

A Paravirtualized Android for Next Generation Interactive Automotive Systems

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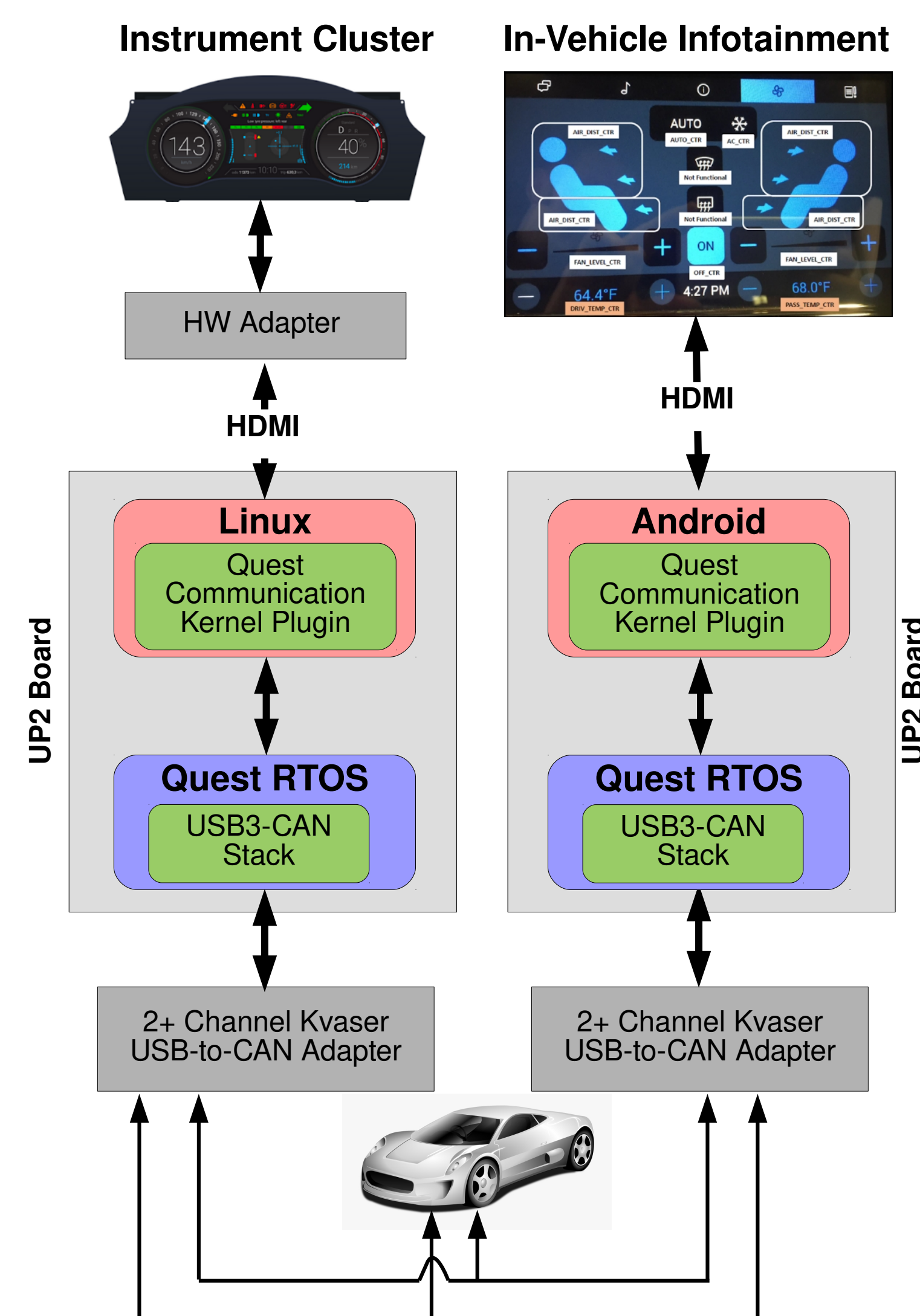


BU Operating Systems and Services

Introduction

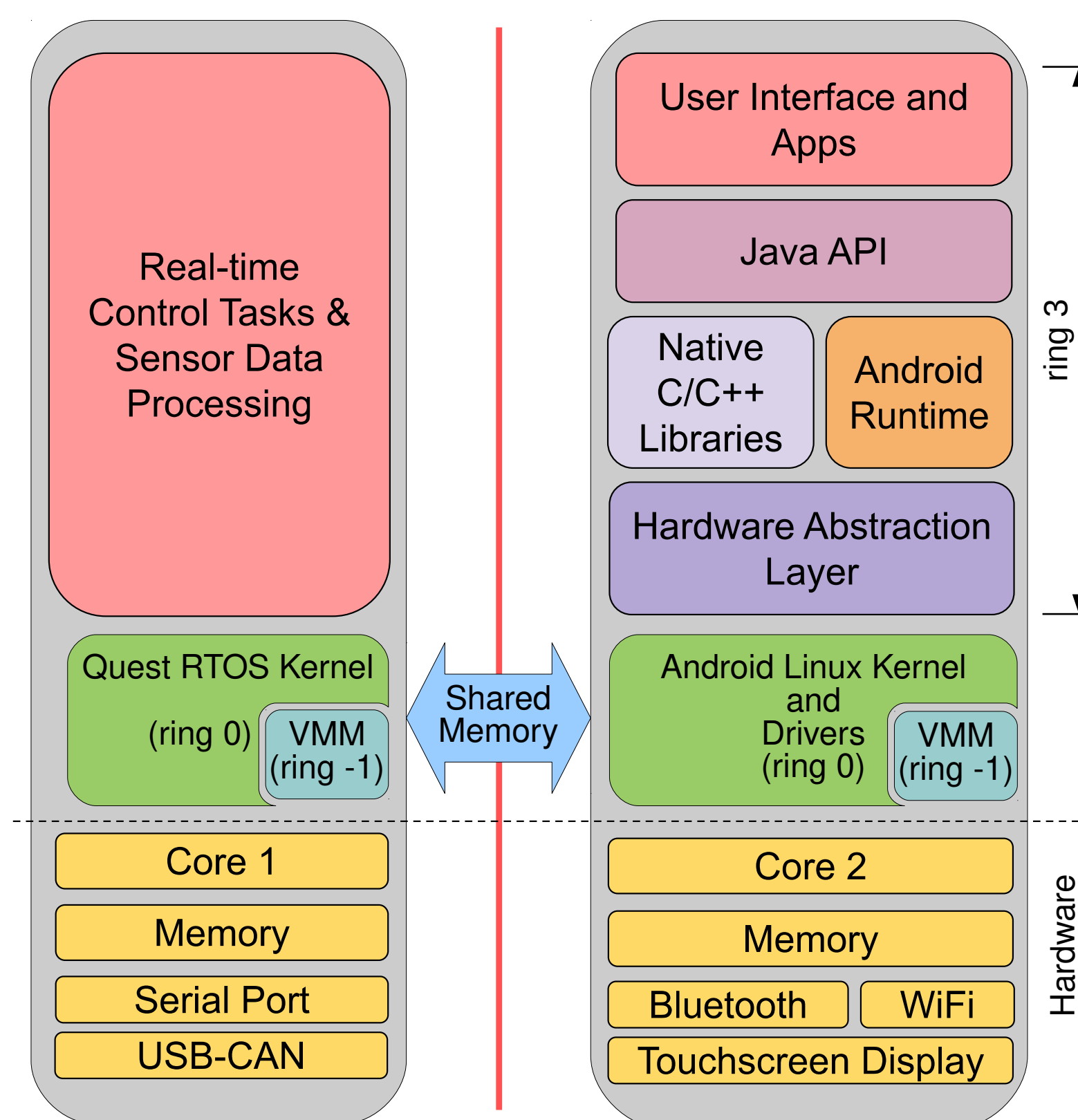
- > Aim to support Next Generation Interactive Automotive Systems
 - > In-vehicle Infotainment (IVI) System
 - > Familiar UI, Navigation facility, HVAC control
 - > Multimedia audio and video playback
 - > Advanced Driver Assistant Services (ADAS)
 - > Lane detection, cruise control, etc.
- > Our goal is an integrated single-board solution:
 - > Android as user-interface to configure vehicle features and settings
 - > A single-platform CAN-bus network concentrator

Quest RTOS + Android OS (for IVI)
Quest RTOS + Yocto Linux (for IC)



Software Architecture

System design is based on the Quest-V partitioning hypervisor.



Advantages

- > Familiar and rich user-interface provided via Android
- > Real-time and predictable I/O in Android
- > Secure and isolated I/O for sensitive devices such as USB-CAN devices
- > Modular software development by the car manufacturer and the Android developer community

Implementation

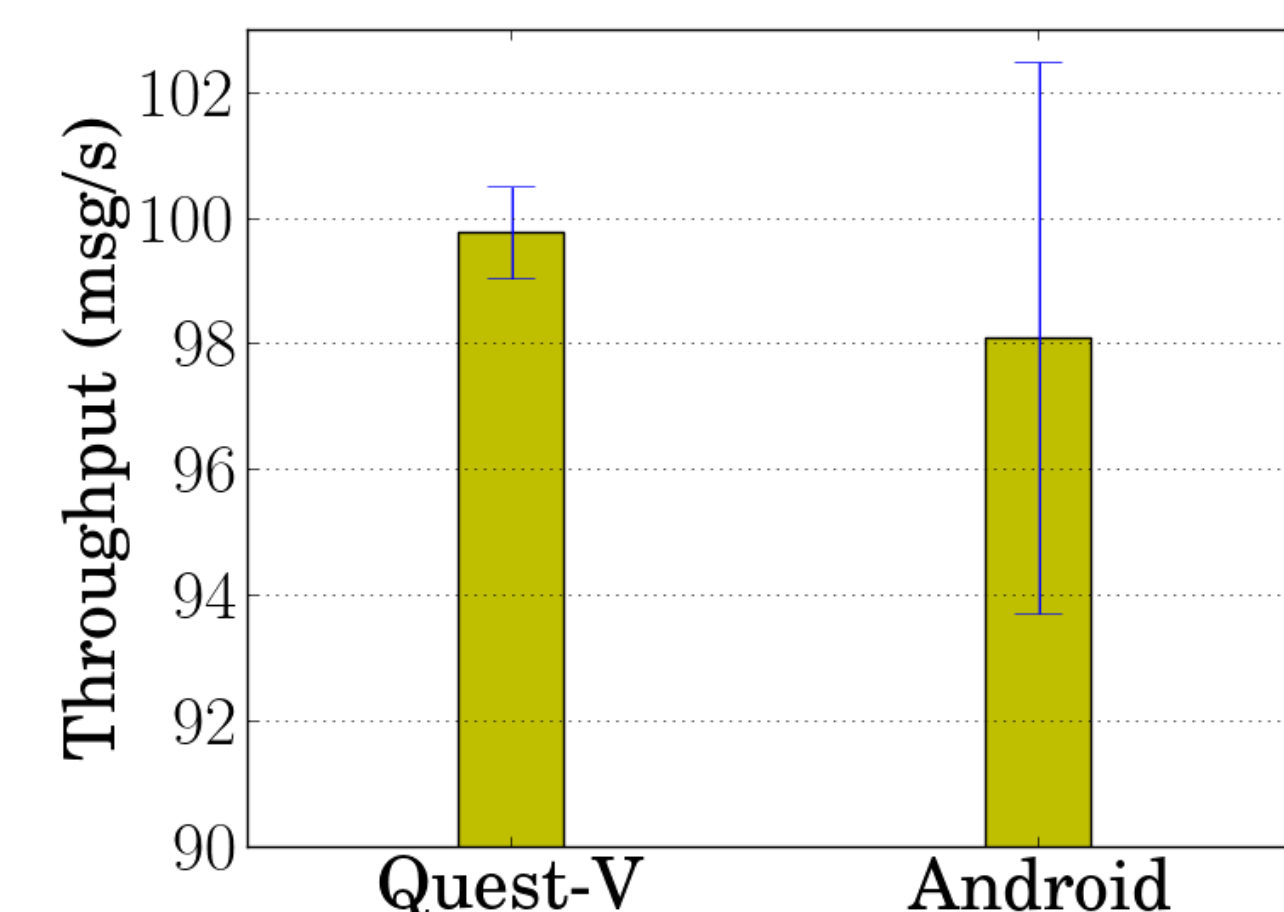
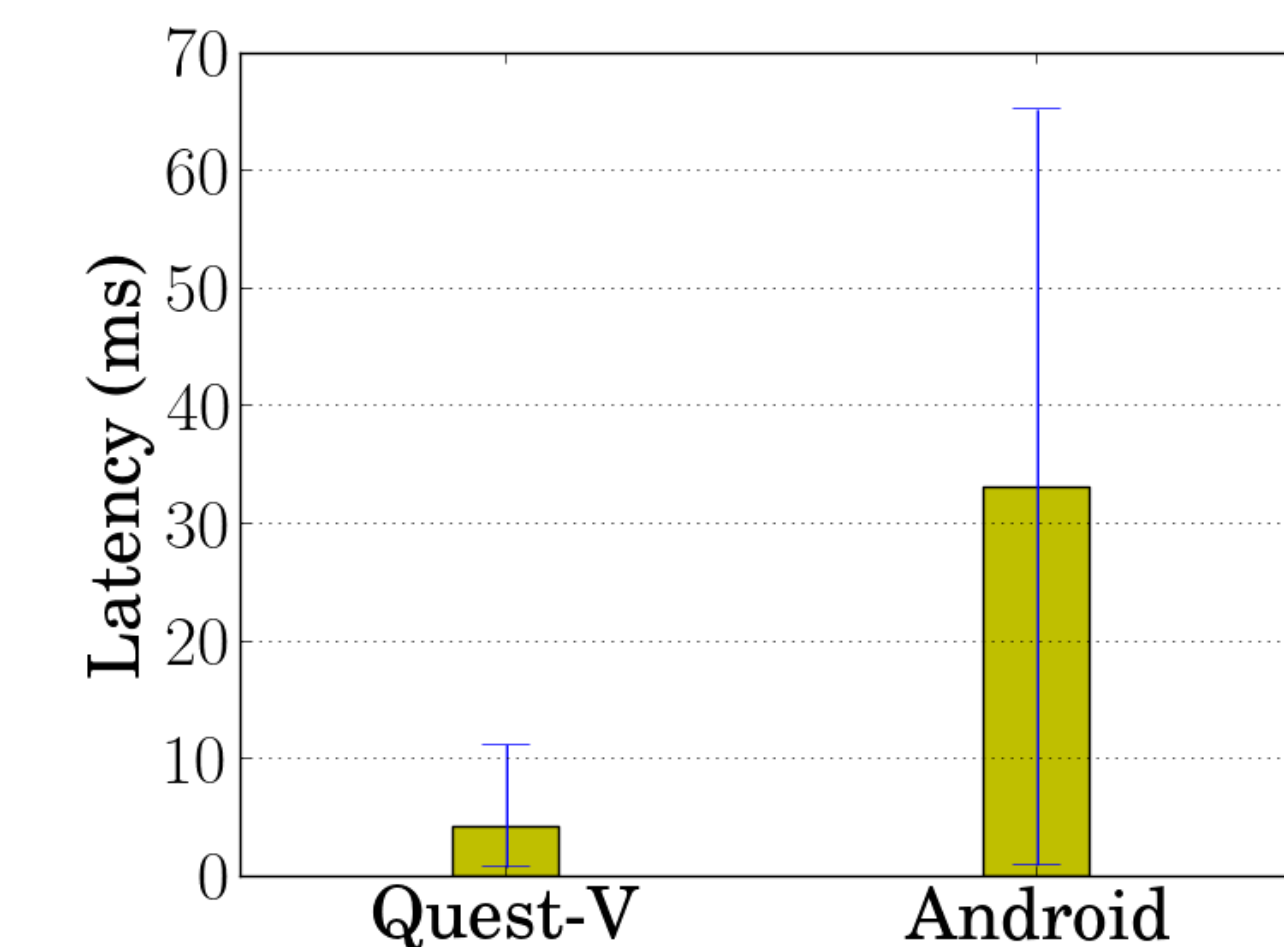
- > Android paravirtualization required modification of 126 lines of kernel code.
- > Physical Address Extension is supported in Quest-V for Android.
 - > 52-bits memory address
- > Advanced Vector Extensions feature is allowed in Android guest for graphics acceleration.

Evaluation

Startup times:

	Vanilla Android	Paravirtualized Android in Quest-V
Booting Android	16.6 s	23.7 s
IVI App Startup time	49 s	59.2 s

I/O Performance:



Conclusions

An integrated single-board solution for next generation interactive automotive system is proposed based on the Quest-V hypervisor, with Android as the user-interface.

Reference: www.questos.org