Welcome

Altera Technology Roadshow 2013

Altera at a Glance

Founded in Silicon Valley, California in 1983

Industry's first reprogrammable logic semiconductors

$1.78 billion in 2012 sales

Over 2,900 employees

Leading supplier of FPGAs, ASICs, and CPLDs

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Altera Around the World

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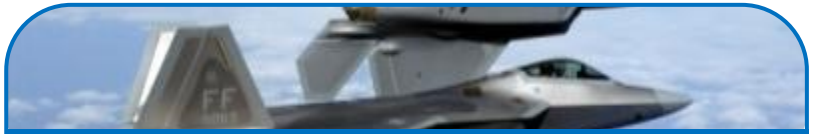
Innovation Leader Across Industries

Industrial and Automotive

Automation and Process Control	PLC and I/O Modules, Motion and Motor Control, Industrial Networking, Sensor/Encoder Interfaces
Building Control and Security	Video Surveillance, Access Control, HVAC Control
Automotive	Displays, Infotainment, Driver Assistance
Smart Energy	Smart Grid/Meter, Energy Management, Power Distribution

Communications

Networking	Switches, Routers
Wireline	Optical Metro Access
Wireless	Remote Radio Head, Basestations, Wireless LAN
Broadcast	Studio, Satellite, Broadcasting



Military and Aerospace

Intelligence	Deep Packet Inspection, Data Analysis, High Performance Computing, Acceleration, Access
EW/Radar	Counter-IED, Jammers, Decoys, Early Warning Radar; Airborne, Ship-Borne and Stationary Radar
Secure Communications	In-Line Network Encryptors; Airborne, Vehicular, Tower and Tactical Radios
Guidance & Control	Aircraft, Missile, Vehicle and Robot Guidance and Control, Instrumentation Clusters

Computing, Consumer, Storage, Test, and Medical

Computer and Storage	Servers, RAID, High Performance Computing, Flash Storage, MFP
Consumer	Displays, Set-Top-Boxes
Test	IP Video Testers, Protocol Testers
Medical	CT Equipment, Ultrasound

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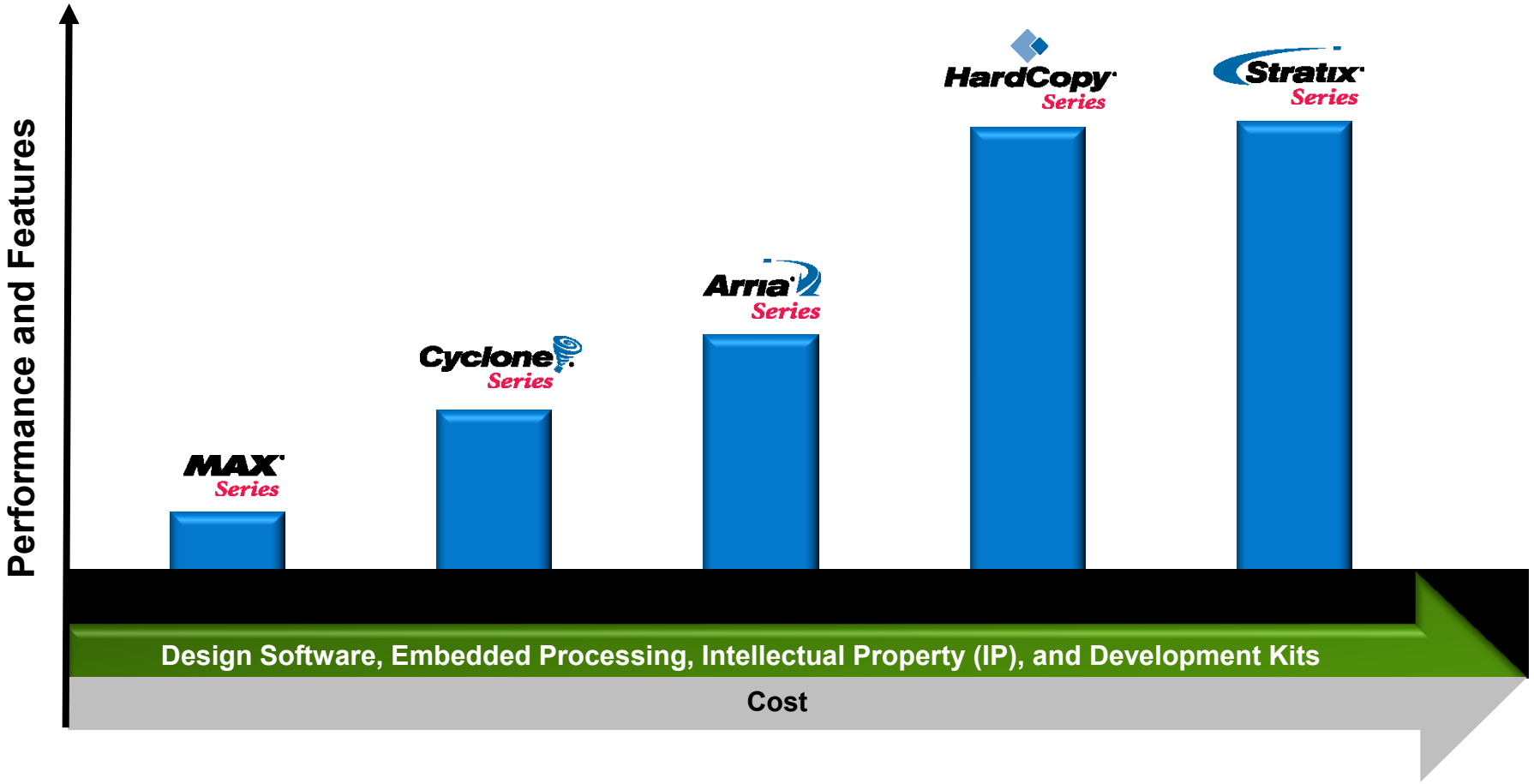
Innovation Leader Across the Board



Optimized for Performance, Productivity, Power, and Price

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Altera in the News

June 10, 2013 ***Altera Announces Breakthrough Advantages with Generation 10***

May 21, 2013 ***Altera Stratix V GX FPGAs Achieve PCIe Gen3 Compliance and Listing on PCI-SIG Integrators List***

May 14, 2013 ***Altera to Deliver Breakthrough Power Solutions for FPGAs with Acquisition of Power Technology Innovator Enpirion***

May 06, 2013 ***Altera Opens the World of FPGAs to Software Programmers with Broad Availability of SDK and Off-the-Shelf Boards for OpenCL***

May 06, 2013 ***Altera Quartus II Software v13.0 Enables World's Fastest FPGA Designs***

April 22, 2013 ***Altera Announces Availability of Cyclone V SoC Development Kit***

April 15, 2013 ***Altera and TSMC Collaborate on 55 nm EmbFlash Process***

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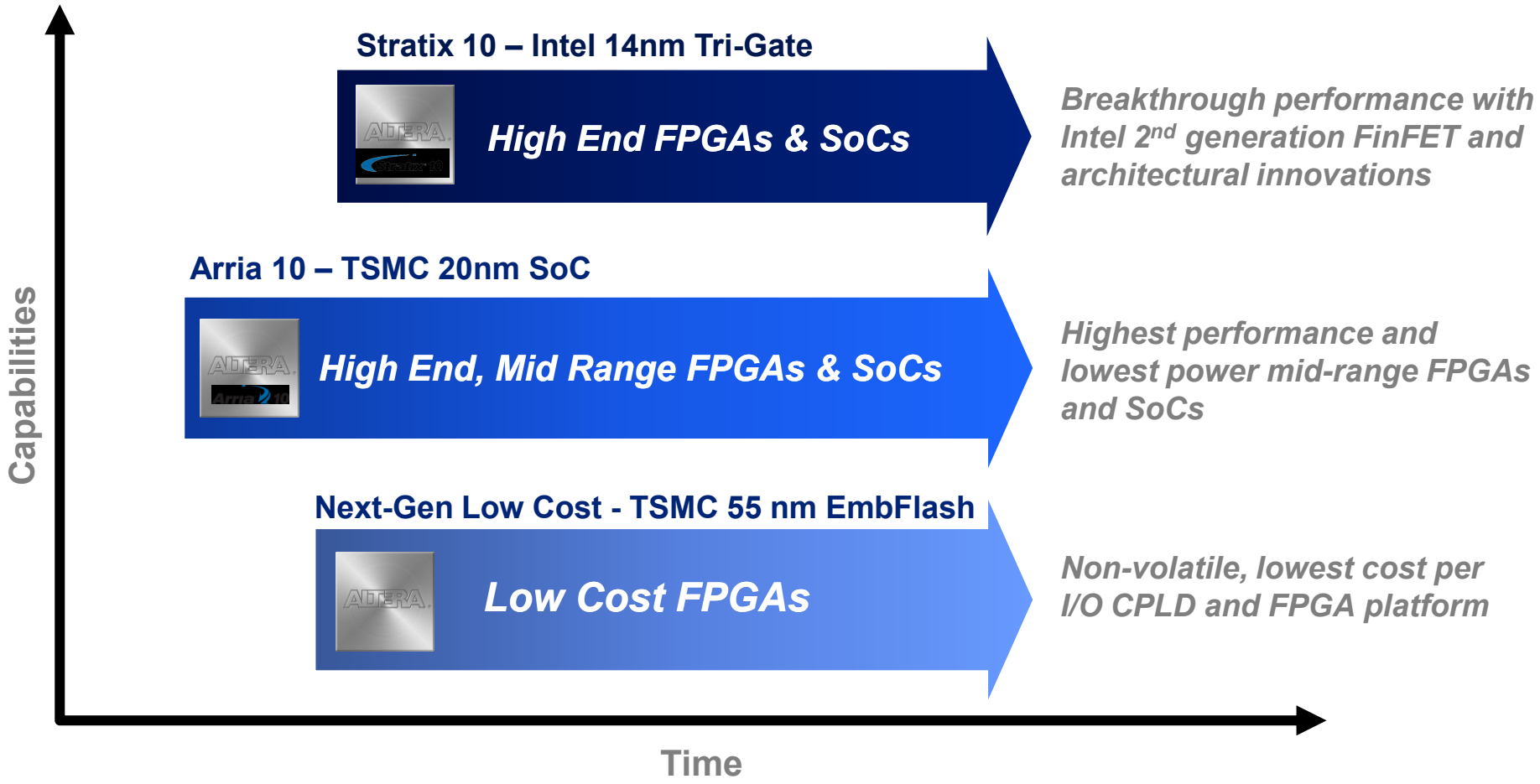
Breakthrough with Generation 10



Tailored to deliver optimized capabilities to meet a broad range of applications

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Breakthrough Power Solutions

Faster time-to-market

- Pre-validated, easy-to-use solutions

Frees up board space

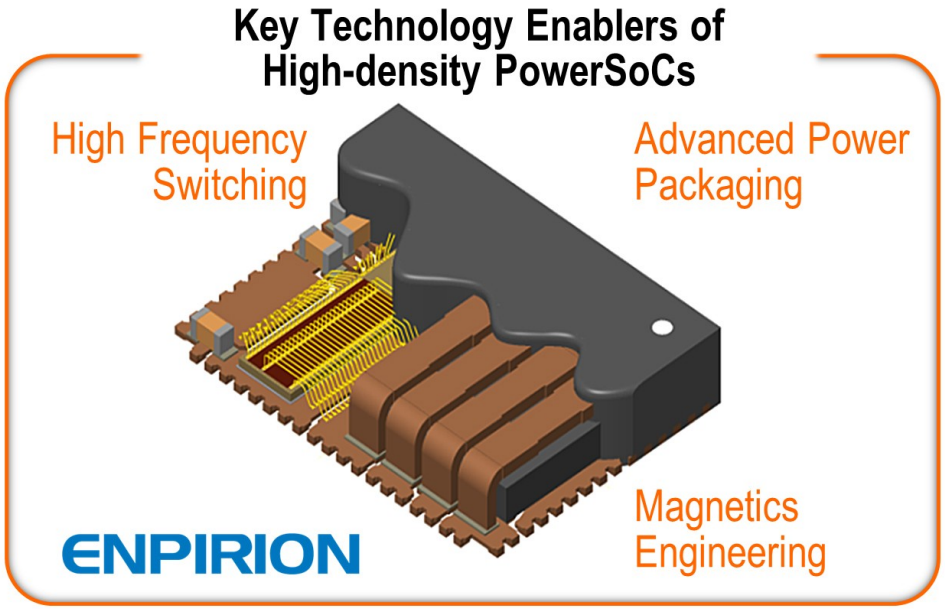
- Smaller footprint

Higher performance

- High efficiency and low noise

Increased system reliability

- Fewer components



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Breakthrough SoC Roadmap

Features & Performance

1st Generation Processor System
28 nm TSMC

800 MHz Dual ARM Cortex™-A9 MPCore™

2nd Generation Processor System
20 nm TSMC

1.5 GHz Dual ARM Cortex™-A9 MPCore™

3rd Generation Processor System
14 nm Intel Tri-Gate

Ultra high-performance processor system

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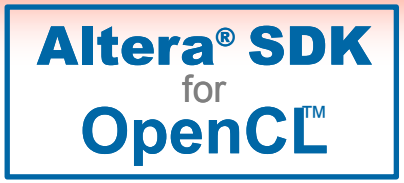
Breakthrough Productivity

Hardware Designer	DSP Designer	Software Developer	
			
Industry's Fastest Compile Time 8X Speed Up	**Industry's Only** Model-Based, Performance-Driven HLS Tool	**Industry's Only** FPGA-Adaptive Debug	**Industry's Only** OpenCL Solution for FPGAs

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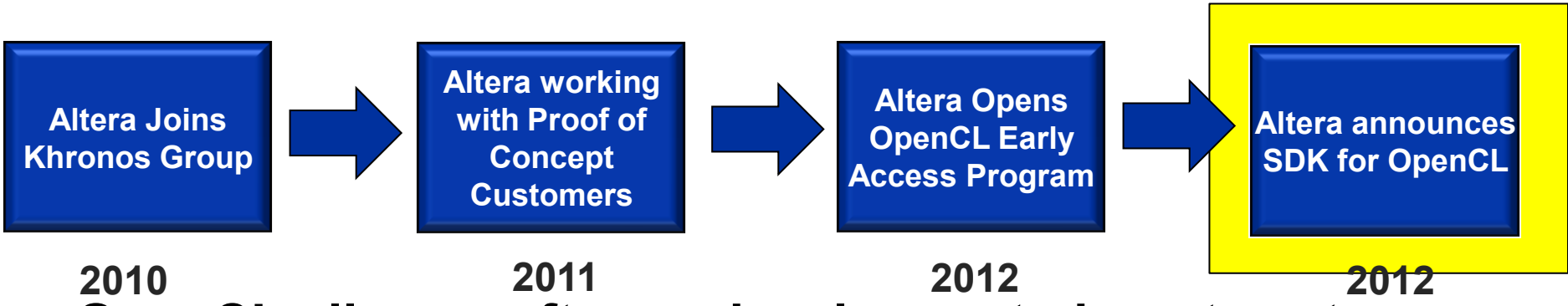
Altera SDK for OpenCL

Today's News

- Altera today announces its SDK for OpenCL



- OpenCL allows software developers to boost system performance by using an FPGA's massively parallel architecture
- Increases designer productivity by raising the level of design abstraction

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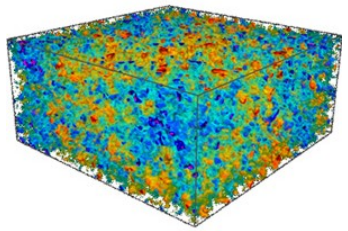
Performance Challenge

Performance Wanted

Multimedia
- HD Video Processing
- Image processing

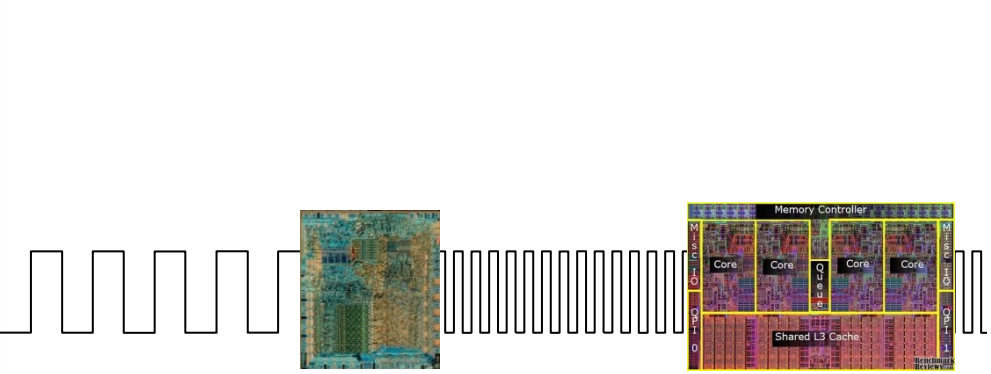
Medical
- Medical imaging
- Bio informatics

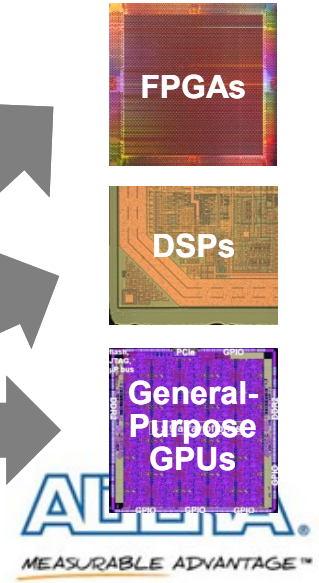
Military
- Radar image processing
- Persistent surveillance



High-Performance Computing
- Financial Modeling
- Big data analytics
- Scientific computing

Performance Challenges





Single Core → Multiple Cores → 100s of Cores

CPU → CPUs

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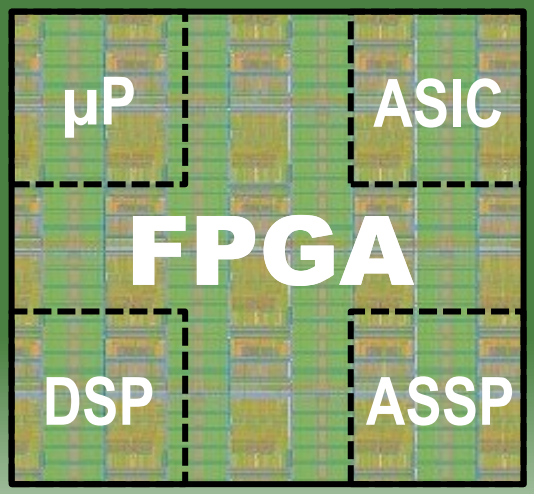
Altera Is Driving Silicon Convergence

General Processors	FPGAs	Application-Specific
Need for **Efficiency** »	FPGA Combines the **Best of All Four + FPGA**	« Need for **Flexibility**



- Software programmable
- Great flexibility
- Poor power efficiency

- **Hardware *and* software programmable**
- ***Great* flexibility**
- ***Good* power efficiency**

= Microprocessor
+ DSP
+ Application-Specific IP
+ Programmable Fabric

- Not programmable, hard wired
- Inflexible
- Great power efficiency
- Many contain embedded processors

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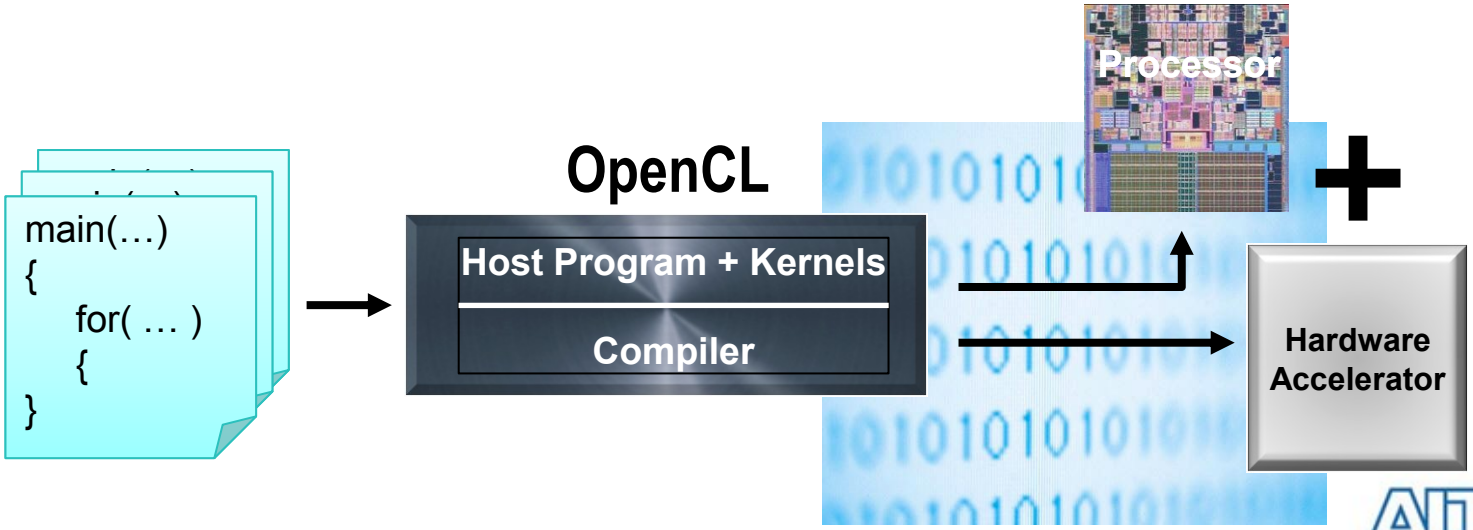
OpenCL for Heterogeneous Solutions

- **C-based language with extensions:**
  - Standard C Language
  - Altera OpenCL C extensions (adds parallelism to C)
  - API (Open standard for different devices)

- **Programming model supports parallelism in heterogeneous systems**
  - CPU/GPU/FPGA



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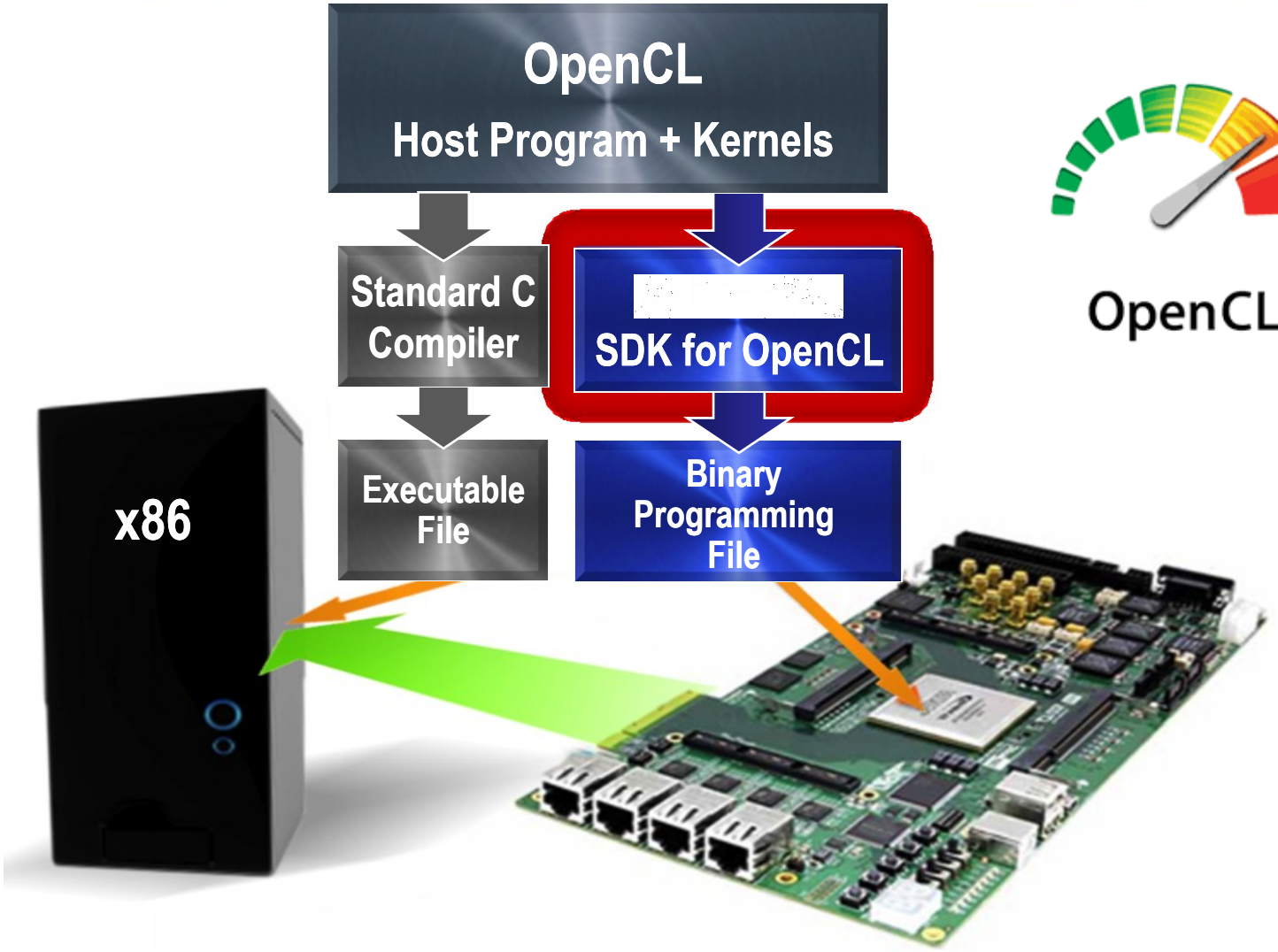
Introducing Altera SDK for OpenCL



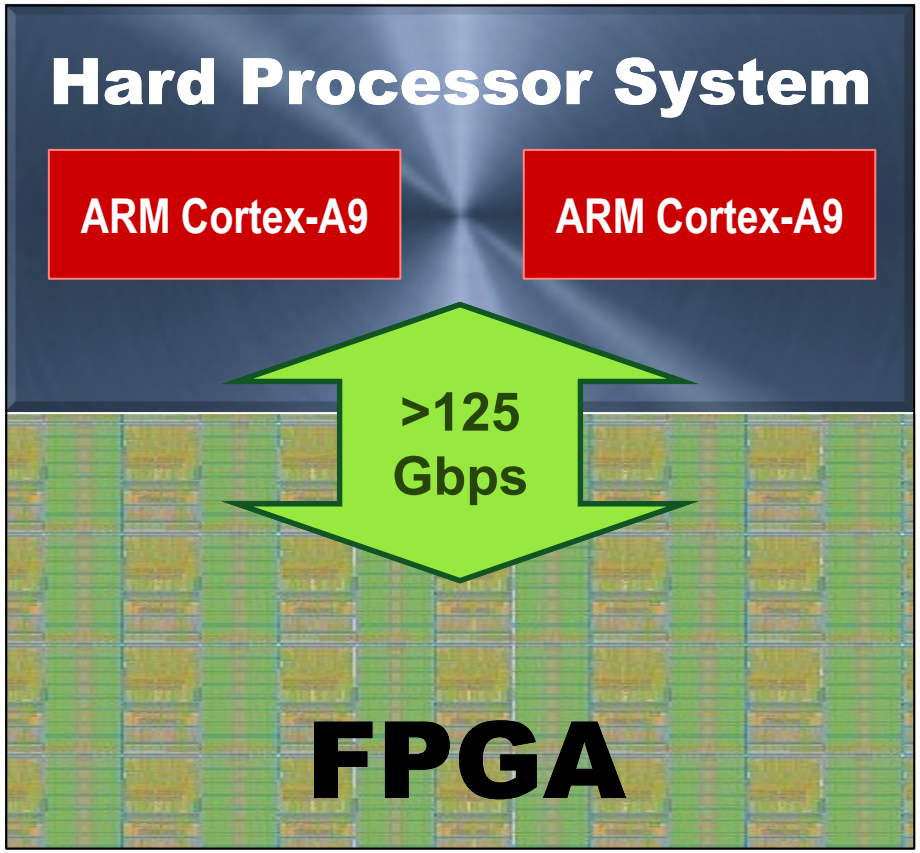
Accelerating Performance with SoC FPGAs

Single-Chip OpenCL Solution:

- SoC = ARM + FPGA

Integration Enables:

- Higher bandwidth and lower latency between FPGA and processor
  - >125Gbps Interconnect
- Processor integration reduces system cost



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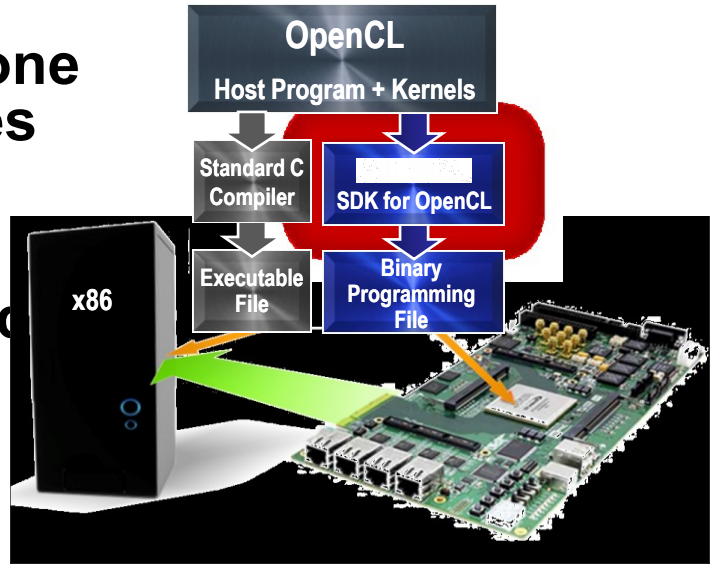
Benefits of Altera OpenCL for FPGA

- ✓ **Superior Design Productivity**
  - Quick and easy evaluation of different solutions
  - Fast development / debug / optimization cycles
  - Faster time-to-market
- ✓ **Higher Performance**
  - >9X greater performance vs CPU alone running a Monte-Carlo Black Scholes simulation
- ✓ **Improved Power Savings**
  - >5X performance/Watt vs GPU-based heterogeneous systems running a document search algorithm
- ✓ **Greater Portability**
  - Reuse across multiple platforms, multiple generations

OpenCL



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