

# Server & Enterprise Software

## Where Are We Trading Now: Amidst Earnings

Industry Overview

### What clients are talking about

Our software coverage universe rose 2.5% w/w (Nasdaq +1.6%). Ahead of a few busy weeks of earnings and post ServiceNow's comments on AI strength, client discussions mainly focused on potential for AI's impact on results and if there is any read-through for Microsoft's AI uptake (M365 Copilot and OpenAI contribution to Azure growth). We also noted questions on whether early software results could serve as a reflection for the broader IT spending environment or if they are idiosyncratic. Lastly, clients are also digging into less straightforward stories such as Autodesk and Unity.

### CRM saw the largest multiple expansion w/w

We examine software valuation by category. On an EV/NTM Sales basis, the CRM software group saw the largest multiple expansion w/w (+4.0%), with the Design software group seeing the largest expansion relative to the 5-year median (+9.0%). On an EV/NTM FCF basis, the ERP & Back Office software group saw the largest multiple expansion w/w (+5.7%), with the Infrastructure software group having the largest multiple expansion relative to the 5-year median (+10.0%).

#### Exhibit 1: CRM software saw the largest EV/NTM Sales expansion w/w, led by Freshworks

Software multiple expansion/contraction by category

Category	EV/NTM Sales				EV/NTM FCF			
	Multiple		% Change		Multiple		% Change	
	Current	5-yr median	1 wk	5-yr median	Current	5-yr median	1 wk	5-yr median
Collaboration	6.0x	7.2x	3.1%	-16.5%	31.0x	20.2x	4.2%	NA
Communication	2.5x	7.7x	0.8%	-68.0%	24.9x	27.6x	0.9%	-9.7%
CRM	5.3x	8.6x	4.0%	-38.0%	40.8x	42.4x	3.8%	-3.6%
Design	10.6x	9.7x	0.9%	9.0%	39.0x	35.6x	1.0%	9.7%
ERP & Back Office	5.4x	7.7x	2.3%	-29.3%	41.4x	42.2x	5.7%	-1.7%
HCM	6.5x	9.8x	0.6%	-33.6%	44.3x	45.1x	2.1%	-1.8%
Infrastructure	7.9x	10.6x	1.8%	-25.3%	43.6x	39.6x	1.2%	10.0%
Security	8.3x	9.0x	1.2%	-7.7%	34.0x	32.3x	1.2%	5.4%
Vertical	6.4x	7.9x	2.3%	-18.5%	38.4x	39.9x	2.2%	-3.8%

Source: BofA Global Research estimates for companies under coverage, Bloomberg consensus for companies not under coverage. Stocks included may not be under BofA software coverage. See appendix.

BofA GLOBAL RESEARCH

#### Within the report:

- Historical software valuation trends (Exhibit 2 – Exhibit 6)
- Software stock performance overview (Exhibit 7)
- Software coverage comp sheet (Exhibit 8 – Exhibit 10)
- Software valuation by category (Exhibit 11 – Exhibit 12)
- See the Appendix for a mapping of software companies by category, as well as the stock performance of individual companies

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. Refer to important disclosures on page 16 to 18.

Timestamp: 29 January 2024 06:33PM EST

12652431

29 January 2024

Equity  
Americas  
Server & Enterprise Software

**Alkesh Shah**  
Research Analyst  
BofAS  
+1 646 855 1556  
alkesh.shah@bofa.com

**Brad Sills**  
Research Analyst  
BofAS  
+1 415 676 3531  
brad.sills@bofa.com

**Koji Ikeda, CFA**  
Research Analyst  
BofAS  
+1 415 913 2106  
koji.ikeda@bofa.com

**Michael J. Funk**  
Research Analyst  
BofAS  
+1 646 855 5664  
michael.j.funk@bofa.com

**Tal Liani**  
Research Analyst  
BofAS  
+1 646 855 5107  
tal.liani@bofa.com

**Carly Liu**  
Research Analyst  
BofAS  
+1 415 298 7319  
carly.liu@bofa.com

**Adam Bergere**  
Research Analyst  
BofAS  
+1 415 279 8591  
adam.bergere@bofa.com

**Andrew Moss**  
Research Analyst  
BofAS  
+1 646 743 2178  
andrew.moss@bofa.com

**Matt Bullock**  
Research Analyst  
BofAS  
+1 646 556 2903  
matthew.bullock2@bofa.com

**Natalie Howe**  
Research Analyst  
BofAS  
+1 415 436 1103  
natalie.howe@bofa.com

**George McGreehan**  
Research Analyst  
BofAS  
+1 415 913 4315  
george.mcgreehan@bofa.com

WTD=week-to-date

QTD=quarter-to-date

YTD=year-to-date

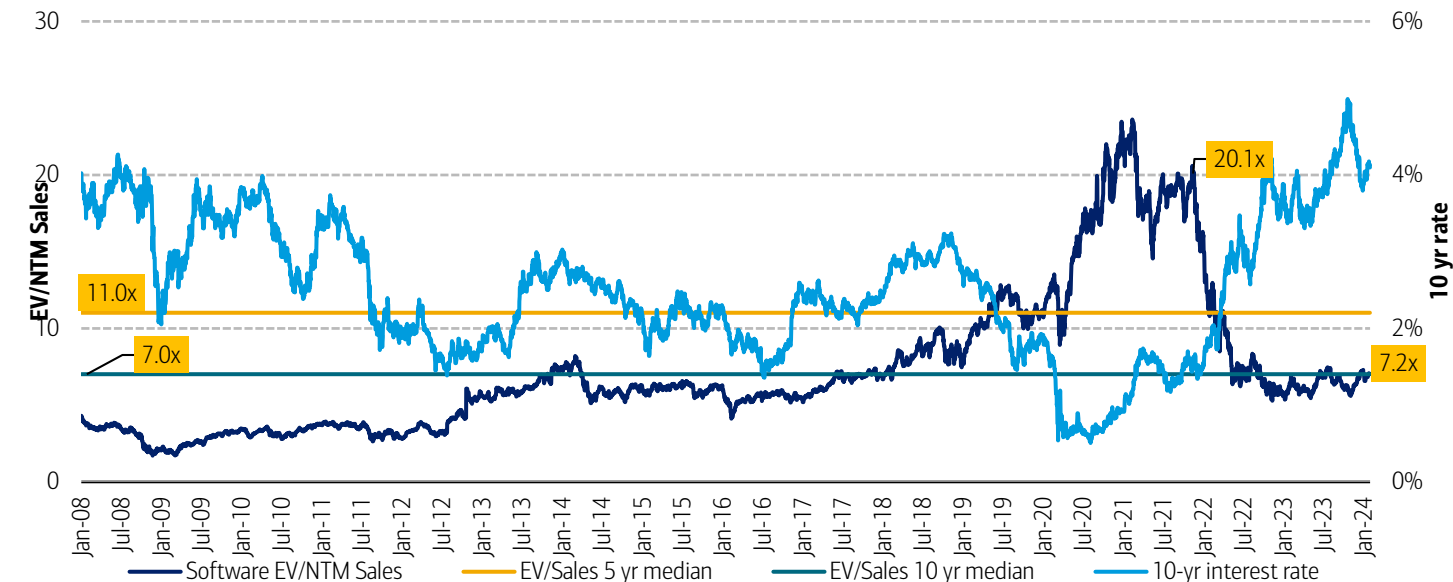
CRM=Customer Relationship Management

# Historical Software Valuation Trend

On an EV/NTM Sales basis, our coverage group is trading at 7.2x, -65% vs the '21 peak of 20.1x. Our coverage group's current multiple is -35% from the 5-year median of 11.0x and roughly on par with the 10-year median of 7.0x.

## Exhibit 2: EV/NTM Sales multiples remain below the 5-yr median though roughly on par with the 10-yr median

EV/NTM Sales versus 10-year interest rate - 2008 to date

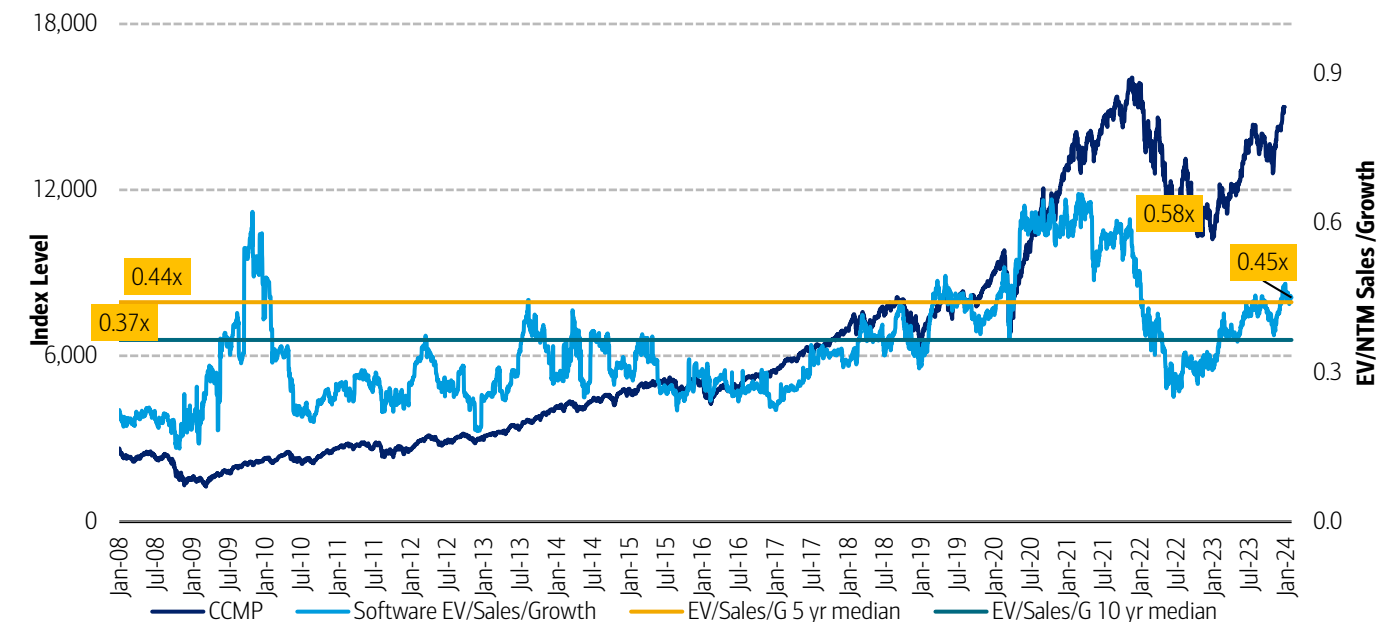


BofA GLOBAL RESEARCH

On an EV/NTM Sales/Growth basis, our software coverage group is trading at 0.45x, -25% from the '21 peak of 0.58x. Our coverage group's current multiple is +3.5% from the 5-year median of 0.44x and +25% from the 10-year median of 0.37x.

## Exhibit 3: Software EV/Sales/Growth multiples have expanded above the 5-yr and 10-yr medians, but remain depressed relative to the Nasdaq's

EV/NTM Sales/Growth versus Nasdaq (CCMP) - 2008 to date

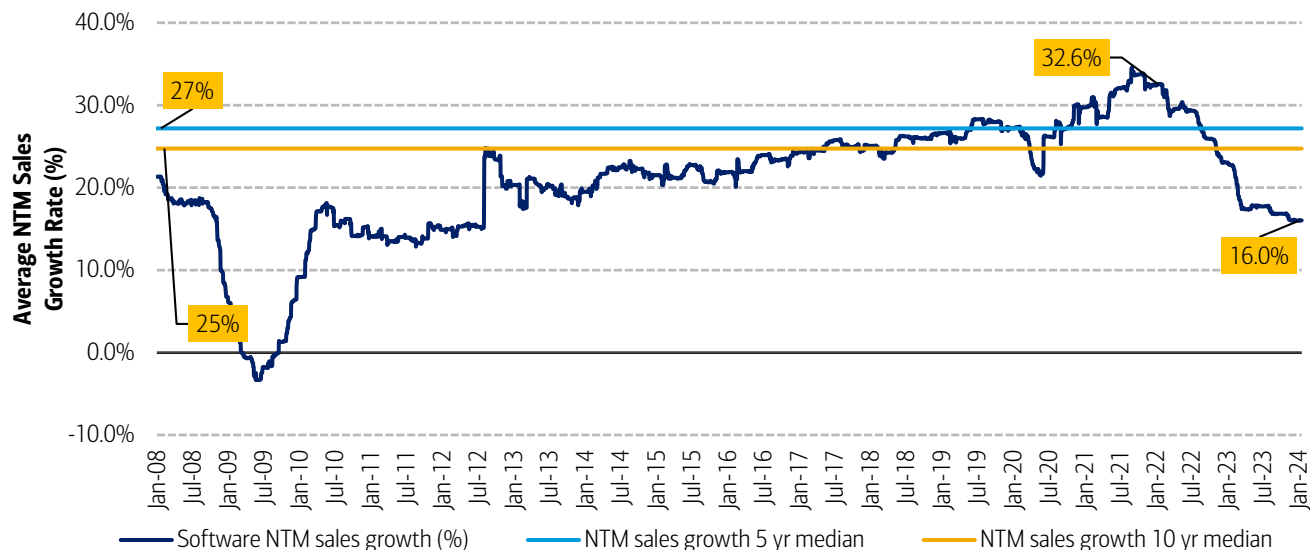


BofA GLOBAL RESEARCH

NTM Sales Growth for our software coverage group is currently 16.0%, -16.6% from the '21 peak of 32.6%. Our software coverage group's current NTM Sales Growth is -11.2% from 5-year median of 27.2% and -8.7% from 10-year median of 24.7%.

#### Exhibit 4: Growth rates remain muted relative to historical medians on macro-driven budget tightening

NTM Sales Growth – 2008 to date



Source: BofA Global Research estimates, Bloomberg

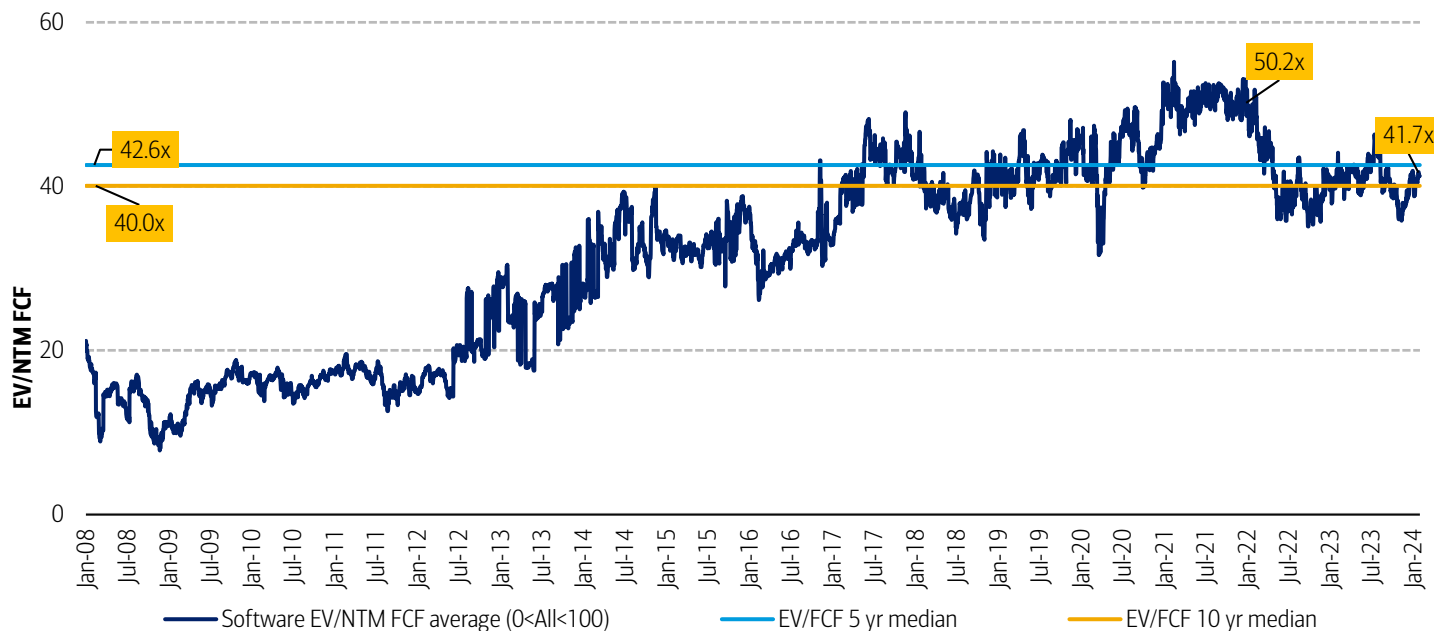
\*Constituents: BofA Software coverage

BofA GLOBAL RESEARCH

On an EV/NTM FCF basis, our coverage group is trading at 41.7x, -17% from the '21 peak of 50.2x. Our coverage group's current multiple is -1.8% from the 5-year median of 42.6x and +4.5% from the 10-year median of 40.0x.

#### Exhibit 5: EV/NTM FCF multiples have expanded above the 10-year medians following steady expansion since November 2023

EV/NTM FCF – 2008 to date



Source: BofA Global Research estimates, Bloomberg

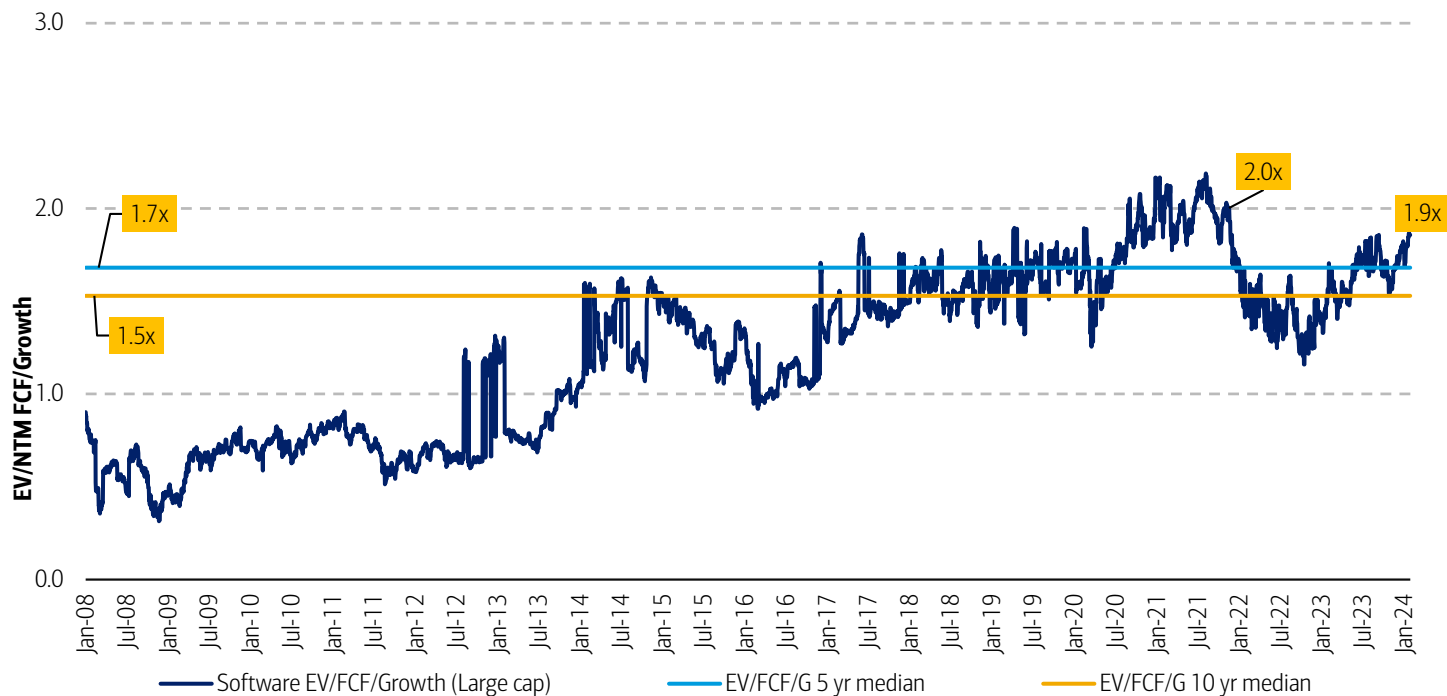
\*Constituents: BofA Software coverage

BofA GLOBAL RESEARCH

On an EV/NTM FCF/Growth basis, the large cap software group is trading at 1.9x, -5% from '21 peak at 2.0x. The current multiple is +12% the 5-year median of 1.7x and +23% from the 10-year median of 1.5x.

**Exhibit 6: EV/NTM FCF/Growth multiples have expanded since November 2023 and are now above the 5 and 10-year medians**

EV/NTM FCF/Growth (large cap) – 2008 to date



Source: BofA Global Research estimates, Bloomberg

\*Constituents: BofA Software coverage

BofA GLOBAL RESEARCH

# Software Stock Performance Overview

As of Jan 29, our software coverage universe was +2.5% from prior week (Nasdaq +1.6%) and +2.3% YTD (Nasdaq +4.0%) which compares to +39.8% in 2023 (Nasdaq +43.4%). The Collaboration software group outperformed the broader software group on a YTD basis (+6.0%), led by Monday.com (not covered).

## Exhibit 7: Large-cap software outperformed our coverage group in 2023 though lagging Nasdaq and S&P 500 YTD

Software stock performance by size and subcategory

BofA Software Coverage	1 Week	YTD	2023 Return	Buy-rated YTD	Buy-rated 2023 Return
Large-Cap Average	2.4%	5.7%	62.7%	6.7%	81.1%
Mid-Cap Average	2.2%	2.4%	38.0%	4.2%	51.5%
Small-Cap Average	2.7%	0.2%	26.6%	3.3%	30.3%
Total Group Average	2.5%	2.3%	39.8%	4.5%	50.9%

Software by Category	1 Week	YTD	2023 Return
Collaboration	1.9%	6.0%	25.5%
Communication	2.1%	-0.3%	-3.0%
CRM	4.3%	1.6%	39.5%
Design	1.3%	-0.9%	39.1%
ERP & Back office	1.8%	-0.4%	22.2%
HCM	0.6%	-0.4%	1.4%
Infrastructure	2.1%	3.5%	53.7%
Security	0.9%	4.5%	54.0%
Vertical	3.4%	2.2%	34.0%
Nasdaq	1.6%	4.0%	43.4%
S&P 500	1.5%	3.2%	24.2%

**Source:** BofA Global Research estimates for companies under coverage, Bloomberg consensus for companies not under coverage. Note that averages are not market-cap weighted. Stocks included in "Software by category" may not be under BofA software coverage.

As of 1/29/2024

BofA GLOBAL RESEARCH



# BofA Software Comp Sheet

## Exhibit 8: Our large-cap software group is trading at 10.0x CY25e sales and 34.3x CY25e FCF

BofA Software Coverage Comp Sheet – Large Cap

							2023	2024	2025				2023	2024	2025
Mkt Cap				EV/2023	EV/2024	EV/2025	EV/Rev/	EV/Rev/	EV/Rev/	EV/2023	EV/2024	EV/2025	EV/FCF/	EV/FCF/	EV/FCF/
Company	Price	(\$mn)		Sales	Sales	Sales	Growth	Growth	Growth	FCF	FCF	FCF	Growth	Growth	Growth
ADBE	ADOBE INC	\$630.23	289,276	14.7x	13.3x	11.9x	1.4x	1.3x	1.0x	41.1x	31.1x	28.2x	...	1.0x	2.7x
ADSK	AUTODESK INC	\$257.23	55,562	10.3x	9.3x	8.3x	1.1x	0.9x	0.7x	45.2x	35.5x	26.4x	...	1.3x	0.8x
BSY	BENTLEY SYSTEMS INC-CLASS B	\$51.71	17,210	15.2x	13.8x	12.5x	1.2x	1.3x	1.2x	53.2x	52.8x	39.3x	1.4x	...	1.1x
CRM	SALESFORCE INC	\$287.86	282,391	8.2x	7.3x	6.4x	0.7x	0.6x	0.5x	33.0x	26.3x	20.8x	0.9x	1.0x	0.8x
DDOG	DATADOG INC - CLASS A	\$128.87	45,273	20.8x	17.6x	14.7x	0.8x	1.0x	0.7x	78.1x	64.7x	53.1x	1.7x	3.1x	2.4x
DT	DYNATRACE INC	\$59.83	17,817	12.7x	10.8x	9.0x	0.5x	0.6x	0.5x	53.7x	49.0x	37.0x	8.7x	5.0x	1.1x
HUBS	HUBSPOT INC	\$609.94	30,528	13.8x	11.8x	9.7x	0.6x	0.7x	0.4x	86.8x	56.4x	44.9x	3.4x	1.0x	1.7x
INTU	INTUIT INC	\$652.88	184,765	12.5x	11.2x	10.0x	1.2x	0.9x	0.9x	35.5x	37.4x	29.8x	1.1x	...	1.2x
MDB	MONGODB INC	\$420.17	34,664	20.5x	16.8x	13.3x	0.7x	0.8x	0.5x	...	...	...	...	...	...
MSFT	MICROSOFT CORP	\$409.72	3,057,331	13.3x	11.5x	10.3x	1.2x	0.7x	0.9x	42.5x	44.8x	35.6x	2.2x	...	1.4x
NOW	SERVICENOW INC	\$787.24	162,959	17.9x	14.7x	12.0x	0.8x	0.7x	0.5x	59.3x	47.4x	37.4x	2.3x	1.9x	1.4x
ORCL	ORACLE CORP	\$113.75	320,434	7.8x	7.2x	6.7x	0.6x	1.0x	0.8x	39.6x	38.4x	31.7x	1.9x	12.1x	1.5x
SHOP	SHOPIFY INC - CLASS A	\$83.54	95,486	13.2x	11.0x	9.2x	0.5x	0.6x	0.5x	...	59.0x	47.0x	...	0.6x	1.8x
SNOW	SNOWFLAKE INC-CLASS A	\$209.54	76,070	26.1x	20.0x	15.2x	0.7x	0.7x	0.5x	95.5x	69.5x	51.7x	2.1x	1.9x	1.5x
VEEV	VEEVA SYSTEMS INC-CLASS A	\$213.42	34,950	13.2x	11.3x	9.8x	1.4x	0.7x	0.6x	36.9x	31.3x	25.8x	3.8x	1.8x	1.2x
WDAY	WORKDAY INC-CLASS A	\$296.73	79,042	10.4x	8.9x	7.6x	0.6x	0.5x	0.4x	43.7x	36.3x	31.4x	1.3x	1.8x	2.0x
ZM	ZOOM VIDEO COMMUNICATIONS-A	\$68.93	21,395	3.3x	3.2x	3.1x	1.2x	1.1x	0.7x	11.1x	9.8x	9.3x	0.8x	0.7x	1.7x
Average				13.8x	11.8x	10.0x	0.9x	0.8x	0.7x	50.4x	43.1x	34.3x	2.4x	2.6x	1.5x
Median				13.2x	11.3x	9.8x	0.8x	0.7x	0.6x	43.7x	41.6x	33.7x	1.9x	1.8x	1.5x

Source: BofA Global Research estimates  
As of 1/29/2024

BofA GLOBAL RESEARCH

## Exhibit 9: Our mid-cap software group is trading at 5.8x C25e Sales, or 0.4x on a growth adjusted basis

BofA Software Coverage Comp Sheet – Mid Cap

							2023	2024	2025				2023	2024	2025
			Mkt Cap	EV/2023	EV/2024	EV/2025	EV/Rev/	EV/Rev/	EV/Rev/	EV/2023	EV/2024	EV/2025	EV/FCF/	EV/FCF/	EV/FCF/
Company		Price	(\$mn)	Sales	Sales	Sales	Growth	Growth	Growth	FCF	FCF	FCF	Growth	Growth	Growth
BILL	BILL HOLDINGS INC	\$79.92	8,537	6.7x	6.0x	5.0x	0.2x	0.6x	0.2x	65.4x	43.8x	34.8x	0.9x	0.9x	1.3x
CFLT	CONFLUENT INC-CLASS A	\$23.73	7,734	9.1x	7.4x	5.9x	0.3x	0.3x	0.2x	...	...	...	...	...	...
DBX	DROPBOX INC-CLASS A	\$32.45	11,228	4.9x	4.7x	4.5x	0.7x	1.4x	1.2x	15.6x	12.6x	11.6x	6.7x	0.5x	1.3x
DOCU	DOCUSIGN INC	\$63.35	13,180	4.5x	4.3x	4.0x	0.5x	0.7x	0.6x	17.2x	16.1x	14.8x	0.2x	2.6x	1.7x
ESTC	ELASTIC NV	\$123.18	12,625	9.7x	8.4x	7.2x	0.6x	0.5x	0.4x	...	65.1x	49.3x	...	0.7x	1.5x
FIVN	FIVE9 INC	\$79.72	5,634	6.3x	5.4x	4.6x	0.4x	0.3x	0.3x	67.6x	43.5x	28.6x	0.4x	0.8x	0.5x
FRSH	FRESHWORKS INC-CL A	\$23.29	7,523	10.7x	9.1x	7.7x	0.6x	0.5x	0.4x	89.3x	53.7x	39.2x	...	0.8x	1.1x
GLBE	GLOBAL-E ONLINE LTD	\$40.51	7,250	12.4x	9.3x	6.9x	0.3x	0.3x	0.2x	66.5x	51.7x	34.5x	1.6x	1.8x	0.7x
GTLB	GITLAB INC-CL A	\$73.58	12,133	19.4x	15.6x	12.2x	0.6x	0.6x	0.4x	...	...	...	...	...	...
GWRE	GUIDEWIRE SOFTWARE INC	\$114.19	9,328	9.8x	8.7x	7.7x	1.5x	0.8x	0.6x	...	55.7x	42.7x	...	0.4x	1.4x
INFA	INFORMATICA	\$30.75	9,119	6.4x	6.2x	5.8x	1.3x	2.1x	0.8x	41.4x	33.1x	28.2x	1.9x	1.3x	1.6x
NICE	NICE LTD - SPON ADR	\$215.39	14,399	5.7x	5.2x	4.7x	0.6x	0.6x	0.4x	27.2x	22.0x	19.3x	2.5x	0.9x	1.4x
PATH	UIPATH INC - CLASS A	\$24.19	13,717	9.3x	7.5x	6.1x	0.4x	0.3x	0.3x	46.7x	41.7x	30.4x	...	3.5x	0.8x
PAYC	PAYCOM SOFTWARE INC	\$195.92	11,357	6.5x	5.8x	5.2x	0.3x	0.5x	0.4x	37.2x	31.1x	25.9x	1.4x	1.6x	1.3x
PCTY	PAYLOCITY HOLDING CORP	\$158.74	9,029	6.8x	5.8x	4.9x	0.2x	0.3x	0.3x	33.3x	28.7x	24.0x	0.5x	1.8x	1.2x
TWLO	TWILIO INC - A	\$74.59	13,963	2.6x	2.5x	2.2x	0.3x	0.4x	0.2x	75.7x	25.8x	18.4x	...	0.1x	0.5x
U	UNITY SOFTWARE INC	\$34.60	11,344	6.0x	5.2x	4.2x	0.1x	0.4x	0.2x	42.7x	20.1x	12.4x	...	0.2x	0.2x
ZI	ZOOMINFO TECHNOLOGIES INC	\$16.85	6,919	6.1x	6.1x	5.7x	0.5x	3.8x	0.9x	19.3x	19.0x	17.7x	13.1x	12.5x	2.5x
Average				7.9x	6.9x	5.8x	0.5x	0.8x	0.4x	46.1x	35.2x	27.0x	2.9x	1.9x	1.2x
Median				6.6x	6.0x	5.4x	0.5x	0.5x	0.4x	42.1x	32.1x	27.1x	1.5x	0.9x	1.3x

Source: BofA Global Research estimates  
As of 1/29/2024

BofA GLOBAL RESEARCH



**Exhibit 10: Our small-cap coverage group is trading at 4.2x C25e Sales, or 0.4x on a growth adjusted basis**

BofA Software Coverage Comp Sheet – Small Cap

			Mkt Cap	EV/2023	EV/2024	EV/2025	2023	2024	2025	EV/2023	EV/2024	EV/2025	2023	2024	2025
	Company	Price	(\$mn)	Sales	Sales	Sales	EV/Rev/ Growth	EV/Rev/ Growth	EV/Rev/ Growth	FCF	FCF	FCF	EV/FCF/ Growth	EV/FCF/ Growth	EV/FCF/ Growth
AI	C3.AI INC-A	\$26.06	3,092	8.1x	6.9x	6.1x	0.8x	0.4x	0.4x	...	...	48.1x	...	...	...
ALRM	ALARM.COM HOLDINGS INC	\$62.90	3,446	3.7x	3.6x	3.3x	0.8x	0.8x	0.4x	29.8x	59.7x	22.9x	0.1x	...	0.1x
AMPL	AMPLITUDE INC-CLASS A	\$13.56	1,979	6.0x	5.6x	5.1x	0.4x	0.8x	0.6x	75.1x	66.4x	53.9x	...	5.1x	2.3x
AVDX	AVIDXCHANGE	\$11.44	2,288	5.3x	4.7x	4.0x	0.3x	0.3x	0.2x	...	...	40.9x	...	...	0.2x
AYX	ALTERYX INC - CLASS A	\$47.44	3,383	4.2x	3.8x	3.4x	0.4x	0.3x	0.3x	...	75.7x	37.5x	...	0.6x	0.4x
BIGC	BIGCOMMERCE HOLDINGS	\$8.69	661	2.4x	2.2x	2.0x	0.2x	0.2x	0.2x	...	51.3x	32.4x	...	...	0.6x
BL	BLACKLINE INC	\$62.29	4,644	7.9x	7.1x	6.4x	0.6x	0.6x	0.6x	42.8x	36.5x	29.8x	0.3x	2.1x	1.3x
BLKB	BLACKBAUD INC	\$84.15	4,474	4.7x	4.4x	4.2x	0.9x	0.7x	0.7x	24.9x	22.0x	19.3x	0.4x	1.7x	1.4x
EGHT	8X8 INC	\$3.74	452	1.2x	1.1x	1.1x	...	0.8x	0.2x	7.9x	6.7x	5.5x	0.0x	0.3x	0.3x
ENFN	ENFUSION	\$8.50	1,087	6.2x	5.3x	4.6x	0.4x	0.3x	0.3x	55.9x	51.5x	34.7x	0.3x	6.1x	0.7x
EVBG	EVERBRIDGE INC	\$22.93	1,009	2.9x	2.7x	2.6x	0.8x	0.5x	0.4x	47.8x	30.4x	21.5x	0.0x	0.5x	0.5x
FROG	JFROG LTD	\$33.69	3,712	9.4x	7.5x	6.1x	0.4x	0.3x	0.3x	61.4x	45.5x	31.8x	0.3x	1.3x	0.7x
HCP	HASHICORP INC-CL A	\$23.46	4,565	5.8x	5.0x	4.2x	0.3x	0.4x	0.2x	...	40.0x	26.2x	...	...	0.5x
INTA	INTAPP INC	\$44.83	3,567	8.8x	7.5x	6.5x	0.3x	0.4x	0.4x	96.1x	63.4x	45.5x	1.1x	1.2x	1.2x
JAMF	JAMF HOLDING CORP	\$20.32	2,763	5.2x	4.6x	4.1x	0.3x	0.4x	0.3x	67.4x	44.3x	28.2x	...	0.8x	0.5x
LAW	CS DISCO INC	\$8.65	561	3.0x	2.8x	2.5x	1.8x	0.3x	0.2x	...	...	...	...	...	...
LSPD	LIGHTSPEED COMMERCE INC	\$19.31	2,964	2.6x	2.1x	1.8x	0.1x	0.1x	0.1x	...	41.6x	49.8x	...	...	...
MLNK	MERIDIANLINK INC	\$23.80	1,930	7.4x	7.0x	6.5x	1.3x	1.2x	0.9x	32.2x	24.9x	21.9x	...	0.9x	1.6x
NCNO	NCINO INC	\$32.75	3,699	7.7x	6.7x	5.8x	0.5x	0.5x	0.4x	50.3x	45.0x	45.2x	...	3.9x	...
PD	PAGERDUTY INC	\$24.66	2,373	5.3x	4.8x	4.2x	0.3x	0.5x	0.3x	32.1x	24.1x	19.3x	0.1x	0.7x	0.8x
PWSC	POWERSCHOOL HOLDINGS	\$24.18	4,916	7.8x	6.8x	6.3x	0.7x	0.5x	0.7x	31.2x	25.9x	22.4x	1.5x	1.3x	1.4x
RNG	RINGCENTRAL INC-CLASS A	\$36.19	3,423	2.2x	2.0x	1.8x	0.2x	0.2x	0.2x	16.4x	12.6x	8.5x	0.1x	0.4x	0.2x
VERX	VERTEX INC - CLASS A	\$25.42	3,866	6.9x	6.1x	5.5x	0.5x	0.5x	0.4x	87.6x	57.1x	40.4x	0.6x	1.1x	1.0x
WEAV	WEAVE COMMUNICATIONS	\$13.50	872	4.9x	4.3x	3.7x	0.3x	0.3x	0.3x	...	44.6x	26.0x	...	0.3x	0.4x
ZETA	ZETA GLOBAL HOLDINGS	\$9.99	2,162	3.1x	2.6x	2.3x	0.1x	0.2x	0.2x	27.1x	18.8x	15.4x	0.6x	0.4x	0.7x
Average				5.3x	4.7x	4.2x	0.5x	0.5x	0.4x	46.2x	40.4x	30.3x	0.4x	1.6x	0.8x
Median				5.3x	4.7x	4.2x	0.4x	0.4x	0.3x	42.8x	42.9x	29.0x	0.3x	1.0x	0.7x

Source: BofA Global Research estimates

As of 1/29/2024

# Software Valuation by Category

We categorized the enterprise software space across 9 categories: Collaboration, Communication, CRM, Design, ERP & Back Office, HCM, Infrastructure, Security and Vertical software.

## Exhibit 11: Design software is currently trading at a significant premium to the broader software group (10.0x C25 Sales, or 0.9x growth adjusted)

Software comp sheet by category

Categories	Mkt Cap (\$mn)	EV/2023 Sales	EV/2024 Sales	EV/2025 Sales	2023 EV/Rev/ Growth	2024 EV/Rev/ Growth	2025 EV/Rev/ Growth	EV/2023 FCF	EV/2024 FCF	EV/2025 FCF	2023 EV/FCF/ Growth	2024 EV/FCF/ Growth	2025 EV/FCF/ Growth
<b>Collaboration</b>	\$35,418												
<b>Average</b>		6.6x	5.7x	4.9x	0.4x	0.7x	0.5x	31.7x	26.1x	28.1x	2.1x	10.7x	0.8x
<b>Median</b>		6.2x	5.2x	4.5x	0.3x	0.5x	0.4x	30.5x	23.8x	22.4x	0.8x	1.7x	0.8x
<b>Communication</b>	\$62,685												
<b>Average</b>		3.0x	2.7x	2.7x	-0.4x	0.5x	0.3x	32.0x	22.3x	15.9x	0.9x	0.5x	0.7x
<b>Median</b>		2.5x	2.4x	2.3x	0.3x	0.4x	0.3x	18.1x	17.8x	14.9x	0.6x	0.4x	0.5x
<b>CRM</b>	\$487,208												
<b>Average</b>		6.5x	5.6x	4.7x	0.4x	-2.2x	0.3x	48.1x	39.2x	34.1x	2.5x	6.4x	1.3x
<b>Median</b>		5.0x	4.3x	3.9x	0.4x	0.4x	0.3x	43.6x	35.7x	33.5x	0.9x	0.8x	0.7x
<b>Design</b>	\$591,275												
<b>Average</b>		12.4x	11.2x	10.0x	1.2x	1.1x	0.9x	45.8x	37.1x	30.8x	1.6x	10.7x	0.0x
<b>Median</b>		11.8x	10.6x	9.5x	1.3x	1.1x	1.0x	43.3x	35.9x	32.5x	1.4x	1.8x	1.5x
<b>ERP &amp; Back Office</b>	\$545,258												
<b>Average</b>		6.9x	6.2x	5.5x	0.9x	0.5x	1.8x	46.8x	39.5x	31.5x	1.0x	0.5x	-6.9x
<b>Median</b>		6.7x	6.1x	5.5x	0.5x	0.5x	0.4x	43.2x	39.8x	32.4x	0.9x	1.1x	0.7x
<b>HCM</b>	\$256,054												
<b>Average</b>		7.3x	6.4x	5.7x	0.5x	0.6x	0.6x	33.1x	40.7x	32.7x	1.3x	4.1x	1.7x
<b>Median</b>		6.8x	5.8x	5.2x	0.4x	0.5x	0.4x	33.3x	31.1x	25.9x	1.3x	1.8x	1.3x
<b>Infrastructure</b>	\$3,934,996												
<b>Average</b>		9.4x	8.0x	6.7x	0.6x	0.6x	0.5x	53.6x	44.0x	33.3x	1.0x	1.6x	1.1x
<b>Median</b>		7.1x	6.6x	5.9x	0.6x	0.6x	0.4x	53.7x	44.5x	33.7x	1.7x	1.3x	0.9x
<b>Security</b>	\$255,455												
<b>Average</b>		9.4x	8.0x	6.8x	0.3x	0.7x	0.6x	39.2x	34.7x	30.4x	0.7x	3.9x	1.2x
<b>Median</b>		6.9x	6.5x	6.3x	0.4x	0.6x	0.5x	32.5x	28.5x	24.5x	1.0x	1.8x	1.1x
<b>Vertical</b>	\$186,715												
<b>Average</b>		7.5x	6.6x	5.8x	0.5x	0.5x	0.5x	41.5x	39.1x	31.2x	0.6x	1.6x	1.3x
<b>Median</b>		7.4x	6.7x	6.1x	0.4x	0.5x	0.4x	34.6x	30.9x	26.5x	0.7x	1.0x	1.2x

**Source:** BofA Global Research estimates for companies under coverage, Bloomberg consensus for companies not under coverage  
As of 1/29/24. Stocks included may not be under BofA software coverage. See appendix.



On an EV/NTM Sales basis, the CRM software group saw the largest multiple expansion w/w (+4.0%) led by Freshworks (covered by Adam Bergere), with the Design software group seeing the largest expansion relative to the 5-year median (+9.0%), led by Cadence Design Systems (covered by Vivek Arya).

On an EV/NTM FCF basis, the Collaboration software group saw the largest multiple expansion w/w (+4.2) led by Monday.com (not covered), with Infrastructure software seeing the largest multiple expansion relative to the 5-year median (+10.0%) led by Oracle (covered by Brad Sills).

#### Exhibit 12: CRM software saw the largest EV/NTM Sales multiple expansion, led by Freshworks

Software multiple expansion/contraction by category

Category	EV/NTM Sales				EV/NTM Sales/growth				EV/NTM FCF			
	Multiple		% Change		Multiple		% Change		Multiple		% Change	
	Current	5-yr median	1 wk	5-yr median	Current	5-yr median	1 wk	5-yr median	Current	5-yr median	1 wk	5-yr median
<b>Collaboration</b>	6.0x	7.2x	3.1%	-16.5%	0.6x	0.4x	0.6%	66.7%	31.0x	20.2x	4.2%	NA
<b>Communication</b>	2.5x	7.7x	0.8%	-68.0%	0.4x	0.4x	1.4%	-1.4%	24.9x	27.6x	0.9%	-9.7%
<b>CRM</b>	5.3x	8.6x	4.0%	-38.0%	0.3x	0.3x	-27.3%	-8.4%	40.8x	42.4x	3.8%	-3.6%
<b>Design</b>	10.6x	9.7x	0.9%	9.0%	0.8x	0.8x	1.8%	9.2%	39.0x	35.6x	1.0%	9.7%
<b>ERP &amp; Back Office</b>	5.4x	7.7x	2.3%	-29.3%	0.5x	0.5x	4.2%	-1.9%	41.4x	42.2x	5.7%	-1.7%
<b>HCM</b>	6.5x	9.8x	0.6%	-33.6%	0.5x	0.6x	0.0%	-8.8%	44.3x	45.1x	2.1%	-1.8%
<b>Infrastructure</b>	7.9x	10.6x	1.8%	-25.3%	0.5x	0.5x	1.9%	4.6%	43.6x	39.6x	1.2%	10.0%
<b>Security</b>	8.3x	9.0x	1.2%	-7.7%	0.7x	0.5x	1.2%	52.1%	34.0x	32.3x	1.2%	5.4%
<b>Vertical</b>	6.4x	7.9x	2.3%	-18.5%	0.5x	0.6x	2.1%	-6.1%	38.4x	39.9x	2.2%	-3.8%

**Source:** BofA Global Research estimates for companies under coverage, Bloomberg consensus for companies not under coverage  
As of 1/29/24. Stocks included may not be under BofA software coverage. See appendix.

BofA GLOBAL RESEARCH

# Appendix

## Exhibit 13: Software by category analysis includes the stocks below

Software companies by category

Collaboration		Communication		CRM		Design		ERP and back office		HCM		Infrastructure		Security		Vertical	
ASAN	Asana Inc	EGAN	eGain	BIGC	Bigcommerce	ADBE	Adobe	AVDX	AvidXchange	ADP	Automatic Data	AI	C3.ai	ALRM	Alarm	APPF	Appfolio
BOX	Box Inc	EGHT	8x8	CRM	Salesforce.com	ADSK	Autodesk	BILL	BILL	CDAY	Ceridian HCM	AMPL	Amplitude	CHKP	Check Point	BLKB	Blackbaud
DBX	Dropbox	FIVN	Five9	CRTO	Criteo	ANSS	Ansys, Inc.	BL	BlackLine, Inc.	PAYC	Paycom	APPN	Appian	CLVT	Clarivate PLC	CCCS	CCC Intelligent Sol
MNDY	Monday.com	KLTR	Kaltura	CVO	Coveo	AZPN	AspenTech	DOCU	DocuSign	PAYX	Paychex	AYX	Alteryx, Inc	CRWD	CrowdStrike	COUR	Coudera
SMAR	Smartsheet	LPSN	LivePerson	CXM	Sprinklr	BSY	Bentley Systems	EXFY	Expensify	PCTY	Paylocity	BASE	Couchbase	CYBR	CyberArk	CPLF	Copperleaf
		LVOX	LiveVox	FRSH	Freshworks	CDNS	Cadence	INTU	Intuit	PYCR	Paycor HCM Inc	BBAI	BigbearAI	FTNT	Fortinet	CWAN	Clearware Analytics
		MCHX	Marchex	GLBE	Global-e Online	DSY	Dessault	LAW	Disco	WDAY	Workday	CFLT	Confluent	GEN	Gen Digital	DH	Definitive Hlthcare.
		NICE	NICE Ltd.	HUBS	HubSpot	NEM	Newmont	MANH	Manhattan Associates			DDOG	Datadog	OKTA	Okta Inc	DOX	Amdocs
		RNG	RingCentral	LSPD	Lightspeed	PTC	PTC	QTWO	Q2			DOMO	Domo	PANW	Palo Alto Networks	EBIX	Ebix
		TWLO	Twilio	ONTF	ON24	U	Unity	SAP	SAP			DT	Dynatrace	QLYS	Qualys	ENFN	Enfusion, Inc.
		VRNT	Verint	SEMR	SEMrush			UPLD	Upland Software			ESTC	Elastic	RPD	Rapid7	ETWO	E2open
		ZM	Zoom	SHOP	Shopify, Inc.			VERX	Vertex			EVBG	Everbridge	S	SentinelOne	EVCN	EverCommerce
				SPT	Sprout Social			WK	Workiva Inc			FROG	JFrog	SCWX	SecureWorks	GWRE	Guidewire
				WIX	Wix			ZUO	Zuora			GTLB	GitLab	TENB	Tenable	INST	Instructure
				YEXT	Yext							HCP	HashiCorp	ZS	Zscaler	INTA	Intapp
				ZETA	Zeta Global							INFA	Informatica			IOT	Samsara Inc
				ZI	ZoomInfo							JAMF	Jamf			KARO	Karooooo
												MDB	MongoDB			MLNK	MeridianLink
												MSFT	Microsoft			MODN	Model N
												NOW	ServiceNow			NCNO	nCino
												ORCL	Oracle			PAR	Par Technology
												OTEX	Open Text			PCOR	Procore
												PATH	UiPath			PRO	PROS
												PD	PagerDuty			PWSC	PowerSchool
												PEGA	Pegasystems			SPSC	SPS Commerce
												PLTR	Palantir			TEMN	Temenos
												SNOW	Snowflake			TOST	Toast
												SWI	Solarwinds			TYL	Tyler Technologies
												TEAM	Atlassian			VEEV	Veeva Systems
																WEAV	Weave

Source: BofA Global Research

Stocks included may not be under BofA software coverage

BofA GLOBAL RESEARCH

**Exhibit 14: YTD large-cap software stock performance outperformed Nasdaq and S&P 500**

Large-cap software stock performance

	1 Week	YTD	2023 Return
Nasdaq	1.6%	4.0%	43.4%
S&P 500	1.5%	3.2%	24.2%
ADBE	4.3%	5.5%	77.3%
ADSK	2.7%	5.8%	30.3%
BSY	1.2%	-1.3%	41.2%
CRM	2.7%	9.4%	98.5%
DDOG	-3.4%	5.8%	65.1%
HUBS	2.9%	4.6%	100.8%
INTU	3.5%	4.4%	60.6%
MDB	1.3%	2.4%	107.7%
MSFT	3.4%	9.0%	56.8%
NOW	4.4%	11.2%	82.0%
ORCL	3.4%	8.0%	29.0%
SHOP	4.0%	7.1%	124.4%
SNOW	5.5%	5.6%	38.6%
VEEV	1.7%	10.6%	19.3%
WDAY	2.0%	7.1%	65.0%
ZM	-0.8%	-4.0%	6.2%
<b>Large-Cap Average</b>	<b>2.4%</b>	<b>5.7%</b>	<b>62.7%</b>

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

**Exhibit 15: YTD mid-cap software stock performance lagged Nasdaq and S&P 500**

Mid-cap software stock performance

	1 Week	YTD	2023 Return
Nasdaq	1.6%	4.0%	43.4%
S&P 500	1.5%	3.2%	24.2%
BILL	5.7%	-2.6%	-25.1%
CFLT	5.2%	0.7%	5.2%
DBX	-0.8%	10.1%	31.7%
DOCU	1.7%	6.1%	7.3%
DT	2.2%	8.9%	42.8%
ESTC	-0.4%	8.9%	118.8%
FRSH	5.3%	-1.5%	59.7%
GLBE	6.2%	1.8%	92.0%
GTLB	4.1%	16.2%	38.6%
GWRE	-1.2%	4.6%	74.3%
INFA	-0.3%	8.6%	74.3%
NICE	0.7%	7.8%	3.7%
PATH	2.8%	-2.8%	95.4%
PAYC	0.3%	-5.3%	-33.4%
PCTY	3.5%	-3.9%	-15.1%
TWLO	0.6%	-2.0%	55.0%
U	1.2%	-15.3%	43.0%
<b>Mid-Cap Average</b>	<b>2.2%</b>	<b>2.4%</b>	<b>39.3%</b>

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

**Exhibit 16: YTD small-cap software stock performance lagged Nasdaq and S&P 500**

Small-cap software stock performance

	1 Week	YTD	2023 Return
Nasdaq	1.6%	4.0%	43.4%
S&P 500	1.5%	3.2%	24.2%
AI	-1.8%	-9.5%	156.6%
ALRM	0.5%	-2.8%	30.6%
AMPL	5.5%	6.3%	5.3%
AVDX	3.3%	-8.2%	24.6%
AYX	0.0%	0.6%	-6.9%
BIGC	2.8%	-10.8%	11.3%
BL	2.3%	-0.4%	-7.2%
BLKB	1.8%	-3.1%	47.3%
CVO	12.8%	3.0%	5.7%
EGHT	5.2%	-1.2%	-12.5%
ENFN	-5.2%	-12.0%	0.3%
EVBG	1.1%	-5.9%	-17.8%
FIVN	-0.4%	1.0%	16.0%
FROG	-2.2%	-3.2%	62.3%
HCP	7.9%	-1.1%	-13.5%
INTA	2.7%	17.6%	52.4%
JAMF	1.9%	12.3%	-15.2%
LAW	4.0%	14.0%	20.1%
LSPD	3.4%	-8.3%	46.8%
MLNK	1.6%	-4.0%	80.4%
NCNO	-0.1%	-2.9%	27.2%
PWSC	-0.9%	2.4%	2.1%
RNG	2.4%	6.6%	-4.1%
VERX	-0.4%	-6.1%	85.7%
WEAV	16.9%	16.8%	150.4%
ZETA	1.9%	13.2%	8.0%
ZI	7.0%	-8.8%	-38.6%
<b>Small-Cap Average</b>	<b>2.7%</b>	<b>0.2%</b>	<b>26.6%</b>

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

**Exhibit 17: Verint Systems within Communication software led the stock performance YTD**

Collaboration, Communications, CRM, and Design software stock performance

	1 Week	YTD	2023 Return
Nasdaq	1.6%	4.0%	43.4%
S&P 500	1.5%	3.2%	24.2%
ASAN	0.5%	0.6%	38.1%
BOX	0.1%	4.0%	-17.7%
DBX	-0.8%	10.1%	31.7%
MNDY	7.6%	16.3%	53.9%
SMAR	2.1%	-1.2%	21.5%
<b>Collaboration Average</b>	<b>1.9%</b>	<b>6.0%</b>	<b>25.5%</b>
EGAN	-0.6%	-7.6%	-7.8%
EGHT	5.2%	-1.2%	-12.5%
FIVN	-0.4%	1.0%	16.0%
KLTR	-4.7%	-5.6%	13.4%
LPSN	2.0%	-18.7%	-62.6%
MCHX	12.5%	5.9%	-15.0%
NICE	0.7%	7.8%	3.7%
RNG	2.4%	6.6%	-4.1%
TWLO	0.6%	-2.0%	55.0%
VRNT	6.6%	15.2%	-25.5%
ZM	-0.8%	-4.0%	6.2%
<b>Communication Average</b>	<b>2.1%</b>	<b>-0.3%</b>	<b>-3.0%</b>
BIGC	2.8%	-10.8%	11.3%
CRM	2.7%	9.4%	98.5%
CRTO	4.9%	2.5%	-2.8%
CVO	12.8%	3.0%	5.7%
CXM	5.1%	7.8%	47.4%
FRSH	5.3%	-1.5%	59.7%
GLBE	6.2%	1.8%	92.0%
HUBS	2.9%	4.6%	100.8%
LSPD	3.4%	-8.3%	46.8%
ONTF	7.6%	1.1%	-8.7%
SEMR	-0.5%	-11.7%	67.8%
SHOP	4.0%	7.1%	124.4%
SPT	4.0%	7.8%	8.8%
WIX	-0.1%	4.6%	60.1%
YEXT	2.7%	5.7%	-9.8%
ZETA	1.9%	13.2%	8.0%
ZI	7.0%	-8.8%	-38.6%
<b>CRM Average</b>	<b>4.3%</b>	<b>1.6%</b>	<b>39.5%</b>
ADBE	4.3%	5.5%	77.3%
ADSK	2.7%	5.8%	30.3%
ANSS	-2.5%	-8.4%	50.2%
AZPN	-1.3%	-7.6%	7.2%
BSY	1.2%	-1.3%	41.2%
CDNS	-0.7%	7.8%	69.6%
DSY	1.6%	8.3%	32.1%
NEM	-1.3%	-16.5%	-12.3%
PTC	4.4%	5.7%	45.8%
PTC	4.4%	5.7%	45.8%
U	1.2%	-15.3%	43.0%
Nasdaq	1.6%	4.0%	43.4%

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

**Exhibit 18: GitLab within Infrastructure led the stock outperformance YTD**

ERP &amp; Back Office, HCM, and Infrastructure software stock performance

	1 Week	YTD	2023 Return
Nasdaq	1.6%	4.0%	43.4%
S&P 500	1.5%	3.2%	24.2%
AVDX	3.3%	-8.2%	24.6%
BILL	5.7%	-2.6%	-25.1%
BL	2.3%	-0.4%	-7.2%
DOCU	1.7%	6.1%	7.3%
EXFY	-12.5%	-30.6%	-72.0%
INTU	3.5%	4.4%	60.6%
LAW	4.0%	14.0%	20.1%
MANH	0.4%	4.7%	77.4%
QWTO	-1.2%	1.9%	61.6%
SAP	8.0%	14.0%	49.8%
UPLD	4.0%	1.3%	-40.7%
VERX	-0.4%	-6.1%	85.7%
WK	0.0%	-4.8%	20.9%
ZUO	6.7%	0.4%	47.8%
<b>ERP &amp; Back Office Average</b>	<b>1.8%</b>	<b>-0.4%</b>	<b>22.2%</b>
ADP	-0.8%	1.9%	-2.5%
CDAY	2.4%	3.5%	4.6%
PAYC	0.3%	-5.3%	-33.4%
PAYX	-1.3%	1.7%	3.1%
PCTY	3.5%	-3.9%	-15.1%
PYCR	-1.9%	-8.1%	-11.8%
WDAY	2.0%	7.1%	65.0%
<b>HCM Average</b>	<b>0.6%</b>	<b>-0.4%</b>	<b>1.4%</b>
AI	-1.8%	-9.5%	156.6%
AMPL	5.5%	6.3%	5.3%
APPN	4.0%	-6.7%	15.7%
AYX	0.0%	0.6%	-6.9%
BASE	-0.7%	9.4%	69.8%
BBAI	-6.2%	-14.5%	217.6%
CFLT	5.2%	0.7%	5.2%
DDOG	-3.4%	5.8%	65.1%
DOMO	15.4%	10.9%	-27.7%
DT	2.2%	8.9%	42.8%
ESTC	-0.4%	8.9%	118.8%
EVBG	1.1%	-5.9%	-17.8%
FROG	-2.2%	-3.2%	62.3%
GTLB	4.1%	16.2%	38.6%
HCP	7.9%	-1.1%	-13.5%
INFA	-0.3%	8.6%	74.3%
JAMF	1.9%	12.3%	-15.2%
MDB	1.3%	2.4%	107.7%
MSFT	3.4%	9.0%	56.8%
NOW	4.4%	11.2%	82.0%
ORCL	3.4%	8.0%	29.0%
OTEX	5.7%	4.9%	41.8%
PATH	2.8%	-2.8%	95.4%
PD	-5.2%	6.1%	-12.8%
PEGA	3.6%	1.6%	42.7%
PLTR	-3.0%	-0.5%	167.4%
SNOW	5.5%	5.6%	38.6%
SWI	2.2%	-0.3%	33.4%
TEAM	4.1%	7.5%	84.8%
<b>Infrastructure Average</b>	<b>2.1%</b>	<b>3.5%</b>	<b>53.7%</b>

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

**Exhibit 19: Appfolio within Vertical led the stock performance YTD**

Security and Vertical software stock performance

	1 Week	YTD	2023 Return
Nasdaq	1.6%	4.0%	43.4%
S&P 500	1.5%	3.2%	24.2%
ALRM	0.5%	-2.8%	30.6%
CHKP	0.6%	4.7%	21.1%
CLVT	-0.9%	-1.5%	11.0%
CRWD	0.3%	17.4%	142.5%
CYBR	0.5%	7.5%	69.0%
FTNT	5.8%	13.3%	19.7%
GEN	2.7%	6.1%	6.5%
OKTA	2.8%	-4.0%	32.5%
PANW	-0.3%	16.9%	111.3%
QLYS	-3.6%	-2.7%	74.9%
RPD	5.0%	0.9%	68.0%
S	6.8%	2.3%	88.1%
SCWX	-9.3%	-4.9%	15.5%
TENB	0.8%	4.2%	20.7%
ZS	1.5%	10.3%	98.0%
<b>Security Average</b>	<b>0.9%</b>	<b>4.5%</b>	<b>54.0%</b>
APPF	26.0%	32.5%	64.4%
BLKB	1.8%	-3.1%	47.3%
CCCS	1.2%	-2.1%	30.9%
COUR	14.9%	6.5%	63.7%
CPLF	-1.0%	1.2%	5.2%
CWAN	3.0%	-2.1%	6.8%
DH	0.2%	-6.4%	-9.6%
DOX	-1.3%	4.9%	-3.3%
ENFN	-5.2%	-12.0%	0.3%
ETWO	2.4%	-9.0%	-25.2%
EVCN	0.6%	-6.3%	48.3%
GWRE	-1.2%	4.6%	74.3%
INST	-0.6%	-5.2%	15.2%
INTA	2.7%	17.6%	52.4%
IOT	-3.2%	-3.5%	168.5%
KARO	-0.1%	2.8%	4.3%
MLNK	1.6%	-4.0%	80.4%
MODN	-0.2%	4.3%	-33.6%
NCNO	-0.1%	-2.9%	27.2%
PAR	4.4%	10.4%	67.0%
PCOR	2.1%	5.1%	46.7%
PRO	-1.7%	-6.5%	59.9%
PWSC	-0.9%	2.4%	2.1%
SPSC	1.4%	-1.4%	50.9%
TEMN	2.2%	12.7%	54.2%
TOST	8.5%	2.3%	1.3%
TWOU	28.1%	-7.7%	-80.4%
TYL	-1.0%	4.2%	29.7%
VEEV	1.7%	10.6%	19.3%
WEAV	16.9%	16.8%	150.4%
<b>Vertical Average</b>	<b>3.4%</b>	<b>2.2%</b>	<b>34.0%</b>

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

# Disclosures

## Important Disclosures

**FUNDAMENTAL EQUITY OPINION KEY:** Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. **VOLATILITY RISK RATINGS**, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. **INVESTMENT RATINGS** reflect the analyst's assessment of both a stock's absolute total return potential as well as its attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). Our investment ratings are: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. An investment rating of 6 (No Rating) indicates that a stock is no longer trading on the basis of fundamentals. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster <sup>R1</sup>
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

<sup>R1</sup> Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

**INCOME RATINGS**, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. *Coverage Cluster* is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Global Research report referencing the stock.

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

## Other Important Disclosures

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.

Officers of BofA or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

Refer to [BofA Global Research policies relating to conflicts of interest](#).

**"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.**

### Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:

BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at [www.bofam.com/BofASEdisclaimer](http://www.bofam.com/BofASEdisclaimer); BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSF); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Canadian Investment Regulatory Organization; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofA Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This information has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSF; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of





its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBL. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the [Electronic Communications Disclaimers](#) for further information.

This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

#### General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities.

This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

Digital assets, including cryptocurrencies and digital tokens, are a new technological innovation and are extremely speculative assets. Digital assets are volatile, have variable liquidity and may be subject to manipulation or fraud. Digital asset markets are relatively nascent and are not regulated in a manner similar to U.S. securities markets. Digital assets do not have a standardized exchange, like a stock market. Any future regulatory developments could limit or affect the viability of digital assets.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

#### Copyright and General Information:

Copyright 2024 Bank of America Corporation. All rights reserved. iQDatabase® is a registered service mark of Bank of America Corporation. This information is prepared for the use of BofA Securities clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Securities. BofA Global Research information is distributed simultaneously to internal and client websites and other portals by BofA Securities and is not publicly-available material. Any unauthorized use or disclosure is prohibited. Receipt and review of this information constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained herein (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Securities.

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content

contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.