Android Custom Kernel/ROM design

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IIUM

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About

- I am a research grad student in Universiti Teknologi Malaysia, Skudai, Johor Bahru, Malaysia
- My current employer is International Islamic University Malaysia, Kuala Lumpur
- Research area - malware detection, narrowing on Windows executables
- Doing things on Android kernel and ROM due to some stories...

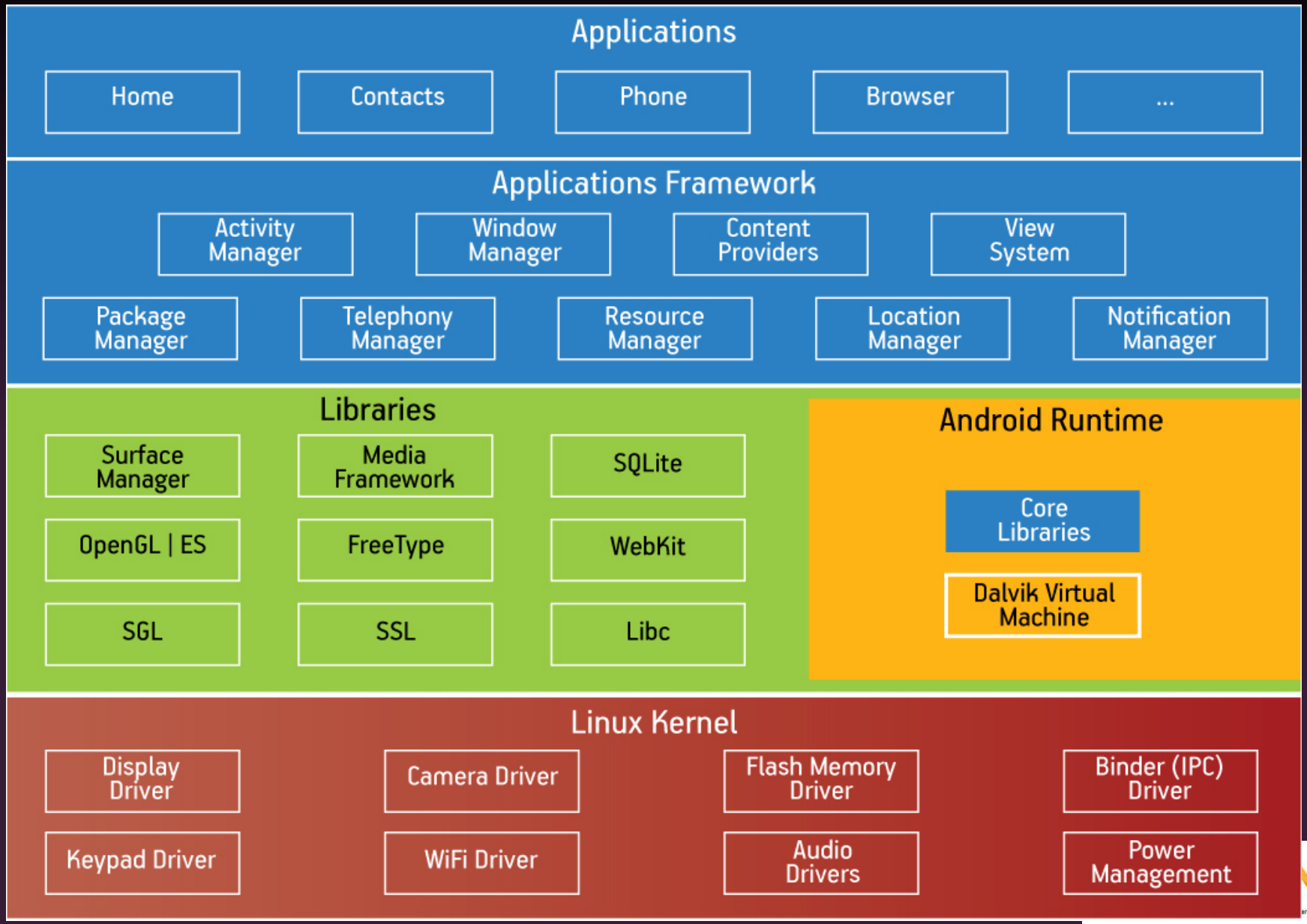
A bit about Android

- Android is a mobile operating system
- Using *Linux* kernel
- Components for kernel are C language
- Components for interface are mostly C++ and Java

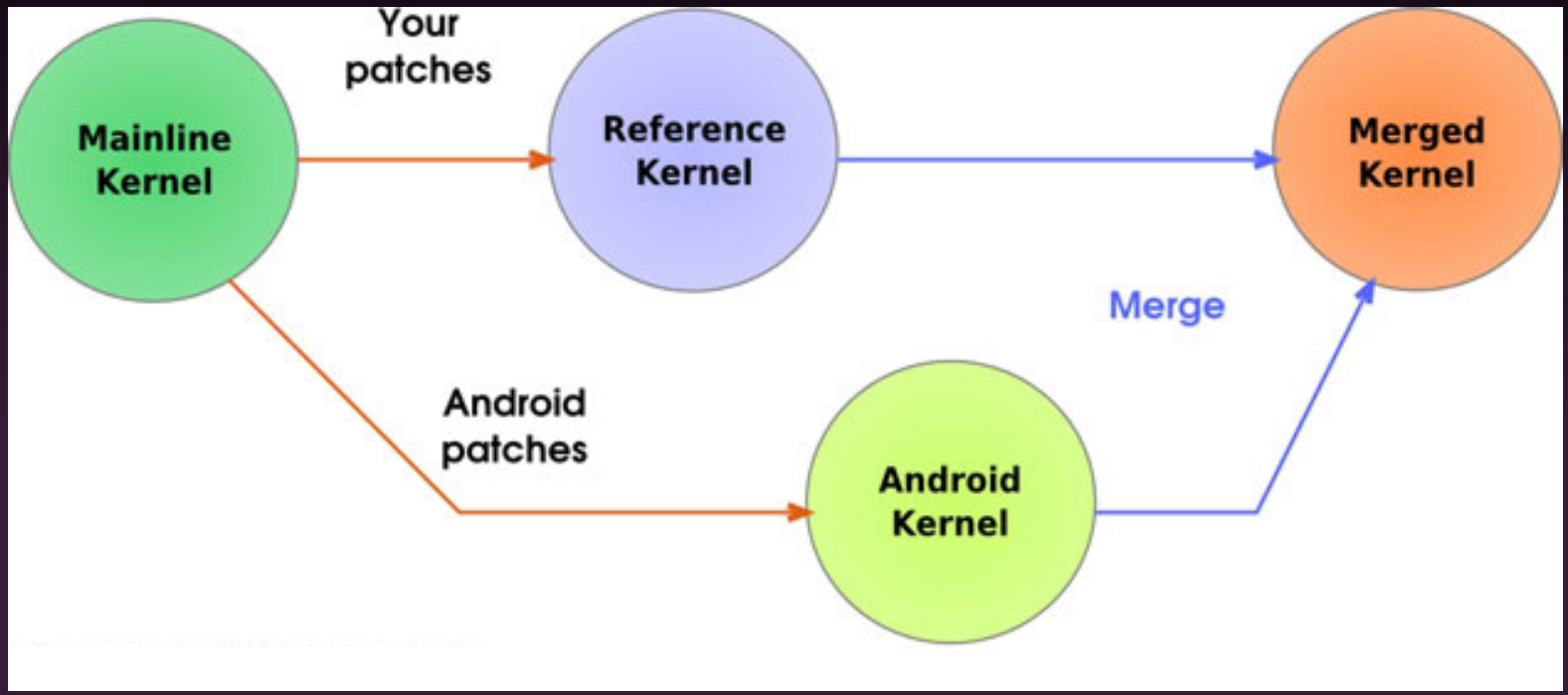
Comparison between Android kernel and ROM

Kernel	ROM
GPL licensed	Apache licensed
Source code must be published	Source code is not compulsory to be published. Hence any modifications are not neccessarily going back to the public

Android structure



Android kernel vs Linux kernel



Source: `http://eecatalog.com/embeddedlinux/2011/08/23/from-zero-to-boot-porting-android-to-your-arm-platform/`

My custom Android kernels

- Some are based from AOSP (Android Open Source Project) kernels - original source are from Google's git
- Some are based from CM (AOSP + Code Aurora Forum (CAF) commits)
- Some are based from other custom kernels which are based from two sources above

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    - After I sold my Mako :)

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- Allow number of online/offline CPUs using many methods
- Allow many more TCP congestion methods

Skillsets for kernel modifying/developing

- Git knowledge
  - Knows at least how to clone, pull, push
  - Then reading git log.. (i'm using --pretty option)
  - Creating branch, reset to certain checkpoint/offset.. resetting everything (git reset --hard)

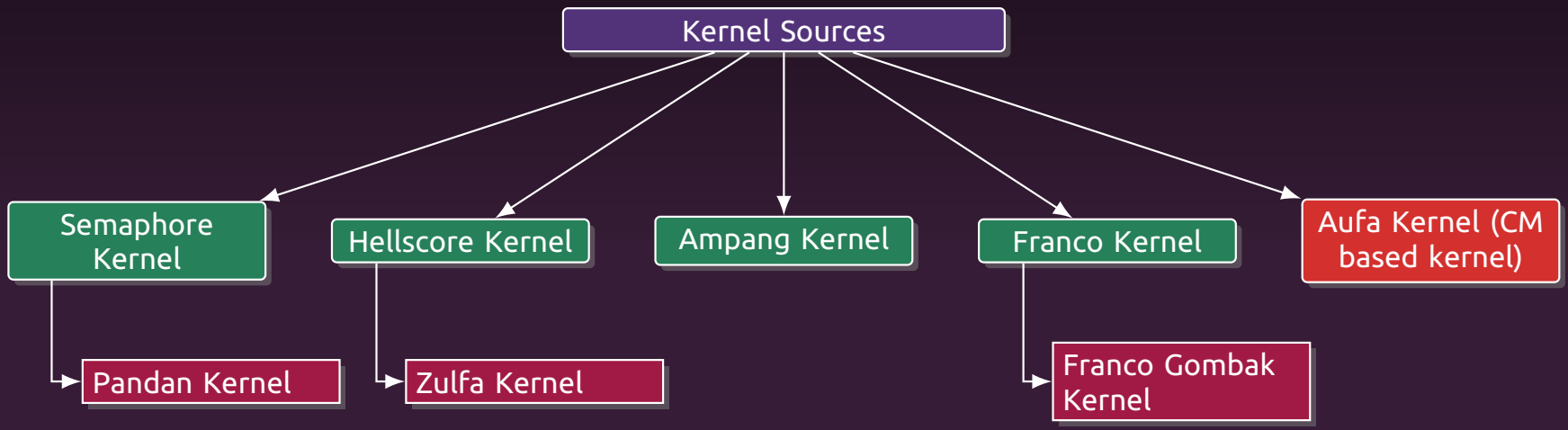
Git cloning the source

```
najmi@quds:~$ git clone https://android.googlesource.com/kernel/msm -b android-msm-hammerhead-3.4-l-preview
Cloning into 'msm'...
remote: Sending approximately 953.94 MiB ...
remote: Finding sources: 100% (3604873/3604873)
Receiving objects:   0% (14589/3604873), 4.63 MiB | 656.00 KiB/s
```

```
najmi@quds:~/cempaka-kernel$ git log --pretty=format:
'%Cred%h%Creset -%C(yellow)%d%Creset %s %Cgreen(%cr)%C(bold blue)<%an>%Creset' --abbrev-commit
ba22633 - (HEAD, origin/cempaka-stable, cempaka-stable)
Cempaka v2.5 (11 days ago) <Muhammad Najmi Ahmad Zabidi>
acaaeea - Merge branch 'ElementalX-1.00-cm' of
https://github.com/flar2/ElementalX-N5 into cempaka-stable (11 days ago) <Muhammad Najmi Ahmad Zabidi>
039a263 - (elementalx/ElementalX-1.00-cm) Merge branch 'ElementalX-1.00' into ElementalX-1.00-cm
(12 days ago) <flar2>
cb7e4f0 - (elementalx/ElementalX-1.00) update defconfig (12 days ago) <flar2>
753de48 - msm-sleeper: use ex_max_freq (12 days ago) <flar2>
c5cc9d2 - Merge branch 'ElementalX-1.00' into
ElementalX-1.00-cm (2 weeks ago) <flar2>
8438630 - vibrator: change permissions again (2 weeks ago) <flar2>
e51fa2d - Revert "vibrator: change sysfs permissions" (2 weeks ago) <flar2>
9949aff - Merge branch 'ElementalX-1.00' into ElementalX-1.00-cm (3 weeks ago) <flar2>
cbee9fe - update defconfig (3 weeks ago) <flar2>
```

- Most of the developers' works are hosted on github
- Some use sourceforge's git and bitbucket's
- I prefer github because I am familiar with it

My kernel projects for Nexus 4/Mako



My kernel projects for Nexus 5/Hammerhead