

## Software

# AI Evolution: NVDA AI app launch – a preview of what’s to come

Industry Overview

## Nvidia’s Chat with RTX expands AI app functionality

Nvidia (NVDA) released the beta version of its Chat with RTX AI app on Feb 13, which can be downloaded for free on Windows PCs with specific system requirements. Chat with RTX enables individuals and enterprises to generate ChatGPT-like responses after uploading and querying personal files and proprietary data in various formats, as well as text from YouTube videos. Unlike ChatGPT, Nvidia’s customizable AI chatbot leverages open-source LLMs like Mistral and Llama 2, runs locally without the need for an internet connection and does not expose data or prompts to third parties.<sup>1</sup> Chat with RTX remains in development and likely provides only a preview of the functionality to come, but our view is that the app exemplifies how rapidly AI development is occurring.

## Enterprise AI adoption requires control and privacy

[AI development has progressed rapidly \(see note\)](#) since ChatGPT democratized access to powerful computer intelligence when it launched 14 months ago, but it’s easy to forget that mainstream adoption of disruptive technologies takes time (Exhibit 1). We expect Nvidia’s launch to reduce enterprise security and compliance concerns by leveraging open-source models that enable transparency into and control over model adjustments, as well as data privacy, given the app runs locally on a PC. The launch facilitates a significant expansion of AI app customization and functionality, in our view, that may accelerate enterprise adoption and deployment of [generalized \(see note\)](#), industry-specific and [specialized AI apps \(see note\)](#), as well as expediate [AI monetization by enterprise software companies \(see note\)](#), (Exhibit 2).<sup>2</sup>

## Specialized AI app development just got easier

Chat with RTX enables individuals and enterprises to build and deploy AI apps for specific use cases that incorporate personal files and proprietary data. Individuals may use Chat with RTX to summarize or analyze their tax returns, or Taylor Swift’s latest album, and use ChatGPT to search the web. Enterprises may integrate off-the-shelf generalized and industry-specific AI apps to drive efficiencies and increased productivity in the near term (Exhibit 3 & Exhibit 4), but apps like Chat with RTX may expediate enterprise deployments of AI apps for specialized use cases that incorporate proprietary data, align with brand values and drive competitive advantages (Exhibit 5). In contrast, ChatGPT leverages GPT-4, which is a closed-source model that makes specialized app development more difficult.

## Beneficiaries include edge-AI and middleware companies

Although monetization of Chat with RTX is unlikely in the near term, we expect a shift in focus toward companies like Nvidia, Microsoft and Apple that are investing in edge-AI use cases, such as customizable chatbots that enable specialized use cases and mitigate security and compliance risks. We maintain our Buy rating and \$480 price objective for MSFT, covered by Brad Sills. We also view companies offering DevSecOps platform for enterprises to optimize and customize AI apps as likely beneficiaries of enterprise AI adoption and accelerating open-source model usage.

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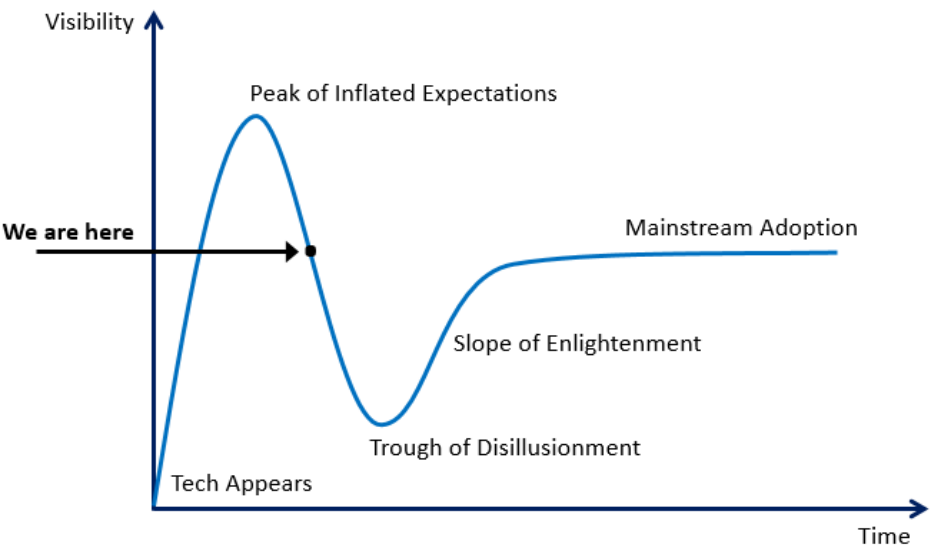
**AI** = Artificial Intelligence  
**Apps** = Applications  
**LLM** = Large Language Model

<sup>1</sup> Individuals and enterprises that use ChatGPT may expose sensitive and proprietary data to OpenAI and must trust that it does not use the data for model training or expose it by mistake.

<sup>2</sup> Industry-specific AI applications include ones that incorporate non-proprietary industry data and enable use cases for specific industries like [Utilities](#) and [Insurance](#).

“We’ve moved from talking about AI to applying AI at scale.”  
–Satya Nadella, Microsoft CEO, Jan’24

**Exhibit 1: AI hype cycle – mainstream adoption of disruptive technologies takes time**  
It’s easy to forget that the newest AI wave began 14 months ago



Source: BofA Global Research

BofA GLOBAL RESEARCH

**Exhibit 2: Specialized AI apps require proprietary data but may drive LT competitive advantages**  
AI applications – Generalized, Industry-Specific, Specialized

Generalized	Industry-Specific	Specialized
Off-the-Shelf	Off-the-Shelf	Company-Specific
Public Data	Industry (Non-Proprietary) Data	Proprietary Data
High Scalability	Moderate Scalability	Limited Scalability
Efficiencies & Productivity	Efficiencies, Productivity, Rev <sup>1</sup>	Efficiencies, Productivity, Rev
No Competitive Advantages	No Competitive Advantages	Competitive Advantages

Source: BofA Global Research

<sup>1</sup> Industry-specific AI apps enable new revenue streams but to a lesser extent than specialized ones

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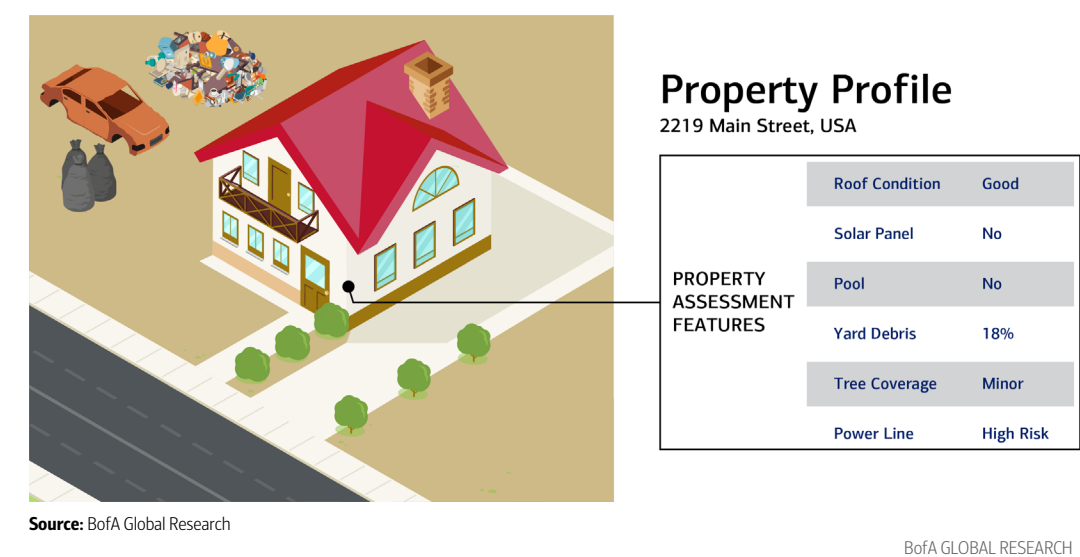
**Exhibit 3: Noteworthy AI’s cameras may enable Utes companies to reduce pole inspection costs by 75%**  
Industry-specific AI apps drive efficiencies and productivity for non-Tech sectors



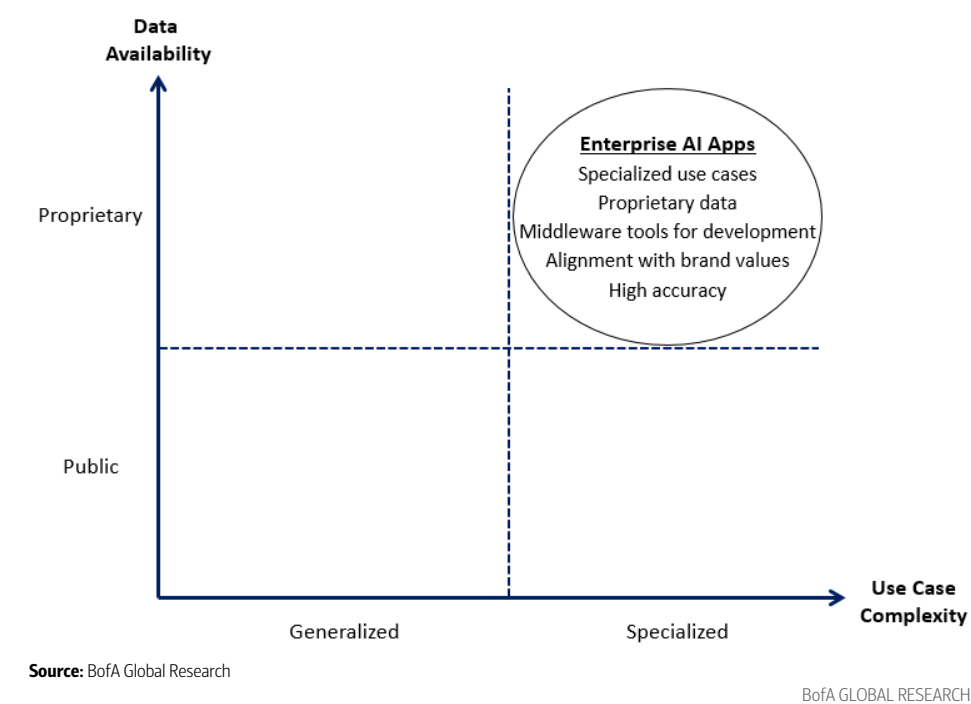
Source: Noteworthy AI

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**Exhibit 4: CAPE Analytics may enable Insurance companies to better analyze insurance risks**  
Industry-specific AI apps drive efficiencies and productivity for non-Tech sectors



**Exhibit 5: Specialized AI apps for enterprise-specific use cases remain largely in development**  
AI applications – from off-the-shelf to proprietary



**Exhibit 6: Stocks mentioned**  
Prices and ratings for stocks mentioned in this report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
AAPL	AAPL US	Apple Inc.	US\$ 183.86	B-1-7
MSFT	MSFT US	Microsoft	US\$ 406.56	B-1-7
NVDA	NVDA US	NVIDIA	US\$ 726.58	C-1-7

Source: BofA Global Research

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## Price objective basis & risk

### Apple Inc. (AAPL)

Our PO of \$225 is based on approximately 32x our C24E EPS. Our target multiple compares to the 5-year historical range of 16-34x (median 27x). We believe a multiple at the higher end of the historical range is justified given a large cash balance and opportunity to diversify into new end markets, increasing mix and diversity of services.

Downside risks are: a) weaker iPhone 15 cycle on consumer spending risk, b) weaker near-term services trajectory where App Store & Licensing can decelerate, c) gross profit dollars declining y/y next few quarters, d) iPads/Macs reverting to pre-COVID levels, and e) stronger dollar. Other risks are potential trade conflicts, tariffs, longer iPhone replacement cycles, commoditization in the smartphone market, intensifying competition in the tablet market, ability to manage beat and raise expectations for EPS estimates, and requirement to maintain pace of product innovation.

Upside risks are: a) stronger sales of Pro iPhone models which can help average selling price and help the mix of the business, b) est. revisions can be lower vs. peers, c) potential new products (AR/VR), and services (advertising). Other upside risks are stronger than expected iPhone cycle, gross margin upside from better mix of higher end iPhones, tailwinds from lower memory costs, and a faster than expected recovery in emerging markets.

### Microsoft Corporation (MSFT)

Our PO of \$480 is based on an EV/FCF multiple of 43x our C25E free cash flow estimate. The growth-adjusted multiple of 1.8x trades at a premium to the large cap GARP group, which we view as warranted given our view of Microsoft as a leading AI play in software.

Downside risks to our price objective: 1) Microsoft could see some near term gross margin pressure as the Azure business grows as a percentage of overall revenue. While Microsoft's on premise offerings offer a high margin profile, growth in these lines of business is decelerating. 2) Enterprise application spending has proven to be highly cyclical, given the more discretionary nature of applications projects. During an economic slowdown, when firms are faced with shrinking IT budgets, projects involving application upgrades, migrations or new installations are often deferred. This could present a higher degree of risk for a bookings deceleration for Microsoft and other application vendors, in the event of an economic slowdown.

### NVIDIA Corporation (NVDA)

Our \$800 PO is based on 31x CY25E PE ex cash, within NVDA's historical 26x-69x forward year PE range, justified given stronger growth opportunities ahead as gaming cycle troughs and data center demand potentially faces strong, long-term demand dynamics.

Downside risks to our price objective are: 1) weakness in consumer driven gaming market, 2) Competition with major public firms, internal cloud projects and other private companies in accelerated computing markets, 3) Larger than expected impact from restrictions on compute shipments to China, or additional restrictions placed on activity in the region, 4) Lumpy and unpredictable sales in new enterprise, data center, and autos markets, 5) Potential for decelerating capital returns.

## Analyst Certification

We, Alkesh Shah, Brad Sills, Vivek Arya and Wamsi Mohan, hereby certify that the views each of us has expressed in this research report accurately reflect each of our respective personal views about the subject securities and issuers. We also certify that no part of

our respective compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

## US - Enterprise Software Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
<b>BUY</b>				
	8x8	EGHT	EGHT US	Michael J. Funk
	Adobe	ADBE	ADBE US	Brad Sills
	Alarm.com	ALRM	ALRM US	Michael J. Funk
	Amplitude, Inc.	AMPL	AMPL US	Koji Ikeda, CFA
	BILL	BILL	BILL US	Brad Sills
	CCC Intelligent Solutions	CCCS	CCCS US	Michael J. Funk
	Dropbox	DBX	DBX US	Michael J. Funk
	Dynatrace	DT	DT US	Koji Ikeda, CFA
	Elastic NV	ESTC	ESTC US	Koji Ikeda, CFA
	GitLab Inc.	GTLB	GTLB US	Koji Ikeda, CFA
	Global-e Online Ltd.	GLBE	GLBE US	Koji Ikeda, CFA
	HubSpot	HUBS	HUBS US	Brad Sills
	Informatica Inc.	INFA	INFA US	Koji Ikeda, CFA
	Intapp Inc.	INTA	INTA US	Koji Ikeda, CFA
	Intuit	INTU	INTU US	Brad Sills
	JFrog Ltd	FROG	FROG US	Koji Ikeda, CFA
	MeridianLink, Inc.	MLNK	MLNK US	Koji Ikeda, CFA
	Microsoft Corporation	MSFT	MSFT US	Brad Sills
	MongoDB Inc	MDB	MDB US	Brad Sills
	nCino, Inc.	NCNO	NCNO US	Adam Bergere
	NICE Ltd.	NICE	NICE US	Michael J. Funk
	NICE Ltd.	NCSYF	NICE IT	Michael J. Funk
	PagerDuty	PD	PD US	Koji Ikeda, CFA
	PowerSchool Holdings, Inc.	PWSC	PWSC US	Koji Ikeda, CFA
	RingCentral	RNG	RNG US	Michael J. Funk
	Salesforce.com	CRM	CRM US	Brad Sills
	ServiceNow	NOW	NOW US	Brad Sills
	UiPath	PATH	PATH US	Brad Sills
	Unity	U	U US	Michael J. Funk
	Weave	WEAV	WEAV US	Michael J. Funk
	Workday Inc.	WDAY	WDAY US	Brad Sills
	Zeta Global	ZETA	ZETA US	Koji Ikeda, CFA
	ZoomInfo	ZI	ZI US	Koji Ikeda, CFA
<b>NEUTRAL</b>				
	Autodesk	ADSK	ADSK US	Michael J. Funk
	Bentley Systems	BSY	BSY US	Michael J. Funk
	BigCommerce Holdings, Inc.	BIGC	BIGC US	Koji Ikeda, CFA
	Coveo	YCVO	CVO CN	Koji Ikeda, CFA
	Datadog Inc	DDOG	DDOG US	Koji Ikeda, CFA
	DocuSign	DOCU	DOCU US	Brad Sills
	Freshworks, Inc.	FRSH	FRSH US	Adam Bergere
	HashiCorp	HCP	HCP US	Brad Sills
	Jamf	JAMF	JAMF US	Koji Ikeda, CFA
	Lightspeed Commerce Inc.	LSPD	LSPD US	Koji Ikeda, CFA
	Lightspeed Commerce Inc.	YLSPD	LSPD CN	Koji Ikeda, CFA
	Oracle Corporation	ORCL	ORCL US	Brad Sills
	Paycom	PAYC	PAYC US	Adam Bergere
	Paylocity	PCTY	PCTY US	Adam Bergere
	Shopify, Inc.	SHOP	SHOP US	Brad Sills
	Snowflake	SNOW	SNOW US	Brad Sills
	Veeva Systems, Inc.	VEEV	VEEV US	Brad Sills
	Zoom Video Communications	ZM	ZM US	Michael J. Funk
<b>UNDERPERFORM</b>				
	AvidXchange, Inc.	AVDX	AVDX US	Brad Sills
	Blackbaud, Inc.	BLKB	BLKB US	Koji Ikeda, CFA
	BlackLine, Inc.	BL	BL US	Koji Ikeda, CFA
	C3.ai	AI	AI US	Brad Sills
	Confluent	CFLT	CFLT US	Brad Sills
	CS Disco, Inc.	LAW	LAW US	Koji Ikeda, CFA
	Enfusion, Inc.	ENFN	ENFN US	Koji Ikeda, CFA
	Five9	FIVN	FIVN US	Michael J. Funk
	Guidewire Software, Inc.	GWRE	GWRE US	Michael J. Funk
	Twilio	TWLO	TWLO US	Michael J. Funk

**US - Enterprise Software Coverage Cluster**

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
	Vertex, Inc.	VERX	VERX US	Brad Sills
<b>RSTR</b>				
	Splunk	SPLK	SPLK US	Brad Sills

**US - IT Hardware and Technology Supply Chain Coverage Cluster**

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

**US - Semiconductors and Semiconductor Capital Equipment Coverage Cluster**

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
<b>BUY</b>				
	Advanced Micro Devices, Inc.	AMD	AMD US	Vivek Arya
	Analog Devices Inc.	ADI	ADI US	Vivek Arya
	Applied Materials, Inc.	AMAT	AMAT US	Vivek Arya
	Arm Holdings	ARM	ARM US	Vivek Arya
	Broadcom Inc	AVGO	AVGO US	Vivek Arya
	Cadence	CDNS	CDNS US	Vivek Arya
	Camtek	CAMT	CAMT US	Vivek Arya
	KLA Corporation	KLAC	KLAC US	Vivek Arya
	Lam Research Corp.	LRCX	LRCX US	Vivek Arya
	M/A-Com	MTSI	MTSI US	Vivek Arya
	Marvell Technology Group Ltd.	MRVL	MRVL US	Vivek Arya
	Microchip	MCHP	MCHP US	Vivek Arya
	Micron Technology, Inc	MU	MU US	Vivek Arya
	Nova	NVMI	NVMI US	Vivek Arya
	NVIDIA Corporation	NVDA	NVDA US	Vivek Arya
	NXP Semiconductors NV	NXPI	NXPI US	Vivek Arya



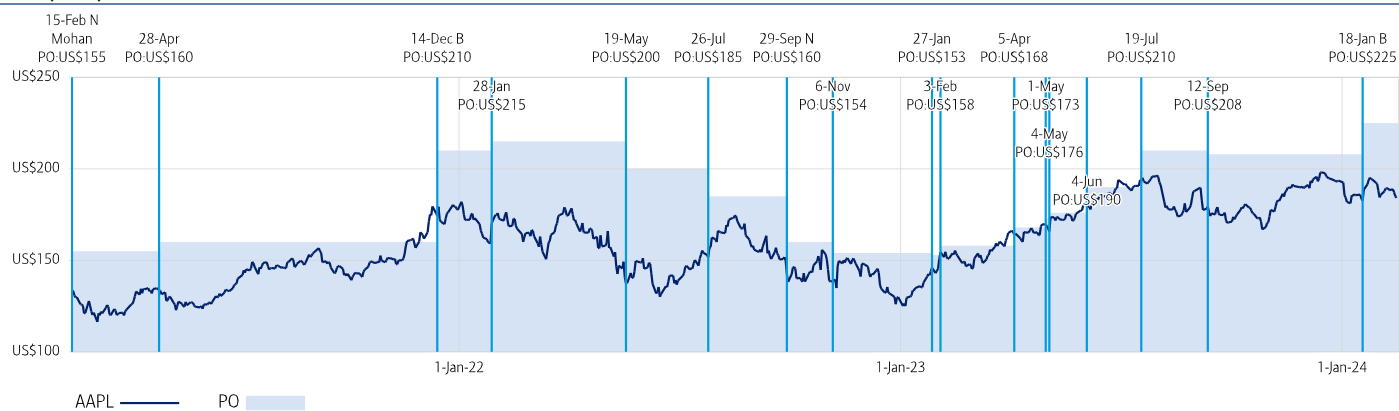
## US - Semiconductors and Semiconductor Capital Equipment Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
	onsemi	ON	ON US	Vivek Arya
	Synopsys	SNPS	SNPS US	Vivek Arya
<b>NEUTRAL</b>				
	Advanced Energy Industries	AEIS	AEIS US	Duksan Jang
	Allegro MicroSystems	ALGM	ALGM US	Blake Friedman
	Axcelis Technologies	ACLS	ACLS US	Duksan Jang
	Coherent Corp	COHR	COHR US	Vivek Arya
	GlobalFoundries	GFS	GFS US	Vivek Arya
	Intel	INTC	INTC US	Vivek Arya
	Lattice Semiconductor	LSCC	LSCC US	Blake Friedman
	Texas Instruments Inc.	TXN	TXN US	Vivek Arya
<b>UNDERPERFORM</b>				
	Ambarella	AMBA	AMBA US	Vivek Arya
	Credo Technology	CRDO	CRDO US	Vivek Arya
	Lumentum Holdings	LITE	LITE US	Vivek Arya
	Qorvo Inc.	QRVO	QRVO US	Vivek Arya
	Skyworks Solutions, Inc.	SWKS	SWKS US	Vivek Arya
	Teradyne	TER	TER US	Vivek Arya
	Wolfspeed Inc	WOLF	WOLF US	Vivek Arya

## Disclosures

## Important Disclosures

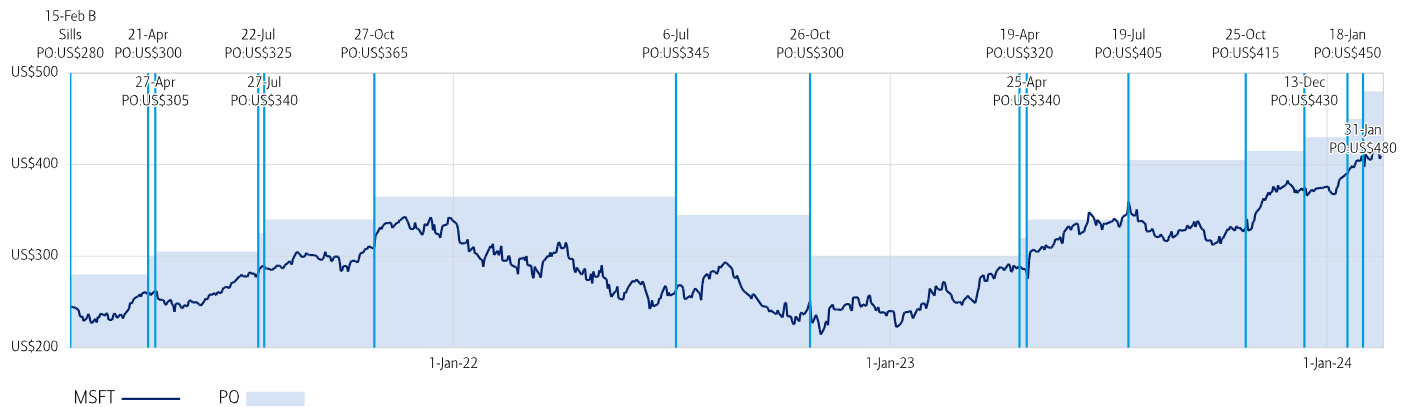
## Apple Inc. (AAPL) Price Chart



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

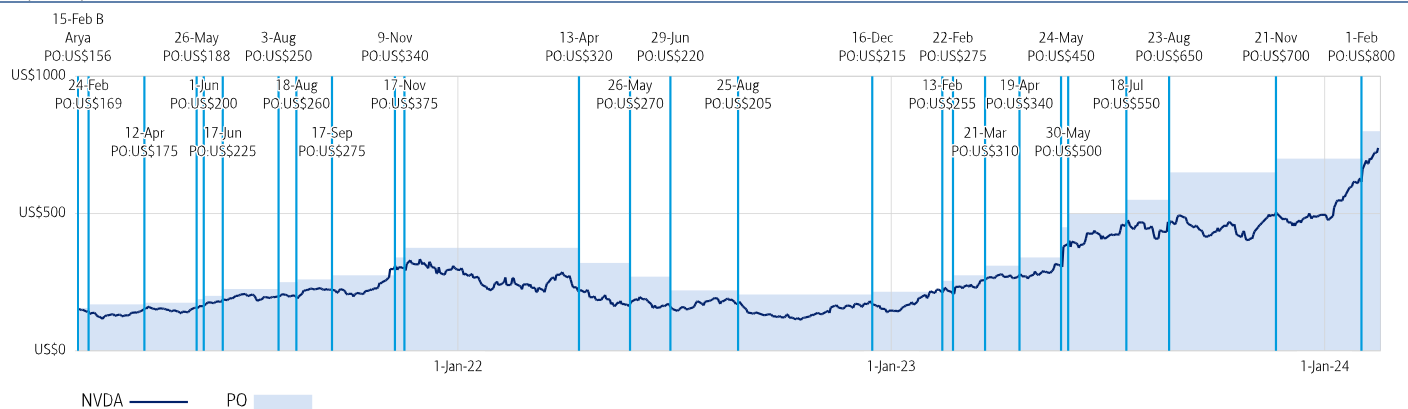
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**Microsoft (MSFT) Price Chart**

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

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**NVIDIA (NVDA) 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 31 Dec 2023)**

Coverage Universe	Count	Percent	Inv. Banking Relationships <sup>R1</sup>	Count	Percent
Buy	215	53.09%	Buy	111	51.63%
Hold	97	23.95%	Hold	45	46.39%
Sell	93	22.96%	Sell	24	25.81%

**Equity Investment Rating Distribution: Global Group (as of 31 Dec 2023)**

Coverage Universe	Count	Percent	Inv. Banking Relationships <sup>R1</sup>	Count	Percent
Buy	1895	53.62%	Buy	1083	57.15%
Hold	832	23.54%	Hold	454	54.57%
Sell	807	22.84%	Sell	383	47.46%

<sup>R1</sup> 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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Underperform	N/A	≥ 20%

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