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Java. Cloud. Leadership.

JBoss, Java and IoT

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Examples of JBoss and IoT

- Raspberry Pi/embedded
  - Narayana, Switchyard, Infinispan, AS7/WildFly 8, Arquillian, ActiveMQ
  - Fuse Fabric, Vert.x
  - …
- Mobile
  - AS7
  - Narayana
  - jBPM 5
  - …

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GE Energy and Smart Grid (Fuse & A-MQ)
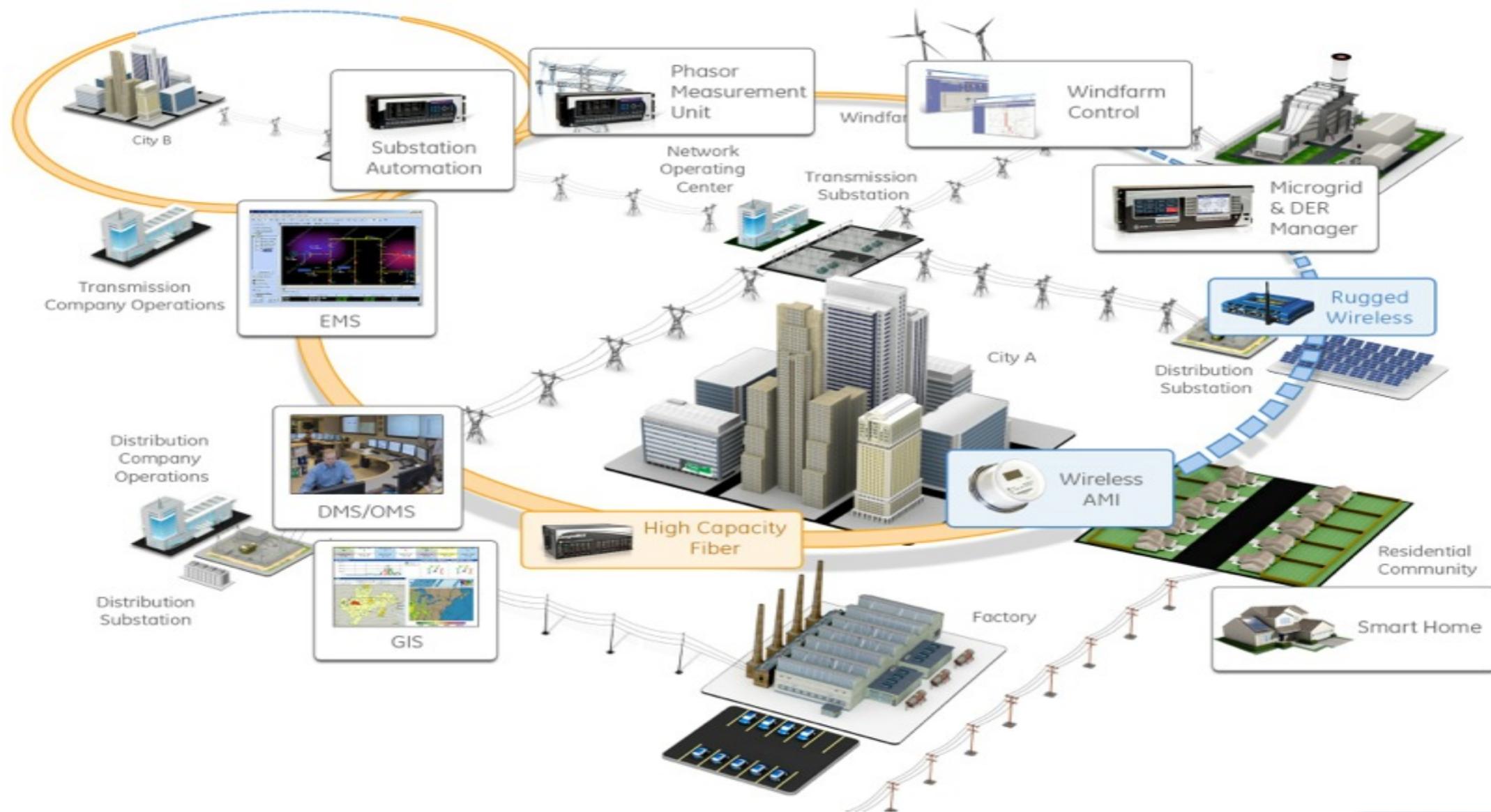
FAA Next Generation (Fuse & A-MQ)

En Route

Terminal

NextGen Applications

Non-FAA Users (e.g., Airlines,

FAA

SWIM Enterprise Infrastructure

FTI IP Backbone

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ActiveMQ In Space!

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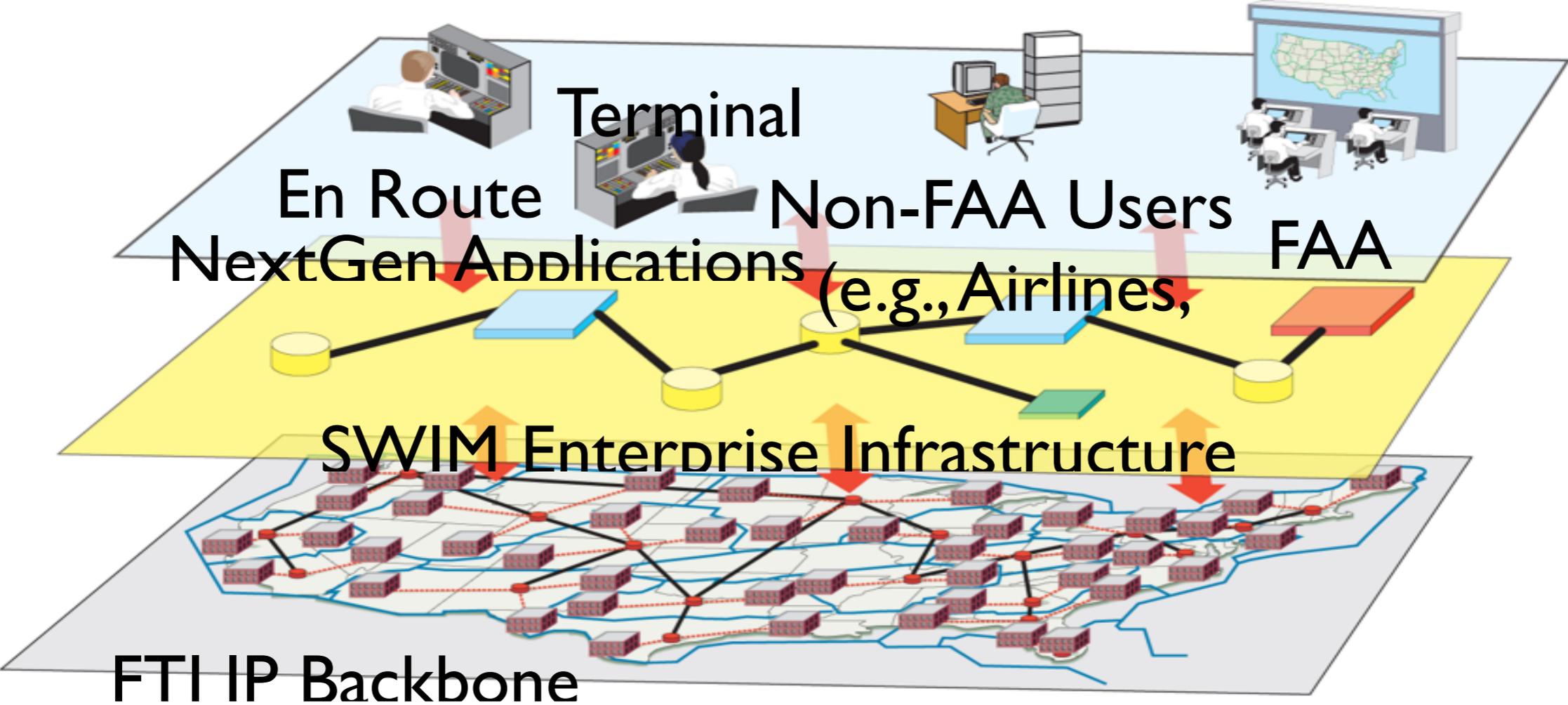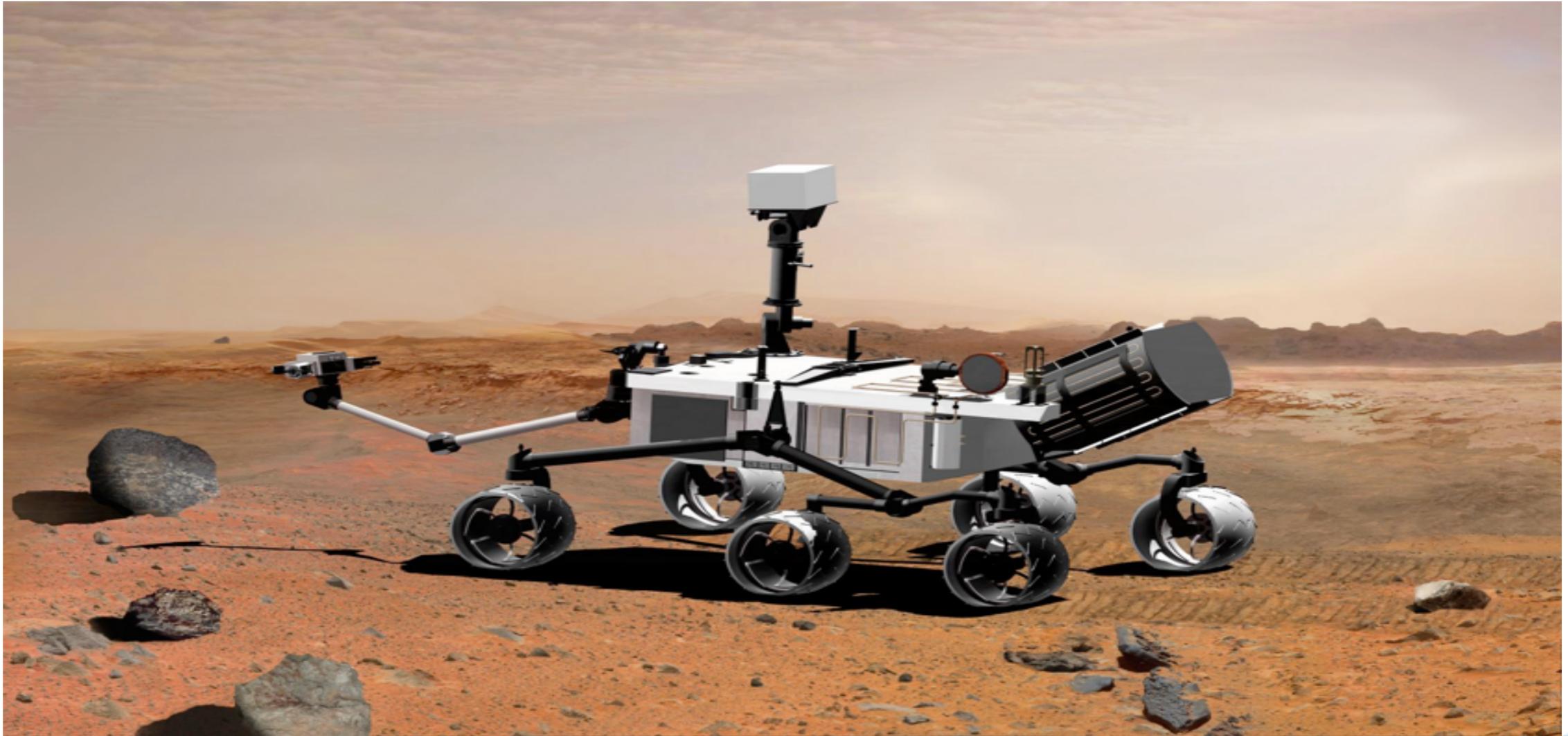
Apollo and High Energy Physics

Enterprise Mobile | JBoss® by Red Hat | JavaEE | JBoss® by Red Hat | Jopr

API (Java, Ruby, Python, C++, etc...)
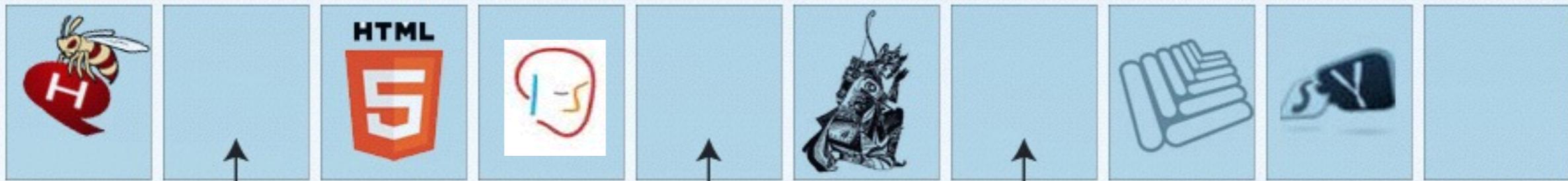
Infinispan

errai

jBPM

JBossMSC

Services

Social Aspect

Examples on the Pi

- Raspberry Pi Model B
  - Wheezy, JDK 1.7
  - 512 Meg, 8Gig SD card
    - http://www.pcmag.com/article2/0,2817,2388408,00.asp
  - Modify swap
    - /etc/dphys-swapfile
    - /etc/init.d/dphys-swapfile stop
    - /etc/init.d/dphys-swapfile start
  - Go with 256 Meg initially. And a FAST SD card!
  - Maven 3

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Fuse Fabric on a Pi after 6 hours

- [ERROR] Failed to execute goal org.apache.maven.plugins:maven-surefire-plugin: 2.12:test (default-test) on project archetype-builder: Error while executing forked tests.; nested exception is java.io.IOException: Cannot run program "/bin/sh" (in directory "/home/pi/fusesource/fuse/tooling/archetype-builder"): java.io.IOException: error=12, Cannot allocate memory -> [Help 1]

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Increase swap to 1024 Meg!

```
Tasks:  62 total,   1 running,  61 sleeping,   0 stopped,   0 zombie
%Cpu(s): 98.7 us,  1.0 sy,  0.0 ni,  0.0 id,  0.0 wa,  0.0 hi,  0.3 si,  0.0 st
KiB Mem:    188112 total,    175792 used,     12320 free,     27484 buffers
KiB Swap:   102396 total,         0 used,    102396 free,     72252 cached

  PID USER      PR  NI  VIRT  RES  SHR S  %CPU %MEM    TIME+  COMMAND
 1938 pi        20   0  215m  51m 5824 S  97.6 27.9  3:02.63 java
 1959 pi        20   0  4664 1416 1048 R   1.3  0.8  0:00.41 top
 1661 pi        20   0  9868 1524  900 S   0.6  0.8  0:00.44 sshd
 1058 root      20   0  1720  512  436 S   0.3  0.3  0:01.46 ifplugd
 1064 root      20   0  1720  488  412 S   0.3  0.3  0:01.06 ifplugd
    1 root      20   0  2128  704  604 S   0.0  0.4  0:01.81 init
    2 root      20   0     0    0    0 S   0.0  0.0  0:00.00 kthreadd
    3 root      20   0     0    0    0 S   0.0  0.0  0:00.00 ksoftirqd/0
    5 root      20   0     0    0    0 S   0.0  0.0  0:00.23 kworker/u:0
    6 root      -2   0     0    0    0 S   0.0  0.0  0:00.92 rcu_kthread
    7 root       0 -20     0    0    0 S   0.0  0.0  0:00.00 khelper
    8 root      20   0     0    0    0 S   0.0  0.0  0:00.01 kdevtmpfs
    9 root       0 -20     0    0    0 S   0.0  0.0  0:00.00 netns
   10 root      20   0     0    0    0 S   0.0  0.0  0:00.01 sync_supers
   11 root      20   0     0    0    0 S   0.0  0.0  0:00.00 bdi-default
   12 root       0 -20     0    0    0 S   0.0  0.0  0:00.00 kblockd
   13 root      20   0     0    0    0 S   0.0  0.0  0:00.27 khub
   14 root       0 -20     0    0    0 S   0.0  0.0  0:00.00 rpci
   16 root      20   0     0    0    0 S   0.0  0.0  0:00.00 khun
   17 root      20   0     0    0    0 S   0.0  0.0  0:00.36 kswq
   18 root      20   0     0    0    0 S   0.0  0.0  0:00.00 fsno
   19 root       0 -20     0    0    0 S   0.0  0.0  0:00.00 nfsi
```

```
top - 19:44:02 up 1 day,  7:43,  2 users,  load average: 5.15, 3.78, 2.79
Tasks:  63 total,   2 running,  61 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.4 us,  9.1 sy,  0.0 ni,  0.0 id, 88.3 wa,  0.0 hi,  2.3 si,  0.0 st
KiB Mem:    188112 total,    178268 used,      9844 free,        44 buffers
KiB Swap:  1048572 total,    162232 used,    886340 free,      3084 cached

  PID USER      PR  NI  VIRT  RES  SHR S  %CPU %MEM    TIME+  COMMAND
   33 root      20   0     0    0    0 R   4.2  0.0 29:42.98 mmcqd/0
   17 root      20   0     0    0    0 D   3.8  0.0 15:26.36 kswapd0
 8529 pi        20   0  209m 3384  248 S   3.3  1.8  0:09.95 java
 8537 pi        20   0  4664  528  160 R   2.1  0.3  0:00.93 top
 7852 pi        20   0  9868  120    0 S   0.9  0.1  0:01.34 sshd
 8030 pi        20   0  749m 137m  136 S   0.7 74.7 65:48.72 java
 1058 root      20   0  1720  164  124 S   0.3  0.1  2:47.33 ifplugd
 1510 ntp       20   0  5832  168   80 S   0.3  0.1  1:10.27 ntpd
    6 root      -2   0     0    0    0 S   0.2  0.0  0:44.42 rcu_kthread
 1065 root      20   0     0    0    0 S   0.2  0.0  0:45.90 RTKTHREAD
 8476 root      20   0     0    0    0 S   0.2  0.0  0:01.45 kworker/0:0
    1 root      20   0  2128   24    4 S   0.0  0.0  0:13.31 init
```

A faster SD card!

```
FuseFabric:karaf@root> container-create-child --profile example-camel root camel1
The following containers have been created successfully:
        camel1
FuseFabric:karaf@root> container-list
[id]                          [version] [alive] [profiles]                     [provision status]
root*                         1.0       true    fabric, fabric-ensemble-0000-1 success
  broker1                     1.0       true    mq                             success
  camel1                      1.0       false   example-camel
FuseFabric:karaf@root> container-list
[id]                          [version] [alive] [profiles]                     [provision status]
root*                         1.0       true    fabric, fabric-ensemble-0000-1 success
  broker1                     1.0       true    mq                             success
  camel1                      1.0       false   example-camel
```

```
FuseFabric:karaf@root> container-list
[id]                          [version] [alive] [profiles]                     [provision status]
root*                         1.0       true    fabric, fabric-ensemble-0000-1 success
  broker1                     1.0       true    mq                             success
  camel1                      1.0       false   example-camel
```

MongoDB?

- After 10 hours of building …

```
g++ -o build/linux2/normal/mongo/db/queryutil.o -c -Wnon-virtual-dtor -Woverloaded-virtual
-fPIC -fno-strict-aliasing -Wstrict-aliasing -ggdb -pthread -Wall -Wsign-compare -Wno-
unknown-pragmas -Wcast-align -Winvalid-pch -O3 -DBOOST_ALL_NO_LIB -D_SCONS -
DMONGO_EXPOSE_MACROS -DSUPPORT_UTF8 -D_FILE_OFFSET_BITS=64 -DJS_C_STRINGS_ARE_UTF8 -
DMONGO_HAVE_HEADER_UNISTD_H -DMONGO_HAVE_EXECINFO_BACKTRACE -DHAVE_SYNC_FETCH_AND_ADD -
DALIGNMENT_IMPORTANT -DHAVE_BSWAP32 -DHAVE_BSWAP64 -DXP_UNIX -Ibuild/linux2/normal/
third_party/boost -Isrc/third_party/boost -Ibuild/linux2/normal/third_party/pcre-8.30 -
Isrc/third_party/pcre-8.30 -Ibuild/linux2/normal -Isrc -Ibuild/linux2/normal/mongo -Isrc/
mongo -Ibuild/linux2/normal/third_party/snappy -Isrc/third_party/snappy -Ibuild/linux2/
normal/third_party/js-1.7 -Isrc/third_party/js-1.7 src/mongo/db/queryutil.cpp
scons: *** [build/linux2/normal/mongo/db/queryutil.o] Build interrupted.
scons: Build interrupted.
scons: building terminated because of errors.
scons: writing .sconsign file.
```

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A little magic, fingers crossed and 12 hours later …

```
warning: 32-bit servers don't have journaling enabled by default. Please use --journal if you want durability.

[initandlisten] MongoDB starting : pid=2139 port=27017 dbpath=/data/db/ 32-bit host=raspberrypi
[initandlisten]
[initandlisten] ** NOTE: This is a development version (2.1.1) of MongoDB.
[initandlisten] **        Not recommended for production.
[initandlisten]
[initandlisten] ** NOTE: when using MongoDB 32 bit, you are limited to about 2 gigabytes of data
[initandlisten] **        see http://blog.mongodb.org/post/137788967/32-bit-limitations
[initandlisten] **        with --journal, the limit is lower
[initandlisten]
[initandlisten] db version v2.1.1, pdfile version 4.5
[initandlisten] git version: f457ff42ec37f2562d1a5ff06b4d96a861414c94
[initandlisten] build info: Linux raspberrypi 3.1.9+ #272 PREEMPT Tue Aug 7 22:51:44 BST 2012 armv6l BOOST_LIB_VERSION=1_49
[initandlisten] options: {}
```

- https://github.com/nmcl/mongo4pi

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tim
Password
••••••••

Login

Logged in as
tim

Welcome to vToons

I hope you will enjoy our fantastic selection of music

Shop Cart

Please choose from our wonderful selection of songs:

Genre	Artist	Album	Price	
Scrumpy and Western	The Wurzels	I Am A Cider Drinker	$0.99	Add to Cart
Hip Hop	Vanilla Ice	Ice Ice Baby	$0.01	Add to Cart
Easy Listening	Ena Baga	The Happy Hammond	$0.50	Add to Cart
Bird related songs	The Tweets	The Birdy Song	$1.20	Add to Cart

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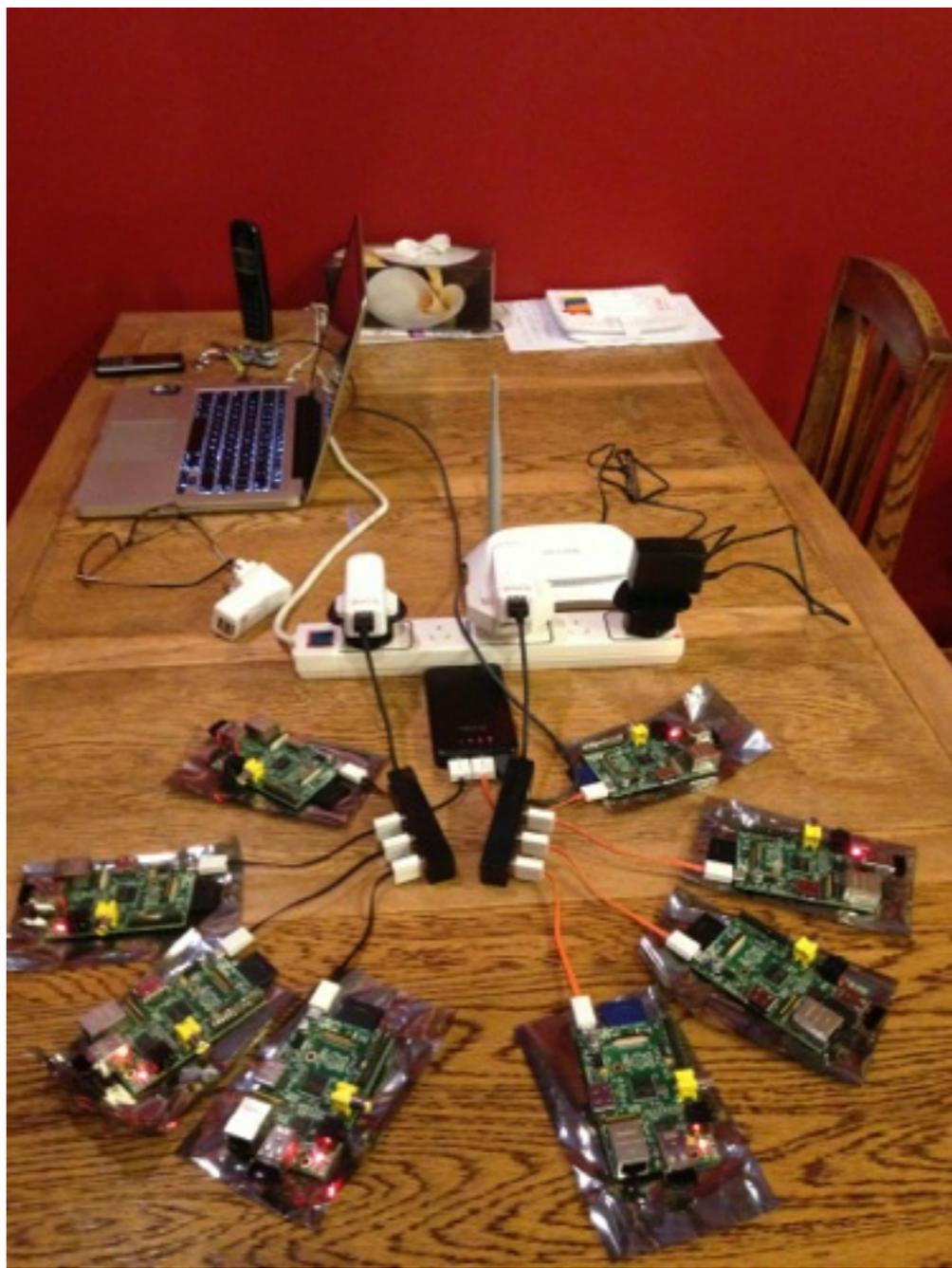
Examples on Android (transactions)

- https://svn.jboss.org/repos/labs/labs/jbosstm/workspace/mlittle/android/

- https://svn.jboss.org/repos/labs/labs/jbosstm/workspace/mlittle/TxAndroid/

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Emulator example ...
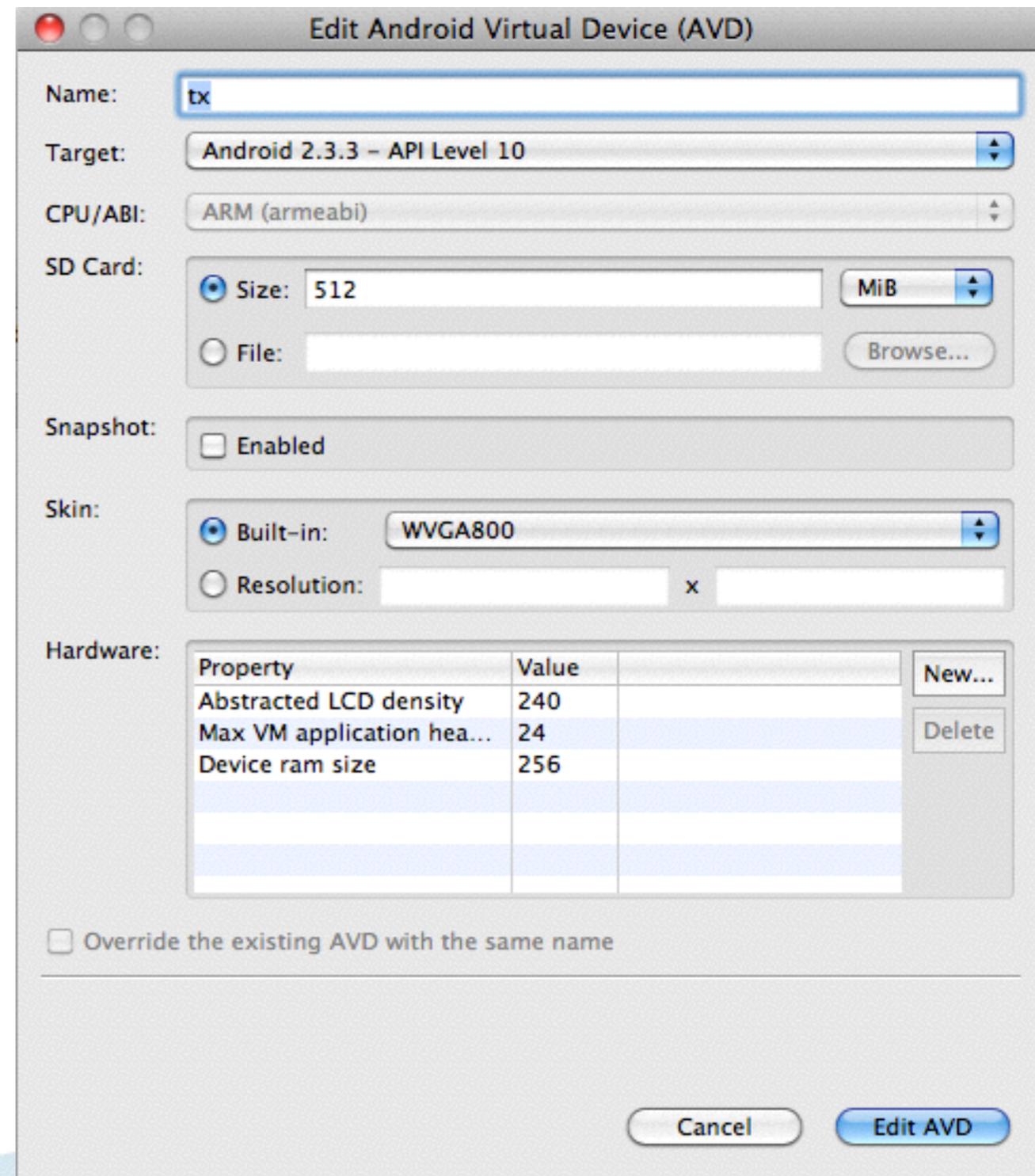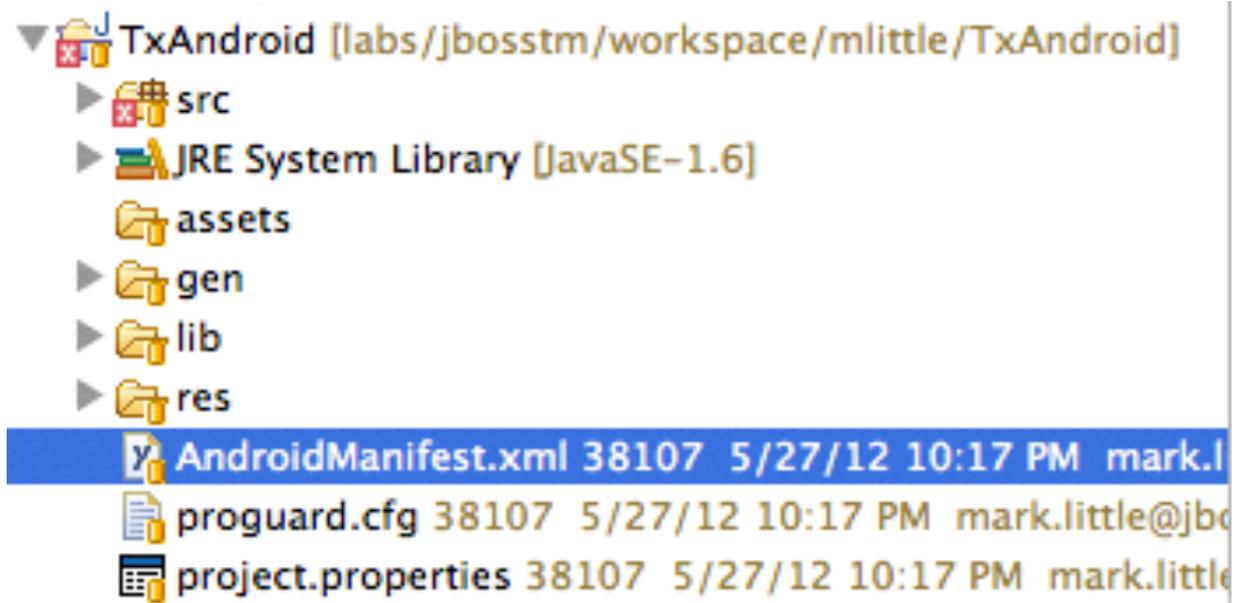
The code

```java
public class HelloAndroid extends Activity {
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {

        super.onCreate(savedInstanceState);
        TextView tv = new TextView(this);

        AtomicAction A = new AtomicAction();
        AtomicObject foo = new AtomicObject();

            A.begin();

            foo.set(2);

            A.commit();

            tv.setText("Hello, TxAndroid created "+A.toString()+" and got "+foo.get());

        setContentView(tv);
    }
}
```

Results

[2012-05-29 09:59:05 - TxAndroid] Uploading TxAndroid.apk onto device 'emulator-5554'
[2012-05-29 09:59:05 - TxAndroid] Installing TxAndroid.apk...
[2012-05-29 09:59:09 - TxAndroid] Success!
[2012-05-29 09:59:09 - TxAndroid] Starting activity com.example.helloandroid.HelloAndroid on device emulator-5554
[2012-05-29 09:59:10 - TxAndroid] ActivityManager: Starting: Intent { act=android.intent.action.MAIN cat=[android.intent.category.LAUNCHER] cmp=com.example.helloandroid/.HelloAndroid }

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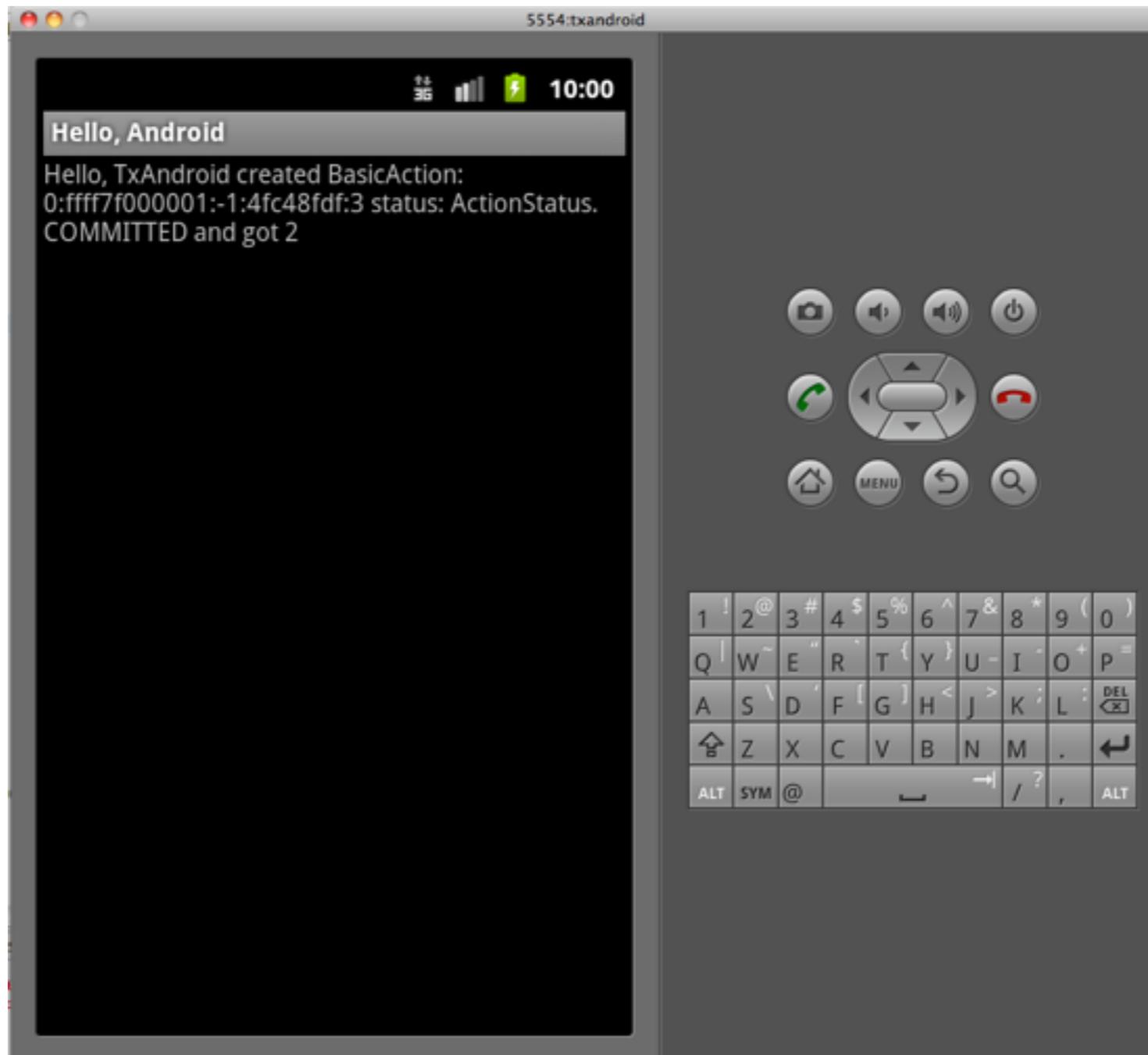
Code changes

- For Raspberry Pi?
  - It's standard Java
    - No code changes
  - Just add a little more patience
- For Android?
  - No StAX by default
  - Classloading is *very* different
    - No loading of byte code at runtime
  - Remember to use —core-library to get javax
  - Some pre-JDK 1.6 compilation issues …

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Eclipse Foundation and IoT

- OSGi is central to Java and IoT
  - Oracle have announced they will focus on Eclipse
- OSGi is part of the Home Gateway Initiative specifications
- Currently active RFCs are:
  - RFC 192: ZigBee Device Service Specification
  - RFC 196: Device Abstraction Layer
  - RFC 199: EnOcean Device Service Specification
  - RFC 200: Resource Management
  - RFC 202: USB Device Category
  - RFC 209: Network Interface Information Service

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Eclipse projects

- liblwm2m - Implements the OMA's LWM2M protocol http://www.eclipse.org/proposals/ technology.liblwm2m

- Californium (Cf) - a CoAP Framework in Java http://www.eclipse.org/proposals/ technology.californium/

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Z-Wave

Zigbee

Gateway

HGI
ActiveMQ
OSGi
DAL (RFC 196)

Enocean

MQTT

data
AMQP/OpenWire

Camel

Fuse

Back-end acts on data

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