

# INTEL UPDATE

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# OUR VISION: THE GREATEST SCIENTIFIC AND CREATIVE BREAKTHROUGHS ARE MADE POSSIBLE BY INTEL

AI

ANALYTICS

MEDICAL IMAGING

PRIVATE CLOUD

PRECISION MEDICINE

VISUALIZATION

SIMULATION

GENOMICS

# THE HPC OPPORTUNITY

## HPC Market



Est. HPC revenue  
~\$30B in 2021 at  
~7% CAGR<sup>1</sup>

## Data Analytics



Server revenue  
CAGR ~17%; >\$4  
billion in 2021<sup>2</sup>

## Artificial Intelligence



DL in HPC server  
revenue CAGR  
~81%, overall AI-  
HPC market ~30%  
CAGR by 2021<sup>3</sup>

## Cloud



>65% of HPC  
workloads are in  
private-hybrid  
clouds<sup>4</sup>

## HPC Workloads Expanding to Become Pervasive Across Industries

<sup>1</sup> Source: Worldwide HPC Application Workloads Market Forecast Update, 2016–2021, July 2017

<sup>2</sup> Worldwide HPC-based Artificial Intelligence (AI) Market Forecast Update, 2016–2021, July 2017

<sup>3</sup> Source: Attributes of the Top National Buyers of HPC Resources for Deep Learning and Machine Learning, 2018

<sup>4</sup> Source: Hyperion, Types of Clouds Used for HPC Workloads, 2017

# HPC GROWTH VECTORS

Supercomputers

New Use Cases

AI-HPDA-Mod-Sim

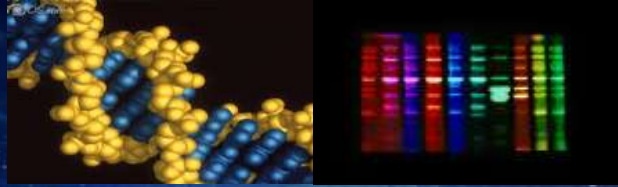
Cloud

On-Prem/Hybrid

Exa

# THE COMING DELUGE OF DATA

## Data explosion challenge



### *The Life Sciences Data Challenge <sup>1</sup>*

**Cryo-Electron Microscopy:  
25TB/device/day**

In 2014, Lead Sequencer: <1TB/device/day, "\$1000 genome"

In 2017, Lead Sequencer: 3.6TB/device/day, "\$100 genome"



### *The Worlds Largest Radio Telescope <sup>2</sup>*

**10 Billion Data Streams**

Incoming data: 10 petabytes

Output 3D image: 1 petabyte per image

Storage: 80 petabytes

## THE SCIENTIFIC OPPORTUNITY OF BIG DATA: DRIVING INSIGHTS

- Source 1: Intel
- Source 2: <https://www.hpcwire.com/2017/11/17/sc17-keynote-hpc-powers-ska-efforts-peer-deep-cosmos/>

# PREDICTIVE ANALYTICS BUSINESS IMPACT

80%

Accuracy in predicting likelihood of an RRT (Rapid Response Team) event within 1 hour<sup>1</sup>



70%

Accuracy in prediction of prolonged ventilation 48 hours in advance of respiratory failure<sup>2</sup>



85%

Accuracy in identifying Sepsis cases 30 hours before onset of septic shock<sup>3</sup>



1. Using Machine Learning and EMR data to Predict Patient Decline: <https://www.intel.com/content/dam/www/public/us/en/documents/case-studies/using-machine-learning-and-emr-data-to-predict-patient-decline-study.pdf>
2. Montefiore Data Analytics Platform Advances Patient Care; <https://www.intel.com.au/content/www/au/en/healthcare-it/solutions/documents/montefiore-advance-patient-care-solution-brief.html>
3. 'Penn Signals Big Data Analytics Helps Penn Medicine Improve Patient Care; Healthcare IT news article <http://www.healthcareitnews.com/sponsored-content/penn-signals-big-data-analytics-helps-penn-medicine-improve-patient-care-0>

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# INTEL'S HPC PORTFOLIO

**Server** CPUs • Chipsets • Ethernet • Boards/Systems • FPGA

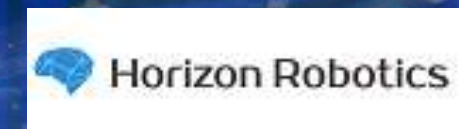
**Storage** CPUs • Flash • SSDs

**Network** CPUs • Accelerators • Ethernet & Omnipath

**Software** Lustre File System • AI Frameworks • OpenHPC

# FROM DATA CENTERS TO THE EDGE INTEL'S COMMITMENT TO AI & HPC

## Major Acquisitions – Strategic Investments



Over 4.5 years, INTEL focus is on AI and HPC  
>\$30B in Acquisitions & Investments

Source: [Intel](#)



# >100+ INTEL PARALLEL COMPUTING CENTERS

- Managing **100+** Intel® PCCs working on **150+** SW codes, across **18** different domains with global reach from **17** countries
- **450+** publications for sharing learnings
- **63** codes/frameworks were optimized and released on IA

Source: <https://software.intel.com/en-us/ipcc>

# Intel Parallel Computing Centers Community



*Collaborating to accelerate the pace of discovery*

# Intel Parallel Computing Centers Community



Collaborating to accelerate the pace of discovery



**INTEL IS DEEPLY INVESTED IN HPC & WE  
WILL CONTINUE TO PARTNER WITH YOU  
TO STRENGTHEN AND DRIVE OUR  
COLLABORATIONS**

**THANK YOU!**

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