



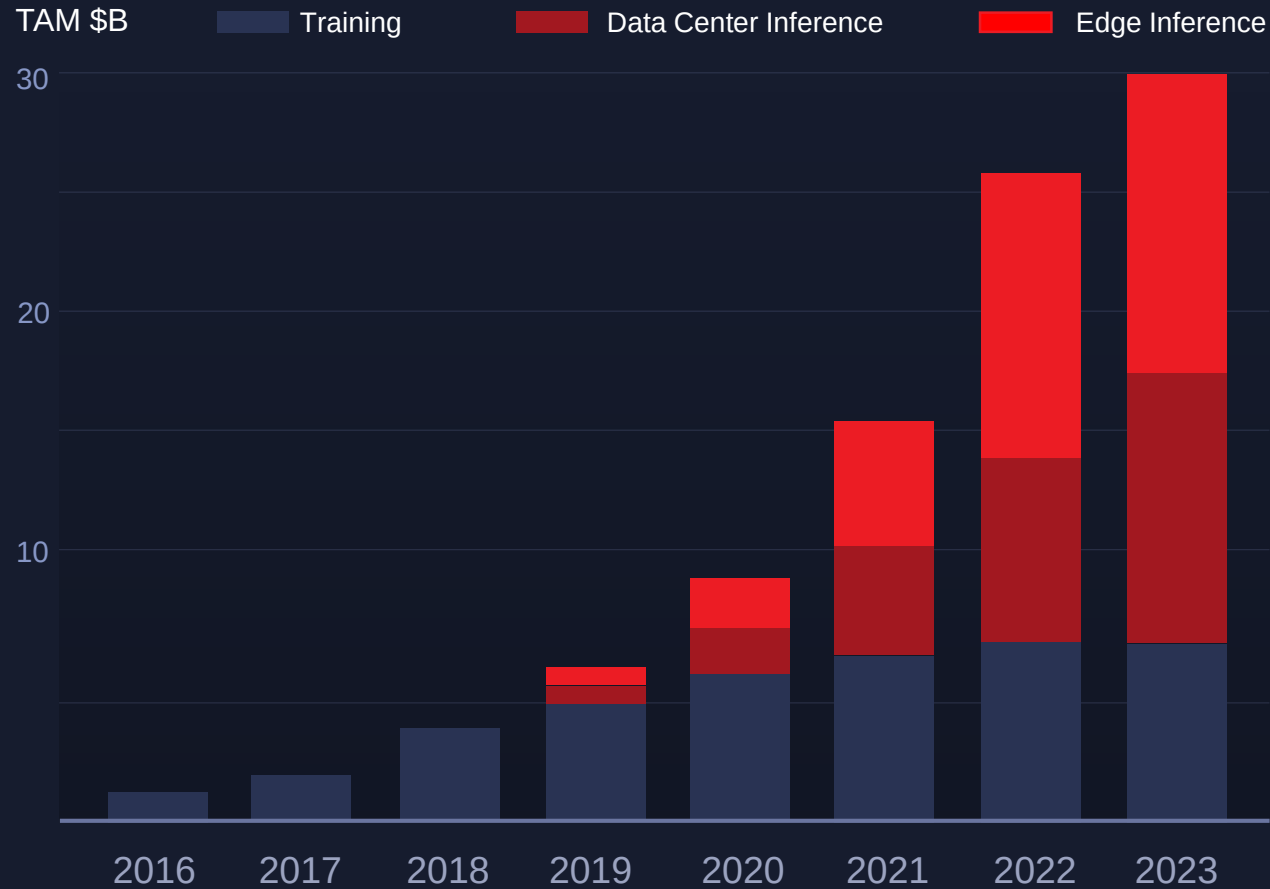
Adaptive Compute Acceleration Platforms Powering the AI Era

Ramine Roane
Vice President, Software and AI Marketing
October 9, 2019

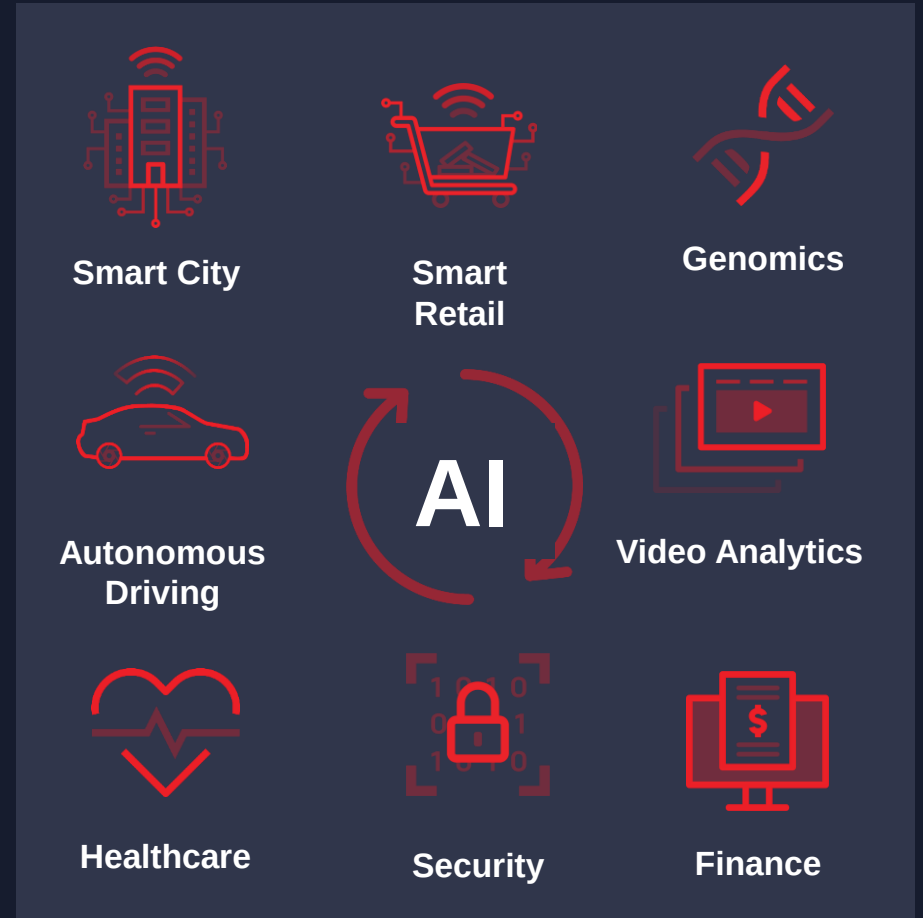
Technology is Making the World a Better Place



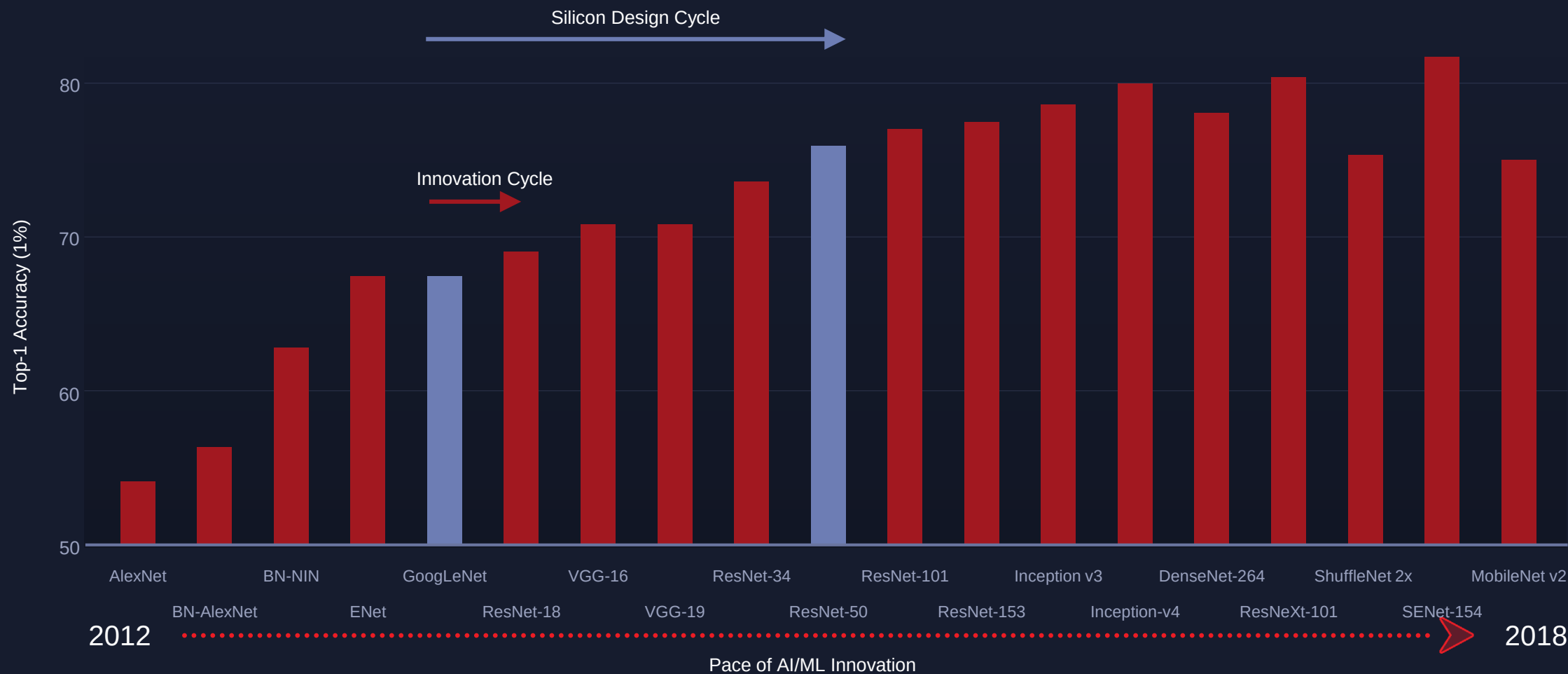
AI Inference Explosion from Cloud to Edge



Barclays Research, Company Reports May 2018

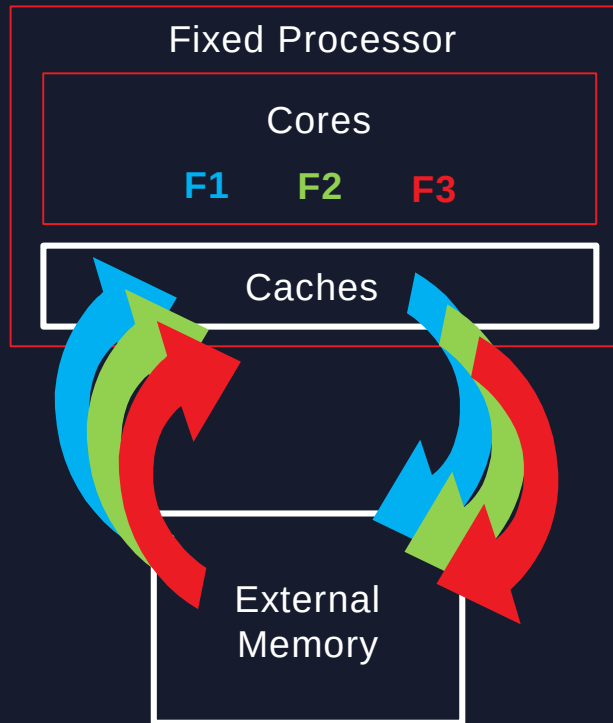


AI Innovation Outpaces Silicon Design Cycles

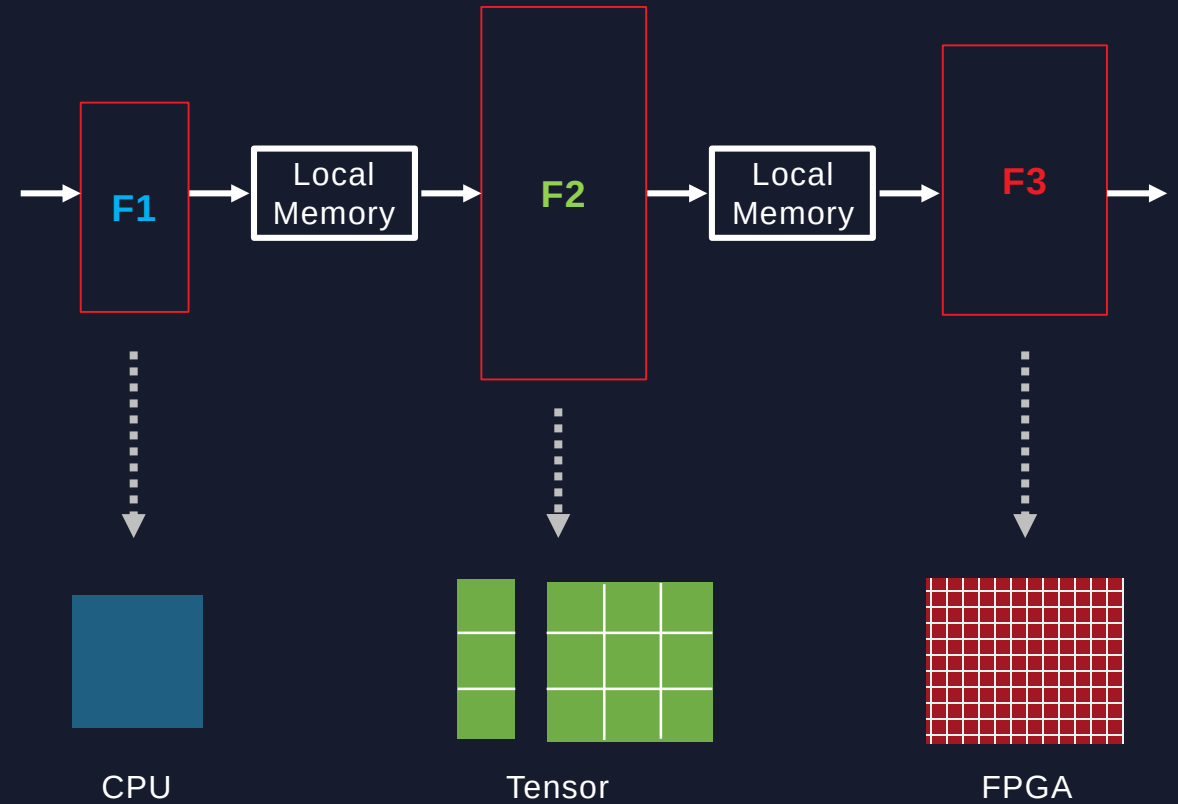


Heterogeneous AND Adaptive Compute is Needed

Fixed Compute

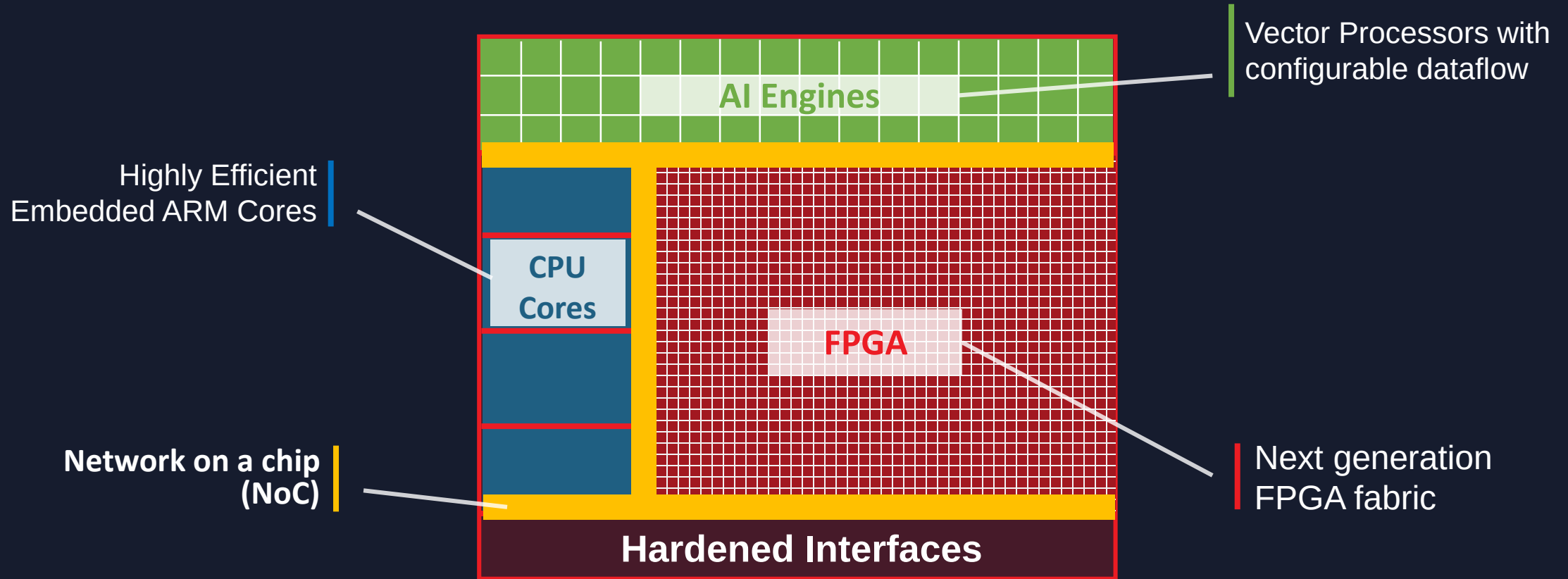


Adaptive Compute



Heterogeneous Engines

Adaptive Compute Acceleration Platform (ACAP)

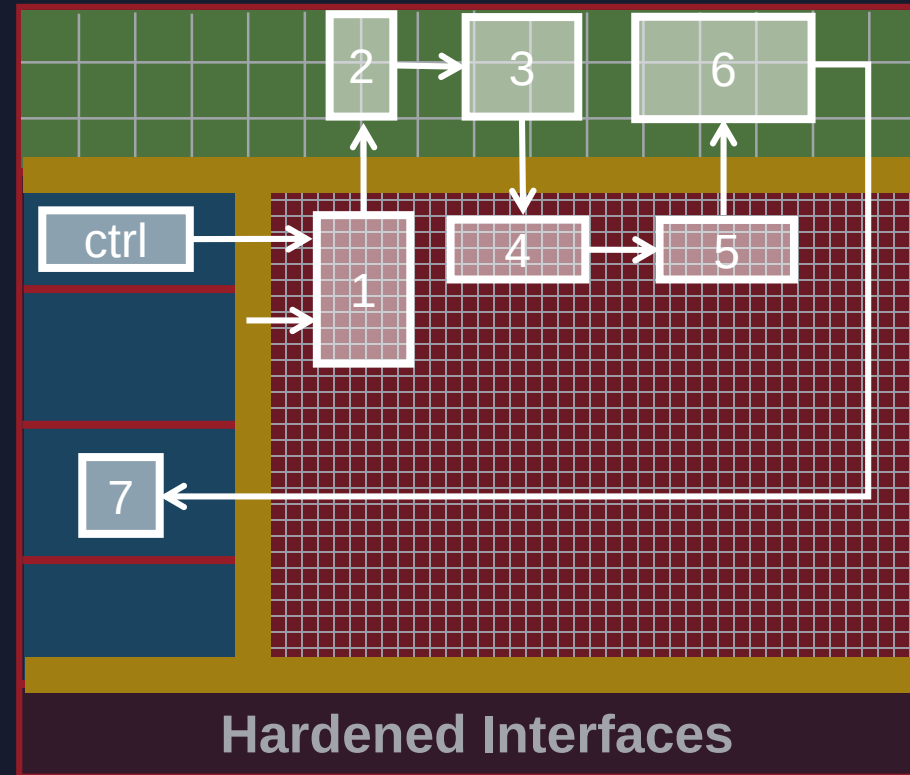


Versal (first ACAP): 36B Transistors – 7nm Process

Adaptive Compute Acceleration Platform (ACAP)

Highly Efficient
Embedded ARM Cores

Network on a chip
(NoC)

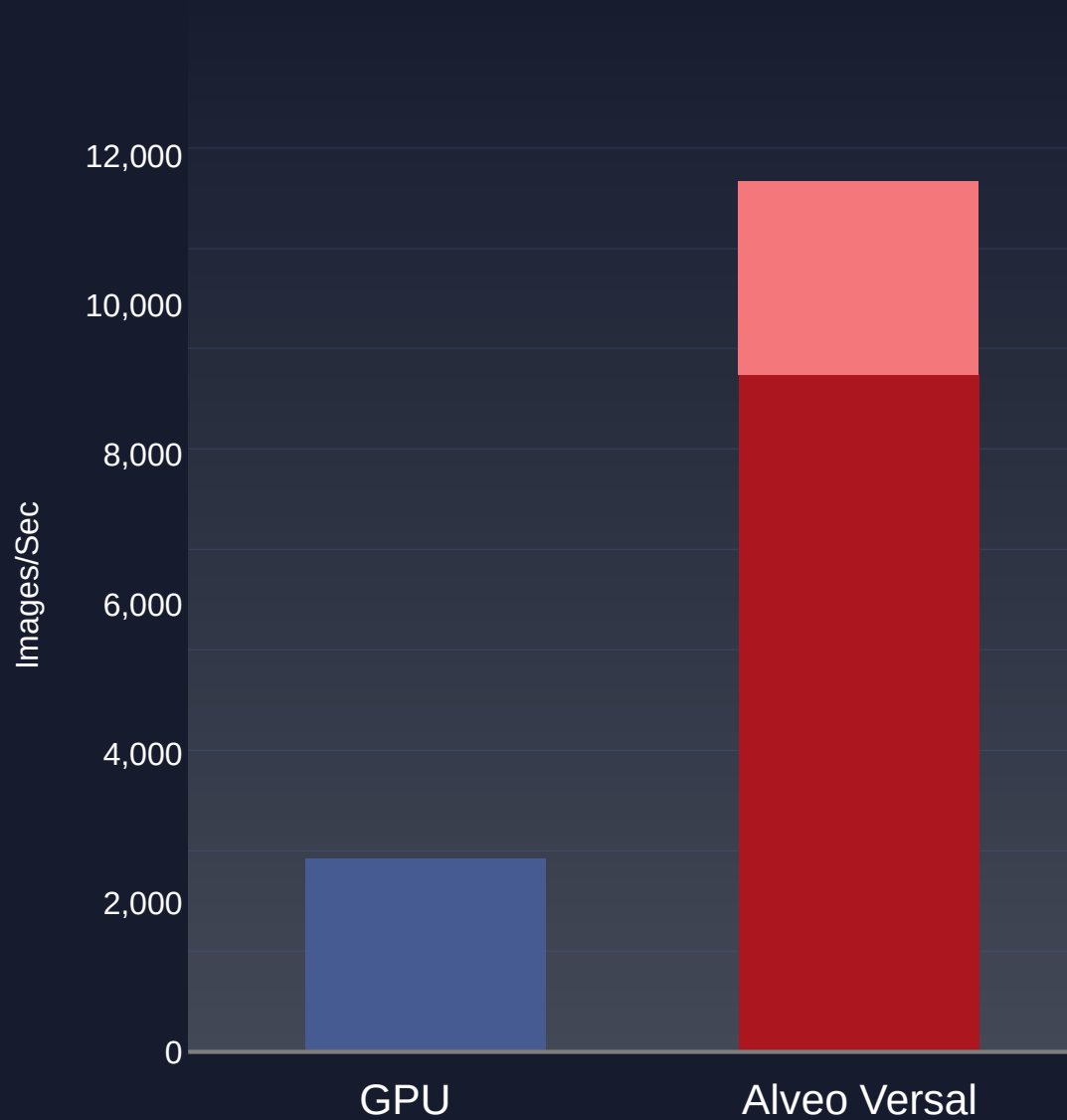


Vector Processors with
configurable dataflow

Next generation
FPGA fabric

Custom Dataflow & Memory Hierarchy

ACAP AI Inference Performance (Resnet50)



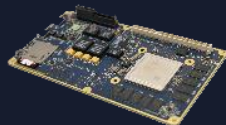
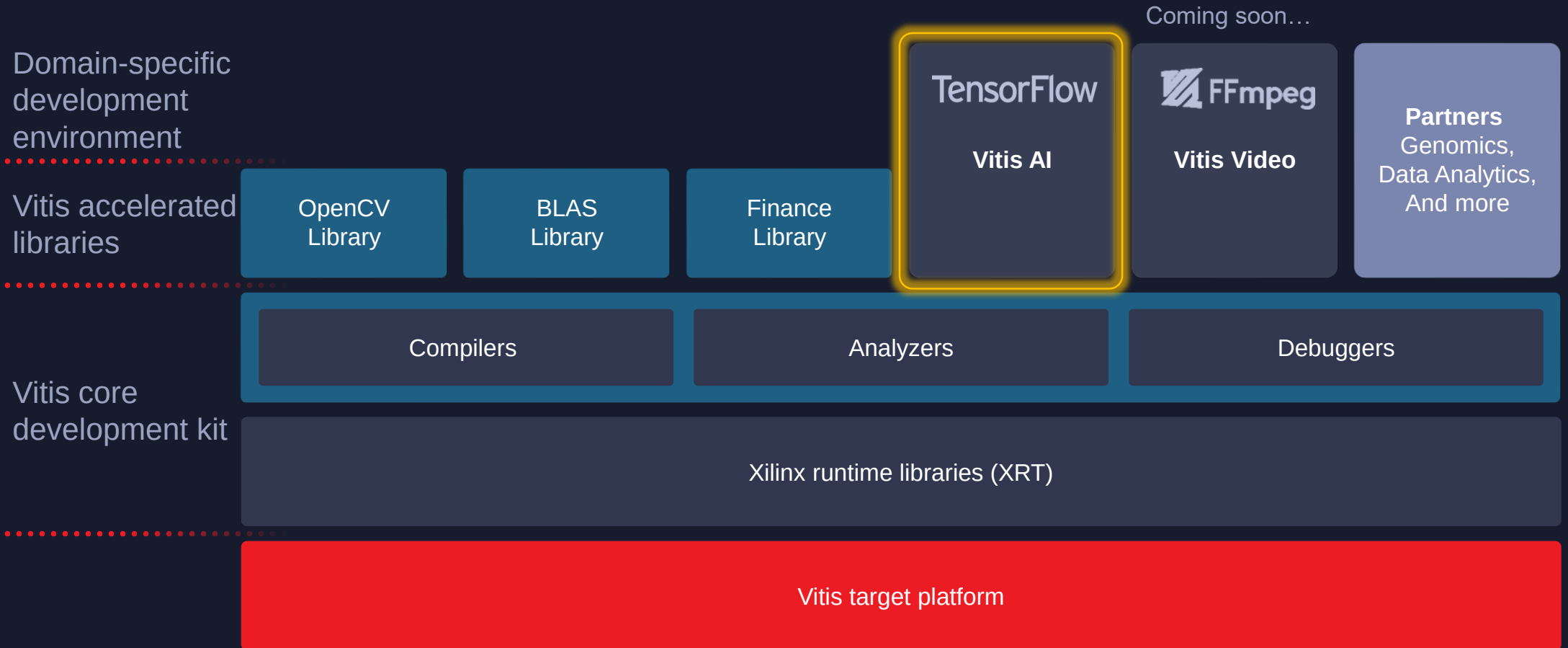
With Pruning

Sources:

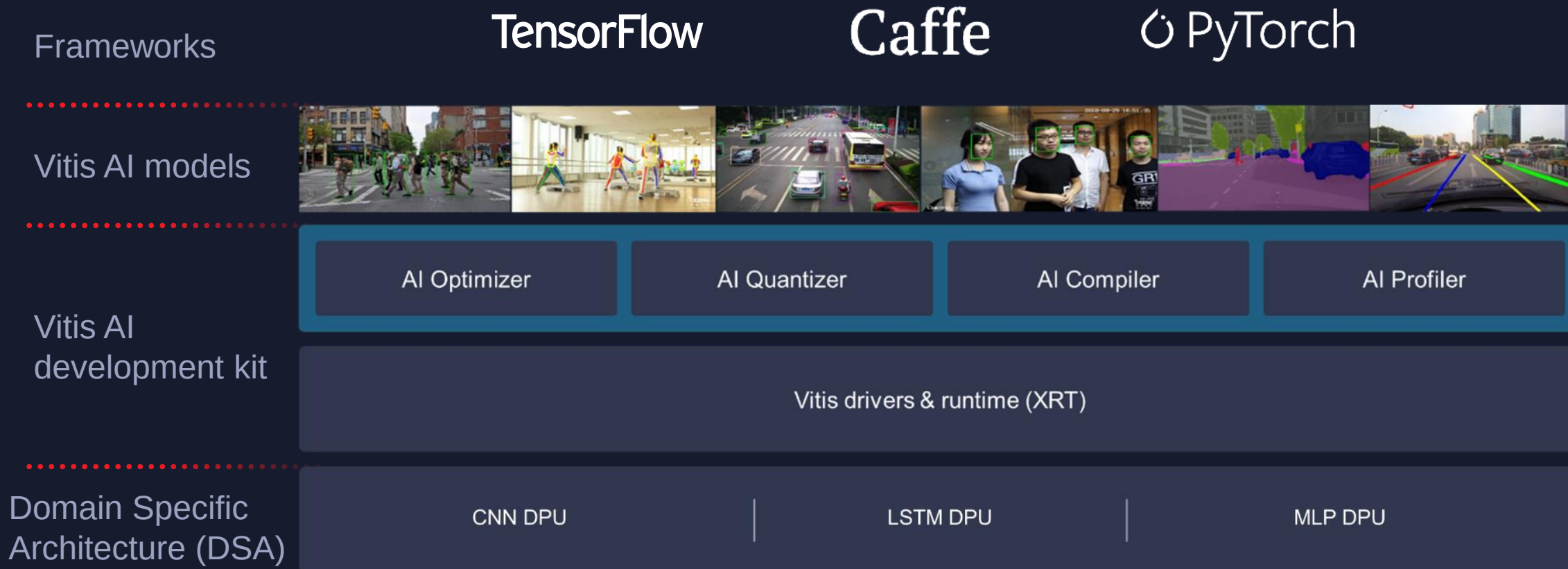
GPU: Nvidia T4 TensorRT 5,
Published March 2019
(INT8 Performance at 1.5ms Latency)

Alveo Versal Card, Projected
(INT8 Performance at 1.5ms Latency)

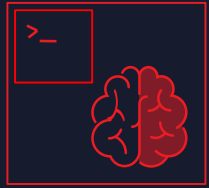
Vitis: Unified Software Platform



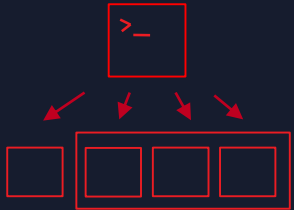
Vitis AI: Deep Learning Acceleration Stack



Vitis AI Compilation Flow



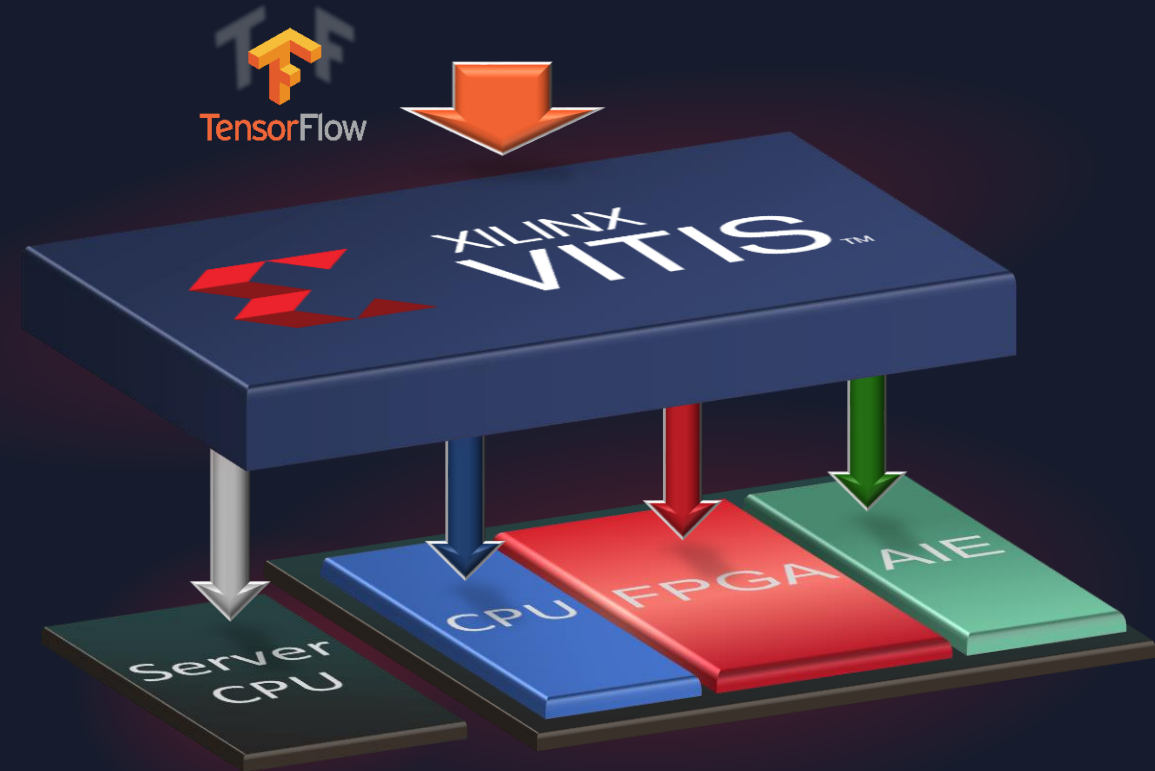
AI Optimization for Inference



Heterogeneous Acceleration



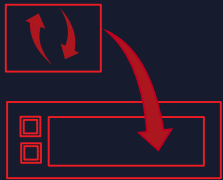
High Throughput at Low Latency



Vitis AI Compilation Flow



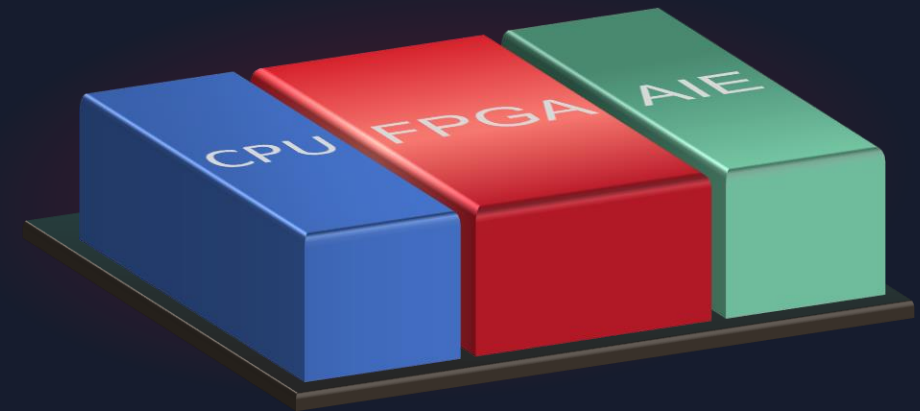
Domain-specific Processing Unit (DPU)



Direct Framework Compilation



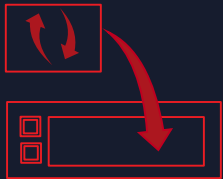
Compile in Minutes or Less



Vitis AI Compilation Flow



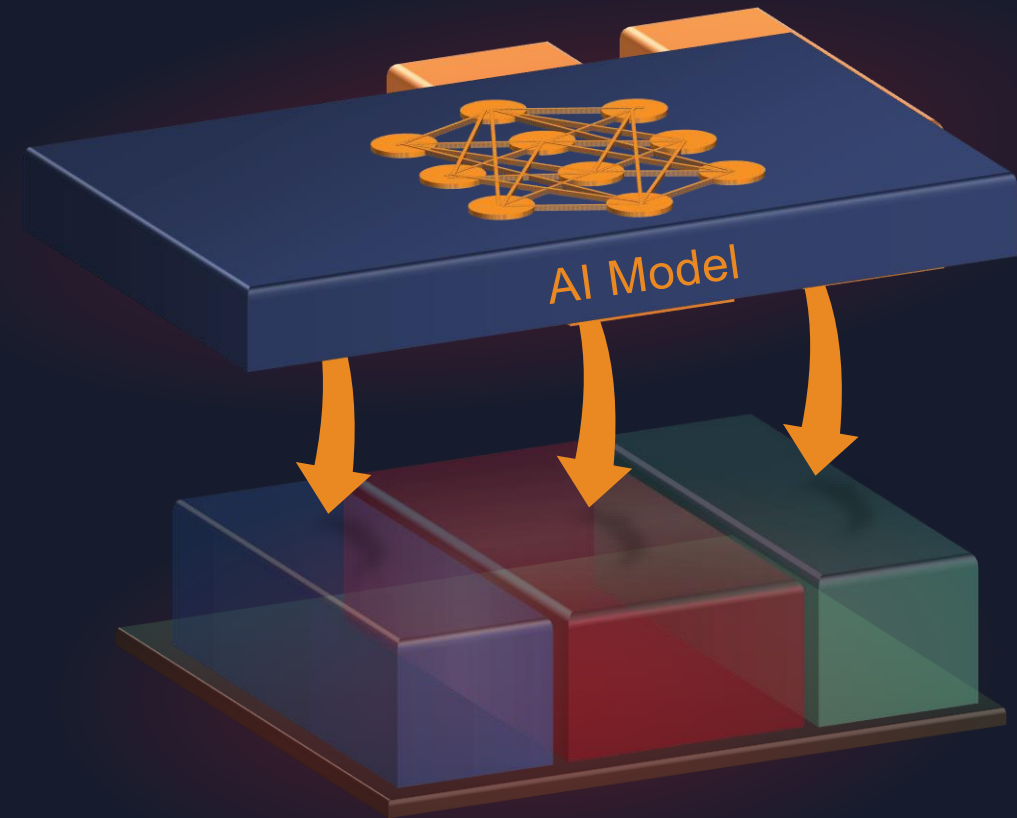
Domain-specific Processing Unit (DPU)



Direct Framework Compilation



Compile in Minutes or Less



Example: Domain Specific Servers



Thirty E5 Servers



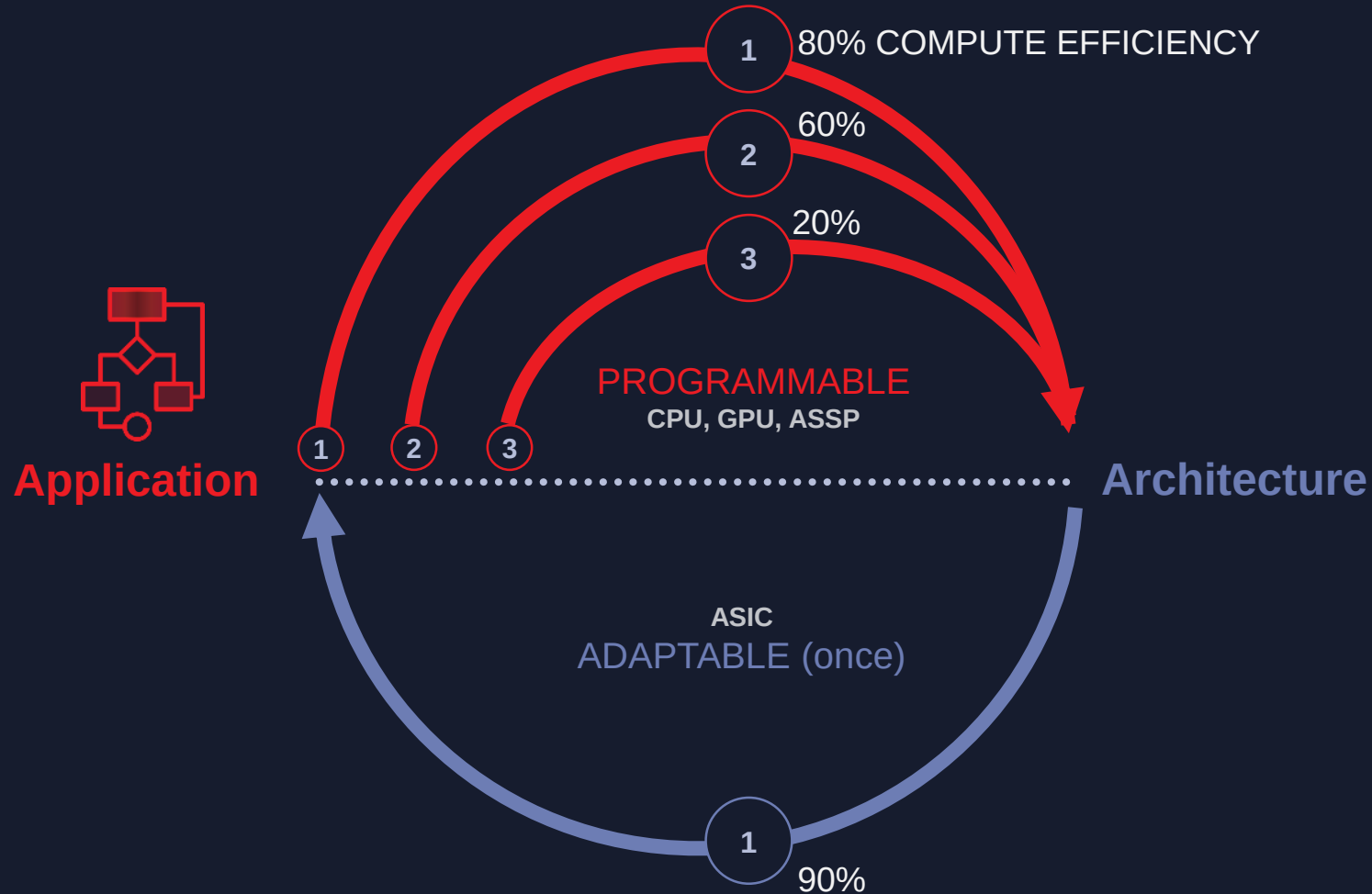
One Aup2603
(48 Xilinx ZU7EV devices)



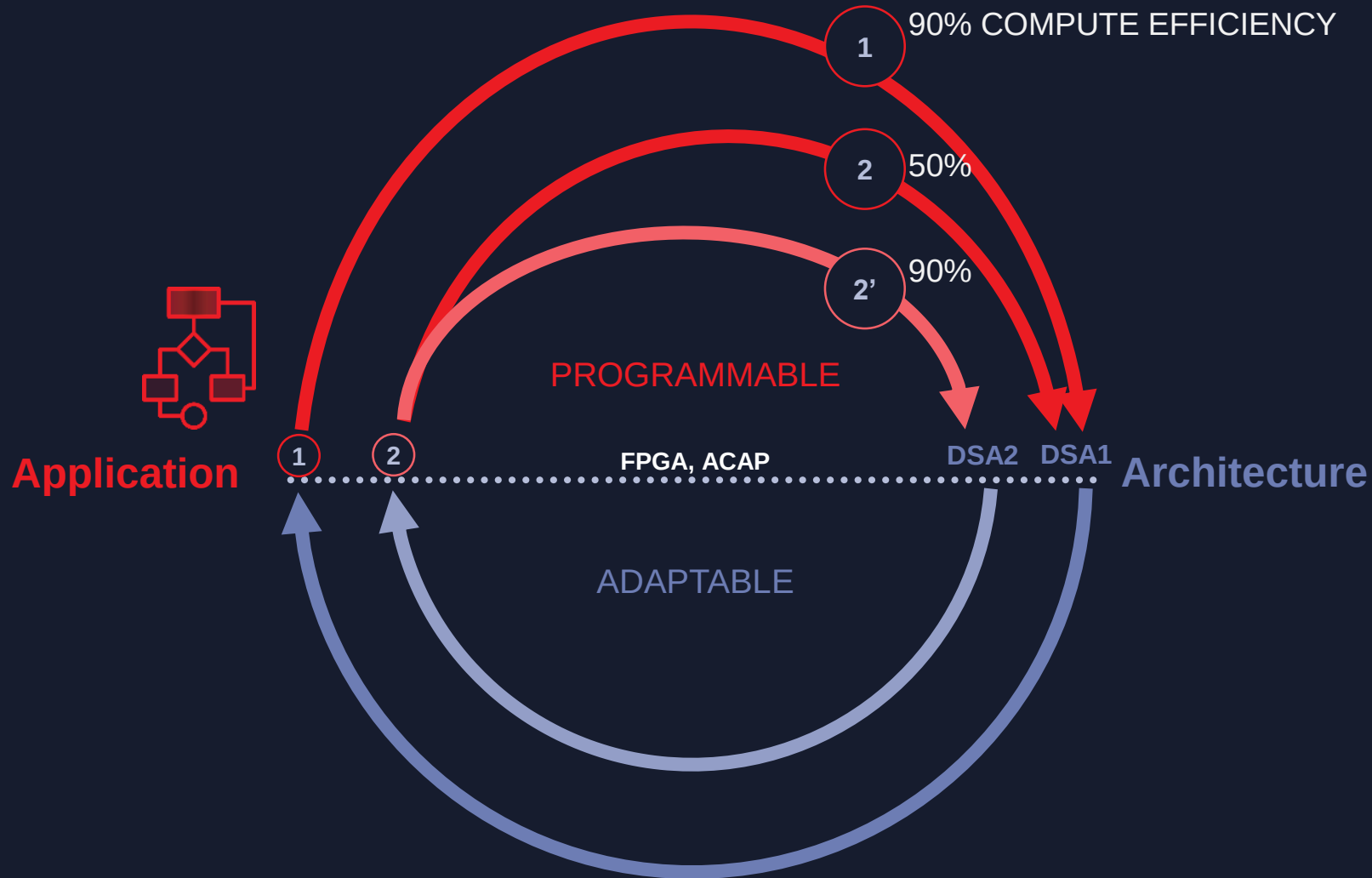
10X Energy Reduction
3.3X Performance Increase



Traditional Computing: Programmable OR Adaptable



New Era: Programmable AND Adaptable



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Enabling the AI Era with ACAPs & the Vitis Development Platform
