

Server & Enterprise Software

Where Are We Trading Now: Entering 2024

Industry Overview

Software coverage group performance to Jan 8

As of Jan 8, our software coverage universe was -3.3% YTD (Nasdaq -1.1%) which compares to +39.8% in 2023 (Nasdaq 43.4%). On an EV/NTM Sales basis, our coverage group traded at 6.8x, 38% below the 5-year median and 3% below the 10-year median. On an EV/NTM FCF basis, our coverage group traded at 40.1x, 6% below the 5-year median and on par with the 10-year median.

HCM software saw the smallest multiple contraction w/w

We examine software valuation by category. On an EV/NTM Sales basis, the HCM software group saw the smallest multiple contraction w/w (-1.4%), with the Design software having the largest multiple expansion relative to the 5-year median (+6.1%). On an EV/NTM FCF basis, the Vertical software group saw the largest multiple expansion w/w (+4%), with the Collaboration software group having the largest multiple expansion relative to the 5-year median (+38.7%).

Exhibit 1: HCM software saw the smallest EV/NTM Sales contraction w/w, led by Automatic Data Processing

Software multiple expansion/contraction by category

Category	EV/NTM Sales				EV/NTM FCF			
	Current	5-yr median	1 wk	5-yr median	Current	5-yr median	1 wk	5-yr median
Collaboration	5.5x	7.3x	-2.5%	-24.5%	28.0x	20.2x	-2.1%	38.7%
Communication	2.4x	7.7x	-2.7%	-69.0%	26.6x	29.0x	-2.2%	-8.3%
CRM	5.0x	8.6x	-4.3%	-42.1%	38.4x	42.5x	-3.6%	-9.6%
Design	10.2x	9.6x	-4.1%	6.1%	38.9x	35.4x	-4.0%	9.9%
ERP & Back Office	5.1x	7.7x	-5.6%	-33.7%	37.5x	42.2x	-6.0%	-11.0%
HCM	6.4x	9.8x	-1.4%	-34.6%	42.8x	45.3x	-4.3%	-5.6%
Infrastructure	7.4x	10.6x	-3.1%	-30.7%	40.2x	39.5x	-2.0%	1.8%
Security	7.5x	9.0x	-3.0%	-16.4%	31.1x	32.2x	-2.7%	-3.6%
Vertical	6.1x	7.9x	-2.8%	-23.0%	39.5x	39.9x	4.0%	-1.1%

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.

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Within the report:

- Historical software valuation trends (Exhibit 2 – Exhibit 6)
- Software stock performance overview (**Error! Reference source not found.**)
- 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

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WTD=week-to-date

QTD=quarter-to-date

YTD=year-to-date

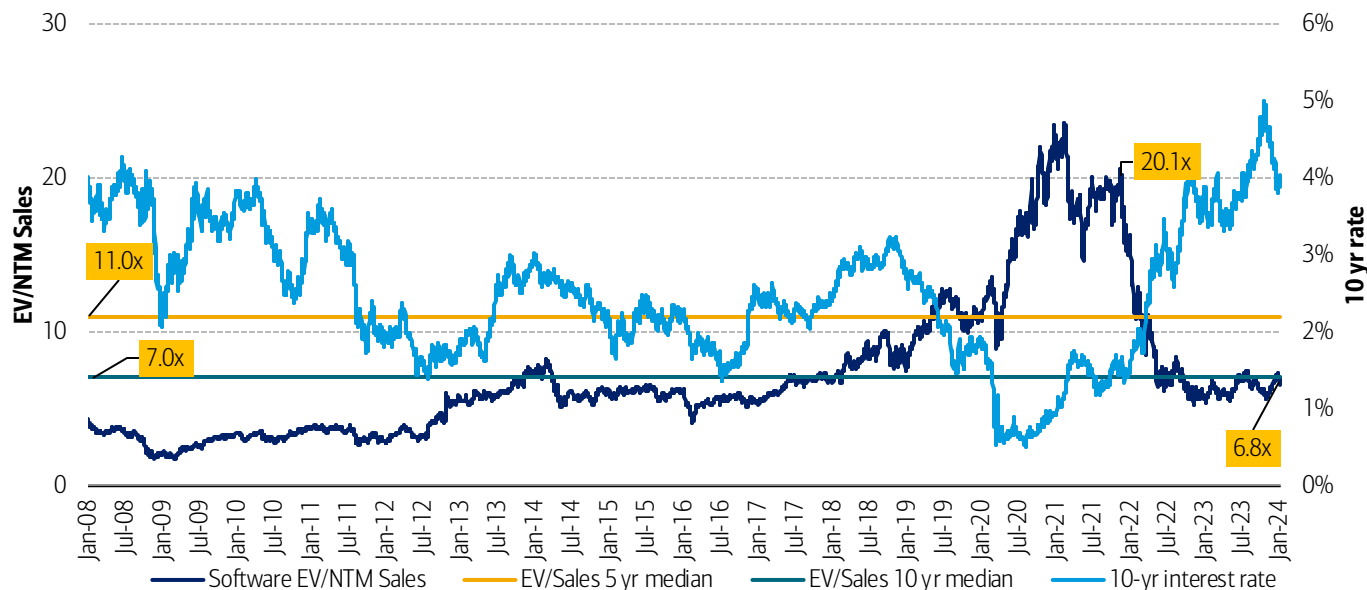
HCM- human capital management

Historical Software Valuation Trend

On an EV/NTM Sales basis, our coverage group is trading at 6.8x, -67% vs the '21 peak of 20.1x. Our coverage group's current multiple is -38% from the 5-year median of 11.0x and 3% below the 10-year median of 7.0x.

Exhibit 2: EV/NTM Sales multiples remain below the 5-yr median

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



Source: BofA Global Research estimates, Bloomberg

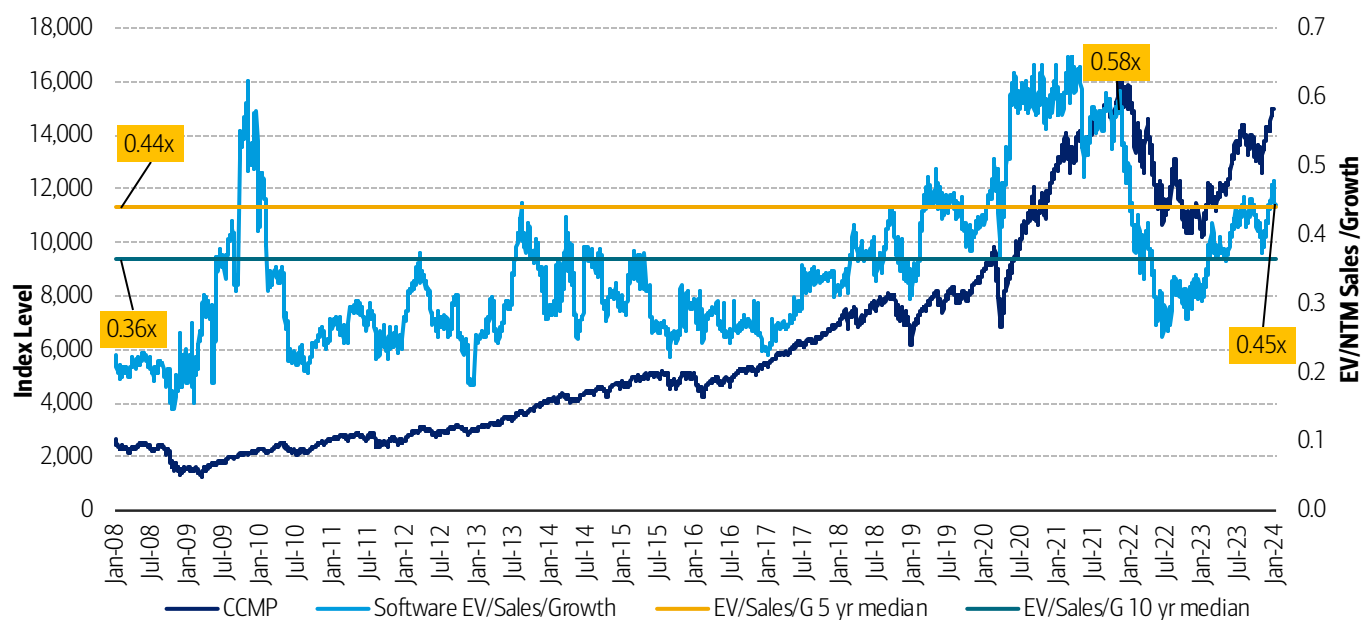
*Constituents: BofA Software coverage

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On an EV/NTM Sales/Growth basis, our software coverage group is trading at 0.45x, -27% from the '21 peak of 0.58x. Our coverage group's current multiple has expanded to 1.7% above the 5-year median of 0.44x and +23% from the 10-year median of 0.36x.

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

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



Source: BofA Global Research estimates, Bloomberg

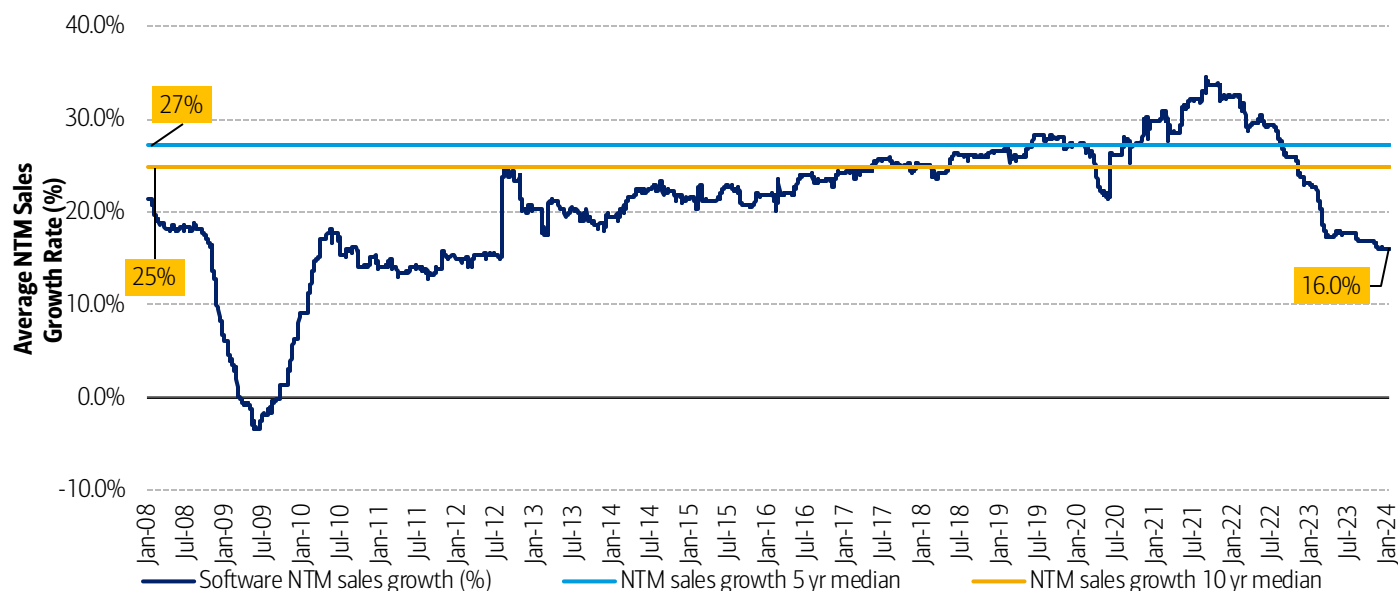
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NTM Sales Growth for our software coverage group is currently 16.0%, -16.2% from the '21 peak of 32.2%. Our software coverage group's current NTM Sales Growth is -11.2% from 5-year median of 27.2% and -8.7% from 10-year median of 24.7%.

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

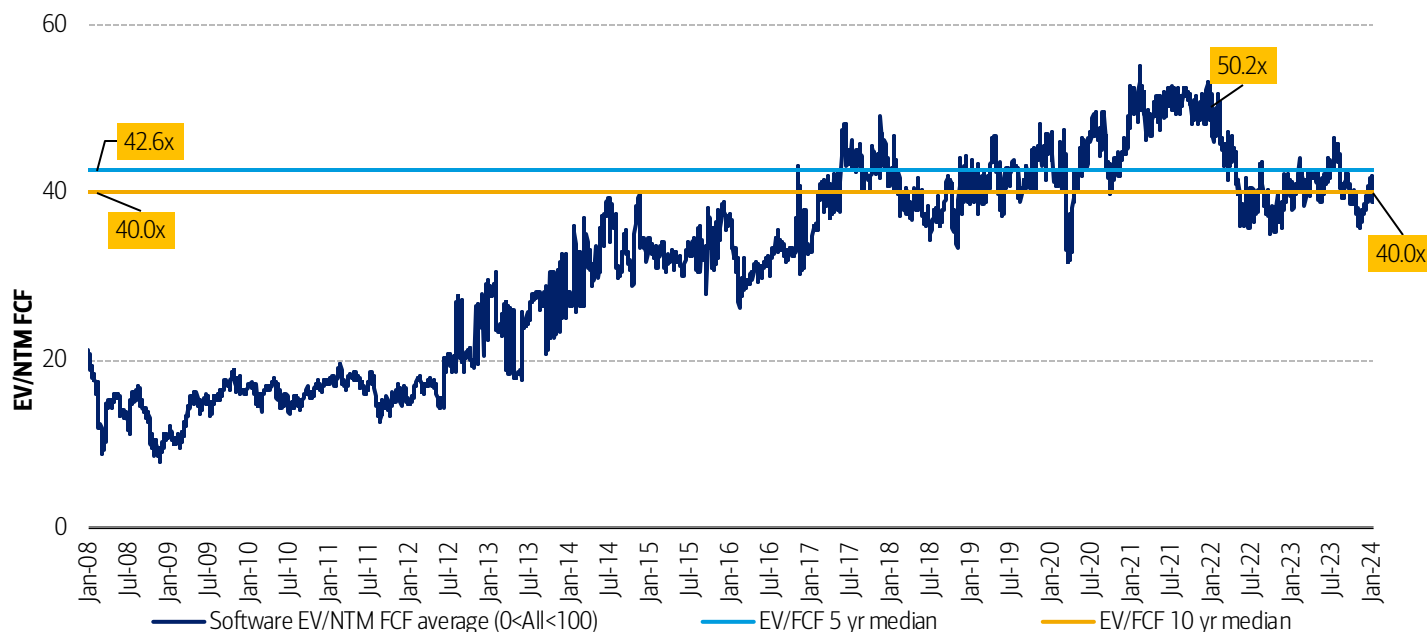
*Constituents: BofA Software coverage

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On an EV/NTM FCF basis, our coverage group is trading at 40.0x, -18% from the '21 peak of 50.2x. Our coverage group's current multiple is -6% from the 5-year median of 42.6x and on par with the 10-year median of 40.0x.

Exhibit 5: EV/NTM FCF multiples are approaching the 5-year median following steady expansion since November 2023

EV/NTM FCF – 2008 to date



Source: BofA Global Research estimates, Bloomberg

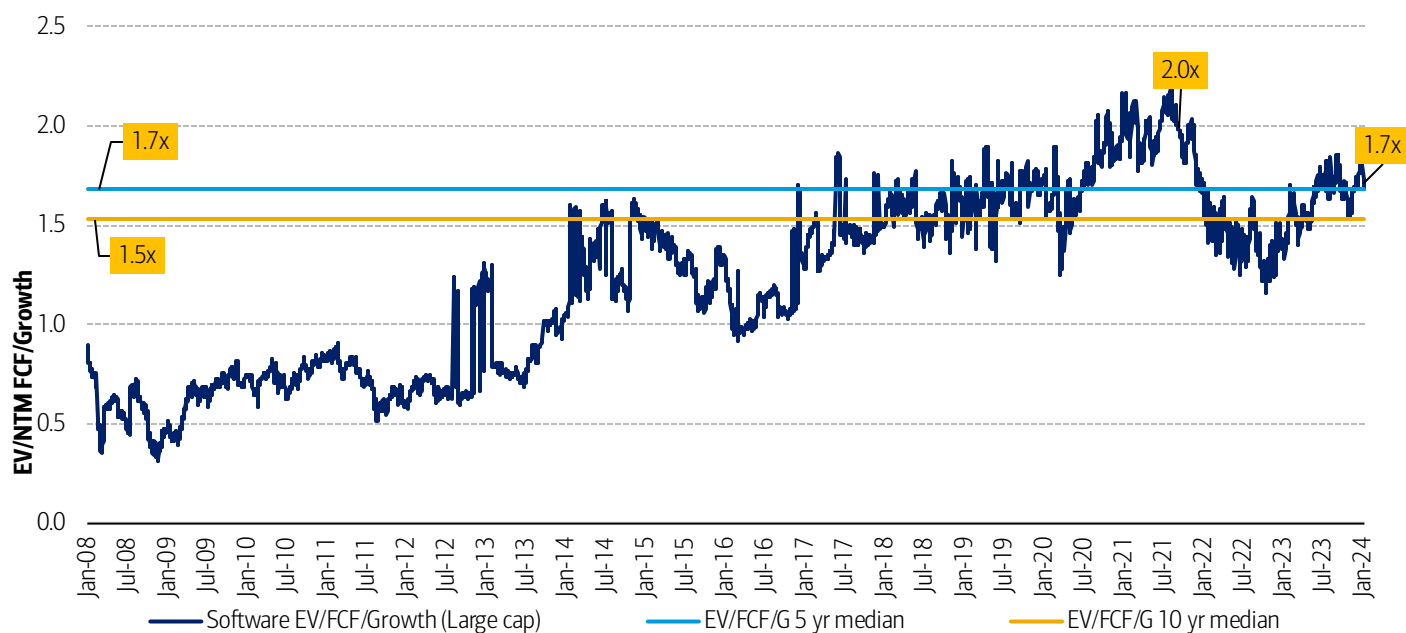
*Constituents: BofA Software coverage

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On an EV/NTM FCF/Growth basis, the large cap software group is trading at 1.7x, -11% from '21 peak at 2.0x. The current multiple is +5% the 5-year median of 1.7x and +15% from the 10-year median of 1.5x.

Exhibit 6: EV/NTM FCF/Growth multiples have expanded since November 2023 and are now on par with the 5-year median

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



Source: BofA Global Research estimates, Bloomberg

*Constituents: BofA Software coverage

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Software Stock Performance Overview

As of Jan 8, our software coverage universe was -3.3% YTD (Nasdaq -1.1%) which compares to +39.8% in 2023 (Nasdaq 43.4%). The Vertical software group outperformed the broader software group on a YTD basis, led by Ebix (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	YTD	2023 Return	Buy-rated YTD	Buy-rated 2023 Return
Large-Cap Average	-2.7%	62.7%	-2.8%	81.1%
Mid-Cap Average	-2.9%	38.0%	-2.8%	51.5%
Small-Cap Average	-4.0%	26.6%	-2.7%	36.6%
Total Group Average	-3.3%	39.8%	-2.7%	54.0%

Software by Category	YTD	2023 Return
Collaboration	-2.2%	25.5%
Communication	-3.0%	-0.6%
CRM	-4.8%	39.5%
Design	-4.0%	39.1%
ERP & Back office	-5.4%	22.2%
HCM	-1.5%	1.4%
Infrastructure	-3.1%	53.7%
Security	-3.8%	54.0%
Vertical	0.8%	29.8%

Nasdaq	-1.1%	43.4%
S&P 500	-0.1%	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 1/8/2024



BofA Software Comp Sheet

Exhibit 8: Our large-cap software group is trading at 9.1x CY25e sales and 35.3x 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	\$580.55	266,472	13.5x	12.3x	11.0x	1.3x	1.2x	0.9x	37.8x	28.6x	25.9x	...	0.9x	2.5x
ADSK	AUTODESK INC	\$235.45	50,857	9.4x	8.6x	7.6x	1.0x	0.8x	0.6x	41.4x	32.5x	24.2x	...	1.2x	0.7x
BSY	BENTLEY SYSTEMS INC-CLASS B	\$48.39	16,105	14.3x	13.0x	11.8x	1.2x	1.2x	1.2x	50.0x	49.7x	36.9x	1.3x	...	1.1x
CRM	SALESFORCE INC	\$260.87	255,913	7.4x	6.6x	5.8x	0.7x	0.6x	0.4x	29.9x	23.8x	18.8x	0.8x	0.9x	0.7x
ODOG	DATADOG INC - CLASS A	\$119.25	41,253	18.9x	16.0x	13.3x	0.7x	0.9x	0.7x	71.0x	58.7x	48.3x	1.5x	2.8x	2.2x
DT	DYNATRACE INC	\$53.75	16,006	11.3x	9.6x	8.1x	0.5x	0.5x	0.4x	48.1x	43.8x	33.1x	7.8x	4.5x	1.0x
HUBS	HUBSPOT INC	\$557.17	27,887	12.6x	10.8x	8.8x	0.5x	0.6x	0.4x	79.1x	51.4x	41.0x	3.1x	1.0x	1.6x
INTU	INTUIT INC	\$598.38	169,342	11.5x	10.3x	9.2x	1.1x	0.9x	0.8x	32.6x	34.3x	27.4x	1.0x	...	1.1x
MDB	MONGODB INC	\$378.45	31,222	18.4x	15.1x	12.0x	0.6x	0.7x	0.5x	...	...	95.8x	...	...	1.7x
MSFT	MICROSOFT CORP	\$374.69	2,795,937	12.2x	10.6x	9.4x	1.1x	0.7x	0.8x	38.8x	41.1x	32.9x	2.0x	...	1.3x
NOW	SERVICENOW INC	\$696.26	143,622	15.9x	13.0x	10.6x	0.7x	0.6x	0.5x	52.9x	41.7x	34.2x	2.2x	1.6x	1.5x
ORCL	ORACLE CORP	\$104.66	294,827	7.3x	6.8x	6.3x	0.6x	1.0x	0.7x	37.1x	36.0x	29.7x	1.8x	11.3x	1.4x
SHOP	SHOPIFY INC - CLASS A	\$77.69	88,800	12.2x	10.2x	8.5x	0.5x	0.5x	0.4x	...	54.7x	43.6x	...	0.5x	1.7x
SNOW	SNOWFLAKE INC-CLASS A	\$196.35	71,282	24.4x	18.7x	14.2x	0.7x	0.6x	0.5x	89.2x	64.9x	48.3x	1.9x	1.7x	1.4x
VEEV	VEEVA SYSTEMS INC-CLASS A	\$190.54	31,203	11.6x	9.9x	8.6x	1.3x	0.6x	0.5x	32.4x	27.6x	22.7x	3.3x	1.6x	1.1x
WDAY	WORKDAY INC-CLASS A	\$272.94	72,705	9.5x	8.2x	7.0x	0.6x	0.5x	0.4x	40.0x	33.2x	28.7x	1.2x	1.6x	1.8x
ZM	ZOOM VIDEO COMMUNICATIONS	\$68.39	21,228	3.3x	3.2x	3.1x	1.2x	1.1x	0.7x	11.0x	9.7x	9.2x	0.8x	0.7x	1.7x
Average				12.6x	10.8x	9.1x	0.8x	0.8x	0.6x	46.1x	39.5x	35.3x	2.2x	2.3x	1.4x
Median				12.2x	10.3x	8.8x	0.7x	0.7x	0.5x	40.0x	38.5x	32.9x	1.8x	1.6x	1.4x

Source: BofA Global Research estimates

As of 1/8/2024

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Exhibit 9: Our mid-cap software group is trading at 5.4x 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	\$78.05	8,337	6.5x	5.9x	4.8x	0.2x	0.6x	0.2x	63.7x	42.7x	33.9x	0.8x	0.9x	1.3x
CFLT	CONFLUENT INC-CLASS A	\$22.59	7,362	8.6x	7.1x	5.6x	0.3x	0.3x	0.2x	...	...	...	...	...	...
DBX	DROPBOX INC-CLASS A	\$29.83	10,321	4.5x	4.4x	4.2x	0.6x	1.3x	1.1x	14.4x	11.7x	10.7x	6.2x	0.5x	1.2x
DOCU	DOCUSIGN INC	\$55.66	11,580	3.9x	3.7x	3.5x	0.4x	0.6x	0.5x	14.9x	14.1x	12.9x	0.2x	2.2x	1.4x
ESTC	ELASTIC NV	\$108.69	11,630	8.9x	7.7x	6.6x	0.5x	0.5x	0.4x	...	59.6x	45.1x	...	0.6x	1.4x
FIVN	FIVE9 INC	\$76.13	5,380	6.0x	5.2x	4.4x	0.4x	0.3x	0.2x	64.6x	41.6x	27.3x	0.4x	0.7x	0.5x
FRSH	FRESHWORKS INC-CL A	\$22.70	7,332	10.4x	8.8x	7.5x	0.5x	0.5x	0.4x	86.6x	52.1x	38.1x	...	0.8x	1.0x
GLBE	GLOBAL E ONLINE LTD	\$39.03	6,848	11.7x	8.8x	6.5x	0.3x	0.3x	0.2x	62.7x	48.8x	32.5x	1.5x	1.7x	0.7x
GTLB	GITLAB INC-CL A	\$59.65	9,836	15.4x	12.4x	9.7x	0.4x	0.5x	0.3x	...	...	...	...	...	...
GWRE	GUIDEWIRE SOFTWARE INC	\$106.86	8,729	9.1x	8.2x	7.2x	1.4x	0.7x	0.6x	...	52.0x	39.9x	...	0.4x	1.3x
INFA	INFORMATICA	\$27.15	7,758	5.6x	5.4x	5.0x	1.1x	1.8x	0.7x	35.9x	28.7x	24.4x	1.6x	1.1x	1.4x
NICE	NICE LTD - SPON ADR	\$206.72	13,819	5.4x	5.0x	4.5x	0.6x	0.5x	0.4x	26.0x	21.1x	18.5x	2.4x	0.9x	1.3x
PATH	UIPATH INC - CLASS A	\$23.10	13,099	8.8x	7.1x	5.8x	0.4x	0.3x	0.3x	44.2x	39.5x	28.8x	...	3.3x	0.8x
PAYC	PAYCOM SOFTWARE INC	\$204.14	11,833	6.8x	6.1x	5.4x	0.3x	0.5x	0.4x	38.9x	32.2x	26.7x	1.5x	1.5x	1.3x
PCTY	PAYLOCITY HOLDING CORP	\$162.48	9,242	7.0x	5.9x	5.0x	0.2x	0.3x	0.3x	34.1x	28.9x	23.3x	0.5x	1.6x	1.0x
TWLO	TWILIO INC - A	\$73.64	13,785	2.6x	2.4x	2.2x	0.3x	0.4x	0.2x	74.5x	25.4x	18.1x	...	0.1x	0.5x
U	UNITY SOFTWARE INC	\$38.98	12,780	6.6x	5.4x	4.3x	0.1x	0.2x	0.2x	47.6x	25.4x	14.1x	...	0.3x	0.2x
ZI	ZOOMINFO TECHNOLOGIES INC	\$16.40	6,609	6.0x	5.9x	5.6x	0.5x	3.7x	0.9x	18.8x	18.5x	17.3x	12.8x	12.2x	2.4x
Average				7.4x	6.4x	5.4x	0.5x	0.7x	0.4x	44.8x	33.9x	25.7x	2.8x	1.8x	1.1x
Median				6.7x	5.9x	5.2x	0.4x	0.5x	0.4x	41.6x	30.6x	25.6x	1.5x	0.9x	1.3x

Source: BofA Global Research estimates

As of 1/8/2024

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Exhibit 10: Our small-cap coverage group is trading at 3.9x C25e Sales, or 0.3x on a growth adjusted basis

BofA Software Coverage Comp Sheet – Small Cap

		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
Company	Price													
AI	C3.AI INC-A	\$28.57	3,390	9.1x	7.8x	6.8x	0.9x	0.5x	0.5x	...	...	54.2x	...	...
ALRM	ALARM.COM HOLDINGS INC	\$62.00	3,396	3.7x	3.5x	3.3x	0.8x	0.8x	0.4x	29.3x	58.9x	22.5x	0.1x	...
AMPL	AMPLITUDE INC-CLASS A	\$12.31	1,797	5.4x	5.0x	4.6x	0.3x	0.7x	0.5x	66.8x	59.2x	48.0x	...	0.1x
AVDX	AVIDXCHANGE	\$11.56	2,312	5.4x	4.7x	4.1x	0.3x	0.3x	0.3x	...	...	41.4x	...	0.2x
AYX	AL TERYX INC - CLASS A	\$47.13	3,361	4.2x	3.8x	3.4x	0.4x	0.3x	0.3x	...	75.3x	37.3x	...	0.4x
BIGC	BIGCOMMERCE HOLDINGS	\$8.76	660	2.4x	2.2x	2.0x	0.2x	0.2x	0.2x	...	51.2x	32.4x	...	0.6x
BL	BLACKLINE INC	\$57.78	3,643	6.2x	5.6x	5.0x	0.5x	0.5x	0.5x	33.6x	28.6x	23.3x	0.2x	1.0x
BLKB	BLACKBAUD INC	\$82.59	4,391	4.6x	4.4x	4.1x	0.9x	0.7x	0.7x	24.5x	21.7x	19.0x	0.4x	1.4x
EGHT	8X8 INC	\$3.72	449	1.2x	1.1x	1.1x	...	0.8x	0.2x	7.9x	6.6x	5.5x	0.0x	0.3x
ENFUS	ENFUSION	\$9.30	1,261	7.2x	6.2x	5.3x	0.5x	0.4x	0.3x	65.0x	59.9x	40.4x	0.3x	0.8x
EVERB	EVERBRIDGE INC	\$21.95	962	2.8x	2.6x	2.5x	0.8x	0.5x	0.4x	46.0x	29.3x	20.7x	0.0x	0.5x
FROG	JFROG LTD	\$32.20	3,324	8.2x	6.6x	5.4x	0.4x	0.3x	0.2x	54.1x	40.1x	28.0x	0.3x	0.6x
HCP	HASHICORP INC-CL A	\$22.42	4,363	5.4x	4.7x	3.9x	0.3x	0.3x	0.2x	...	37.6x	24.6x	...	0.5x
INTA	INTAPP INC	\$36.90	2,711	6.6x	5.6x	4.9x	0.3x	0.3x	0.3x	72.2x	47.7x	34.2x	0.8x	0.9x
JAMF	JAMF HOLDING CORP	\$18.30	2,297	4.4x	3.9x	3.4x	0.3x	0.3x	0.3x	56.6x	40.8x	31.6x	...	1.1x
LAW	CS DISCO INC	\$7.87	500	2.6x	2.4x	2.1x	1.5x	0.3x	0.2x	...	...	...	...	...
LSPD	LIGHTSPEED COMMERCE INC	\$19.09	2,897	2.5x	2.1x	1.7x	0.1x	0.1x	0.1x	...	40.4x	48.3x	...	...
MLNK	MERIDIANLINK INC	\$22.90	1,937	7.4x	7.0x	6.6x	1.3x	1.2x	0.9x	32.3x	26.4x	24.3x	...	2.8x
NCNO	NCINO INC	\$34.59	3,907	8.1x	7.1x	6.2x	0.5x	0.5x	0.4x	53.1x	47.6x	47.8x	...	...
PD	PAGERDUTY INC	\$23.12	2,153	4.7x	4.3x	3.8x	0.3x	0.4x	0.3x	29.0x	21.7x	17.4x	0.1x	0.7x
PWSC	POWERSCHOOL HOLDINGS INC-A	\$23.76	4,740	7.6x	6.6x	6.1x	0.7x	0.5x	0.7x	30.2x	25.1x	21.7x	1.5x	1.4x
RNG	RINGCENTRAL INC-CLASS A	\$32.36	3,061	2.0x	1.8x	1.7x	0.2x	0.2x	0.1x	15.2x	11.6x	7.9x	0.1x	0.2x
VERX	VERTEX INC - CLASS A	\$25.04	3,808	6.8x	6.0x	5.4x	0.5x	0.5x	0.4x	86.3x	56.2x	39.8x	0.6x	1.0x
WEAV	WEAVE COMMUNICATIONS	\$11.45	739	4.1x	3.6x	3.1x	0.2x	0.3x	0.2x	...	37.4x	21.8x	...	0.3x
ZETA	ZETA GLOBAL HOLDINGS	\$8.62	1,650	2.4x	2.0x	1.8x	0.1x	0.1x	0.1x	20.8x	14.5x	11.9x	0.5x	0.5x
Average				5.0x	4.4x	3.9x	0.5x	0.4x	0.3x	42.5x	38.1x	29.3x	0.4x	0.8x
Median				4.7x	4.4x	3.9x	0.4x	0.4x	0.3x	33.6x	38.8x	26.3x	0.3x	0.6x

Source: BofA Global Research estimates

As of 1/8/2024

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 (9.4x C25 Sales, or 0.8x 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
Collaboration \$32,394													
Average		6.0x	5.2x	4.5x	0.4x	0.6x	0.5x	28.6x	23.6x	25.7x	1.9x	13.9x	0.7x
Median		5.8x	5.1x	4.2x	0.3x	0.5x	0.4x	29.1x	22.9x	21.8x	0.7x	1.5x	0.7x
Communication \$60,717													
Average		2.8x	2.6x	2.6x	-0.4x	0.4x	0.3x	30.7x	20.7x	14.8x	0.9x	0.5x	0.7x
Median		2.2x	2.1x	2.2x	0.2x	0.4x	0.2x	15.8x	16.5x	14.0x	0.6x	0.4x	0.5x
CRM \$445,875													
Average		6.1x	5.2x	4.4x	0.4x	-1.1x	0.3x	44.5x	39.6x	32.8x	2.4x	5.4x	0.5x
Median		5.2x	4.3x	3.7x	0.3x	0.3x	0.3x	40.3x	40.4x	33.7x	0.8x	0.7x	0.5x
Design \$546,613													
Average		11.7x	10.5x	9.4x	1.1x	1.0x	0.8x	43.6x	35.3x	29.1x	1.4x	10.0x	-0.1x
Median		11.3x	10.3x	9.2x	1.2x	1.0x	0.9x	42.3x	32.6x	30.0x	1.3x	1.6x	1.4x
ERP & Back Office \$491,176													
Average		6.5x	5.8x	5.1x	1.0x	0.4x	1.8x	44.1x	37.4x	30.3x	0.9x	0.9x	-7.4x
Median		6.2x	5.6x	4.8x	0.5x	0.5x	0.4x	41.6x	34.3x	30.8x	0.8x	1.1x	1.0x
HCM \$248,765													
Average		7.1x	6.3x	5.6x	0.5x	0.6x	0.6x	32.6x	40.3x	30.8x	1.2x	4.1x	1.7x
Median		7.0x	6.1x	5.4x	0.3x	0.5x	0.4x	34.1x	32.2x	26.7x	1.2x	1.6x	1.2x
Infrastructure \$3,600,075													
Average		8.6x	7.3x	6.2x	0.6x	0.6x	0.4x	49.3x	40.7x	34.0x	1.0x	1.5x	1.1x
Median		6.4x	6.0x	5.2x	0.5x	0.5x	0.4x	48.1x	40.4x	32.9x	1.5x	1.1x	1.1x
Security \$232,099													
Average		8.5x	7.3x	6.2x	0.2x	0.7x	0.6x	36.1x	37.7x	27.4x	0.7x	3.1x	0.9x
Median		6.5x	6.3x	5.9x	0.4x	0.5x	0.4x	31.2x	26.8x	22.5x	0.9x	1.8x	1.0x
Vertical \$173,934													
Average		7.0x	6.2x	5.4x	0.5x	0.4x	0.5x	42.1x	37.1x	29.2x	0.5x	1.6x	1.3x
Median		7.2x	6.2x	5.5x	0.5x	0.5x	0.4x	33.4x	28.6x	26.5x	0.6x	1.0x	1.1x

Source: BofA Global Research estimates for companies under coverage, Bloomberg consensus for companies not under coverage
As of 1/8/24. Stocks included may not be under BofA software coverage. See appendix.

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On an EV/NTM Sales basis, the HCM software group saw the smallest multiple contraction w/w (-1.4%) led by Automatic Data Processing (covered by Jason Kupferberg), with the Design software group also seeing the largest expansion relative to the 5-year median (+6.1%), led by PTC Inc. (covered by Andrew Obin).

On an EV/NTM FCF basis, the Vertical software group saw the largest multiple expansion w/w (+4.0%) led by nCino (covered by Adam Bergere), with Collaboration software seeing the largest multiple expansion relative to the 5-year median (+38.7%) led by Asana (not covered).

Exhibit 12: Design software saw the smallest EV/NTM Sales multiple contraction, led by Ansys

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
Collaboration	5.5x	7.3x	-2.5%	-24.5%	0.6x	0.4x	-1.6%	56.7%	28.0x	20.2x	-2.1%	38.7%
Communication	2.4x	7.7x	-2.7%	-69.0%	1.7x	0.4x	-7.3%	302.0%	26.6x	29.0x	-2.2%	-8.3%
CRM	5.0x	8.6x	-4.3%	-42.1%	0.4x	0.3x	-5.2%	17.0%	38.4x	42.5x	-3.6%	-9.6%
Design	10.2x	9.6x	-4.1%	6.1%	1.0x	0.8x	-4.1%	35.2%	38.9x	35.4x	-4.0%	9.9%
ERP & Back Office	5.1x	7.7x	-5.6%	-33.7%	0.5x	0.5x	-4.6%	-7.1%	37.5x	42.2x	-6.0%	-11.0%
HCM	6.4x	9.8x	-1.4%	-34.6%	0.5x	0.6x	0.2%	-9.8%	42.8x	45.3x	-4.3%	-5.6%
Infrastructure	7.4x	10.6x	-3.1%	-30.7%	0.5x	0.6x	-2.4%	-17.8%	40.2x	39.5x	-2.0%	1.8%
Security	7.5x	9.0x	-3.0%	-16.4%	0.7x	0.6x	-1.8%	21.9%	31.1x	32.2x	-2.7%	-3.6%
Vertical	6.1x	7.9x	-2.8%	-23.0%	0.7x	0.6x	-2.6%	6.1%	39.5x	39.9x	4.0%	-1.1%

Source: BofA Global Research estimates for companies under coverage, Bloomberg consensus for companies not under coverage. As of 1/8/24. Stocks included may not be under BofA software coverage. See appendix.

BofA GLOBAL RESEARCH

Appendix

Exhibit 13: Our 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	EGAN	BIGC	ADBE	AVDX	ADP	AI	ALRM	APPF
BOX	EGHT	CRM	ADSK	BILL	CDAY	AMPL	CHKP	BLKB
DBX	FIVN	CRTO	ANSS	BL	PAYC	APPN	CLVT	CCCS
MNDY	KLTR	CVO	AZPN	DOCU	PAYX	AYX	CRWD	COUR
SMAR	LPSN	CXM	BSY	EXFY	PCTY	BASE	CYBR	CPLF
	LVOX	FRSH	CDNS	INTU	PYCR	BBAI	FTNT	CWAN
	MCHX	GLBE	DSY	LAW	WDAY	CFLT	GEN	DH
	NICE	HUBS	NEM	MANH		DDOG	OKTA	DOX
	RNG	LSPD	PTC	QTWO		DOMO	PANW	EBIXQ
	TWLO	ONTF	U	SAP		DT	QLYS	ENFN
	VRNT	SEMR		UPLD		ESTC	RPD	ETWO
	ZM	SHOP		VERX		EVBG	S	EVCN
		SPT		WK		FROG	SCWX	GWRE
		WIX		ZUO		GTLB	TENB	INST
		YEXT				HCP	ZS	INTA
		ZETA				INFA		IOT
		ZI				JAMF		KARO
						MDB		MLNK
						MSFT		MODN
						NOW		NCNO
						ORCL		PAR
						OTEX		PCOR
						PATH		PRO
						PD		PWSC
						PEGA		SPSC
						PLTR		TEMN
						SNOW		TOST
						SWI		TYL
						TEAM		VEEV
								WEAV

Source: BofA Global Research

Stocks included may not be under BofA software coverage

BofA GLOBAL RESEARCH

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

Large-cap software stock performance

	YTD	2023 Return
Nasdaq	-1.1%	43.4%
S&P 500	-0.1%	24.2%
ADBE	-2.7%	77.3%
ADSK	-3.3%	30.3%
BSY	-7.3%	41.2%
CRM	-0.9%	98.5%
DDOG	-1.8%	65.1%
HUBS	-4.0%	100.8%
INTU	-4.3%	60.6%
MDB	-7.4%	107.7%
MSFT	-0.4%	56.8%
NOW	-1.4%	82.0%
ORCL	-0.7%	29.0%
SHOP	-0.3%	124.4%
SNOW	-1.3%	38.6%
VEEV	-1.0%	19.3%
WDAY	-1.1%	65.0%
ZM	-4.9%	6.2%
Large-Cap Average	-2.7%	62.7%

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 15: YTD mid-cap software stock performance was led by Nice Ltd.

Mid-cap software stock performance

	YTD	2023 Return
Nasdaq	-1.1%	43.4%
S&P 500	-0.1%	24.2%
BILL	-4.3%	-25.1%
CFLT	-3.5%	5.2%
DBX	1.2%	31.7%
DOCU	-6.4%	7.3%
DT	-1.7%	42.8%
ESTC	-3.6%	118.8%
FRSH	-3.4%	59.7%
GLBE	-1.5%	92.0%
GTLB	-5.3%	38.6%
GWRE	-2.0%	74.3%
INFA	-4.4%	74.3%
NICE	3.6%	3.7%
PATH	-7.0%	95.4%
PAYC	-1.2%	-33.4%
PCTY	-1.4%	-15.1%
TWLO	-2.9%	55.0%
U	-4.7%	43.0%
Mid-Cap Average	-2.9%	39.3%

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 16: YTD small-cap software stock performance was led by CS Disco

Small-cap software stock performance

	YTD	2023 Return
Nasdaq	-1.1%	43.4%
S&P 500	-0.1%	24.2%
AI	-0.5%	156.6%
ALRM	-4.1%	30.6%
AMPL	-3.2%	5.3%
AVDX	-6.7%	24.6%
AYX	-0.1%	-6.9%
BIGC	-10.0%	11.3%
BL	-7.5%	-7.2%
BLKB	-4.7%	47.3%
CVO	-4.3%	5.7%
EGHT	-1.6%	-12.5%
ENFN	-4.1%	0.3%
EVBG	-9.7%	-17.8%
FIVN	-3.3%	16.0%
FROG	-7.0%	62.3%
HCP	-5.2%	-13.5%
INTA	-2.9%	52.4%
JAMF	1.3%	-15.2%
LAW	3.7%	20.1%
LSPD	-9.1%	46.8%
MLNK	-7.5%	80.4%
NCNO	2.9%	27.2%
PWSC	0.8%	2.1%
RNG	-4.7%	-4.1%
VERX	-7.1%	85.7%
WEAV	-0.2%	150.4%
ZETA	-2.3%	8.0%
ZI	-11.3%	-38.6%
Small-Cap Average	-4.0%	26.6%

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 17: Nice Ltd. within communication software led the stock performance YTD

Collaboration, Communications, CRM, and Design software stock performance

	YTD	2023 Return
Nasdaq	-1.1%	43.4%
S&P 500	-0.1%	24.2%
ASAN	-5.2%	38.1%
BOX	-1.9%	-17.7%
DBX	1.2%	31.7%
MNDY	-1.2%	53.9%
SMAR	-3.7%	21.5%
Collaboration Average	-2.2%	25.5%
EGAN	-4.7%	-7.8%
EGHT	-1.6%	-12.5%
FIVN	-3.3%	16.0%
KLTR	-9.7%	13.4%
LPSN	-4.5%	-62.6%
LVOX	0.0%	25.6%
MCHX	-2.2%	-15.0%
NICE	3.6%	3.7%
RNG	-4.7%	-4.1%
TWLO	-2.9%	55.0%
VRNT	-1.3%	-25.5%
ZM	-4.9%	6.2%
Communication Average	-3.0%	-0.6%
BIGC	-10.0%	11.3%
CRM	-0.9%	98.5%
CRTO	-3.9%	-2.8%
CVO	-4.3%	5.7%
CXM	1.2%	47.4%
FRSH	-3.4%	59.7%
GLBE	-1.5%	92.0%
HUBS	-4.0%	100.8%
LSPD	-9.1%	46.8%
ONTF	-10.5%	-8.7%
SEMR	-8.8%	67.8%
SHOP	-0.3%	124.4%
SPT	-5.9%	8.8%
WIX	-2.1%	60.1%
YEXT	-4.4%	-9.8%
ZETA	-2.3%	8.0%
ZI	-11.3%	-38.6%
CRM Average	-4.8%	39.5%
ADBE	-2.7%	77.3%
ADSK	-3.3%	30.3%
ANSS	-3.9%	50.2%
AZPN	-5.1%	7.2%
BSY	-7.3%	41.2%
CDNS	-3.8%	69.6%
DSY	-4.3%	32.1%
NEM	-2.8%	-12.3%
PTC	-3.0%	45.8%
PTC	-3.0%	45.8%
U	-4.7%	43.0%
Design Average	-4.0%	39.1%

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 18: CS Disco within ERP & Back Office led the stock performance YTD

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

	YTD	2023 Return
Nasdaq	-1.1%	43.4%
S&P 500	-0.1%	24.2%
AVDX	-6.7%	24.6%
BILL	-4.3%	-25.1%
BL	-7.5%	-7.2%
DOCU	-6.4%	7.3%
EXFY	-13.0%	-72.0%
INTU	-4.3%	60.6%
LAW	3.7%	20.1%
MANH	-6.1%	77.4%
QTWO	-3.3%	61.6%
SAP	-1.3%	49.8%
UPLD	-2.1%	-40.7%
VERX	-7.1%	85.7%
WK	-8.4%	20.9%
ZUO	-9.6%	47.8%
ERP & Back Office Average	-5.4%	22.2%
ADP	1.6%	-2.5%
CDAY	-2.3%	4.6%
PAYC	-1.2%	-33.4%
PAYX	0.3%	3.1%
PCTY	-1.4%	-15.1%
PYCR	-6.1%	-11.8%
WDAY	-1.1%	65.0%
HCM Average	-1.5%	1.4%
AI	-0.5%	156.6%
AMPL	-3.2%	5.3%
APPN	-7.9%	15.7%
AYX	-0.1%	-6.9%
BASE	1.0%	69.8%
BBAI	2.3%	217.6%
CFLT	-3.5%	5.2%
DDOG	-1.8%	65.1%
DOMO	-4.2%	-27.7%
DT	-1.7%	42.8%
ESTC	-3.6%	118.8%
EVBG	-9.7%	-17.8%
FROG	-7.0%	62.3%
GTLB	-5.3%	38.6%
HCP	-5.2%	-13.5%
INFA	-4.4%	74.3%
JAMF	1.3%	-15.2%
MDB	-7.4%	107.7%
MSFT	-0.4%	56.8%
NOW	-1.4%	82.0%
ORCL	-0.7%	29.0%
OTEX	-1.7%	41.8%
PATH	-7.0%	95.4%
PD	-0.1%	-12.8%
PEGA	-5.4%	42.7%
PLTR	-2.9%	167.4%
SNOW	-1.3%	38.6%
SWI	-6.0%	33.4%
TEAM	-1.0%	84.8%
Infrastructure Average	-3.1%	53.7%

Source: BofA Global Research, Bloomberg

BofA GLOBAL RESEARCH

Exhibit 19: Ebix Inc. within Vertical led the stock performance YTD

Security and Vertical software stock performance

	YTD	2023 Return
Nasdaq	-1.1%	43.4%
S&P 500	-0.1%	24.2%
ALRM	-4.1%	30.6%
CHKP	-0.3%	21.1%
CLVT	-0.8%	11.0%
CRWD	2.3%	142.5%
CYBR	-0.5%	69.0%
FTNT	4.7%	19.7%
GEN	-0.1%	6.5%
OKTA	-7.4%	32.5%
PANW	-1.8%	111.3%
QLYS	-6.2%	74.9%
RPD	-7.2%	68.0%
S	-14.5%	88.1%
SCWX	-14.8%	15.5%
TENB	-4.9%	20.7%
ZS	-1.6%	98.0%
Security Average	-3.8%	54.0%
APPF	-3.2%	64.4%
BLKB	-4.7%	47.3%
CCCS	-4.1%	30.9%
COUR	-0.6%	63.7%
CPLF	0.8%	5.2%
CWAN	-2.3%	6.8%
DH	-5.0%	-9.6%
DOX	1.4%	-3.3%
EBIXQ	119.2%	-94.8%
ENFN	-4.1%	0.3%
ETWO	-6.6%	-25.2%
EVCN	-7.2%	48.3%
GWRE	-2.0%	74.3%
INST	-6.6%	15.2%
INTA	-2.9%	52.4%
IOT	-3.4%	168.5%
KARO	-1.2%	4.3%
MLNK	-7.5%	80.4%
MODN	-0.6%	-33.6%
NCNO	2.9%	27.2%
PAR	-3.8%	67.0%
PCOR	-2.2%	46.7%
PRO	-11.0%	59.9%
PWSC	0.8%	2.1%
SPSC	-7.1%	50.9%
TEMN	0.2%	54.2%
TOST	2.1%	1.3%
TWOU	-13.0%	-80.4%
TYL	-0.9%	29.7%
VEEV	-1.0%	19.3%
WEAV	-0.2%	150.4%
Vertical Average	0.8%	29.8%

Source: BofA Global Research, Bloomberg

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