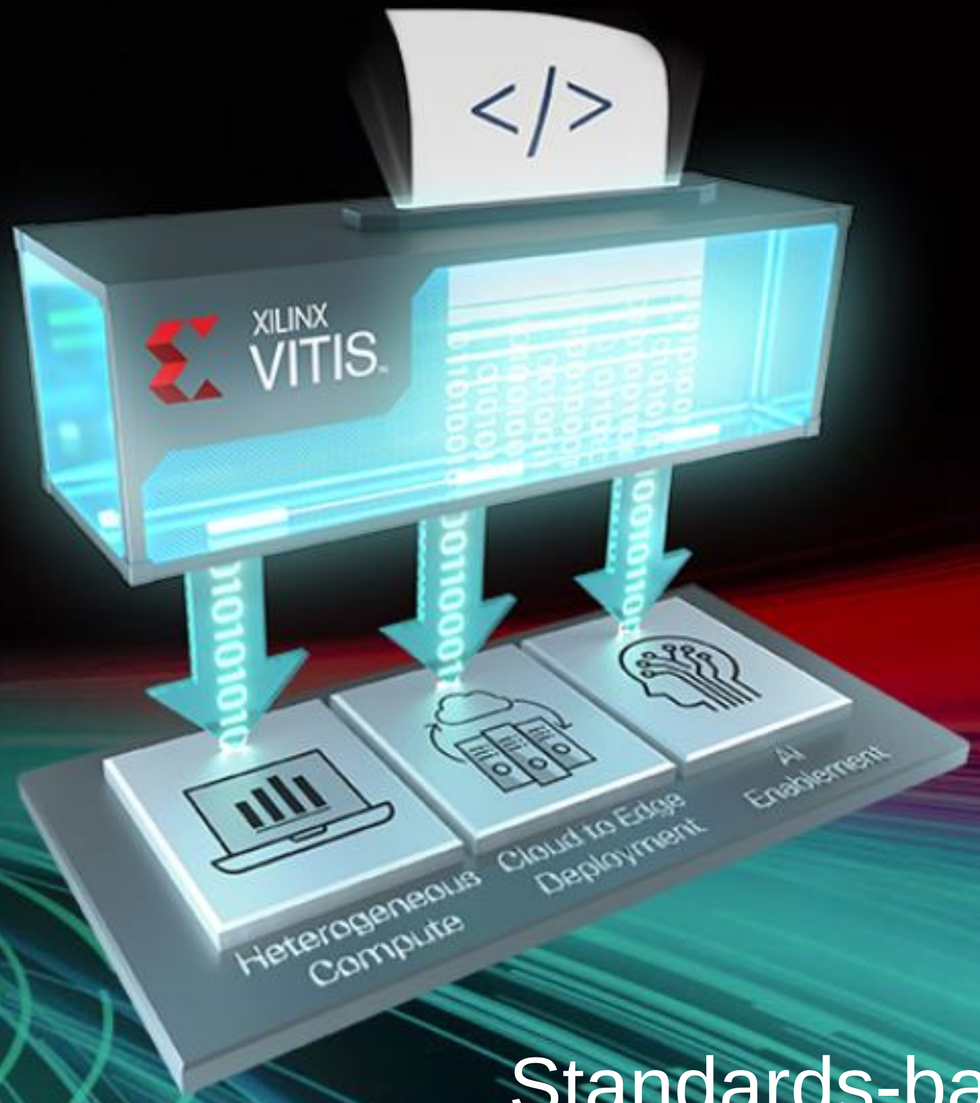
Introducing the Vitis Unified Software Platform

Ramine Roane
VP Software & AI Product Management



XILINX
VITIS™

Unified Software Platform
for all developers

NOW AVAILABLE FOR DOWNLOAD

Standards-based Open Free

VITAL

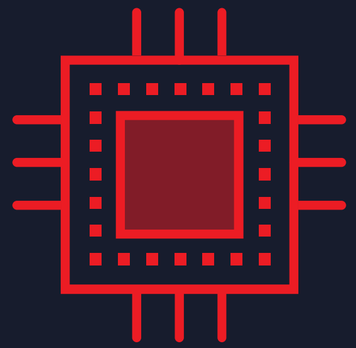
VITALITY

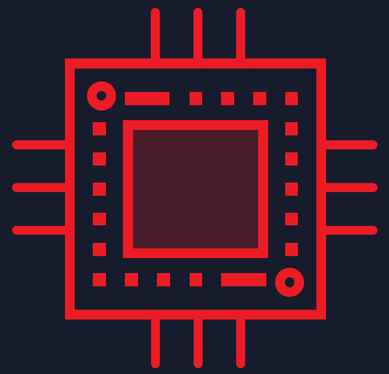
The Next Wave Of Computing

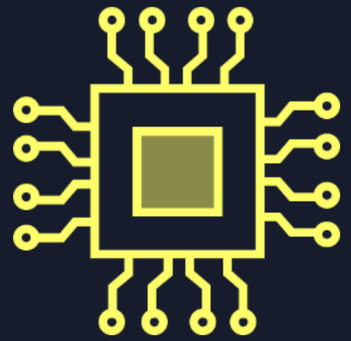
1980-2000
2x/ 1.5y
Si process → Dennard scaling

2000-2010
2x/ 3.5y
Multithreading → Amdahl's law

2010-2020
2x/ 10y
Density → Moore's law







CPU

DOMAIN SPECIFIC ACCELERATOR

ADAPTIVE PLATFORM

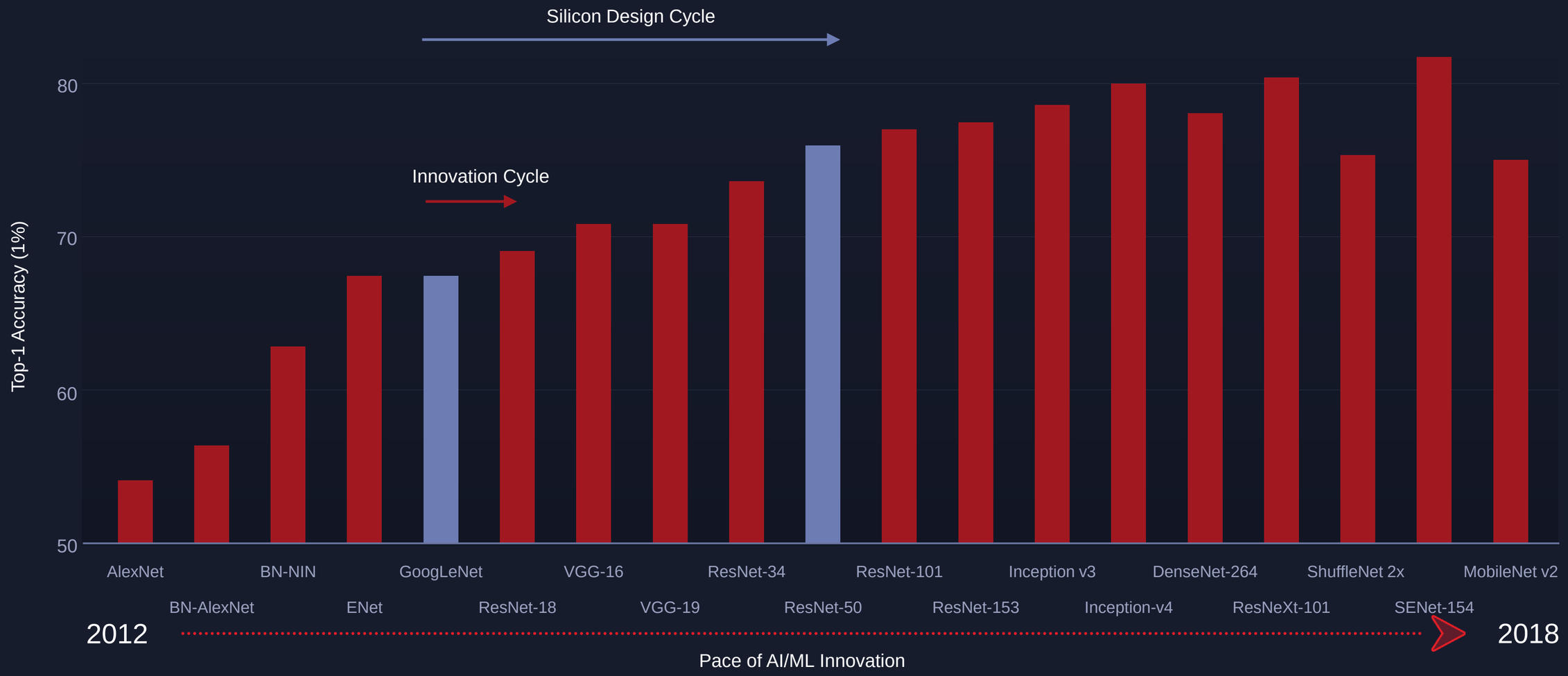
> Fixed Hardware Architecture

> Software Programmable

> Adaptive Hardware Architecture

> Software & Hardware Programmable

AI Innovation Outpaces Silicon Design Cycles



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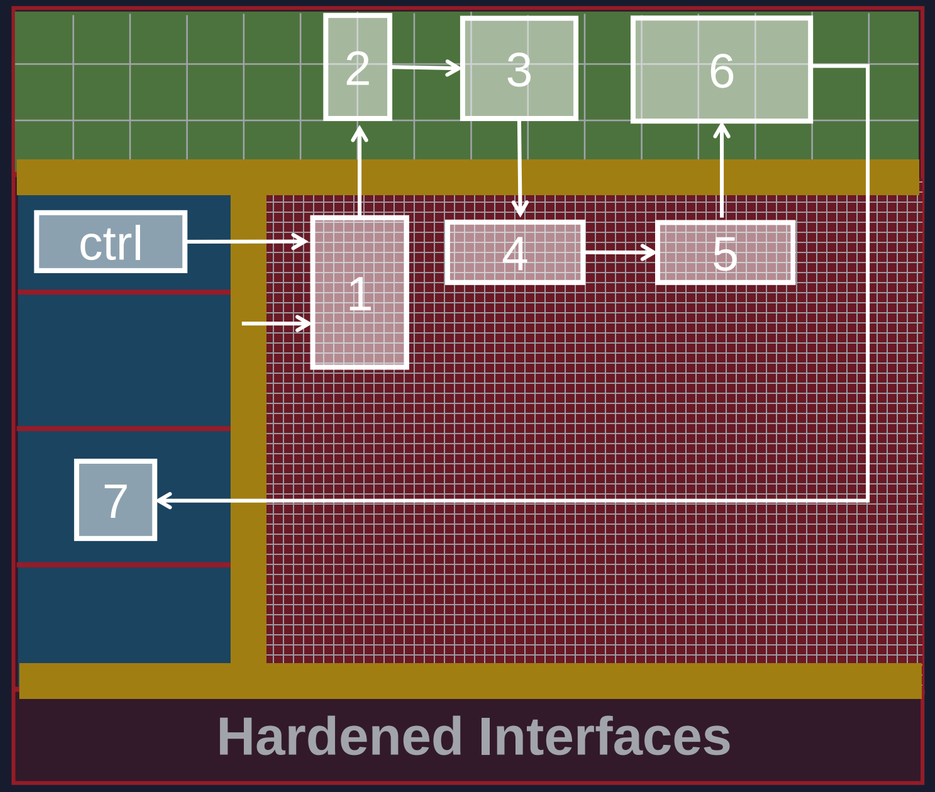
Adaptive Compute Acceleration Platform

Embedded ARM Cores sub-system

Network on a chip (NoC)



Vector Processors with configurable dataflow

FPGA fabric for custom logic & memory

Application-Specific Dataflow & Memory Hierarchy

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Building The Adaptable Intelligent World

Medical Treatment Acceleration

illumina®

- Genome analysis of critically ill newborns
- Analysis reduced from 1 day to 20 minutes

Automotive Safety with Artificial Intelligence

DAIMLER

- Accelerate AI for fast decision making
- Flexibility to adapt hardware for new AI

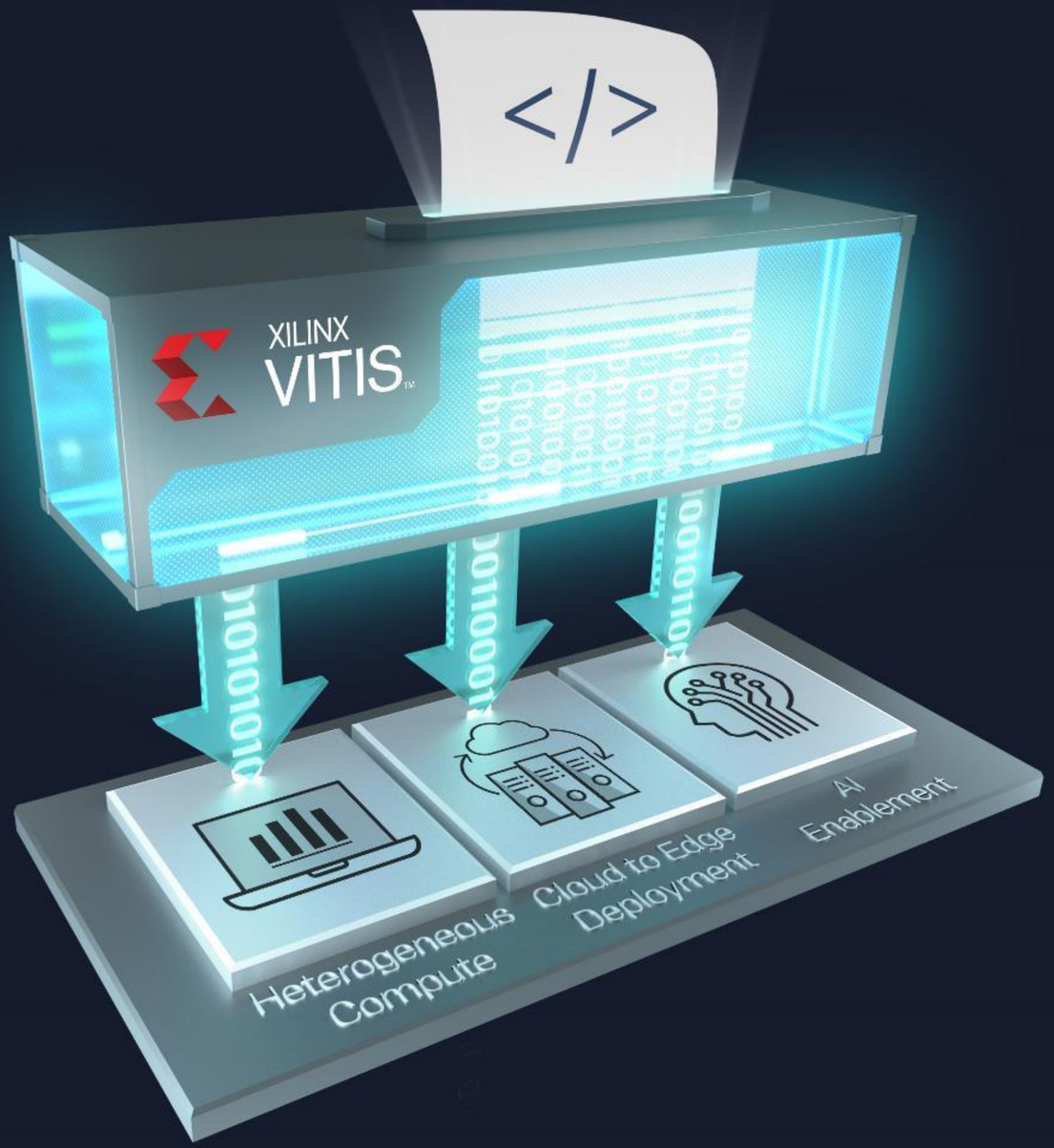
Big data Analytics

CERN

- Rapid analysis of proton collision debris
- Resulted in discovery of the Higgs Boson

XILINX VITIS™

Empowering Software & AI Developers



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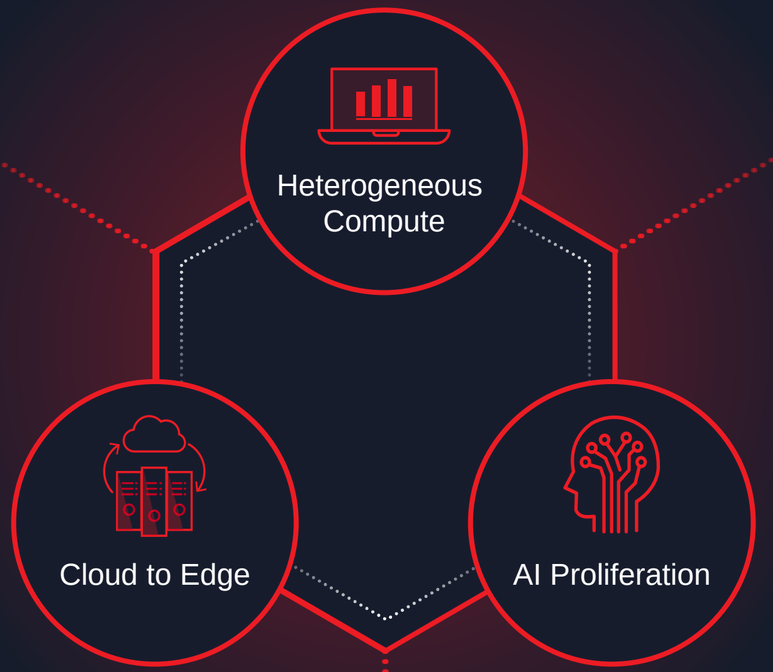
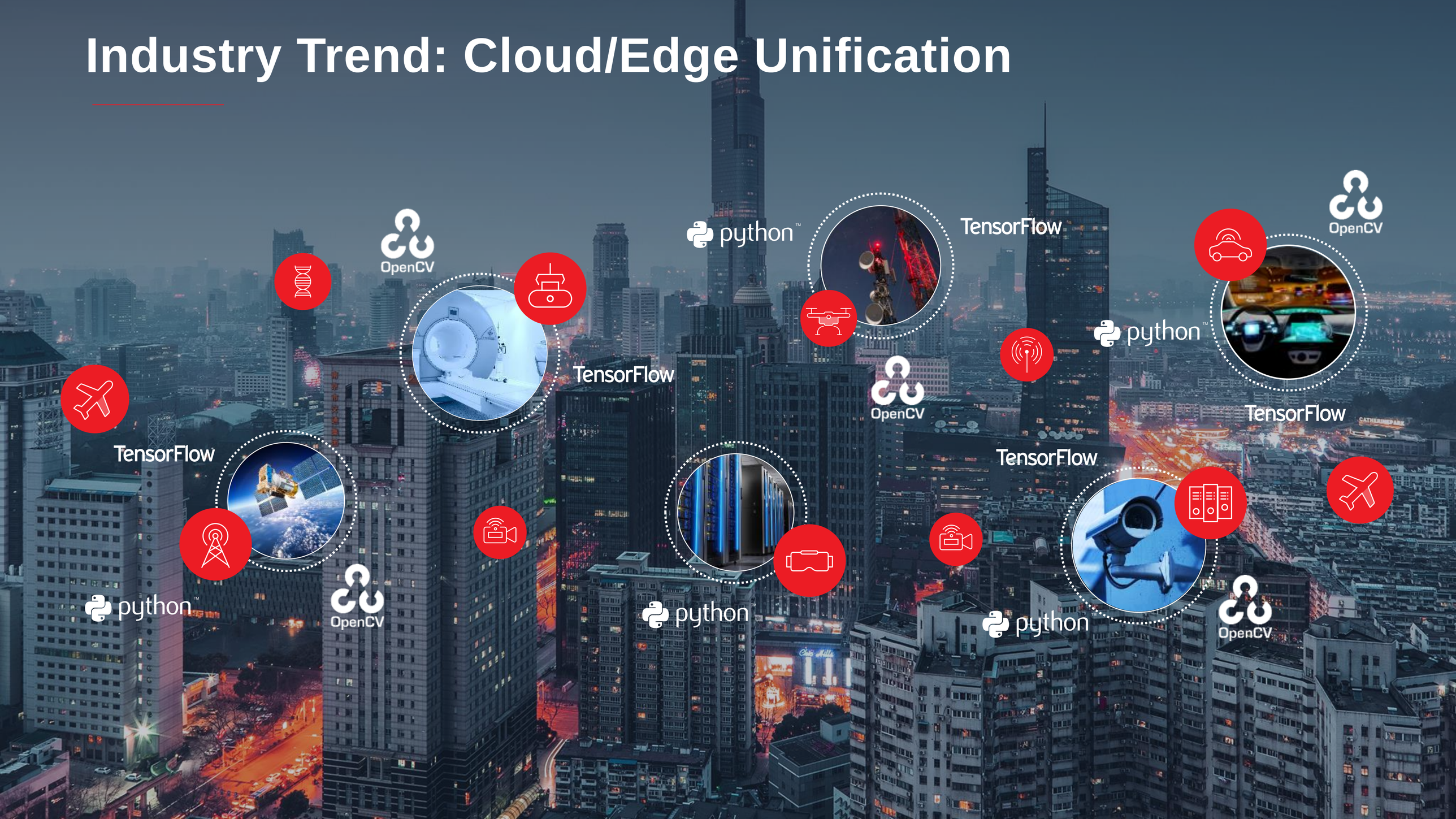
Industry Trends



Industry Trend: Cloud/Edge Unification



Industry Trend: AI Proliferation

Smart City

Smart Retail

Autonomous Driving

Security

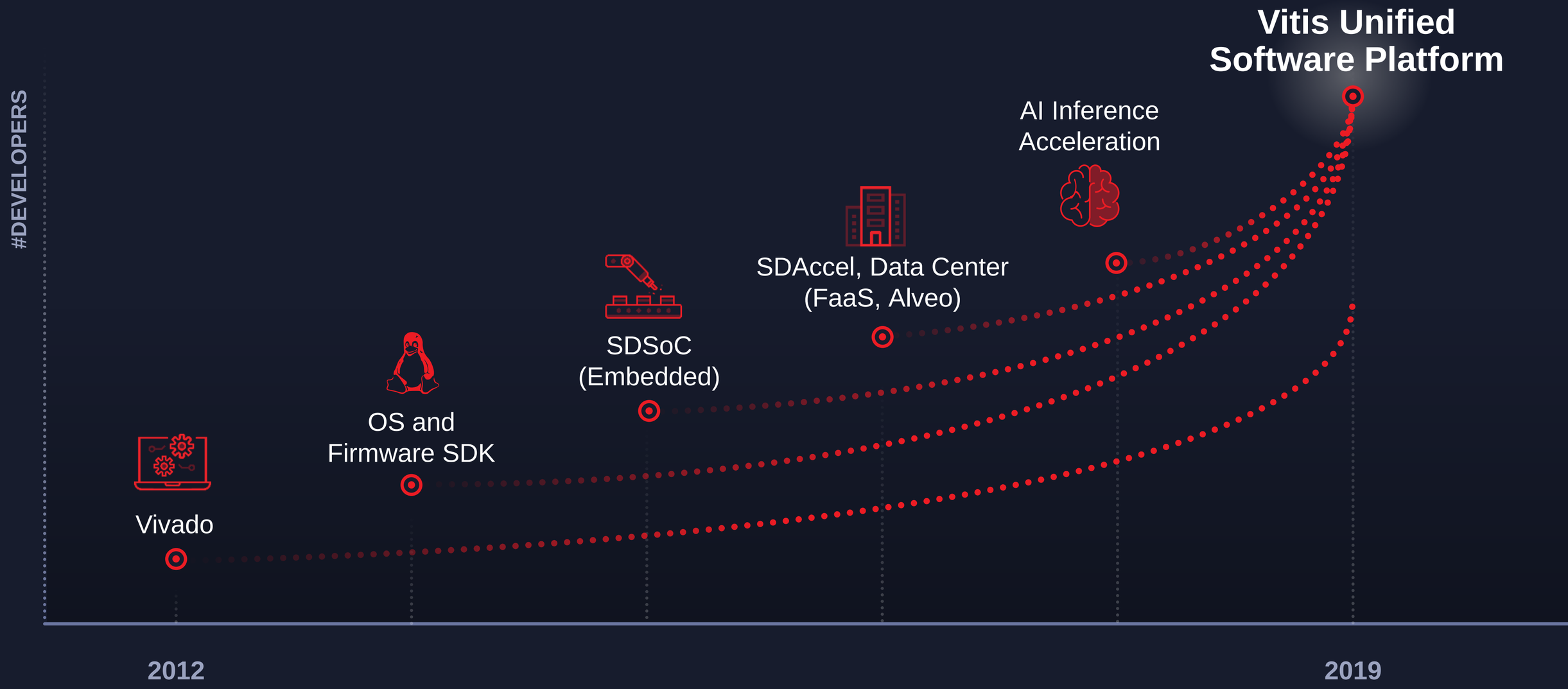
Genomics

Video Analytics

Healthcare

Finance

Platform Transformation



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Vitis: Unified Software Platform

Coming soon…

Domain-specific development environment

Vitis accelerated libraries

Vitis core development kit

OpenCV Library

BLAS Library

Finance Library

TensorFlow

Vitis AI

FFmpeg

Vitis Video

Partners
Genomics, Data Analytics, And more

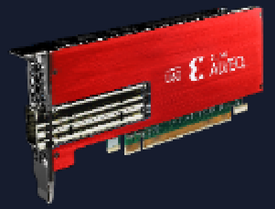
Compilers

Analyzers

Debuggers

Xilinx runtime libraries (XRT)

Vitis target platform



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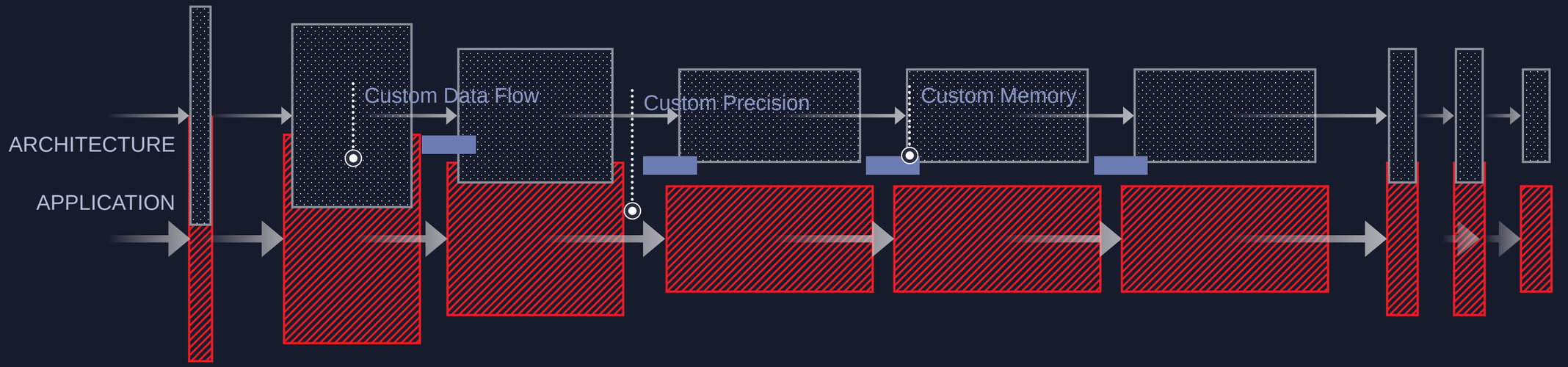
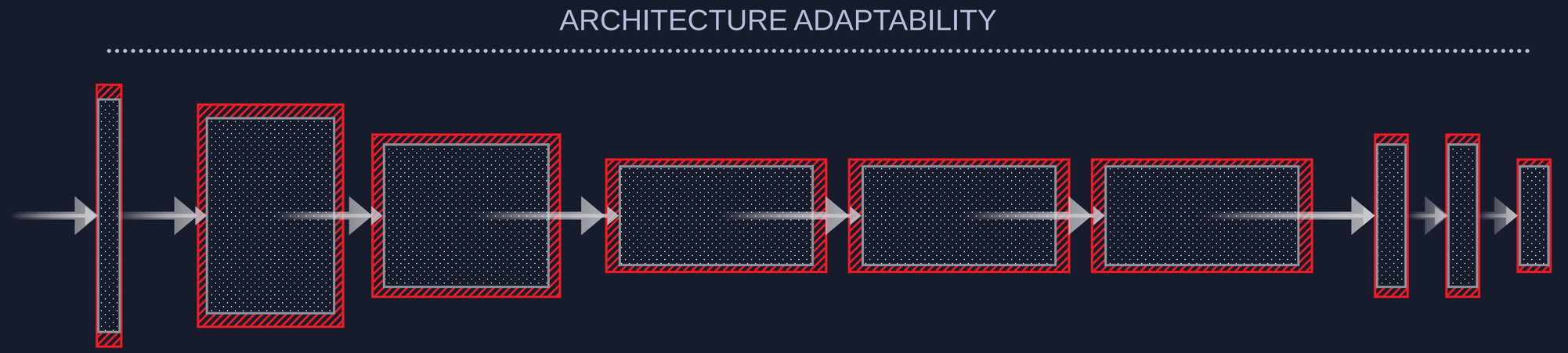
Domain Specific Architecture



Domain Specific Architecture



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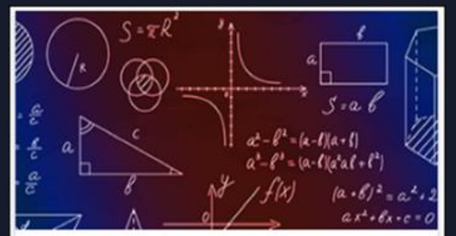
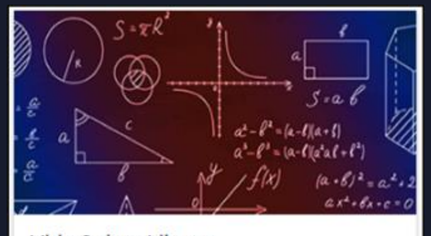
Extensive Open Source Libraries

400+ functions across 8 libraries
Open source, performance-optimized out-of-the-box acceleration

GitHub

- Library
  - Docs
    - Source
    - Tests
    - Examples
    - Benchmarks


Vitis BLAS Library **25 functions**


Vitis Solver Library **12**

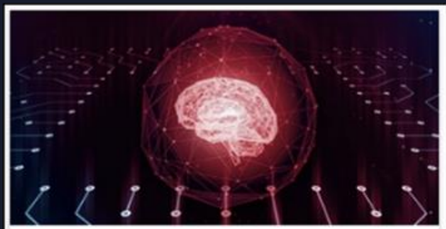

Vitis Security Library **99**


Vitis Vision Library **114**


Vitis Data Compression Library **25**


Vitis Quantitative Finance Library **55**

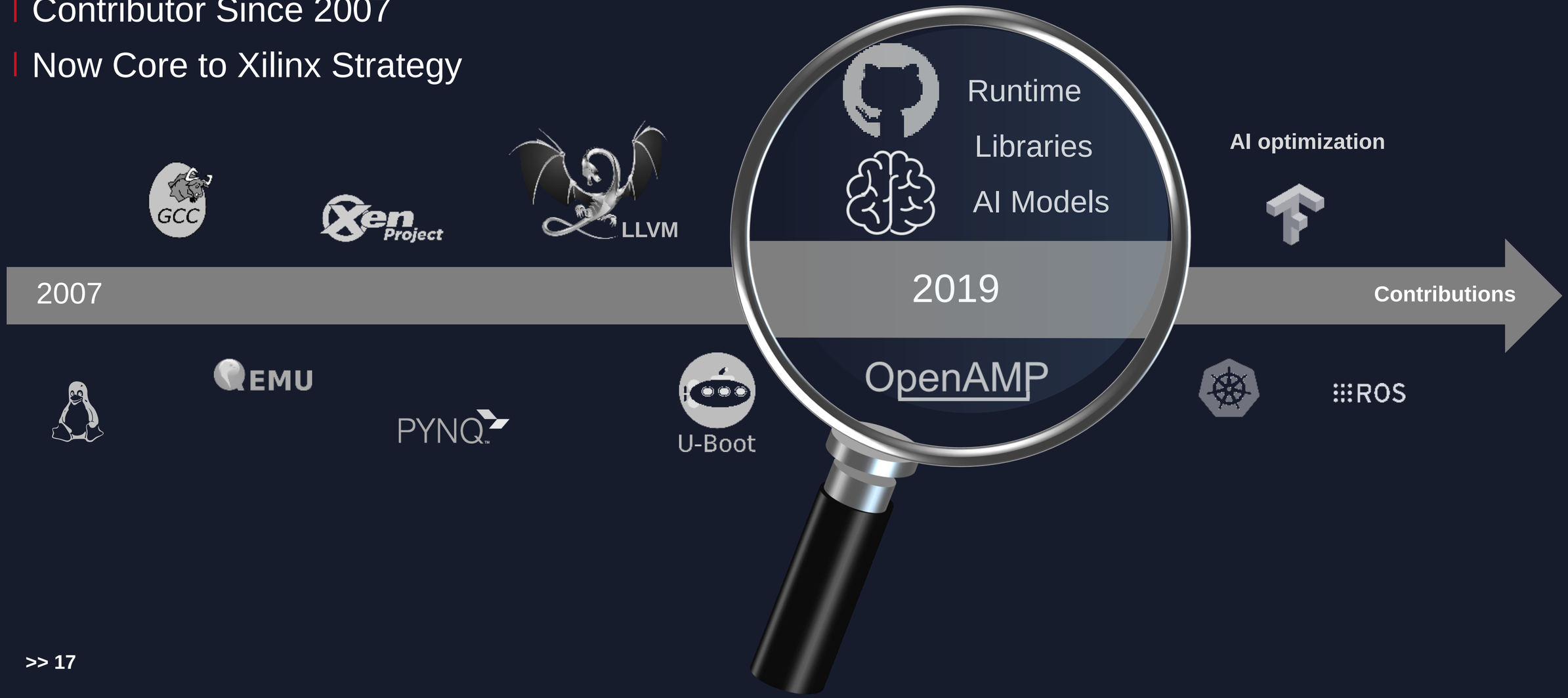

Vitis Database Library **36**


Vitis AI Library **37 Models**

XILINX.

Committed to Open Source

- User Since 2001
- Contributor Since 2007
- Now Core to Xilinx Strategy



Deep Learning vs. Traditional Software

Deep Blue (traditional software)
beats Garry Kasparov

Complexity: 10^120

IBM Watson becomes
Jeopardy champion!

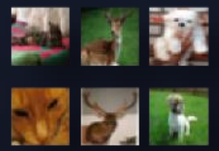


Image
classification

Classification
better than humans

AlphaGo beats
Lee Sedol

AlphaZero
chess champion!

ADAS

Robo-taxis
(geofenced)

Fully
autonomous
vehicles

1997 2004 2009 2014 2019 2024

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Vitis AI

Coming soon…

Domain-specific development environment

Vitis accelerated libraries

Vitis core development kit

OpenCV Library

BLAS Library

Finance Library

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Vitis AI

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Genomics, Data Analytics, And more

Compilers

Analyzers

Debuggers

Xilinx runtime library (XRT)

Vitis target platform

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Vitis AI: Deep Learning Acceleration Stack

Frameworks

TensorFlow Caffe PyTorch

Vitis AI models

Vitis AI development kit

AI Optimizer | AI Quantizer | AI Compiler | AI Profiler

Vitis drivers & runtime (XRT)

Domain Specific Architecture (DSA)

CNN DPU | LSTM DPU | MLP DPU

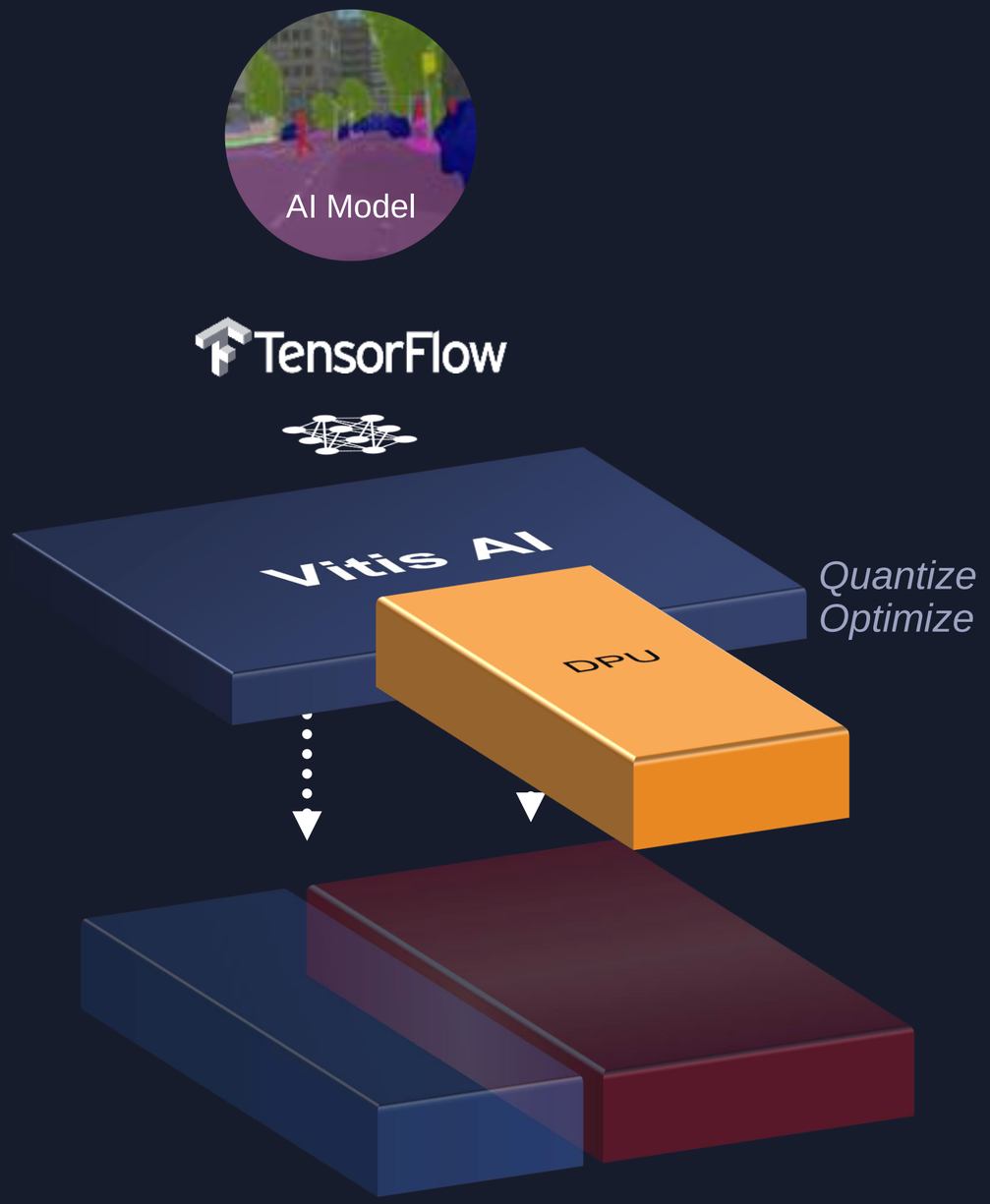
DSA for Deep Learning

Rapid Iterations from TensorFlow

DNN Processing Unit (DPU)

Direct Framework Compilation

Minutes of Compile Times



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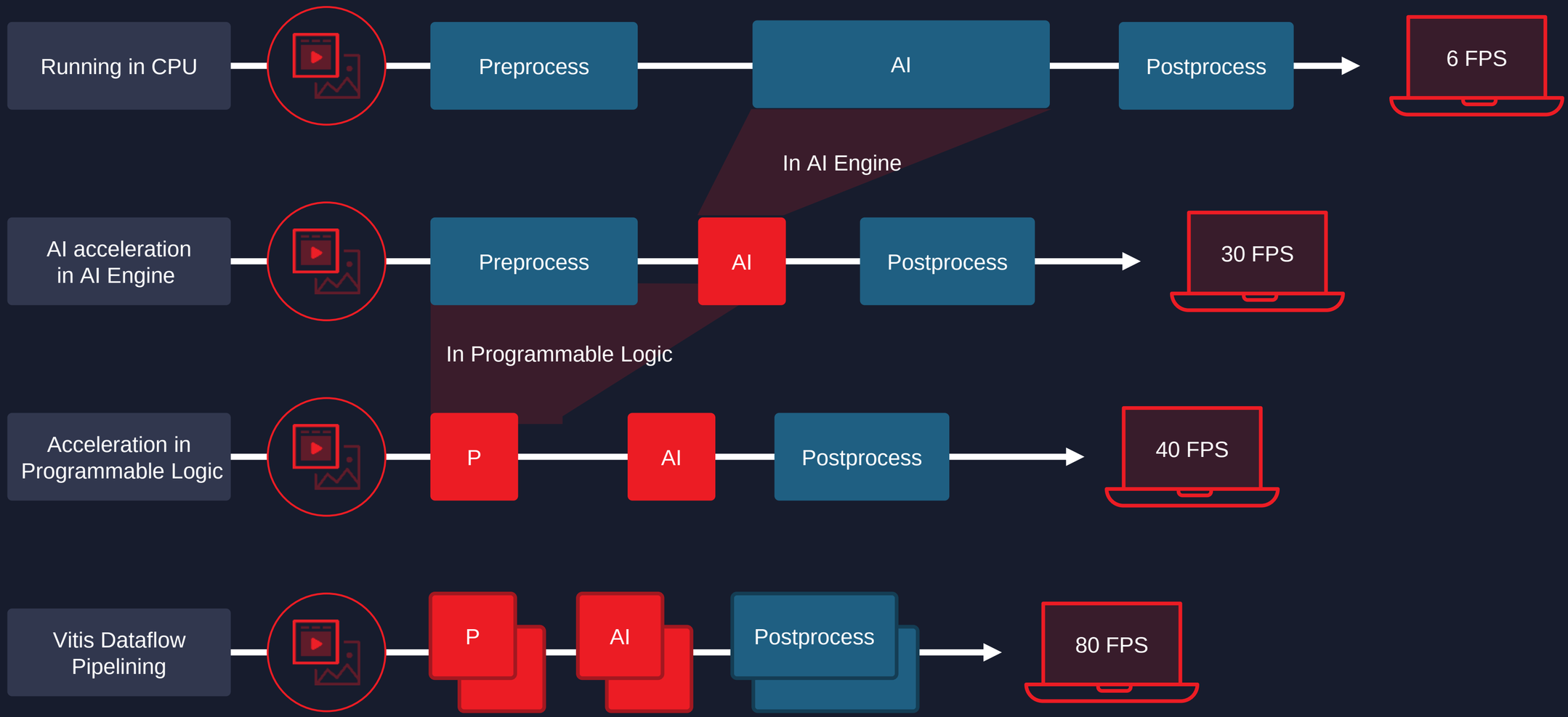
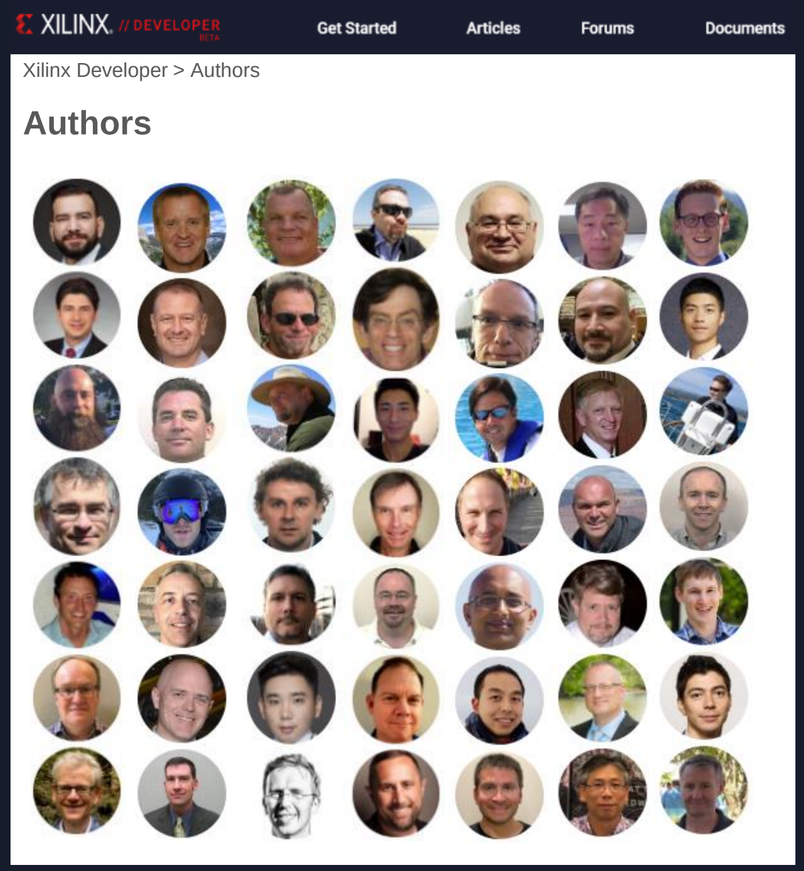
Vitis Application Example: Smart City

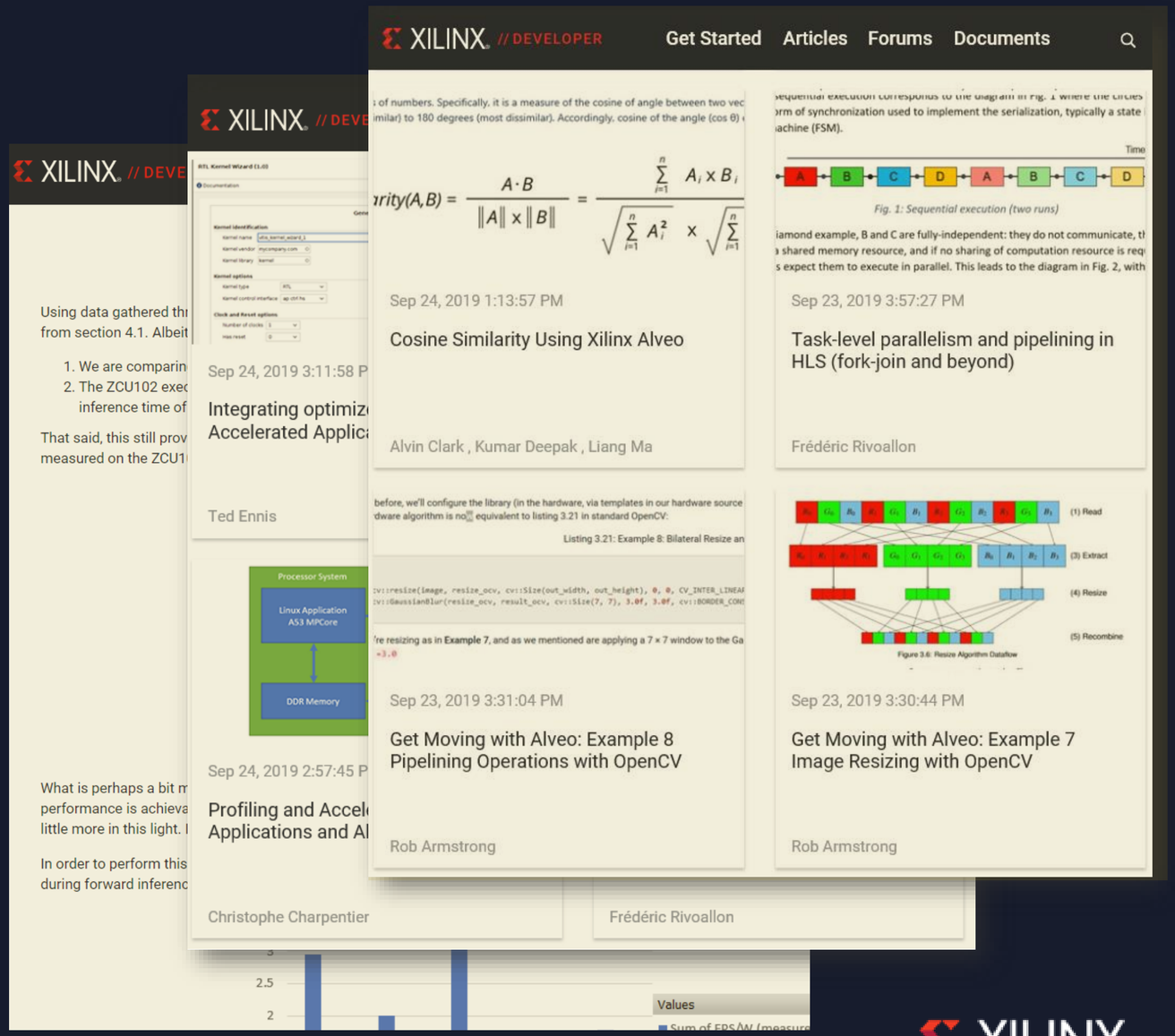
Adaptive Architecture for Smart City Application



Developer.xilinx.com

Easy Access to Examples, Tutorials, Documentation
1500+ Page Views Per Day





Connecting developers to experts
30+ Expert Articles & Projects And Growing
Covering 9 Segments

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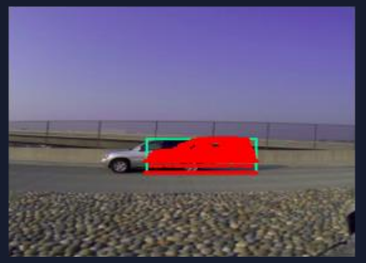
Vitis Early Access Customers

Watson / Power AI Vision

Amazon Sagemaker

Autonomous Drive

Without FPGA Sensor Fusion

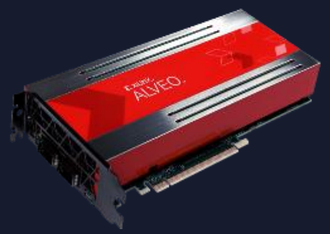


With Xilinx FPGA Sensor Fusion

Automotive AI

Microsoft Azure FaaS

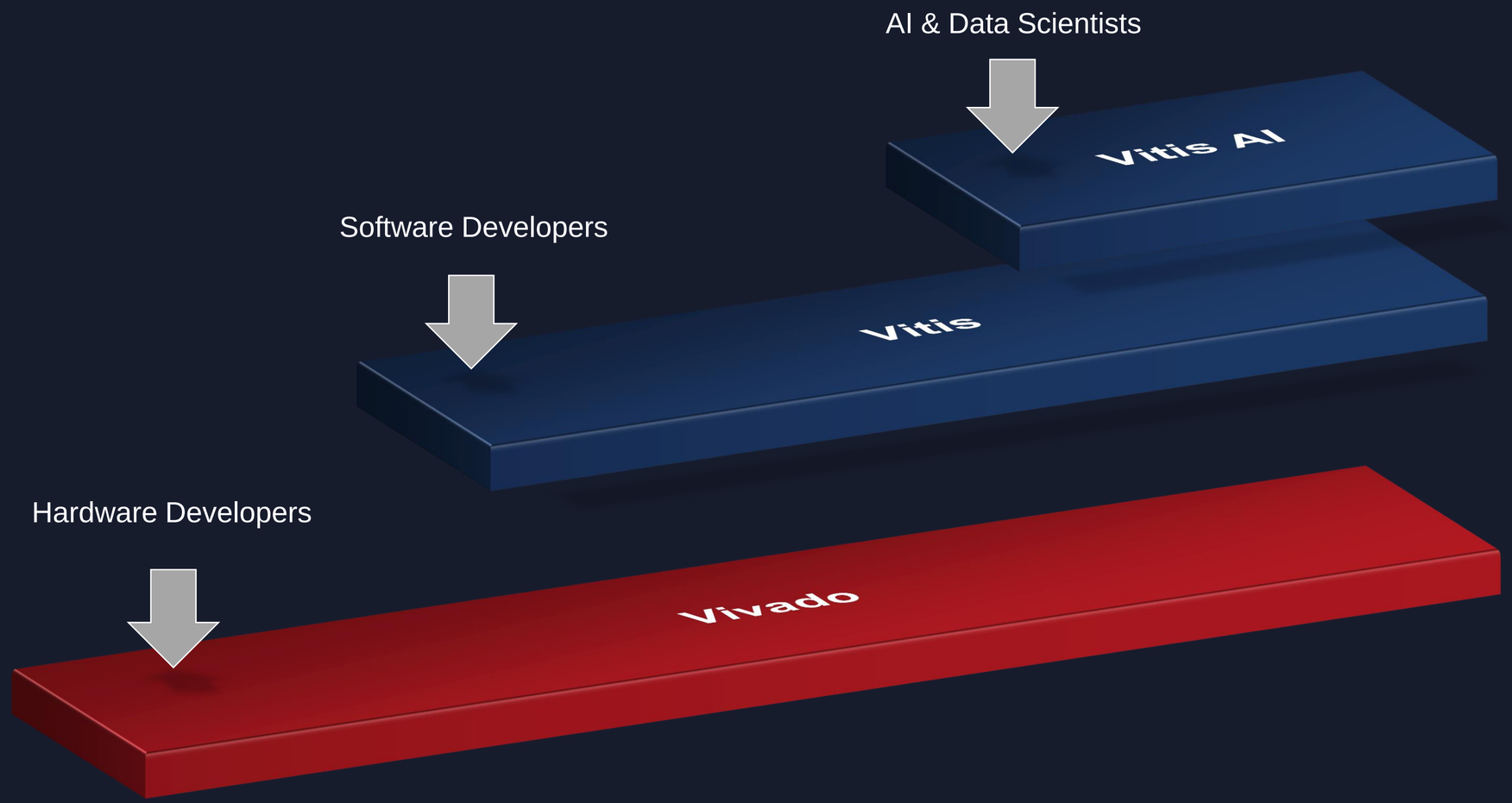
Host VM Specifications	NP10	NP20	NP40
CPU Cores	10	20	40
Local SSD Temp. Storage	0.7 TB	1.4 TB	2.8 TB
Host RAM	168 GB	336 GB	672 GB
Accelerators (U250s)	1	2	4



5G Deployment

(Source : Samsung Presentation, Ministry of Science and ICT, Korea)

Development Platforms for ALL Developers



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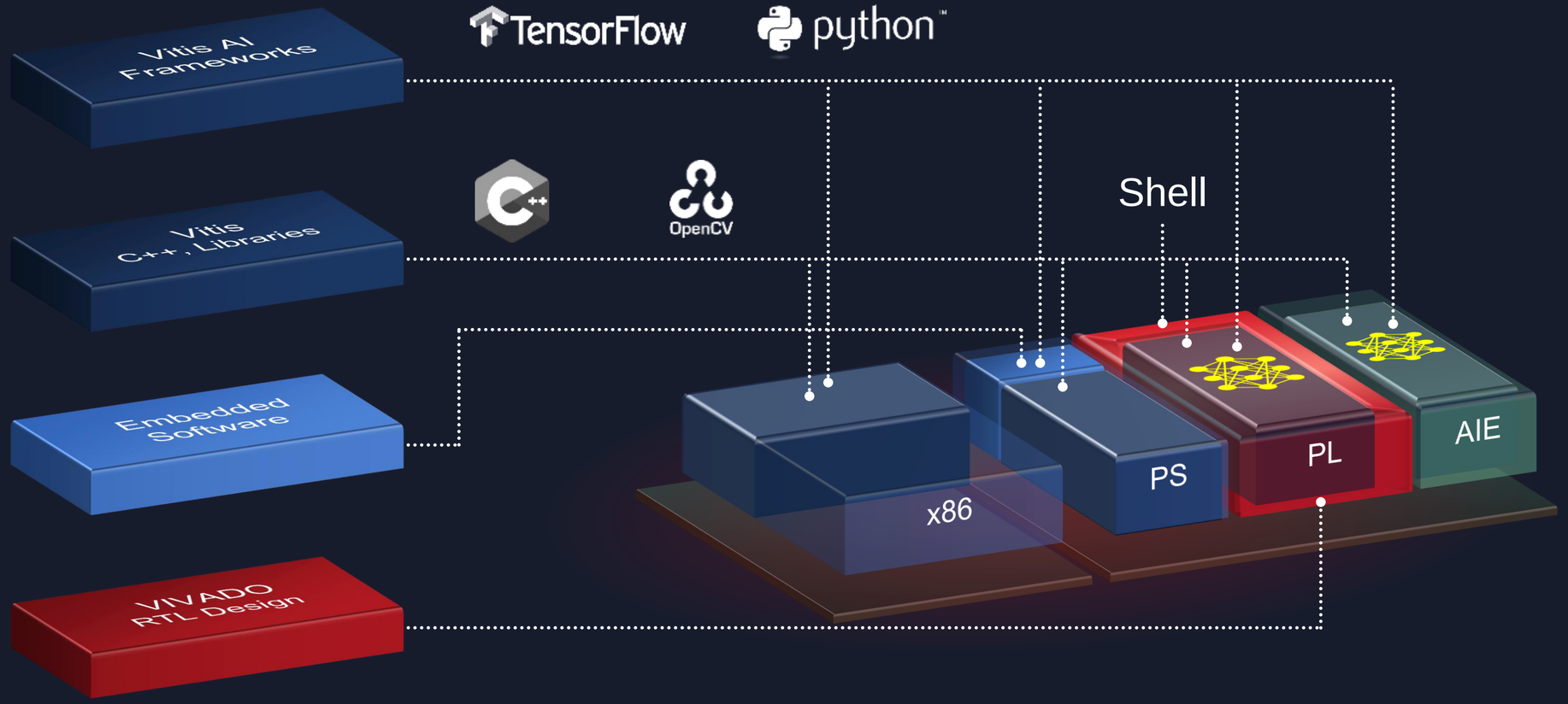
Putting it All Together

AI Scientists
(iterations in minutes)

Application
Software Developers

Embedded
Developers

Hardware
Developers



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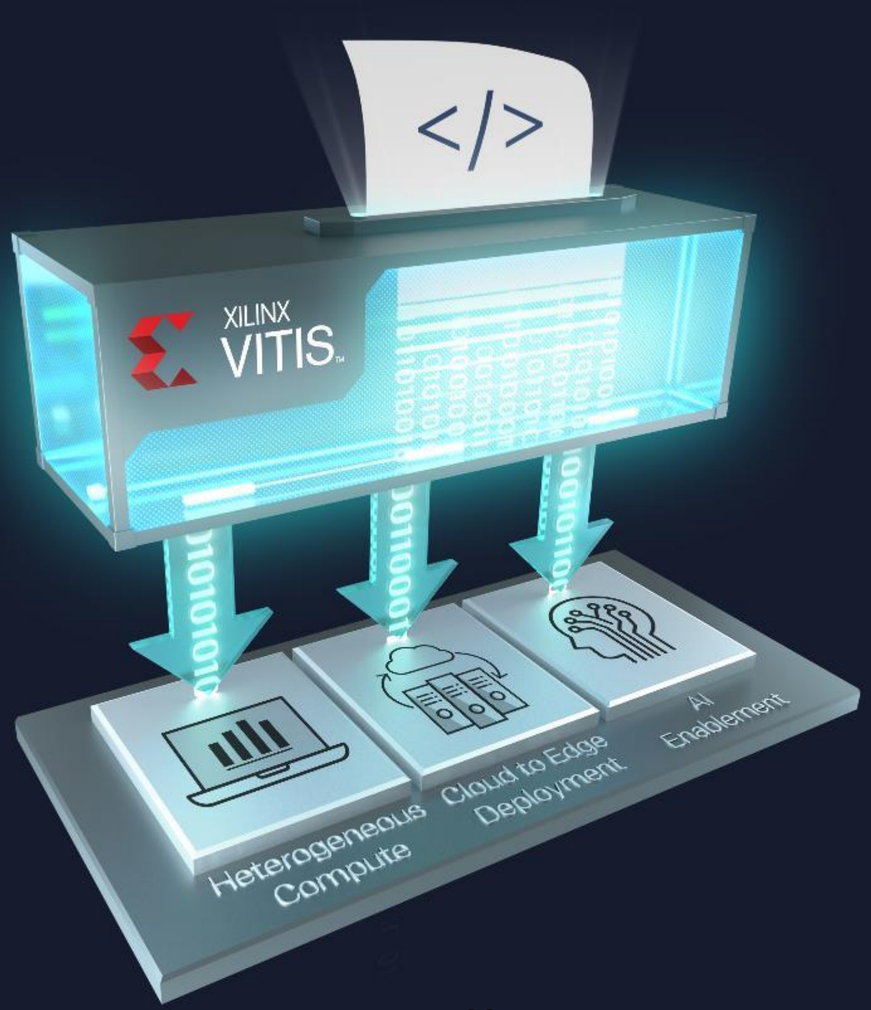
Key Takeaways



Unified Software Platform

Cloud to edge, software and AI

Comprehensive libraries and models

Work at Speed of Innovation

Hardware adaptable to software

Software programmable DSA

Standards, Open Source, Free

Embracing & participating in open source

Use of standard environments & APIs

Mission

Building the Adaptable, Intelligent World