FUTURE PROOF FOR IT AND BUSINESS TRANSFORMATION

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FORMER CIO

DATA-DRIVEN SERVICES FUEL ORGANIZATIONAL GROWTH
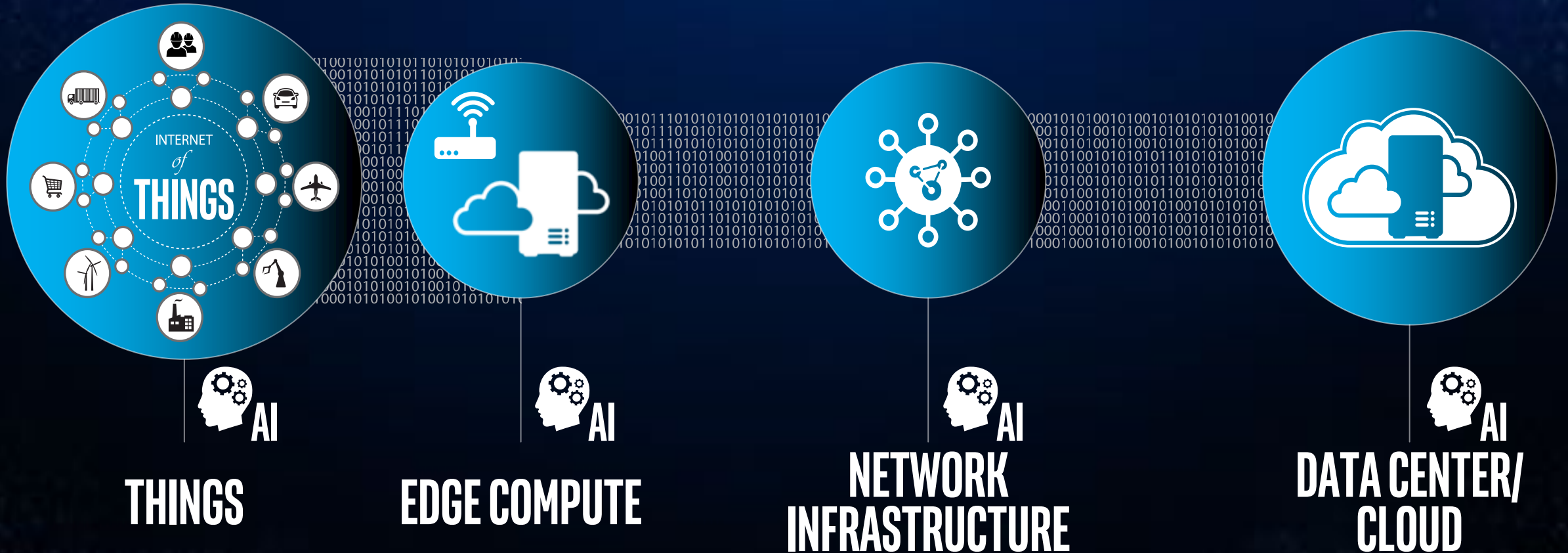
For a typical large enterprise,

10% increase in data accessibility...

...will result in more than **$65M** additional net income.[1]

• 1. http://www.baselinemag.com/analytics-big-data/slideshows/surprising-statistics-about-big-data.html

"EDGE" DATA CREATING WAVE OF END-TO-END IMPLICATIONS

INTERNET *of* THINGS

AI — THINGS

AI — EDGE COMPUTE

AI — NETWORK INFRASTRUCTURE

AI — DATA CENTER/ CLOUD

SECURITY, COMPLIANCE, REGULATIONS

YET... 55% of companies are struggling in their digital transformation efforts[1]

SILOED DATA | TECHNICAL DEBT | COMPLEX WORKLOADS

- 1. IDC Insights - CIO Summit keynote – Meredith Whalen, September 2018

INTELLIGENT DIGITAL SERVICES INFRASTRUCTURE

CUSTOMER LENS

COMPLEXITY

RAPID CHANGE

GLOBAL REACH

MINDSET & GOALS

SIMPLICITY

MODERNIZED IT-AS-A-SERVICE

AGILE & FLEXIBLE

POWERED BY SOFTWARE DEFINED INFRASTRUCTURE

SCALABLE

UNIFIED HYBRID, MULTI CLOUD DATA ECONOMY

NEW ERA OF DATA-CENTRIC TECHNOLOGY

PUBLIC

PRIVATE

MULTI-CLOUD

DATA-CENTRIC INFRASTRUCTURE

MOVE FASTER

(intel) SILICON PHOTONICS

(intel) OMNI-PATH FABRIC

(intel) ETHERNET

STORE MORE

(intel) OPTANE DC ⟨⟩⟩
SOLID STATE DRIVE

(intel) OPTANE DC ⟨⟩⟩
PERSISTENT MEMORY

PROCESS EVERYTHING

intel XEON PLATINUM inside

intel STRATIX 10 inside

intel NERVANA inside

• No product or component can be absolutely secure.

THE CIO'S IMPERATIVES

MODERNIZE

HARNESS DATA

SECURE DATA

STRATEGY + CULTURE + PEOPLE

AGING INFRASTRUCTURE

OVER
20 MILLION
SERVER INSTANCES OF 2008/R2 GLOBALLY[3]

AVERAGE SERVER AGE[2]
HAS INCREASED BY **30%**

~5 years
2015

~7 years
2017
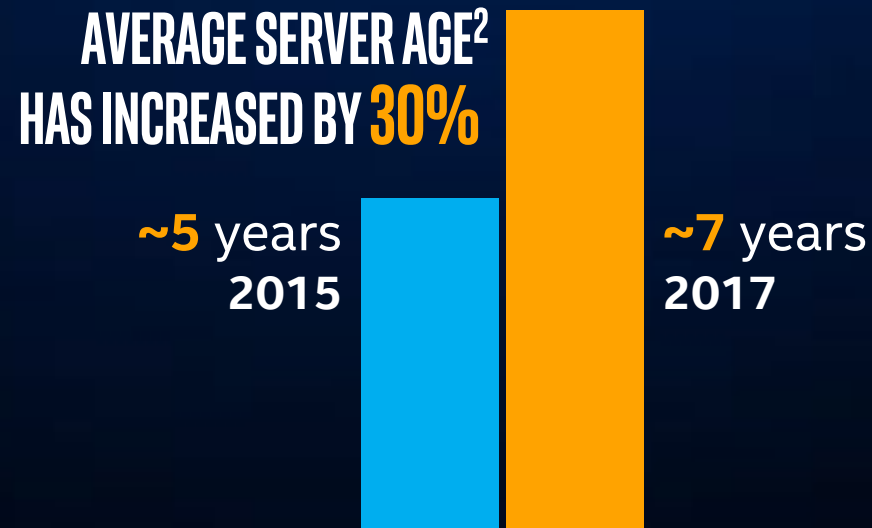
71%
LEGACY INFRASTRUCTURE AS
BIGGEST BARRIER TO
BUSINESS TRANSFORMATION[1]

1. ESG 2017 (https://www.emc.com/collateral/analyst-reports/esg-dellemc-it-transformation-maturity-report.pdf); 2. CMR: Server Market Insights, 02/2018 3. Microsoft source

MODERNIZATION SOLUTIONS WITH CDW

INFRASTRUCTURE REFRESH

Windows Server 2008 R2
vmware ESXi
Microsoft SQL Server 2008 R2
SAP S/4HANA
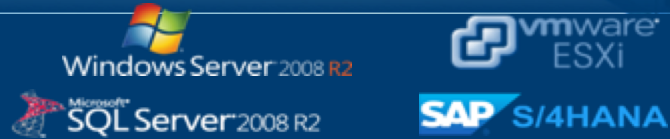
MICROSOFT REFRESH

☑ Solutions: Windows* SRV'16/ SRV'19 on CLX/ Intel® Optane™ DC Persistent Memory

☑ Solutions: SQL SRV'17 on CLX/ Intel® Optane™ DC Persistent Memory

HYBRID MULTI- CLOUD SOLUTIONS

PRIVATE   HYBRID   PUBLIC

HUAWEI
RED HAT OPENSHIFT Container Platform
Microsoft
Google Cloud   amazon
Hewlett Packard Enterprise   Lenovo   DELL

SCALE HCI SOLUTIONS

☑ VMware* vSAN & Cloud Foundation

☑ Microsoft* Azure Stack

☑ Red Hat* OpenShift Container Platform

☑ Huawei* FusionStorage

HYBRID & MULTI CLOUD

MULTIPLE CLOUDS DRIVE MISSION SUCCESS
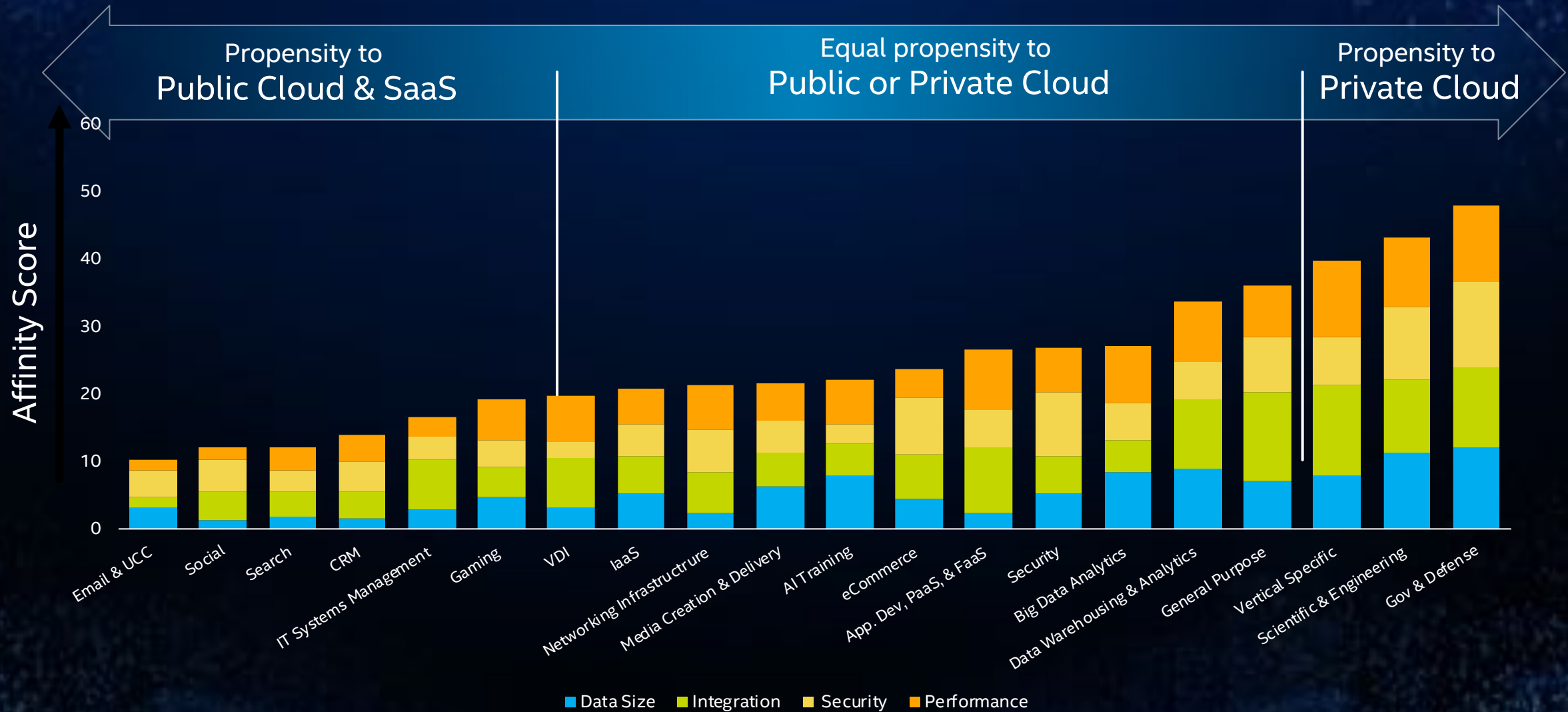
HYBRID

AND
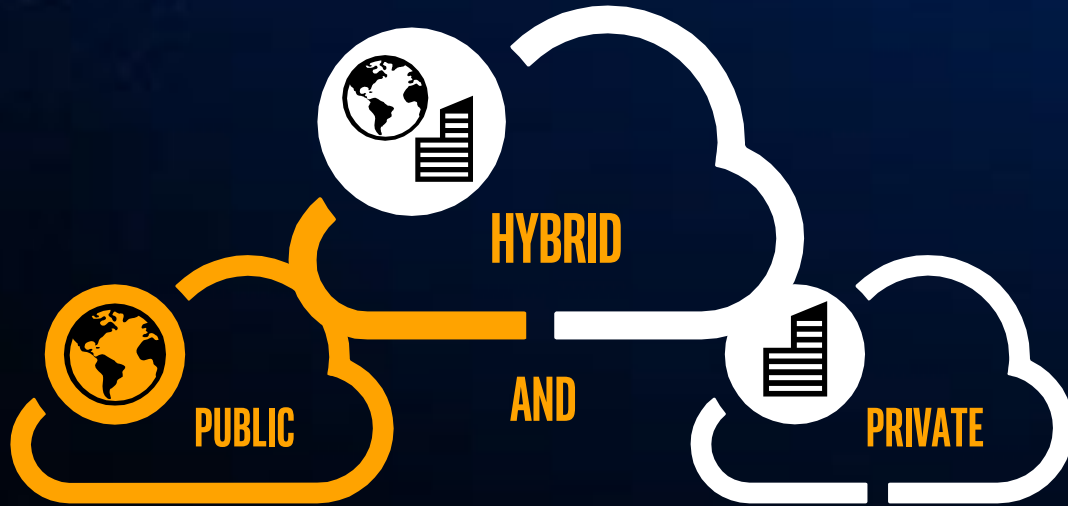
PUBLIC

PRIVATE

70% of organizations using multi-cloud environments[1]

BOTH PUBLIC AND PRIVATE CLOUD CAN MAKE SENSE FOR DRIVING STRONG RESILIENCE AND UPTIME.
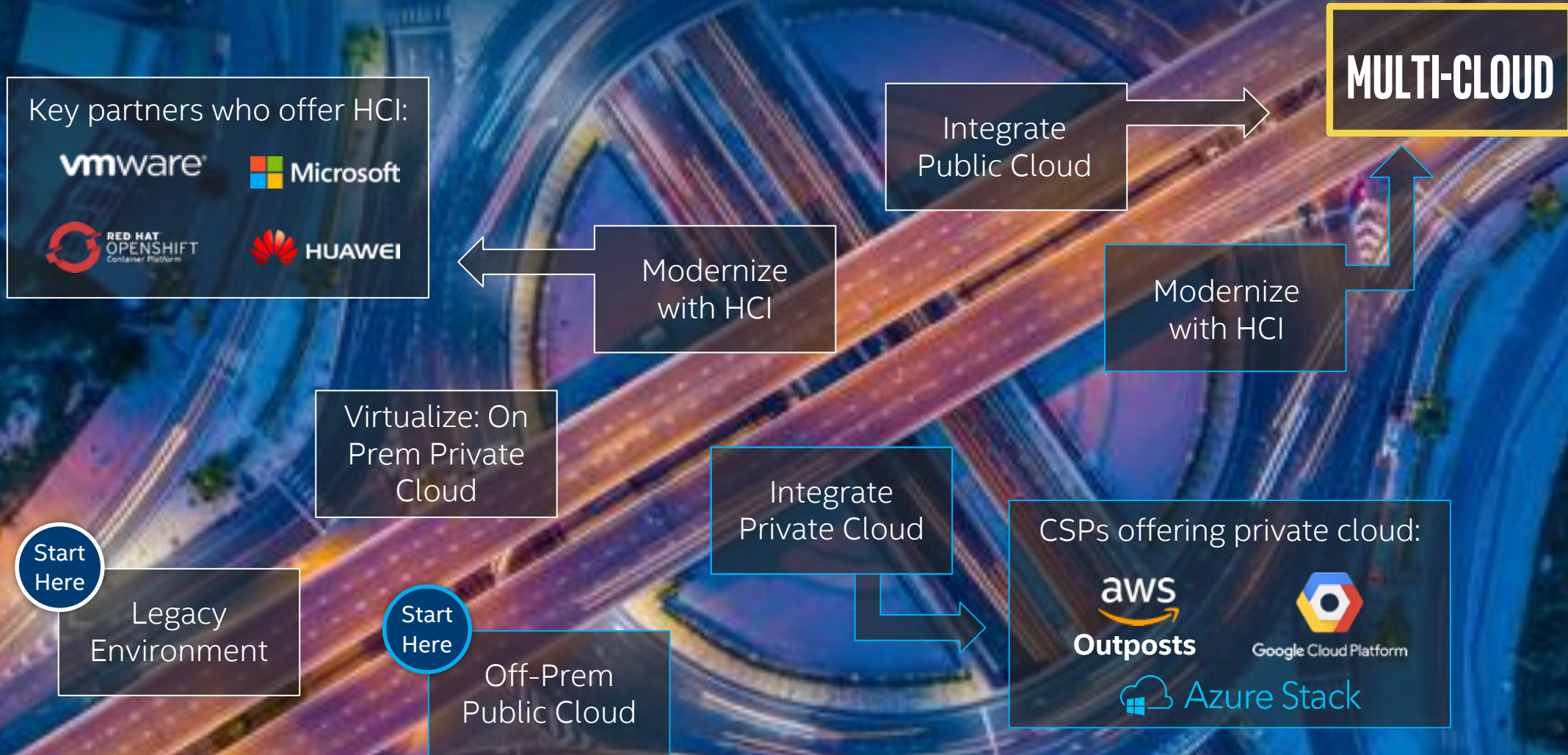
A Holistic Cloud Strategy should:

- Drive faster time to deployment

- Optimize performance and availability

- Provide control, transparency and compliance

- Enable app portability and consistency

INTEL® AFFINITY MODEL FOR WORKLOAD PLACEMENT

Propensity to
Public Cloud & SaaS

Equal propensity to
Public or Private Cloud

Propensity to
Private Cloud

Affinity Score

Categories (left to right): Email & UCC, Social, Search, CRM, IT Systems Management, Gaming, VDI, IaaS, Networking Infrastructrure, Media Creation & Delivery, AI Training, eCommerce, App. Dev, PaaS, & FaaS, Security, Big Data Analytics, Data Warehousing & Analytics, General Purpose, Vertical Specific, Scientific & Engineering, Gov & Defense

Legend: ■ Data Size ■ Integration ■ Security ■ Performance

BUILDING A DATA-CENTRIC FOUNDATION

Key partners who offer HCI:

vmware®   ▦ Microsoft

RED HAT OPENSHIFT Container Platform   HUAWEI

MULTI-CLOUD

Integrate Public Cloud

Modernize with HCI

Modernize with HCI

Virtualize: On Prem Private Cloud

Integrate Private Cloud

CSPs offering private cloud:

aws Outposts   Google Cloud Platform

Azure Stack

Start Here

Legacy Environment

Start Here

Off-Prem Public Cloud

MODERN DATA CENTER SOLUTIONS

vmware

SOLUTIONS

- vSphere
- vSAN
- NSX
- VMware Cloud Foundation

Microsoft

SOLUTIONS

- Windows Server
- WS2D & WSSD
- SQL Server
- Azure Stack

redhat IBM

SOLUTIONS

- Red Hat OpenShift Container
- Red Hat HCI
- Red Hat Cloud Forms Satellite
- Red Hat NFVi
- IBM Cloud Private

NUTANIX
Hewlett Packard Enterprise Lenovo

SOLUTIONS

- Nutanix Hyper converged
- Cisco Hyperflex
- HPE Simplivity

INDUSTRY-LEADING SOLUTIONS OPTIMIZED FOR INTEL® ARCHITECTURE

BROADEST ECOSYSTEM SUPPORT
SYSTEMS AND SOLUTIONS PROVIDERS
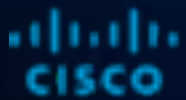
• Other names and brands may be claimed as the property of others

MASSIVE AMOUNTS OF UNDERUTILIZED DATA

WORLD'S DATA WILL GROW

10X

IN 10 YEARS

<1%

OF ALL DATA IS EVER ANALYZED AND USED

ANALYTICS & AI STRATEGY

ACCELERATE YOUR INSIGHTS
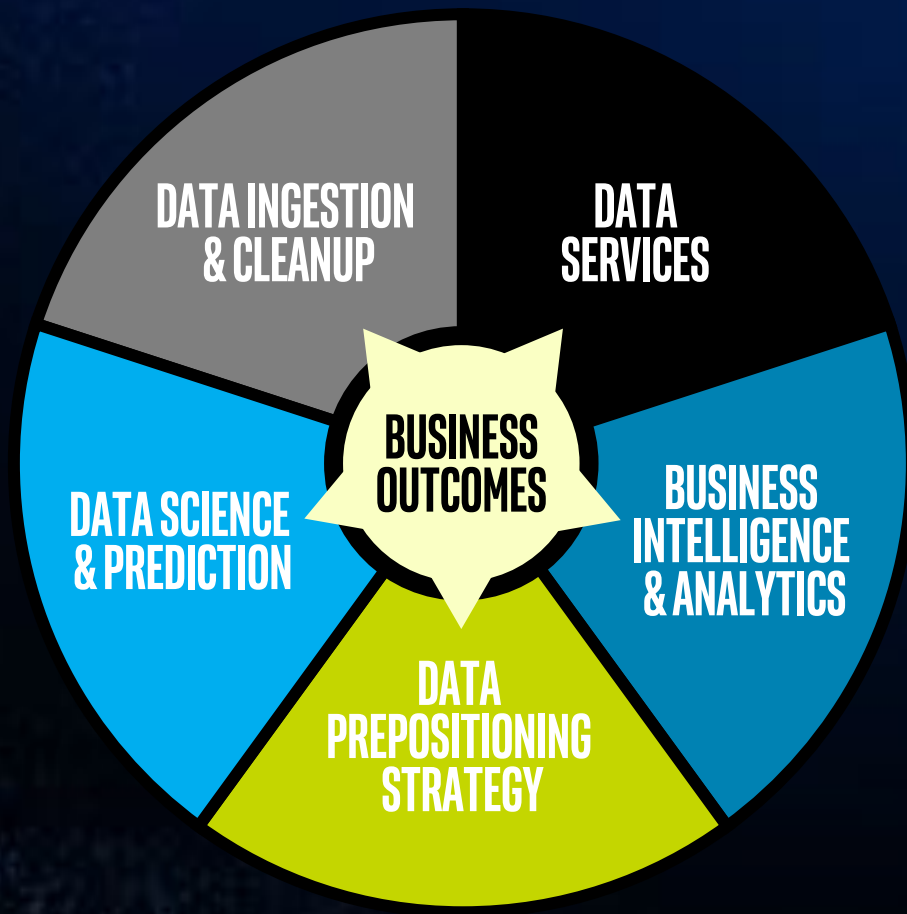
By 2020, enterprises need analytics to be
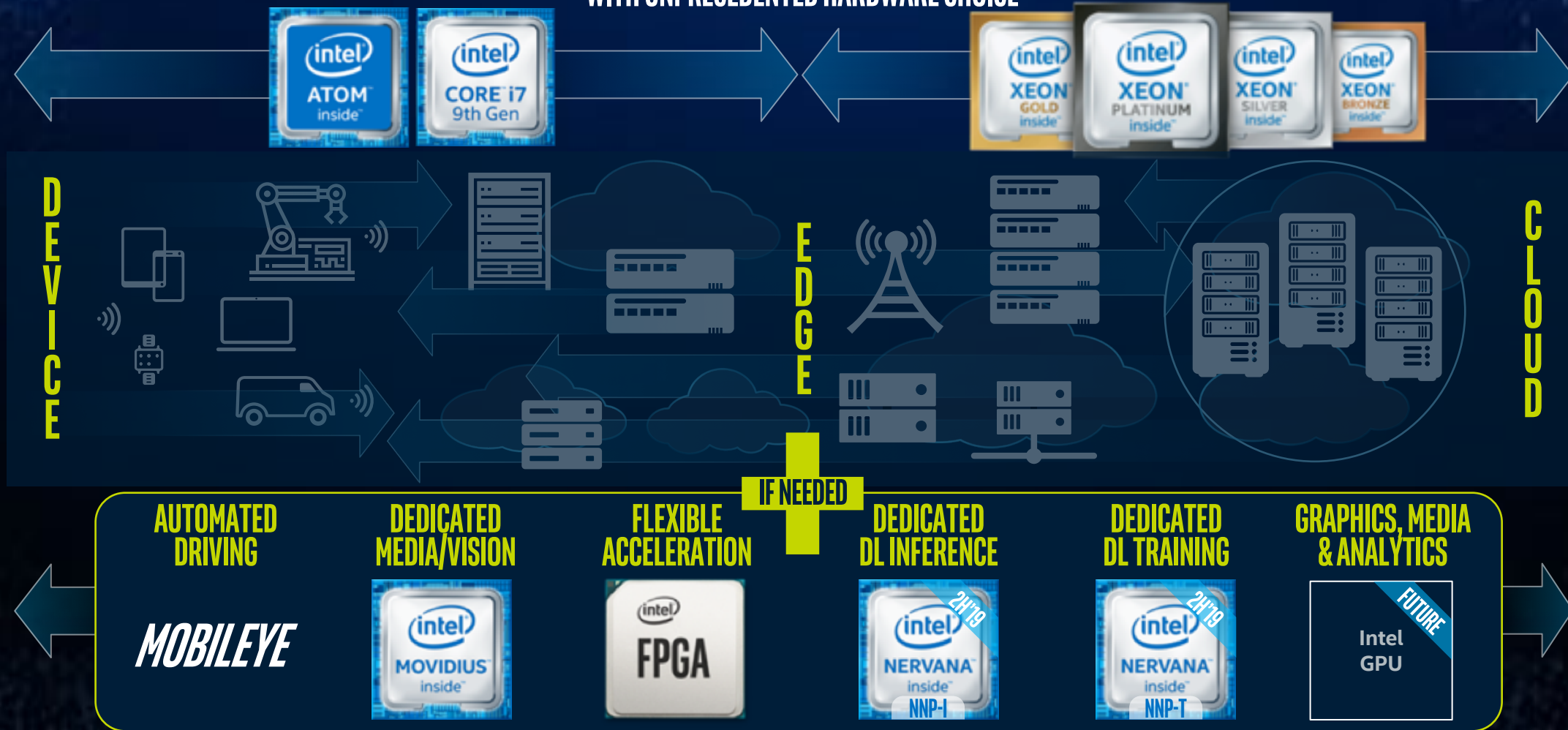**75%** faster and
2x more sophisticated[1]

ORGANIZATIONAL NEEDS SHOULD INFORM AI STRATEGY AND INFRASTRUCTURE INVESTMENTS.

Build an Analytics & AI Platform that ensures:

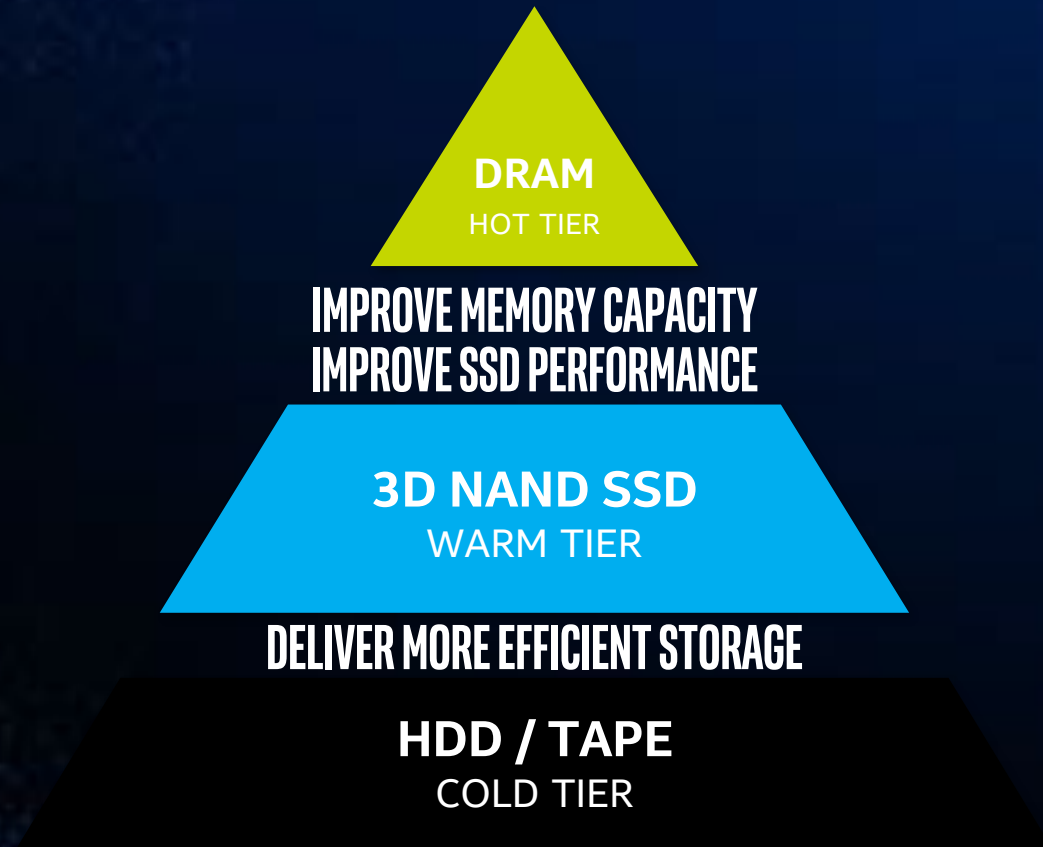- Performance & scalability
- Agility
- Consistency
- Security

• 1 Source: PwC's Global Data and Analytics Survey, July 2016: Big Decisions TM Global Base: 2,106 senior executives.

FUTURE-READY STORAGE

AGILE, EFFICIENT, ACCESSIBLE

intel OPTANE DC
PERSISTENT MEMORY

DRAM
HOT TIER

IMPROVE MEMORY CAPACITY
IMPROVE SSD PERFORMANCE

3D NAND SSD
WARM TIER

DELIVER MORE EFFICIENT STORAGE
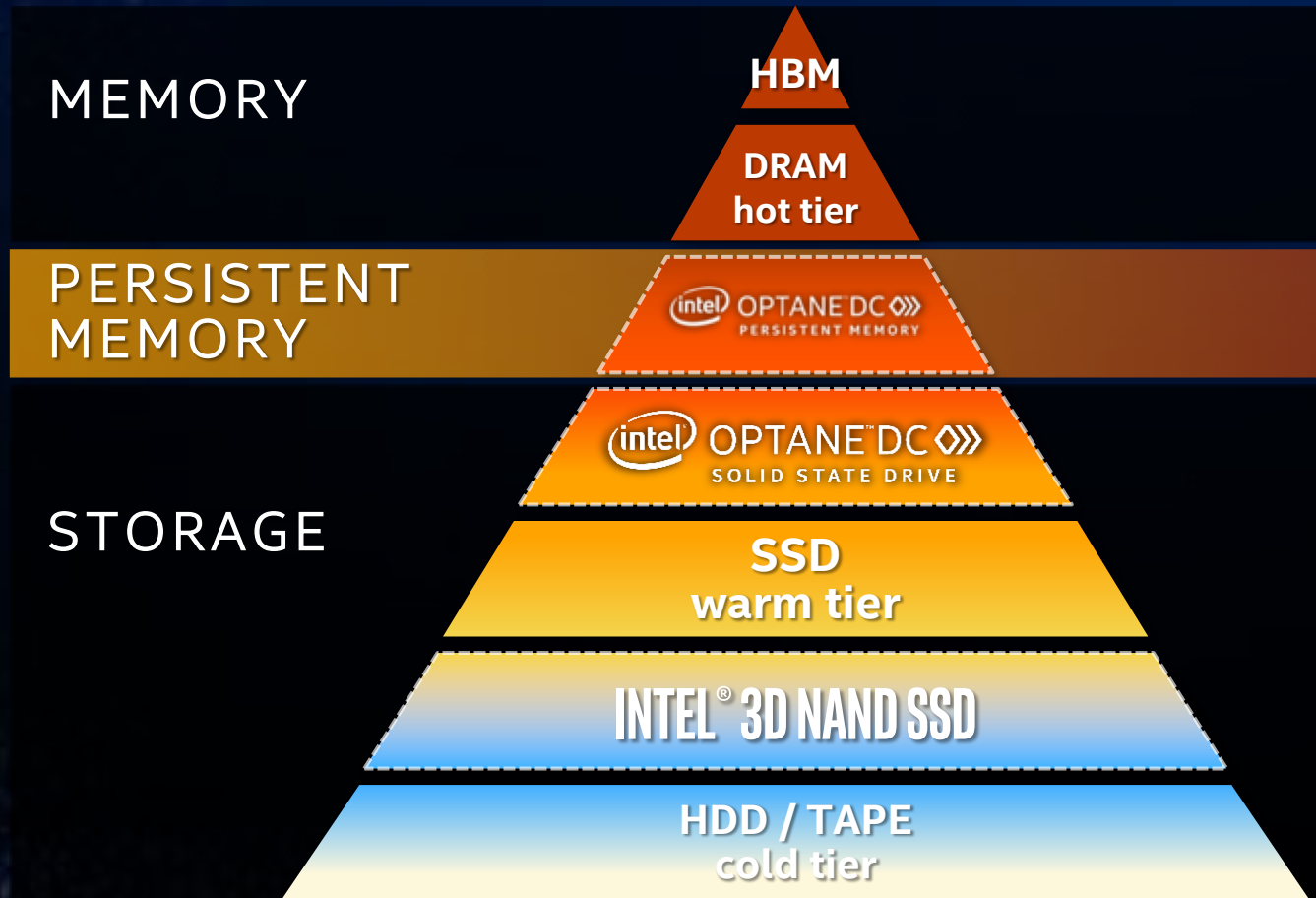
HDD / TAPE
COLD TIER

94%

of organizations have
a plan to adopt
software-defined storage[1]

UN-TIERED DATA IN LEGACY SILOS IS
INEFFICIENT TO SUPPORT DATA GROWTH
AND DRIVE BETTER DECISION MAKING.

Storage infrastructure needs to:

- Pre-position data for ready use
- Scale to meet mission needs
- Drive higher dependability
- Enable faster time to insights

# CONVERGING THE MEMORY / STORAGE HIERARCHY

MEMORY

HBM

DRAM
hot tier

PERSISTENT
MEMORY

intel OPTANE DC »»
PERSISTENT MEMORY

STORAGE

intel OPTANE DC »»
SOLID STATE DRIVE

SSD
warm tier

INTEL® 3D NAND SSD

HDD / TAPE
cold tier

intel OPTANE DC »»
PERSISTENT MEMORY

✓ BETTER PERFORMANCE

✓ HIGHER CAPACITY

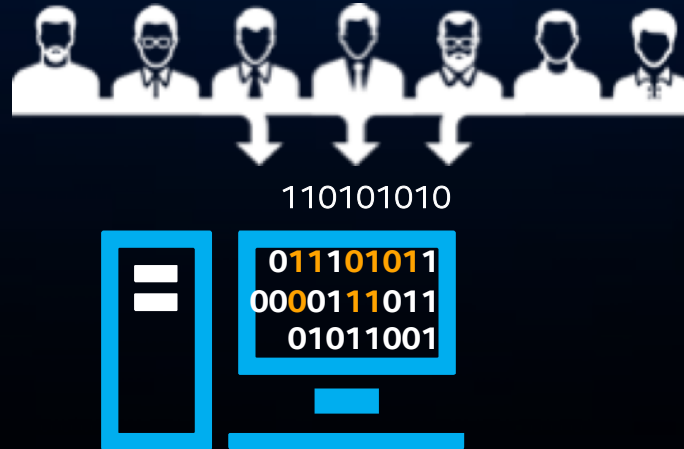✓ NEW USAGE MODELS

BIG MEMORY
BIGGER INSIGHTS

THREE FORCES IMPACTING DATA CENTER SECURITY

EXPANSION
OF ATTACK SURFACE
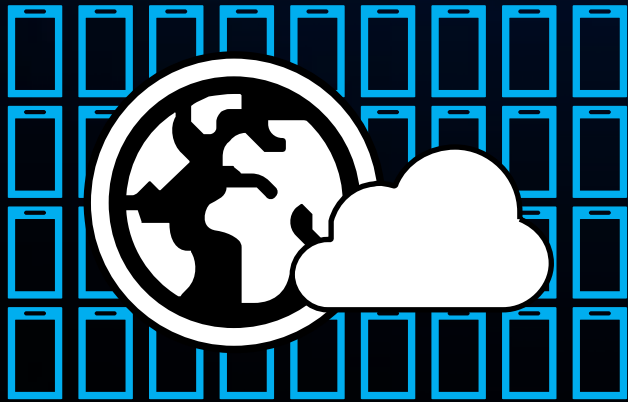
Billions of connected devices and the move to the cloud

INDUSTRIALIZATION
OF HACKING

110101010
011101011
000011011
01011001

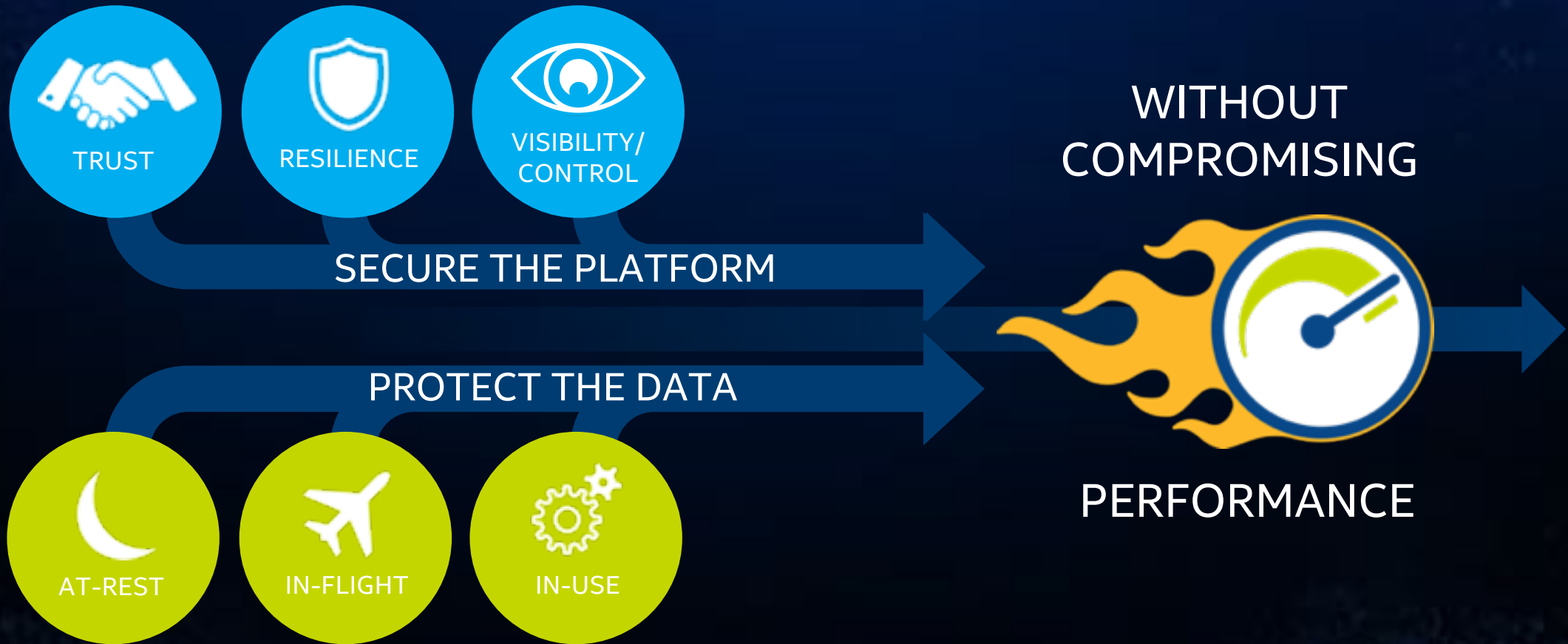Criminal sophistication and evolving intent to get to your data

FRAGMENTATION
OF SOLUTIONS

Thousands of products from hundreds of vendors

INTEL'S DATA CENTER SECURITY STRATEGY

EFFECTIVE SECURITY IS BUILT ON A FOUNDATION OF TRUST

TRUST

RESILIENCE

VISIBILITY/ CONTROL

SECURE THE PLATFORM

PROTECT THE DATA

AT-REST

IN-FLIGHT

IN-USE

WITHOUT COMPROMISING

PERFORMANCE

- ****No computer system can be absolutely secure**

END-TO-END SECURITY SOLUTIONS

SECURITY MITIGATIONS
CPU ARCHITECTURE UPDATES TO ENHANCE PROTECTION

TRUSTED PLATFORM
HARDWARE BASED ASSURANCE

DATA PROTECTIONS
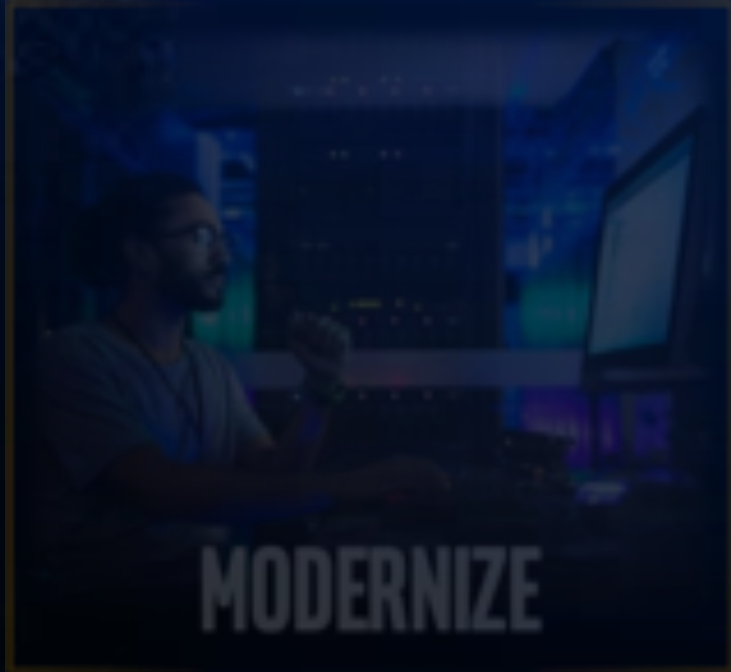ENCRYPTION
IN FLIGHT, AT REST, IN USE

FULL-STACK SOLUTIONS
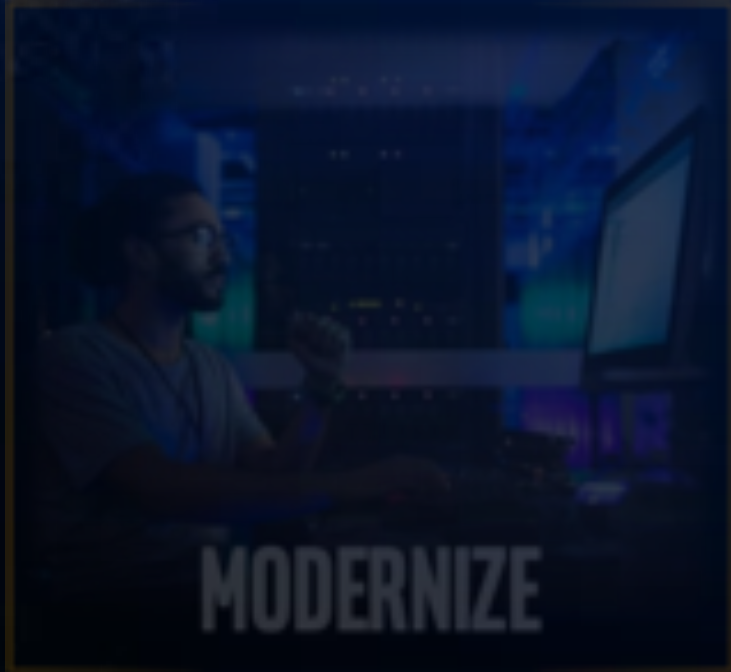OPTIMIZED SOFTWARE AND HARDENED PLATFORMS

Other names and brands may be claimed as the property of others.

REAL WORLD EXPERIENCES

MODERNIZE

DEPARTMENT OF JUSTICE

HARNESS DATA

SECURE DATA

STRATEGY + CULTURE + PEOPLE

CALL TO ACTION

MODERNIZE

HARNESS DATA

SECURE DATA

DRIVE FUTURE-PROOF TRANSFORMATION NOW

INTEL: 50 YEARS OF INNOVATION

1965
MOORE'S LAW
Gordon Moore authors paper predicting the rate of growth of IC components in Electronics magazine. His observation was later termed 'Moore's Law'

1971
FIRST MICROPROCESSOR
Intel's Ted Hoff invents the first microprocessor (called the 4004, 2300 transistors)

1995
5.5 MILLION TRANSISTORS
Intel introduces Intel® Pentium® Pro processor (5.5 million transistors)

2010
ENCRYPTION
Intel Xeon Processor 6500/7500 Series, Intel Xeon Processor E7-8800/4800/2800 Product Families

2006
VIRTUALIZATION
Dual-Core Intel® Xeon® Processor 5000 Series, Dual-Core Intel Xeon Processor LV and ULV, Dual-Core Intel Xeon Processor 5100 Series

2001
42 MILLION TRANSISTORS
Intel introduces Intel Pentium 4 processor (42 million transistors)

2012
1ST CLOUD CUSTOM CPU, VISUAL CLOUD, STORAGE
Intel Xeon Processor E5-4600/2600/1600 Product Families

2015
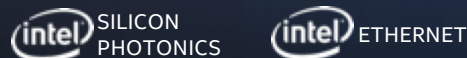**DATABASE**
Intel Xeon Processor E7-8800/4800 v3 Product Families

2017
AI, NETWORK & HPC
Intel Xeon Processor E3-1200 v5 Product Family

YOUR TRUSTED INNOVATION PARTNER

WHY INTEL

PORTFOLIO & SYSTEMS

intel STRATIX 10 inside
intel XEON PLATINUM inside
intel NERVANA inside

intel ATOM inside
intel MOVIDIUS inside

intel OPTANE DC ◊》 SOLID STATE DRIVE
intel OPTANE DC ◊》 PERSISTENT MEMORY

intel SILICON PHOTONICS
intel ETHERNET

intel select ✦ solution

OPTIMIZED PLATFORMS

ECOSYSTEM

VALUE CHAIN ENABLING
13K - OXM, ISV, SI, USERS

TECHNOLOGY & INDUSTRY LEADERSHIP

ARTIFICIAL INTELLIGENCE

WORKLOAD ACCELERATION

SECURITY

SUPPORT

PLATFORM HW & SW ENABLING

SW TOOLS & COMPILERS

INVESTMENT IN OPTIMIZED PLATFORMS - 15,000 INTEL SW ENGINEERS