Quick Take

Projected Major Near Exascale and Exascale Roll Outs and Revenues 2020-2025

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HYPERION RESEARCH OPINION

Countries around the world are developing plans for the next generation of large supercomputers, with investments that exceed $300 million per system in many cases. This Quick Take provides Hyperion Research's estimate of schedules of installations and prices of accepted near-exascale and exascale supercomputers around the world.

Note that this Quick Take focuses on when systems are fully accepted. In many cases they will be installed 6 to 12 months before being fully accepted.

Hyperion Research projects that major government-sponsored efforts will drive the development of about 26 near-exascale and exascale systems in the 2020 to 2025 time frame, with a total price tag of around $9 billion. Projections indicate that in 2021, the combined major HPC development entities, China, the EU, Japan, and the United States, will start installing 4 to 5 near-exascale or exascale systems costing a total of close to $2 billion, an historic high-water mark.

- Subsequently, the sector will see an average of 4 to 5 new high-end HPCs per year out to 2025, with total annual revenues in the $1.4 to $1.7 billion range.
- It is unclear if future large supercomputers will stay at these price levels or return to a more modest price level.

CONTINUED EXASCALE ROLL OUTS FOR THE FORESEEABLE FUTURE

Hyperion Research expects that world-wide efforts to development HPC systems capable of achieving sustained exascale performance on 64-bit workloads will reach fruition in the 2021 to 2023 time frame, when each major exascale development nation or regional entity will have installed one or more exascale systems. As seen in Table 1, and based on announced development plans and time tables, Hyperion Research believes that China may be the first nation to install an exascale system, followed closely by the United States, and then the EU and Japan.

- EU plans call for the development of an indigenous exascale system and processor, in addition to the procurement of one or more non-indigenous HPCs to meet their overall exascale procurement plans. Because calls for pre- and full-exascale computers will be for production (rather than research) systems, they will follow EU rules prohibiting favoritism, so indigenous European systems will need to compete and win on their own merits.
- Japan's Post-K system will also make its first appearance in 2021 and is classified as a near exascale system, but its sophisticated design should enable the Post-K to outperform some counterpart exascale machines on a wide range of workloads.

TABLE 1

Projected Pre-Exascale and Exascale Acceptances 2020-2025

Year Accepted	China	EU	Japan	US	Total Installations	Total Price
2020	1 pre-exascale	1 pre-exascale	-	1 pre-exascale	3-4	~$750 Million
2021	1 pre-exascale 1 near-exascale	1 pre-exascale	1 (Post K Accepted)	1 pre-exascale	4-5	~$1,900 Million
2022	1 or 2 exascale	1 near-exascale	?	2 exascale	4-5	~$1,700 Million
2023	1 exascale	1 exascale	1 near-exascale ($100 million)	1 or 2 exascale	4	~$1,500 Million
2024	1 exascale	1 exascale	?	2 exascale	4	~$1,400 Million
2025	2 exascale	1 or 2 exascale	1 near-exascale ($100 million)	1 exascale	5-6	~$1,600 Million

Source: Hyperion Research 2019

FUTURE OUTLOOK

Ultimately, Hyperion Research expects the introduction of about six exascale systems in China, three to four in the EU, and six in the United States, during the 2021 to 2025 time frame with an average price tag that exceeds $400 million. It is unclear to what extent future (beyond 2025) large supercomputers will continue to be purchased in the $400 million plus price range or will return to more "modest" price levels in the $100 to $250 million price range per system.

- Hyperion Research expects that by 2024 or so, mainstream exascale-class systems less costly than the initial leading-edge exascale systems will be entering the commercial and academic sectors.