
intel
DATA-CENTRIC INNOVATION SUMMIT
EXTRACTING VALUE FROM DATA:
FPGA ACCELERATION
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GENERAL MANAGER, PROGRAMMABLE SOLUTIONS GROUP

ACCELERATING THE DATA-CENTRIC WORLD

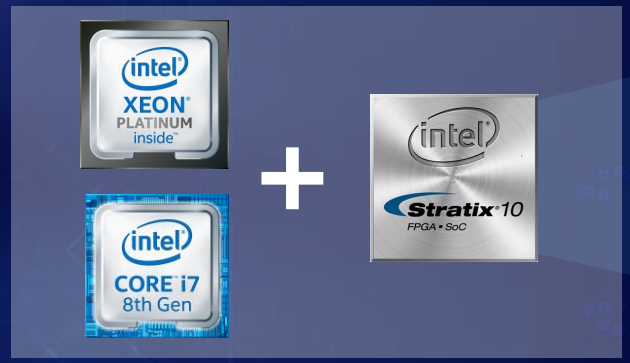
DEVICES / EDGE

NETWORK

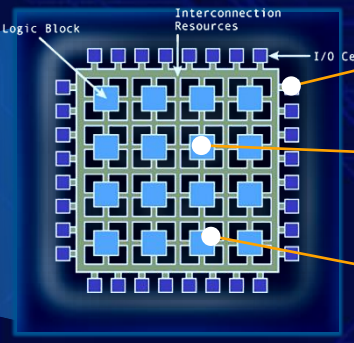
CLOUD/DATA CENTER

REMOVING DATA BOTTLENECKS WITH FPGA ACCELERATION

IA+ FPGA: ACCELERATING BUSINESS OUTCOMES



FPGA



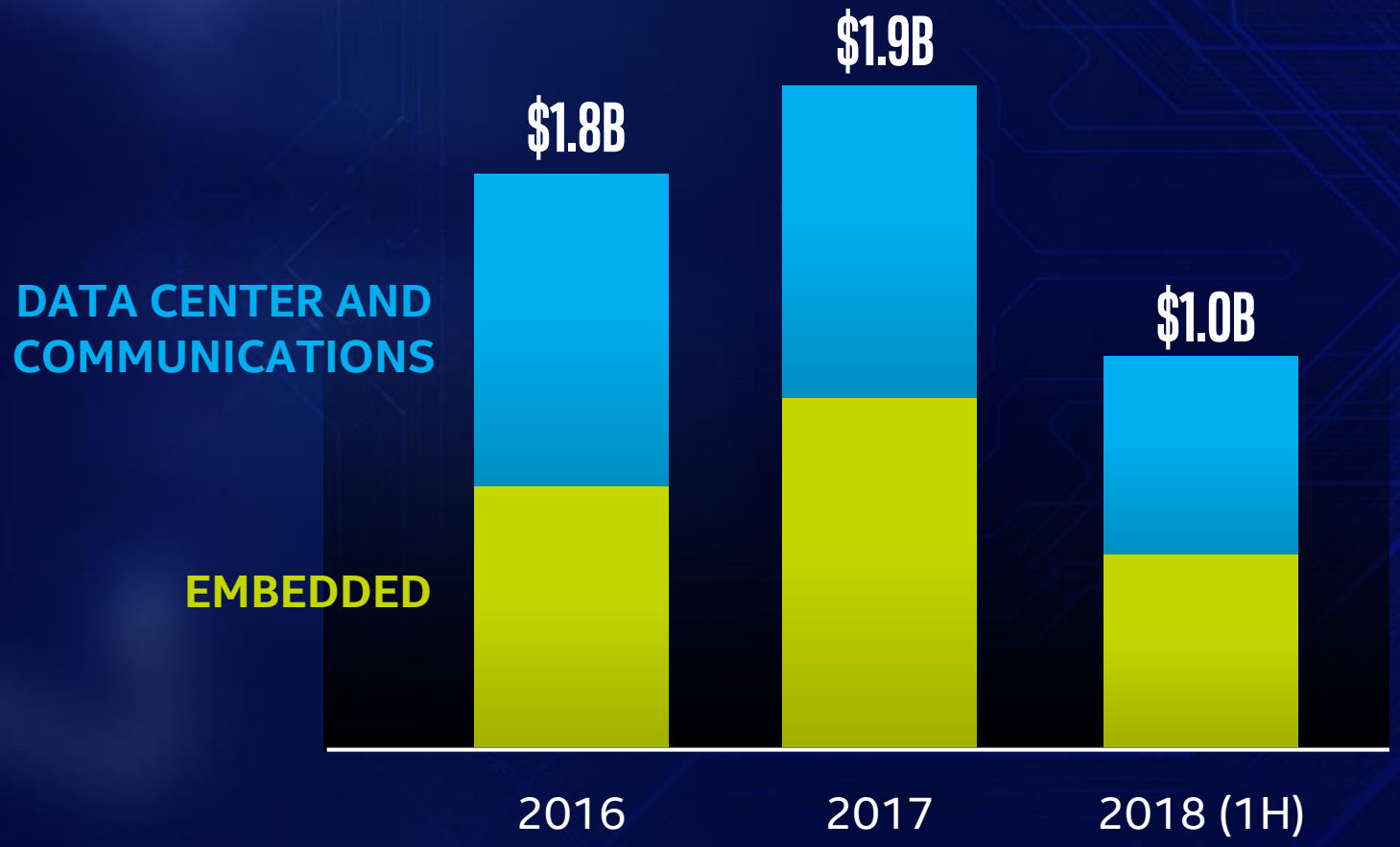
- HIGH THROUGHPUT I/O
- 1000s OF PARALLEL PROCESSING UNITS
- PROGRAMMABLE

LOWER LATENCY
HIGHER PERFORMANCE
MULTI-FUNCTIONAL

BUSINESS OUTCOMES

Real-time actionable intelligence at the edge
New revenue streams for Communication service providers
Improved total cost of ownership (TCO) in the cloud

INTEL SCALE DRIVING VALUE AND GROWTH



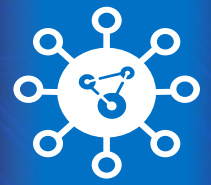
*Revenue excludes Intel products with integrated FPGAs

YEAR-OVER-YEAR REVENUE GROWTH

	1H '18
DATA CENTER	140%
ADVANCED PRODUCTS (28NM, 20NM, 14NM)	50%
TOTAL REVENUE	17%

BETTER TOGETHER: SOLUTIONS ACROSS MARKETS

IA+FPGA SOLUTIONS

EDGE/EMBEDDED	ENTERPRISE	NETWORKING	CLOUD
			
Vision Analytics Smart retail Industrial (IOT) Radar/surveillance	Database AI Financial Health Life Sciences	5G NFV Wireline	Networking Storage Security AI Transcode

IP & ECOSYSTEM — INTEL PARTNERSHIPS: IP, OEM, SI, ISV, VAR

SOFTWARE — INTEL+FPGA FLOWS: SOFTWARE-CENTRIC DESIGN METHODOLOGY

SILICON/BOARDS — HW LEADERSHIP: SILICON, BOARDS, FPGA ACCELERATION CARDS

MULTI-FUNCTION ACCELERATION IN THE DATA CENTER

INFRASTRUCTURE ACCELERATION

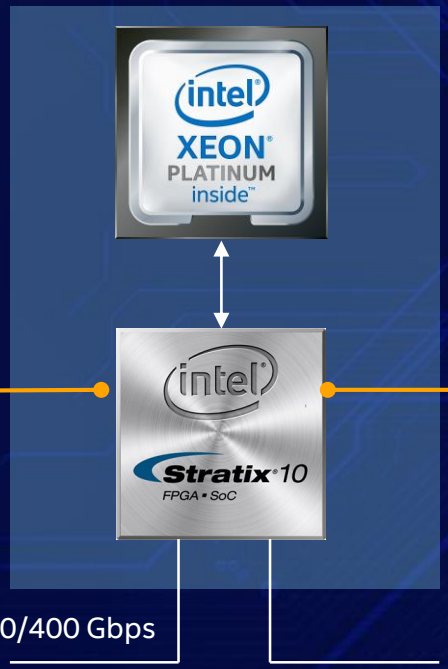
NETWORK | STORAGE | SECURITY

Desire for lower server overhead

Intel® Xeon® processor cores

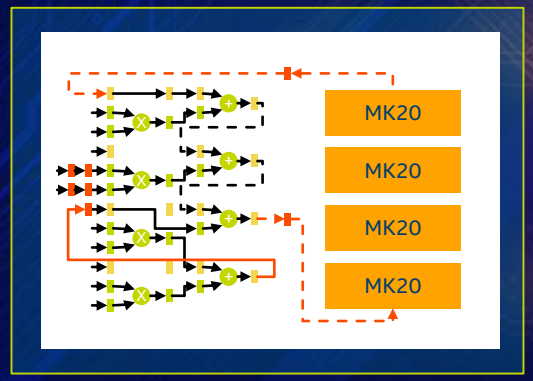
Applications

Infrastructure



LOOK-ASIDE ACCELERATION

AI INFERENCE
VIDEO TRANSCODE
APPLICATIONS (DATABASE) SEARCH



FPGA : BECOMING MAINSTREAM IN ENTERPRISE

INTEL® PROGRAMMABLE ACCELERATION CARD (PAC) WITH INTEL® FPGAS

+

FUJITSU
PRIMERGY
RX2540 M4

DELL EMC
Dell R640, R740, R740xd

- DATA ANALYTICS
- AI
- FINANCIAL
- VIDEO PROCESSING
- CYBERSECURITY
- GENOMICS

GROWING LIST OF SOLUTION ACCELERATION PARTNERS

iAbra
Accelize
ADAPTIVE MICRO-WARE
ALGO-LOGIC
bcom
bigstream
CAST
CTACCEL Accelerated Computing
enyx
Falcon COMPUTING
Levyx
MEGH COMPUTING
Myrtle
NAGASE NAGASE & CO.,LTD.
napatech
rENIAC
swarm64

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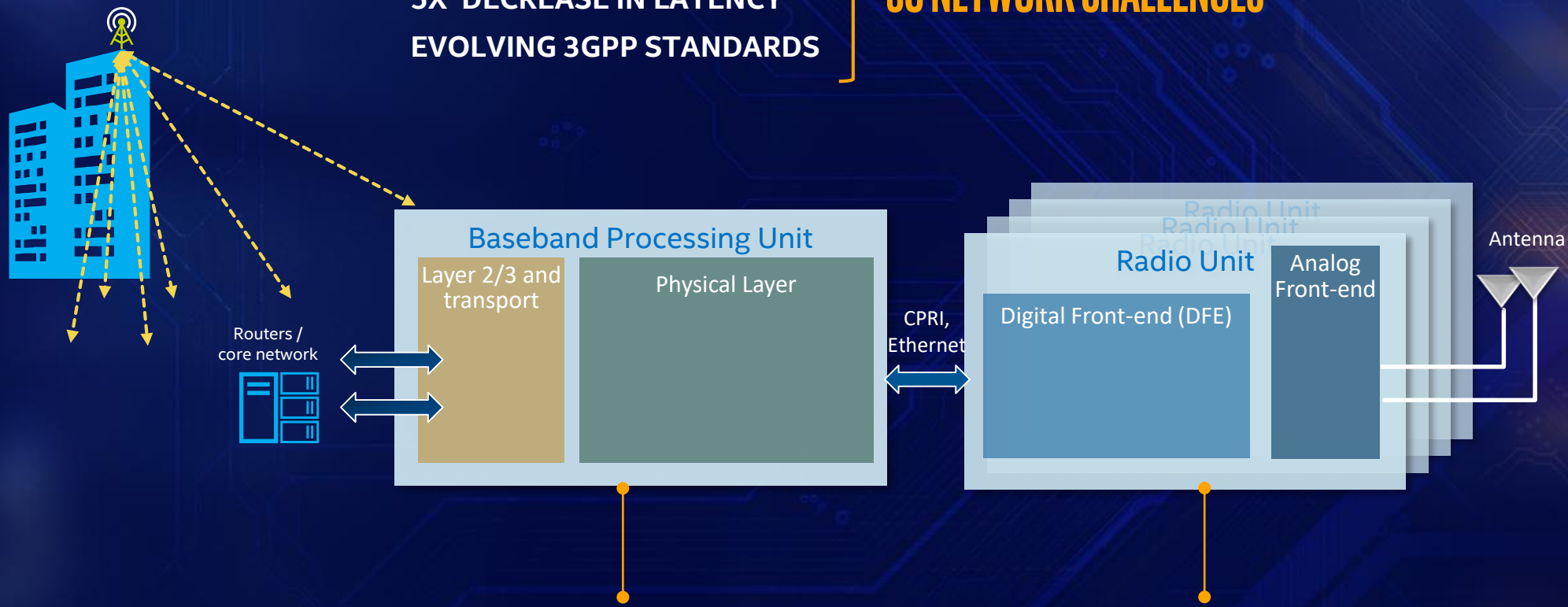
END-TO-END SOLUTIONS FOR 5G

1000X CAPACITY INCREASE [1]
5X DECREASE IN LATENCY
EVOLVING 3GPP STANDARDS

5G NETWORK CHALLENGES



1. https://www.techworld.com/apps-wearables/what-is-5g-everything-you-need-know-about-5g-3634921/
*mobile experts base station transceiver forecast, 2018

END-TO-END SOLUTIONS FOR NFV

NETWORK INFRASTRUCTURE
Physical Appliances

Single application on
dedicated hardware and
proprietary management

EDGE | EPC | ROUTER

TEM/OEM
Proprietary OS

ASIC, DSP, FPGA, ASSP

NFV

FLEXIBLE CLOUD INFRASTRUCTURE
Industry-Standard x86 Servers

**Decoupled software on
standard x86 server hardware
solution agnostic management**

EDGE | EPC | ROUTER

MANAGEMENT & ORCHESTRATION

Compute | Storage | Networking

H/W Accelerators
FPGA

DATA-CENTRIC INNOVATION SUMMIT

#IntelDCISummit

ACCELERATION AT THE EDGE

PERFORMANCE AND POWER

CLOUD
High-capacity memory
High -peed I/O
RAID & 10Gbe

+

EDGE
Video playback
Transcoding VMS, Video
Analytics & Sensor
aggregation

+

DEVICE
Excellent image quality
Image enhancement
Encoding & Analytics

+

EDGE WORKLOADS

SURVEILLANCE

SMART RETAIL

INDUSTRY 4.0

SMART CLASSROOM

DATA-CENTRIC INNOVATION SUMMIT

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ACCELERATING AI WITH FPGA

SI ADVANTAGES

SUPPORT EVOLVING AI TOPOLOGIES

HIGH ON-CHIP MEMORY FOR INCREASED THROUGHPUT

LOW LATENCY INFERENCE

ENERGY-EFFICIENT INFERENCE

TOOLKITS Application Developers

OpenVINO™ †

Open Visual Inference & Neural Network Optimization toolkit for inference deployment on CPU/GPU/FPGA for TensorFlow, Caffe* & MXNet**

FOUNDATION Library Developers

Intel® nGraph™ Compiler

Open-sourced compiler for deep learning model computations optimized for multiple devices from multiple frameworks

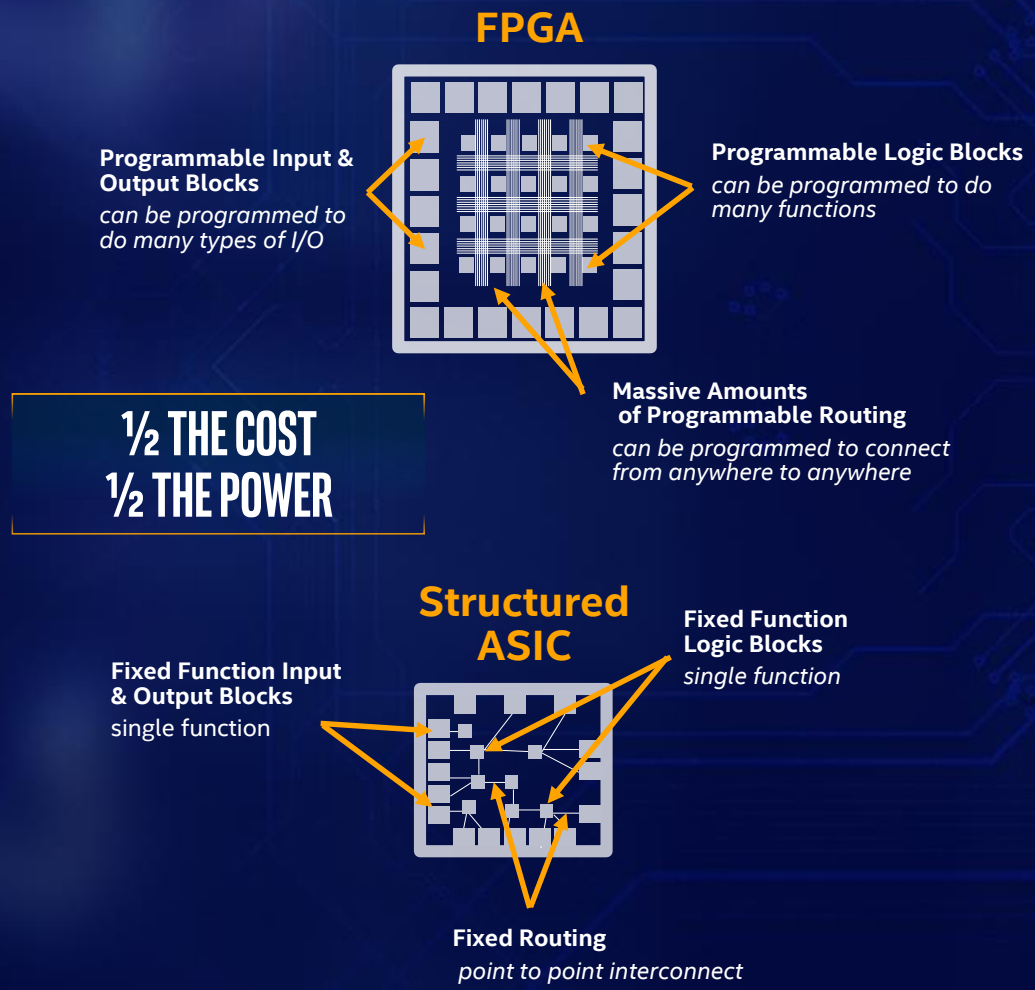
ACCELERATION OF AI FOR EARTH

"WITH MICROSOFT'S AI FOR EARTH PROGRAM WE ARE PUTTING OUR CLOUD AND AI TOOLS IN THE HANDS OF THOSE WORKING TO SOLVE GLOBAL ENVIRONMENTAL CHALLENGES – A TOPIC THAT REQUIRES **COMBINING BIG DATA, BIG COMPUTE, AND EFFICIENT ALGORITHMS**. DEPLOYING DEEP NEURAL NETWORK MODELS TO FIELD-PROGRAMMABLE GATE ARRAY (FPGA) SERVICES USING MICROSOFT PROJECT BRAINWAVE IS ONE SUPER SIMPLE WAY TO ACHIEVE THIS. RECENTLY WE USED THIS FPGA SERVICE TO PERFORM LAND COVER MAPPING OF THE ENTIRE UNITED STATES, ANALYZING 10 TRILLION PIXELS ACROSS 20 TB OF AERIAL IMAGERY. **MICROSOFT PROJECT BRAINWAVE, USING INTEL FPGAS, SCORED THESE 200 MILLION IMAGES IN ENTIRETY IN JUST OVER 10 MINUTES FOR A COST OF $42.**"

Microsoft

Doug Burger
Technical Fellow, Azure HW Systems Group

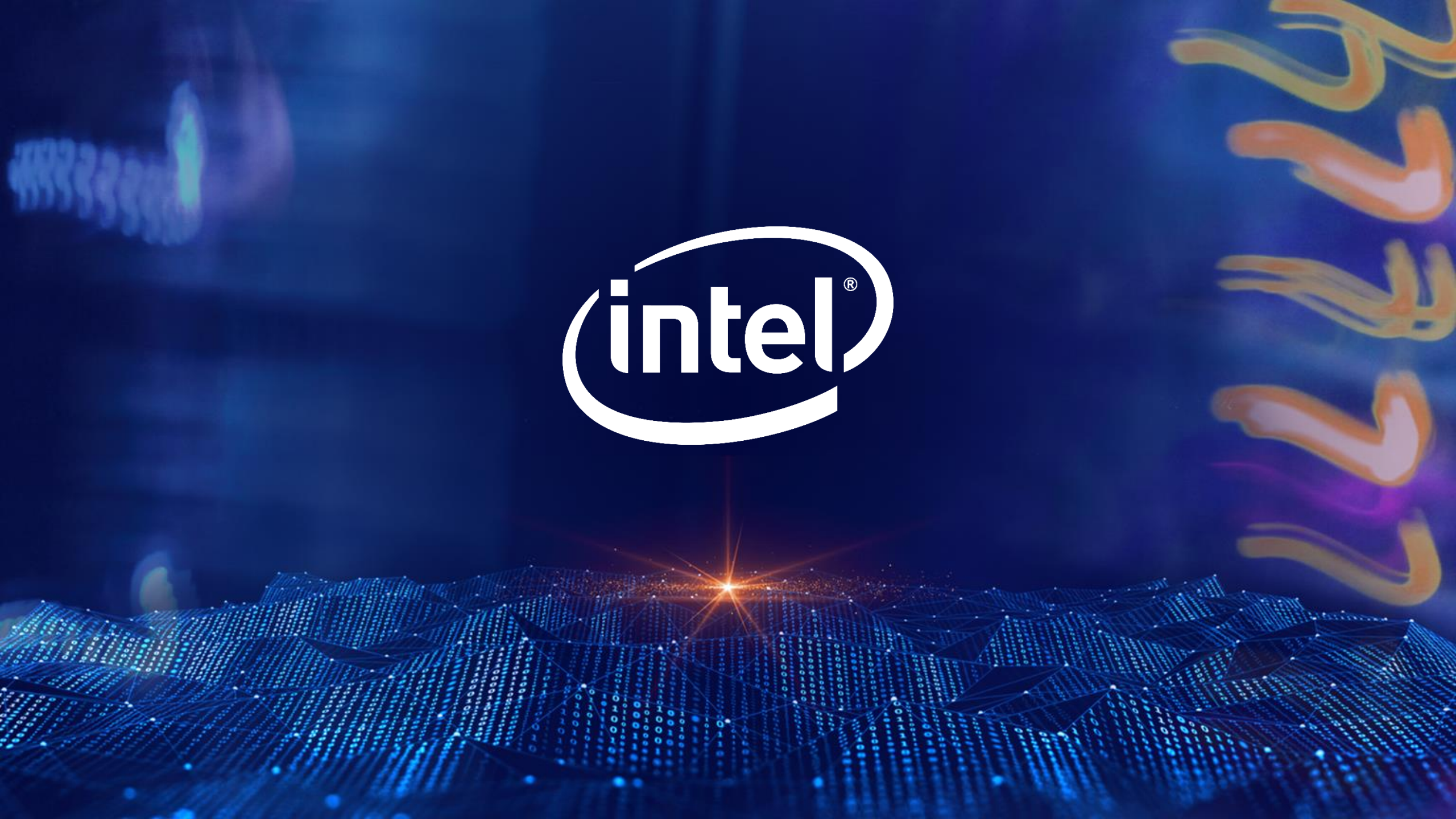
EASIC ACQUISITION DRIVING MARKET EXPANSION



- Cost *and* power reduction path for FPGA customers
- Lower NRE cost and time-to-market for ASIC customers
- Scalable technology to provide pathway to cost reduction for 16nm/10nm/7nm FPGA products

UNMATCHED CUSTOMER VALUE

- FPGA versatility addresses evolving needs of data era
- IA+FPGA solutions creating unparalleled customer value
- Expanded TAM and end-to-end lifecycle solutions with eASIC acquisition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