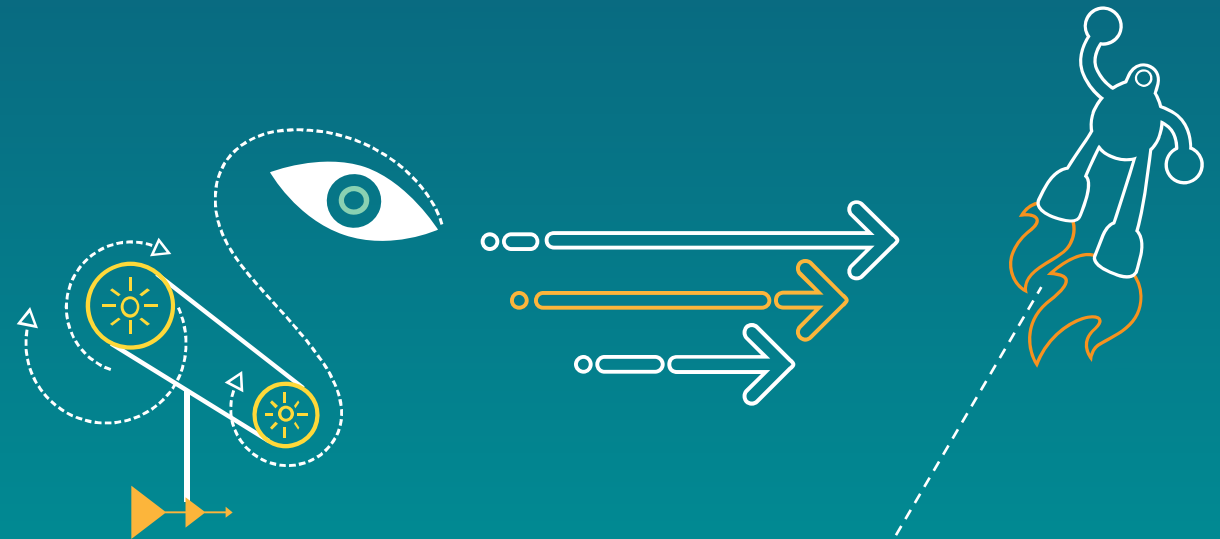


Eric Demers
VP of Engineering

Adreno GPU Compute

IWOCL 2015



A Worldwide Leader in Mobile Technologies



29

Years of wireless innovation

15+

Billion chips shipped

\$3.4

Billion in R&D in FY2013

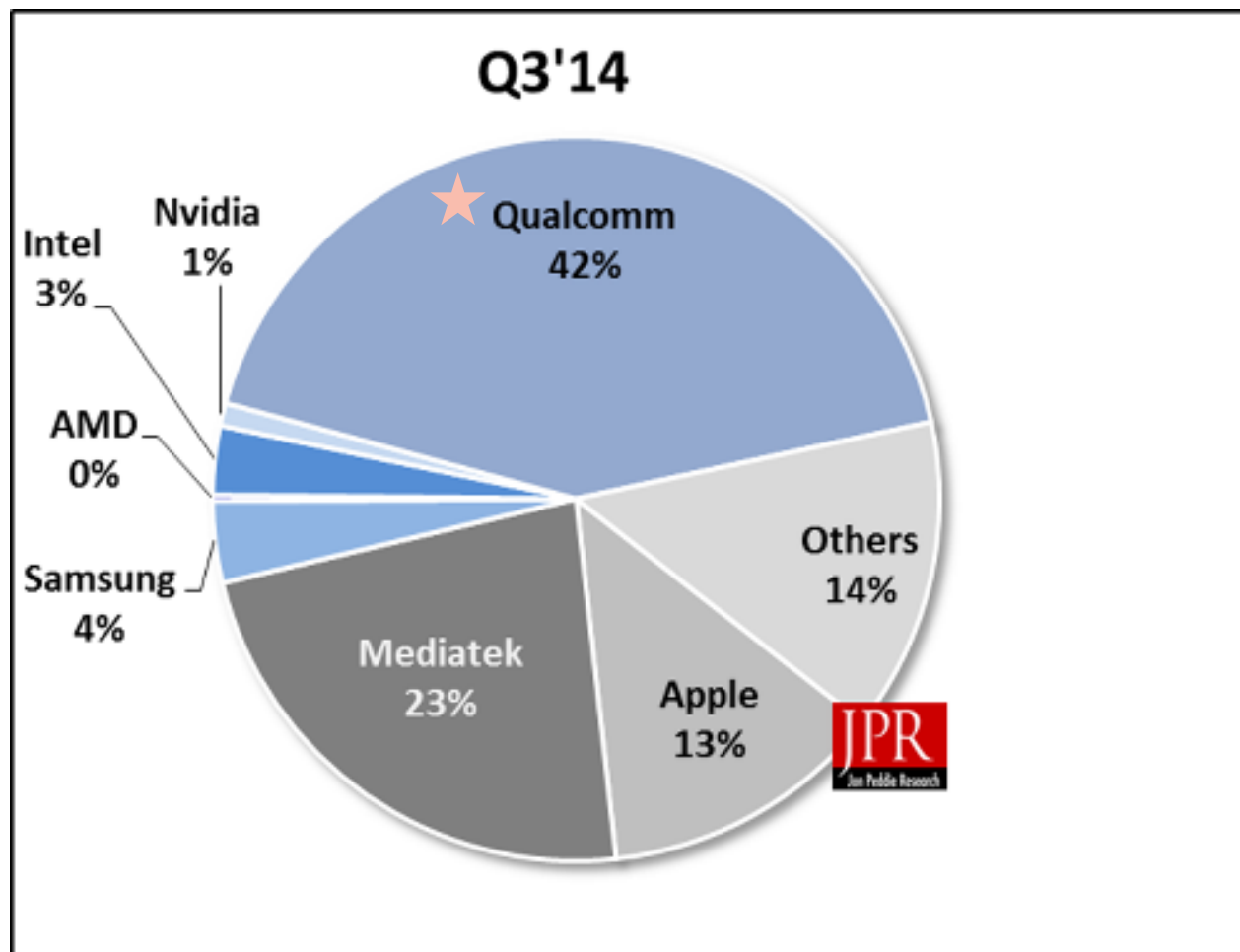
84,000+

Patents

\$120

Billion market cap

SoCs with embedded GPUs Q3 2014



Supplier	Market Share
AMD	0.0%
Apple	13%
Intel	3%
MediaTek	23%
Nvidia	1%
Samsung	4%
QTI	42%
Others	14%
TOTAL	100.0%

Source: Jon Peddie Research, December 09, 2014
<http://jonpeddie.com/press-releases/details/the-demand-for-powerful-gpus-in-mobile-devices-drive-the-industry1/>

Commercial Products with OpenCL Support



HTC Droid DNA
 LG Optimus G
 Motorola Moto X, Droid Mini
 Sony Xperia ZL, Tablet Z
 ...

Samsung GALAXY S4
 HTC One, One Max
 LG G Pad, Optimus
 Amazon Fire TV
 ...

HTC Desire
 Motorola Moto E
 LG Watch Urbane
 ...

Samsung GALAXY S5
 HTC One(M8), Desire Eye
 LG G3
 Sony Xperia Z2, Z3
 ...

Samsung GALAXY Tab S
 LG G Pro 2
 Sony Xperia Z1S
 ...

Samsung GALAXY Note 4, Edge
 HTC One M, Desire 820
 LG G Flex
 Sony Xperia Z4 Tablet
 ...

2013

2014 - 2015

• **Snapdragon S4 Pro**

• **Snapdragon 600**

• **Snapdragon 400**

• **Snapdragon 410**

• **Snapdragon 800**

• **Snapdragon 801**

• **Snapdragon 805**

• **Snapdragon 810**

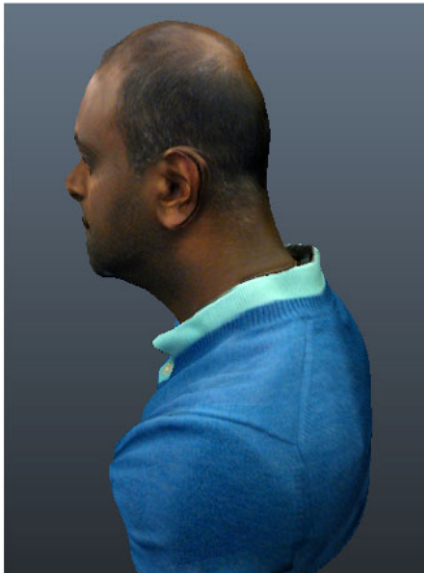
• **Snapdragon 615**

OpenCL 1.1 Embedded

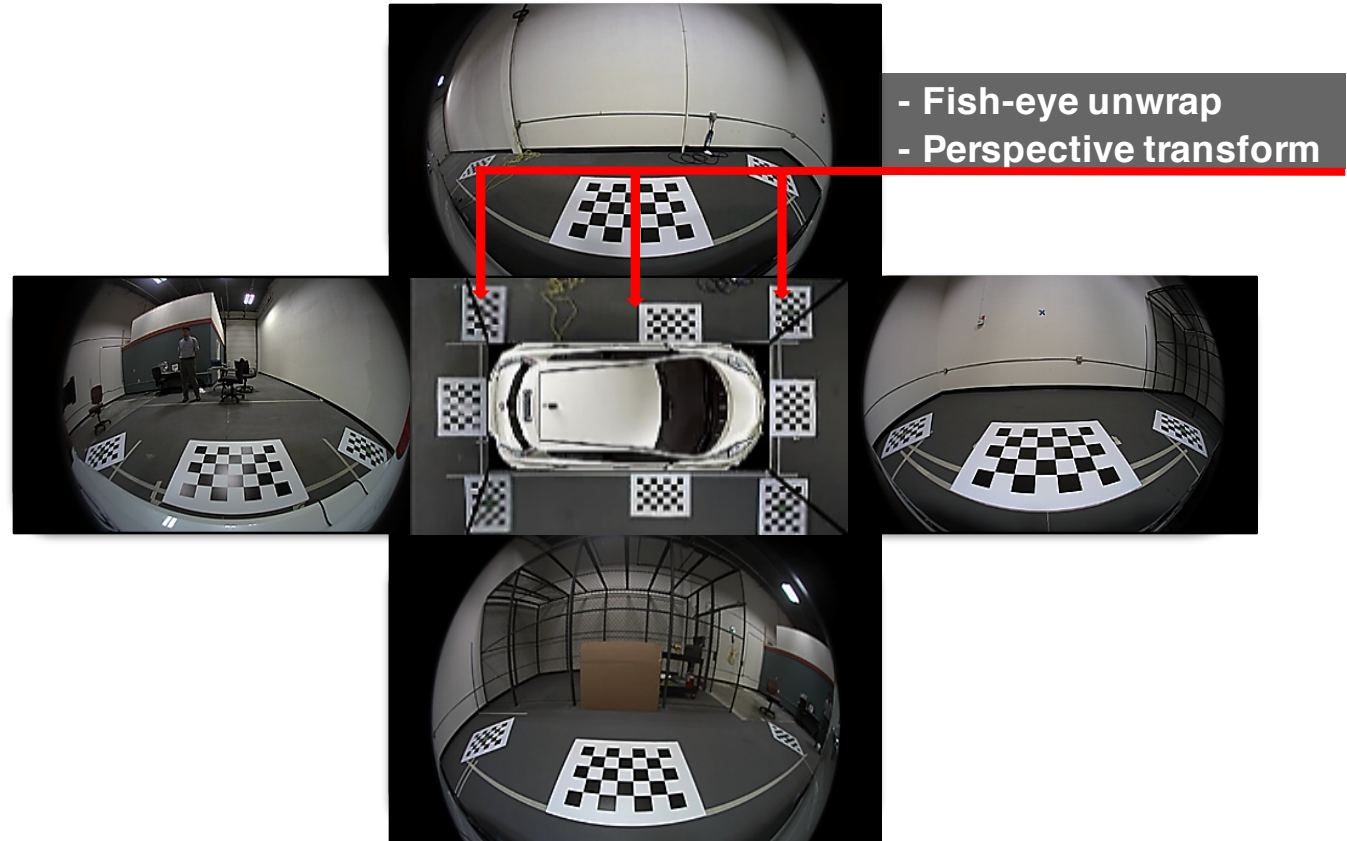
OpenCL 1.2 Full

GPU Compute Accelerated Computer Vision

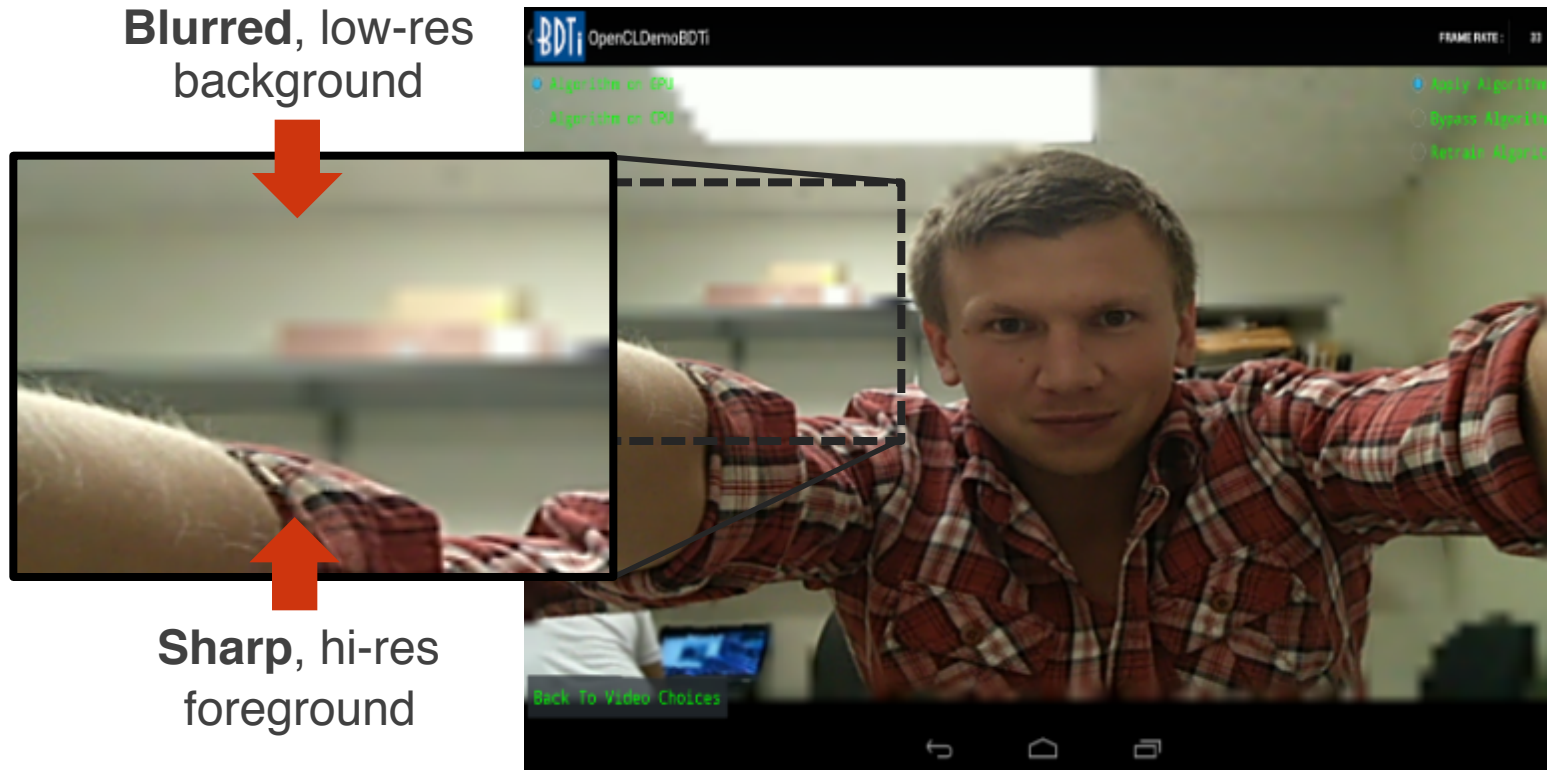
- **Accelerated FastCV**
 - OpenCL(GPU), DSP and NEON acceleration
- **Deep Convolutional Neural Networks**
- **High Quality 3D Scanning: Model and Texture Mapping**



- **360 Degree Bird-Eye View**
 - Demoed in CES 2015
 - 30 FPS on GPU



Real time Video Post-Processing Demo



- **Video conferencing**

- Hide details on background
- Video stream compression

- **Not feasible without GPU Compute**


- 33 FPS on GPU Accelerated
- 17 FPS on 4-Core NEON CPU

- The demo implements background subtraction using local-binary-pattern descriptors that are integrated with a custom refinement algorithm and contour filtering
- Understanding CPU and GPU architecture and **device specific optimization techniques** is a key for getting to top performance levels and creating new user experiences with OpenCL

OpenCL Tools for Snapdragon



DEVELOP



Snapdragon™ OpenCL Software Development Guide



Advanced OpenCL Tutorials

OpenCL Developer Guide

Find these in Adreno SDK on developer.qualcomm.com

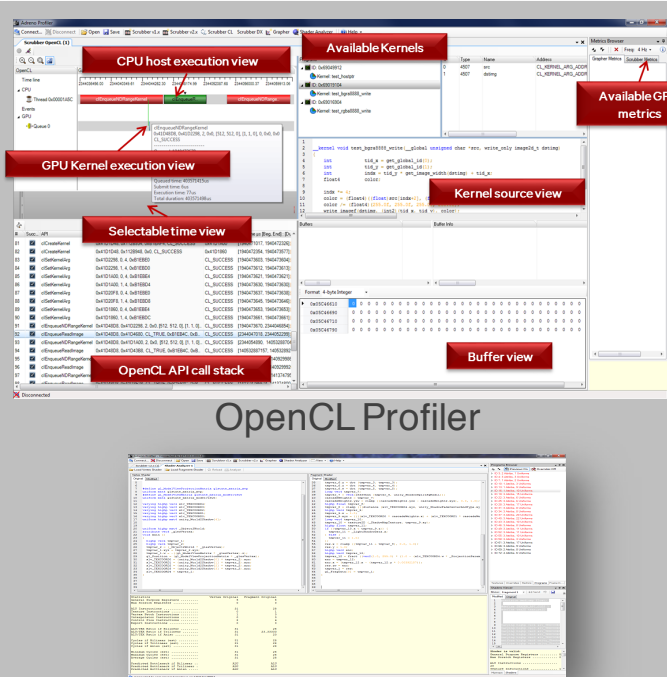
DEBUG



On-device OpenCL Debugger

Find this in Adreno SDK on developer.qualcomm.com

PROFILE / TUNE



OpenCL Profiler

OpenCL Kernel Analyzer

Find these in Adreno Profiler on developer.qualcomm.com

Annotations in the screenshots include: CPU host execution view, GPU Kernel execution view, Selectable time view, OpenCL API call stack, Available Kernels, Available GPU metrics, and Kernel source view.

OpenCL Product Differentiation



- **It's a perfect time to **start differentiating your product** with using GPU Compute on Snapdragon!**
 - Significant performance improvement and power reduction
 - New user experiences which are not feasible to implement without using GPU Compute
 - Set of all required profiling, debugging tools and development platforms is available to help you with *reducing time-to-market*

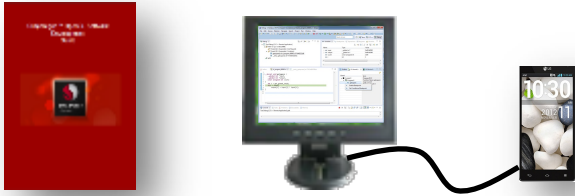
How to Start?

1.



- ✓ Order **Snapdragon development boards** on intrinsic.com

2.



- ✓ Download our **SDK and Programming Guide** developer.qualcomm.com

3.



- ✓ Ask your questions regarding Adreno GPGPU, **tools and SDK** on <https://developer.qualcomm.com/forums/qdevnet-forums/mobile-gaming-graphics-adreno>
- ✓ For all other GPGPU related questions, e-mail to arthurn@qti.qualcomm.com

Thank you

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