

IT Hardware Industry

The Quantum Spin No. 4

Industry Overview

PsiQuantum: private hardware company - photonic qubits

We recently spoke with PsiQuantum's Co-Founder & Chief Scientific Officer Pete Shadbolt and CFO Susan Kim. We walked away optimistic on PsiQuantum's ability to drive QC successfully & impressed at the steady operational execution such as addressing multiplexing with an optical switch made of Barium Titanate & breaking ground in Chicago in September 2025. Founded in 2016, PsiQuantum's strategy to deploy a million-qubit system is centered on using single photons to achieve manufacturing feasibility, scalability, & high-fidelity qubits through existing mature fabs, contract manufacturers, & fiberoptic networking. PsiQuantum is developing a fault-tolerant quantum computer with silicon photonics & semiconductor manufacturing techniques, while also developing cooling, networking, & control systems. In 2019, it partnered with GlobalFoundries to integrate quantum photonic devices into GFS' Fab 8. Omega, PsiQuantum's chipset, integrates superconducting single photon detectors, single photon sources, & a high-performance optical switch into a single ultra-low-loss silicon nitride platform. Construct (a QDE) is PsiQuantum's software suite used to design, develop, & optimize quantum algorithms. PsiQuantum raised \$1bn in its Series E round in September 2025 at a valuation of \$7bn. See 5 related exhibits starting Page 3.

Classiq: private software company – quantum algo design

Founded in 2020, Classiq provides a comprehensive QC software stack that streamlines quantum development processes for developers. Classiq's platform is integrated with quantum hardware, simulators, and classical execution backends, making quantum development scalable, robust, and adaptable. Workflow on Classiq flows through four steps: 1) Model (designing quantum circuits in a user-friendly environment using SDKs and IDEs); 2) Synthesize (automatically generate optimized quantum circuits via EDA-inspired synthesis engine that accounts for developer preferences & HW constraints); 3) Analyze (visualizing & debugging circuits); and 4) Execute (running circuits on quantum & classical backends through integrated cloud services). Classiq offers Qmod, its quantum programming language, and supports major QPUs and quantum clouds. Today, Classiq serves customers like Rolls Royce. In November 2025, Classiq brought its total funding to \$200mn with investments from AMD and Qualcomm. See Page 5 for related exhibits.

Weekly recap of quantum computing news flow

Monday: NVIDIA announced that supercomputing centers globally are adopting NVQLink, which enables the coupling of QPUs & GPUs. NVDA CEO Jensen Huang stated, "in the future, supercomputers will be quantum-GPU systems." Monday: IonQ announced its acquisition of Skyloom, an optical comm infra company. Tuesday: AQT (details in section 6.10 in our [QC industry primer](#)) announced its IBEX Q1 system is now available on Amazon Braket. Thursday: IBM announced collaborating with Cisco on networked distributed QC, with plans to deliver a proof-of-concept by 2030. IBM plans to build a quantum networking unit (QNU) that will connect QPUs by converting stationary quantum information into "flying" quantum information. Cisco's quantum network aims to distribute entanglement between QNUs on-demand via a SW protocol framework.

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Refer to important disclosures on page 8 to 11. Analyst Certification on page 7. Price Objective Basis/Risk on page 7.

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See our proprietary QPU progress tracker (Figure 2) in Page 2

Quantum Computing Exhibits

DARPA's QBI: 11 companies remain at Stage B, no changes

DARPA's Quantum Benchmarking Initiative was announced in 07/24 as an expansion of the Underexplored Systems for Utility-Scale Quantum Computing program which was announced in 01/23. For further details on QBI stages and related companies, see Fig 1.

Figure 1: 11 out of the 15 companies that were in Stage A of DARPA's QBI have moved to Stage B

QC companies noted under DARPA's QBI per most recent PR from November 2025

Stage A			Stage B			Stage C		
Company	Public/Private	Modality	Company	Public/Private	Modality	Company	Public/Private	Modality
Google Quantum AI*	NASDAQ: GOOGL	Superconducting Transmon Qubits	IBM	NYSE: IBM	Superconducting Qubits	PsiQuantum	Private	Photonics
HPE	NYSE: HPE	Partnerships**	IonQ***	NYSE: IONQ	Trapped Ions	Microsoft	NASDAQ: MSFT	Topological
Rigetti	NASDAQ: RGTI	Superconducting	Nord Quantique	Private	Superconducting Qubits			
Alice & Bob	Private	Superconducting Cat Qubits	Photonic Inc.	Private	Silicon Spin Qubits (Photonically Linked)			
			Quantum Motion	Private	Spin Qubits			
			QuEra	Private	Neutral Atoms			
			Silicon Quantum Computing	Private	Spin Qubits			
			Xanadu	Private	Photonics			
			Atom Computing	Private	Neutral Atoms			
			Diraq	Private	Silicon Spin Qubits			

Source: DARPA, BofA Global Research

Note: *GOOGL acquired Atlantic Quantum in October 2025, a QBI Stage A startup, furthering strengthening its in-house quantum division; **DARPA outlines HPE as a Stage A company & we note HPE has partnered with others to oversee research efforts in full-stack quantum-HPC integration; ***IonQ acquired Oxford Ionics in June 2025, a QBI Stage A startup; Microsoft & PsiQuantum were in the second phase of US2QC when QBI started

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QPU Progress Tracker

Figure 2: Today, there are various modalities being pursued by public and private players and a wide range of progress with qubit counts and gate fidelity.

Proprietary tracker of QC progress

Company	Public / Private	Architecture	Latest System	Physical Qubits	1Q Fidelity	2Q Fidelity	Logical Qubits	SW Stack
Amazon	NASDAQ: AMZN	Superconducting (cat qubit)	Ocelot chip	N/A	N/A	N/A	5*	Braket SDK
D-Wave	NYSE: QBTS	Superconducting	Advantage2 system	4,400+	N/A	N/A	N/A	Ocean
Google	NASDAQ: GOOGL	Superconducting	Willow chip	105	99.9650%	99.6700%	N/A	Cirq & Qualtran
IBM	NYSE: IBM	Superconducting	Nighthawk QPU	N/A	N/A	99.9500%**	120	Qiskit
Infleqtion	Going public via SPAC deal	Neutral Atom	Sqale	1600	N/A	99.730%	8	Superstaq
Intel	NASDAQ: INTC	Silicon Spin	Tunnel Falls chip	12	N/A	N/A	N/A	Intel Quantum SDK
IonQ	NYSE: IONQ	Trapped Ion	Forte Enterprise	36	N/A	99.9900%	N/A	IonQ Quantum OS & Hybrid Services
Microsoft	NASDAQ: MSFT	Topological	Majorana 1 chip	N/A	N/A	N/A	N/A	QDK
Quantum Computing Inc.	NASDAQ: QUBT	Photonic	DIRAC-3	N/A	N/A	N/A	N/A	N/A
Rigetti	NYSE: RGTI	Superconducting	Cepheus-1-36Q	36	99.9000%	99.5000%	N/A	QCS stack
Xanadu	Going public via SPAC deal	Photonic	X-Series	216	N/A	99.9900%	N/A	PennyLane & Catalyst + Lightning
Alice & Bob	Private	Superconducting (cat qubit)	Boson 4	1***	N/A	N/A	N/A	N/A
Alpine Quantum Technologies	Private	Trapped Ion	Marmot	20	99.9600%	98.4700%	N/A	ARNICA supports major SDKs
Anyon Systems	Private	Superconducting	Qube	24	N/A	N/A	N/A	Snowflurry
Atom Computing	Private	Neutral Atom	AC1000	1,200+	99.9000%+	99.6000%+	N/A	N/A
Diraq	Private	Silicon Spin	N/A	N/A	N/A	N/A	N/A	N/A
EeroQ	Private	Superfluid Helium	N/A	N/A	N/A	N/A	N/A	N/A
eleQtron	Private	Ion-based with microwaves	Quantum computer with magnetic gradient induced coupling	N/A	N/A	N/A	N/A	N/A
IQM	Private	Superconducting	Halocene (IQM Crystal 150 QPU)	150	N/A	99.7000%	5	Specialized SDK + supports Qrisp, Qiskit, Cirq, & Cuda Quantum
Nord Quantique	Private	Superconducting	N/A	N/A	N/A	N/A	N/A	N/A



Figure 2: Today, there are various modalities being pursued by public and private players and a wide range of progress with qubit counts and gate fidelity.
Proprietary tracker of QC progress

Company	Public / Private	Architecture	Latest System	Physical Qubits	1Q Fidelity	2Q Fidelity	Logical Qubits	SW Stack
OQC	Private	Superconducting	Genesis	N/A	N/A	N/A	16	OQC Cloud
ORCA Computing	Private	Photonic	ORCA PT-2	N/A	N/A	N/A	N/A	N/A
Pasqal	Private	Neutral Atom	Orion Gamma	140	N/A	N/A	N/A	Pasqal Software Suite
Photonic Inc.	Private	Silicon Spin (Photonically-Linked)	N/A	N/A	N/A	N/A	N/A	N/A
PsiQuantum	Private	Photonic	Omega chipset	N/A	99.9900%	>99%	N/A	Construct
Qolab	Private	Superconducting	N/A	N/A	N/A	N/A	N/A	N/A
Quandela	Private	Photonic	Belenos	12	N/A	N/A	N/A	Perceval
Quantum Brilliance	Private	Diamond	Gen1	N/A	N/A	N/A	N/A	Qristal
Quantum Circuits Inc	Private	Superconducting	Aqumen Seeker	N/A	N/A	N/A	N/A	Aqumen SDK
Quantum Motion	Private	Silicon Spin	300mm CMOS quantum computer	4	N/A	N/A	N/A	Compatible with Qiskit & Cirq
QuEra	Private	Neutral Atom	Gemini-Class Gate-Model Quantum Computer	260	99.9000%	99.2000%	N/A	Bloqade
QuiX Quantum	Private	Photonic	Universal Quantum Computer	64	N/A	N/A	N/A	N/A
SemiQon	Private	Silicon Spin	SemiQit	N/A	N/A	N/A	N/A	N/A
Silicon Quantum Computing	Private	Silicon Spin	Jalapeño 1	3	99.9900%	99.9500%	N/A	N/A
SpinQ	Private	Superconducting	SPINQ QPU C Series - C25	25	99.8000%	98.0000%	N/A	SpinQit & QEDA
Universal Quantum	Private	Trapped Ion	N/A	N/A	N/A	N/A	N/A	N/A

Source: Company websites, BofA Global Research

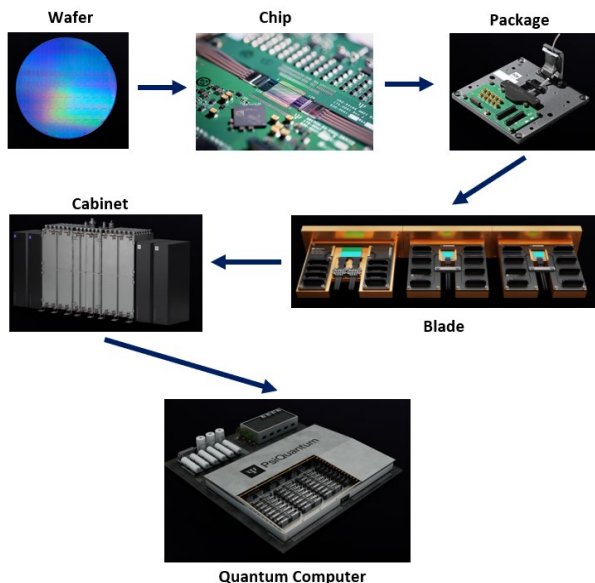
Note: Numbers and QPU generations are constantly changing, non-exhaustive list of current QC companies, N/A represents either data unavailable or unknown, IQM 2QG is a target & Halocene supports up to 5 logical qubits, Willow fidelity is based on quantum error correction; *Ocelot has five data qubits (the cat qubits), five buffer circuits for stabilizing the data qubits, and 4 qubits for detecting errors on the data qubits; **2QG mentioned during IBM quantum day regarding Heron r3 as Nighthawk QPU 2QG not disclosed yet; ***refers to cat qubit

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PsiQuantum Exhibits

Figure 3: PsiQuantum’s process of building a quantum computer starts with wafers

PsiQuantum’s bottom-up process for quantum computer development



Source: PsiQuantum, BofA Global Research

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Figure 4: PsiQuantum's wafers are built in a high-volume, commercial semiconductor foundry

PsiQuantum’s wafer used in the Omega chipset

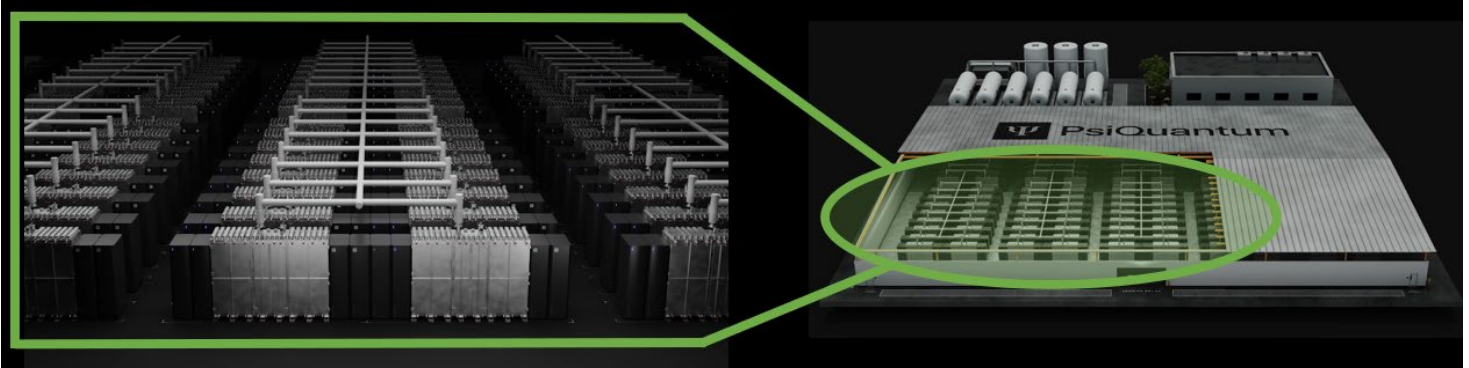


Source: PsiQuantum

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Figure 5: Cabinets networked together work cohesively to operate as one quantum computer for PsiQuantum

Inside look of PsiQuantum's quantum computer

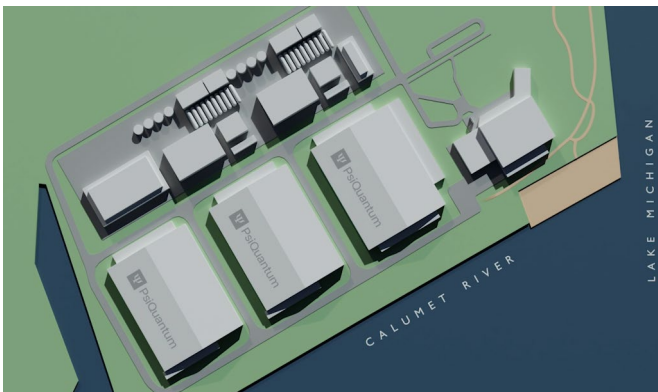


Source: PsiQuantum, BofA Global Research

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Figure 6: PsiQuantum aims to build and deploy America's first million-qubit scale, fault-tolerant quantum computer in Chicago

Rendering of PsiQuantum's site at the Illinois Quantum and Microelectronics Park in Chicago



Source: PsiQuantum

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Figure 7: Construct consists of Circuit Designer, Workbench, and Resource Analyzer

PsiQuantum's software suite Construct



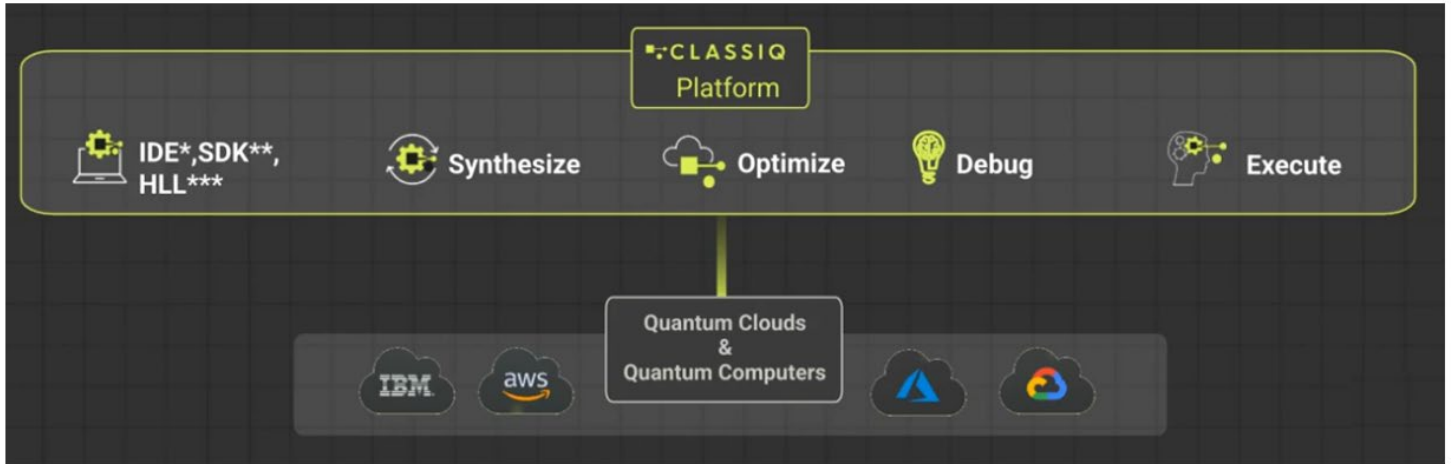
Source: PsiQuantum

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Classiq Exhibits

Figure 8: Classiq’s platform features various capabilities for developers, and it also links to major quantum computers and clouds
 Classiq platform overview

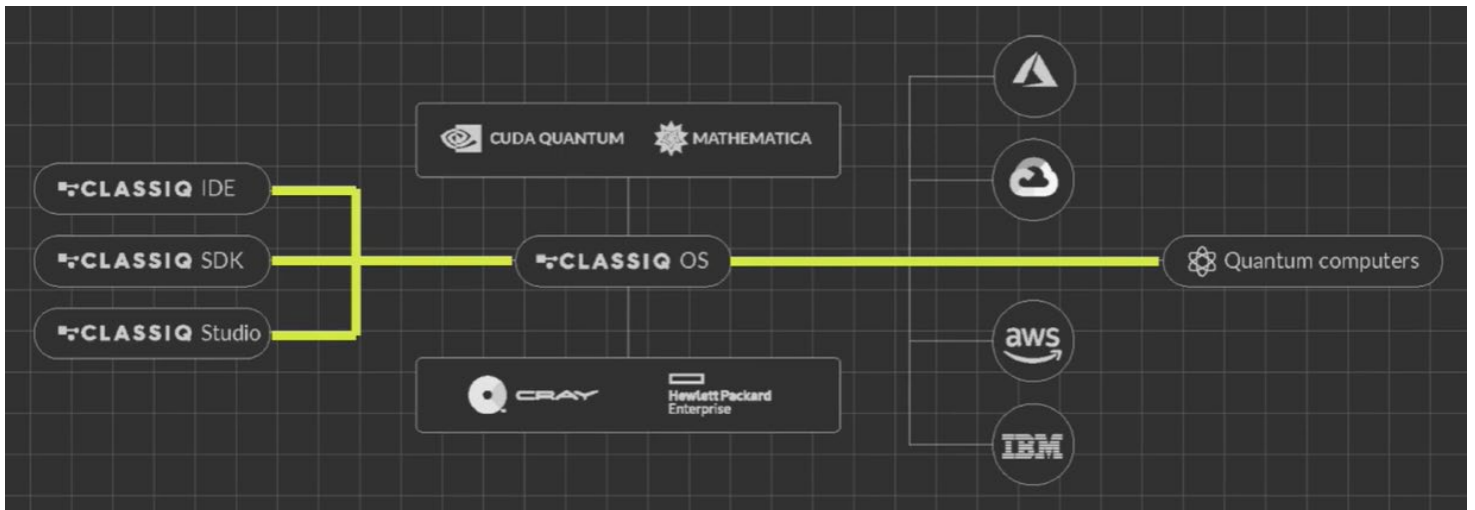


Source: Classiq

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Figure 9: From intuitive modeling in its IDE and SDK to circuit compression via its patented synthesis engine, Classiq ensures scalability, hardware flexibility, and futureproof quantum software development

Another look at Classiq’s platform structure



Source: Classiq

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Abbreviations

QC: quantum computing

QPU: quantum processing unit

GPU: graphics processing unit

CPU: central processing unit

QNU: Quantum networking uniy

AI: artificial intelligence

QBI: Quantum Benchmarking Initiative

US2QC: Utility-Scale Quantum Computing

DARPA: Defense Advanced Research Projects Agency

Qrtly: Quarterly

Revs: Revenue

Semi: Semiconductor

SW: Software

Qubit: Quantum bit

Fig: Figure

QG: Quantum gate

QDE: Quantum development environment

Algo: Algorithm

SDK: Software development kit

IDE: Integrated development environment

EDA: Electronic design automation

Comm: Communications

Infra: Infrastructure

OS: Operating system

Table 1: Stocks mentioned

Prices and ratings for stocks mentioned in this report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
HPE	HPE US	Hewlett-Packard	US\$ 20.02	B-1-7
IBM	IBM US	Int Business Machine	US\$ 290.4	B-1-7

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Price objective basis & risk

Hewlett-Packard Enterprise (HPE)

Our PO of \$29 is based on 11x our C26E pro-forma EPS of \$2.50. Our target multiple is in line with the median (9x) of the historical range (6x-13.0x). In our opinion, this multiple is justified as it balances positives including that HPE now has a better growth profile, and free cash flow will likely grow significantly by 2026 vs. near-term macro headwinds.

Downside risks to our PO are larger than expected economic slowdown due to inflation and rising interest rates, ongoing component availability concerns, more aggressive server pricing from peers, a faster than expected adoption of As-a-Service offerings which can pressure revenues in the near-term, unexpected share loss and slower than expected mix shift to higher margin products and services, FX headwinds, restructuring and execution challenges in relation to the JNPR acquisition.

Upside risks are share gains, steady margin improvement and lower than expected restructuring costs and better free cash flow, accretion from the JNPR deal.

International Business Machines Corp. (IBM)

Our PO of \$315 is based on 23x EV/FCF. Our target multiple for IBM exceeds the high end of the historical range 8-22x, with median 13x. We believe a multiple at the high end/exceeding the historical range is justified given the company's improving growth and FCF trajectory with Red Hat.

Downside risks to our price objective are (1) failure to execute on the company's growth roadmap, (2) inability to realize expected cost savings from restructuring, (3) technology/competitor risk in hardware, software, and services, (4) unforeseen currency impacts on revenue and profits, (5) acquisition integration, given IBM's acquisitive nature, and (6) increased concern of economic uncertainty and tightening corporate IT budgets.

Upside risks to our price objective are (1) faster reacceleration of topline, (2) faster improvement in margins, (3) better-than-expected accretion from M&A, and (4) delivery of upside to FCF.

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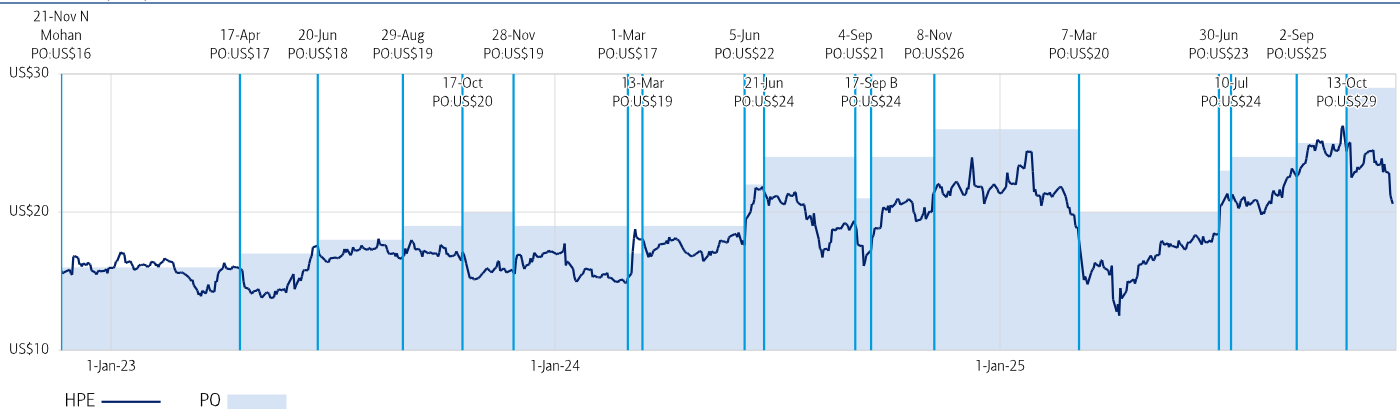
US - IT Hardware and Technology Supply Chain Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
BUY				
	Amphenol	APH	APH US	Wamsi Mohan
	Apple Inc.	AAPL	AAPL US	Wamsi Mohan
	Corning Inc.	GLW	GLW US	Wamsi Mohan
	Dell Technologies Inc.	DELL	DELL US	Wamsi Mohan
	DigitalOcean	DOCN	DOCN US	Wamsi Mohan
	Flex Ltd.	FLEX	FLEX US	Ruplu Bhattacharya
	Hewlett-Packard Enterprise	HPE	HPE US	Wamsi Mohan
	Ingram Micro Holding Corporation	INGM	INGM US	Ruplu Bhattacharya
	International Business Machines Corp.	IBM	IBM US	Wamsi Mohan
	Jabil Inc.	JBL	JBL US	Ruplu Bhattacharya
	Nutanix Inc	NTNX	NTNX US	Wamsi Mohan
	Sandisk Corporation	SNDK	SNDK US	Wamsi Mohan
	Seagate Technology	STX	STX US	Wamsi Mohan
	TD Synnex Corp	SNX	SNX US	Ruplu Bhattacharya
	TE Connectivity Plc.	TEL	TEL US	Wamsi Mohan
	Western Digital Corporation	WDC	WDC US	Wamsi Mohan
NEUTRAL				
	CDW Corp	CDW	CDW US	Ruplu Bhattacharya
	Concentrix Corporation	CNXC	CNXC US	Ruplu Bhattacharya
	HP Inc.	HPQ	HPQ US	Wamsi Mohan
	NetApp Inc.	NTAP	NTAP US	Wamsi Mohan
	Pure Storage	PSTG	PSTG US	Wamsi Mohan
	Sanmina Corporation	SANM	SANM US	Ruplu Bhattacharya
	Sensata Technologies Holdings Plc	ST	ST US	Wamsi Mohan
UNDERPERFORM				
	Arrow Electronics Inc.	ARW	ARW US	Ruplu Bhattacharya
	Avnet Inc.	AVT	AVT US	Ruplu Bhattacharya
	Super Micro Computer Inc.	SMCI	SMCI US	Ruplu Bhattacharya
	Teradata Corporation	TDC	TDC US	Wamsi Mohan
	Vishay Intertechnology, Inc.	VSH	VSH US	Ruplu Bhattacharya

Disclosures

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Hewlett-Packard (HPE) Price Chart

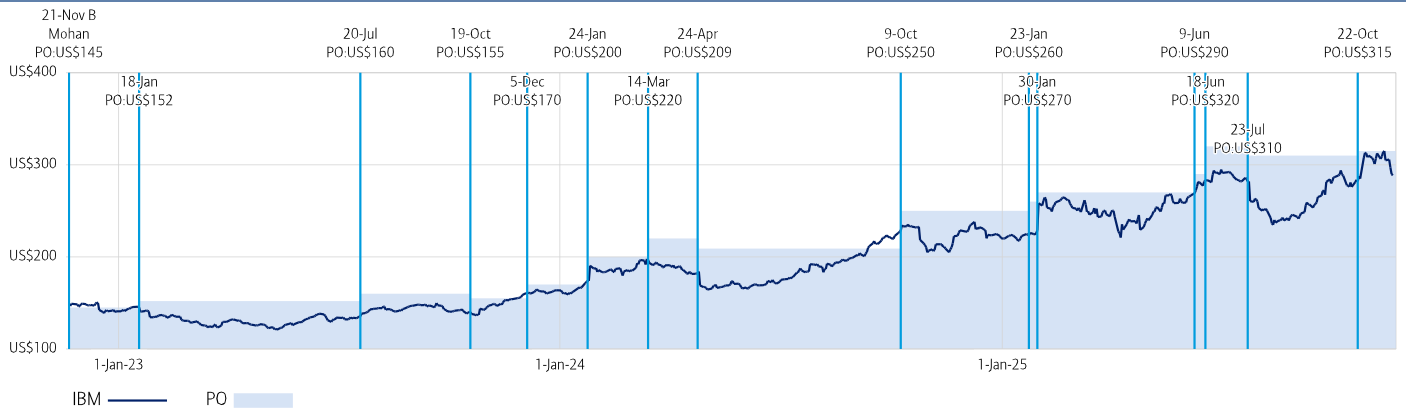


B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.



Int Business Machine (IBM) Price Chart



B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

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Equity Investment Rating Distribution: Technology Group (as of 30 Sep 2025)

Coverage Universe	Count	Percent	Inv. Banking Relationships ^{R1}	Count	Percent
Buy	195	51.72%	Buy	99	50.77%
Hold	103	27.32%	Hold	52	50.49%
Sell	79	20.95%	Sell	23	29.11%

Equity Investment Rating Distribution: Global Group (as of 30 Sep 2025)

Coverage Universe	Count	Percent	Inv. Banking Relationships ^{R1}	Count	Percent
Buy	1816	53.11%	Buy	1062	58.48%
Hold	825	24.13%	Hold	480	58.18%
Sell	778	22.76%	Sell	385	49.49%

^{R1} Issuers that were investment banking clients of BofA Securities or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster ^{R2}
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Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

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