XDF XILINX DEVELOPER FORUM

State of FPGA-based Acceleration

Presented By

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Sr. Director, Software Solutions and Platform Marketing

October 2, 2018

XILINX

FPGA-Based Acceleration Momentum

Accelerated Applications	**250+ Companies Developing Applications**
Developers	**10x More Developers Onboarded since 2017**
Acceleration Platforms	**4 Cloud 2 On-premise**

Develop & Deploy Applications From Cloud to On-Premise

SDAccel™ Environment

aws	AWS GovCloud (US)	HUAWEI	Aliyun Alibaba Cloud Computing	aws	NIMBIX supercomputing made super human™	On-premise
						
F1 Instance VU9P	F1 Instance VU9P	FP1 Instance VU9P	F3 Instance VU9P	New instance F1.4xlarge	Alveo U200, U250	Alveo U200, U250
Sep. 2017	Nov. 2017	June 2018	Sep. 2018	Sep. 2018	Oct. 2, 2018	Oct. 2, 2018

General Availability

XILINX.

Announcing EC2 F1 New Capabilities

- New instance size: f1.4xlarge provides a significant performance boost compared to f1.2xlarge

3 FPGA instance types

- Virtual Ethernet: enabling high-performance networking acceleration use-cases like firewalls, routers, filtering and more

F1 Virtual Ethernet

- DRAM data retention: boosting FPGA images pipeline runtime execution

DRAM Data Retention

- New FPGA developer AMI supporting Vivado 2018.2 for faster compile times, higher frequencies and improved timing closure

> → Visit AWS Developer Hangout zone to learn more!

Acceleration Ecosystem

Developers

2017	2018
115	**1127**

Developers Trained
Companies + Academia

Partners

2017	2018
43	**268**

Accelerator Program
(Approved Partner)

Apps

2017	2018
15	**35**

Published Apps

Getting Developers Onboarded

In-person

Co-located at strategic events
SC17, FPGA2018, XDF, CVPR, …

Virtual on-demand

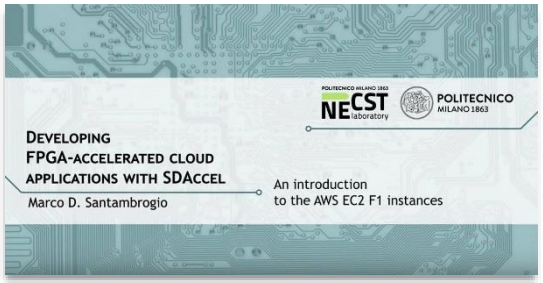
https://www.xilinx.com/products/design-tools/cloud-based-acceleration.html#sdaccellab

115 (2017) **1127** (2018)

Developers Trained
Companies + Academia

University Courses

Prof. Zhiru Zhang, Cornell
High-level Digital Design Automation Labs and project offered on AWS F1, Fall 2018

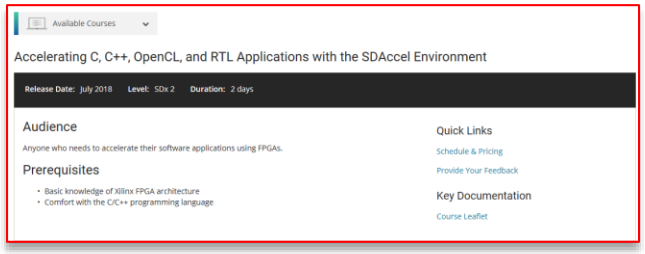


Prof. Jason Cong, UCLA
Customizable Computing for Big Applications, Fall 2018
Parallel and Distributed Computing, Winter 2019

Prof. Krste Asanovic, UC Berkeley
CS152 Computer Architecture and Engineering, Spring 2018

eLearning & Instructor-Led Courses

eLearning Modules	Duration in Minutes		
	Lecture	Demo	Lab
SDAccel Introduction	20	-	-
SDx Tools Overview	20	15	60
Host Code – OpenCL Execution Model	20	-	-
Profiling	20	-	-
Optimization Methodologies	15	-	-
RTL Kernel Wizard	20	-	-
C based Kernels	15	-	-
C based Kernel Optimizations	15	-	-
Setting up SDAccel Environments for XBB	-	15	-



XILINX

Acceleration In Education

Xilinx University Program

Accelerate Your Research on the AWS Cloud with Xilinx FPGAs

- Scalable infrastructure
- No tools or license setup
- Integrate with over 100+ AWS services
- Get started with AWS EC2 F1 instances

PROFESSORS

University Teaching and Research

- Get the latest Xilinx technology
- Attend a professor workshop
- Access teaching material
- XUP Professor Area...

STUDENTS

Class Room and Projects

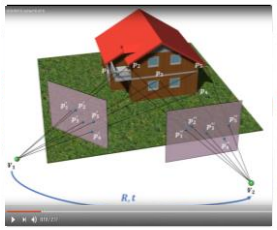
- Download free FPGA design tools
- Purchase your own board
- Access technical resources
- XUP Students Area...

www.xilinx.com/xup

Open Hardware design competition EMEA 2018

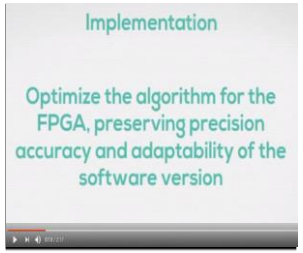
AWS F1 Category Winner and Finalists

5 Points to Rule Them All
Winner: AWS EC2 F1 prize



Politecnico di Milano
Emanuele Del Sozzo, Marco Rabozzi,Lorenzo Di Tucci
(Prof. Marco D. Santambrogio)
Project Link

AWS EC2 F1: circFA



Politecnico di Milano
Peverelli Francesco, Zeni Alberto, Cabri Enrico
(Prof. Marco Santambrogio)
Project link

AWS EC2 F1: FastBrain

Politecnico di Milano
Filippo Carloni, Giada Casagrande, Valentina Corbetta
(Prof. Marco Santambrogio)

Acceleration Posters @ XDF

FireSim: Productive, Scalable, FPGA-Accelerated Cycle-Accurate Hardware Simulation using Cloud FPGAs
Sagar Karandikar, Howard Mao, Donggyu Kim, David Biancolin, Alon Amid, Borivoje Nikolic, Randy Katz, Jonathan Bachrach, Krste Asanovic.
Dept. of Electrical Engineering and Computer Sciences, UC Berkeley. Contact: sagark@eecs.berkeley.edu

Automata Processing on FPGAs
Chunkun Bo, Vinh Dang, Ted Xie, Jack Wadden, Mircea Stan, Kevin Skadron
Department of Computer Science, University of Virginia, chunkun@virginia.edu

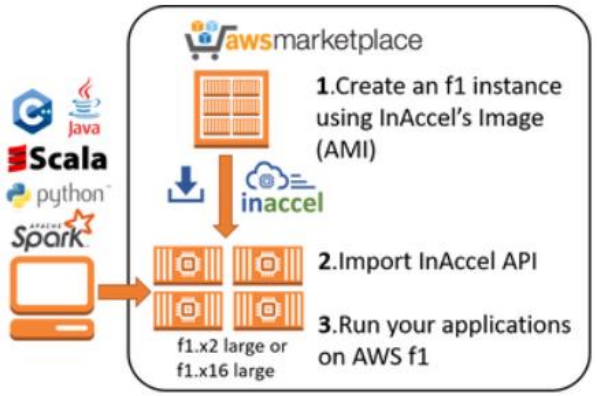
DEMOCRATIZE ACCELERATED GENOMIC PIPELINES ON FPGA
Lorenzo Di Tucci, Giulia Guidi, Marco Rabozzi, Sara Notargiacomo, Marco D. Santambrogio
Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano (Milano), lorenzo.ditucci@polimi.it

Galapagos: A Full Stack Approach to FPGA Integration in the Cloud
Naif Tarafdar, Nariman Eskandari, Paul Chow
Electrical and Computer Engineering, University of Toronto, naif.tarafdar@mail.utoronto.ca

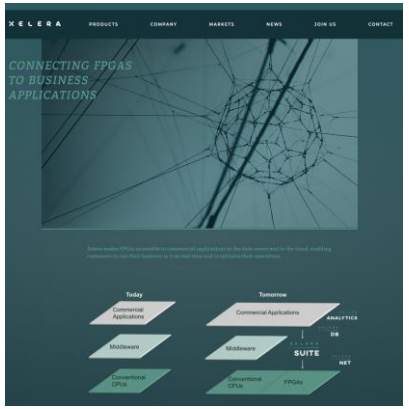
FPGA ACCELERATED BASEBAND FOR WIRELESS SYSTEMS
Chance Tarver, Kaipeng Li, Joseph Cavallaro
Department of Electrical and Computer Engineering, Rice University, {cat12, kl33, cavallar}@rice.ede

Rosetta: A Realistic HLS Benchmark Suite for FPGAs
Students: Yuan Zhou, Ritchie Zhao, Hanchen Jin
Faculty Advisor: Zhiru Zhang
School of Electrical and Computer Engineering, Cornell University

Accelerator Startups from Academia



www.inaccel.com



xelera.io/

XILINX

Xilinx Accelerator Program for Developers

Enable companies to accelerate products/services
on the cloud and on-premise

43

2017

268

2018

Accelerator Program
(Approved Partner)

- Leverage your Existing algorithms and IP
- Deploy Custom Hardware to Millions in Public Cloud
- Extend your existing business model
- Discounted XBB cards for development
- Connect to Xilinx marketing, FPGA expertise and funding opportunities

www.xilinx.com/accelerator-program

XILINX

Accelerated Applications

Compression

CAST

Accelize

XILINX

Data Analytics

BLACKLYNX

XILINX

BigZetta Systems

LegUp

Axonerve™

Published Apps

15 2017

35 2018

Financial Computing

MAXELER Technologies
Maximum Performance Computing

SUMUP ANALYTICS

POLITECNICO DI TORINO

Genomics

debeb Genetics

Falcon COMPUTING

edico genome
an Illumina company

Image Processing

XILINX

CTACCEL Accelerated Computing

ALSE

Machine Learning

DEEPHI 深鉴科技

XILINX

inaccel

mle missing link electronics

Mipsology

Security

ZO TECH

Titan IC

SECURE-IC

Video

NGCODEC

PATHPARTNER

skreens

Tool

XILINX

PLUNIFY

FireSim

System View

Reconfigure.io

https://www.xilinx.com/products/design-tools/acceleration-zone.html#libraries

Xilinx ML Suite - Fastest Real Time Inference

Your Application

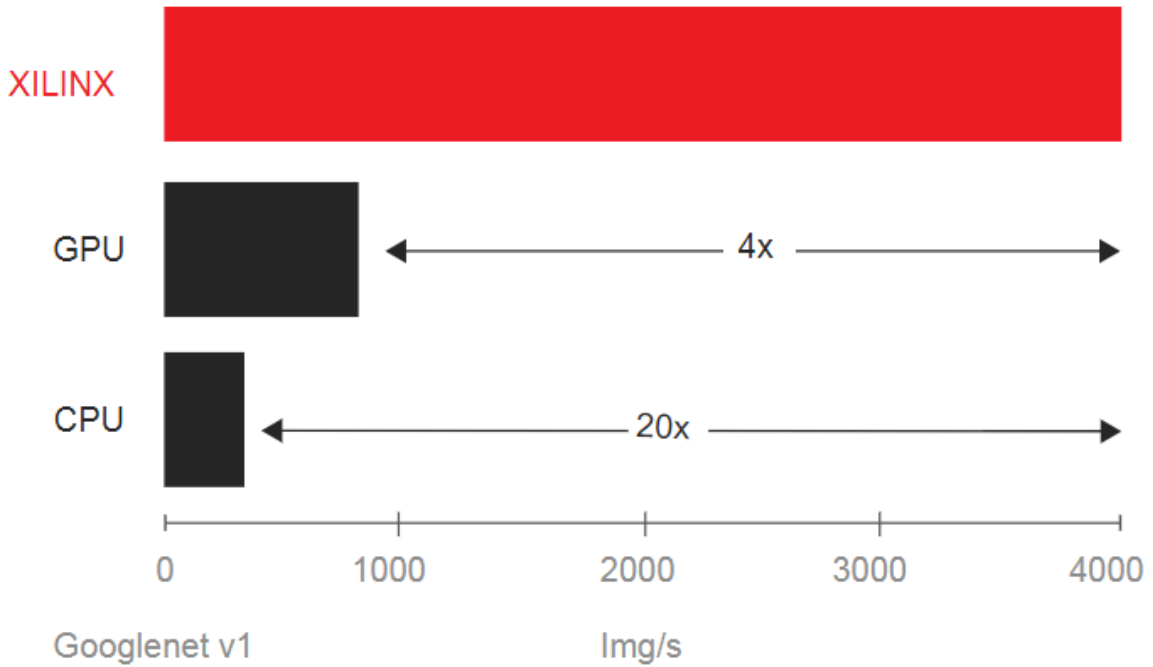
{RESTful API} python™

TensorFlow mxnet Caffe

xfDNN | Compiler • Auto-quantizer
ML Software Libraries

HUAWEI Alibaba Cloud aliyun.com awsmarketplace NIMBIX

Alveo
U200, U250

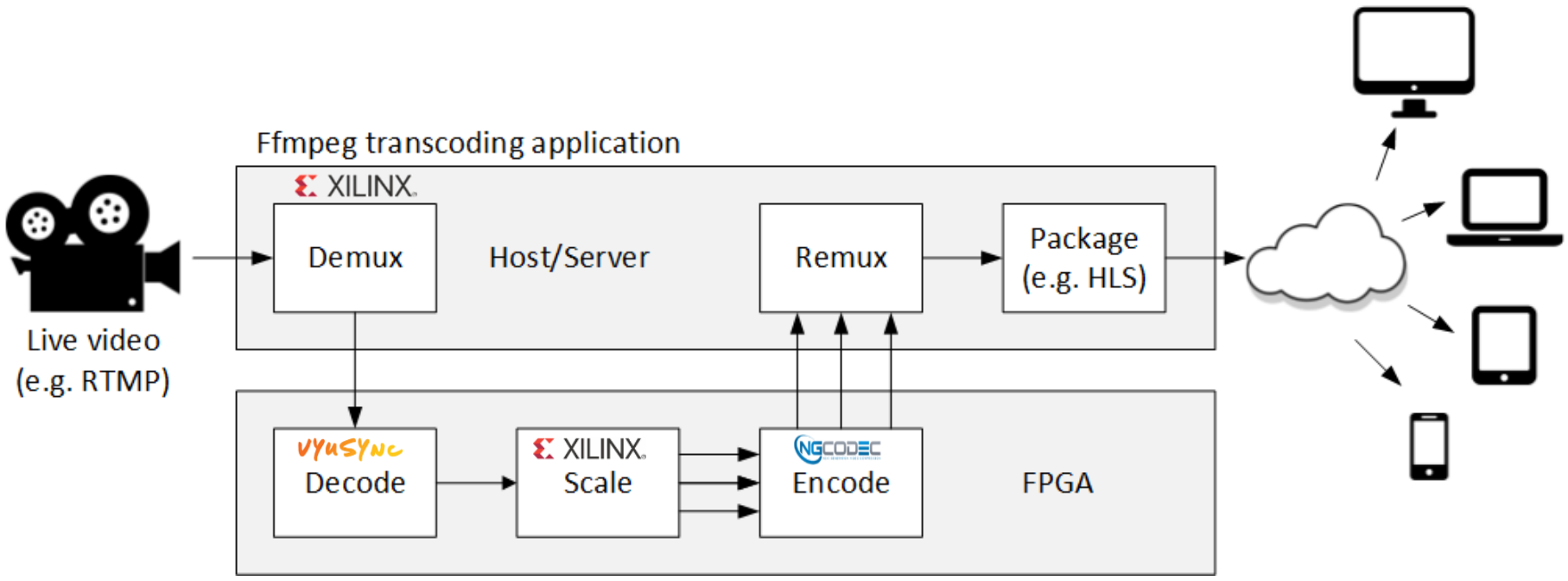


* See White Paper for performance details

https://www.xilinx.com/ml

https://github.com/xilinx/ml-suite

Xilinx ABR Video - Real Time Video Streaming



High performance HEVC and VP9 Encoder

Fully configured transcoding pipeline

Easy programming interface with FFmpeg

60 fps for real-time video streaming

7x greater than x265 slow

10x greater than Libvpx

Acceleration Resources

Developers

AWS F1 SDAccel Developer Lab

www.xilinx.com/products/design-tools/cloud-based-acceleration.html#sdaccellab

Data Scientists, ML Practitioners

AWS F1 ML Suite Developer Lab (coming soon)

www.xilinx.com/ml

Academics

Sign-up for: AWS Educate, Xilinx University Program

aws.amazon.com/education/F1-instances-for-educators/
www.xilinx.com/xup

Start-ups, IP Providers

Sign-up for:
Xilinx Accelerator Program

www.xilinx.com/products/design-tools/acceleration-zone/accelerator-program.html

Cloud End Users

AWS F1 Apps
and Libraries

www.xilinx.com/products/design-tools/acceleration-zone.html#libraries

On-premise End Users

Xilinx Alveo
Accelerator Cards

www.xilinx.com/alveo
www.nimbix.net/alveo

FPGA-based Acceleration Momentum

Accelerated Apps

VYUSYNC, Alma Technologies, Mipsology, SUMUP ANALYTICS, MAXELER Technologies, Titan IC, XELERA, edico genome, NGCODEC, skreens, InAccel, bigstream, Falcon COMPUTING, CTACCEL, PATHPARTNER, XILINX, DEEPHI, BLACKLYNX, ALGO-LOGIC, VITESSE DATA, deCODE Genetics

Developers

- Developer Labs
- GitHub Examples
- Forums
- Xilinx Accelerator Program
- SDAccel™ Environment
- Xilinx University Program

Acceleration Platforms

aws, AWS GovCloud (US), Aliyun Alibaba Cloud Computing, HUAWEI, NIMBIX supercomputing made super human™