Cyber Security

Year Ahead 2024: Cybersecurity is still the place to be; now we favor the laggards

Industry Overview

Key trends to focus on in 2024

2023 was a strong year for cybersecurity stocks as IT budgets remained robust despite tough macro conditions. Heading into 2024, we remain positive on sector fundamentals, supported by growing enterprise cybersecurity budgets, platformization, and cloud transformation. Yet, we also flag a few risk factors. The industry reported on weaker billings, longer sales cycles, and increased spending scrutiny, and only time will tell if these are just minor adjustments to the business environment or the beginning of a slower cycle. In addition, valuation levels are fairly rich after the strong stock performances in 2023, and our note delves closer into this topic. We maintain our Buy ratings on CrowdStrike and Zscaler, but favor the relative 2023 underperformers, namely Fortinet and CyberArk.

Rich valuation for the outperformers

With leading cyber stocks up 75%-130%+ in 2023, we ran our cybersecurity universe through a valuation exercise, modeling three scenarios of revenue growth and FCF margin assumptions and valuing the stocks on an EV/FCF multiple basis. As an example, for CrowdStrike, we assumed revenue would grow from $3.05bn in 2023E to $10bn in 2028, and FCF margin would grow from 30% to 36%, respectively. We discount the FCF to 2024 values using a 10% discount factor and apply a 25x FCF multiple. Our model suggests that despite a healthy set of growth and margin assumptions, the fair value of CrowdStrike offers -4.3% downside in the base case, with similar conclusions for all the good stock performers in 2023, namely Palo Alto Networks, Zscaler, and others. Our model suggests the laggards offer healthy potential valuation upside and we mainly highlight the model conclusions for Buy-rated Fortinet. One of the key concerns on Fortinet is a prolonged absorption period, but we show in a separate note (here) that true excess Firewall deployments are limited and order growth should resume in 2H24.

Our top picks: Fortinet and CyberArk

Valuation considerations alone rarely drive the performance of tech stocks, especially in times of strong momentum, and our year-ahead report discuss the key fundamental growth drivers in the industry, namely Zero Trust, SASE, Cloud Security (CNAPP) and the impact of Artificial Intelligence on Cybersecurity. However, we also grow our focus on companies that have both business momentum drivers as well as a long-term valuation case. We highlight Fortinet as a top pick for 2024, as we believe the stock performance should improve once the business momentum improves in 2H24. We also favor CyberArk, which continues to exhibit strong business momentum, yet trades at a discount to other successful cybersecurity stocks. We maintain our Buy ratings on CrowdStrike and Zscaler, though highlight the growing valuation risk into 2024. Lastly, on Okta, our model suggests high valuation upside, but it also assumes solid execution, while the execution history has been challenging and the fundamentals are challenged.

04 January 2024

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Timestamp: 04 January 2024 01:01AM EST

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Cybersecurity remains highly defensible

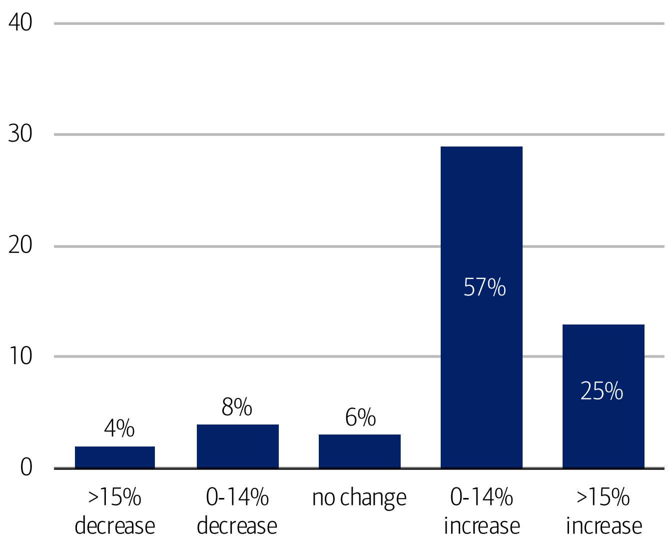
Cybersecurity is a highly defensible area of IT spend and should remain a top secular theme for technology and software investors in 2024, especially as enterprise security budgets should increase over the next twelve months. Despite macro pressures, elongated sales cycles, and weaker overall IT budgets in 2023, cybersecurity stock returns at the key vendors, namely CrowdStrike (+147% in 2023), Palo Alto Networks (+113%) and Zscaler (+101%) outperformed the software sector's IGV (+58%), which supports our view that cybersecurity is a more resilient area of IT spend. We expect this trend to continue through 2024 and see increasing enterprise cybersecurity budgets, vendor/product consolidation, Cloud transformation, SASE, and AI as net positives. Nevertheless, we are also flagging that should companies start trading on FCF generation, and even assuming very aggressive growth and cash flow generation capabilities, there is not much upside left to the leading cyber stocks.

> Key themes in cybersecurity for 2024: IT budgets, platformization, Cloud transformation, billings impact from sales cycles and deal durations, SASE, and AI

Enterprise IT budgets for cyber expected to increase in 2024

Despite weaker macro trends this past year, cybersecurity solutions are a key component of enterprise IT budgets, and demand for these products remains healthy on all fronts. In our view, one of the key themes that underpins healthy demand and robust spending for cybersecurity solutions is the enterprise's inevitable costs following a data breach or malware attack.

Exhibit 1: Cybersecurity budgets expected changes in next year
82% of respondents expect their security-specific budgets to increase



Source: BofA Global Research

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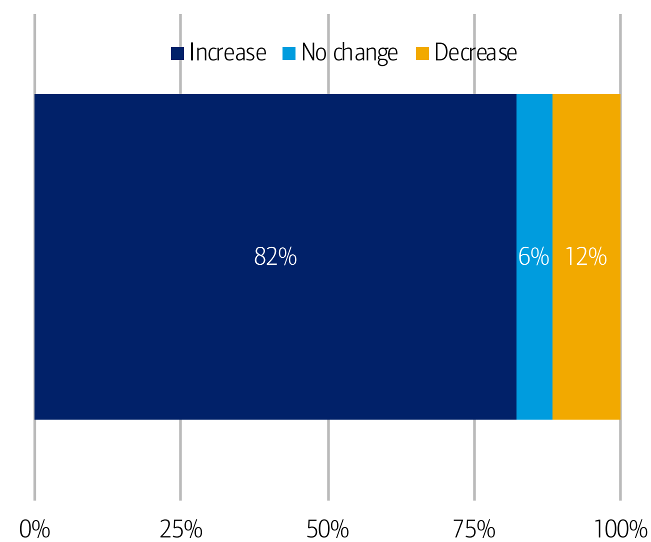
Exhibit 2: Expected change in cybersecurity budgets (n=51)
We compare the expected increase to decrease in 2023 budgets and back out an up-to-down ratio of ~7x



Source: BofA Global Research

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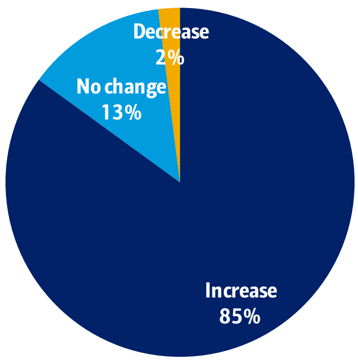
We previously conducted a survey of 51 Chief Information Security Officers (CISOs) across different size businesses and found that 82% of our respondents saw their cybersecurity budgets increase in 2023, with the same expected in 2024. If we apply a weighted average to the expected budget changes, we arrive at an expected budget increase of ~13% YoY in 2023. Additionally, using the percentage of respondents expecting an increase vs. decrease, we were able to back out an up-to-down ratio of 6.8x, which further demonstrates the criticality of cybersecurity solutions, as well as the strength of cybersecurity budgets overall. We also supplement our insights with data from Omdia's recent "Cybersecurity Decision Maker Survey," which also suggests to us that cybersecurity budgets are expected to increase YoY in 2024.

Exhibit 3: Overall, how do you expect your organization's security budget to change in the next 12 months? (n=627)

Cybersecurity budgets are expected to increase YoY in 2024



Source: BofA Global Research, Omdia

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Platformization: hype vs. reality

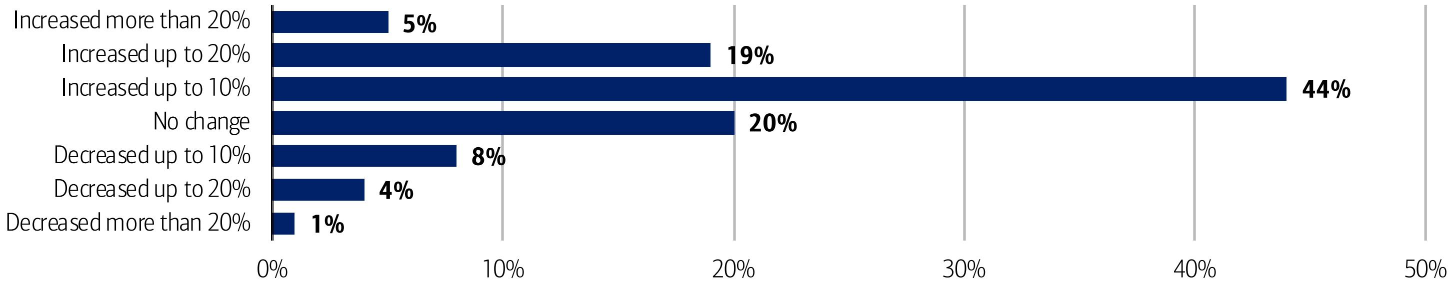
Point solutions continue to grow in the near-term, though platform vendors should win out over the long-run

Another key trend across cybersecurity is product and vendor consolidation, dubbed platformization. The average enterprise has an extensive stack of cybersecurity tools, often between ~50-70 different solutions, some of which may provide overlapping functions. However, since enterprises have been under pressure to tighten IT spend while keeping networks secure, the value proposition of platformization, or using a platform vendor in place of several point products, has become increasingly prevalent. We flag vendors like Fortinet, Palo Alto Networks, CrowdStrike, and Microsoft, which offer many products across a single platform and have been direct beneficiaries of platformization thus far.

However, we believe this potential tailwind for larger platform vendors has likely been overblown by security vendors thus far, with best of breed solutions still dominating certain parts of the network. Instead of consolidating the cyber tech stack to only a handful of vendors, as many in the industry initially thought would happen, the overhaul of point products seems to be more of a long-term trend. The sweet spot for CISOs seems to be leveraging 5-10 platforms for broad functions such as cloud security, endpoint security and network security, while supplementing high-risk categories such as Privilege Access Management (PAM) and Application programming interface (API) security with best of breed point products. In our view, this trend should favor the larger platform vendors CrowdStrike, Palo Alto Networks, Fortinet, Cisco, and Microsoft.

We flag that Omdia's latest survey results also show that hype around platformization has been overstated, as 68% of respondents increased their number of standalone security products in the last 12 months. Similarly, as part of our BofA survey, 82% of our respondents expect to increase their number of cybersecurity vendors over the next 2-3 years, and only 8% expect to be using fewer vendors (see both Exhibits below).

Exhibit 4: Which best describes how the number of standalone security products in your organization changed during the past 12 months?
68% saw increased adoption of point products in the last 12 months



Source: BofA Global Research, Omdia

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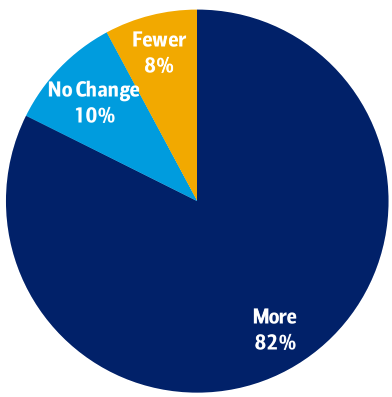
Exhibit 5: Do you expect to have more or fewer cybersecurity vendors in 2-3 years? (n=51)
Significant skew towards increased solutions over the next few years



Source: BofA Global Research

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Weak billings could have lasting impacts

Weak macro conditions are driving longer sales cycles, increased scrutiny for procurement processes, and a decline in deal durations. Some customers have also recently asked for deferred payment terms and even resort to external financing in some cases. The deal durations have shortened in certain instances, and cybersecurity vendors started seeing more one-year contracts vs. prior three-year deals. While these trends are not impacting revenues or ARR at this point, they have driven weaker billings across cybersecurity in C3Q23, as reported by Palo Alto Networks, CrowdStrike, Zscaler, Fortinet, and SentinelOne. The risks seem relatively manageable and are well understood at this point, yet we flag the potential for further deterioration to billings, which could have negative impacts on FCF generation and hitting long-term growth targets given smaller deal sizes and greater reliance on expansion at existing customers vs. new customer adds. We also note that the lack of an expected year-end budget flush, as exemplified in the weaker C4Q23 growth expectations, could further hinder abilities to drive more normalized billings growth over the next few quarters.

We believe these trends mostly reflect how management teams are responding to a challenging spending environment through greater flexibility for customer payments and better business terms. While this might prove to be a prudent reaction and a good way of getting ahead of the tough spending environment, it could also develop into weaker FCF generation down the line if these trends persist. In certain instances, as a way of preventing further deterioration of deal durations, some of the cybersecurity vendors have created makeshift "discounts" on longer deals through vendor financing.

The two tables below demonstrate how these trends have negatively impacted deferred revenues and billings, as well as remaining performance obligations and bookings over the last few quarters. In particular, we flag smaller changes in deferred revenues, potentially troughing in C3Q23, and potentially recovering throughout 2024. Should the negative trends in billings persist, it could eventually impact revenues and FCF generation.

Exhibit 6: Analysis of billings and deferred revenues across cybersecurity

We flag weak billings growth in C3Q23 at the key cybersecurity vendors, due to impacts from sales cycles and deal duration

(in mns $)	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23E	1Q24E	2Q24E	3Q24E	4Q24E
Billings										
Check Point	559	869	485	566	531	868	511	593	567	902
CrowdStrike	752	977	741	835	821	1,150	953	1,062	1,101	1,430
Fortinet	1,411	1,719	1,503	1,541	1,491	1,590	1,444	1,568	1,592	1,783
Palo Alto Networks	1,749	2,029	2,256	3,160	2,025	2,360	2,628	3,726	2,250	2,765
SentinelOne	125	178	136	162	165	231	179	214	213	285
Qualys	129	146	133	143	147	162	147	162	164	181
Zscaler	340	494	482	719	457	619	605	886	584	785
QoQ growth (%)										
Check Point	*-2%*	*56%*	*-44%*	*17%*	*-6%*	*63%*	*-41%*	*16%*	*-4%*	*59%*
CrowdStrike	*10%*	*30%*	*-24%*	*13%*	*-2%*	*40%*	*-17%*	*11%*	*4%*	*30%*
Fortinet	*8%*	*22%*	*-13%*	*3%*	*-3%*	*7%*	*-9%*	*9%*	*1%*	*12%*
Palo Alto Networks	*-35%*	*16%*	*11%*	*40%*	*-36%*	*17%*	*11%*	*42%*	*-40%*	*23%*
SentinelOne	*-27%*	*43%*	*-24%*	*20%*	*2%*	*40%*	*-23%*	*19%*	*0%*	*34%*
Qualys	*0%*	*13%*	*-8%*	*7%*	*3%*	*10%*	*-9%*	*11%*	*1%*	*10%*
Zscaler	*-35%*	*45%*	*-2%*	*49%*	*-37%*	*36%*	*-2%*	*47%*	*-34%*	*34%*
YoY growth (%)										
Check Point		*2%*	*-3%*	*-1%*	*-5%*	*0%*	*5%*	*5%*	*7%*	*4%*
CrowdStrike		*45%*	*14%*	*22%*	*9%*	*18%*	*29%*	*27%*	*34%*	*24%*
Fortinet		*32%*	*30%*	*18%*	*6%*	*-7%*	*-4%*	*2%*	*7%*	*12%*
Palo Alto Networks		*26%*	*26%*	*18%*	*16%*	*16%*	*16%*	*18%*	*11%*	*17%*
SentinelOne		*47%*	*48%*	*-6%*	*33%*	*30%*	*32%*	*32%*	*29%*	*23%*
Qualys		*12%*	*9%*	*11%*	*14%*	*11%*	*10%*	*13%*	*12%*	*12%*
Zscaler		*34%*	*40%*	*38%*	*34%*	*25%*	*25%*	*23%*	*28%*	*27%*
(in mns $)	**3Q22**	**4Q22**	**1Q23**	**2Q23**	**3Q23**	**4Q23E**	**1Q24E**	**2Q24E**	**3Q24E**	**4Q24E**
Deferred Revenue										
Check Point	1,647	1,878	1,797	1,774	1,709	1,919	1,834	1,810	1,750	1,965
CrowdStrike	2,016	2,355	2,404	2,508	2,543	2,857	2,919	3,035	3,126	3,489
Fortinet	4,194	4,640	4,881	5,129	5,285	5,514	5,604	5,768	5,900	6,129
Palo Alto Networks	7,180	7,554	8,090	9,296	9,443	9,830	10,418	11,856	11,999	12,451
SentinelOne	354	406	408	421	423	483	482	499	503	562
Qualys	303	317	318	337	339	356	357	367	374	393
Zscaler	1,006	1,112	1,175	1,440	1,400	1,509	1,577	1,892	1,844	1,968
QoQ growth (%)										
Check Point	*-1%*	*14%*	*-4%*	*-1%*	*-4%*	*12%*	*-4%*	*-1%*	*-3%*	*12%*
CrowdStrike	*9%*	*17%*	*2%*	*4%*	*1%*	*12%*	*2%*	*4%*	*3%*	*12%*
Fortinet	*7%*	*11%*	*5%*	*5%*	*3%*	*4%*	*2%*	*3%*	*2%*	*4%*
Palo Alto Networks	*3%*	*5%*	*7%*	*15%*	*2%*	*4%*	*6%*	*14%*	*1%*	*4%*
SentinelOne	*3%*	*15%*	*1%*	*3%*	*0%*	*14%*	*0%*	*4%*	*1%*	*12%*
Qualys	*0%*	*5%*	*0%*	*6%*	*1%*	*5%*	*0%*	*3%*	*2%*	*5%*
Zscaler	*-2%*	*11%*	*6%*	*22%*	*-3%*	*8%*	*5%*	*20%*	*-3%*	*7%*
YoY growth (%)										
Check Point		*10%*	*8%*	*7%*	*4%*	*2%*	*2%*	*2%*	*2%*	*2%*
CrowdStrike		*54%*	*42%*	*36%*	*26%*	*21%*	*21%*	*21%*	*23%*	*22%*
Fortinet		*34%*	*33%*	*30%*	*26%*	*19%*	*15%*	*12%*	*12%*	*11%*
Palo Alto Networks		*39%*	*38%*	*33%*	*32%*	*30%*	*29%*	*28%*	*27%*	*27%*
SentinelOne		*55%*	*48%*	*22%*	*19%*	*19%*	*18%*	*18%*	*19%*	*16%*
Qualys		*9%*	*7%*	*11%*	*12%*	*12%*	*12%*	*9%*	*10%*	*10%*
Zscaler		*46%*	*44%*	*41%*	*39%*	*36%*	*34%*	*31%*	*32%*	*30%*

Source: BofA Global Research estimates, company report, Bloomberg

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Exhibit 7: Analysis of bookings and remaining performance obligations across cybersecurity

Bookings figures also relatively soft in C3Q23, as Remaining Performance Obligations (RPO) growth rates declined from the tough macro environment

(in mns $)	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23E	1Q24E	2Q24E	3Q24E	4Q24E
Bookings										
CrowdStrike	581	638	693	732	786	839	899	947	1,009	1,070
Fortinet	1,150	1,283	1,263	1,293	1,335	1,411	1,383	1,445	1,510	1,613
Palo Alto Networks	1,563	1,655	1,721	1,954	1,878	1,972	2,040	2,292	2,219	2,328
SentinelOne	115	127	134	150	165	170	181	198	213	223
Qualys	126	131	131	137	142	145	147	152	157	161
Zscaler	356	388	419	455	497	508	531	565	616	633
QoQ growth (%)										
CrowdStrike	*-15%*	*10%*	*9%*	*6%*	*7%*	*7%*	*7%*	*5%*	*6%*	*6%*
Fortinet	*-12%*	*12%*	*-2%*	*2%*	*3%*	*6%*	*-2%*	*4%*	*4%*	*7%*
Palo Alto Networks	*-45%*	*6%*	*4%*	*13%*	*-4%*	*5%*	*3%*	*12%*	*-3%*	*5%*
SentinelOne	*-34%*	*10%*	*6%*	*12%*	*10%*	*3%*	*7%*	*9%*	*8%*	*5%*
Qualys	*15%*	*4%*	*0%*	*5%*	*4%*	*2%*	*1%*	*4%*	*3%*	*2%*
Zscaler	*-50%*	*9%*	*8%*	*9%*	*9%*	*2%*	*5%*	*6%*	*9%*	*3%*
YoY growth (%)										
CrowdStrike		*-15%*	*20%*	*7%*	*35%*	*32%*	*30%*	*29%*	*28%*	*28%*
Fortinet		*-2%*	*8%*	*-1%*	*16%*	*10%*	*10%*	*12%*	*13%*	*14%*
Palo Alto Networks		*2%*	*-13%*	*-31%*	*20%*	*19%*	*19%*	*17%*	*18%*	*18%*
SentinelOne		*-13%*	*27%*	*-14%*	*43%*	*34%*	*35%*	*32%*	*30%*	*31%*
Qualys		*-10%*	*18%*	*26%*	*13%*	*11%*	*12%*	*11%*	*11%*	*11%*
Zscaler		*-22%*	*-24%*	*-36%*	*40%*	*31%*	*27%*	*24%*	*24%*	*25%*

(in mns $)	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23E	1Q24E	2Q24E	3Q24E	4Q24E
RPO										
CrowdStrike	2,798	3,368	3,300	3,600	3,700	4,250	4,285	4,600	4,893	5,608
Fortinet	4,190	4,640	4,880	5,150	5,300	5,710	5,834	5,982	5,977	6,260
Palo Alto Networks	8,300	8,800	9,200	10,600	10,400	10,936	11,463	13,036	13,093	13,746
SentinelOne	517	609	604	676	776	922	860	1,028	1,120	1,392
Qualys	259	272	292	321	331	341	359	387	391	395
Zscaler	2,682	2,809	3,023	3,514	3,487	3,682	3,911	4,436	4,408	4,631
QoQ growth (%)										
CrowdStrike	*12%*	*20%*	*-2%*	*9%*	*3%*	*15%*	*1%*	*7%*	*6%*	*15%*
Fortinet	*7%*	*11%*	*5%*	*6%*	*3%*	*8%*	*2%*	*3%*	*0%*	*5%*
Palo Alto Networks	*1%*	*6%*	*5%*	*15%*	*-2%*	*5%*	*5%*	*14%*	*0%*	*5%*
SentinelOne	*16%*	*18%*	*-1%*	*12%*	*15%*	*19%*	*-7%*	*20%*	*9%*	*24%*
Qualys	*-4%*	*5%*	*7%*	*10%*	*3%*	*3%*	*5%*	*8%*	*1%*	*1%*
Zscaler	*3%*	*5%*	*8%*	*16%*	*-1%*	*6%*	*6%*	*13%*	*-1%*	*5%*
YoY growth (%)										
CrowdStrike		*49%*	*40%*	*44%*	*32%*	*26%*	*30%*	*28%*	*32%*	*32%*
Fortinet		*34%*	*33%*	*31%*	*26%*	*23%*	*20%*	*16%*	*13%*	*10%*
Palo Alto Networks		*40%*	*33%*	*29%*	*25%*	*24%*	*25%*	*23%*	*26%*	*26%*
SentinelOne		*76%*	*62%*	*52%*	*50%*	*51%*	*42%*	*52%*	*44%*	*51%*
Qualys		*-4%*	*4%*	*19%*	*28%*	*25%*	*23%*	*21%*	*18%*	*16%*
Zscaler		*44%*	*36%*	*35%*	*30%*	*31%*	*29%*	*26%*	*26%*	*26%*

Source: BofA Global Research estimates, company report, Bloomberg

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Below, we summarize commentary from management teams across our cybersecurity coverage on the current situation with billings, sales cycles, procurement scrutiny, and deal durations.

Palo Alto Networks

- In Q1, the higher cost of money remained a focal point for customers.
- Palo Alto uses a mix of strategies to address greater spending scrutiny: annual billing plans, financing through its Palo Alto Networks Financial Services (PANFS) and partner financing.
- This creates variability of billings and contract duration but is not a reflection on the underlying demand, per management.

CrowdStrike

- Sales cycles continue to be elongated and deals have been pushed out, yet management has not seen any deals lost from these impacts. However, billings has been and will continue to be impacted by changes in deal duration.
- At enterprise customers, average days to close remained consistent in the past two quarters, at a higher level than historical averages. Larger customers continue to prioritize CrowdStrike investments but are also simultaneously managing timing issues related to OpEx budgets and cash flows.
- Demand for CrowdStrike's products remains strong and the company continues to see a record pipeline into F4Q24. Given the macro impacts in the last few quarters, CrowdStrike has focused more on pipeline expansion and pipeline creation.
- On the other hand, the company has seen recent strength at SMBs, which has driven recent net new logo adds.

Check Point

- Check Point saw fewer customers willing to pay upfront for multi-year deals, which resulted in shorter billing duration, largely due to the high interest rate environment.

Fortinet

- Increased deal scrutiny and longer sales cycles is constraining near-term results and is expected to continue in the near term.
- In 3Q, Fortinet's contract duration shortened by one month.
- In terms of customer verticals, service provider, retail, and large enterprise billings were weak. On the other hand, education, government, and small billings growth was strong.

Okta

- Okta has seen shortening contract durations, smaller average deal sizes, and more upsell/cross-sell vs. new business. These are all impacting RPO growth.

Zscaler

- Customers continue to scrutinize projects and budgets, largely driven by macro conditions. This has also impacted Zscaler's close rates.
- Larger new logo deals are still taking longer to close, and like CrowdStrike, those deals are not lost, just delayed.

SentinelOne

- SentinelOne's billings only grew 2% QoQ in F3Q24, which was directly impacted by customer mix, especially by MSSPs.
- Surprisingly, SentinelOne's management called out that average contract duration is up, but is offset by fewer upfront payments (common theme across cybersecurity)
- MSSPs deal in monthly and quarterly payments, and that has not changed.

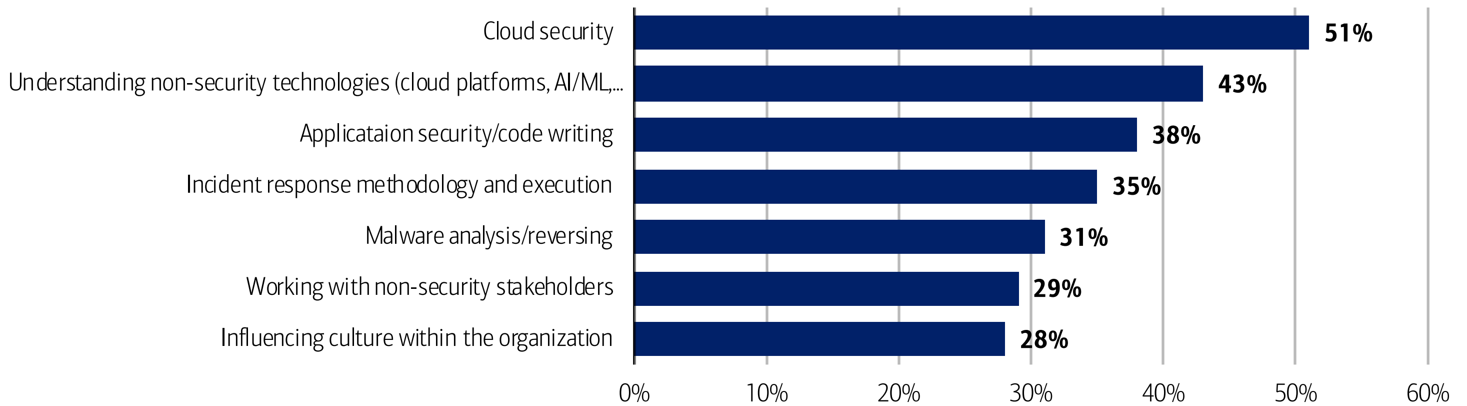
Adoption of Cloud security has lagged Cloud transformations

As the proliferation of Cloud-based networks continued to gain momentum in 2023, we believe there now exists an expertise gap within enterprise security teams, especially for Cloud security. In our view, the adoption of Cloud security solutions has strongly lagged enterprise transformations from on-premises technologies to cloud-based ones, with a resulting gap in the protection of cloud-based applications and various environments (on-prem, cloud, hybrid, etc.) at many organizations. We see Cloud Native Application Protection Platforms (CNAPP) as a key growth area in 2024, and note that many cybersecurity vendors like CrowdStrike, SentinelOne, Tenable, Qualys, etc. have invested in expanding their cloud security solutions to compete with the incumbent vendors like Palo Alto Networks, and startups Wiz and Orca, as well as the hyperscalers Microsoft, Google, and Amazon who also offer (more basic) cloud security capabilities.

We support our thesis that Cloud security is a large growth opportunity across cybersecurity in 2024 with data from Omdia's latest survey, shown below.

Exhibit 8: What are the biggest skills/expertise gaps in your security team? (n=627)

Cloud security has a large growth opportunity, given that many enterprises see CNAPP as a key gap in their security infrastructure



Source: BofA Global Research, Omdia

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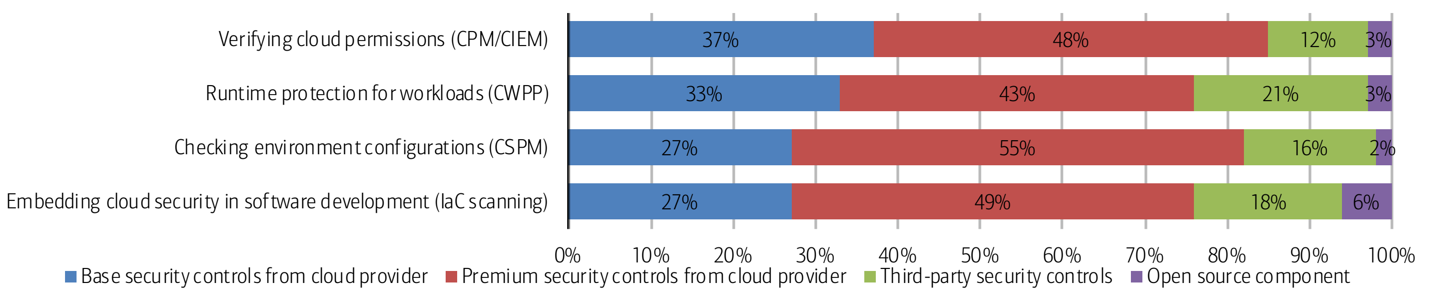
Exhibit 9: Which approach do you most commonly use to perform the following cloud security tasks? (n = 178)

Many organizations currently deploy Cloud security solutions from the Cloud providers, creating a large replacement opportunity for cybersecurity vendors to take share



Source: BofA Global Research, Omdia

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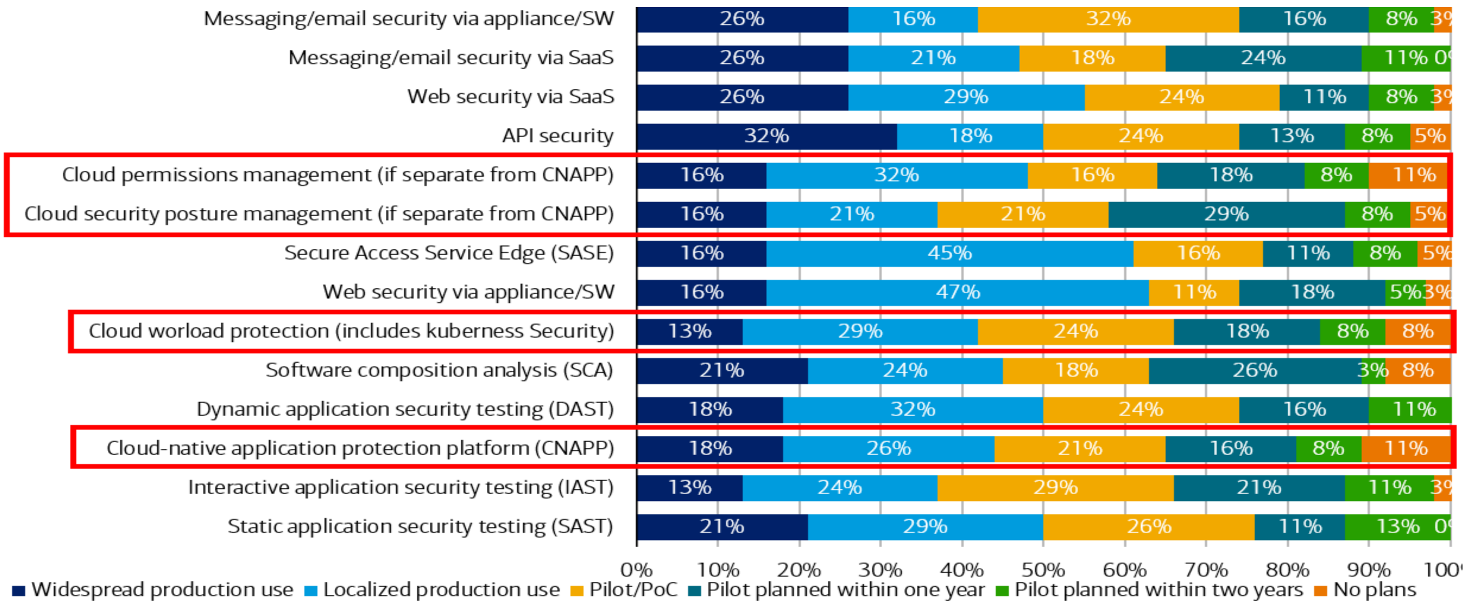
Exhibit 10: What is your current state of adoption for the following technologies? (n=178)

Many organizations do not currently deploy a Cloud security solution, but plan to adopt these solutions within the next two years



Source: BofA Global Research, Omdia

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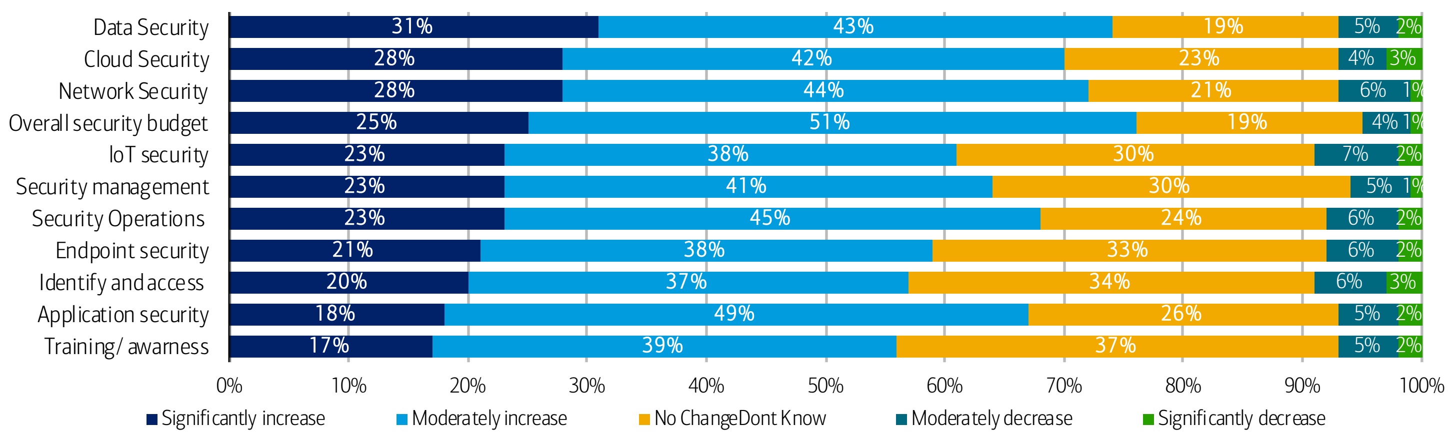
Exhibit 11: How do you expect security budgets to change in the next 12 months in the following areas? (n=627)

Cloud security is one of the top areas of enterprise security stacks where investments should significantly increase in 2024



Source: BofA Global Research, Omdia

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Supported by the current gap in cloud security product adoption at many organizations vs. cloud transformations, CNAPP is a high growth market and grew at ~25% YoY in 2023 to $5.6bn, following a strong year of 24% YoY growth in 2022. The strength of the cloud security market should continue over the next few years and is expected to grow at a 23% CAGR through 2027, well ahead of the 12% CAGR for overall IT security spend.

Exhibit 12: Cloud security market growth forecasts through 2027

The Cloud security market is expected to grow at a 23% CAGR through 2027, vs 12% CAGR for overall cybersecurity spending

Market (size in mns)	2021	2022	2023	2024	2025	2026	2027	CAGR 2022-27
Cloud Access Security Brokers	928.3	1,268.3	1,721.9	2,275.6	2,964.2	3,798.8	4,691.9	
YoY growth (%)		*36.6%*	*35.8%*	*32.2%*	*30.3%*	*28.2%*	*23.5%*	*29.9%*
Cloud Workload Protection Platforms	2,690.9	3,219.1	3,894.8	4,727.0	5,692.2	6,827.1	8,119.2	
YoY growth (%)		*19.6%*	*21.0%*	*21.4%*	*20.4%*	*19.9%*	*18.9%*	*20.3%*
Sum of Cloud Security	**3,619.2**	**4,487.8**	**5,617.1**	**7,002.9**	**8,656.7**	**10,626.2**	**12,811.3**	
YoY growth (%)		*24.0%*	*25.2%*	*24.7%*	*23.6%*	*22.8%*	*20.6%*	*23.3%*
Total Cybersecurity Spending	**148,947.4**	**164,728.0**	**188,114.8**	**214,953.7**	**240,410.7**	**264,587.7**	**288,497.2**	
YoY growth (%)		*10.6%*	*14.2%*	*14.3%*	*11.8%*	*10.1%*	*9.0%*	*11.9%*

Source: Gartner

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Many of the key cybersecurity companies are approaching CNAPP from different angles. CNAPP platforms are relatively new, however components like Cloud Workload Protection Platforms (CWPP) and Cloud Security Posture Management (CSPM) have been around for a few years. As a result, some CNAPP vendors have a stronger foundation in CWPP and approach the market from this domain, while others arrive from a CSPM lens. Similarly, some companies are focusing on agentless solutions that are faster to deploy, yet carry some inherent weaknesses, while other companies offer agent-based solutions, though deploying these solutions takes more time to rollout, and coverage across endpoints may be limited. All in, both approaches have their respective niches in the market, especially as the proliferation of Cloud-Native applications continues to grow exponentially.

Despite still being a relatively nascent space at this point, the CNAPP market is quickly consolidating. CrowdStrike, Tenable, Cisco, Check Point, Palo Alto Networks, and Zscaler have all acquired and/or developed CNAPP solutions within the last two years to bolster their product portfolios. While many workloads have been moved to Cloud through digital transformations, many workloads still operate on-premises as enterprises adopt hybrid environments. This, in turn, positions CNAPP solutions as point products versus platform solutions, given the singular focus on Cloud environments. CNAPP has become table stakes for broader security vendors like Palo Alto Networks and Cisco to have in their portfolios, as the inclusion of CNAPP enables these vendors to offer unified security solutions that are environment agnostic.

Overall, we view expansion into Cloud security as an important growth driver in 2024 for many of the key cybersecurity vendors, especially the platform vendors like Palo Alto Networks and CrowdStrike, with Zscaler and SentinelOne making some progress, yet still being at an early stage of development.

SASE is slowly migrating to a single-vendor approach

As organizations work to improve their security posture while enabling a remote workforce, SASE is becoming a part of many organizations' roadmaps. Per Gartner, at least 60% of enterprises will have explicit strategies and timelines for SASE adoption by 2025, vs. 10% in 2020. The emergence of a SASE architecture enables the convergence of networking and security, both delivered as a service, prompting an optimized user experience with consolidated security policy enforcement across a hybrid workforce. SASE supports branch office, remote worker, and on-prem secure access use cases, while reducing costs and complexity through consolidation of vendors.

According to Gartner, the SASE market is expected to grow at a 29.5% CAGR from 2022 to 2027. SASE spend accounted for 29% of the aggregate spend of the five SASE market subsegments (SD-WAN, firewall, SWG, CASB, and ZTNA), per Gartner, and is expected to grow to 41% of the aggregated spend in 2024. SSE and SD-WAN are the two pivotal underlying technologies of SASE and may be adopted as a single SASE approach or as separate initiatives depending on leadership priorities, personnel, and budget restrictions. Refresh cycles will also affect the adoption of both approaches.

As such, we break down the competitive environment into three segments: disaggregated SASE vendors, single-vendor SASE vendors, and unified SASE vendors. On the disaggregated front, some cloud-based security providers, such as Zscaler, partner with SD-WAN vendors to help direct the network traffic seamlessly. This disaggregation of SD-WAN and Cloud-based security is also the primary architecture for enterprises using Bitglass, for example. Single-vendor SASE vendors, such as Fortinet and Cisco aim to offer all the components of SASE including SD-WAN, management, and security, typically through integration of multiple products or consoles. On the other hand, unified SASE takes single-vendor SASE up a notch with full explicit integration of all capabilities onto the same platform. Example vendors include VMware, Versa Networks, and Cato Networks. Current market leaders include Palo Alto Networks, Zscaler, and to a certain degree Netskope. However, as the market evolves, new players are entering the market with Fortinet and Check Point recently entering with a different approach, offering a solution built on top of their firewall footprint.

While there continues to be strong demand for disaggregated SASE use cases, we note that the market is slowly shifting its preference to a single-vendor approach. Per Gartner, 45% of new SASE deployments will be based on a single-vendor SASE offering in 2027, up from about 20% in 2023. Additionally, as part of Omdia's 2023 Cybersecurity Decision Maker survey, only 21% of respondents noted their target architecture for SASE deployment involves using separate vendors for networking and security aspects. However, many security teams and network teams remain siloed, driving the ongoing need for separate networking and security functionalities.

Based on our mid-year CISO survey results, we found that cybersecurity executives have a solid appetite for SASE solutions overall and are likely plan to deploy them in the future, if not adopted already. Additionally, about 75% of Palo Alto's SASE customers are also the company's Firewall customers, which is both a function of technical synergies and client relationships. As such, we don't see much risk to Palo Alto's Prisma Access from Zscaler's ZIA/ZPA share growth, as they seem to address different market segments.

Rise of AI-related cyberattacks drives the need for AI-implemented cybersecurity

We would be remiss not to mention Artificial Intelligence (AI) in our note, as the concept has proliferated across cybersecurity in 2023, and we expect potential revenue contributions to start amassing in 2024. AI creates both risks and opportunities for the cybersecurity industry. On one hand, there is a notable shortage of cybersecurity talent and AI can fill in many of the gaps left behind by companies unable to fill cybersecurity-related positions. On the other hand, the pace of cyberattacks continues to accelerate, with the average number of days from compromise to exfiltration decreasing from 44 days to only 5 days in the last two years. We expect malicious AI use-cases such as malware code creation and advanced phishing attempts to drive further growth in successful cyberattacks, especially for bad actors with limited malware experience.

For example, we note how simple it is for hackers to generate new threats, as generative AI models can write and copy specific lines of code that previously took sophisticated engineers hours to write. A cybercriminal with no coding/technical knowledge can easily ask AI tools for the details of a specific vulnerability in a historical breach and the response will include the exact code targeting the vulnerability. Cybercriminals can then copy/paste that code and easily attack multiple sites simultaneously.

At the same time, digitalization trends such as multi/hybrid-cloud, remote-work, etc. are driving an exponential increase in the number of "security log events" that can no longer be manually managed. We are currently seeing AI, specifically gen-AI, being used for both internal purposes, such as enabling organizations to use natural language queries to generate internal insights and responses, and external purposes, such as automatically remediating threats to both remove the growing burden from human analysts and drive down the mean time to remediation so threats can be resolved in real-time or near real-time.

Many cybersecurity companies are now leveraging generative AI. To name all product introductions would be futile, however we list a few to give a broad understanding of current AI capabilities. Microsoft's Security Copilot provides real-time security information to IT teams while helping to remediate security risks. The tool is expected to reduce manual burdens on already overstaffed security teams. Palo Alto Networks recently launched Cortex XSIAM, which uses AI to stitch security data across the network, endpoint, identity, cloud, attack surface and more. Growth of Cortex XSIAM has exceeded internal goals, and Palo Alto management noted a growing pipeline of demand, suggesting the demand for AI-related products. We also flag CrowdStrike's Charlotte AI and SentinelOne's Purple AI, as well as a few recent product introductions, including Cisco's AI Assistant for Firewall Policy and Fortinet Advisor.

Is there any valuation upside left?

Robust demand and solid execution have been driving up the stocks of our cybersecurity universe over the last two years. The stocks of CrowdStrike, Palo Alto Networks, and Zscaler were up 147%, 113%, and 101%, respectively, in 2023. However, the rising cost of money is driving billings lower as vendors are reporting on customers demanding further discounting/financing, as well as shorter-duration deals, which could lead to a potential negative impact on cash flow generation in the future.

We currently value the cybersecurity stocks in our universe on an EV/Sales basis, yet as the companies mature and FCF generation improves, we believe these stocks will start trading on an FCF-basis.

As such, we build a 5-year growth model for all of our covered cybersecurity companies, assume bear/base/bull scenarios on both growth and FCF margin, and value these stocks based on their full-cycle FCF generation capabilities.

Our exercise yields a note of caution, as it implies that the valuation levels of the successful companies already reflect their future FCF generation capabilities. Still, these stocks will likely continue to trade on their business momentum in the short-term. We especially turn our focus to the laggards as, on a valuation and fundamental basis, we believe they could outperform in 2024.

Exhibit 13: Comps table (1/2)

We include key fundamental metrics across SaaS software peers and cybersecurity peers

Pricing as of 1/3/23	Ticker	Price	Mkt Cap	EV	Revenue Growth				Gross Margin				Operating Margin				FCF Margin			
					2022	2023	2024E	2025E	2022	2023	2024E	2025E	2022	2023	2024E	2025E	2022	2023	2024E	2025E
SaaS																				
ADOBE INC	ADBE	$570.72	$259,850	$256,088	11.5%	10.3%	10.7%	11.7%	87.9%	89.7%	89.3%	89.3%	34.4%	35.4%	45.8%	46.2%	41.6%	36.1%	41.2%	43.5%
DOCUSIGN INC	DOCU	$55.57	$11,333	$10,578	21.0%	9.8%	5.7%	6.3%	82.0%	82.3%	82.2%	82.1%	(3.9%)	4.7%	24.9%	26.4%	16.7%	27.4%	24.6%	25.0%
JFROG LTD	FROG	$32.52	$3,411	$2,933	35.5%	23.5%	22.0%	21.1%	84.0%	83.3%	82.2%	81.7%	(32.1%)	9.6%	12.0%	13.8%	6.1%	15.9%	17.9%	18.8%
HUBSPOT INC	HUBS	$532.96	$26,824	$26,014	33.1%	24.0%	18.0%	19.8%	82.7%	84.6%	84.1%	84.3%	(6.3%)	14.8%	15.5%	16.8%	11.1%	12.9%	14.7%	15.8%
SNOWFLAKE INC	SNOW	$184.49	$60,753	$57,501	72.9%	36.9%	29.6%	29.6%	70.9%	73.5%	74.0%	74.6%	(40.7%)	(32.0%)	9.0%	12.3%	23.8%	26.0%	28.0%	29.7%
PALANTIR TECHNOLOGIES INC	PLTR	$16.13	$35,102	$32,137	23.6%	16.5%	20.1%	20.6%	80.9%	81.6%	82.1%	82.6%	(8.5%)	27.5%	28.7%	27.4%	9.6%	25.2%	25.0%	29.9%
ATLASSIAN CORP	TEAM	$221.30	$57,107	$56,143	30.8%	21.2%	16.9%	23.4%	85.3%	84.2%	83.2%	82.6%	(4.5%)	(0.4%)	19.8%	22.3%	22.7%	25.7%	24.9%	26.4%
TWILIO INC	TWLO	$69.07	$12,505	$9,842	34.6%	7.6%	7.3%	12.4%	51.0%	52.4%	52.5%	52.9%	(31.5%)	11.7%	11.9%	13.2%	(9.0%)	5.3%	9.1%	11.3%
WORKDAY INC	WDAY	$267.70	$70,405	$66,798	21.1%	16.9%	16.5%	16.9%	77.0%	79.4%	79.9%	80.3%	(3.7%)	5.2%	24.4%	25.0%	20.8%	23.5%	23.7%	25.3%
Average					**31.6%**	**18.5%**	**16.3%**	**18.0%**	**78.0%**	**79.0%**	**78.8%**	**78.9%**	**(10.7%)**	**8.5%**	**21.3%**	**22.6%**	**15.9%**	**22.0%**	**23.3%**	**25.1%**
Median					**30.8%**	**16.9%**	**16.9%**	**19.8%**	**82.0%**	**82.3%**	**82.2%**	**82.1%**	**(6.3%)**	**9.6%**	**19.8%**	**22.3%**	**16.7%**	**25.2%**	**24.6%**	**25.3%**
Cybersecurity software																				
CHECK POINT SOFTWARE TECHNOLOGIES LTD	CHKP	$151.88	$17,768	$14,780	7.5%	3.6%	4.9%	4.7%	81.0%	89.2%	89.3%	89.5%	38.0%	44.2%	43.5%	43.8%	46.2%	42.1%	42.3%	43.0%
CROWDSTRIKE HOLDINGS INC	CRWD	$244.01	$58,598	$56,258	55.6%	37.3%	29.0%	24.9%	76.0%	77.6%	78.1%	78.7%	(8.2%)	2.5%	22.3%	23.5%	29.9%	30.3%	31.0%	32.4%
CYBERARK SOFTWARE LTD	CYBR	$216.36	$9,036	$8,380	17.7%	24.8%	24.0%	23.0%	82.3%	81.9%	82.0%	82.2%	(25.8%)	2.7%	7.6%	14.2%	6.3%	4.9%	10.2%	17.0%
FORTINET INC	FTNT	$57.70	$44,305	$42,128	32.2%	20.0%	12.8%	15.1%	75.4%	76.5%	76.4%	76.8%	21.9%	27.3%	25.8%	26.3%	32.8%	32.9%	29.5%	29.7%
OKTA INC	OKTA	$84.86	$14,030	$13,440	45.1%	22.2%	10.5%	12.1%	77.9%	79.9%	80.0%	80.3%	(45.7%)	(18.8%)	16.8%	18.9%	2.9%	19.0%	19.6%	20.4%
PALO ALTO NETWORKS INC	PANW	$285.86	$90,132	$85,471	27.0%	22.8%	18.1%	17.5%	73.1%	74.2%	76.8%	76.7%	(0.2%)	12.1%	26.4%	28.1%	43.1%	39.0%	36.2%	38.4%
RAPID7 INC	RPD	$53.24	$3,271	$3,972	28.0%	13.0%	12.4%	13.2%	73.0%	73.9%	74.1%	74.4%	(16.3%)	12.2%	16.0%	17.3%	8.4%	10.4%	18.1%	20.3%
SENTINELONE INC	S	$24.56	$7,334	$6,559	--	49.8%	32.3%	31.5%	71.3%	76.8%	77.3%	77.8%	(97.7%)	(57.5%)	(3.4%)	6.3%	(48.0%)	(14.8%)	0.1%	11.3%
TENABLE	TENB	$43.92	$5,135	$4,857	26.3%	15.9%	14.2%	14.2%	77.3%	79.7%	79.3%	79.5%	(9.9%)	13.7%	14.1%	16.0%	16.4%	17.4%	21.1%	22.8%
QUALYS	QLYS	$188.24	$6,924	$6,495	19.1%	13.3%	11.3%	11.4%	81.1%	82.0%	81.7%	81.6%	26.7%	41.3%	39.3%	39.5%	37.5%	37.3%	38.0%	37.8%
ZSCALER	ZS	$210.26	$31,188	$30,079	57.7%	41.0%	25.2%	24.9%	81.0%	80.8%	80.5%	80.6%	(23.7%)	(6.0%)	17.6%	19.2%	20.4%	25.1%	22.1%	24.9%
Average					**31.6%**	**24.0%**	**17.7%**	**17.5%**	**76.8%**	**78.3%**	**78.6%**	**78.9%**	**(12.8%)**	**6.7%**	**20.5%**	**23.0%**	**17.8%**	**22.1%**	**24.4%**	**27.1%**
Median					**27.5%**	**22.2%**	**14.2%**	**15.1%**	**76.7%**	**78.7%**	**78.7%**	**79.1%**	**(9.9%)**	**12.1%**	**17.6%**	**19.2%**	**20.4%**	**25.1%**	**22.1%**	**24.9%**
Overall Average					**31.6%**	**21.5%**	**17.1%**	**17.7%**	**77.4%**	**78.7%**	**78.7%**	**78.9%**	**(11.9%)**	**7.5%**	**20.9%**	**22.8%**	**17.0%**	**22.1%**	**23.9%**	**26.2%**
Overall Median					**28.0%**	**20.6%**	**16.7%**	**17.2%**	**77.9%**	**79.9%**	**80.0%**	**80.3%**	**(8.3%)**	**10.7%**	**18.7%**	**20.8%**	**18.5%**	**25.2%**	**24.2%**	**25.2%**

Source: Bloomberg, company reports

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Exhibit 14: Comps table (2/2)

We include key valuation metrics across SaaS software peers and cybersecurity peers

Pricing as of 1/3/23	EV/FCF				EV/Sales				EV/Sales/Growth			
	2022	2023	2024E	2025E	2022	2023	2024E	2025E	2022	2023	2024E	2025E
SaaS												
ADOBE INC	34.7x	36.3x	28.7x	24.3x	14.4x	13.1x	11.8x	10.6x	1.3x	1.3x	1.1x	0.9x
DOCUSIGN INC	25.5x	14.1x	14.8x	13.8x	4.2x	3.9x	3.7x	3.4x	0.2x	0.4x	0.6x	0.5x
JFROG LTD	171.5x	53.2x	38.8x	30.5x	10.5x	8.5x	7.0x	5.7x	0.3x	0.4x	0.3x	0.3x
HUBSPOT INC	135.9x	94.3x	69.7x	54.1x	15.0x	12.1x	10.3x	8.6x	0.5x	0.5x	0.6x	0.4x
SNOWFLAKE INC	121.1x	81.0x	57.9x	42.2x	28.8x	21.0x	16.2x	12.5x	0.4x	0.6x	0.5x	0.4x
PALANTIR TECHNOLOGIES INC	174.9x	57.4x	48.2x	33.5x	16.9x	14.5x	12.1x	10.0x	0.7x	0.9x	0.6x	0.5x
ATLASSIAN CORP	77.9x	56.7x	50.0x	38.2x	17.7x	14.6x	12.5x	10.1x	0.6x	0.7x	0.7x	0.4x
TWILIO INC	--	44.8x	24.6x	17.6x	2.6x	2.4x	2.2x	2.0x	0.1x	0.3x	0.3x	0.2x
WORKDAY INC	52.5x	39.7x	33.8x	27.1x	10.9x	9.3x	8.0x	6.9x	0.5x	0.6x	0.5x	0.4x
Average	**99.3x**	**53.1x**	**40.7x**	**31.2x**	**13.4x**	**11.0x**	**9.3x**	**7.8x**	**0.5x**	**0.6x**	**0.6x**	**0.5x**
Median	**99.5x**	**53.2x**	**38.8x**	**30.5x**	**14.4x**	**12.1x**	**10.3x**	**8.6x**	**0.5x**	**0.6x**	**0.6x**	**0.4x**
Cybersecurity software												
CHECK POINT SOFTWARE TECHNOLOGIES LTD	13.7x	14.5x	13.8x	13.0x	6.3x	6.1x	5.8x	5.6x	0.8x	1.7x	1.2x	1.2x
CROWDSTRIKE HOLDINGS INC	86.6x	62.3x	47.2x	36.2x	25.9x	18.9x	14.6x	11.7x	0.5x	0.5x	0.5x	0.5x
CYBERARK SOFTWARE LTD	225.3x	229.9x	--	43.7x	14.2x	11.3x	9.2x	7.4x	0.8x	0.5x	0.4x	0.3x
FORTINET INC	29.1x	24.2x	23.8x	20.6x	9.5x	7.9x	7.0x	6.1x	0.3x	0.4x	0.6x	0.4x
OKTA INC	259.5x	31.8x	27.9x	24.0x	7.4x	6.1x	5.5x	4.9x	0.2x	0.3x	0.5x	0.4x
PALO ALTO NETWORKS INC	32.8x	29.5x	26.9x	21.6x	14.1x	11.5x	9.8x	8.3x	0.5x	0.5x	0.5x	0.5x
RAPID7 INC	68.7x	49.5x	25.2x	19.8x	5.8x	5.1x	4.6x	4.0x	0.2x	0.4x	0.4x	0.3x
SENTINELONE INC	--	--	--	55.7x	16.3x	10.9x	8.2x	6.3x	--	0.2x	0.3x	0.2x
TENABLE	43.4x	35.3x	25.5x	20.6x	7.1x	6.1x	5.4x	4.7x	0.3x	0.4x	0.4x	0.3x
QUALYS	35.4x	31.4x	27.7x	25.0x	13.3x	11.7x	10.5x	9.4x	0.7x	0.9x	0.9x	0.8x
ZSCALER	113.2x	65.2x	--	42.1x	23.1x	16.4x	13.1x	10.5x	0.4x	0.4x	0.5x	0.4x
Average	**90.8x**	**57.4x**	**27.3x**	**29.3x**	**13.0x**	**10.2x**	**8.5x**	**7.2x**	**0.4x**	**0.4x**	**0.5x**	**0.4x**
Median	**56.0x**	**33.5x**	**26.2x**	**24.0x**	**13.3x**	**10.9x**	**8.2x**	**6.3x**	**0.4x**	**0.4x**	**0.5x**	**0.4x**
Overall Average	**94.5x**	**55.3x**	**34.4x**	**30.2x**	**13.2x**	**10.6x**	**8.9x**	**7.4x**	**0.5x**	**0.5x**	**0.5x**	**0.4x**
Overall Median	**73.3x**	**44.8x**	**27.9x**	**26.0x**	**13.7x**	**11.1x**	**8.7x**	**7.1x**	**0.4x**	**0.5x**	**0.5x**	**0.4x**

Source: Bloomberg, company reports

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We make the following assumptions across the universe (see Model Details on Page 16 for further details):

1) We assume healthy growth across the entire cybersecurity universe and build bear/base/bull case revenue growth scenarios across our coverage. In most cases, the growth assumption necessitates excellent execution, giving each company credit for achieving its long-term growth targets. For example, in CrowdStrike's case, our base case assumes that revenues would grow from $3.05bn in 2023 to $8.84bn in 2028. Our bear and bull cases assume revenue grows to $7.21bn and $10.06bn, respectively.

2) We then also assume the companies will improve their FCF generation and hit their long-term targets, even surpassing this level in our bull case scenarios. For example, in the case of CrowdStrike, management targets FCF margin to grow from ~30% in 2023 to 36% in the long run, and in our bull case scenario we assume a 37.5% FCF margin.

3) We calculate the expected FCF generation under these assumptions, and discount it back to 2024 using a 10% discount factor.

4) Lastly, we apply a healthy FCF multiple and calculate potential upside/downside to the stock. For example, despite aggressive growth and margin assumptions for CrowdStrike, our model suggests the company's stock has 26% upside in our bull case scenario, yet 4% and 33% downside in our base and bear case scenarios.

5) Within our analysis, we note that Palo Alto Networks, Check Point, CrowdStrike, etc. are fairly valued on a relative basis, with our base case suggesting that implied fair value is roughly in-line or slightly below current stock price levels. On the other hand, Fortinet is a laggard in the cybersecurity sector, with its stock up 13% YTD, yet our base case scenario applies 44% potential upside to the current stock price.

Conclusions: uninspiring valuations, but the growth momentum is strong

We present our assumptions and the analysis outcomes below. In general, stocks that had strong performance in 2023 do not have much of a valuation case left, while the laggards still carry value upside in almost all scenarios, albeit at a higher execution risk.

Exhibit 15: Summary of FCF Valuation Exercise – Stock Delta

In our FCF valuation exercise, Fortinet has the highest stock upside to its base case scenario, while Zscaler has the most downside

Company Name	Bear Case Delta	Base Case Delta	Bull Case Delta
Check Point	-22.7%	-6.4%	16.6%
CrowdStrike	-31.6%	-2.4%	28.3%
CyberArk	-35.7%	-10.8%	17.0%
Fortinet	3.7%	32.7%	57.5%
Okta	-15.5%	13.3%	47.1%
Palo Alto Networks	-14.5%	4.2%	31.6%
SentinelOne	-10.3%	30.1%	96.3%
Zscaler	-48.4%	-31.4%	-12.8%

Source: BofA Global Research estimates

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Per the above table, our analysis suggests to us the following ranking for our companies, from the highest upside to the greatest downside on valuation factors (base case scenario): Fortinet, Okta, SentinelOne, Palo Alto Networks, CrowdStrike, CyberArk, Check Point, and Zscaler

We note however that in practicality, stocks rarely behave according to their theoretical fair value. We believe that the most successful companies will continue to have strong business momentum in 2024 and as such will continue to trade well. The importance of our analysis is to flag the long-term risks, yet we believe it may take time until the valuation factor will supersede the momentum factor in determining the trading behavior and we therefore only provide it as a framework that yields another factor for consideration.

Summary of assumptions

We present below only the base cases of our analysis, with more full details presented in the following section.

Exhibit 16: Summary of FCF Valuation Exercise – Base Case Revenue Growth and FCF Margin Assumptions
In the base case of our FCF valuation exercise, we assume excellent execution, giving the companies the credit for achieving long-term growth targets

Company Name	2023	2024	2025	2026	2027	2028
Revenue Growth - Base Case						
Fortinet	20.0%	12.4%	15.0%	16.0%	14.0%	12.0%
Okta	20.8%	9.7%	9.6%	10.0%	10.0%	10.0%
SentinelOne	46.0%	32.2%	30.6%	28.0%	26.0%	24.0%
Palo Alto Networks	22.2%	17.9%	17.7%	16.0%	13.0%	11.0%
CrowdStrike	36.0%	28.9%	24.9%	23.0%	22.0%	20.0%
CyberArk	25.1%	23.9%	22.6%	22.0%	20.0%	18.0%
Check Point	3.6%	4.8%	4.5%	5.0%	5.0%	5.0%
Zscaler	39.4%	24.6%	26.8%	25.0%	23.0%	21.0%
FCF Margin - Base Case						
Fortinet	38.4%	35.7%	36.0%	36.0%	35.0%	35.0%
Okta	15.5%	25.8%	25.5%	26.0%	27.0%	28.0%
SentinelOne	-13.4%	2.7%	11.6%	15.0%	19.0%	24.0%
Palo Alto Networks	38.2%	37.0%	37.0%	37.0%	37.0%	37.0%
CrowdStrike	30.3%	31.4%	32.7%	34.0%	35.0%	36.0%
CyberArk	9.2%	21.7%	21.8%	22.0%	23.0%	25.0%
Check Point	42.5%	42.7%	43.5%	44.0%	44.0%	44.0%
Zscaler	26.9%	19.3%	18.4%	20.0%	22.0%	24.0%

Source: BofA Global Research estimates

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Model Details

Check Point – Base/Bull/Bear Case Scenario

Our Base/Bull/Bear Case Scenario on EV/FCF valuation for Check Point suggests that the company's stock is fairly valued. Our base case scenario suggests that implied fair value is roughly in-line with current stock price levels. Additionally, our bear case and bull case scenarios suggest a respective -23% downside and +17% upside risk to stock price. We believe that additional upside to Check Point's largely relies on opportunity for growth acceleration. Management previously noted opportunity to accelerate to double-digit growth, which could be feasible on the company's growing product portfolio and focus on sales execution.

Exhibit 17: Summary of FCF Valuation Exercise – Check Point

Our base case scenario suggests that the implied fair value has 4.5% downside to Check Point's current market price

Base Case		CY22	CY23	CY24	CY25	CY26	CY27	CY28	
CY28 Revenue	$3,059.4	$2,329.9	$2,412.7	$2,529.1	$2,642.8	$2,775.0	$2,913.7	$3,059.4	**Revenue**
CY28 FCF Margin	44.0%	-	3.6%	4.8%	4.5%	5.0%	5.0%	5.0%	**Revenue Growth**
CY28 FCF	$1,346.1								
		45.4%	42.5%	42.7%	43.5%	44.0%	44.0%	44.0%	**FCF Margin**
EV/FCF Multiple (Comps)	15.0x	$1,057.9	$1,026.0	$1,079.5	$1,148.4	$1,221.0	$1,282.0	$1,346.1	**FCF**
Implied Enterprise Value	$20,192.1								
Discount Factor	10.0%								
Discounted EV	$ 13,791.5								
Cash	$2,988.7								
Debt	$0.0								
- Net Debt	-$2,988.7								
Equity Value	$ 16,780.2								
Shares Outstanding	117.3								
Current Market Price	$152.82								
Implied Fair Value	$ 143.05								
Upside to Current Market Price	-6.4%								

Source: BofA Global Research estimates

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Exhibit 18: Base/Bull/Bear Case Scenario – Check Point

Our valuation exercise suggests that Check Point has 16.6% upside, -6.4% downside, and -22.7% downside in our bull, base, and bear case scenario, respectively

	CY23	CY24	CY25	CY26	CY27	CY28
Revenue Growth - Bull	3.6%	4.8%	4.5%	5.0%	7.0%	9.0%
Revenue Growth - Base	3.6%	4.8%	4.5%	5.0%	5.0%	5.0%
Revenue Growth - Bear	3.6%	4.8%	4.5%	4.0%	3.0%	3.0%
FCF Margin - Bull	42.5%	42.7%	43.5%	44.0%	45.0%	45.0%
FCF Margin - Base	42.5%	42.7%	43.5%	44.0%	44.0%	44.0%
FCF Margin - Bear	42.5%	42.7%	43.5%	42.0%	42.0%	42.0%
EV/FCF Multiple - Bull	18.0x					
EV/FCF Multiple - Base	15.0x					
EV/FCF Multiple - Bear	13.0x					
Discount Rate	10.0%					
	Bull	**Base**	**Bear**			
Implied Fair Value	$ 178.13	$ 143.05	$ 118.18			
Upside/Downside	16.6%	-6.4%	-22.7%			

Source: BofA Global Research estimates

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Base Case Assumptions:

- Revenue: Revenue growth is supported by new initiatives and a growing contribution from new product pillars such as CloudGuard, Harmony, and Infinity, driving sustainable mid-single digits growth.
- FCF Margin: Check Point's FCF margin has remained at roughly 40%+ over the last two years, and we believe that the company can sustain a similar margin level over the next few years at roughly 44%.
- EV/FCF Target Multiple: Our base case scenario utilizes a 15x EV/FCF targeted multiple, which is calculated by discounting back CY28 FCF to CY24 using a 10% discount rate. This target multiple is in-line with where the company currently trades at.

Bull Case Assumptions:

- Revenue: Stabilization of legacy declines, ramping of sales force productivity, accelerated Subscription growth, and contribution from new initiatives (such as SASE) drives better-than-expected growth.
- FCF Margin: Improvement in top-line growth and associated improvement in operating margin drives a better-than-expected FCF margin.
- EV/FCF Target Multiple: A higher baseline for revenue and FCF margin drives us to use a 18x EV/FCF multiple.

Bear Case Assumptions:

- Revenue: New product initiatives fail to gain momentum and the company reverts to historical low-single digit growth, driven by secular market declines and share loss to peers.
- FCF Margin: Fewer customers willing to pay upfront for multi-year deals, resulting in shorter billing duration, would also drive lower-than-expected cash flow generation.
- EV/FCF Target Multiple: A lower baseline for revenue and FCF margin drives us to use a 13x EV/FCF multiple.

CrowdStrike – Base/Bull/Bear Case Scenario

Our Base/Bull/Bear Case Scenario on EV/FCF valuation for CrowdStrike suggests that the company's stock is relatively fairly valued. Our base case scenario suggests that implied fair value is roughly in-line with the current stock price. Additionally, our bear case and bull case scenarios suggest -32% downside and 28% upside.

Exhibit 19: Summary of FCF Valuation Exercise – CrowdStrike

Our base case scenario suggests that the implied fair value has -2.4% downside to CrowdStrike's current market price

Base Case	
CY28 Revenue	$8,837.0
CY28 FCF Margin	36.0%
CY28 FCF	$3,181.3
EV/FCF Multiple (Comps)	25.0x
Implied Enterprise Value	$79,533.2
Discount Rate	10.0%
Discounted EV	$ 54,322.2
Cash	$3,167.2
Debt	$741.8
- Net Debt	-$2,425.5
Equity Value	$ 56,747.7
Shares Outstanding	237.9
Current Market Price	$244.36
Implied Fair Value	$ 238.52
Upside to Current Market Price	-2.4%

CY22	CY23	CY24	CY25	CY26	CY27	CY28	
$2,241.2	$3,049.2	$3,930.2	$4,907.5	$6,036.2	$7,364.2	$8,837.0	**Revenue**
-	*36.0%*	*28.9%*	*24.9%*	*23.0%*	*22.0%*	*20.0%*	**Revenue Growth**
30.2%	30.3%	31.4%	32.7%	34.0%	35.0%	36.0%	**FCF Margin**
$676.8	$925.0	$1,232.1	$1,603.9	$2,052.3	$2,577.5	$3,181.3	**FCF**

Source: BofA Global Research estimates

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Exhibit 20: Base/Bull/Bear Case Scenario – CrowdStrike

Our valuation exercise suggests that CrowdStrike has 28.3% upside, -2.4% downside, and -31.6% downside in our bull, base, and bear case scenario, respectively

	CY23	CY24	CY25	CY26	CY27	CY28
Revenue Growth - Bull	36.0%	28.9%	28.0%	27.0%	26.0%	25.0%
Revenue Growth - Base	36.0%	28.9%	24.9%	23.0%	22.0%	20.0%
Revenue Growth - Bear	36.0%	28.9%	24.9%	15.0%	14.0%	12.0%
FCF Margin - Bull	30.3%	31.4%	32.7%	35.5%	36.5%	37.5%
FCF Margin - Base	30.3%	31.4%	32.7%	34.0%	35.0%	36.0%
FCF Margin - Bear	30.3%	31.4%	32.7%	32.5%	33.5%	34.5%
EV/FCF Multiple - Bull	28.0x					
EV/FCF Multiple - Base	25.0x					
EV/FCF Multiple - Bear	22.0x					
Discount Rate	10.0%					
	Bull	**Base**	**Bear**			
Implied Fair Value	$ 313.52	$ 238.52	$ 167.21			
Upside/Downside	28.3%	-2.4%	-31.6%			

Source: BofA Global Research estimates

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Base Case Assumptions:

- Revenue: Continued strong growth in EDR and solid expansion beyond endpoint into Cloud security, log management, and identity protection.
- FCF Margin: CrowdStrike has maintained strong FCF margins in the last few years, which we expect to continue through CY28, at mid-30%, which is in-line with management's expectations.
- EV/FCF Target Multiple: Our base case scenario utilizes a 25x EV/FCF targeted multiple, which is calculated by discounting back CY28 FCF to CY24 using a 10% discount rate.

Bull Case Assumptions:

- Revenue: Better than expected net new customer growth and strong net retention rates driven by solid adoption of EDR and cross-selling of adjacent solutions.
- FCF Margin: Improvement in top-line growth and associated improvement in operating margin drives a better-than-expected FCF margin.
- EV/FCF Target Multiple: A higher baseline for revenue and FCF margin drives us to use a 28x EV/FCF multiple.

Bear Case Assumptions:

- Revenue: CrowdStrike struggles with competitive pressures, mainly from Microsoft, Palo Alto Networks, and SentinelOne. The company also struggles to grow beyond endpoint security.
- FCF Margin: Lower revenue growth and fewer new customers impacts free cash flow generation, below management's CY28 FCF margin target of 36%.
- EV/FCF Target Multiple: A lower baseline for revenue and FCF margin drives us to use a 22x EV/FCF multiple.

CyberArk – Base/Bull/Bear Case Scenario

At a high level, our scenario analysis indicates that CyberArk is currently trading at a fair market value, as our base case implies -10.8% downside to the existing stock price, however, we believe that there is additional room for upside to the stock. We model our base case on management targets, but, in our view the 2027 FCF target of $375mn, which implies a FCF margin of 23%, is not high enough based on growth opportunities for the company and subsequent leverage in the model. Additionally, the company is a market leader in a critical area of cybersecurity spend, and secular tailwinds should support continued acceleration of growth through CY26. Lastly, we note that the TAM of the Privileged Access Management market continues to expand, supported by digitalization and the transition to Cloud, and note that the market is 5% penetrated, leaving ample runway for future growth.

Exhibit 21: Summary of FCF Valuation Exercise – CyberArk

Our base case scenario suggests that the implied fair value has -10.8% downside to CyberArk's current market price

Base Case	
CY28 Revenue	$1,943.3
CY28 FCF Margin	25.0%
CY28 FCF	$485.8
EV/FCF Multiple (Comps)	25.0x
Implied Enterprise Value	$12,145.9
Discount Rate	10.0%
Discounted EV	$ 8,295.8
Cash	$621.7
Debt	$0.0
- Net Debt	-$621.7
Equity Value	$ 8,917.5
Shares Outstanding	46.6
Current Market Price	$214.38
Implied Fair Value	$ 191.19
Upside to Current Market Price	-10.8%

	CY22	CY23	CY24	CY25	CY26	CY27	CY28
Revenue	$591.7	$740.3	$917.3	$1,124.9	$1,372.4	$1,646.9	$1,943.3
Revenue Growth	-	*25.1%*	*23.9%*	*22.6%*	*22.0%*	*20.0%*	*18.0%*
FCF Margin	6.3%	9.2%	21.7%	21.8%	22.0%	23.0%	25.0%
FCF	$37.2	$68.3	$199.4	$245.1	$301.9	$378.8	$485.8

Source: BofA Global Research estimates

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Exhibit 22: Base/Bull/Bear Case Scenario – CyberArk

Our valuation exercise suggests that CyberArk has 17.0% upside, -10.8% downside, and -35.7% downside in our bull, base, and bear case scenario, respectively

	CY23	CY24	CY25	CY26	CY27	CY28
Revenue Growth - Bull	25.1%	23.9%	22.6%	25.0%	24.0%	23.0%
Revenue Growth - Base	25.1%	23.9%	22.6%	22.0%	20.0%	18.0%
Revenue Growth - Bear	25.1%	23.9%	22.6%	18.0%	16.0%	14.0%
FCF Margin- Bull	9.2%	21.7%	21.8%	23.0%	25.0%	27.0%
FCF Margin- Base	9.2%	21.7%	21.8%	22.0%	23.0%	25.0%
FCF Margin- Bear	9.2%	21.7%	21.8%	22.0%	22.0%	22.0%
EV/FCF Multiple	25.0x					
Discount Rate	10.0%					
	Bull	Base	Bear			
Implied Fair Value	$ 250.76	$ 191.19	$ 137.75			
Upside/Downside	17.0%	-10.8%	-35.7%			

Source: BofA Global Research estimates

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Base Case Assumptions:

- Revenue: Revenue growth is consistent with Management targets of +25% through CY25 and +20% through CY27 as the company executes on new growth opportunities within PAM and enters new markets such as Access Management and Cloud Identity.

- FCF Margin: Our base case scenario assumes Management's C&27 FCF target of $375mn, implying a FCF margin of 23%.

- EV/FCF Target Multiple: Our base case scenario utilizes a 25x EV/FCF targeted multiple, which is calculated by discounting back CY28 FCF to CY24 using a 10% discount rate. This target multiple is in-line with other software cybersecurity companies, such as CrowdStrike, Zscaler and Palo Alto Networks, where CyberArk also benefits from having stronger FCF generation.

Bull Case Assumptions:

- Revenue: Revenue growth benefits from continued penetration of the PAM market, growth of new identities, new environments and new attack methods which will require specialized access management, continued upsell/cross-sell momentum and favorable competitive positioning.

- FCF Margin: With scale should come leverage, and CyberArk continues to evolve into a comprehensive identity platform and offer new solutions to new types of customers, we should begin to see benefits such as lower Customer Acquisition Costs and increased operating efficiency which should benefit free cash flow.

- EV/FCF Target Multiple: A higher baseline for revenue and FCF margin drives us to use a 28x EV/FCF multiple.

Bear Case Assumptions:

- Revenue: CyberArk's competitive moat narrows leading to increased pricing pressure. Entry into new markets like access management and cloud security are less successful than anticipated. Privileged Access Management TAM is slower to expand.

- FCF Margin: Slower topline growth and investments needed for new market entry create a headwind on FCF, and expect the company to manage FCF to current levels versus prioritize margin expansion.

- EV/FCF Target Multiple: A lower baseline for revenue and FCF margin drives us to use a 22x EV/FCF multiple

Fortinet – Base/Bull/Bear Case Scenario

Fortinet, the cybersecurity laggard of 2023, continues to trade at a significant discount according to our Bull/Bear scenario analysis, which implies that with Bear case assumptions, the stock should still see upside of at least 4% from the current price. We believe the reasons for Fortinet's recent underperformance are transitionary as the firewall market experiences a period of digestion after multiple years of strong pull-forward demand. In our view, the stock should recover once the company passes through the current negative growth cycle and starts demonstrating growth acceleration and traction for its new products and model a Base case scenario implying 33% upside.

Exhibit 23: Summary of FCF Valuation Exercise – Fortinet

Our base case scenario suggests that the implied fair value has 32.7% upside to Fortinet's current market price

Base Case	
CY28 Revenue	$10,146.6
CY28 FCF Margin	35.0%
CY28 FCF	$3,551.3
EV/FCF Multiple (Comps)	25.0x
Implied Enterprise Value	$88,782.5
Discount Rate	10.0%
Discounted EV	$ 60,639.7
Cash	$2,186.8
Debt	$0.0
- Net Debt	-$2,186.8
Equity Value	$ 62,826.5
Shares Outstanding	791.2
Current Market Price	$57.85
Implied Fair Value	$ 76.79
Upside to Current Market Price	32.7%

	CY22	CY23	CY24	CY25	CY26	CY27	CY28
Revenue	$4,417.4	$5,300.0	$5,957.2	$6,850.8	$7,946.9	$9,059.4	$10,146.6
Revenue Growth	-	20.0%	12.4%	15.0%	16.0%	14.0%	12.0%
FCF Margin	32.8%	38.4%	35.7%	36.0%	36.0%	35.0%	35.0%
FCF	$1,449.4	$2,037.8	$2,129.1	$2,466.3	$2,860.9	$3,170.8	$3,551.3

Source: BofA Global Research estimates

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Exhibit 24: Base/Bull/Bear Case Scenario – Fortinet

Our valuation exercise suggests that Fortinet has 71.0% upside, 44.1% upside, and 12.5% upside in our bull, base, and bear case scenario, respectively

	CY23	CY24	CY25	CY26	CY27	CY28
Revenue Growth - Bull	20.0%	12.4%	15.0%	16.0%	16.0%	14.0%
Revenue Growth - Base	20.0%	12.4%	15.0%	16.0%	14.0%	12.0%
Revenue Growth - Bear	20.0%	12.4%	15.0%	13.0%	11.0%	10.0%
FCF Margin- Bull	38.4%	35.7%	36.0%	36.0%	36.0%	36.0%
FCF Margin- Base	38.4%	35.7%	36.0%	36.0%	35.0%	35.0%
FCF Margin- Bear	38.4%	35.7%	36.0%	35.0%	34.0%	33.0%
EV/FCF Multiple	25.0x					
Discount Rate	10.0%					
	Bull	Base	Bear			
Implied Fair Value	$ 94.21	$ 79.41	$ 62.00			
Upside/Downside	57.5%	32.7%	3.7%			

Source: BofA Global Research estimates

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Base Case Assumptions:

- Revenue: Revenue growth is consistent with the impacts from the down cycle in the firewall market, which should trough in CY24 at 12% revenue growth and increase to a historically normal trend of mid-teens growth by CY25.

- FCF Margin: Fortinet has historically guided to FCF margin above 30% in order to leave room for flexibility to invest in the business, however typically has experienced FCF margins in the low to mid 30s We therefore model our base case FCFm to be in-line with historical levels.

- EV/FCF Target Multiple: Our base case scenario utilizes a 25x EV/FCF targeted multiple, which is calculated by discounting back CY28 FCF to CY24 using a 10% discount rate. This target multiple is in-line with other software cybersecurity companies, such as CrowdStrike, Zscaler and Palo Alto Networks, where Fortinet also benefits from having stronger FCF generation.

Bull Case Assumptions:

- Revenue: New products like SASE and Operational Technology solutions have a faster uptake than anticipated. First, we believe Fortinet's firewall business will stabilize and recover, given its superior price/performance, single Operating System and fit to Fortinet's target customers

- FCF Margin: Fortinet's financial model has historically been one of the strongest among cyber peers. As the company continues to gain scale and leverage efficiencies from its platform strategy, we expect FCF margin to expand by a few hundred basis points.
- EV/FCF Target Multiple: A higher baseline for revenue and FCF margin drives us to use a 28x EV/FCF multiple.

Bear Case Assumptions:

- Revenue: Fortinet's SASE products begin to cannibalize firewall and SD-WAN products leading to a large portion of the business experiencing deceleration. SASE adoption is not as rapid within Fortinet's existing customer base.
- FCF Margin: Slower topline growth create a headwind on FCF, yet the company's scale and existing efficiencies should create a floor for FCF margin around 30%.
- EV/FCF Target Multiple: A lower baseline for revenue and FCF margin drives us to use a 22x EV/FCF multiple.

Okta – Base/Bull/Bear Case Scenario

Our scenario analysis for Okta implies the stock is currently trading at a discount to fair value, implying 47%/13%/-15% upside across our bull/base/bear scenarios. However, the problem with relying purely on our FCF valuation method is that is overlooks key qualitative inputs to financial performance such as execution. The below scenarios assume consistent performance and execution which is why it yields upside. However, the company has struggled with execution over the last two years, including elevated salesforce attrition as a result of integration challenges from the Auth0 acquisition and cybersecurity incidents stemming from technological vulnerabilities, both of which have created headwinds to growth. As Okta continues to battle execution issues, we believe growth will continue to be pressured and the stock should continue to underperform as these issues take multiple quarters to reverse.

Exhibit 25: Summary of FCF Valuation Exercise – Okta

Our base case scenario suggests that the implied fair value has 13.3% upside to Okta's current market price

Base Case	
CY28 Revenue	$3,593.5
CY28 FCF Margin	28.0%
CY28 FCF	$1,006.2
EV/FCF Multiple (Comps)	25.0x
Implied Enterprise Value	$25,154.3
Discount Rate	10.0%
Discounted EV	$ 17,180.8
Cash	$125.0
Debt	$1,979.0
- Net Debt	$1,854.0
Equity Value	$ 15,326.8
Shares Outstanding	161.3
Current Market Price	$83.87
Implied Fair Value	$ 95.01
Upside to Current Market Price	13.3%

	CY22	CY23	CY24	CY25	CY26	CY27	CY28
Revenue	$1,857.8	$2,244.9	$2,462.3	$2,699.8	$2,969.8	$3,266.8	$3,593.5
Revenue Growth	-	20.8%	9.7%	9.6%	10.0%	10.0%	10.0%
FCF Margin	3.5%	15.5%	25.8%	25.5%	26.0%	27.0%	28.0%
FCF	$65.0	$348.7	$635.2	$688.4	$772.2	$882.0	$1,006.2

Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

Exhibit 26: Base/Bull/Bear Case Scenario – Okta

Our valuation exercise suggests that Okta has 47.1% upside, 13.3% upside, and -15.5% downside in our bull, base, and bear case scenario, respectively

	CY23	CY24	CY25	CY26	CY27	CY28
Revenue Growth - Bull	20.8%	9.7%	9.6%	10.0%	12.0%	14.0%
Revenue Growth - Base	20.8%	9.7%	9.6%	10.0%	10.0%	10.0%

Exhibit 26: Base/Bull/Bear Case Scenario – Okta

Our valuation exercise suggests that Okta has 47.1% upside, 13.3% upside, and -15.5% downside in our bull, base, and bear case scenario, respectively

	CY23	CY24	CY25	CY26	CY27	CY28
Revenue Growth - Bear	20.8%	9.7%	9.6%	9.0%	8.0%	7.0%
FCF Margin- Bull	15.5%	25.8%	25.5%	26.0%	28.0%	30.0%
FCF Margin- Base	15.5%	25.8%	25.5%	26.0%	27.0%	28.0%
FCF Margin- Bear	15.5%	25.8%	25.5%	26.0%	26.0%	26.0%
EV/FCF Multiple	25.0x					
Discount Rate	10.0%					
	Bull	Base	Bear			
Implied Fair Value	$ 123.36	$ 95.01	$ 70.86			
Upside/Downside	47.1%	13.3%	-15.5%			

Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

Base Case Assumptions:

- Revenue: Revenue growth is negatively impacted by challenging macro conditions and low new customer growth as a result of recent cybersecurity incidents. We assume growth will stay consistent at 10% as the company leans on upsell/cross-sell momentum versus recovering new customer growth.

- FCF Margin: Okta has taken meaningful steps to improve margins, expanding FCF margin to 15% n CY23 up from 4% year prior. As the company continues to reduce duplicative costs and focus on spend management, margins should continue to expand, albeit at a more moderate rate. We model FCF margin in line with other cybersecurity peers around 30%.

- EV/FCF Target Multiple: Our base case scenario utilizes a 25x EV/FCF targeted multiple, which is calculated by discounting back CY28 FCF to CY24 using a 10% discount rate. This target multiple is in-line with other software cybersecurity companies, such as CrowdStrike, Zscaler and SentinelOne.

Bull Case Assumptions:

- Revenue: New products like PAM, AI functionality and Universal Log Out should drive new growth within the existing customer base. Impact from security breaches is less material than initially anticipated. New customer growth is driven by new attack methods like AI social engineering requiring renewed investment in Access Management technology.

- FCF Margin: As the topline grows and the company removes all duplicative costs stemming from the Auth0 acquisition, margins should continue to see steady expansion.

- EV/FCF Target Multiple: A higher baseline for revenue and FCF margin drives us to use a 28x EV/FCF multiple.

Bear Case Assumptions:

- Revenue: Revenue growth continues to decelerate as core products face commoditization and pricing pressures, mainly from competition like Microsoft. Security incident impacts continue to pressure new customer growth as the growing competitive landscape offers many options at lower price points. The existing base becomes saturated with Okta products while growth from new products take over 4 quarters to ramp materially into revenues.

- FCF Margin: Slower topline growth creates a headwind on FCF, yet the company's scale and existing efficiencies should create a floor for FCF margin around 25%.

- EV/FCF Target Multiple: A lower baseline for revenue and FCF margin drives us to use a 22x EV/FCF multiple.

Palo Alto Networks – Base/Bull/Bear Case Scenario

Our Base/Bull/Bear Case Scenario on EV/FCF valuation for Palo Alto Networks suggests that the company's stock is fairly valued. Our base case scenario suggests that implied fair value is roughly in-line with current stock price levels. Additionally, our bear case and bull case scenarios suggest a respective -15% downside and 32% upside risk to stock price. This leads us to believe that the stock is trading on momentum, with the stock up 26% since reporting its last earnings, despite weak billings performance and commentary.

Exhibit 27: Summary of FCF Valuation Exercise – Palo Alto Networks

Our base case scenario suggests that the implied fair value has 4.2% upside to Palo Alto Networks' current market price

Base Case		CY22	CY23	CY24	CY25	CY26	CY27	CY28	
CY28 Revenue	$15,195.8	$6,155.7	$7,522.3	$8,870.7	$10,443.9	$12,114.9	$13,689.9	$15,195.8	**Revenue**
CY28 FCF Margin	37.0%	-	*22.2%*	*17.9%*	*17.7%*	*16.0%*	*13.0%*	*11.0%*	**Revenue Growth**
CY28 FCF	$5,622.4								
		43.7%	38.2%	37.0%	37.0%	37.0%	37.0%	37.0%	**FCF Margin**
EV/FCF Multiple (Comps)	25.0x	$2,689.1	$2,877.0	$3,282.2	$3,864.2	$4,482.5	$5,065.3	$5,622.4	**FCF**
Implied Enterprise Value	$140,560.7								
Discount Rate	10.0%								
Discounted EV	$ 96,004.9								
Cash	$6,882.7								
Debt	$1,946.7								
- Net Debt	-$4,936.0								
Equity Value	$ 100,940.9								
Shares Outstanding	338.2								
Current Market Price	$286.47								
Implied Fair Value	$ 298.47								
Upside to Current Market Price	4.2%								

Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

Exhibit 28: Base/Bull/Bear Case Scenario – Palo Alto Networks

Our valuation exercise suggests that Palo Alto Networks has 31.6% upside, 4.2% upside, and -14.5% downside in our bull, base, and bear case scenario, respectively

	CY23	CY24	CY25	CY26	CY27	CY28
Revenue Growth - Bull	22.2%	17.9%	17.7%	17.0%	15.0%	14.0%
Revenue Growth - Base	22.2%	17.9%	17.7%	16.0%	13.0%	11.0%
Revenue Growth - Bear	22.2%	17.9%	17.7%	16.0%	10.0%	8.0%
FCF Margin - Bull	38.2%	37.0%	37.0%	38.0%	39.0%	40.0%
FCF Margin - Base	38.2%	37.0%	37.0%	37.0%	37.0%	37.0%
FCF Margin - Bear	38.2%	37.0%	37.0%	36.0%	36.0%	36.0%
EV/FCF Multiple - Bull	28.0x					
EV/FCF Multiple - Base	25.0x					
EV/FCF Multiple - Bear	22.0x					
Discount Rate	10.0%					
	Bull	**Base**	**Bear**			
Implied Fair Value	$ 376.94	$ 298.47	$ 244.80			
Upside/Downside	31.6%	4.2%	-14.5%			

Source: BofA Global Research estimates

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Base Case Assumptions:

- Revenue: Revenue growth is consistent with management's expectations for a 17%-19% revenue CAGR from FY23-FY26. As the company grows and scales to $10bn+ of revenue, the YoY growth rate declines, driven by the law of large numbers.

- FCF Margin: FCF margin is consistent with management's expectations for a sustained 37%+ margin level. Solid operating profitability, strong bookings growth, and interest income drive the basis for our expectations. While deferred payment plans could have a short-term impact on FCF, deferred payments also provide greater predictability of cash flow longer-term.

- EV/FCF Target Multiple: Our base case scenario utilizes a 25x EV/FCF targeted multiple, which is calculated by discounting back CY28 FCF to CY24 using a 10% discount rate. This target multiple is in-line with other software cybersecurity companies, such as CrowdStrike and SentinelOne, where Palo Alto Networks also benefits from having stronger FCF generation.

Bull Case Assumptions:

- Revenue: Revenue growth benefits from market share gains, new module adoption, and continued growth in customers and large deals. Platformization becomes increasingly prevalent within cybersecurity, and Palo Alto continues to expand on its Prisma SASE, Prisma Cloud, and Cortex portfolios.

- FCF Margin: The negative impact of financing and discounting on billings proves to be a short-term issue, and improvement in top-line growth and subsequent improvement in operating margin drives FCF margin above 37%

- EV/FCF Target Multiple: A higher baseline for revenue and FCF margin drives us to use a 28x EV/FCF multiple

Bear Case Assumptions:

- Revenue: Success in Palo Alto's NGS portfolio is offset by higher-than-expected declines in the company's firewall and Product business, driven by secular headwinds.

- FCF Margin: The impact of financing and discounting impacts the company for several quarters, which then negatively flows through to FCF generation, driving the need for Palo Alto to reduce its long-term target of a 37% sustained margin.

- EV/FCF Target Multiple: A lower baseline for revenue and FCF margin drives us to use a 22x EV/FCF multiple

SentinelOne – Base/Bull/Bear Case Scenario

Our Base/Bull/Bear Case Scenario on EV/FCF valuation for SentinelOne suggests that the company's stock is undervalued. Our base case scenario suggests that the current stock price still has roughly 30% upside to reach the implied fair value. Our bull case, which utilize undemanding revenue growth and FCF margin assumptions (in our view) suggests more than 96% upside, vs. the bear case which estimates -10% downside.

Exhibit 29: Summary of FCF Valuation Exercise – SentinelOne

Our base case scenario suggests that the implied fair value has 30.1% upside to SentinelOne's current market price

Base Case		CY22	CY23	CY24	CY25	CY26	CY27	CY28	
CY28 Revenue	$2,127.3	$422.2	$616.3	$814.4	$1,063.7	$1,361.6	$1,715.6	$2,127.3	**Revenue**
CY28 FCF Margin	24.0%	-	*46.0%*	*32.2%*	*30.6%*	*28.0%*	*26.0%*	*24.0%*	**Revenue Growth**
CY28 FCF	$510.6								
		-50.1%	-13.4%	2.7%	11.6%	15.0%	19.0%	24.0%	**FCF Margin**
EV/FCF Multiple (Comps)	25.0x	($211.7)	($82.8)	$22.3	$123.8	$204.2	$326.0	$510.6	**FCF**
Implied Enterprise Value	$12,764.1								
Discount Rate	10.0%								
Discounted EV	$ 8,718.0								
Cash	$215.2								
Debt	$0.0								
- Net Debt	-$215.2								
Equity Value	$ 8,933.3								
Shares Outstanding	288.3								
Current Market Price	$23.81								
Implied Fair Value	$ 30.99								
Upside to Current Market Price	30.1%								

Source: BofA Global Research estimates

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Exhibit 30: Base/Bull/Bear Case Scenario – SentinelOne

Our valuation exercise suggests that SentinelOne has 96.3% upside, 30.1% upside, and -10.3% downside in our bull, base, and bear case scenario, respectively

	CY23	CY24	CY25	CY26	CY27	CY28
Revenue Growth - Bull	46.0%	32.2%	30.6%	33.0%	31.0%	29.0%
Revenue Growth - Base	46.0%	32.2%	30.6%	28.0%	26.0%	24.0%
Revenue Growth - Bear	46.0%	32.2%	30.6%	23.0%	21.0%	19.0%
FCF Margin - Bull	-13.4%	2.7%	11.6%	20.0%	24.0%	29.0%
FCF Margin - Base	-13.4%	2.7%	11.6%	15.0%	19.0%	24.0%
FCF Margin - Bear	-13.4%	2.7%	11.6%	12.0%	16.0%	21.0%
EV/FCF Multiple - Bull	28.0x					
EV/FCF Multiple - Base	25.0x					
EV/FCF Multiple - Bear	22.0x					
Discount Rate	10.0%					
	Bull	**Base**	**Bear**			
Implied Fair Value	$ 46.74	$ 30.99	$ 21.37			
Upside/Downside	96.3%	30.1%	-10.3%			

Source: BofA Global Research estimates

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Base Case Assumptions:

- Revenue: Revenue growth is supported by continued growth in EDR and expansion at existing customers.

- FCF Margin: SentinelOne is well on its way to FCF profitability and we believe the company could reach low to mid-20s FCF margin over the next few years.

- EV/FCF Target Multiple: Our base case scenario utilizes a 25x EV/FCF targeted multiple, which is calculated by discounting back CY28 FCF to CY24 using a 10% discount rate.

Bull Case Assumptions:

- Revenue: Revenue growth is supported by outsized share gains in EDR as well as successful deployment of products beyond endpoint like Cloud security, SIEM, and data loss prevention. Our bull case also implies

- FCF Margin: SentinelOne overdelivers on reaching positive FCF generation and sees continued improvement in its ability to generate cash. This is also supported by better-than-expected revenue growth.
- EV/FCF Target Multiple: A higher revenue growth baseline for and FCF margins drive us to use a 28x EV/FCF multiple.

Bear Case Assumptions:

- Revenue: Competition in endpoint security eats at SentinelOne's market share and the company struggles to produce successful products in adjacent markets.
- FCF Margin: Slower growth at new and existing customers results in less cash generation.
- EV/FCF Target Multiple: A lower baseline for revenue and FCF margin drives us to use a 22x EV/FCF multiple.

Zscaler – Base/Bull/Bear Case Scenario

Our scenario analysis for Zscaler implies that the stock is trading at a premium to its fundamental valuation, with -31% downside to our base case. The stock has traded up on momentum throughout CY23 up 92% through YE 2023 versus NASDAQ's 36% as investors have favored more resilient subcategories of TMT like cybersecurity, where budgets have largely remained intact and spend continues to increase. While we are positive on the long-term fundamentals of the company's unique technology and market leading position, we caution that the return to fundamental valuation is likely to be a headwind for the stock, as even our bull case suggests -13% downside.

Exhibit 31: Summary of FCF Valuation Exercise – Zscaler

Our base case scenario suggests that the implied fair value has -31.4% upside to Zscaler's current market price

Base Case	
CY28 Revenue	$5,523.9
CY28 FCF Margin	24.0%
CY28 FCF	$1,325.7
EV/FCF Multiple (Comps)	25.0x
Implied Enterprise Value	$33,143.6
Discount Rate	10.0%
Discounted EV	$ 22,637.5
Cash	$1,361.7
Debt	$1,134.0
- Net Debt	-$227.7
Equity Value	$ 22,865.2
Shares Outstanding	158.5
Current Market Price	$210.24
Implied Fair Value	$ 144.26
Upside to Current Market Price	-31.4%

	CY22	CY23	CY24	CY25	CY26	CY27	CY28
Revenue	$1,348.0	$1,879.6	$2,341.2	$2,969.3	$3,711.6	$4,565.2	$5,523.9
Revenue Growth	-	*39.4%*	*24.6%*	*26.8%*	*25.0%*	*23.0%*	*21.0%*
FCF Margin	22.7%	26.9%	19.3%	18.4%	20.0%	22.0%	24.0%
FCF	$305.6	$506.5	$452.9	$546.1	$742.3	$1,004.4	$1,325.7

Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

Exhibit 32: Base/Bull/Bear Case Scenario – Zscaler

Our valuation exercise suggests that Zscaler has -12.8% downside, -31.4% downside, and -48.4% downside in our bull, base, and bear case scenario, respectively

	CY23	CY24	CY25	CY26	CY27	CY28
Revenue Growth - Bull	39.4%	24.6%	26.8%	27.0%	25.0%	23.0%
Revenue Growth - Base	39.4%	24.6%	26.8%	25.0%	23.0%	21.0%
Revenue Growth - Bear	39.4%	24.6%	26.8%	23.0%	20.0%	17.0%
FCF Margin- Bull	26.9%	19.3%	18.4%	20.0%	23.0%	26.0%
FCF Margin- Base	26.9%	19.3%	18.4%	20.0%	22.0%	24.0%
FCF Margin- Bear	26.9%	19.3%	18.4%	20.0%	21.0%	22.0%
EV/FCF Multiple	25.0x					
Discount Rate	10.0%					
	Bull	Base	Bear			
Implied Fair Value	$ 183.32	$ 144.26	$ 108.38			
Upside/Downside	-12.8%	-31.4%	-48.4%			

Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

Base Case Assumptions:

- Revenue: Revenue growth slows due to the company's scale and law of large numbers, yet continues to be supported by secular tailwinds like the adoption of Zero Trust as well as the company's platform expansion into other key cybersecurity markets.
- FCF Margin: Topline growth and scale should help expand the operating margin to +20% as the company matures.
- EV/FCF Target Multiple: Our base case scenario utilizes a 25x EV/FCF targeted multiple, which is calculated by discounting back CY28 FCF to CY24 using a 10% discount rate. This target multiple is in-line with other software cybersecurity companies, such as CrowdStrike, SentinelOne and Palo Alto.

Bull Case Assumptions:

- Revenue: New products like Data Protection and Cloud Workload Security should drive growth within the existing base while becoming new landing points for new customers. Zero Trust adoption accelerates, especially in the federal vertical where the company is particularly well positioned.
- FCF Margin: Accelerated topline growth and efficiencies from product maturity should boost FCF margin closer to 30%
- EV/FCF Target Multiple: A higher baseline for revenue and FCF margin drives us to use a 28x EV/FCF multiple.

Bear Case Assumptions:

- Revenue: SASE market becomes more competitive, putting pressure on pricing. New areas of focus like Data Protection and CNAPP are not as successful as anticipated.
- FCF Margin: Slower topline growth creates a headwind on FCF, and newer products could need increased investment to become market ready.
- EV/FCF Target Multiple: A lower baseline for revenue and FCF margin drives us to use a 22x EV/FCF multiple.

Glossary

- AI: artificial intelligence
- CASB: cloud access security broker
- CISO: chief information security officer
- CNAPP: cloud-native application protection platform
- SaaS: software-as-a-service
- SASE: secure access server edge
- ZTNA: zero trust network access

Exhibit 33: Stocks mentioned
Prices and ratings for stocks mentioned in this report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
CHKP	CHKP US	Check Point	US$ 152.82	B-1-9
CRWD	CRWD US	CrowdStrike	US$ 244.36	C-1-9
CYBR	CYBR US	CyberArk Software	US$ 214.38	C-1-9
FTNT	FTNT US	Fortinet	US$ 57.85	B-1-9
OKTA	OKTA US	Okta Inc	US$ 83.87	C-3-9
PANW	PANW US	Palo Alto Networks	US$ 286.47	B-2-9
S	S US	SentinelOne	US$ 23.81	C-2-9
ZS	ZS US	Zscaler	US$ 210.24	C-1-9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Price objective basis & risk

Check Point Software Technologies (CHKP)

We arrive at our PO of $160 by applying an EV/FCF multiple of roughly 14x 2025E EV/FCF, which is slightly below the peer group average for mature software companies, which trade at roughly 15x-16x. We believe a discount is warranted given roughly 19% of revenue is derived from perpetual licensing and hardware, and given Check Point's low-growth profile in a dynamic cyber security industry. Longer-term, a greater mix shift to ratable recurring revenue is positive for the model.

Downside risks to our PO are 1) increased competition and potential share loss to comparable products from Cisco, Fortinet, and Palo Alto Networks, 2) lengthened upgrade cycles due to slow macro, 3) new network architectures opening competition to cloud-based alternatives, 4) slower adoption of advanced software blades as customers choose discrete competitive solutions, 5) lack of traction in high end data centers, 6) limited upside to margins, and 7) overall risks of slower macro environment or overall IT spending.

Upside risks to our PO are 1) better-than-expected execution that could translate into higher than anticipated growth rates, 2) broad adoption of Check Point's Quantum, CloudGuard, Harmony, and Infinity offerings, 3) better-than-expected operating margin improvement.

CrowdStrike Holdings Inc. (CRWD)

Our PO of $250 is based on roughly 14x our CY24E EV/Sales. We choose EV/Sales as our target valuation metric due to CrowdStrike's early growth stage and investment period making the profitability level still in early stages. We believe the valuation is warranted due to CrowdStrike's higher growth profile and potential to take meaningful share in new markets that would increase TAM and potentially accelerate growth. The positives of CrowdStrike's high growth and long-term opportunities are somewhat offset by lower margins and expected growth deceleration.

Downside risks to our PO are 1) investor sentiment and sensitivity to the premium valuation levels, 2) a lower take-rate of new offerings, 3) potential slowdown in new customer adoption and expansion deals, 4) risk of security breaches, and 5) an increase in competition from incumbent vendors and newer next-generation players.

CyberArk (CYBR)

Our PO of $230 is based on roughly 9x 2025E EV/Sales. This is near the middle of SaaS security peers at 10-12x. CyberArk's transition to SaaS is gaining additional momentum, which should support the multiple.

Upside risks to our price objective are difficulties in sizing the market given its newness and low market awareness, stronger conversion of qualified customers that are currently in the pipeline, and higher average deal sizes from rising license attach rates.

Downside risks are FX risk exposure (40% international exposure), difficulties sizing the market, and competition from large, well-established operators.

Fortinet (FTNT)

Our $65 PO is based on roughly 23x 2024E EV/FCF. Our multiple is slightly below the hardware peer group average multiple of 25-35x and a discount to software peers as well. We believe the slightly below multiple to the hardware peer group is appropriate at this stage given the current business environment despite some recent share gains, shift to more recurring software, and expansion into adjacent security markets. New market tailwinds, such as software defined wide area networking (SD-WAN) should drive further market share gains.

Upside risks to our price objective are growth of non-FortiGate products, which could support high growth and acceleration from current levels and could result in more SaaS-like multiples and drive up the valuation.

Downside risks to our price objective are 1) product convergence leading to a shrinking market with larger competitors, 2) exposure to public spending and EMEA, 3) reputation risk if major threats missed and 4) early ordering that occurred during CY21/CY22 creates tough comps heading in CY23

Okta Inc (OKTA)

Our PO of $64 is based on 5x FY25E EV/Sales. We note this multiple is at a discount to high growth cybersecurity peers that trade at 8-12x, yet we believe this is warranted giving potential headwinds to revenue growth and the operational challenges the company currently faces.

Upside risks to our PO are 1) higher growth rates on greater adoption of Okta's Customer Identity products, 2) higher growth rates if Okta's products warrant a premium compared to other IAM vendors and 3) margin uplift from a more efficient sales force.

Downside risks to our PO are 1) continued price erosion of Okta's core products due to more intense competition, 2) purchase pushouts of additional products should customer budgets come down and 3) lower margin ramp if execution issues worsen.

Palo Alto Networks (PANW)

Our price objective of $315 is based on roughly 10x CY25E EV/Sales, which is above the high-end range of appliance companies, which trade at roughly 6-8x 2025E EV/Sales. The migration to Software and Cloud warrants a higher valuation, in our view, with successful SaaS vendors trading at 11-15x forward revenues.

Downside risks to our PO are increased competition and execution-related challenges as the company transitions to the cloud and SASE models.

SentinelOne, Inc. (S)
Our PO of $26.50 is based on 9x our FY25E EV/Sales, a discount to the 14x multiple at which competitor CrowdStrike trades, reflecting lower scale and margins. We choose EV/Sales as our valuation metric due to S's early growth stage and investment period creating outsized operating losses in the near term. We believe our valuation is justified given SentinelOne's risk profile based on the macro environment and IT spending conditions despite the company's potential for high growth and meaningful share gains in new markets. The positives of SentinelOne's high growth and long-term opportunities are somewhat offset by lower margins.

Downside risks to our PO are 1) investor sentiment and sensitivity to the premium valuation levels, 2) a lower take-rate of new offerings, 3) material slowdown in new customer adoption and platform expansion deals, 4) risk of security breaches, and 5) an increase in competition from incumbent vendors and other next-gen players.

Upside risks to our PO are 1) increased growth within the endpoint security market, 2) higher adoption of adjacent products, 3) better-than-expected enterprise IT spending, 4) material increase in new customer adds, and 5) further growth of offerings into new markets

Zscaler (ZS)
Our PO of $205 is based on roughly 11x CY25E EV/Sales. The multiple is a premium versus high-growth software peers (7-10x), which we justify by the higher growth profile. We believe a premium is warranted due to Zscaler's higher growth profile and potential to take meaningful share in new markets that would increase the TAM and potentially accelerate growth.

Upside risks to our PO are 1) faster-than-expected adoption of Zscaler's new products, such as Zscaler Private Access, 2) higher ASP uplift due to adoption of high-end offerings like the Cloud Next-generation firewall and Cloud Sandbox, and 3) a more significant shift to cloud-based security across enterprises of all sizes.

Downside risks to our PO are 1) a lower take-rate of new offerings, 2) material slowdown in new customer adoption and expansion deals, 3) risk of network outages or security breaches, and 4) an increase in competition from incumbent vendors and newer start-ups.

Analyst Certification

We, Tal Liani and Madeline Brooks, 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 - Telecom and Data Networking Equipment Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
BUY				
	Akamai	AKAM	AKAM US	Madeline Brooks
	Amdocs	DOX	DOX US	Tal Liani
	Arista Networks	ANET	ANET US	Tal Liani
	Check Point Software Technologies	CHKP	CHKP US	Tal Liani
	Ciena	CIEN	CIEN US	Tal Liani
	CrowdStrike Holdings Inc.	CRWD	CRWD US	Tal Liani
	CyberArk	CYBR	CYBR US	Tal Liani
	Fastly	FSLY	FSLY US	Madeline Brooks
	Fortinet	FTNT	FTNT US	Tal Liani
	Gen Digital, Inc.	GEN	GEN US	Jonathan Eisenson
	InterDigital, Inc.	IDCC	IDCC US	Tal Liani
	Motorola Solutions	MSI	MSI US	Tomer Zilberman
	Qualcomm	QCOM	QCOM US	Tal Liani
	Zscaler	ZS	ZS US	Tal Liani
NEUTRAL				
	Cellebrite	CLBT	CLBT US	Tal Liani
	Cisco Systems	CSCO	CSCO US	Tal Liani
	CommScope	COMM	COMM US	Tal Liani
	Palo Alto Networks	PANW	PANW US	Tal Liani
	SentinelOne, Inc.	S	S US	Tal Liani
UNDERPERFORM				
	Cloudflare	NET	NET US	Madeline Brooks
	F5 Inc	FFIV	FFIV US	Tal Liani
	Juniper Networks	JNPR	JNPR US	Tal Liani
	Okta Inc	OKTA	OKTA US	Madeline Brooks
	SecureWorks	SCWX	SCWX US	Tal Liani

Disclosures

Important Disclosures

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

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	Count	Percent
Buy	57	51.82%	Buy	43	75.44%
Hold	27	24.55%	Hold	17	62.96%
Sell	26	23.64%	Sell	12	46.15%

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

Coverage Universe	Count	Percent	Inv. Banking Relationships [R1]	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%

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

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster[R2]
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

[R2]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.

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