Hardware acceleration with FPGAs on AWS

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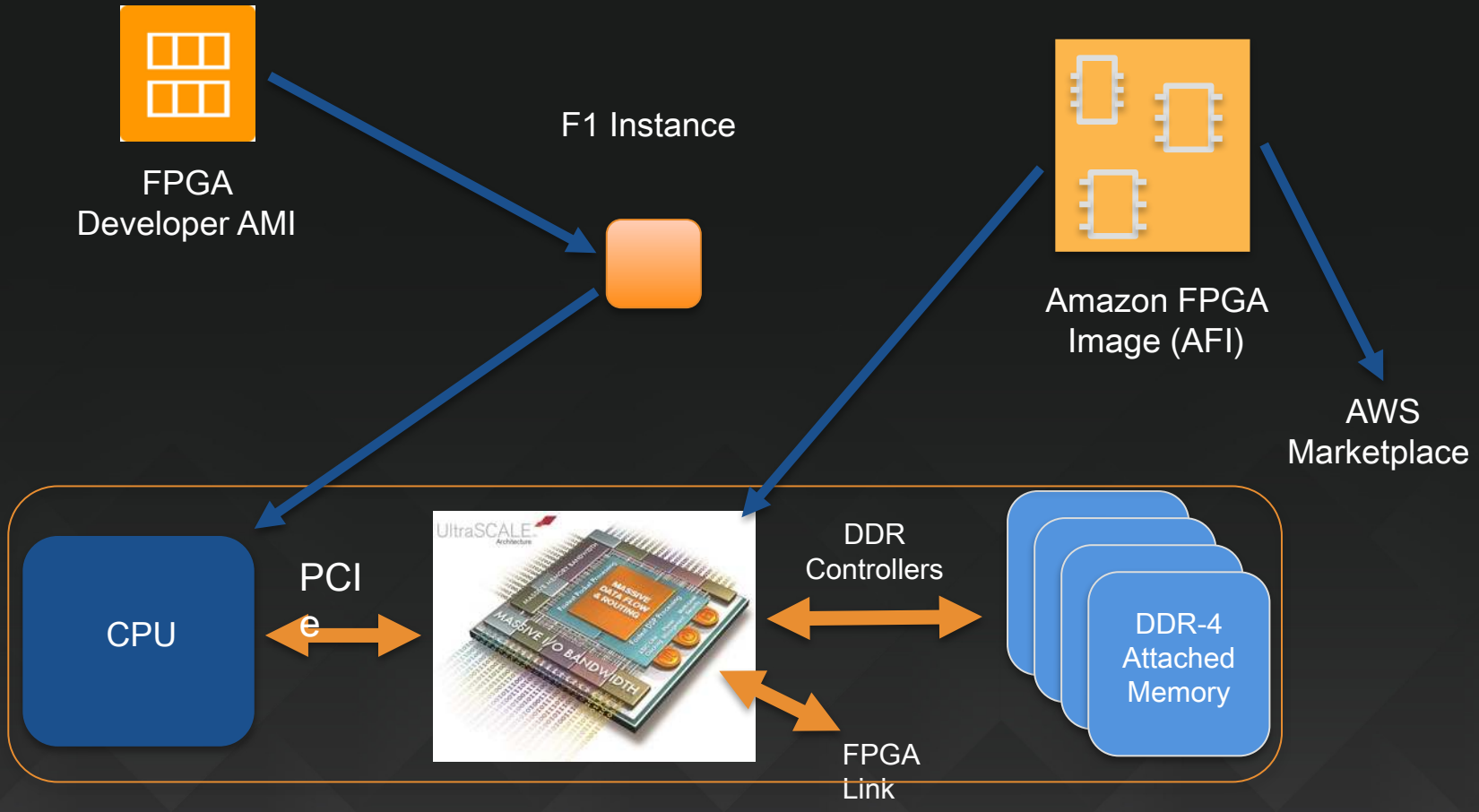
FPGA Acceleration Using F1 instances



Demo: OpenCL on F1 instance

Building the OpenCL application

```
git clone https://github.com/aws/aws-fpga.git
cd aws-fpga
source sdk_setup.sh
source hdk_setup.sh
source sdaccel_setup.sh
source $XILINX_SDX/settings64.sh

cd $SDACCEL_DIR/examples/xilinx/getting_started/host/helloworld_ocl/
make clean
make check TARGETS=sw_emu DEVICES=$AWS_PLATFORM all
make check TARGETS=hw_emu DEVICES=$AWS_PLATFORM all
make check TARGETS=hw DEVICES=$AWS_PLATFORM all
Creating Vivado project and starting FPGA synthesis
…
INFO: [XOCC 60-586] Created xclbin/vector_addition.hw.xilinx_aws-vu9p-f1_4ddr-xpr-2pr_4_0.xclbin
Total elapsed time: 2h 31m 7s

$(SDACCEL_DIR)/tools/create_sdaccel_afi.sh -xclbin=xclbin/vector_addition.hw.xilinx_aws-vu9p-f1_4ddr-
xpr-2pr_4_0.xclbin -o=vector_addition.hw.xilinx_aws-vu9p-f1_4ddr-xpr-2pr_4_0 -s3_bucket=jsimon-fpga
-s3_logs_key=logs -s3_dcp_key=dcp
…
Generated manifest file '17_10_02-163912_manifest.txt'
upload: ./17_10_02-163912_Developer_SDAccel_Kernel.tar to s3://jsimon-fpga/dcp/17_10_02-
163912_Developer_SDAccel_Kernel.tar17_10_02-163912_agfi_id.txt
```

Building the AFI

```
aws ec2 describe-fpga-images --fpga-image-id afi-056fb17ddb8cedf37
{    "FpgaImages": [{
      "UpdateTime": "2017-10-02T16:39:17.000Z",
      "Name": "xclbin/vector_addition.hw.xilinx_aws-vu9p-f1_4ddr-xpr-2pr_4_0.xclbin",
"FpgaImageGlobalId": "agfi-03a8031774fc4773f",
      "Public": false,
      "State": { "Code": "pending"},
      "OwnerId": "6XXXXXXXXXXX",
      "FpgaImageId": "afi-056fb17ddb8cedf37",
      "CreateTime": "2017-10-02T16:39:17.000Z",
      "Description": "xclbin/vector_addition.hw.xilinx_aws-vu9p-f1_4ddr-xpr-2pr_4_0.xclbin"           }]
}
```

Loading the AFI and running the OpenCL application

```
aws ec2 describe-fpga-images --fpga-image-id afi-056fb17ddb8cedf37
{    "FpgaImages": [{
      "UpdateTime": "2017-10-02T16:39:17.000Z",
      "Name": "xclbin/vector_addition.hw.xilinx_aws-vu9p-f1_4ddr-xpr-2pr_4_0.xclbin",
"FpgaImageGlobalId": "agfi-03a8031774fc4773f",
      "Public": false,
      "State": { "Code": "ready"},
      "OwnerId": "6XXXXXXXXXXX",
      "FpgaImageId": "afi-056fb17ddb8cedf37",
      "CreateTime": "2017-10-02T16:39:17.000Z",
      "Description": "xclbin/vector_addition.hw.xilinx_aws-vu9p-f1_4ddr-xpr-2pr_4_0.xclbin"           }]
}

sudo fpga-load-local-image -S 0 -I agfi-03a8031774fc4773f
sudo fpga-describe-local-image -S 0

sudo sh
source /opt/Xilinx/SDx/2017.1.rte/setup.sh
./helloworld

sudo fpga-clear-local-image  -S 0
```

Demo: video encoding on F1 instance

Resources

https://aws.amazon.com/ec2/instance-types/f1
https://aws.amazon.com/ec2/instance-types/f1/partners/

https://github.com/aws/aws-fpga

https://github.com/aws/aws-fpga/blob/master/SDAccel/README.md

https://github.com/awslabs/aws-fpga-app-notes/tree/master/reInvent17_Developer_Workshop

Thank you!

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