

## Special Study

# Attributes of the Top National Buyers of HPC Resources for Deep Learning and Machine Learning

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### HYPERION RESEARCH OPINION

Hyperion Research covers the worldwide market for deep learning (DL) and machine learning (ML) that is challenging enough to require the use of HPC server systems and other HPC resources (we do not cover the mainstream DL/ML market that does not use HPC, e.g. social media and large internet providers).

Our current market sizing and five-year forecast for HPC-based ML and DL, which are subsets of HPC-based artificial intelligence (AI), stresses that HPC-based ML and DL today are small, formative markets that will grow very quickly. See Table 1.

**TABLE 1**

**Worldwide M/L, D/L and AI HPC-Based Revenues (\$ Millions)**

	2015	2016	2017	2018	2019	2020	2021	CAGR 16-21
M/L in HPC	\$203	\$282	\$373	\$478	\$548	\$546	\$594	16.0%
D/L in HPC	\$15	\$31	\$93	\$159	\$258	\$395	\$618	81.5%
Other AI In HPC	\$28	\$32	\$34	\$36	\$39	\$44	\$48	8.4%
<b>Total</b>	<b>\$246</b>	<b>\$346</b>	<b>\$501</b>	<b>\$673</b>	<b>\$845</b>	<b>\$986</b>	<b>\$1,260</b>	<b>29.5%</b>

Source: Hyperion Research 2017

Large companies and government organizations (rather than small and medium-size enterprises) will be the most important buyers of HPC-based DL and ML during the forecast period. In almost all cases, the largest buyers in this market will be the largest existing buyers of HPC for modeling and simulation – they are adding DL and ML to their mix of workloads. A smaller number of enterprise IT organizations will become new adopters of HPC for DL and ML. This report characterizes HPC DL/ML buyers for the most important countries.

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## ATTRIBUTES OF HPC ML AND DL KEY BUYERS, BY COUNTRY

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Countries listed below that we expect to be the top buyers of HPC-based ML and DL share many attributes but differ from each other in important ways.

### United States

Here are the expected main U.S. buyers of HPC-based ML and DL:

- **Government:** Strong contingent of federal government buyers, including by not limited to consumer-facing agencies (e.g., Department of Energy, National Science Foundation, NASA, Centers for Medicare and Medicaid Services, National Institute of Health, intelligence community (cyber security, operations), NCAR and NOAA for knowledge discovery forecast algorithms).
- **Academia:** The largest research universities
- **Industries:** Automotive (autonomous vehicle design), aerospace, health care (personalized medicine), pharmaceutical (molecular dynamics for drug discovery), financial services (high frequency trading, portfolio optimization), social media (personal digital assistants, search algorithms), electronics, oil and gas

### China (PRC)

Here are the expected main PRC buyers of HPC-based ML and DL:

- **Government:** Strong contingent of central government and government-related buyers (e.g., NUDT), including by not limited to weather centers, health care agencies, planning agencies; regional and city governments for Smart Cities functions (traffic management, power grid management, Internet of Things), intelligence community (cyber security, operations)
- **Academia:** The largest research universities
- **Industries:** Aerospace, financial services (high frequency trading, portfolio optimization), social media (personal digital assistants, search algorithms), online gaming, film industry, electronics, oil and gas

### Germany

Here are the expected main German buyers of HPC-based ML and DL:

- **Government:** Central and regional governments, including by not limited to weather services, national health service, planning agencies, intelligence community (cyber security, operations)
- **Academia:** The largest research universities
- **Industries:** Banking/financial services (high frequency trading, portfolio optimization), social media (personal digital assistants, search algorithms), automotive and other manufacturing, electronics

### United Kingdom

Here are the expected main UK buyers of HPC-based ML and DL:

- **Government:** Central and national governments (England, Scotland, Ireland, Wales), including by not limited to weather services, national health service, planning agencies, intelligence community (cyber security, operations), Research Councils
- **Academia:** The largest research universities

- **Industries:** Banking/financial services (high frequency trading, portfolio optimization), automotive and other manufacturing, aerospace, oil and gas (North Sea oil)

## France

Here are the expected main French buyers of HPC-based ML and DL:

- **Government:** Central government, including by not limited to weather services, national health service, planning agencies, intelligence community (cyber security, operations), ANR (national research agency), aerospace
- **Academia:** The largest research universities
- **Industries:** Banking/financial services (high frequency trading, portfolio optimization), automotive and other manufacturing, aerospace, machinery, chemicals, electronics

## Japan

Here are the expected main Japanese buyers of HPC-based ML and DL:

- **Government:** Central government, including by not limited to weather service, national health service, planning agencies, intelligence community (cyber security, operations), MEXT
- **Academia:** The largest research universities
- **Industries:** Banking/financial services (high frequency trading, portfolio optimization), automotive and other manufacturing, aerospace, electronics, pharmaceuticals, shipbuilding

## Switzerland

Here are the expected main Swiss buyers of HPC-based ML and DL:

- **Government:** Central government, including by not limited to weather service (Meteo Swiss), national health service, planning agencies, research centers (e.g., EPFL, ETHZ, CERN)
- **Academia:** The largest research universities
- **Industries:** Banking/financial services (high frequency trading, portfolio optimization), pharmaceuticals (e.g., Novartis), chemicals, textiles

## About Hyperion Research, LLC

Hyperion Research provides data-driven research, analysis and recommendations for technologies, applications, and markets in high performance computing and emerging technology areas to help organizations worldwide make effective decisions and seize growth opportunities. Research includes market sizing and forecasting, share tracking, segmentation, technology and related trend analysis, and both user & vendor analysis for multi-user technical server technology used for HPC and HPDA (high performance data analysis). We provide thought leadership and practical guidance for users, vendors and other members of the HPC community by focusing on key market and technology trends across government, industry, commerce, and academia.

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