



## L4Android: A Generic Operating System Framework for Secure Smartphones

Workshop on Security and Privacy in Smartphones and Mobile Devices

**Matthias Lange**, S. Liebergeld, A. Lackorzynski, A. Warg, M. Peter, October 17th, 2011  
mlange@sec.t-labs.tu-berlin.de

This talk is not about mobile  
virtualization.

# Motivation

- Near field communication
- Secure text and voice communication
- BYOD policies

# Motivation

- Near field communication
- Secure text and voice communication
- BYOD policies

“The NSA Wants Its Own Smartphone”  
(Uberreview [1], 9/27/2011)

# Motivation

- Near field communication
- Secure text and voice communication
- BYOD policies

“The NSA Wants Its Own Smartphone”  
(Uberreview [1], 9/27/2011)

“AT&T toggle taps Enterploid for Android device  
management”  
(eWeek [5], 10/12/2011)

- Emerging threats
- Existing OS not a secure foundation

- Emerging threats
- Existing OS not a secure foundation

“QR code infects Android phones with Trojan malware”

(Android community [4], 9/30/2011)

- Emerging threats
- Existing OS not a secure foundation

“QR code infects Android phones with Trojan malware”

(Android community [4], 9/30/2011)

“Android vulnerability renders antivirus products ineffective”

(The Inquirer [3], 10/4/2011)



- Emerging threats
- Existing OS not a secure foundation

“QR code infects Android phones with Trojan malware”

(Android community [4], 9/30/2011)

“Android vulnerability renders antivirus products ineffective”

(The Inquirer [3], 10/4/2011)

“HTC Android Handsets spew private data to ANY app”

(The Register [2], 10/3/2011)

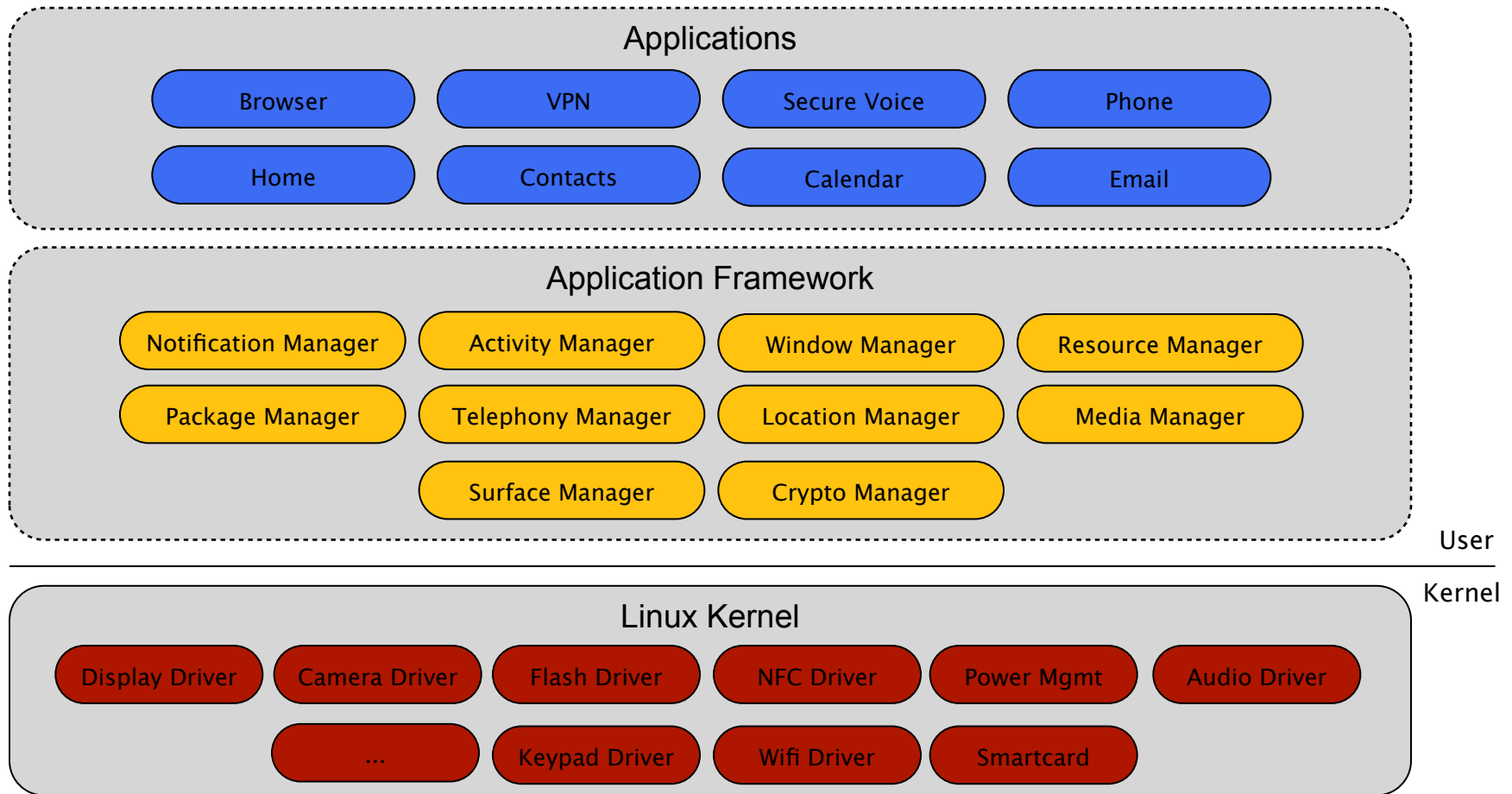
# Outline

- Framework architecture
- Results

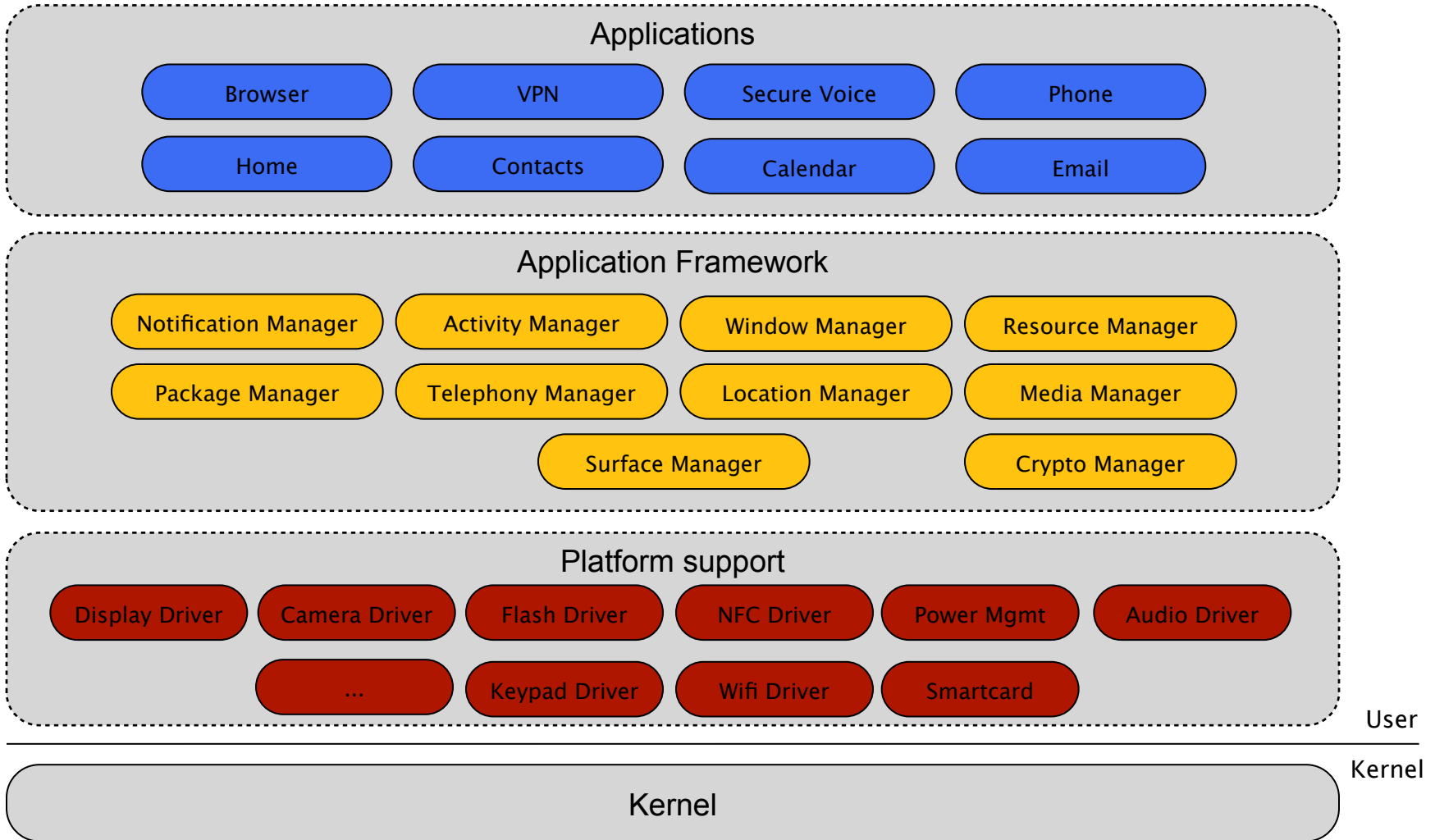


## Framework Architecture

# Instead of this ...



# ... we want that

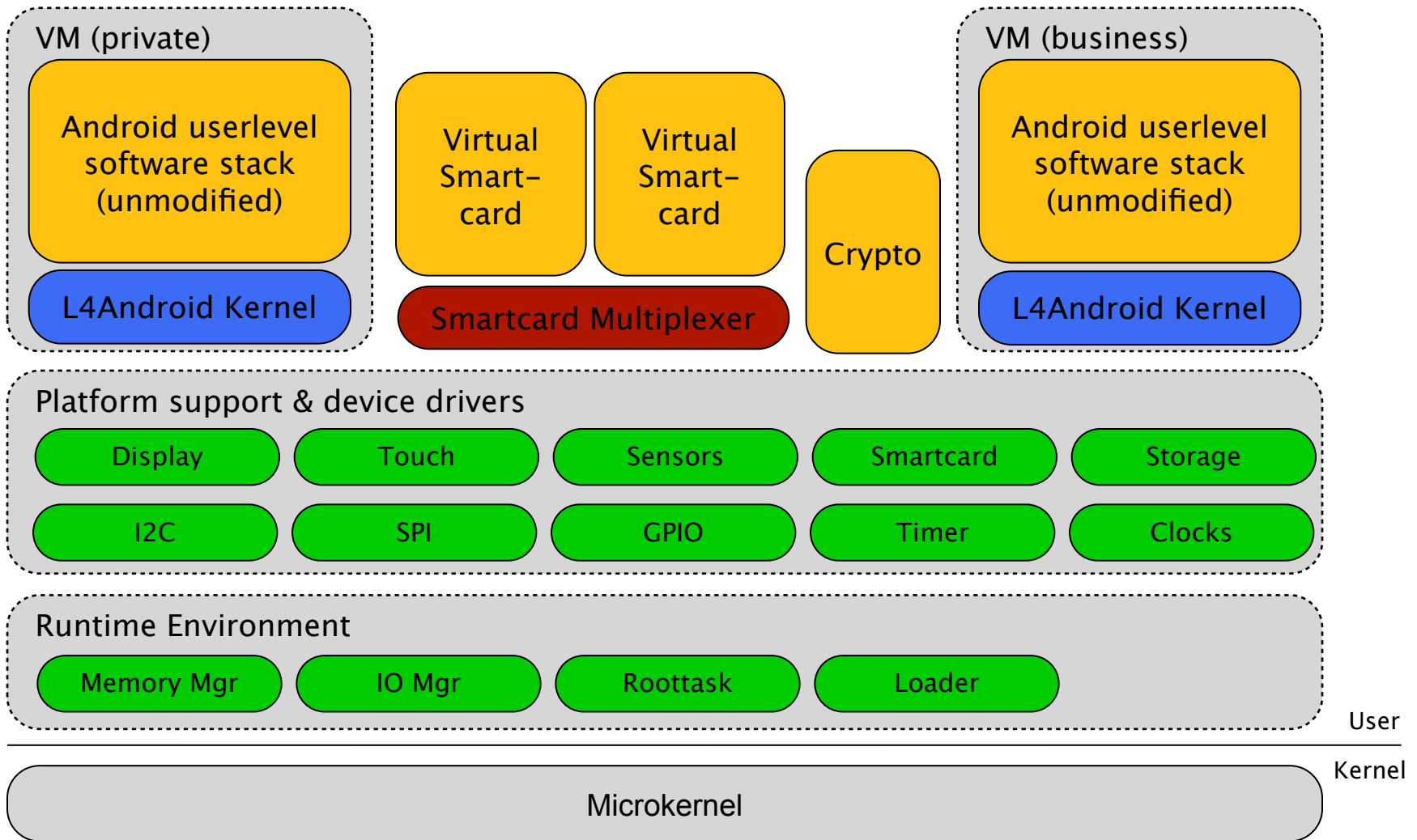


# Building blocks

- Microkernel
- Runtime environment
- Virtual machines

# Architecture

# Architecture







## Results

# Results

- Framework does not require hardware modifications or extensions
- Microkernel and runtime environment running on x86 and ARM
- L4Android on x86 and ARM
  - generic HW interface for both architectures
- Prototypes running on
  - Freescale iMX.51 (ARM)
  - Aava Moorestown Smartphone (x86)
  - Samsung Galaxy S2 (ARM)
  - Odroid-A tablet (ARM)

- Check [l4android.org](http://l4android.org)





Questions?

Thank you!

- [1] <http://www.uberreview.com/2011/09/the-nsa-wants-its-own-smartphone.htm>
- [2] [http://www.theregister.co.uk/2011/10/03/htc\\_android\\_security/](http://www.theregister.co.uk/2011/10/03/htc_android_security/)
- [3] <http://www.theinquirer.net/inquirer/news/2114308/android-vulnerability-renders-antivirus-products-ineffective>
- [4] <http://androidcommunity.com/qr-code-infects-android-phones-with-trojan-malware-20110930/>
- [5] <http://www.eweek.com/c/a/Mobile-and-Wireless/ATT-Toggle-Taps-Enterpoid-for-Android-Device-Management-863216/>