BOINC on Android

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Joachim Fritzsch

BOINC on Android - Outline

1. Motivation
2. Architecture
    1. Android OS
    2. BOINC on Android
3. Smartphone considerations
4. Current status & outlook
5. Android-ready project
6. Demonstration

Expanding BOINC infrastructure to Android - Why?

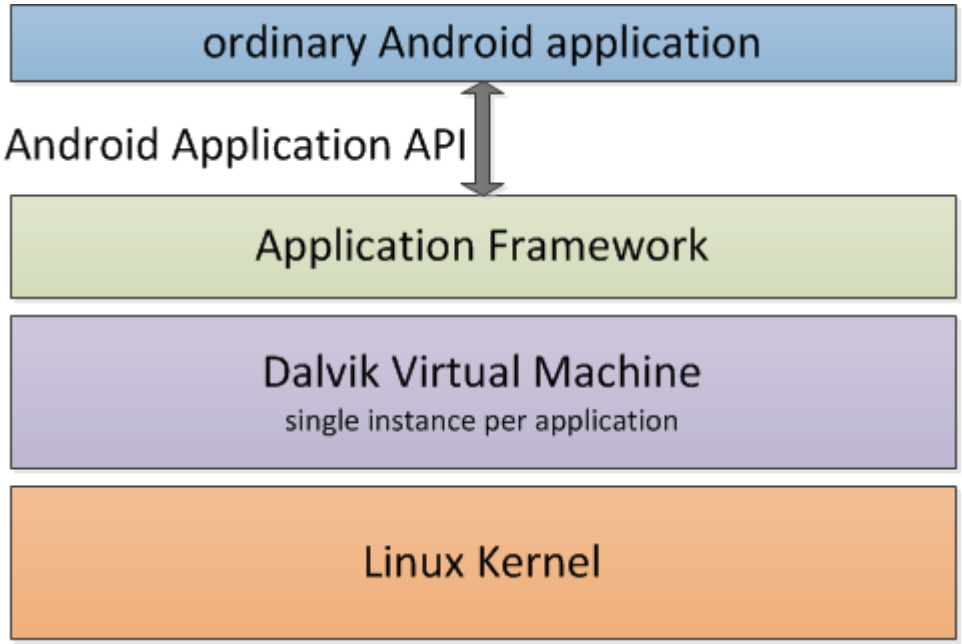
many devices	500,000,000 [1]
increasing capabilities	e.g. Samsung's Galaxy S III Quad-Core 1,4GHz CPU [2]
powerful distribution	reach volunteers via app stores & project web-sites

Android is Java on Linux …

adapted Linux kernel

apps run in virtual machine, architecture independent.

application framework for Java, offers powerful API



… but different.

optimized for needs of smartphones

e.g. usability, power consumption, performance

restrictive security model, Linux multi-user abilities enforce:

app encapsulation
feature access control (e.g. reading contact information)

user does not have to actively close apps

system closes unused apps, when running out of memory

How about BOINC?

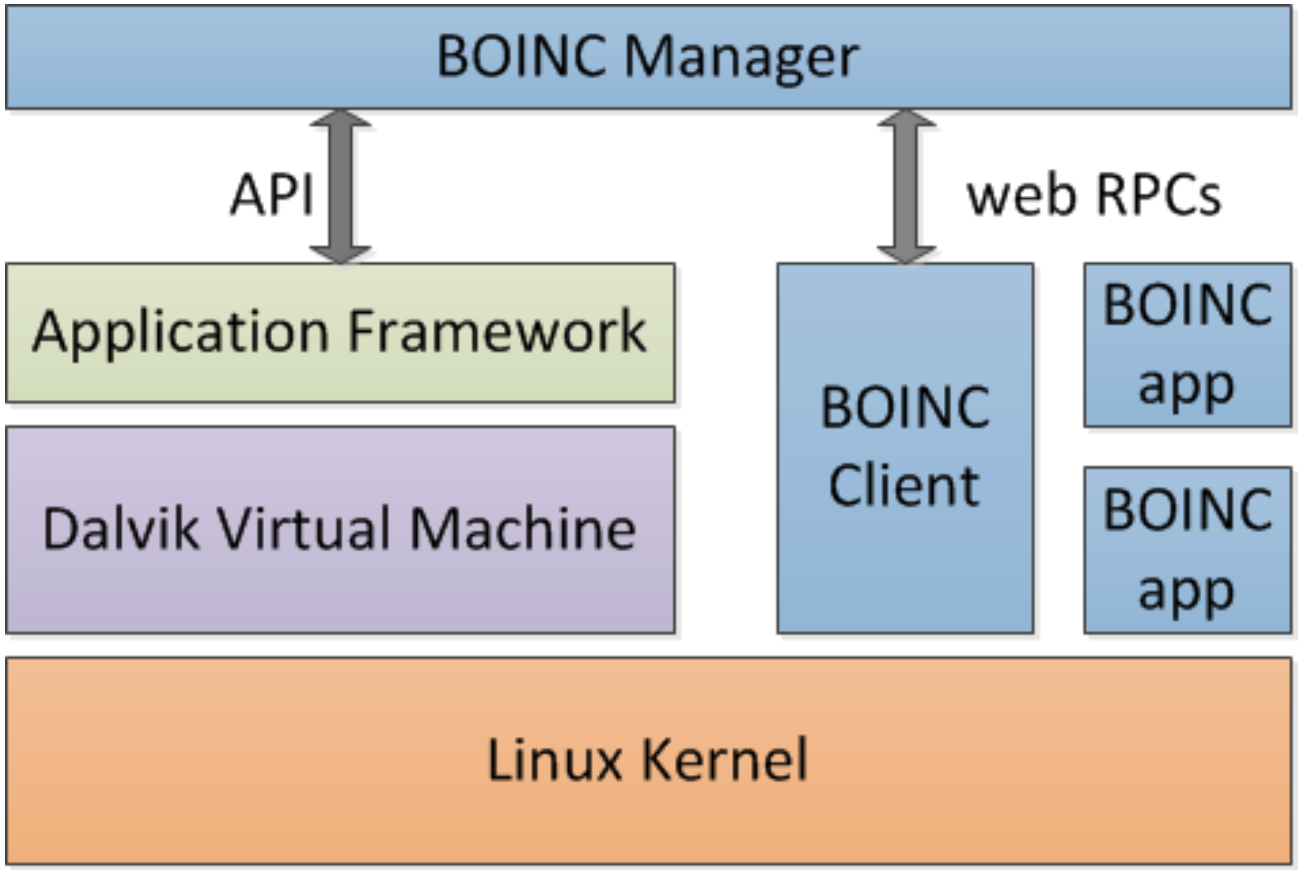
Android BOINC Manager (GUI)

implemented in Java using Application Framework
interacts with Client with proven web-RPCs

existing BOINC Client

written in C, executed as native process
Con: app loses advantages of virtualization
Pros: no re-implementation in Java, no parallel maintenance
better performance (scientific computation in native code)

How about BOINC?



Technical details

compiling BOINC Client (& BOINC science apps) using NDK

- architecture dependent (ARM is ubiquitous)

Android security model still applies (enforced on kernel level)

- running Client using Runtime.exec()
- Client uses fork & exec to start downloaded science apps
- all components need to be same “user”
- Client gets bundled into APK of Manager

Dealing with smartphone limitations

Power consumption

battery life significant limitation
-> computation only when connected to charger

Public networks

cellular data use might be restricted or charged
-> BOINC transfers only on Wi-Fi

Use case: charging phone at home, logged into private Wi-Fi

To this day:

BOINC Client adapted to run on Android

rudimentary BOINC Manager developed

test project at UC Berkeley delivering science task for Android

-> proof of concept

Going forward

higher test coverage

evaluating open questions:

- storage space sufficient?
- wake locks necessary?
- … and whatever else comes to light.

communicate & encourage BOINC projects to use Android

Benefit of BOINC on Android!

1. Apply project identity to BOINC Manager [4]
2. Compile science apps for ARM/Android [5]
3. Configure BOINC Scheduler to deliver Android platform
4. Distribute BOINC on Android (e.g. Google's PlayStore)

Wiki entries are in place. [3][4][5]

Tomorrow's Hackfast: "Making app versions for Android"

Try it on your phone!

Installation of “non-market” apps must be enabled in settings.

[1] https://plus.google.com/110023707389740934545/posts/R5YdRRyeTHM

[2] http://www.gsmarena.com/samsung_i9300_galaxy_s_iii-4238.php

[3] http://boinc.berkeley.edu/trac/wiki/AndroidBoincImpl

[4] http://boinc.berkeley.edu/trac/wiki/AndroidBuildClient

[5] http://boinc.berkeley.edu/trac/wiki/AndroidBuildApp