a few minutes and want to read some news. The news must be fresh; the app must be fast.
 2. I'm at my desk and want to read on the browser. I don't want to see stuff I've read on the mobile or tablet.
- => I want an interface that makes it easy to read, skim, or ignore.

RSS? Fever?

- XML documents, published along with site, that have post information plus a unique ID.
- Clients can check for updates to feed periodically
- Fever is a commercial RSS aggregator (PHP)


```
<?xml version="1.0" encoding="utf-8"?>
<feed xmlns="http://www.w3.org/2005/Atom" xmlns:creativecommons="http://backend.userland
<title type="text">newest questions tagged android - Stack Overflow</title>
...
  <entry>
    ...
  </entry>
  <entry>
    <id>http://stackoverflow.com/q/9439999</id>
    <re:rank scheme="http://stackoverflow.com">0</re:rank>
    <title type="text">Where is my data file?</title>
    <category scheme="http://stackoverflow.com/feeds/tag?tagnames=android&sort=newes
    <category scheme="http://stackoverflow.com/feeds/tag?tagnames=android&sort=newes
    <author>
      <name>cliff2310</name>
      <uri>http://stackoverflow.com/users/1128925</uri>
    </author>
    <link rel="alternate" href="http://stackoverflow.com/questions/9439999/where-is-
    <published>2012-02-25T00:30:54Z</published>
    <updated>2012-02-25T00:30:54Z</updated>
    <summary type="html">
      <p>I have an Application that requires a data file...</p>

    </summary>
  </entry>
  <entry>
    ...
  </entry>
...
</feed>
```

- Hot
 - Kindling 30
 - AAAA 2
 - AAAA Tech 1
 - AAAB Econ 2
 - AAAB Politics etc 1
 - AAAC Android 1
 - AAAC Econ 2
 - AAAC Image heavy 3
 - AAAC Style 3
 - AAAC Video 42**
 - AAAE if time 4
 - AAAF Ity 2
 - AAAG Bored 2
 - AAAH High volume 6
 - AAAI Watch fors 24
 - AD Macintosh 2
 - BB Jobs 1
 - OO Saved 51
 - Sparks
- Last refreshed 928 feeds just now

Devour Yesterday

Everything Wrong With Back To The Future




Even a cinematic masterpiece like Back to the Future sins every now and again...

Visit [Devour](#) to watch this video.

Devour Yesterday

David Blaine Does Magic For Bryan Cranston and Aaron Paul



David Blaine proves for once and for all that he is the one who knocks...

Visit [Devour](#) to watch this video.

Devour Yesterday

Will Ferrell Hangs Out With Ron Burgundy




Funnyman of the year Will Ferrell hangs out with anchorman of the year Ron Burgundy during their GQ Men Of The Year photo shoot...

Visit [Devour](#) to watch this video.

Devour Yesterday

Stabilized Zapruder JFK Assassination Footage



Abraham Zapruder's shaky home video of the assassination of John F. Kennedy gets interpolated to playback at an eerie 30 frames per second...

Visit [Devour](#) to watch this video.

Devour Yesterday

Meltdown

- Native app for Android v4 or later
- Pure reader: no code to manage/add feeds
- Written over four months of nights and weekends, around 4k SLOC
- Released Nov 2012
- Niche app - around 1,400 total installs
- Open source

Demo



4:02 PM



Meltdown

Server URL: <https://www.phfactor.net/fever>

Email: user@example.com

Password: password

Log in

AAAA

2 unread items

AAAA Tech

One unread item

AAAB Econ

2 unread items

AAAB Politics etc

One unread item

AAAC Android

3 unread items

AAAC Econ

2 unread items

Meltdown
100 to read



AAAA

2 unread items

AAAA Tech

One unread item

AAAB Econ

2 unread items

A

On

Sync in progress

A

3 u



Updating feeds

AAAC Econ

2 unread items

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Jean Claude Van Damme's Epic Split

Jean Claude Van Damme shows off his Belgian

Apple's Phil Schiller on Samsung: Patent Infringement Weakened Our Image as an Innovator



Another day, another news item concerning [Apple and Samsung's long-running patent battle](#). This time, the focus of our attention is on

Android Retro Game Of The Week: Isle Of Bxnes



Some games are just too easy these days. Indie Dev studio Whalenought Studios would agree. That's why they've brought us Isle of Bxnes. They remember the days when games were so difficult that if you died just one more time before making any real headway that you'd just have to bash your head against the wall. Or break your controller, which would certainly hurt less.



Isle of Bxnes is inspired from action rpgs of the old days where you had more of a chance for success to build your own rocket than win. Perseverance be damned, no matter how hard you try, you'll never beat that last level.(or so you'd think)In Isle of Bxnes, you're the head of an island tribe that is being led east by a mysterious set of lights. In your quests to move east in search of what is drawing you near, you'll encounter many dangers and must make choices that could ultimately lead to your demise many times over.



Apple's Phil Schiller on Samsung: Patent Infringement Weakened Our Image as an Innovator



Another day, another news item concerning [Apple and Samsung's long-running patent battle](#). This time, the focus of our attention is on none other than Apple Senior Vice President of Worldwide Marketing Phil Schiller, who recently took the stand to testify in the ongoing legal scuffle between the two technology giants. In an effort to net Apple the damages it believes it deserves from Samsung's patent infringement, Schiller is making some big claims, testifying that Samsung's infringement has damaged t...

Schiller's i... Samsung i... to an Appl... said he wa... iPhone." A... infringeme...

Save on server
Remind me next week
Open Post item
Next

General Discussion • Re: Incoming. What's in the mail? Post pics

can't decide if this is ugly or beautiful - <http://www.bomberg.ch/timepieces/ns44assba...>

HomageForum.com 10 minutes ago

The Current State Of Moving On

Looking at new watch prices for "luxury" type brands lately kind of disturbs...

Wa ... ago

Tv ... o

Fi

As

need to double state the amount...

Do you want to mark 24 items as read in group AAAI Watch fora?

No	Yes
----	-----



3:56 PM



Meltdown



Meltdown

Version 0.9.5 build 66

Meltdown is an open source RSS client for [Fever](#) and is written by [Paul Hubbard](#). Please see [Github for source code](#). Also includes code from <https://github.com/MoriTanosuke> and <https://github.com/flurischt>.

Server URL: <https://www.phfactor.net/fever>

Last refresh 2 minutes ago - network up.

100 unread items in 17 groups and 928 feeds

100 cached posts on disk

Update interval: 15:00

Quick add | Add event | Add task

Cancel | Save

Calendar

My calendar



Title

s an Innovator by Eric Abent



From



Sat 11/23/2013

To



Sat 11/23/2013

All day

Repeat

One-time event



Reminder



Location

Tap to enter location



Description

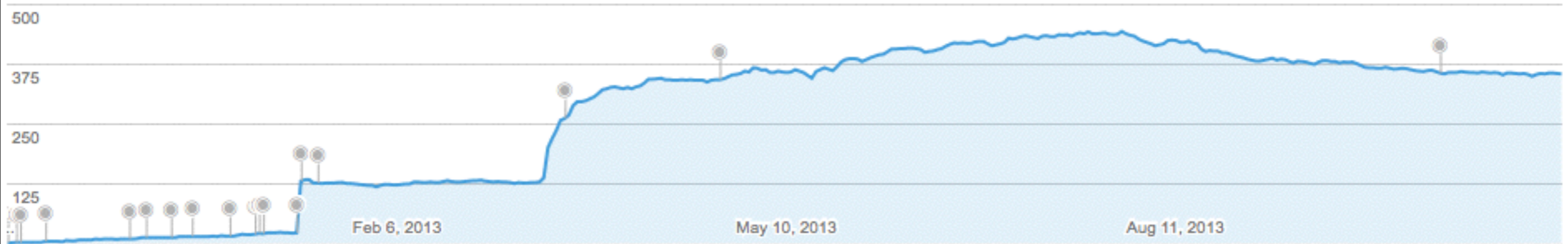
Install stats

MELTDOWN – net.phfactor.meltdown

✓ Published ▼

STATISTICS **Current installs by device** for Nov 5, 2012 - Nov 11, 2013 [Export as CSV](#) Show: [last month](#) [3m](#) [6m](#) [1y](#) [all](#)

The number of active devices on which the application is currently installed. [Learn more](#)



Speed injures

- My #1 feature is speed, which lead to...
- My first big mistake: In-memory data structures
- My second mistake: JSON files
- My biggest mistake of all: Locking data.

App organization

- Activities with ListViews for groups, feeds, and posts.
- ScrollView + WebView for viewing a post
- IntentService run via AlarmManager to keep updated.
- AsyncTasks to mark stuff as read.

Data structures

- In-memory arrays for groups, feeds and posts. Owned and managed by Application.
- Classes as data structures - all public.
- Bulky page contents in individual JSON files
- IntentService uses LocalBroadcastManager

Fever REST API

- Well documented at <http://feedafever.com/api>
- Already alternatives, e.g. <https://github.com/passiomatic/coldsweat>
- Emerging standard?

Android Docs Are Bad

- Lots of fine detail but hard to find big picture. E.g., SO or blog posts on how to fix an error, but harder to find advice on how to design an app.
- The book I bought was good, but the APIs were deprecated by the time I started!
- A mentor would have helped immensely

Evolving design patterns

- Activity or Fragments?
- SQLiteOpenHelper or ContentProvider?
- insert vs SQL bulk operations?
- ContentProvider or SyncAdapter?
- ManagedCursor vs CursorLoader?
- Multiple HTTP clients, DownloadManager

The Docs I Want

- Big-picture design patterns
- Detailed API / parameter /return value
- Sample code, as concise as possible
- Context: When to use A versus B, drawbacks, gotchas, bugs.

Finding Good Code

- Google I/O - <https://code.google.com/p/iosched/>
- Android blog - <http://android-developers.blogspot.com>
- Github - look for projects with stars and forks
- Google sample code in ADK

Where I blew it

- More time on RTFM and design.
- Should have been a SyncAdapter app from the start
- Nights and weekends lead to bad decisions.
- “Always have running code”
- Strings
- Activities and not Fragments

SQLite mistakes

- Wrote an SQLiteOpenHelper as per book, got *a* whopping insert per second on a Galaxy Nexus.
- Rewrote using the filesystem, got ~1k per second.
- Stopped there - should have kept reading and found bulk SQL operations.

Sync and lock errors

- Despite knowing pthreads & MPI, I didn't RTFM on locking.
- App works... almost all of the time.
- 3 possible activities need to lock
- Derived data!

Other Mistakes

- Strings not in strings.xml - hard to fix, blocker on localization and translation.
- Communications code doesn't save and present errors to user. Hard problem.
- Local broadcasts are not reliable
- ListViews blow up when done poorly

Useful tips and tools

- ITerm2 - select, right click, search on Google. Best way to find errors.
- 'adb logcat | grep Meltdown' in one and 'adb logcat | grep Runtime' in another
- LaunchBar shortcut to search StackOverflow
- Play console - stack traces
- GraphicalHTTPClient and API widget

POST

http://www.phfactor.net/fever/?api&mark=group&as=read&id=18&before=1358118602

+ - Clear

Cookies

Options

Authentication

Request Body

Clear

Header Name	Header Value
Content-Type	application/x-www-form-urlencoded

api_key=2fb5e88ea00e29130be56c51d89e4e

Status: 200 - OK

Time: 14 ms

Redirects: 0

Copy Headers to Clipboard



Header Name	Header Value
Connection	close
Content-Length	64
Content-Type	text/json; charset=utf-8
Date	Tue, 12 Nov 2013 18:54:23...
Server	Apache/2.4.6 (Debian)
X-Powered-By	PHP/5.5.5-1

Response Body (64 bytes)

Copy to Clipboard

View as HTML

Save to File

```
{
  "api_version": 3,
  "last_refreshed_on_time": "1384282461",
  "auth": 1
}
```

[Fever API Documentation](#)

Fever URL	<input type="text" value="https://www.phfactor.net/"/>	eg. yourdomain.com/fever
Email	<input type="text" value="pfb@phfactor.net"/>	eg. you@yourdomain.com
Password	<input type="password" value="....."/>	eg. b3stp4s4wd3v4
GET arguments	<input type="text" value="groups"/>	eg. groups&feeds
POST arguments	<input type="text"/>	eg. mark=item&as=read&id=1024
Format	<input checked="" type="radio"/> JSON <input type="radio"/> XML	
<input type="button" value="Submit"/>		

Request

GET: `https://www.phfactor.net/fever/?api&groups`

POST: `api_key=2fb5e88ea00e29130be56c51d89e4ed3&`

Response

```
{"api_version":3,"auth":1,"last_refreshed_on_time":"1384647732","groups":[{"id":1,"title":"AAAB"}, {"id":4,"title":"AAAB"}, {"id":5,"title":"AAAB Biking"}, {"id":6,"title":"AAAB Comics"}, {"id":7,"title":"AAAB"}, {"id":9,"title":"AAAB images"}, {"id":10,"title":"AAAB Watches"}, {"id":11,"title":"AAAC AMQP"}, {"id":12,"title":"AAAC"}, {"id":14,"title":"AAAC Image heavy"}, {"id":15,"title":"AAAC Drupal"}, {"id":16,"title":"AAAC M"}, {"id":17,"title":"AAAC Tech"}, {"id":19,"title":"AAAD Friends"}, {"id":20,"title":"AAAD Pictures from friends"}, {"id":21,"title":"AAAD"}, {"id":23,"title":"AAAG Bored"}, {"id":24,"title":"AAAH High volume"}, {"id":25,"title":"AAAH Ki"}, {"id":26,"title":"AAAH Gadgets and such"}, {"id":28,"title":"AD Macintosh"}, {"id":29,"title":"Audition"}, {"id":30,"title":"Video"}, {"id":33,"title":"AAAB Politics etc"}, {"id":34,"title":"AAAB Mobile"}, {"id":35,"title":"AAAB"}, {"id":37,"title":"AAAB Windows"}],"feeds_groups": [{"id":1,"title":"AAAB"}, {"id":2,"title":"AAAB"}, {"id":3,"title":"AAAB"}, {"id":4,"title":"AAAB"}, {"id":5,"title":"AAAB Biking"}, {"id":6,"title":"AAAB Comics"}, {"id":7,"title":"AAAB"}, {"id":8,"title":"AAAB"}, {"id":9,"title":"AAAB images"}, {"id":10,"title":"AAAB Watches"}, {"id":11,"title":"AAAC AMQP"}, {"id":12,"title":"AAAC"}, {"id":13,"title":"AAAC"}, {"id":14,"title":"AAAC Image heavy"}, {"id":15,"title":"AAAC Drupal"}, {"id":16,"title":"AAAC M"}, {"id":17,"title":"AAAC Tech"}, {"id":18,"title":"AAAC"}, {"id":19,"title":"AAAD Friends"}, {"id":20,"title":"AAAD Pictures from friends"}, {"id":21,"title":"AAAD"}, {"id":22,"title":"AAAD"}, {"id":23,"title":"AAAG Bored"}, {"id":24,"title":"AAAH High volume"}, {"id":25,"title":"AAAH Ki"}, {"id":26,"title":"AAAH Gadgets and such"}, {"id":27,"title":"AAAH"}, {"id":28,"title":"AD Macintosh"}, {"id":29,"title":"Audition"}, {"id":30,"title":"Video"}, {"id":31,"title":"AAAB"}, {"id":32,"title":"AAAB"}, {"id":33,"title":"AAAB Politics etc"}, {"id":34,"title":"AAAB Mobile"}, {"id":35,"title":"AAAB"}, {"id":36,"title":"AAAB"}, {"id":37,"title":"AAAB Windows"}]}
```



java.lang.IndexOutOfBoundsException

in java.util.ArrayList.throwIndexOutOfBoundsException

Hide

Crash 1 of 2



Reports this week

0

Reports total

1

Last reported

Oct 23, 2013

STACK TRACES

[User Messages](#)

Page 1 of 1

Last reported

Oct 23, 2013

Application version

0.9.5

Reports this week

0

Reports total

1

```
java.lang.RuntimeException: Failure delivering result ResultInfo{who=null, request=9752,
    result=-1, data=null} to activity
    {net.phfactor.meltdown/net.phfactor.meltdown.ItemsActivity}:
    java.lang.IndexOutOfBoundsException: Invalid index 14, size is 11
    at android.app.ActivityThread.deliverResults(ActivityThread.java:3367)
    at android.app.ActivityThread.handleSendResult(ActivityThread.java:3410)
    at android.app.ActivityThread.access$1100(ActivityThread.java:141)
    at android.app.ActivityThread$H.handleMessage(ActivityThread.java:1304)
    at android.os.Handler.dispatchMessage(Handler.java:99)
    at android.os.Looper.loop(Looper.java:137)
    at android.app.ActivityThread.main(ActivityThread.java:5103)
    at java.lang.reflect.Method.invokeNative(Native Method)
    at java.lang.reflect.Method.invoke(Method.java:525)
    at com.android.internal.os.ZygoteInit$MethodAndArgsCaller.run(ZygoteInit.java:737)
    at com.android.internal.os.ZygoteInit.main(ZygoteInit.java:553)
    at dalvik.system.NativeStart.main(Native Method)
    Caused by: java.lang.IndexOutOfBoundsException: Invalid index 14, size is 11
    at java.util.ArrayList.throwIndexOutOfBoundsException(ArrayList.java:255)
    at java.util.ArrayList.get(ArrayList.java:308)
    at android.widget.AdapterView.getItem(AdapterView.java:337)
    at android.widget.AdapterView.getItemAtPosition(AdapterView.java:763)
    at net.phfactor.meltdown.ItemsActivity.viewPost(ItemsActivity.java:222)
    at net.phfactor.meltdown.ItemsActivity.onActivityResult(ItemsActivity.java:350)
    at android.app.Activity.dispatchActivityResult(Activity.java:5322)
    at android.app.ActivityThread.deliverResults(ActivityThread.java:3363)
    ... 11 more
```

Little touches help!

- Correct keyboard for different text entry - URLs, email, passwords
- Subject/verb agreement
- Share to calendar
- Call users' URL as a hook
- Share outwards with text/plain
- Mark as read in background - heck, all network in background

Odd bits

- Couple small commits on Github, but I need to do more to encourage collaboration there.
- Runs on Blackberry OS 10
- Volunteers for translation
- Other app stores - Amazon, AppSurfer

Status of version two

- Volunteering to present it here lead to a frantic attempt to clean up the mess.
- Bulk SQL ops working, ~2k / sec on HTC One.
- ContentProvider for items
- Fragments for tablets and landscape
- New ListView with favicon placeholder
- Faster, uses less memory, less facepalm-y

More ideas for v2

- Strings into strings.xml & move to Android Studio
- Add gestures to interface
- More time on ListView cell design
- SyncAdapter once I have working ContentProvider
- EventBus and/or Volley
- Coalesce mark-as-read updates
- Might use ACRA with dialog to report bugs

Hoping for help here

- Issue 20: HTTP stops working. WTF?
- Best design patterns for Service / Activity IPC and locking. EventBus? Java primitives?
- Service -> ProgressBar?
- How to save and present HTTP(S) errors

Free Advice

- Look at how Google writes iosched
- Setup Eclipse to filter completions - big help.
- Invest the time to learn the complex patterns such as SyncAdapter and CursorLoader
- Research Volley or other networking libraries
- Use EventBus for IPC. Super clean.
- Be willing to share flawed code. It's OK.