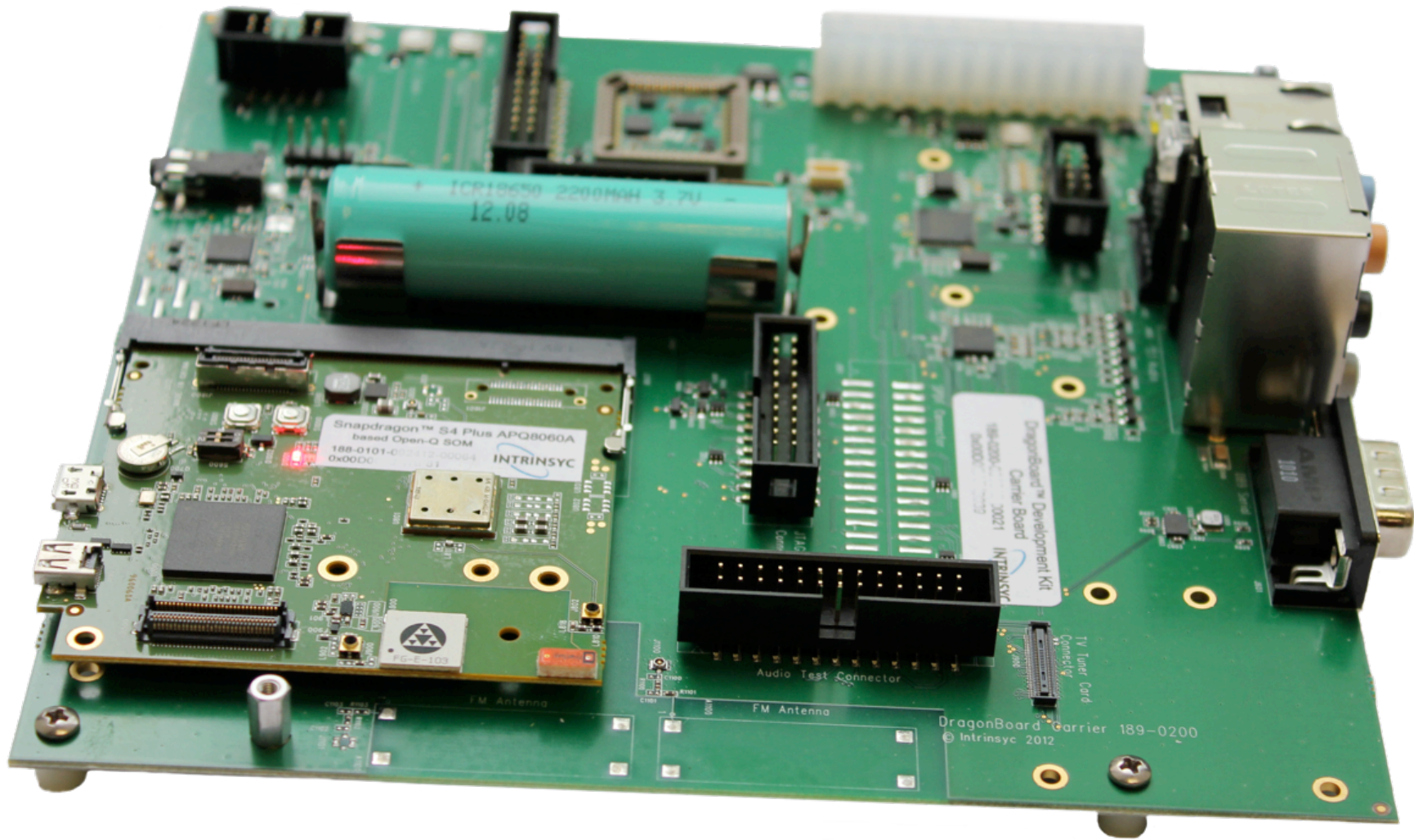


# Developing on DragonBoard™

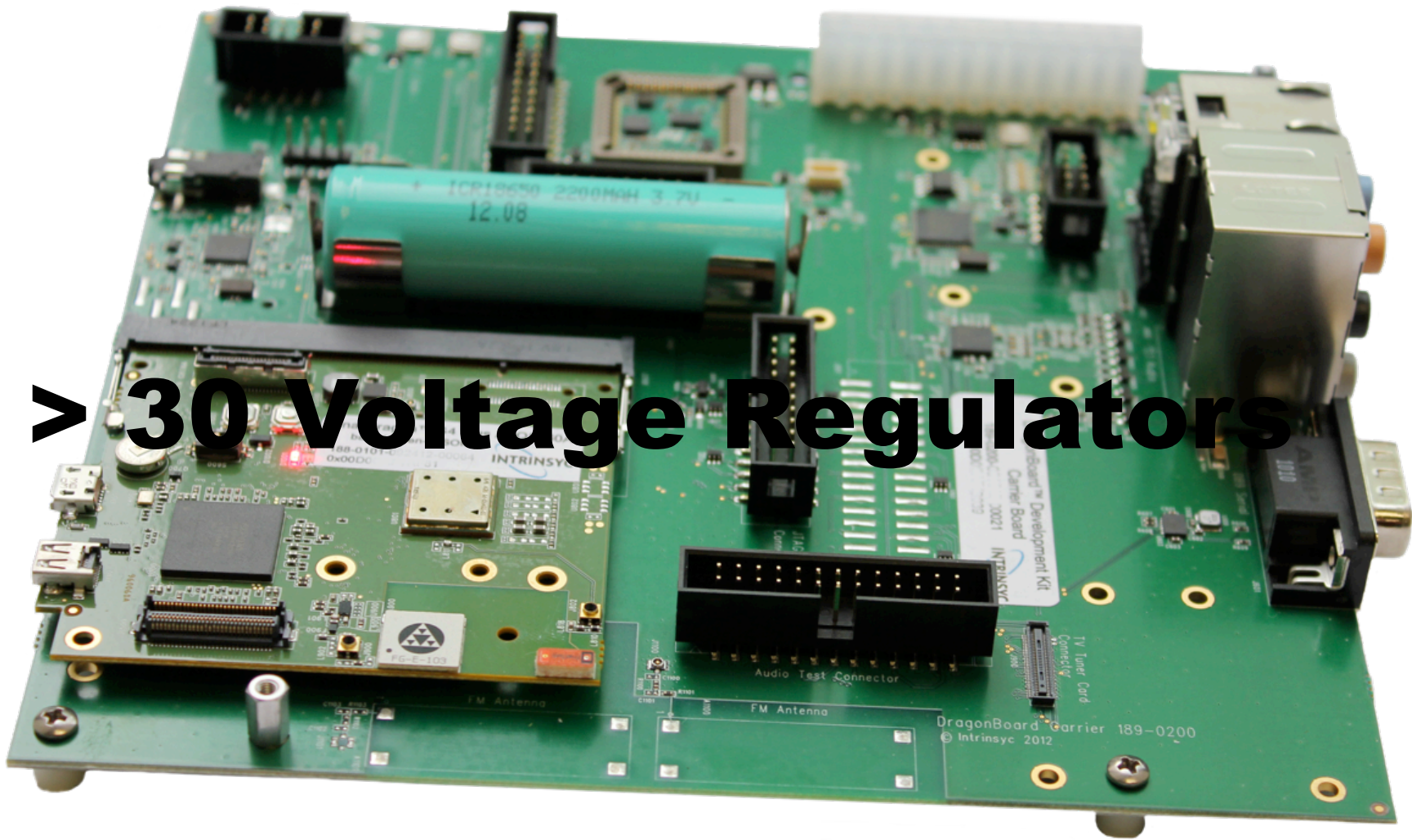
Getting Started with APQ8060A  
and Pragmatux+Android

Ryan Kuester  
[rkuester@insymbols.com](mailto:rkuester@insymbols.com)

DragonBoard™



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**> 30 Voltage Regulators**

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How do I turn this into **my** product?

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Pragmat**ux**

DragonBoard™

Which one is right for me?



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# Android is purpose-built

If it brings what you need, great!

(Otherwise, not so much)



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# Android lacks as a general purpose Embedded OS

native processes not integrated

no real-time scheduling

limited software availability

buildroot-style workflow

no field upgrade story



DragonBoard™





Pragmat**ux**

A community-developed Linux distribution for  
embedded systems

Adopted by Qualcomm for embedded market

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Pragmat**ux**

Workstation environment

Target device operating system

Deployment management system

Developer ecosystem

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Pragmat**ux**

Utilizes tools, concepts from the Debian Project

Isn't "Debian", but has a similar look and feel



debian  emdebian

DragonBoard™



# Pragmatux

package management and repository tools

cross-toolchains

minimized packages

keeps binary compatibility



debian emdebian

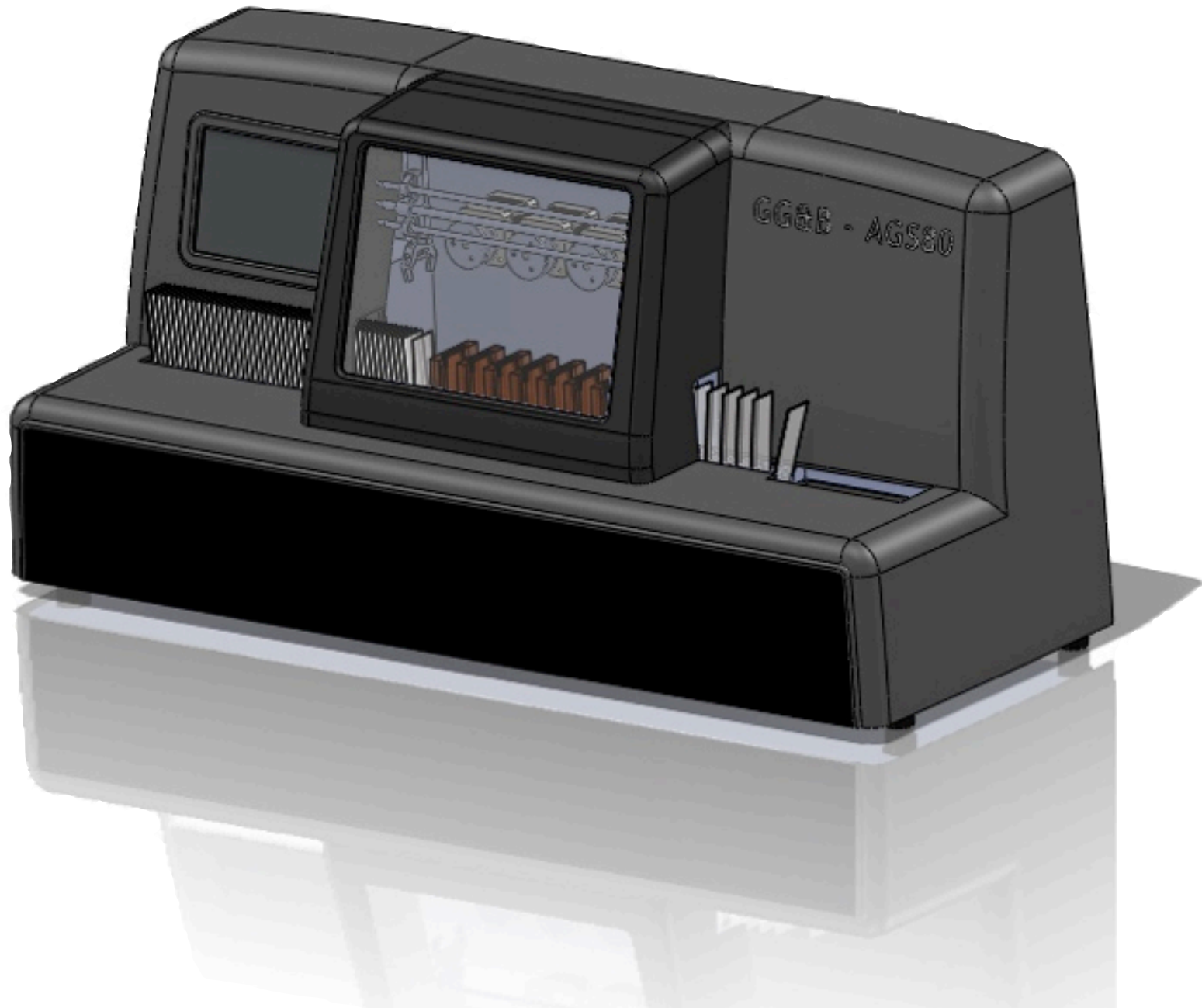
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Pragmat**ux**

Best-practices, real-world embedded Linux

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**ECHOMETER MODEL M  
ACOUSTIC LIQUID LEVEL INSTRUMENT**  
OPERATE SAFELY AT ALL TIMES

**OPERATING INSTRUCTIONS SUMMARY**

1. Attach Gas Gun to casing valve
2. Charge Gas Gun
3. Open casing valve between Gas Gun and well
4. Close all lines venting gas from casing annulus
5. Connect microphone cable from Gas Gun to instrument
6. Turn power ON
7. Select upper or lower collars
8. Set both gain controls to AUTO
9. Turn chart drive ON
10. Generate pulses when message appears
11. Turn chart drive OFF when record is obtained
12. Turn power OFF when test is completed

**REFER TO OPERATORS MANUAL FOR FURTHER INSTRUCTIONS**

<p><small>ECHOMETER COMPANY 5001 DITTO LAKE WICHITA FALLS, TX 76702 USA</small></p>	<p><small>TELEPHONE: 840/767-4334 FAX: 840/723-7507 E-MAIL: INFO@ECHOMETER.COM</small></p>
---	--

INCHES	
4000 076	0200 000
4000 080	0400 000
4750 170	0800 000
5117 300	1600 000
5000 000	3200 000









But isn't Debian a desktop or server operating system?

Yes, but not so different from your embedded OS



Pragmatux

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# A way of organizing and deploying software

Take a universe of available software

Configure the subset you want

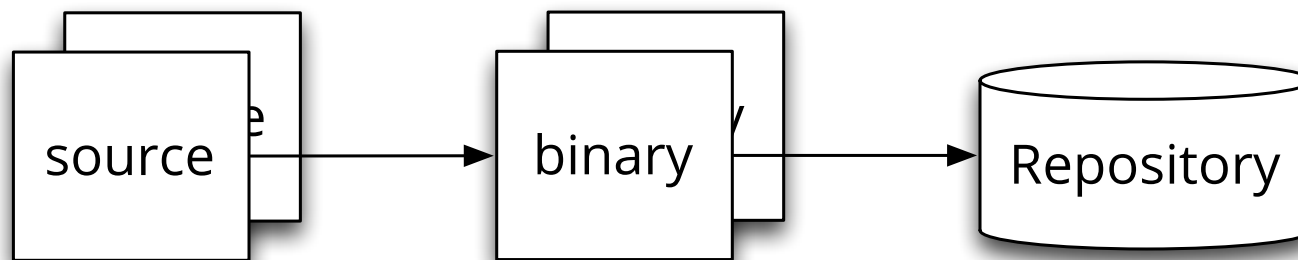
Compose it into a filesystem



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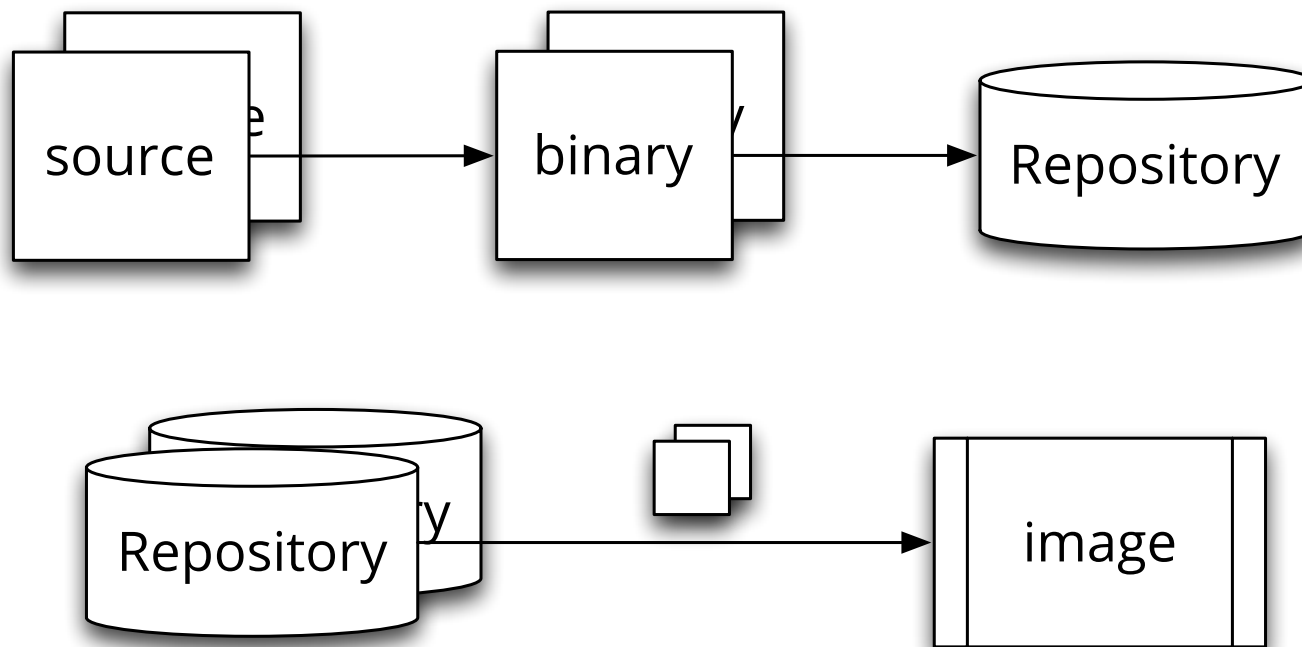
# Package-orientation



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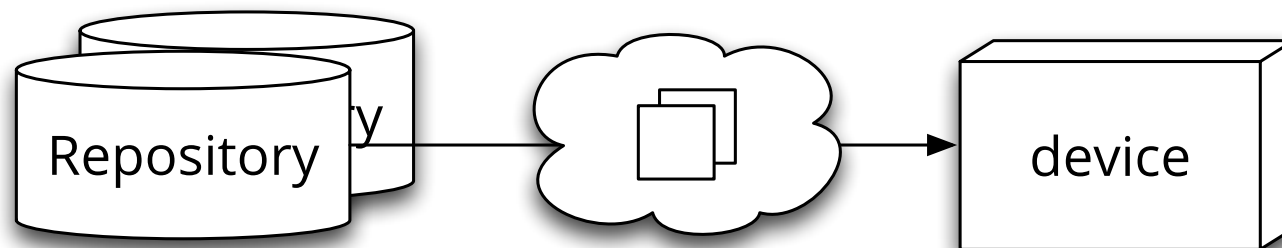
# Package-orientation



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# Field updates



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## ... and disconnected machines?

Repositories delivered by USB, carrier pigeon

Targets install package at next opportunity



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## ... and “secure” machines?

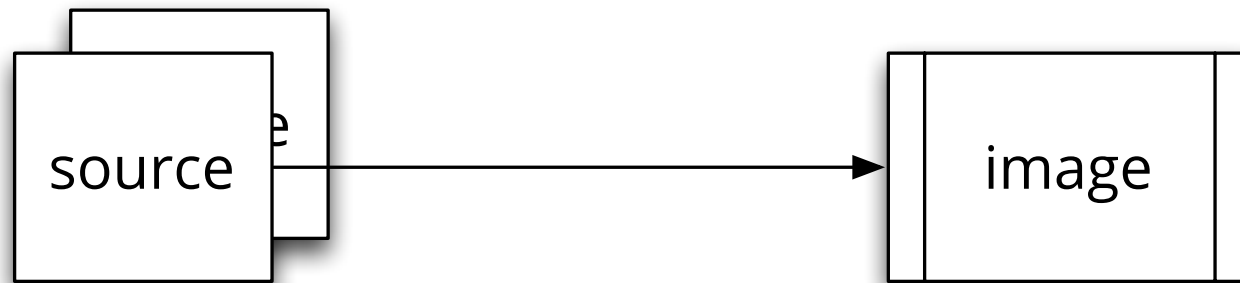
Repository tools create crypto-signed manifest  
Use HTTPS + certificates for mutual authentication



Pragmatux

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# Most embedded workflows



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Embedded community has failed to embrace  
package management



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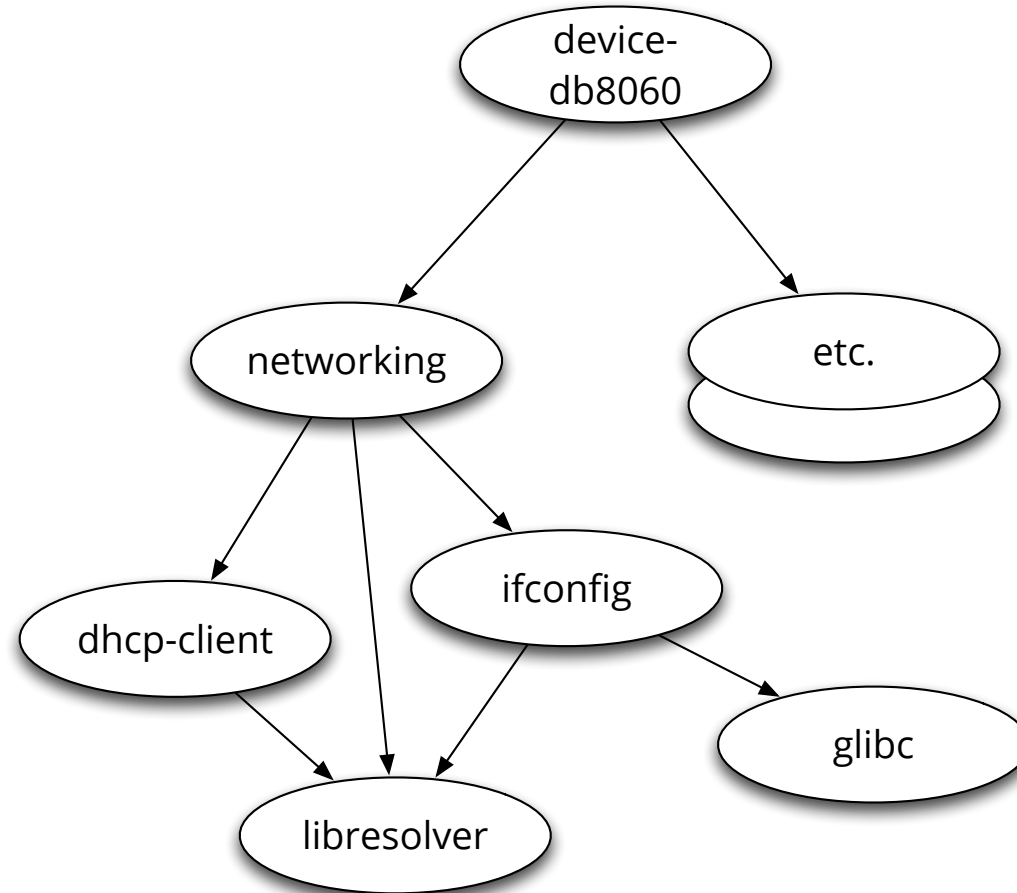
Pragmatux fully embraces package-orientation, and takes it as step further...



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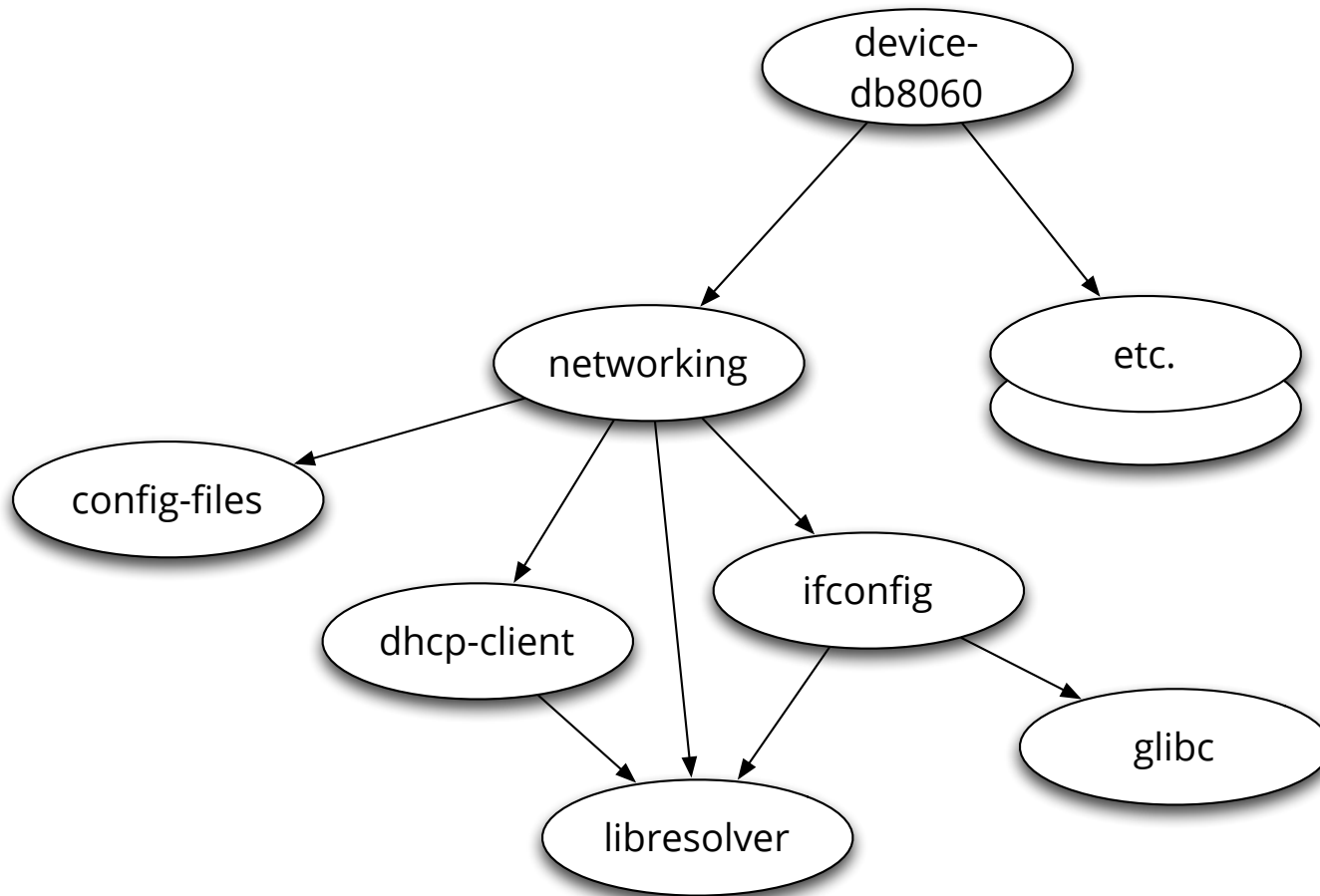
# Composition by dependency tree



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# ... configuration files too

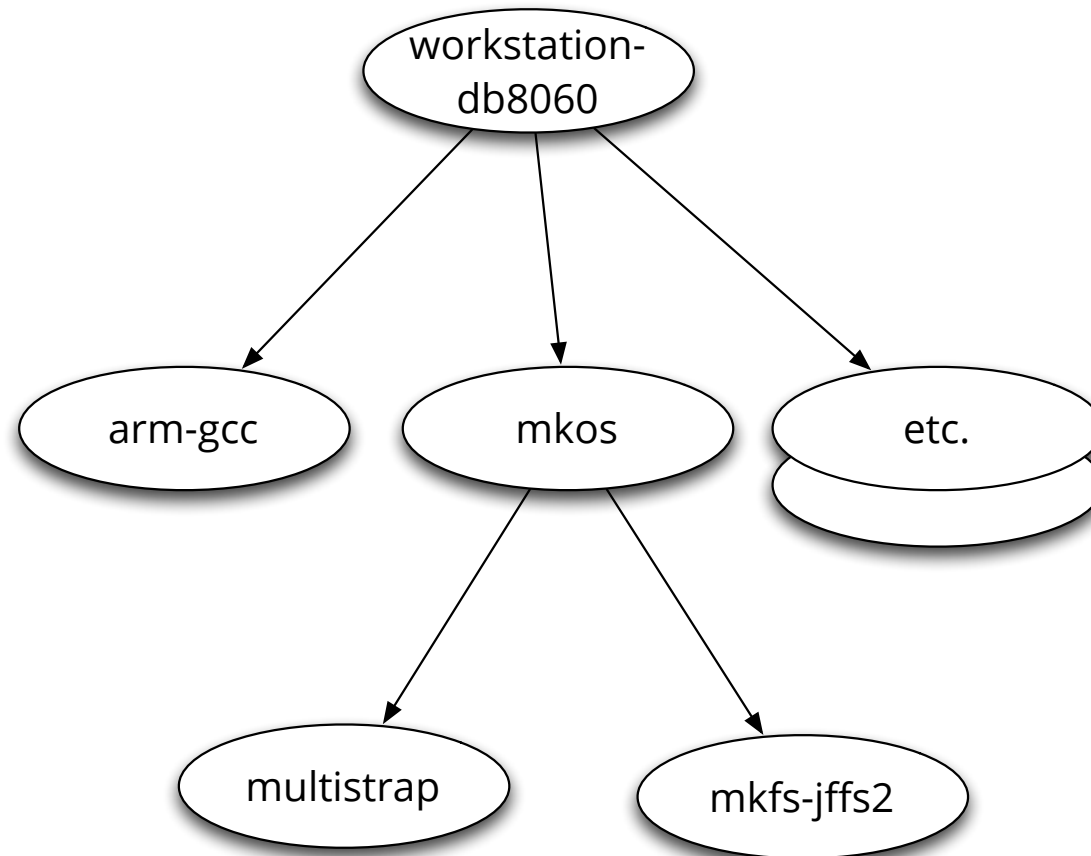


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# ... development workstations too



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# Demonstrations

Create workstation

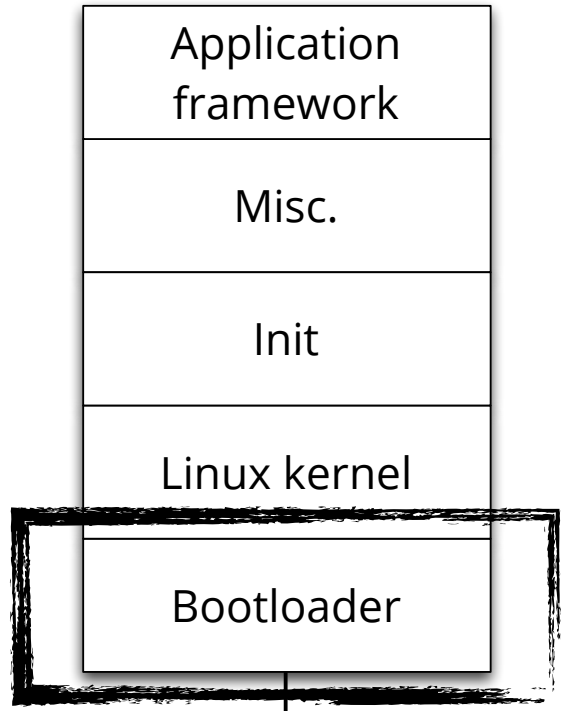
Create image



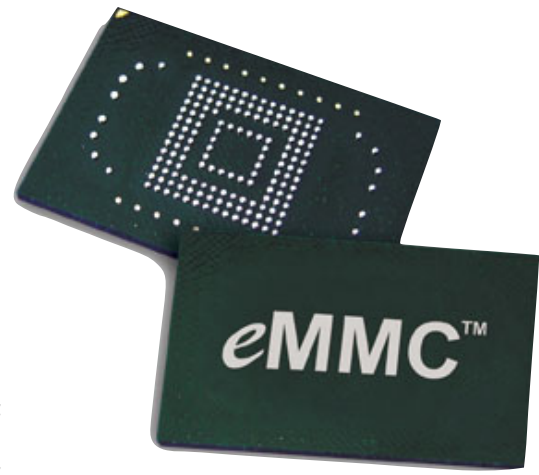
Pragmat**ux**

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Normally don't touch this

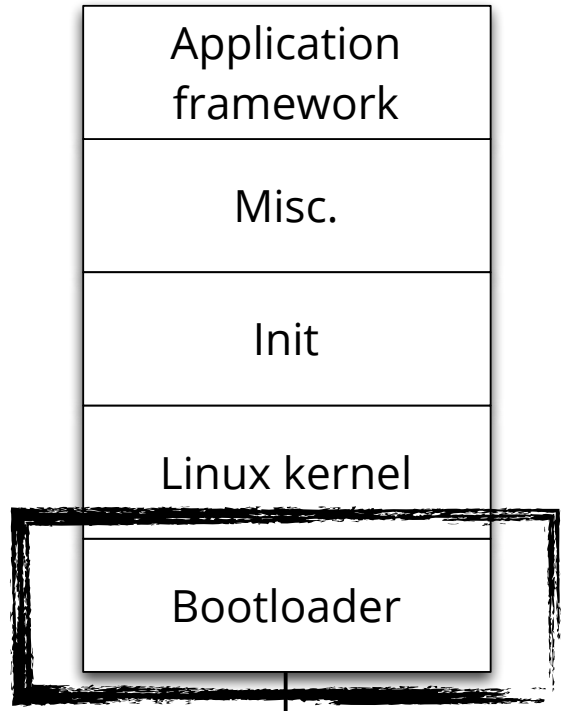


# fastboot flash \$IMAGE

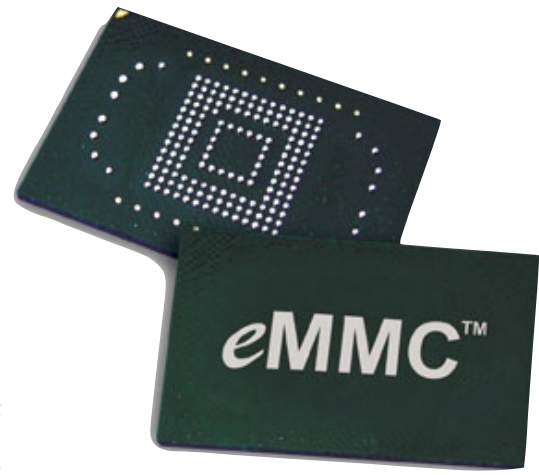


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Normally don't touch this

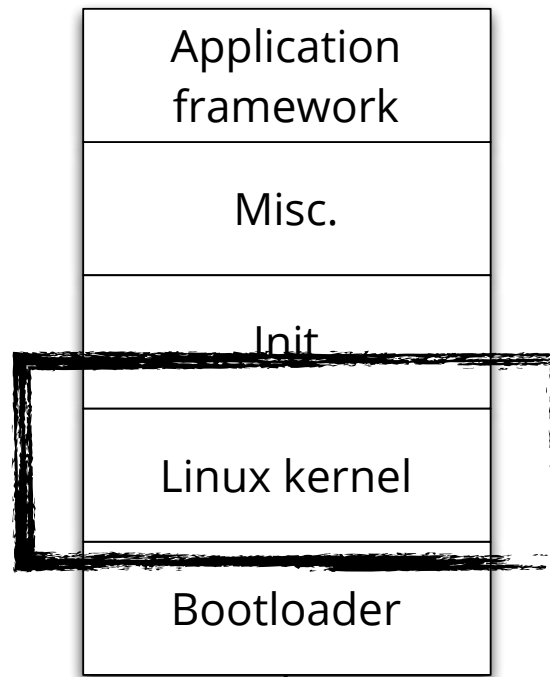


# fastboot flash \$IMAGE

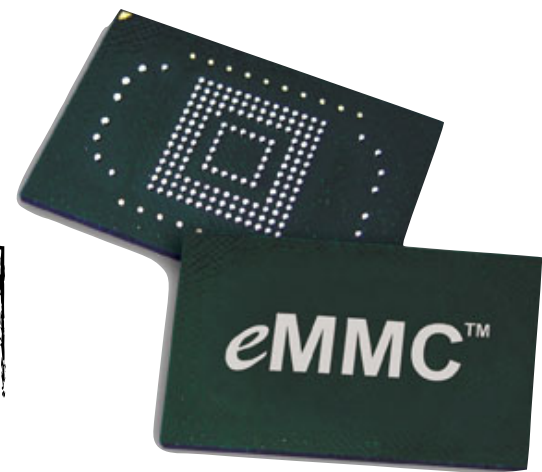


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boot.img

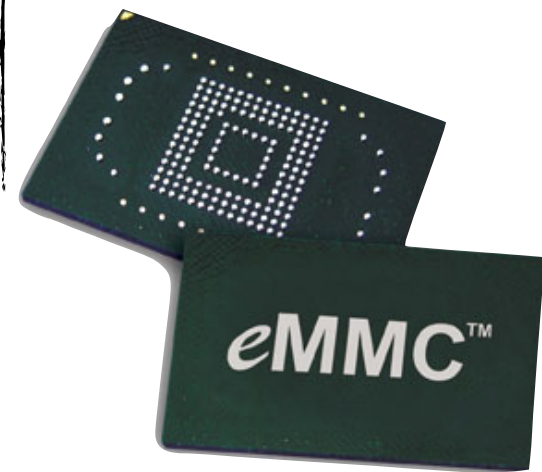
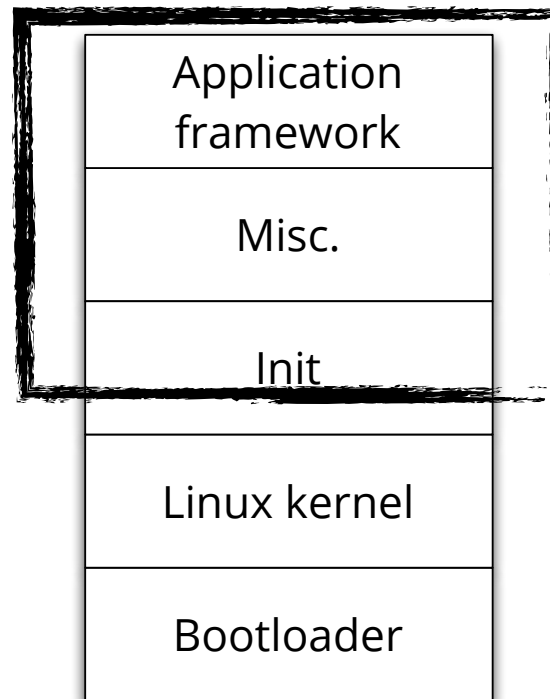


# fastboot flash \$IMAGE



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system.img



# fastboot flash \$IMAGE

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# Demonstrations

Install image

Kick tires

Customize distribution

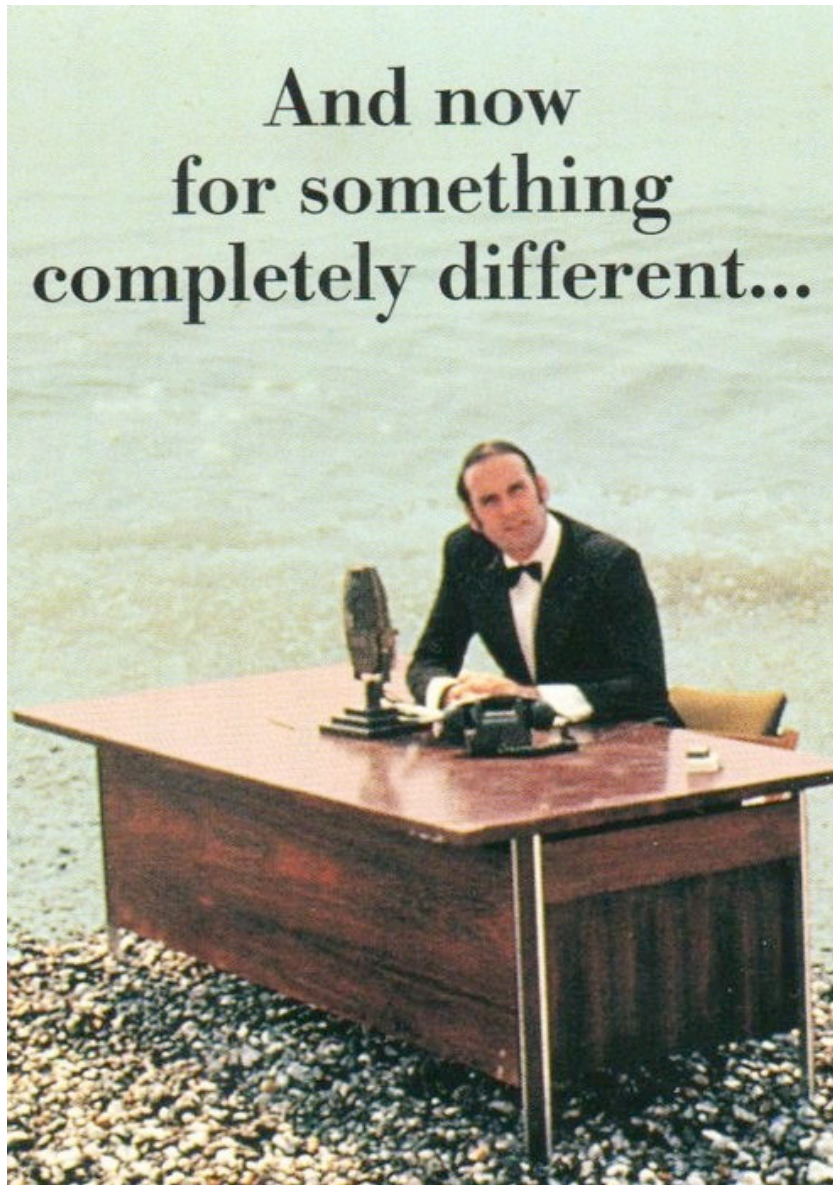
Upgrade



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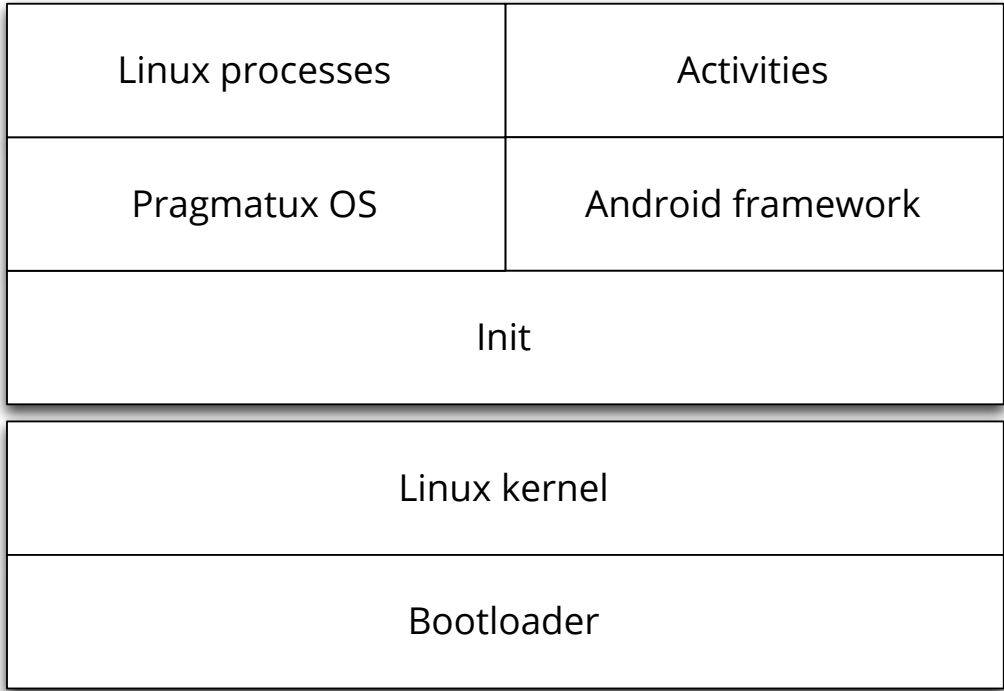
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And now  
for something  
completely different...

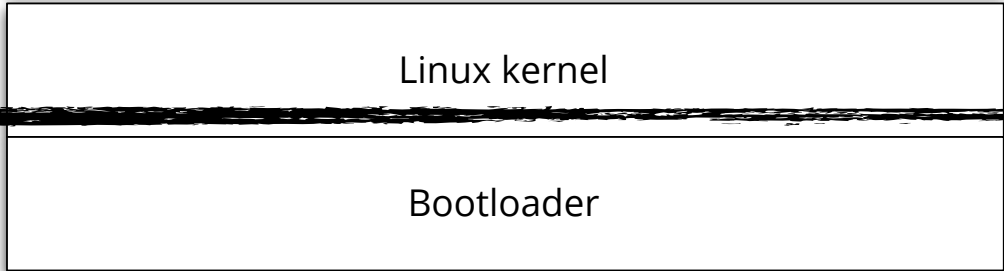
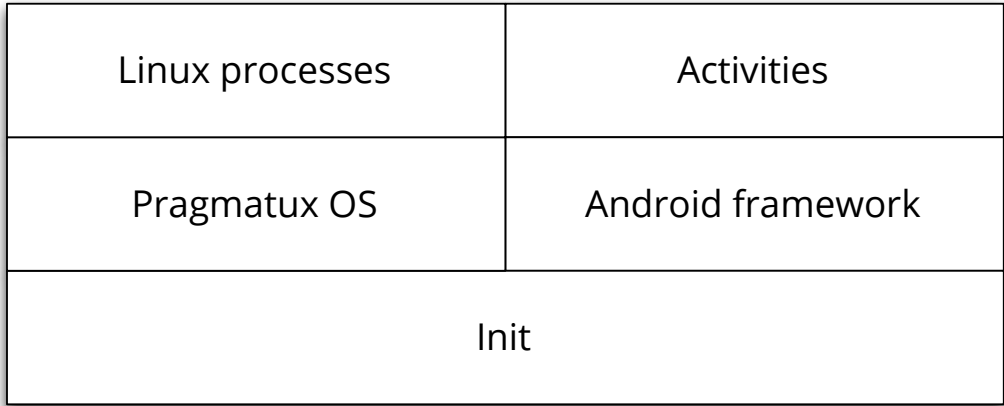


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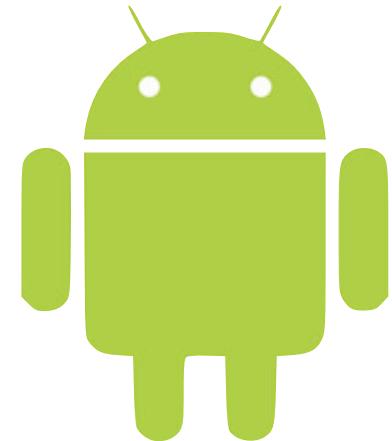
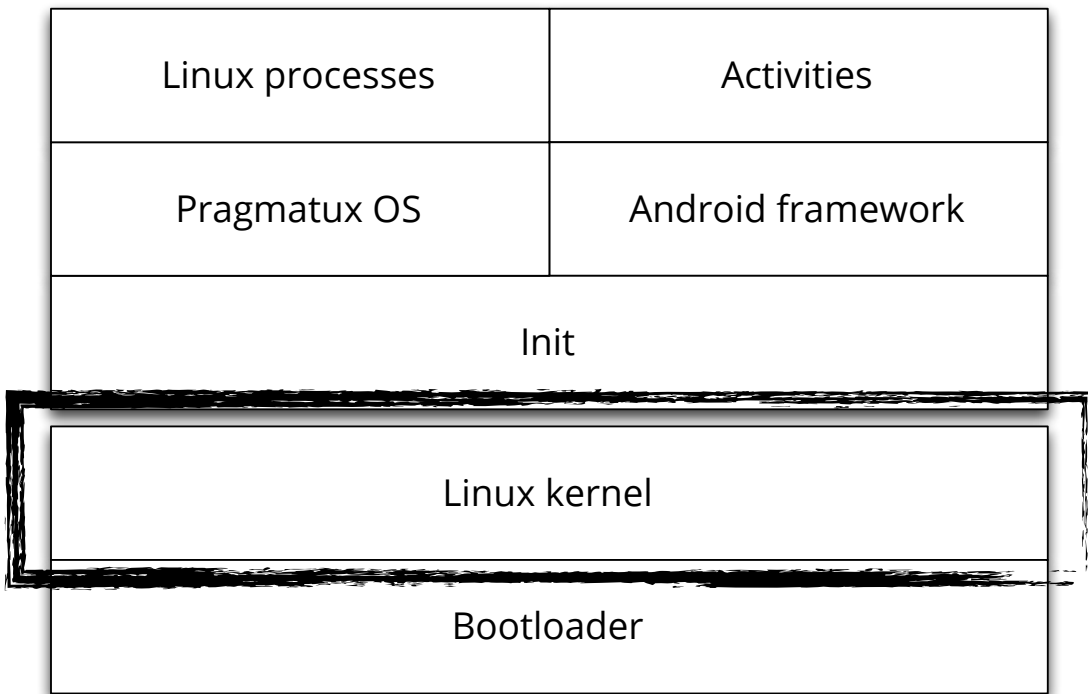




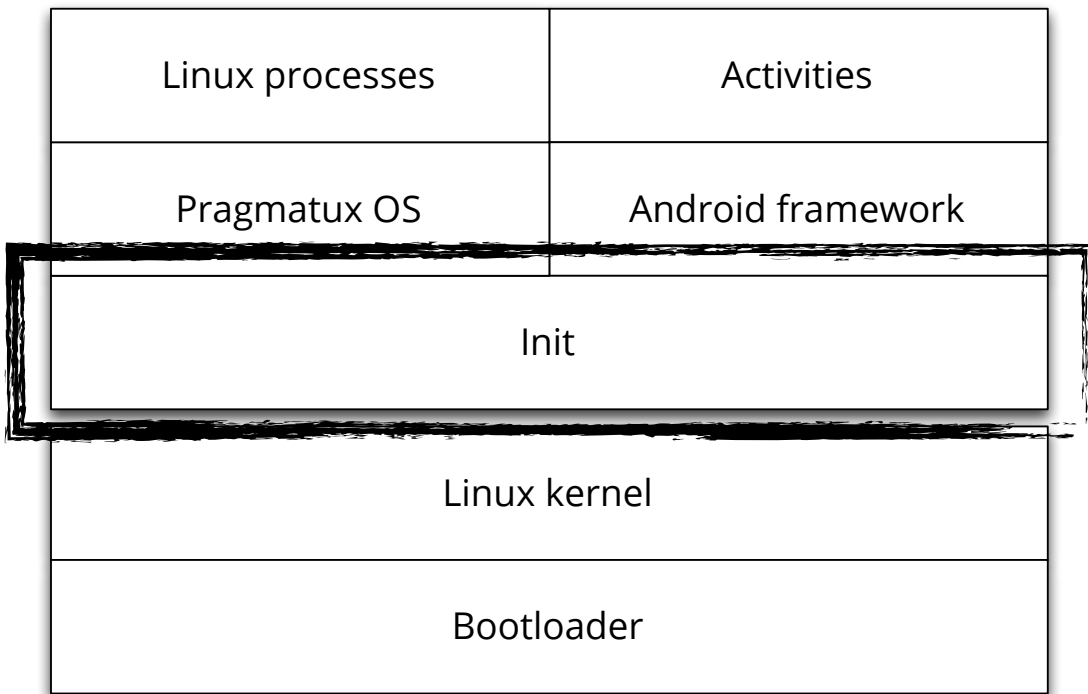
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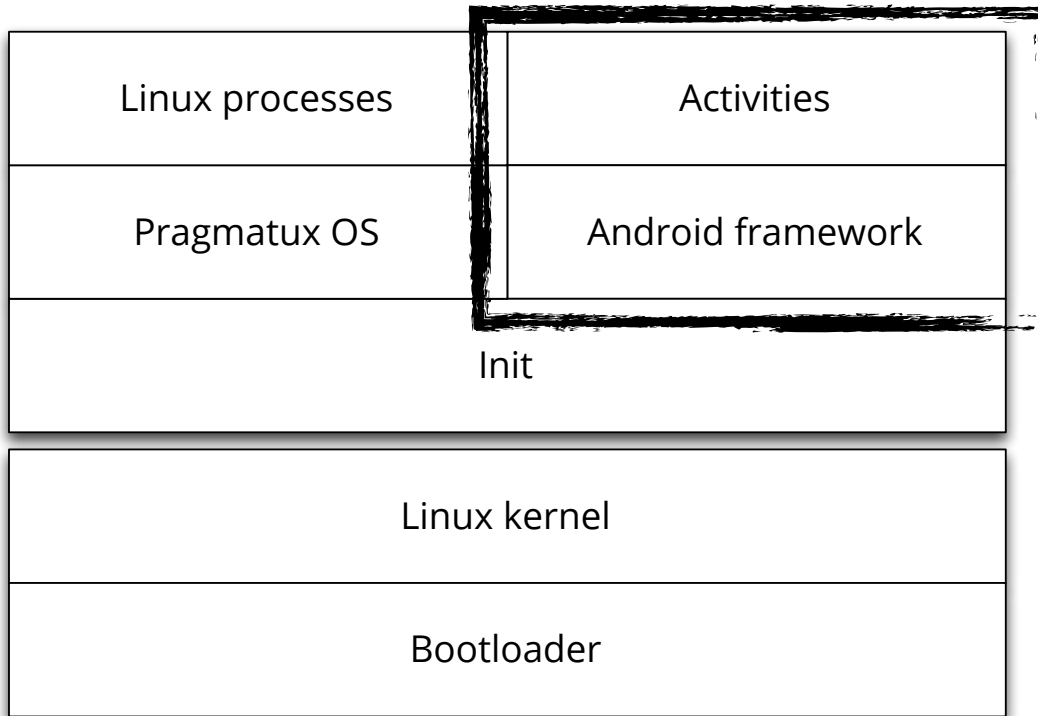
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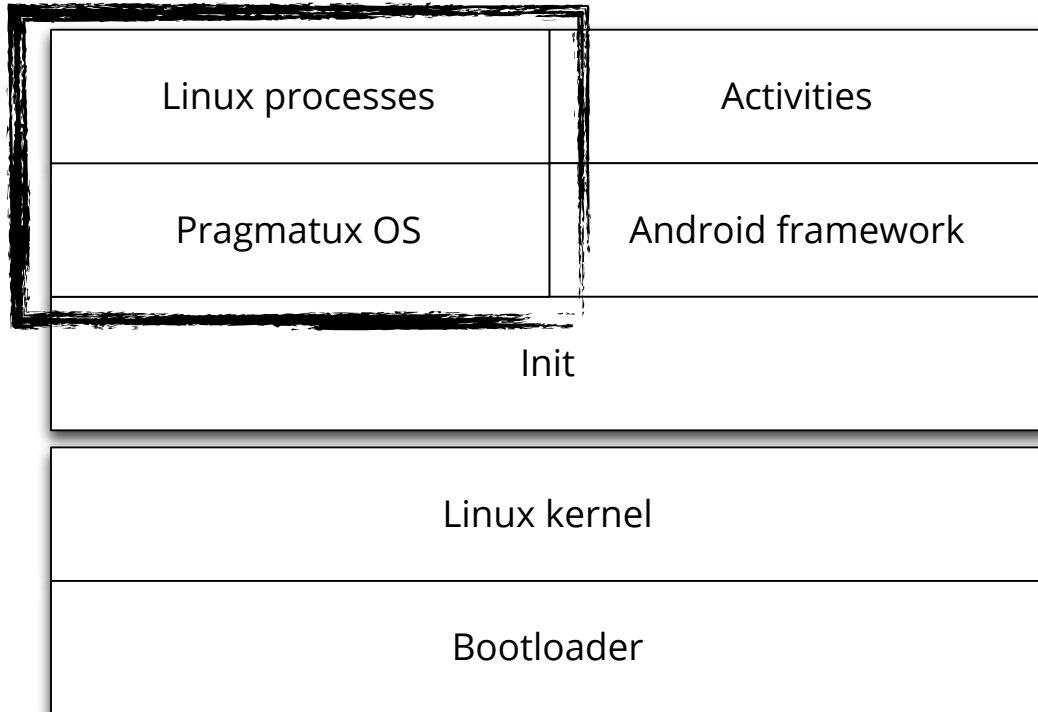
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# The right way to use Android

Let Android do what it does well

Don't let Android do anything else!

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# The right way to use Android

Leave the rest to Linux, where it belongs

Connect the two at the right places

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# Demonstrations

Pragmatux+Android

Manage APKs via Pragmatux packages

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# What you just saw

Package-managed workstation

Package-managed target

Fast developer workflow

Field upgrades via network

Pragmatux+Android running together

Android as application framework atop real Linux

APKs deployed via Pragmatux packages

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myDragonBoard.org



codeaurora.org

pragmatux.org

DragonBoard™

# Developing on DragonBoard™

Getting Started with APQ8060A  
and Pragmatux+Android

Ryan Kuester  
[rkuester@insymbols.com](mailto:rkuester@insymbols.com)

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