Xilinx Adapt 2021: Developer News

Introducing
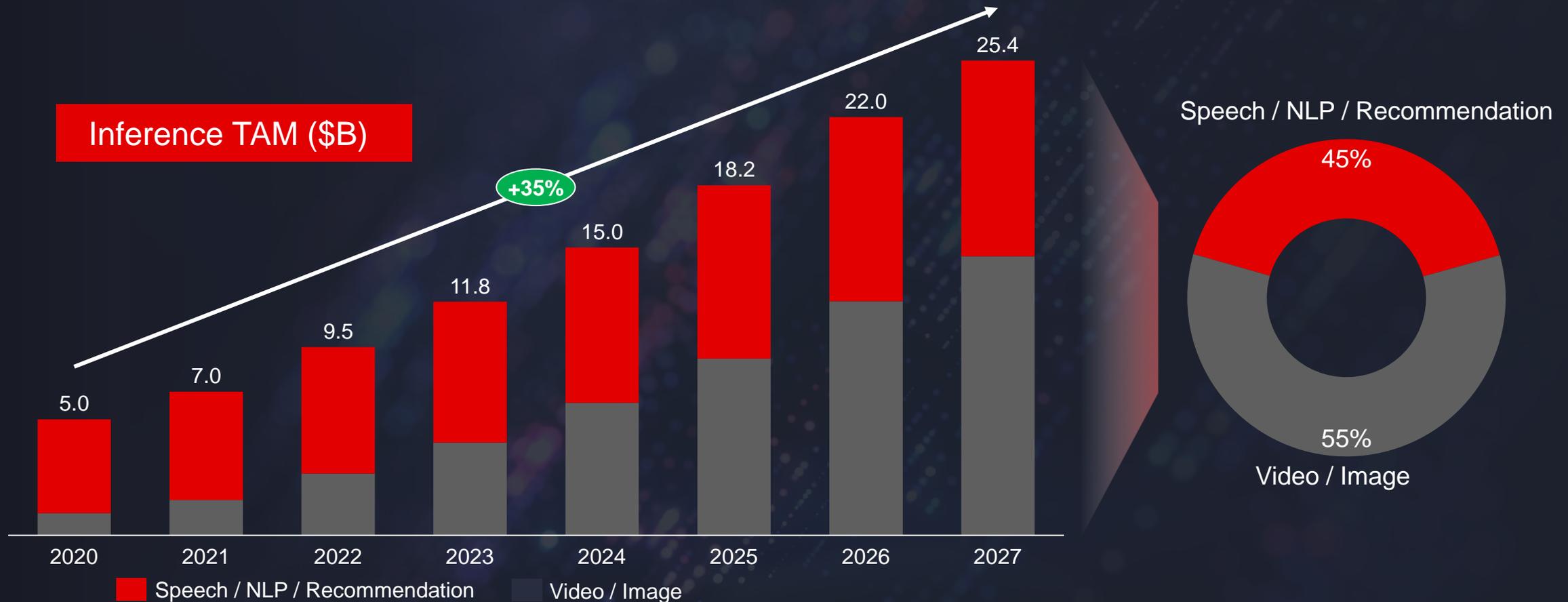
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VITIS™ Video Analytics SDK

Build and deploy AI-based intelligent video analytics applications

AI Inference Market Growing at 35% CAGR

Video Analytics – Fastest Growing Segment

Source: Omdia 2020 + Xilinx projection

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Applications for Video Analytics

Smart Retail

Smart Parking

Smart City

Critical Infrastructure

Speech / NLP / Recommendation

45%

55%

Video / Image

AI Analytics Rapidly Replacing Traditional Computer Vision

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Typical AI-Based Video Analytics

001011010
101010100
010101110
101010100
100000011

Decode →

Detection & Tracking → Sports Drink

Detection & Tracking → Chips

Detection & Tracking → Salsa

Processing 100's of Cameras, Each Frame With 10+ AI Models

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Xilinx: 2x Camera Streams Compared to Best GPUs

End-to-end throughput

Number of streams per card (10fps per stream)

- Jetson Nano
- Jetson TX2
- KV260

End-to-end throughput

Number of streams per card (10fps per stream)

- Nvidia T4
- Xilinx VCK5000

Kria SOM

Versal VCK5000
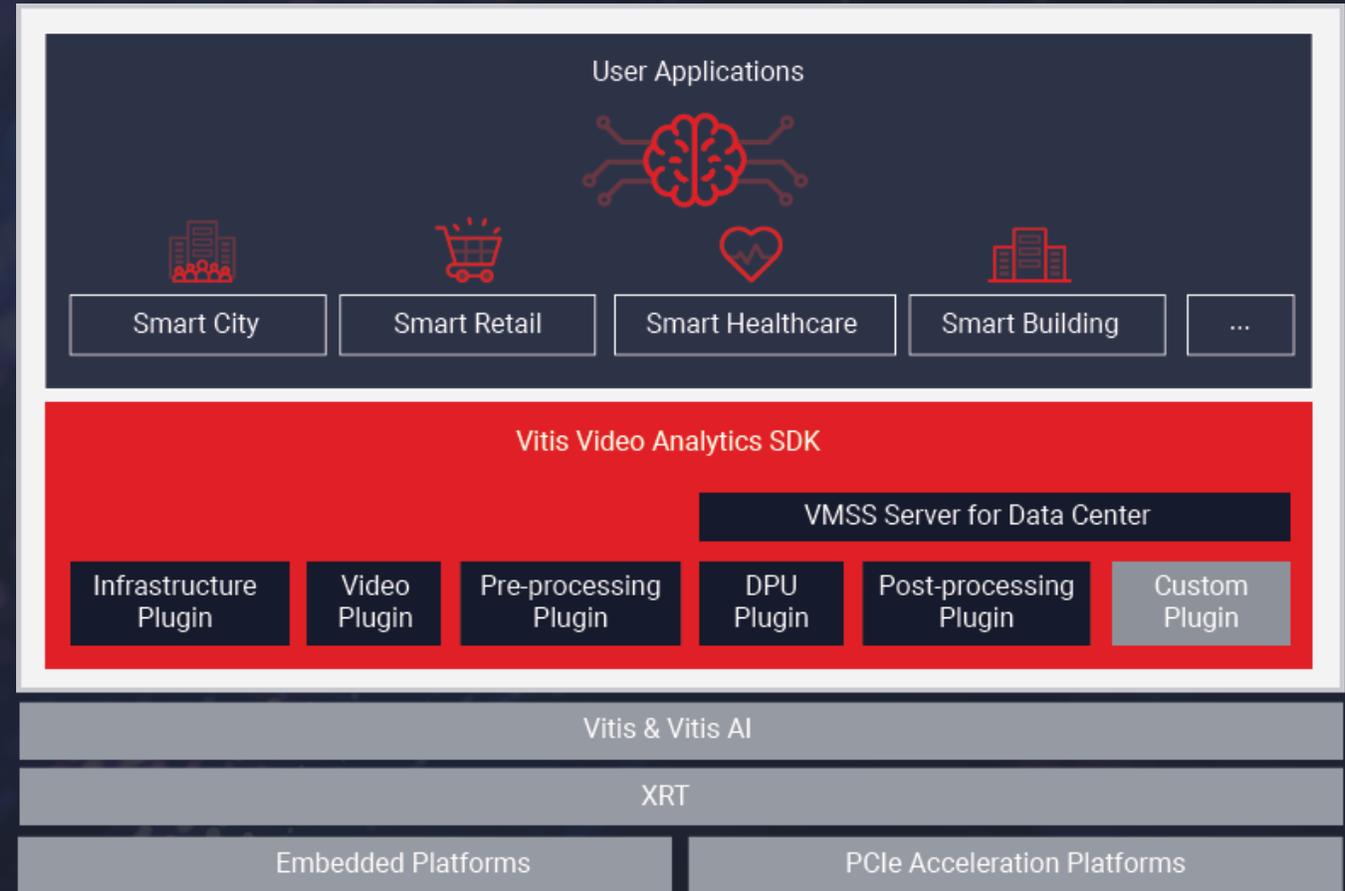
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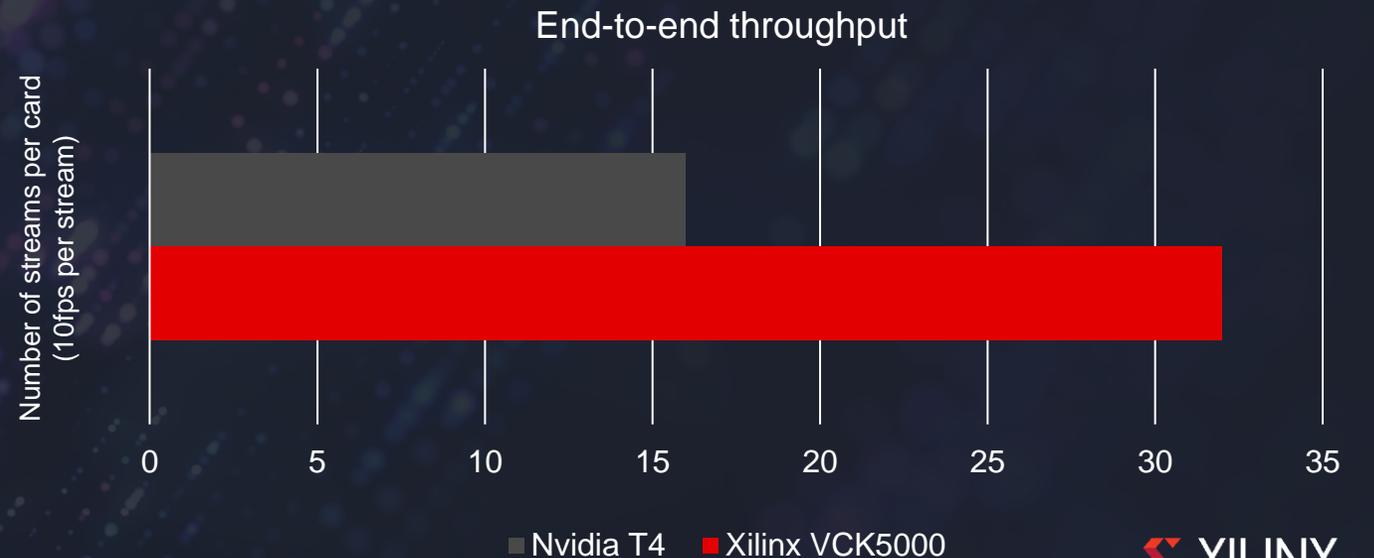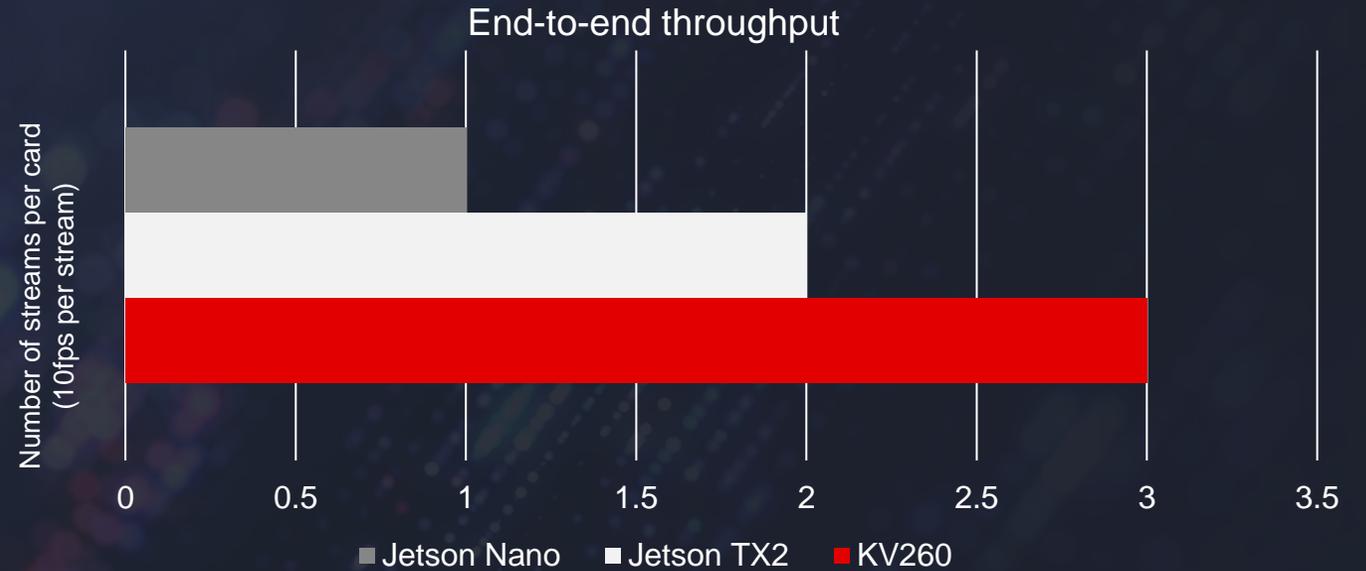
Introducing Vitis Video Analytics SDK

Gstreamer based pipeline creation

Direct TensorFlow, Pytorch support

No hardware expertise necessary

User Applications

| Smart City | Smart Retail | Smart Healthcare | Smart Building | ... |

Vitis Video Analytics SDK

VMSS Server for Data Center

| Infrastructure Plugin | Video Plugin | Pre-processing Plugin | DPU Plugin | Post-processing Plugin | Custom Plugin |

Vitis & Vitis AI

XRT

| Embedded Platforms | PCIe Acceleration Platforms |

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Key Takeaways

Video analytics is a fast-growing market with AI rapidly replacing traditional computer vision

Xilinx platform achieves over 2x best GPUs in number of camera streams

Vitis Video Analytics SDK allows framework-based development from Gstreamer and TensorFlow / Pytorch

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Expanded Video & Imaging IP Portfolio

Providing 8K-ready building blocks for professional quality, real-time video and imaging pipelines usable in all industry segments

Xilinx Key Enabler of Many Video and Vision Markets

Television and Cinema

Control Rooms

Collaboration

AR/VR

Live Streaming

Security Cameras

Machine Vision

Medical Imaging

Robotics

Aerospace and Defense

Surround View

Driver Monitor Systems

Auto Forward Camera

Full Display Mirror

Infotainment

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Addressing Key Trends in Video and Vision Markets

▸ **Higher resolutions and faster refresh and better pixels**

- 8K and higher at faster frame rates
- High bit depth >10bpc and High dynamic range

▸ **Vision based analytics becoming ubiquitous**

- Face and Pedestrian detect
- License plate recognition
- Defect detection
- Driver assistance
- ……

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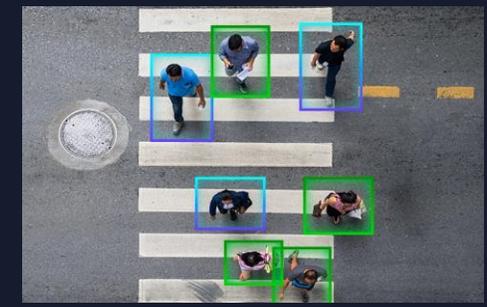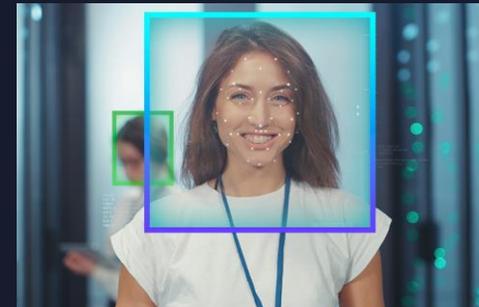
Expanded 8K Video IP Portfolio to Support Complete Workflows

Video Interface IP

- HDMI 2.1
- DisplayPort 1.4
- 12G-SDI (quad)

Video Processing Subsystem (VPSS)

- 8K Scaling
- Color space conversion and Chroma resampling
- Frame rate conversion
- Deinterlacing
- YUV & RGB 4:2:0, 4:2:2 or 4:4:4 & 8, 10, 12 and 16-bit

Video Mixer (VMIX)

- Mix up to 16x memory-based or streaming layers @ 8K30
- Logo insertion layer, optional scaling on each layer
- Per pixel/layer alpha blending

Multi-Scaler

- Multiple inputs to multiple output scaler (8 ports)
- Up to 8K60

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Wide Portfolio of AV Solutions from Xilinx & Partners

DisplayPort 1.4
Available Now
Xilinx

VESA DSC 1.2a
Available Now
Hardent

(Quad) 12G-SDI
Available Now
Xilinx

1-100 GbE
Available Now
Xilinx

HDMI 2.1
Available Now
Xilinx

SMPTE ST 2110 & IPMX
Available Now
Macnica, Nextera, M3L, CoreEL

READY FOR 8K & AV-OVER-IP

8K VC-2
Available Now
Silex Insight

8K JPEG 2000
Available Now
intoPIX & Silex Insight
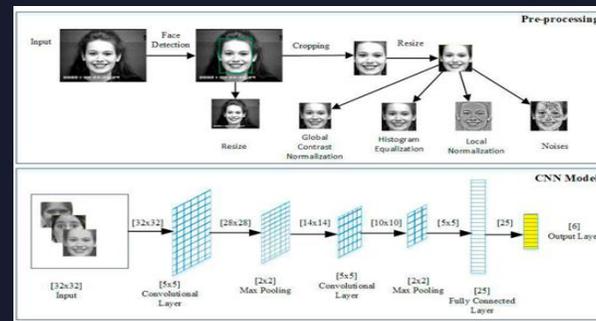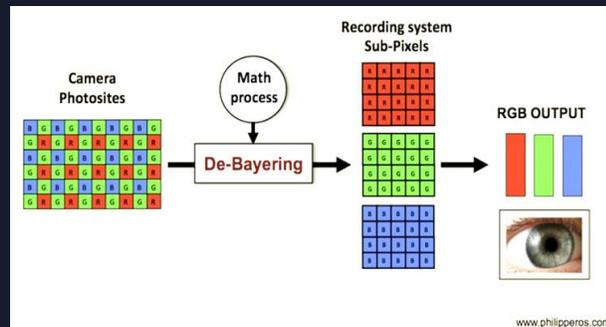
8K Colibri
Available Now
Silex Insight

8K TICO
Available Now
intoPIX
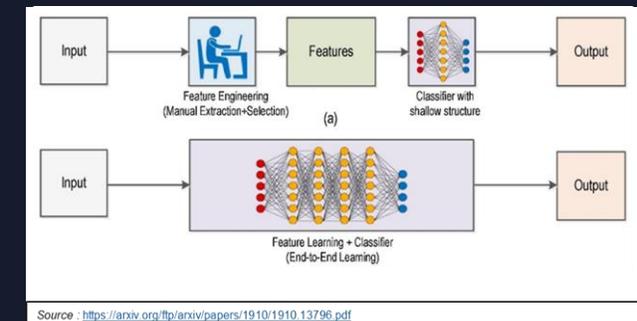
8K JPEG-XS
Available Now
intoPIX

HEVC over IP
Available Now
Xilinx

8K Video Scaling
Available Now
Xilinx

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Updated Vision Libraries to Support Comprehensive Computer Vision and ISP Tasks

www.philipperos.com

Courtesy of Diah Anggraeni Pitaloka et al.

Source : https://arxiv.org/ftp/arxiv/papers/1910/1910_13796.pdf

Image Signal Processing (ISP)

Reconstructs Image sensors raw data by interpolating the values of RGB colors. Debayer (Demosaic), Bad pixel correction, Auto white balance, Auto exposure, Gamma and Color correction…

Pre-Processing for ML

Functions used in preparing images for trained ML models inference such as data format conversion, normalization, bit width, image resolution …

Computer Vision

Traditional CV functions: Filters, Edge detector, Morph, transform,, track, feature … CV is more effective for applications such as 3D Vision, AR/VR, SLAM, Motion Est, 360 camera

▸ HW accelerated in PL, AIE

▸ Support multiple pixels per clock (1, 2, 4 and 8ppc)

▸ Low latency with streaming interface

▸ OpenCV API

▸ Integrated into TRDs and SOM applications

▸ $Zero cost and unencrypted format

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The Largest FPGA Design Contest

Coming Back with 2x the Scale of 2020

2020	2021
1000 participants	**2000** participants
120 board winners	**350+** board winners
$54,000 in prizes, 9 winners	**$70,000** in prizes, **15** winners
	2 New $2,500 Awards

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WOMEN IN TECHNOLOGY

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Three New Categories with $10,000 Top Prize

Edge Computing

Data Center AI

Big Data Analytics

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Contest Schedule

Contest Announcement in Xilinx ADAPT and Registration Opens
09/07/2021

Complete Hardware shipping by Mid-November
11/15/2021

Winners Announced
03/31/2022

Hardware Application Deadline
10/15/2021

Contest Deadline
02/28/2022

Active Contest
Dec-Jan-Feb

2021

September · October · November · December · January · February · March

2022

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Thank You