Juniper Networks

Analyzing the potential overlap and contributions of the HPE-Juniper deal

Reiterate Rating: NO RATING | PO: NA | Price: 37.03 USD

08 February 2024

Equity

High aspirations, yet a more challenging reality

Following HPE's announced acquisition of Juniper, we provide a bottom-up analysis of Juniper's revenue across routing, switching, wireless LAN, firewall, and SD-WAN. We discuss the potential contribution to HPE, mainly on the wireless front, and what we believe are potential challenges ahead, given the large contribution of products that are currently not in HPE's domain, the impact of expected spending weakness with Service Providers (SPs), potential portfolio overlap, and other similar factors. We reiterate No Rating for Juniper and fine-tune our estimates to reflect the weak spend environment.

Bringing new capabilities to Wireless LAN

Juniper's Mist likely played a pivotal role in the decision of HPE to acquire Juniper. Wireless LAN accounts for 12% of Juniper's product revenue, with Juniper only carrying 3.3% share, while HPE holds 14.3% share and Cisco holds 38.5% share. However, Fortune 100 companies are increasingly deploying public cloud-controlled solutions, with Mist taking share from both HPE and Cisco. In 9M23, HPE's public cloud-managed WLAN revenue only grew 4% YoY, while Mist grew 47%. In addition, Juniper is in the process of 'Mistifying' its switches and security solutions, providing customers with a more streamlined experience of cloud-controlled networking and security solutions.

A more challenged integration with the other parts

The majority of Juniper's revenues are outside of Wireless LAN, with routing accounting for nearly 50% of product revenue, while switching and SD-WAN add another ~30%. The routing market is in secular decline, growing at about 1% per annum in the 10-year period between 2010 to 2020. In addition, HPE would need to re-align itself around Service Providers, dealing with spending pressure, a more direct sales strategy, and high requirements for R&D and engineering. In switching, we see overlapping portfolios where HPE would have to work on integration and unification of the software layer. Lastly, high-end Firewall appliances are also a new market for HPE, accounting for ~ 8% of Juniper's product revenue. Our bottom-up model calls for Juniper's product revenue to grow -5% and +5% YoY in 2024 and 2025, respectively, slightly higher than HPE's total revenue growth at 3.5% and 2.5%. This report should be read in conjunction with our Switching Trends and Routing Trends reports published today.

Estimates (Dec) (US$)	2022A	2023A	2024E	2025E	2026E
EPS	1.95	2.26	2.25	2.48	2.51
GAAP EPS	1.43	0.95	1.46	1.66	1.67
EPS Change (YoY)	11.4%	15.9%	-0.4%	10.2%	1.2%
Consensus EPS (Bloomberg)			2.26	2.48	2.44
DPS	0.82	0.86	0.80	0.81	0.80
EPS Ex-Options Expense	1.95	2.26	2.25	2.48	2.51
Valuation (Dec)					
P/E	19.0x	16.4x	16.4x	14.9x	14.7x
GAAP P/E	25.9x	38.9x	25.3x	22.3x	22.2x
Dividend Yield	2.2%	2.3%	2.2%	2.2%	2.2%
EV / EBITDA*	18.1x	16.8x	16.5x	15.2x	14.9x
Free Cash Flow Yield*	0%	4.1%	4.9%	5.5%	5.3%

* For full definitions of *iQmethod*SM measures, see page 32.

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.
Refer to important disclosures on page 33 to 36. Analyst Certification on page 30. Price Objective Basis/Risk on page 30. 12650309

Timestamp: 08 February 2024 01:00AM EST

Key Changes

(US$)	Previous	Current
2024E Rev (m)	5,511.8	5,429.5
2025E Rev (m)	5,749.5	5,657.6
2026E Rev (m)	NA	5,833.2
2024E EPS	2.34	2.25
2025E EPS	2.59	2.48
2026E EPS	NA	2.51
2024E DPS	0.81	0.80

Networking and Cybersecurity
Tal Liani
Research Analyst
BofAS
tal.liani@bofa.com

Tomer Zilberman
Research Analyst
BofAS
tomer.zilberman@bofa.com

Jonathan Eisenson
Research Analyst
BofAS
jonathan.eisenson@bofa.com

Madeline Brooks
Research Analyst
BofAS
madeline.brooks@bofa.com

IT Hardware and Technology Supply Chain
Wamsi Mohan
Research Analyst
BofAS
wamsi.mohan@bofa.com

Ruplu Bhattacharya
Research Analyst
BofAS
ruplu.bhattacharya@bofa.com

Stock Data

Price	37.03 USD
Price Objective	NA
Date Established	NA
Investment Opinion	-6-
52-Week Range	24.87 USD - 38.04 USD
Mrkt Val (mn) / Shares Out (mn)	17,626 USD / 476.0
Free Float	98.7%
Average Daily Value (mn)	258.85 USD
BofA Ticker / Exchange	JNPR / NYS
Bloomberg / Reuters	JNPR US / JNPR.N
ROE (2024E)	15.2%
Net Dbt to Eqty (Dec-2023A)	12.2%
ESGMeter™	High

Please refer to "BofA ESGMeter Methodology".

iQprofile[SM] Juniper Networks

iQ**method* [SM] **– Bus Performance

(US$ Millions)	**2022A**	**2023A**	**2024E**	**2025E**	**2026E**
Return on Capital Employed	8.8%	8.2%	8.8%	9.1%	8.6%
Return on Equity	14.6%	16.4%	15.2%	14.6%	13.2%
Operating Margin	15.7%	16.9%	17.1%	18.1%	18.0%
Free Cash Flow	(8)	713	862	963	936

iQ**method* [SM] **– Quality of Earnings

(US$ Millions)	**2022A**	**2023A**	**2024E**	**2025E**	**2026E**
Cash Realization Ratio	0.2x	1.2x	1.4x	1.4x	1.3x
Asset Replacement Ratio	0.5x	0.8x	0.6x	0.6x	0.6x
Tax Rate	24.5%	35.8%	26.6%	25.9%	26.1%
Net Debt-to-Equity Ratio	16.1%	12.2%	-3.3%	-16.9%	-27.0%
Interest Cover	21.2x	30.3x	32.7x	24.8x	18.3x

Income Statement Data (Dec)

(US$ Millions)	**2022A**	**2023A**	**2024E**	**2025E**	**2026E**
Sales	5,301	5,565	5,430	5,658	5,833
% Change	11.9%	5.0%	-2.4%	4.2%	3.1%
Gross Profit	3,043	3,289	3,256	3,414	3,524
% Change	7.6%	8.1%	-1.0%	4.9%	3.2%
EBITDA	1,052	1,135	1,154	1,252	1,279
% Change	6.5%	7.9%	1.7%	8.5%	2.1%
Net Interest & Other Income	(39)	(31)	(28)	(41)	(57)
Net Income (Adjusted)	**643**	**736**	**728**	**798**	**806**
% Change	**11.5%**	**14.6%**	**-1.1%**	**9.5%**	**1.0%**

Free Cash Flow Data (Dec)

(US$ Millions)	**2022A**	**2023A**	**2024E**	**2025E**	**2026E**
Net Income from Cont Operations (GAAP)	471	310	472	535	537
Depreciation & Amortization	218	195	226	226	226
Change in Working Capital	(575)	65	18	48	11
Deferred Taxation Charge	NA	NA	NA	NA	NA
Other Adjustments, Net	(16)	303	287	295	303
Capital Expenditure	(105)	(159)	(142)	(142)	(142)
Free Cash Flow	**-8**	**713**	**862**	**963**	**936**
% Change	**NM**	**NM**	**20.8%**	**11.7%**	**-2.8%**
Share / Issue Repurchase	57	62	153	153	153
Cost of Dividends Paid	(270)	(281)	(261)	(259)	(258)
Change in Debt	0	0	0	0	0

Balance Sheet Data (Dec)

(US$ Millions)	**2022A**	**2023A**	**2024E**	**2025E**	**2026E**
Cash & Equivalents	880	1,068	1,784	2,594	3,357
Trade Receivables	1,227	1,044	1,106	1,051	1,083
Other Current Assets	1,510	1,683	1,703	1,723	1,743
Property, Plant & Equipment	667	690	605	521	436
Other Non-Current Assets	5,043	5,033	5,033	5,033	5,033
Total Assets	**9,327**	**9,519**	**10,232**	**10,921**	**11,652**
Short-Term Debt	0	0	0	0	0
Other Current Liabilities	2,079	2,104	2,177	2,205	2,284
Long-Term Debt	1,601	1,617	1,617	1,617	1,617
Other Non-Current Liabilities	1,171	1,305	1,332	1,316	1,301
Total Liabilities	**4,852**	**5,026**	**5,126**	**5,138**	**5,201**
Total Equity	**4,475**	**4,493**	**5,106**	**5,783**	**6,451**
Total Equity & Liabilities	**9,327**	**9,519**	**10,232**	**10,921**	**11,652**

* For full definitions of *iQmethod*[SM] measures, see page 32.

Company Sector

Data Networking

Company Description

Juniper (JNPR) is a provider of high-performance network infrastructure to service providers and enterprises. Key products include IP-based routers for service provider core and edge networks, security solutions, and high-end enterprise routing equipment. Juniper's products supports converged data, voice, video, and wireless applications across extended network

Investment Rationale

We have removed the investment opinion on the company's stock. Investors should no longer rely on our previous opinion or price objective.

Stock Data

Average Daily Volume	6,990,393

Quarterly Earnings Estimates

	2023	2024
Q1	0.48A	0.41E
Q2	0.58A	0.53E
Q3	0.60A	0.62E
Q4	0.61A	0.70E

Contents

Implications of the HPE-Juniper Deal 4

Analysis of Juniper's Segments 5

Juniper's market position 6

Risks to the acquisition 8

Service Provider Routing 9

Enterprise Networking 12

Ethernet Switching 14

Wireless LAN Equipment 19

Firewall 21

How HPE could leverage Juniper's firewall business 24

SD-WAN Equipment 24

Financial Highlights 26

Glossary 29

Implications of the HPE-Juniper Deal

HPE's acquisition of Juniper could bolster its networking business and allow the company to provide a more comprehensive portfolio across the full networking stack, in a bid to further compete with the incumbent powerhouse Cisco. As part of the acquisition, Juniper will fit into HPE's networking segment, dubbed Intelligent Edge, and nearly double the company's networking revenue, from 18% of total FY23 revenue to 31%. Concurrently, HPE's addressable market would expand by ~26% from $94bn to $118bn in 2026, with incremental growth in routing, tier-1 data center networking, and firewalls, as well as increasing exposure to service providers (SPs), tier-1 cloud providers, and enterprise customers. Depending on execution, the deal could solidify HPE as a provider of a larger piece of the overall networking stack, with HPE bringing better 'networking technology for AI' and Juniper contributing better 'AI technology for networking'.

Our note primarily focuses on the potential overlap and contributions of the HPE-Juniper deal from a product segment view, yet we also highlight the financial implications. The deal has a solid financial profile, accelerating HPE's portfolio mix towards higher-margin, higher-growth solutions. While the combined networking segment would constitute 31% of revenue, it would also grow to 56% of pro-forma operating profit vs. standalone 39%, driving HPE's 2023 networking operating profit up from $1.4bn to $2.8bn. HPE also expects the deal to be accretive to EPS and FCF in year 1, post-close.

We flag that the potential benefits of the acquisition also constitute the risks. The acquisition would boost HPE's market share across switching, wireless and SD-WAN, where Cisco remains the dominant player, and expands HPE's position across on-premises systems to cloud networks and data centers. At the same time, overlap in customer accounts as well as product segments, such as Mist vs. Aruba, will require careful consideration and thoughtful merging or risk share loss to peers and phasing out of certain products.

Additionally, Juniper stands to benefit from HPE's channel presence and go-to-market strategy, with 95% of HPE's business routed through channels, yet Juniper's direct sales strategy will require a major re-focus for HPE. On one hand, HPE's strong channel presence outside of North America would support Juniper's growth above its limited international scope. Juniper's revenue ex-U.S. accounted for 45% of total revenue in 2022, while HPE's ex-U.S. revenue accounted for 66% of its total revenue. On the other hand, Juniper's large customer exposure to SPs and the competitive landscape of SP routing will require a heavy focus on R&D and engineering. We note a sizable portion of R&D spend is driven by the need to invest resources into proprietary routing silicon and chipsets, whereas HPE primarily relies on merchant silicon.

At a high level, it is evident that AI is a major factor of the deal and Juniper's Mist likely played a pivotal role. As AI capabilities become increasingly integral in the networking landscape, HPE stands to gain from the Mist platform. However, Mistified revenue accounted for roughly 19% product revenue in 1H23, while routing accounted for nearly 50%. During the investor call to discuss the acquisition, HPE and Juniper management mentioned the word 'AI' over 50 times while only mentioning 'routers' once. However, the increased revenue contribution from networking (including routing) services to diversify HPE's revenue stream that has historically been concentrated in Compute. In our view, the reality is that HPE will face a weak Service Provider spend environment and a trough in Juniper's core businesses, with growth declining into 2024. As such, we believe HPE might have to go through a learning and digestion process of Juniper's unique assets, and therefore flag the integration risks.

Analysis of Juniper's Segments

We discuss below Juniper's product segments and customer verticals to review the potential implications to HPE. Historically, Juniper has predominantly sold to Service Provider (SP) customers with lower exposure to Cloud provider and Enterprise segments. However, in recent years, Juniper has improved its Enterprise presence by focusing on go-to-market transformations and leveraging the success of its acquisition of Mist.

Roughly 50% of Juniper's product revenue is attributed to routing, capturing 13.2% of the global market. Juniper's routing business is sold mostly to SPs and Data Center Interconnect (DCI) of Cloud, offering a highly integrated routing portfolio. However, we believe Juniper's SP exposure is less compelling to HPE, given the pressure on SP spending and expected reversion to the mean of the routing market. The SP spending environment is worsening, with BofA Global Research Telecom analyst David Barden expecting Wireless capex to decline 9% in 2023 and another 10% in 2024, partially related to end of spectrum spending. Additionally, the routing market has grown at a 1% CAGR in the ten-year period between 2010 to 2020, yet grew 14.3% YoY in 1H23 driven by backlog buildout and unexpected new data traffic growth. With backlog drawdown offering limited support going into 2024, coupled with weak spending initiatives across service providers, we believe growth will decline before returning to the long-term growth of low single digits per annum.

42% of Juniper's product revenue is predominantly tied to switching, wireless, and SD-WAN. The company has taken steps in the last few years to improve its business resiliency by innovating on its capabilities, such as through its integrations of Mist and Apstra, and building a competitive moat vs. networking peers. Juniper has steadily increased its Enterprise presence, supported by Mist, with the Enterprise segment accounting for over 50% of revenue in the last quarter. However, we see overlap between HPE Aruba and Juniper Mist. On one hand, Aruba is focused on the visibility of the network, while Mist is focused on the visibility of the experience of the end user. On the other hand, HPE will need to merge overlapping solutions between Juniper's and its own switching platform, as well as Mist and Aruba.

Lastly, firewall is Juniper's largest security segment and accounts for approximately 8% of its product revenue. Juniper does not tend to sell security standalone and therefore does not look to compete with traditional cybersecurity players. The company primarily offers low latency capabilities and high-throughput firewalls, which is largely limited towards SP customers and to some extent Cloud customers. Given the company's narrow focus on SP customers and high-throughput firewalls, it remains to be seen whether Juniper's security segment is something HPE would adapt to and focus on over time.

Our report examines the end-markets that Juniper participates in and Juniper's performance to better understand the potential contributions to HPE's business model. We provide a bottom-up product revenue build, total addressable market (TAM) analysis, and segment forecast using industry market projections and market share assumptions. We also explore each end-market and review key trends and growth drivers.

Exhibit 1: Snapshot of Market Growth Rates

SP Routers, Ethernet Switches, WLAN Equipment, Firewall, and SD-WAN Equipment are expected to grow at a respective 1.7%, 7.1%, 6.8%, 6%, and 12.1% CAGR

Calendar Year (in $mn)	2019	2020	2021	2022	1H23	2H23E	2023E	2024E	2025E	2022-2025 CAGR
Edge Routers	$9,288.0	$9,011.9	$9,540.9	$9,810.6	$5,163.6	$4,979.6	$10,143.1	$9,656.3	$10,061.8	0.8%
YoY Chg (%)	*1.7%*	*-3.0%*	*5.9%*	*2.8%*	*12.4%*	*-4.5%*	*3.4%*	*-4.8%*	*4.2%*	
Core Routers	$3,384.6	$3,098.2	$3,357.7	$3,297.0	$2,027.7	$1,905.8	$3,933.4	$3,583.3	$3,723.1	4.1%
YoY Chg (%)	*-4.6%*	*-8.5%*	*8.4%*	*-1.8%*	*19.5%*	*19.1%*	*19.3%*	*-8.9%*	*3.9%*	
Total Service Provider Routers	**$12,672.6**	**$12,110.1**	**$12,898.6**	**$13,107.7**	**$7,191.2**	**$6,885.3**	**$14,076.5**	**$13,239.6**	**$13,784.9**	**1.7%**
YoY Chg (%)	*-0.1%*	*-4.4%*	*6.5%*	*1.6%*	*14.3%*	*1.0%*	*7.4%*	*-5.9%*	*4.1%*	
Campus Switches	$15,752.2	$14,662.3	$16,360.8	$20,663.6	$13,127.8	$14,098.1	$27,225.9	$23,914.5	$24,373.6	5.7%
YoY Chg (%)	*1.9%*	*-6.9%*	*11.6%*	*26.3%*	*52.7%*	*16.8%*	*31.8%*	*-12.2%*	*1.9%*	
Data Center Switches	$12,002.2	$11,953.1	$12,745.5	$16,797.1	$10,000.2	$10,245.3	$20,245.5	$20,053.8	$21,691.7	8.9%
YoY Chg (%)	*2.9%*	*-0.4%*	*6.6%*	*31.8%*	*26.4%*	*15.3%*	*20.5%*	*-0.9%*	*8.2%*	

Exhibit 1: Snapshot of Market Growth Rates

SP Routers, Ethernet Switches, WLAN Equipment, Firewall, and SD-WAN Equipment are expected to grow at a respective 1.7%, 7.1%, 6.8%, 6%, and 12.1% CAGR

Calendar Year (in $mn)	2019	2020	2021	2022	1H23	2H23E	2023E	2024E	2025E	2022-2025 CAGR
Total Ethernet Switches	**$27,754.4**	**$26,615.3**	**$29,106.3**	**$37,460.7**	**$23,128.0**	**$24,343.4**	**$47,471.4**	**$43,968.4**	**$46,065.4**	**7.1%**
YoY Chg (%)	*2.4%*	*-4.1%*	*9.4%*	*28.7%*	*40.1%*	*16.2%*	*26.7%*	*-7.4%*	*4.8%*	
Access Points	$5,171.1	$5,224.9	$6,409.5	$8,717.0	$5,332.8	$4,857.1	$10,190.0	$9,667.2	$10,134.4	5.2%
YoY Chg (%)	*0.8%*	*1.0%*	*22.7%*	*36.0%*	*50.8%*	*-6.2%*	*16.9%*	*-5.1%*	*4.8%*	
Controllers	$1,528.1	$1,679.2	$1,988.1	$2,313.9	$1,495.4	$1,571.1	$3,066.4	$3,141.5	$3,301.5	12.6%
YoY Chg (%)	*8.0%*	*9.9%*	*18.4%*	*16.4%*	*46.0%*	*21.8%*	*32.5%*	*2.4%*	*5.1%*	
Total Wireless LAN Equipment	**$6,699.2**	**$6,904.1**	**$8,397.6**	**$11,030.8**	**$6,828.2**	**$6,428.2**	**$13,256.4**	**$12,808.7**	**$13,435.9**	**6.8%**
YoY Chg (%)	*2.3%*	*3.1%*	*21.6%*	*31.4%*	*49.7%*	*-0.6%*	*20.2%*	*-3.4%*	*4.9%*	
Next Generation Firewall (NGFW)	$6,126.7	$6,356.7	$7,109.9	$7,792.0	$4,417.4	$4,409.6	$8,827.0	$9,047.6	$9,336.9	6.2%
YoY Chg (%)	*8.8%*	*3.8%*	*11.8%*	*9.6%*	*19.5%*	*7.7%*	*13.3%*	*2.5%*	*3.2%*	
Unified Threat Management (UTM)	$1,838.3	$1,750.0	$1,824.1	$1,815.2	$1,000.3	$1,166.0	$2,166.4	$2,195.9	$2,241.0	7.3%
YoY Chg (%)	*14.8%*	*-4.8%*	*4.2%*	*-0.5%*	*6.4%*	*33.2%*	*19.3%*	*1.4%*	*2.1%*	
Traditional Firewall	$493.2	$452.2	$419.7	$403.5	$221.2	$179.8	$401.0	$374.0	$348.3	-4.8%
YoY Chg (%)	*3.9%*	*-8.3%*	*-7.2%*	*-3.9%*	*2.2%*	*-3.9%*	*-0.6%*	*-6.7%*	*-6.9%*	
Total Firewall	**$8,458.1**	**$8,558.9**	**$9,353.7**	**$10,010.7**	**$5,638.9**	**$5,755.4**	**$11,394.3**	**$11,617.5**	**$11,926.3**	**6.0%**
YoY Chg (%)	*9.7%*	*1.2%*	*9.3%*	*7.0%*	*16.2%*	*11.6%*	*13.8%*	*2.0%*	*2.7%*	
SD-WAN Equipment	**$2,518.9**	**$2,977.6**	**$3,724.2**	**$4,656.1**	**$2,590.8**	**$2,558.3**	**$5,149.1**	**$5,913.8**	**$6,565.5**	**12.1%**
YoY Chg (%)	*79.6%*	*18.2%*	*25.1%*	*25.0%*	*24.1%*	*-0.4%*	*10.6%*	*14.9%*	*11.0%*	

Source: Omdia, IDC, BofA Global Research estimates

BofA GLOBAL RESEARCH

Juniper's market position

We build a bottom-up product revenue model and include a three-year forecast, using market growth projections and Juniper market share assumptions, to decipher the potential near-term financial impact to HPE. Our model calls for Juniper's product revenue to grow -5% and +5% YoY in 2024 and 2025, respectively, vs. BofA expectations for HPE's total revenue growth at 3.5% and 2.5% YoY over the next two years. We attribute Juniper's weak 2024 growth to weak spending initiatives across service providers and cloud providers, tough comps and reversion of the backlog drawdown benefit seen in 2023. We expect Juniper's growth will return to its historical low-to-mid single digits growth in 2025 and onwards, following the period of absorption by cloud providers and SPs.

Our model uses market data for the various sub-segments, which we compare to Juniper's reported product revenue. Some of the market segments carry some overlap with other segments, and our bottom-up model therefore results in a small over-estimation in some years. For example, SD-WAN market estimates includes the revenue of some routers and firewalls that are deployed as a component of SD-WAN, therefore ending up with some double-counting. Separately, our product revenue build does not include various segments such as multi-cloud networking software, network access control, and other segments that carry a relatively small contribution to Juniper's business. These modeling issues have no material impact on our conclusions though.

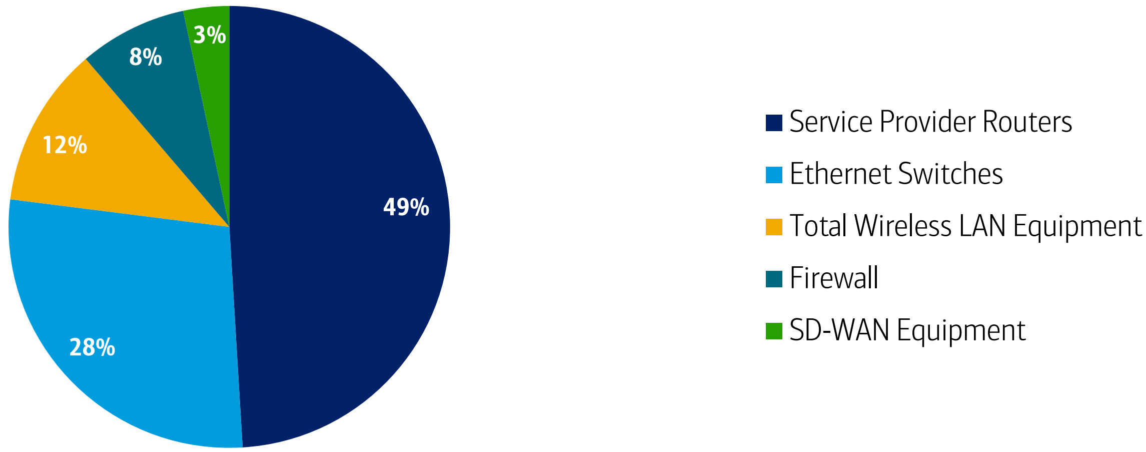
Exhibit 2: Bottom-Up Juniper Product Revenue Build and Forecast

Our bottom-up model calls for Juniper's product revenue to grow -5% YoY in 2024 and +5% in 2025

Calendar Year (in $mn)	2019	2020	2021	2022	1H23	2H23E	2023E	2024E	2025E	2022-2025 CAGR
Edge Routers	$1,037.1	$1,027.0	$1,059.0	$1,325.5	$681.2	$672.2	$1,353.4	$1,288.4	$1,342.5	0.4%
YoY Chg (%)	-3.9%	-1.0%	3.1%	25.2%	21.3%	-12.0%	2.1%	-4.8%	4.2%	
% of Product Revenue	37.3%	36.8%	33.9%	35.8%	35.2%	35.6%	35.4%	35.3%	35.2%	
Market Share (%)	11.2%	11.4%	11.1%	13.5%	13.2%	13.5%	13.3%	13.3%	13.3%	
Core Routers	$586.1	$585.2	$591.9	$539.8	$268.0	$247.5	$515.4	$469.6	$487.9	-3.3%
YoY Chg (%)	-22.9%	-0.2%	1.2%	-8.8%	-8.3%	0.0%	-4.5%	-8.9%	3.9%	
% of Product Revenue	21.1%	21.0%	19.0%	14.6%	13.8%	13.1%	13.5%	12.9%	12.8%	
Market Share (%)	17.3%	18.9%	17.6%	16.4%	13.2%	13.0%	13.1%	13.1%	13.1%	
Total Service Provider Routers	**$1,623.2**	**$1,612.1**	**$1,650.9**	**$1,865.2**	**$949.1**	**$919.7**	**$1,868.8**	**$1,758.0**	**$1,830.4**	**-0.6%**
YoY Chg (%)	-11.8%	-0.7%	2.4%	13.0%	11.2%	-9.1%	0.2%	-5.9%	4.1%	
% of Product Revenue	58.3%	57.8%	52.9%	50.3%	49.0%	48.7%	48.9%	48.2%	47.9%	
Market Share (%)	12.8%	13.3%	12.8%	14.2%	13.2%	13.4%	13.3%	13.3%	13.3%	
Campus Switches	$378.4	$409.6	$438.8	$531.8	$259.3	$282.0	$541.3	$475.4	$484.6	-3.1%
YoY Chg (%)	-8.9%	8.2%	7.1%	21.2%	7.7%	-3.1%	1.8%	-12.2%	1.9%	
% of Product Revenue	13.6%	14.7%	14.1%	14.4%	13.4%	14.9%	14.2%	13.0%	12.7%	
Market Share (%)	2.4%	2.8%	2.7%	2.6%	2.0%	2.0%	2.0%	2.0%	2.0%	
Data Center Switches	$490.2	$438.1	$509.6	$638.4	$281.7	$282.5	$564.2	$558.9	$604.5	-1.8%
YoY Chg (%)	-5.5%	-10.6%	16.3%	25.3%	2.0%	-22.0%	-11.6%	-0.9%	8.2%	
% of Product Revenue	17.6%	15.7%	16.3%	17.2%	14.6%	15.0%	14.8%	15.3%	15.8%	
Market Share (%)	4.1%	3.7%	4.0%	3.8%	2.8%	2.8%	2.8%	2.8%	2.8%	
Total Ethernet Switches	**$868.6**	**$847.6**	**$948.4**	**$1,170.2**	**$541.0**	**$571.8**	**$1,112.8**	**$1,034.3**	**$1,089.1**	**-2.4%**
YoY Chg (%)	-7.0%	-2.4%	11.9%	23.4%	4.7%	-12.5%	-4.9%	-7.1%	5.3%	
% of Product Revenue	31.2%	30.4%	30.4%	31.6%	28.0%	30.3%	29.1%	28.4%	28.5%	
Market Share (%)	3.1%	3.2%	3.3%	3.1%	2.3%	2.3%	2.3%	2.4%	2.4%	
Access Points	$0.0	$71.3	$150.4	$240.5	$181.1	$136.0	$317.1	$300.8	$315.3	9.5%
YoY Chg (%)	nmf	nmf	110.9%	59.9%	79.3%	-2.5%	31.9%	-5.1%	4.8%	
% of Product Revenue	0.0%	2.6%	4.8%	6.5%	9.4%	7.2%	8.3%	8.2%	8.3%	
Market Share (%)	0.0%	1.4%	2.3%	2.8%	3.4%	2.8%	3.1%	3.1%	3.1%	
Controllers	$0.0	$0.0	$30.1	$53.1	$46.2	$47.2	$93.4	$95.7	$100.6	23.8%
YoY Chg (%)	nmf	nmf	nmf	76.4%	124.1%	45.6%	76.1%	2.4%	5.1%	
% of Product Revenue	0.0%	0.0%	1.0%	1.4%	2.4%	2.5%	2.4%	2.6%	2.6%	
Market Share (%)	0.0%	1.0%	2.1%	2.7%	3.3%	3.0%	3.0%	3.0%	3.0%	
Total Wireless LAN Equipment	**$0.0**	**$71.3**	**$180.5**	**$293.5**	**$227.3**	**$183.2**	**$410.5**	**$396.5**	**$415.9**	**12.3%**
YoY Chg (%)	nmf	nmf	153.0%	62.6%	86.9%	6.6%	39.9%	-3.4%	4.9%	
% of Product Revenue	0.0%	2.6%	5.8%	7.9%	11.7%	9.7%	10.7%	10.9%	10.9%	
Market Share (%)	0.0%	1.0%	2.1%	2.7%	3.3%	2.9%	3.1%	3.1%	3.1%	
Next Generation Firewall (NGFW)	$234.6	$204.8	$235.1	$241.2	$136.9	$135.9	$272.8	$279.6	$288.6	6.2%
YoY Chg (%)	-2.8%	-12.7%	14.8%	2.6%	11.0%	15.3%	13.1%	2.5%	3.2%	
% of Product Revenue	8.4%	7.3%	7.5%	6.5%	7.1%	7.2%	7.1%	7.7%	7.6%	
Market Share (%)	3.8%	3.2%	3.3%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	
Unified Threat Management (UTM)	$20.5	$16.1	$17.8	$18.3	$10.4	$9.9	$20.3	$20.6	$21.0	4.7%
YoY Chg (%)	-6.7%	-21.3%	10.8%	2.6%	11.0%	10.5%	10.8%	1.4%	2.1%	
% of Product Revenue	0.7%	0.6%	0.6%	0.5%	0.5%	0.5%	0.5%	0.6%	0.5%	
Market Share (%)	1.1%	0.9%	1.0%	1.0%	1.0%	0.8%	0.9%	0.9%	0.9%	
Traditional Firewall	$10.5	$9.2	$10.0	$10.2	$5.8	$4.5	$10.3	$9.6	$9.0	-4.4%
YoY Chg (%)	-4.0%	-12.6%	8.6%	2.6%	11.0%	-10.3%	0.6%	-6.7%	-6.9%	
% of Product Revenue	0.4%	0.3%	0.3%	0.3%	0.3%	0.2%	0.3%	0.3%	0.2%	
Market Share (%)	2.1%	2.0%	2.4%	2.5%	2.6%	2.5%	2.6%	2.6%	2.6%	
Total Firewall	**$265.6**	**$230.1**	**$262.9**	**$269.7**	**$153.1**	**$150.3**	**$303.4**	**$309.8**	**$318.5**	**5.7%**
YoY Chg (%)	-3.1%	-13.4%	14.3%	2.6%	11.0%	14.0%	12.5%	2.1%	2.8%	
% of Product Revenue	9.5%	8.2%	8.4%	7.3%	7.9%	8.0%	7.9%	8.5%	8.3%	
Market Share (%)	3.1%	2.7%	2.8%	2.7%	2.7%	2.6%	2.7%	2.7%	2.7%	
SD-WAN Equipment	**$25.2**	**$29.6**	**$79.2**	**$107.1**	**$64.9**	**$64.1**	**$129.0**	**$148.1**	**$164.5**	**15.4%**
YoY Chg (%)	nmf	17.5%	167.6%	35.2%	43.0%	3.9%	20.4%	14.9%	11.0%	
% of Product Revenue	0.9%	1.1%	2.5%	2.9%	3.4%	3.4%	3.4%	4.1%	4.3%	
Market Share (%)	1.0%	1.0%	2.1%	2.3%	2.5%	2.5%	2.5%	2.5%	2.5%	
Other/Adjustments	**$85.1**	**$54.3**	**-$43.8**	**-$165.9**	**-$59.6**	**-$76.6**	**-$136.2**	**-$147.6**	**-$141.2**	
Product Revenue	**$2,867.7**	**$2,845.0**	**$3,078.1**	**$3,539.9**	**$1,875.8**	**$1,812.5**	**$3,688.3**	**$3,499.2**	**$3,677.2**	**1.3%**
YoY Chg (%)	-7.7%	-0.8%	8.2%	15.0%	18.4%	-7.3%	4.2%	-5.1%	5.1%	
% of Total Revenue	64.5%	64.0%	65.0%	66.8%	66.9%	64.6%	65.8%	63.6%	63.9%	

Source: Omdia, IDC, BofA Global Research estimates

Exhibit 3: Juniper Product Revenue Breakdown, 1H23
Service provider routers accounted for nearly 50% of Juniper's product revenue in 1H23



Source: Omdia, IDC

BofA GLOBAL RESEARCH

Risks to the acquisition

We flag that risks of the HPE-Juniper acquisition include the overlap between HPE's and Juniper's switching, wireless, and SD-WAN functionalities. The integration work is one of the greatest risks, as HPE Aruba and Juniper Mist are direct competitors and integration may not be cohesive. It is evident that HPE's intention for the acquisition is to provide a more comprehensive suite of networking solutions, as well as bolster its AI-driven management capabilities with Mist, as well as target AI cloud and data center infrastructure buildouts. We flag the integration risks and the growing competition with other cloud-based networking tool vendors, like Cisco Meraki, who may react more aggressively.

Additionally, Juniper's large exposure to Service Providers could be a challenge to HPE. The sales motion between both companies is different as ~95% of HPE's business goes through channels, while Juniper sells directly to its SP customers. The SP routing market is highly concentrated by 4 main players including Huawei, Cisco, Nokia, and Juniper, and this will require HPE to maintain a strong focus on the SP segment, including aligning the people, culture, and existing ecosystems to maintain the high-end focus of Juniper's relevant R&D and engineering. For example, a sizable portion of R&D spend is driven by the need to invest resources into proprietary routing silicon and chipsets, whereas HPE primarily relies on merchant silicon for its networking portfolio.

While the acquisition could trigger a potential regulatory review in China, we believe regulatory concerns are minimal given low sales exposure to the region. We estimate Juniper's China-derived switching and routing revenue at roughly $36mn in 1H23, translating to only 2% of product revenue and 1% of total revenue. Similarly, HPE's China exposure is expected to be negligible, at less than $150mn in 2024, following the divestiture of its H3C joint venture in 1H24.

Service Provider Routing

The service provider (SP) routing market was approximately $7.2bn in 1H23, increasing 14.3 % YoY vs. 1.6% in 2022, supported by better supply chain, capacity additions by service providers and hyperscalers, and the support for SP's modernization of Internet Protocol (IP) backhaul networks. From 2010 to 2020, the market was generally flat to down, suffering from a few distinct pressure sources. On the Core routing front (about 25% of the market), rapid innovation and intense competition brought pricing down, faster than traffic growth, causing prolonged pressure on the market. On the Edge routing front, the market lacked new and unique applications to drive a deployment cycle, and new technologies replaced the need for expensive routers. Examples of such technologies include MPLS switches, SD-WAN, and others.

These trends had a long-lasting impact on the market, driving demand and pricing down for the past few years. For comparison, total routing revenue grew at a 1.0% CAGR from 2010-2020, with core routing growing at a 0.9% CAGR and edge routing growing at a 1.0% CAGR.

Routers make up the Internet backbone, with demand driven by 30% annual average growth in data traffic. The COVID-19 pandemic only added fuel to the fire with an additional unprecedented 30%-50% traffic growth reported by Telefonica, Orange, Vodafone, Verizon and others. The need for routing will only increase over time with new content generated by media companies, migration to 8K streaming, and the proliferation of video chat/conferencing.

Routers are high-end expensive machines. For years, the high-end nature was fueled by the SPs' desire to consolidate all types of services into a single platform for enterprise, wireless, and broadband traffic. Routers had to deliver a long list of business services such as VPN, Aggregation, Peering, and more. However, three factors have pressured the market in the last few years, driving what we think is a long-term secular decline of the routing market. First, the rate of innovation of routers is exceeding the growth in demand, pressuring port pricing by about 20%-25% per year. In simple terms, router capacity and port sizes are increasing much faster than demand is growing, resulting in a rapid decline in port cost per bit. Second, customers are looking to replace expensive services that are enabled by routers, such as MPLS, with cheaper alternative solutions. For example, SD-WAN connects branch offices via a cheap $100 per month broadband connection, while a dedicated MPLS line offered through a router would cost ~$1,700 per month. These costs are hypothetical to provide an illustration of the cost savings. Lastly, there is a new type of customer – the hyperscaler customer – which introduced a different set of needs and different network architectures. Cloud customers do not have a need for wireless or business services support, and instead need simple routers that only support basic connectivity functions at large scale.

We believe SPs continue to be cautious about router spend as they migrate to new deployment models including virtualization, disaggregated platforms, and SDN control and orchestration. On one hand, we expect a slight boost in router spending in 2024 and onwards, driven by next-generation 400G-optimized routing platforms. On the other hand, we expect Wireless capex to decline 9% in 2023 and another 10% in 2024, partially related to end of spectrum spending. This is a key indicator of progression within the broadband life-cycle.

As a result, we anticipate investment in routing infrastructure will remain subdued, with the routing market growing at a 1.7% CAGR between 2022 and 2025. We expect SPs to wait for new solutions to mature and differentiated architectural approaches to be proven. However, we note several drivers promoting growth, including 400G-optimized routers in the core router segment. In addition, we expect 5G network deployments to grow, facilitating a need for transport infrastructure investment.

Over the course of the introduction of higher port speeds (i.e., 400G vs. 100G), average revenue per port will decline over time as the technology moves to mass production and then benefits from more cost-efficient designs. 400G started at a relatively high price point but will drive down overall cost at a network level as the need for separate optical transponders can be eliminated.

In the core routing segment, 400G speeds will drive up the average price per port over the next few years before declining. In the edge routing market, there is a larger percentage of lower speed ports being driven by a higher percentage of applications farther out in the network, such as mobile backhaul and broadband aggregation. Although speeds are increasing, the major trend in edge routing is from 1G to 10G (both relatively mature markets). In addition, the shift to software licensing is also exerting downward pressure lowering average revenue per port in edge routing.

Routing continues to be a fundamental aspect of networking infrastructure, and the market is in a period of transformation towards new technologies driving network efficiency and flexibility while reducing costs. Router application mix is shifting from complex and high-priced edge routers to simpler data center edge routing implementations where much of the intelligence is located in the cloud. In addition, disaggregation, virtualization and network consolidation are all affecting routing investments. Despite these new technologies, investment decisions are mainly based around the most cost-efficient solutions that fulfill requirements necessary at the time.

As 5G buildouts and migration to cloud continues, SPs will need to add long-term network capacity to address bandwidth growth – both in wireline and wireless. Buildout of the 5G transport backbone may be the most significant growth driver as SPs provision higher-bandwidth 5G radio networks and enable enhanced mobile broadband over their mobile networks. SPs will also need to invest to adapt their network architectures to the growing and flexible network capacity. This spending will include core router refresh and higher capacity for edge routers in dense metro networks, as migration to cloud for applications and services requires expanded metro capacity. In addition, SPs will need to continue to invest capex in their data centers to support DCI, cloud connect, and virtualized Wide Area Network (WAN) services.

Exhibit 4: Snapshot of the Service Provider Routing Market ($mn)

Juniper held 13.2% of the total service provider routing market in 1H23

	2019	2020	2021	2022	1H23
Edge Routers	**$9,288.0**	**$9,011.9**	**$9,540.9**	**$9,810.6**	**$5,163.6**
% of Total	*73.3%*	*74.4%*	*74.0%*	*74.8%*	*71.8%*
YoY Chg (%)	*1.7%*	*-3.0%*	*5.9%*	*2.8%*	*12.4%*
Market Share (%)					
Huawei	27.5%	32.0%	30.5%	28.7%	30.5%
Cisco	26.9%	22.8%	25.5%	24.4%	23.4%
Nokia	23.1%	24.1%	25.0%	24.5%	21.6%
Juniper	**11.2%**	**11.4%**	**11.1%**	**13.5%**	**13.2%**
ZTE	8.3%	6.5%	5.3%	4.4%	6.4%
Ciena	0.0%	0.0%	0.0%	1.6%	2.2%
Ericsson	0.7%	0.9%	0.7%	1.4%	1.3%
Alaxala	0.0%	0.0%	0.1%	0.4%	0.3%
Other Vendors	2.3%	2.2%	1.8%	1.1%	1.0%
Core Routers	**$3,384.6**	**$3,098.2**	**$3,357.7**	**$3,297.0**	**$2,027.7**
% of Total	*26.7%*	*25.6%*	*26.0%*	*25.2%*	*28.2%*
YoY Chg (%)	*-4.6%*	*-8.5%*	*8.4%*	*-1.8%*	*19.5%*
Market Share (%)					
Cisco	29.0%	29.5%	38.8%	43.6%	50.2%
Huawei	42.5%	42.4%	37.7%	33.8%	30.8%
Juniper	**17.3%**	**18.9%**	**17.6%**	**16.4%**	**13.2%**
ZTE	5.1%	4.4%	3.2%	3.1%	3.6%
Nokia	5.7%	4.3%	2.2%	2.7%	1.8%
Other Vendors	0.4%	0.4%	0.4%	0.4%	0.4%
Total Service Provider Routers	**$12,672.6**	**$12,110.1**	**$12,898.6**	**$13,107.7**	**$7,191.2**
YoY Chg (%)	*-0.1%*	*-4.4%*	*6.5%*	*1.6%*	*14.3%*

Exhibit 4: Snapshot of the Service Provider Routing Market ($mn)
Juniper held 13.2% of the total service provider routing market in 1H23

	2019	2020	2021	2022	1H23
Market Share (%)					
Cisco	27.4%	24.5%	29.0%	29.2%	31.0%
Huawei	31.5%	34.7%	32.4%	30.0%	30.6%
Nokia	18.5%	19.1%	19.1%	19.0%	16.0%
Juniper	**12.8%**	**13.3%**	**12.8%**	**14.2%**	**13.2%**
ZTE	7.5%	6.0%	4.8%	4.1%	5.6%
Ciena	0.0%	0.0%	0.0%	1.2%	1.6%
Ericsson	0.5%	0.6%	0.5%	1.1%	0.9%
Alaxala	0.0%	0.0%	0.1%	0.3%	0.2%
Other Vendors	1.8%	1.7%	1.4%	0.9%	0.9%

Source: Omdia

BofA GLOBAL RESEARCH

The Core routing market has generally underperformed the Edge routing market in the past several years, and we therefore challenge Omdia's expectations for better growth of the Core market from 2022 to 2025. Core routing is a capacity game, with very little add-on services on top, while Edge routing has a large service element, explaining the better trends in the past. We believe this trend will continue and expect little to no growth in the core and overall routing markets in the next few years. 2024/2025 might have some elevated cycles, given the investment in 5G and associated need for Access routers, as well as higher investment in hyperscaler networks, yet we believe the market will revert to its historical growth trends longer-term, competing with cheaper technologies, white box routers and other negative factors.

Lastly, strong market interest in SD-WAN will act as a negative impact on edge router revenue, pushing down on the control heavy software aspect of edge routers. For IP access and aggregation applications including backhaul, we see interest in white box routing. As a result of these factors, we expect the market to be relatively flat in the short term, with some of the new positives helping the market grow to low single digits per annum longer-term.

The four largest vendors (Huawei, Cisco, Nokia, and Juniper) hold approx. 90% of the global market today, which provides barriers of entry for the software-oriented new entrants. However, incumbent vendors are embracing the evolution of the market at varying levels of speed, working with their customer bases to help develop solutions to address emerging opportunities.

Cisco is the top vendor in 1H23 at 31% share, with Huawei at 30.6% and Nokia at 16%. Juniper has been losing share in routing over the years, lagging the other vendors after peaking at 26% share in 2005. Over the last few years, the company announced new products to address opportunities in the Access space (or 5G aggregation) and it offers a strong unified software platform that supports a highly-integrated routing portfolio, helping Juniper re-gain share from 12.8% in 2021 to 14.2% in 2022. The vendor has a strong handle on integrated offerings including switches, access points, routers, and more. However, pent-up backlog levels have begun to normalize, driving share back down to 13.2% in 1H23. We believe normalized backlog levels, as well as weak spending initiatives and absorption of previous orders across service providers could continue to drive share loss for Juniper in 2024. As such, we expect Juniper's routing revenue to decline at a -0.6% CAGR between 2022 to 2025.

Combination of HPE and Juniper brings both benefits and risks

HPE does not participate in the SP routing business, and we note the increased exposure to Service Providers will drive several challenges. Juniper sells directly to its SP customers, requiring HPE to re-direct its efforts into direct sales, as ~95% of its business currently goes through channels. Additionally, given that the SP routing market is dominated by four main players, HPE will have to align its culture towards a heightened focus on R&D and engineering, primarily investing resources into developing routing silicon and chipsets in-house. Lastly, given the general risk-averse nature of SPs, HPE will need to carefully handle the adoption and integration of Juniper's ecosystems or risk pushing SPs towards other vendors.

On the positive side, we note that HPE's portfolio in 5G Radio Access Network (RAN) and mobile core should benefit from Juniper's portfolio across core, edge and metro domains. The combination of Juniper's routing portfolio with HPE's servers could provide a more unified solution to SPs across Open RAN, 5G, virtualization, and cloud integration. Both vendors recently introduced RAN solutions and combining both initiatives could drive a compelling value proposition as Open RAN gains more momentum. Lastly, HPE's acquisition of Athonet in 2023 to leverage the opportunity in private 5G, should benefit from Juniper's network automation and visibility capabilities.

Enterprise Networking

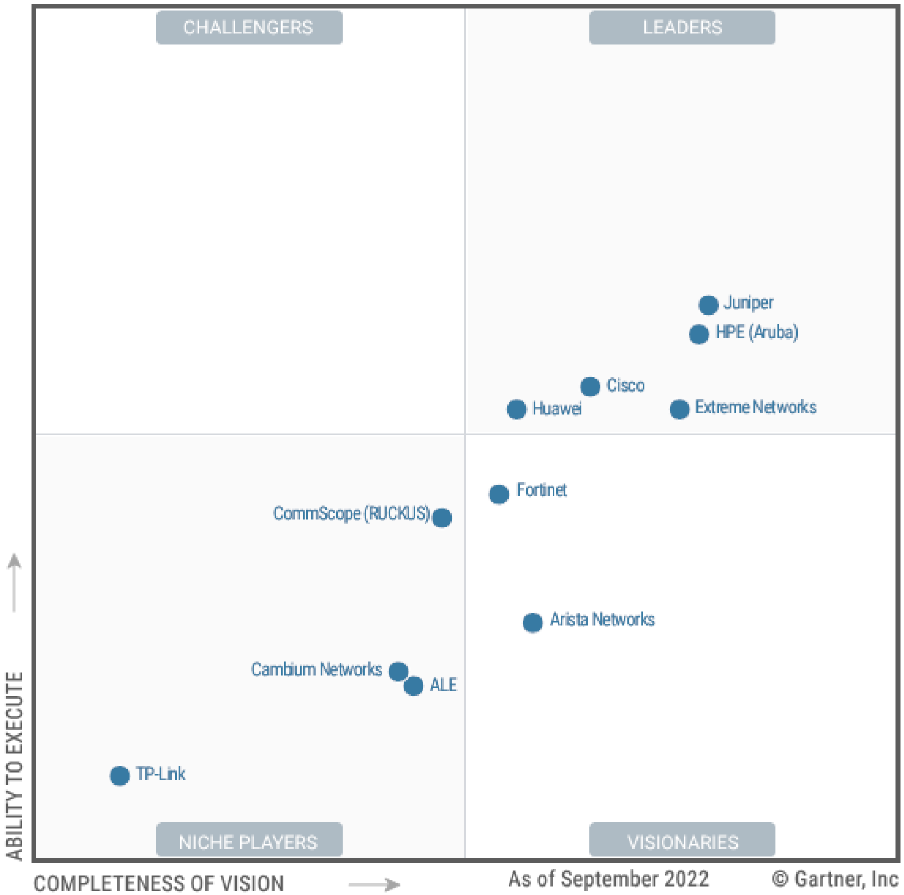
The enterprise network market is going through a period of growth, with ethernet switches and wireless LAN equipment expected to grow at an 7.1% and 6.8% CAGR from 2022 to 2025. According to Omdia's US WLAN Strategies survey, 84% of respondents noted they are planning a major LAN refresh by YE25.

Growth is supported by the need to deliver a unified solution across the enterprise networking stack (WLAN, LAN, WAN, etc.) to provide centralized management, security, and control, vs. previously siloed network functions. Networking vendors are focused on building out platform-based approaches. While Juniper has historically focused on service provider routers, the company has shifted its focus towards enterprise networks over the last few years and made several acquisitions in the space including Mist, Apstra, and 128 Technology amongst others. Juniper is well-known for its strength and engineering and has created a thoroughly integrated portfolio that is strongly resonating with enterprise customers. Similarly, HPE has also built an intelligent networking portfolio through its acquisition of Aruba and Silver Peak. We believe the acquisition of Juniper will expand out HPE's intelligent networking portfolio and provide a more comprehensive suite of IT, cloud, networking, and AI solutions.

Despite customer validation and perception, Juniper has remained only a small player in enterprise networks over the last few years, with 2.3% share in switching and 3.3% share in WLAN equipment in 1H23. Cisco dominates the switching and WLAN market with a respective 43.6% share and 38.5% share in each end-market, while HPE holds 6.2% share of the switching market and 14.3% of the WLAN equipment market.

HPE has stronger brand recognition in the enterprise and data center (ex-DC switching) than Juniper, as well as a strong channel presence outside North America. Juniper could benefit from a more geographically diverse customer base with HPE. Juniper's revenue ex-U.S. accounted for 45% of total revenue in 2022, while HPE's ex-U.S. revenue accounted for 66% of its total revenue.

Exhibit 5: Magic Quadrant for Enterprise Wired and Wireless LAN Infrastructure, 2022
Gartner labels Juniper and HPE as Leaders in this Magic Quadrant



Source: Gartner

BofA GLOBAL RESEARCH

We note that Juniper's limited market reception in enterprise networks is partially driven by its young history within some of these markets. Juniper is a more recent entrant into the wireless market after its 2019 acquisition of Mist, as well as entering the SD-WAN market following its acquisition of 128 Technology in 2020.

On the positive side, Gartner labels both Juniper and HPE as Leaders in its 2022 Magic Quadrant for Enterprise Wired and Wireless LAN Infrastructure. Both companies rank amongst the top three vendors in product scoring across various critical capabilities use cases. Juniper's strength resides in its Mist assurance, which provides highly rated and market-leading AI-driven automation as well as solid brand marketing. On the other hand, Juniper's weaknesses include a predominantly cloud-based offering, with its on-prem solutions comparatively lagging in functionality, as well as high pricing compared to other network vendors.

HPE's strength lies in its Edge Services Platform (ESP) that provides cloud-based campus management across its wired, wireless, an WAN portfolio. Additionally, HPE has previously noted that Network as a Service (NaaS) will be a core aspect of its go-to-market strategy and accordingly has one of the largest user bases using the NaaS consumption model. HPE's weaknesses include lack of feature parity between its cloud-based and on-premises offerings, as well as lagging competitors in large core switch deployments.

Exhibit 6: Product Score in Enterprise Wired and Wireless LAN Infrastructure Use Cases for Critical Capabilities

Across all five use cases for critical capabilities, Juniper and HPE rank amongst the top three vendors in product scoring

	Unified Wired and Wireless LAN	Hands-Off NetOps	Remote Branch Office	Wired-Only Refresh/New Build	WLAN-Only Refresh/New Build
ALE	3.65	3.60	3.67	3.69	3.67
Arista	3.68	3.63	3.66	3.72	3.66
Cambium	3.49	3.38	3.52	3.31	3.69
Cisco (Catalyst)	3.82	3.76	3.79	3.87	3.81
Cisco (Meraki)	3.67	3.66	3.69	3.64	3.72
CommScope (Ruckus)	3.75	3.70	3.73	3.74	3.77
Extreme	4.03	3.95	4.02	4.03	4.06
Fortinet	3.75	3.67	3.74	3.69	3.78
HPE (Aruba)	**4.12**	**4.13**	**4.12**	**4.05**	**4.19**
Huawei	4.02	4.00	4.03	4.06	4.04
Juniper	**4.14**	**4.17**	**4.11**	**4.10**	**4.19**
TP-Link	2.45	2.28	2.51	2.60	2.57

Source: Gartner

BofA GLOBAL RESEARCH

The combined entity of HPE and Juniper would give HPE an increase in market share in the market segments in which both overlap (i.e. switching, wireless, and SD-WAN). However, maintaining or even growing market share, especially against the incumbent Cisco, will require thoughtful integration between the overlapping portfolios. If merged properly, Juniper's Mist can benefit from HPE's global scale and go-to-market resources while HPE's Aruba can benefit from Mist's cloud-native, micro-services-based network management platform. Yet this will require Mist to expand outside of its current scope of enterprise switching, wireless, SD-WAN, and Network Access Control (NAC) into additional network domains such as data center, cloud, routing, and more.

Ethernet Switching

The switching market continues to see notable growth, with 1H23 revenue up 40.1% YoY vs. 2022's 28.7% growth. We saw continued in both campus and data center switching in 1H23, up about 52.7% and 26.4% YoY, respectively, supported by improved supply chain and significant data center investments from hyperscalers.

We highlight two key demand drivers for switches. At a high level, the number of devices on a network, including mobile, PCs, IoT (Internet of Things) and more, will continue to increase, requiring organizations to increase number of ports and bandwidth. While much of the device growth will come from wireless devices, there will still be a need for wired networks to support mobility. Demand for data center switches remains a function of traffic growth, as consumption of web-based services increases, and traffic is migrating to the cloud.

Campus switching is driven by different factors – in general, traffic growth is less of a driver, as single devices hardly utilize the available bandwidth available by the switch port. Instead, campus switching growth is driven by other factors, including the increase in number of connected devices and the requirement to better manage and better secure the switches. The new generation of campus switches enable enterprises to manage these switches from the Cloud and offer better centralized manageability, control, and security. They also carry a different business model for the vendor, where the price of the hardware and software pieces get aggregated, and the software/services carries a recurring revenue model.

However, we expect growth for the switching market to decline in 2024, with spending moderation across all major verticals. Omdia is projecting the switching market growth to decelerate to -7.4% YoY growth in 2024, and we believe that the market growth rates will normalize to the long-term rate of ~2%-5% in 2025 and beyond.

Cisco leads the switching market, with approximately 200,000 enterprise customers, but its market share declined to 43.6% in 1H23 after peaking at roughly 70% in 2010. Juniper accounted for 2.3% of 1H23 switching revenue share, up 4.7% YoY vs. 23.4% growth in 2022. Juniper has seen increased traction in its switching business over the last few years, supported by its acquisitions of Mist and Apstra, which are providing pullthrough opportunities for switches. HPE held 6.2% share of the total switching market in 1H23, with weak data center switching presence (1.5% share) offsetting its second-place position in the campus switching market.

Exhibit 7: Snapshot of the Ethernet Switching Market ($mn)
Juniper held 2.3% of the total ethernet switching market in 1H23, while HPE held 6.2% share

	2019	2020	2021	2022	1H23
Campus Switches	**$15,752.2**	**$14,662.3**	**$16,360.8**	**$20,663.6**	**$13,127.8**
% of Total	*56.8%*	*55.1%*	*56.2%*	*55.2%*	*56.8%*
YoY Chg (%)	*1.9%*	*-6.9%*	*11.6%*	*26.3%*	*52.7%*
Market Share (%)					
Cisco	55.6%	51.6%	48.9%	49.1%	53.4%
HPE	**8.7%**	**9.8%**	**10.0%**	**8.8%**	**9.7%**
Huawei	8.5%	10.4%	9.9%	10.4%	8.1%
H3C	6.5%	6.5%	8.8%	7.4%	4.2%
Extreme	3.6%	3.1%	1.4%	2.8%	2.8%
Ruijie	0.0%	0.0%	0.0%	0.0%	2.1%
Juniper	**2.4%**	**2.8%**	**2.7%**	**2.6%**	**2.0%**
Arista	0.1%	0.4%	0.9%	2.6%	1.6%
Ubiquiti	1.1%	1.7%	0.9%	1.6%	1.3%
Other Vendors	13.6%	13.8%	16.4%	14.6%	14.8%
Data Center Switches	**$12,002.2**	**$11,953.1**	**$12,745.5**	**$16,797.1**	**$10,000.2**
% of Total	*43.2%*	*44.9%*	*43.8%*	*44.8%*	*43.2%*
YoY Chg (%)	*2.9%*	*-0.4%*	*6.6%*	*31.8%*	*26.4%*
Market Share (%)					
Cisco	41.0%	40.1%	38.8%	31.3%	30.7%
Arista	16.8%	14.8%	17.6%	19.7%	20.8%
White Box Vendors	6.5%	9.2%	9.7%	15.9%	18.1%
Huawei	11.3%	12.6%	12.1%	9.9%	6.7%
H3C	5.3%	6.3%	6.1%	6.1%	5.1%
Dell	3.4%	3.3%	3.1%	3.0%	2.9%
Juniper	**4.1%**	**3.7%**	**4.0%**	**3.8%**	**2.8%**
HPE	**1.8%**	**1.6%**	**1.4%**	**0.9%**	**1.5%**
NVIDIA	0.0%	0.0%	0.0%	0.0%	1.1%
Other Vendors	9.7%	8.5%	7.3%	9.4%	10.2%
Total Ethernet Switches	**$27,754.4**	**$26,615.3**	**$29,106.3**	**$37,460.7**	**$23,128.0**
YoY Chg (%)	*2.4%*	*-4.1%*	*9.4%*	*28.7%*	*40.1%*
Market Share (%)					
Cisco	49.3%	46.5%	44.5%	41.1%	43.6%
Arista	7.3%	6.9%	8.2%	10.2%	9.9%
White Box Vendors	2.8%	4.1%	4.2%	7.1%	7.8%
Huawei	9.7%	11.4%	10.9%	10.2%	7.5%
HPE	**5.7%**	**6.1%**	**6.3%**	**5.3%**	**6.2%**
H3C	6.0%	6.4%	7.6%	6.9%	4.6%
Juniper	**3.1%**	**3.2%**	**3.3%**	**3.1%**	**2.3%**
Dell	2.0%	2.0%	1.8%	1.7%	1.6%
Extreme	2.0%	1.7%	0.8%	1.6%	1.6%
Other Vendors	12.0%	11.8%	12.5%	12.8%	15.0%

Source: Omdia

BofA GLOBAL RESEARCH

Campus Switching

Campus switching is generally not a growth market, given it is less driven by bandwidth growth, but rather by employee count and technology refresh. However, the market goes through cycles every few years, mostly related to product cycles, new technology or external events, such as the migration to hybrid work environments and the desire of enterprises to add cloud-based security and manageability features.

The resumption of network upgrade projects after a few years of COVID-related delays and easing of the supply chain has helped to temporarily uplift growth rates, with the market growing 52.7% and 26.3% YoY in 1H23 and 2022, following 11.6%, -6.9%, and 1.9% growth in 2021, 2020 and 2019, respectively. We expect campus switching market growth to decline -12.2% in 2024, as depleted backlog levels provide limited support, and revert to 1%-3% growth p.a. longer-term.

HPE holds the second-highest share in campus switching, at 9.7% in 1H23, yet trails behind Cisco's dominant 53.4% share. HPE's campus switching revenue grew 46.7% YoY in 1H23, driven by its comprehensive portfolio of CX switches, its ArubaOS-CX operating system supporting unified infrastructure offerings, and backlog drawdown. HPE announced GreenLake in 2019 as a NaaS consumption-based model that includes both hardware and software, which HPE will have an opportunity to integrate Mist into.

Juniper has maintained relatively steady market share at roughly 2.5% over the last few years, yet the company's share fell 60bps from 2022 to 1H23, partially a reflection of the environment post-backlog fulfillment. While Juniper had a weak presence in the enterprise segment a few years ago, it started focusing on go-to-market transformations by homing in on partner-led processes and focusing on the success of its acquisition of Mist. Juniper's AI-Driven Enterprise segment includes EX series switches, including Mistified EX switches. In campus switching, Juniper focuses mostly on high-end enterprises, whereas HPE typically plays in the commercial and mid-market segments.

Mist growing as a proportion of revenue, yet mostly for wireless

Mist Systems, acquired by Juniper in April 2019, was built from the ground-up to be cloud-native, AI-driven, and session-smart to provide a strong focus on end user experience. Whereas other peer solutions, such as Cisco Meraki and HPE Aruba, are focused on the visibility of the network, Mist is focused on the critical part of visibility of experience of the end user; benefits that are being extended to the Wired Network, SD-WAN and Security portfolios. Juniper also acquired WiteSand in 4Q21 to Mistify NAC technology, which is becoming more prevalent to customers. Mistified orders are greater than $1bn and Mistified revenue was roughly $360mn in 1H23 and $500mn in 2022, translating to 19% and 14% of product revenue, accordingly. However, ex-wireless, Mistified revenue (i.e., Mistified switches and SD-WAN) only grew from ~6% of product revenue in 2022 to 7% in 1H23.

Data Center Switching

The data center switching market grew a solid 26.4% and 31.8% YoY in 1H23 and 2022, respectively, above 2021's 6.6%, mostly attributed to hyperscalers investing in data center capacity. This is also an acceleration from the 2020 and 2019 growth levels of -0.4% and 2.9% YoY.

However, like campus switching, we flag the risk of reversion to the mean. The market grew at a 1.3% CAGR between 2017 and 2020, while accelerating to 31.8% and 26.4% YoY growth in 2020 and 1H23, respectively, yet we could see the growth reverting to low-single digit levels in 2024 and onwards.

Gartner estimates that in 2022, hyperscalers accounted for as much as 40% of total switches sold. The enterprise adoption of public cloud and web services is driving the need for hyperscalers to address growing customer demand and latency requirements. 400G port shipments grew 488% in 2022 as Cloud providers upgraded their super spine and core networks.

In the enterprise segment, larger enterprises continue to refresh, deploying 25G leaf switches and 100G spine switches. Smaller organizations are actively preferring public cloud and SaaS for applications, reducing their switching spend and altering the vendors' product focus towards large-scale customer deployments. The economies of scale that hyperscalers provide mean that higher-bandwidths will also be available earlier in the product cycle to other buyers. We note that for most enterprise requirements, there is not much differentiation between vendor offerings at the hardware or NOS (network operating system) level. Thus, the differences between vendors lies within the fabric controllers, which handle management, visibility, and automation/orchestration of the switches.

On the difference between vendors, we broadly divide the market into three different types of strategies: Cisco's portfolio is focused on convenience, offering deep integration of various solutions that integrate with switching. On the other hand, Arista focuses on speed and port throughput, offering breath of switches to address high bandwidth requirements. Juniper is leaning on service delivery and reliability, using its Mist and Apstra acquisitions.

Data center switching accounted for 14.6% of Juniper's 1H23 product revenue. However, the data center switching market share data demonstrates recent share loss for Juniper, down from a stable 4% share over the last few years to 2.8% in 1H23, mainly due to depleted backlog levels and growing demand of hyperscalers, where Juniper is lagging. In the data center space, HPE has predominantly focused on the compute side. HPE stands to benefit from Juniper's data center switching business, which is greater than 4x the size of HPE's, with revenue of $638.4mn in 2022 vs. HPE's $157mn.

We also provide a snapshot of the 400G data center switch market, a segment that represented 19% of total data center switching revenue in 1H23 vs. only 1% in 2020. Gartner estimates that over 90% of the demand for 400G comes from hyperscalers and, to an extent, Tier-2 and Tier-3 cloud providers.

Juniper has a weak position with hyperscalers for data center switching, with 0% share in hyperscaler 400G and a respective 3.7% share in hyperscaler 100G switching, while HPE has 0% share in overall hyperscaler data center switching. These are way below that of Arista and White Box vendors, at an approx. 40% share of the hyperscaler DC switching market each. White box vendor share data mostly represents purchases from Amazon and Google, while Microsoft and Meta demand is captured through a few proprietary vendors, mainly Arista. At Microsoft, we see some share of HPE in lower-end leaf switching levels, together with a few other vendors, yet Arista holds a commanding share, controlling the Spine layer.

Cloud providers will continue to be dominant players in the market as they are typically early adopters of new technology. With enterprises migrating to the cloud, budgets for on-prem data centers are slowing. Per Omdia, Cloud providers will account for 41.2% of total DC switching revenue in 2025 (vs. 24.2% in 2022), while SPs will account for 20.7% down from 21.8%, and Enterprises will decline to 38.1% (vs. 54% in 2022).

Apstra and Cloud-Ready Data Center

Juniper has three different layers that envelopes its data center portfolio: 1) a foundational switching layer, incorporated through its QFX series switches, 2) top-down operations and automation provided by its Apstra acquisition, 3) and the ability to add on services for unique environments, such as Kubernetes, gained through the historical acquisition of Contrail. QFX is Juniper's family of data center switching products and accounts for approximately 75% of Cloud-Ready Data Center revenue, with about 90% of these products based on merchant silicon (Broadcom). The solutions come in two fabric variants, IT fabric and EVPN-based fabric.

Apstra translates intent into an underlying configuration required for the network. In simple terms, Apstra compares a model of a fully-functioning network and a model of the actual network as-is, to detect if the actual network is running as intended, and makes changes accordingly, getting speed and efficiency as byproducts. Furthermore, Apstra can run in multi-vendor deployments across its own and competitors' switches, which enables Juniper to sell into other environments first, led by Apstra, then upselling its own switches. The end benefit to the customer is the ability to diversify suppliers, together with uniform operations across a diverse underlying infrastructure.

Apstra's primary target market is large Enterprises, some SPs where data centers approximate an Enterprise's DC, and some Cloud Providers. The solution provides the most value in large environments, particularly with multi-vendor deployments, with success depending on the importance of automation in the Enterprises' agenda. The solution helps with new account wins as well as use case expansion for existing customers. It helps the company to increase its channel presence, providing stronger leverage to the solution's uniqueness.

Despite the solid momentum on Apstra with new logo growth of 80% in 3Q23, growth of the Cloud-Ready Data Center segment has been weak, down -15.3% YoY in 2023. We attribute the weakness to mean reversion following Juniper's strong order growth in 2022. Accordingly, while Juniper's data center switching share has remained around the 4% mark over the last few years, Juniper's 1H23 share stood at a lowered 2.8% share, driven by depleted backlog levels, in our view.

Opportunity in AI/generative AI networks

In our view, HPE aims to integrate Juniper's investments in AI and automation to leverage the forthcoming ethernet switching opportunity in generative AI and general AI/ML workloads. Spending on generative AI data center switching currently represents roughly 3% of the total data center switch market, per IDC. However, IDC forecasts that generative AI data center switch spend will account for ~12% of the data center switch market by 2025 and 25% by 2027.

Exhibit 8: Snapshot of the Generative AI Data Center Switching Market ($mn)

The generative AI data center switch market is expected to grow at a 100.8% CAGR from 2022 to 2027

	2022	2023E	2024E	2025E	2026E	2027E	2022-2027 CAGR
Hyperscale cloud provider	**$147.6**	**$516.7**	**$1,031.4**	**$1,848.3**	**$2,872.7**	**$3,798.9**	**91.5%**
% of Total	*84.9%*	*82.0%*	*78.0%*	*74.1%*	*70.4%*	*66.9%*	
YoY Chg (%)	*nmf*	*250.1%*	*99.6%*	*79.2%*	*55.4%*	*32.2%*	
Enterprise	**$8.8**	**$41.9**	**$127.2**	**$314.1**	**$618.7**	**$1,005.8**	**158.0%**
% of Total	*5.1%*	*6.6%*	*9.6%*	*12.6%*	*15.2%*	*17.7%*	
YoY Chg (%)	*nmf*	*376.1%*	*203.6%*	*146.9%*	*97.0%*	*62.6%*	
Tier-2 cloud provider	**$17.5**	**$71.7**	**$164.1**	**$331.2**	**$586.3**	**$874.7**	**118.7%**
% of Total	*10.1%*	*11.4%*	*12.4%*	*13.3%*	*14.4%*	*15.4%*	
YoY Chg (%)	*nmf*	*309.7%*	*128.9%*	*101.8%*	*77.0%*	*49.2%*	
Total Generative AI Data Center Switches	**$173.9**	**$630.3**	**$1,322.7**	**$2,493.6**	**$4,077.7**	**$5,679.4**	**100.8%**
% of Total Data Center Switches	*1.0%*	*3.1%*	*6.6%*	*11.5%*	*18.6%*	*25.3%*	
YoY Chg (%)	*nmf*	*262.4%*	*109.9%*	*88.5%*	*63.5%*	*39.3%*	

Source: IDC, Omdia, BofA Global Research estimates

BofA GLOBAL RESEARCH

The generative AI data center switch market is expected to see explosive growth over the next several years, growing at a 100.8% CAGR from 2022 to 2027, per IDC. Cloud providers are a significant portion of the market opportunity, with hyperscalers accounting for 82% of the market in 2023, yet Enterprises are expected to steadily grow from 6.6% of the market in 2023 to 17.7% in 2027.

While InfiniBand currently remains the leading standard for connecting AI GPU clusters, we believe AI/ML networks will migrate towards enhanced flavors of Ethernet, which would carry several advantages over InfiniBand, such as scalability, resilience, and interoperability. For example, Ethernet switches have the ability to support multiple AI jobs concurrently, such as multiple training model workloads on the same GPI cluster, while InfiniBand can only support single AI job capability. Furthermore, InfiniBand is designed for lowering latency on a port-to-port-basis, while Ethernet can better optimize latency and jitter across the data center, holistically. While we do not believe this would be a "winner-takes-all" market, industry forecasts call for Ethernet to grow from 25% of the addressable AI/ML switching market in 2023 to 75% by 2027, with InfiniBand diminishing from 75% to 25% in the same period.

However, with Juniper's limited presence in hyperscaler switching, we believe HPE's switching opportunity will largely be relegated to Enterprise and Tier-2 cloud providers, suggesting a smaller addressable market. Tier-2 Cloud and Enterprise represents roughly 53% of Juniper's combined 100G/400G data center switch sales and 84% of HPE's combined sales. We believe higher-speed ethernet ports (i.e., 100G, 400G and above) would be primarily used for interconnecting GPU clusters to run network-intensive generative AI workloads. A notable contribution from HPE lies in their Slingshot Interconnect Fabric, which services as an alternative to InfiniBand for connecting large GPU clusters.

Wireless LAN Equipment

Following the impact of the COVID-19 pandemic, the wireless LAN (WLAN) market encountered large revenue growth in 2022 and 2021, up 31.4% and 21.6% YoY, vs. only 3.1% and 2.3% in 2020 and 2019. WLAN equipment is required to support all types of traffic, including real-time high bandwidth applications such as video conferencing and cloud-based SaaS applications. Premium pricing and scarcity drove revenue to increase faster than unit shipments, driving the 49.7% YoY revenue growth in 1H23 vs. 37.9% unit growth.

Additionally, enterprises are refreshing to Wi-Fi 6 as a future-proofing measure, helping accelerate some growth in the market. WLAN equipment has become largely commoditized, with many vendors offering Wi-Fi 6/6E access points. The Wi-Fi 6 standard was ratified in 2020 and in 2022, it accounted for 80% and 64% of AP revenue and shipments, respectively.

Cisco is a perennial market leader in WLAN equipment, accounting for 38.5% of the total market. HPE is the second largest vendor by revenue, accounting for 14.3% of the market in 1H23. Juniper held 3.3% of the market in 1H23, yet its growth exceeded peers and the overall market, growing 86.9% YoY in 1H23 on top of 62.6% growth in 2022 and 153% in 2021. Yet even when combined, HPE and Juniper's revenue share is less than half that of Cisco's.

Juniper's acquisition of Mist has proven to be a key differentiator, displacing Cisco and HPE with Fortune 100 companies, supporting the company's outsized growth. Additionally, return-to-office and digital transformation trends, including public cloud-managed WLAN, have accelerated Juniper's growth rates. Juniper's public cloud-managed WLAN revenue surpassed HPE in 2020 and grew 47% YoY for the first three quarters of 2023, vs. HPE's 4% growth.

Similar to the trends in switching, we expect the market to eventually return to low-single digit growth longer-term, yet see elevated growth in the near-term, with an expected 6.8% CAGR from 2022 to 2025, attributed to the Wi-Fi 6 and Wi-Fi 7 migration. We believe the success of Mist will help Juniper grow above the market and continue to gain share against incumbents, growing above its historical 1%-2% share over the next few years.

Exhibit 9: Snapshot of the Wireless LAN Equipment Market ($mn)
Juniper held 3.3% of the total wireless LAN equipment market in 1H23, while HPE held 14.3% share

	2019	2020	2021	2022	1H23
Access Points	**$5,171.1**	**$5,224.9**	**$6,409.5**	**$8,717.0**	**$5,332.8**
% of Total	*77.2%*	*75.7%*	*76.3%*	*79.0%*	*78.1%*
YoY Chg (%)	*0.8%*	*1.0%*	*22.7%*	*36.0%*	*50.8%*
Market Share (%)					
Cisco	35.4%	31.4%	30.2%	32.7%	33.8%
HPE (Aruba)	**14.7%**	**14.7%**	**13.7%**	**14.4%**	**16.0%**
Ubiquiti	8.7%	11.7%	11.7%	9.7%	8.4%
Huawei	6.4%	6.8%	8.7%	8.4%	7.5%
Juniper (Mist)	**0.0%**	**1.4%**	**2.3%**	**2.8%**	**3.4%**
Ruijie	0.0%	0.0%	0.0%	0.0%	3.3%
H3C	4.3%	4.9%	5.1%	5.1%	2.9%
Extreme	3.2%	3.0%	2.6%	2.6%	2.9%
CommScope (Ruckus)	0.0%	5.5%	4.5%	3.9%	2.8%
Fortinet	1.5%	2.0%	1.9%	2.0%	2.5%
Other Vendors	25.7%	18.7%	19.4%	18.5%	16.5%
Controllers	**$1,528.1**	**$1,679.2**	**$1,988.1**	**$2,313.9**	**$1,495.4**
% of Total	*22.8%*	*24.3%*	*23.7%*	*21.0%*	*21.9%*
YoY Chg (%)	*8.0%*	*9.9%*	*18.4%*	*16.4%*	*46.0%*
Market Share (%)					
Cisco	62.2%	63.8%	58.4%	56.0%	55.2%
HPE (Aruba)	**8.4%**	**7.3%**	**6.9%**	**6.9%**	**8.2%**
Extreme	3.1%	4.8%	6.4%	6.1%	6.2%
Huawei	4.2%	5.1%	6.3%	6.6%	5.6%

Exhibit 9: Snapshot of the Wireless LAN Equipment Market ($mn)

Juniper held 3.3% of the total wireless LAN equipment market in 1H23, while HPE held 14.3% share

	2019	2020	2021	2022	1H23
H3C	3.1%	1.7%	2.4%	3.3%	3.4%
Juniper (Mist)	**0.0%**	**0.0%**	**1.5%**	**2.3%**	**3.1%**
CommScope (Ruckus)	0.0%	2.7%	3.7%	3.4%	2.2%
Cambium	0.0%	0.0%	0.0%	1.0%	1.8%
Other Vendors	19.1%	14.7%	14.3%	14.4%	14.3%
Total Wireless LAN Equipment	**$6,699.2**	**$6,904.1**	**$8,397.6**	**$11,030.8**	**$6,828.2**
YoY Chg (%)	*2.3%*	*3.1%*	*21.6%*	*31.4%*	*49.7%*
Market Share (%)					
Cisco	41.5%	39.3%	36.9%	37.6%	38.5%
HPE (Aruba)	**13.3%**	**12.9%**	**12.1%**	**12.8%**	**14.3%**
Huawei	5.9%	6.4%	8.1%	8.0%	7.1%
Ubiquiti	6.7%	8.9%	8.9%	7.7%	6.5%
Extreme	3.2%	3.4%	3.5%	3.3%	3.6%
Juniper (Mist)	**0.0%**	**1.0%**	**2.1%**	**2.7%**	**3.3%**
H3C	4.1%	4.1%	4.5%	4.7%	3.0%
CommScope (Ruckus)	0.0%	4.8%	4.3%	3.8%	2.7%
Ruijie	0.0%	0.0%	0.0%	0.0%	2.6%
Fortinet	1.3%	1.6%	1.5%	1.6%	2.0%
Other Vendors	24.1%	17.6%	18.1%	17.8%	16.3%

Source: Omdia

BofA GLOBAL RESEARCH

While we flag that wireless is one segment in which there is overlap between the portfolios of both companies, we also note the positives. Looking at customer verticals, Juniper and HPE have strength in Service Provider, Retail, and Higher Education, with share above their respective overall share. Additionally, HPE has solid performance in the Finance and Government verticals, boosting opportunity for Juniper in those segments.

Lastly, we highlight that HPE's large channel presence can support Juniper's expansion in international markets. Outside of North America, Juniper only held 1% share in 1H23 (vs. 6.5% share in North America), while HPE held 14.1% and Cisco held 31.3%.

On the negative side, we note the integration risk between Juniper Mist and HPE Aruba, which may take time to properly merge. Along the same framework, Cisco announced its intention to converge its Meraki and Catalyst wireless platforms in mid-2022, yet revenue of Cisco's converged access points remain de minimis. The development of a hybrid wireless roadmap, including cross-functionality between portfolios as well as across public cloud and on-prem managed equipment, will remain a challenge.

Access Points

The task of an Access Point (APs) is to receive/transmit data to and from wireless-enabled client devices. Enterprise access points, dubbed coordinated APs, have intelligence for performing network functions. However, the management layer comes from the controller functionality, discussed in the following section.

Access points are primarily a commoditized solution, and HPE/Juniper held a combined 19.4% revenue share and 10.5% unit share in 1H23, below that of Cisco's 33.8% revenue share and 16% unit share. HPE's portfolio includes its 500/600 series Wi-Fi 6/6E APs, while Juniper's portfolio consists of its Mist AI APs.

Controllers

Controllers manage coordinated access points, load balance users, enforce security policies, and provide a number of higher-level network policies. In addition, controllers also perform Layer 2 ethernet switching and RF (Radio Frequency) management. Some advanced controllers also include authentication, security features, as well as Layer 3 and 4 applications (load balancing, DHCP, NAT).

Cisco is the de factor market leader in the controllers market with 55.2% revenue share in 1H23, with HPE trailing at only 8.2% share and Juniper at 3.1% share.

SaaS controllers (subscription services) accounted for 28.3% of total controllers in 1H23 and Gartner forecasts the segment to account for 64% in 2027, replacing hardware appliances as the dominant type of controller. Within the SaaS controller market, Juniper has been taking share away from incumbents, growing from 5.5% market share in 2021 to 8.2% share in 2022 and 10.9% share in 1H23. HPE Aruba has maintained roughly 7.1% share in 2021 and 2022, yet its share fell to 6.1% in 1H23. Cisco held 38.5% share in 1H23, down from 41% in 2022 and 44.6% in 2021, losing share to peers such as Juniper's Mist, Huawei, and Cambium.

Firewall

The primary function of traditional firewalls is to be the gatekeeper of the network through stateful packet inspection (dynamic packet filtering) which inspects individual data packets and monitors the state of a connection to defend against spoofing and malicious traffic activity. At their basic form, firewalls compare the request from a sender to connect to a receiver through a certain port number (relating to a specific application) and matches the request to a list of allowed connections. Unified Threat Management (UTM) solutions combine firewalls with additional features, such as network antivirus, web filtering, and mail security, into a comprehensive all-in appliance. Historically, UTM was more attractive for smaller organizations looking to consolidate appliances into a single box to save on costs and ease of management. Lastly, Next Generation Firewalls (NGFW) add deep packet inspection (content-based filtering) for application-aware packet filtering vs. filtering traffic solely based on addresses, ports, and protocols in a traditional firewall solution. We note that while there are still distinctions between UTM and NGFW solutions, the lines are blurring, given the added functionality to firewall platforms.

Juniper's firewall product line, the SRX series, includes hardware appliances, virtual appliances (vSRX) with native SD-WAN support, and a containerized firewall (cSRX). Additionally, FWaaS (Firewall-as-a-Service) is provided with Juniper's Secure Edge SSE product. Juniper was labeled as a Challenger in Gartner's 2022 Magic Quadrant for Network Firewalls with strong ability to execute, yet a lack of completeness of vision. The company's strength in firewall includes a single console to manage all its security products through its Security Director and Security Director Cloud solutions. Additionally, Juniper offers its Advanced Threat Prevention and SecIntel offerings that allows for shared threat intelligence between its networking and firewall product lines.

The company offers high-throughput firewalls, however, Juniper firewalls are primarily targeted at telcos, alongside its networking products, limiting market penetration. Juniper has been slow to identify and introduce products for key emerging use cases, such as ZTNA, cloud security, etc. and lacks a strong stand-alone security portfolio, relative to competitors that are expanding their security offerings aggressively. Lastly, Gartner notes that clients find its prices high, with SD-WAN and DLP features at added cost. Given the high-end nature of Juniper's SRX portfolio and the associated high costs, we believe the company will remain a niche player focusing on high end customers who require low latency and high-throughput capabilities.

Exhibit 10: Magic Quadrant for Network Firewalls, 2022
Gartner labels Juniper as a Challenger in this Magic Quadrant

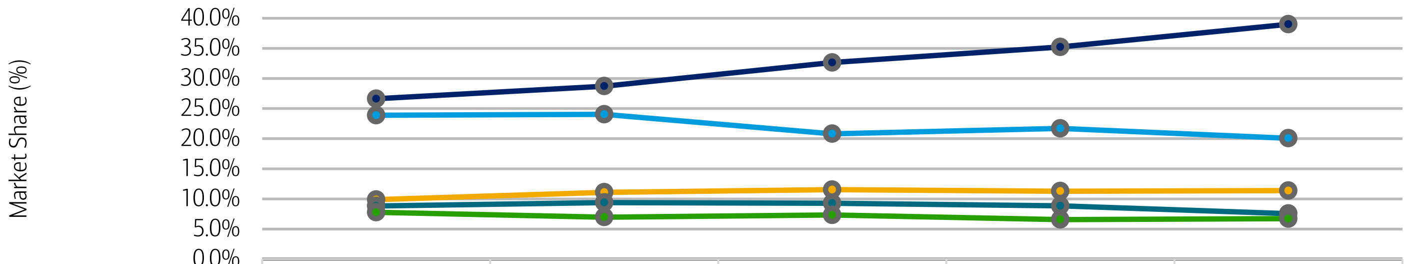
Source: Gartner

BofA GLOBAL RESEARCH

Firewalls account for about 8% of Juniper's product revenue, with its total market share remaining consistent around 3%. Juniper's total firewall revenue was $153.1mn in 1H23, up 11% YoY vs. only 2.6% growth in 2022. This is versus 14.3% YoY growth in 2021 and a a 13.4% decline in 2020. We expect Juniper's total firewall revenue to grow at a 5.7% 2022-2027 CAGR, driven by growth in NGFW and UTM. In addition, we expect that Juniper's market share will continue to remain relatively consistent around the 3% range.

Within higher-end carrier-grade and data center firewalls (defined at a $30,000 or higher price point), Juniper has the fifth-largest market share at 6.7%, below Palo Alto Networks, Cisco, Fortinet, and Check Point. These firewalls are typically deployed in enterprise and service provider data centers and wired and wireless carrier transport and backhaul networks, with the growth in network traffic driving upgrades in network security infrastructure. Juniper only participates in the Data Center and Carrier segment, while other vendors compete in additional segments such as campus, small-office home-office (SOHO), small to medium enterprise (SME), and more.

Exhibit 11: Market Share for Data Center and Carrier Firewalls
Juniper held 6.7% of the data center and carrier firewall market in 1H23



	2019	2020	2021	2022	1H23
Palo Alto Networks	26.6%	28.7%	32.6%	35.2%	39.0%
Cisco	23.9%	24.0%	20.8%	21.7%	20.1%
Fortinet	9.9%	11.1%	11.5%	11.3%	11.4%
Check Point	8.8%	9.4%	9.3%	8.8%	7.5%
Juniper	7.8%	7.0%	7.3%	6.6%	6.7%

Source: Omdia

BofA GLOBAL RESEARCH

Between 2019 and 2022, Juniper lost marginal share in the NGFW market going from 3.8% in 2019 to 3.1% in 1H23. Palo Alto Networks and Fortinet continue to remain market leaders and grow their share through competitive displacements, product innovation and refresh cycles. Within the UTM market, Juniper has maintained roughly 1% share from 2019 to 1H23, way below Fortinet and Cisco at 30.4% and 25.3% share, respectively. Lastly, Juniper has gained some incremental share in the traditional firewall market over the last few years, up from 2.1% in 2019 to 2.6% in 1H23.

The total firewall market was $10bn in 2022, up 7% YoY, mostly composed of hardware-centric solutions. We expect it to grow at about a 6% CAGR from 2022 through 2025, with growth in software/cloud solutions offset by secular decline in on-prem firewalls. The traditional segment (~4% of the total market in 1H23) is expected to decrease at a -4.8% CAGR from 2022-2025, while NGFW (78% of total) and UTM (18% of total) are expected to increase at a 6.2% and 7.3% CAGR, respectively.

Exhibit 12: Snapshot of the Firewall Market ($mn)
Juniper held 2.7% of the total firewall market in 1H23

	2019	2020	2021	2022	1H23
Next Generation Firewall (NGFW)	**$6,126.7**	**$6,356.7**	**$7,109.9**	**$7,792.0**	**$4,417.4**
% of Total	*72.4%*	*74.3%*	*76.0%*	*77.8%*	*78.3%*
YoY Chg (%)	*8.8%*	*3.8%*	*11.8%*	*9.6%*	*19.5%*
Market Share (%)					
Palo Alto Networks	26.3%	29.3%	33.6%	36.6%	39.3%
Fortinet	15.7%	18.1%	18.5%	18.4%	18.2%
Cisco	18.8%	16.5%	13.4%	14.2%	12.9%
Check Point	16.6%	15.7%	14.4%	13.9%	11.7%
SonicWALL	5.3%	5.7%	6.3%	6.0%	5.6%
Juniper	**3.8%**	**3.2%**	**3.3%**	**3.1%**	**3.1%**
WatchGuard	2.3%	2.1%	1.9%	1.8%	1.6%
Other Vendors	11.1%	9.3%	8.7%	6.1%	7.7%
Unified Threat Management (UTM)	**$1,838.3**	**$1,750.0**	**$1,824.1**	**$1,815.2**	**$1,000.3**
% of Total	*21.7%*	*20.4%*	*19.5%*	*18.1%*	*17.7%*
YoY Chg (%)	*14.8%*	*-4.8%*	*4.2%*	*-0.5%*	*6.4%*
Market Share (%)					
Fortinet	21.0%	24.8%	27.5%	29.9%	30.4%
Cisco	25.1%	25.4%	23.1%	27.1%	25.3%
SonicWALL	4.3%	4.9%	5.8%	6.4%	6.0%
WatchGuard	6.0%	6.0%	5.4%	5.6%	5.3%
Check Point	3.3%	3.3%	3.4%	3.6%	3.1%

Exhibit 12: Snapshot of the Firewall Market ($mn)
Juniper held 2.7% of the total firewall market in 1H23

	2019	2020	2021	2022	1H23
Juniper	**1.1%**	**0.9%**	**1.0%**	**1.0%**	**1.0%**
Other Vendors	39.1%	34.7%	33.8%	26.5%	28.9%
Traditional Firewall	**$493.2**	**$452.2**	**$419.7**	**$403.5**	**$221.2**
% of Total	*5.8%*	*5.3%*	*4.5%*	*4.0%*	*3.9%*
YoY Chg (%)	*3.9%*	*-8.3%*	*-7.2%*	*-3.9%*	*2.2%*
Market Share (%)					
Fortinet	17.1%	21.7%	23.3%	27.7%	28.3%
Check Point	18.6%	20.1%	21.0%	23.0%	20.1%
Cisco	10.2%	7.3%	5.6%	6.9%	6.4%
Juniper	**2.1%**	**2.0%**	**2.4%**	**2.5%**	**2.6%**
WatchGuard	1.8%	1.9%	1.9%	2.1%	2.0%
Other Vendors	50.0%	46.9%	45.7%	37.8%	40.6%
Total Firewall	**$8,458.1**	**$8,558.9**	**$9,353.7**	**$10,010.7**	**$5,638.9**
YoY Chg (%)	*9.7%*	*1.2%*	*9.3%*	*7.0%*	*16.2%*
Market Share (%)					
Palo Alto Networks	19.1%	21.8%	25.5%	28.5%	30.8%
Fortinet	17.0%	19.6%	20.5%	20.9%	20.7%
Cisco	19.7%	17.9%	14.9%	16.3%	14.9%
Check Point	13.8%	13.4%	12.6%	12.4%	10.5%
SonicWALL	4.8%	5.2%	5.9%	5.8%	5.4%
Juniper	**3.1%**	**2.7%**	**2.8%**	**2.7%**	**2.7%**
WatchGuard	3.1%	2.9%	2.6%	2.5%	2.3%
Other Vendors	19.4%	16.5%	15.3%	11.0%	12.8%

Source: Omdia

BofA GLOBAL RESEARCH

How HPE could leverage Juniper's firewall business

HPE has previously noted it is placing an emphasis on security, including its acquisition of Axis Security, a Security Service Edge (SSE) provider. HPE lacks a firewall portfolio, which Juniper brings to the table with its SRX product line, as well as other network security technologies that HPE lacks. We believe HPE will utilize Juniper's security technologies to drive further integration between networking and network security, namely in a Secure Access Service Edge (SASE) framework.

However, Juniper's narrow focus on service providers (SPs) and higher-end, higher-cost firewalls may marginalize sales and prevent HPE from successfully leveraging cross-sell and upsell opportunities. Per Gartner, Juniper's cybersecurity practice does not come up in many customer conversations, and cybersecurity peers do not consider them as a direct competitor. Juniper is the 6th largest firewall vendor, accounting for roughly 3% market share, and falls even further below in the SASE market. Juniper's SSE solution, dubbed Secure Edge, is relatively new to market, only being introduced in 1Q22, and as such Juniper holds the 18th revenue position in the SASE market. In comparison, HPE's SASE business is nearly 4x larger and is the tenth largest SASE vendor. Thus, we question whether Juniper's security segment is something HPE would keep or phase out over time.

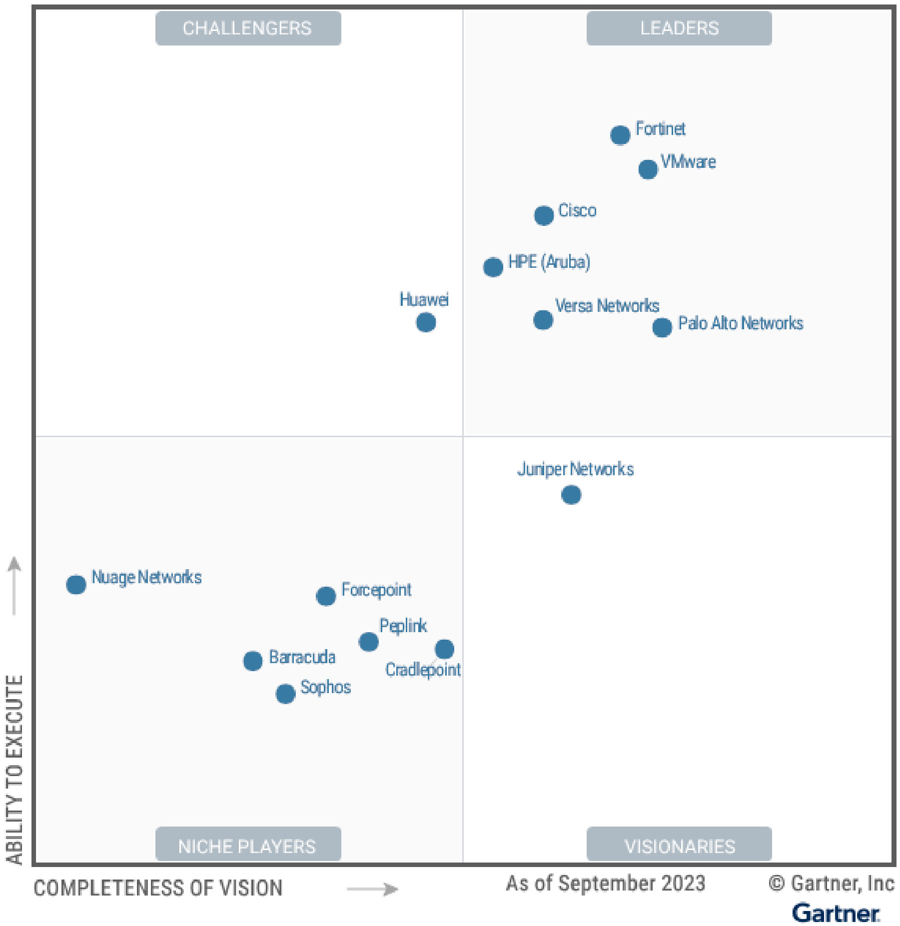
SD-WAN Equipment

The SD-WAN market kickstarted in 2017, and growth of the market continues to remain strong, with the market up 25% in 2022 and 24.1% YoY in 1H23. In December 2020, Juniper acquired 128 Technology, a company carrying about 1% share and focusing on tunnel-free routing and SD-WAN infrastructure. Juniper's growth has been strong, up 17.5% YoY in 2020 and 167.6% YoY in 2021, which was mostly related to the 128 Technology acquisition. Growth continues to remain solid, up 35.2% YoY in 2022 and 43% in 1H23, and we believe that Juniper can continue to grow this segment at a 15.4% CAGR between 2022 to 2025, driven by secular trends, such as cloud migration, network visibility, security, and more.

SD-WAN solutions create encrypted tunnels over public internet infrastructure, replacing the need to lease expensive private lines to connect two points in the network. There are multiple approaches to addressing the SD-WAN market. Cisco primarily includes it as a feature on its routers, while Fortinet, for example, has added the same functionality to its firewalls. Some vendors are more networking-focused, such as Cisco, while others are more application-centric and provide greater application-level controls, like Palo Alto Networks. There is also clear synergy with cloud-delivered security dubbed SASE (Secure Access Service Edge), where companies deliver an added value of security beyond the service of connectivity. Gartner forecasts that by 2026, more than 50% of new SD-WAN purchases will be part of a single vendor SASE offering, up from 10% in 2022.

Exhibit 13: Magic Quadrant for SD-WAN, 2023

Gartner labels Juniper and HPE as a Leader as a Visionary in this Magic Quadrant



Source: Gartner

BofA GLOBAL RESEARCH

Juniper's SD-WAN offering is driven by Mist AI, which includes Session Smart Routers, WAN Assurance and Marvis Virtual Network Assistant. It also offers its SRX firewall solutions for specific use cases. Gartner estimates that Juniper has approximately 3,000 SD-WAN enterprise customers and IDC estimates that it held roughly 2.5% of the market in 1H23. Juniper was labeled as a Visionary in Gartner's 2022 Magic Quadrant for SD-WAN with a solid product roadmap that aligns with emerging customer requirements (such as single-vendor SASE) and applicable to most enterprise use cases. However, Gartner notes that Juniper isn't as widely available as other vendors, based on narrow channels, higher pricing, and limited market share. The company also has limited integrations with third-party SSE vendors, adding complexity for dual-vendor SASE use cases.

Juniper integrated 128 Technology into its cloud-based Mist management platform to build out an AI-driven SD-WAN product as part of a broader portfolio of networking and security offerings. Juniper is also integrating the 128 Technology portfolio with its SRX and vSRX firewall and releasing a series of hardware appliances as an integrated hardware and software offering for SD-WAN infrastructure. Juniper's SD-WAN also includes native NGFW, content security, and Intrusion Detection and Prevention System (IDS/IPS) capabilities. The solution also offers integrations with Juniper Security Director Cloud, the company's SaaS-based real-time threat awareness portal.

Exhibit 14: Snapshot of the SD-WAN Market ($mn)

Juniper held 2.5% of the SD-WAN market in 1H23, while HPE held 7.4% share

	2019	2020	2021	2022	1H23
SD-WAN Equipment	**$2,518.9**	**$2,977.6**	**$3,724.2**	**$4,656.1**	**$2,590.8**
YoY Chg (%)	*79.6%*	*18.2%*	*25.1%*	*25.0%*	*24.1%*
Market Share (%)					
Cisco	39.3%	37.9%	37.2%	40.1%	41.9%
Fortinet	6.8%	8.2%	9.5%	9.2%	10.1%
Versa	5.8%	8.6%	11.7%	10.4%	8.4%
VMware	8.8%	9.5%	8.3%	7.7%	7.8%
HPE (Aruba)	**7.9%**	**8.0%**	**7.0%**	**7.6%**	**7.4%**
Huawei	4.0%	4.3%	4.7%	5.8%	5.7%
Palo Alto Networks	4.5%	5.0%	5.1%	4.8%	4.7%
Juniper	**1.0%**	**1.0%**	**2.1%**	**2.3%**	**2.5%**
Nokia	4.1%	3.7%	3.0%	2.3%	1.9%
Other Vendors	17.8%	13.9%	11.4%	9.9%	9.6%

Source: IDC

BofA GLOBAL RESEARCH

HPE established its position in the SD-WAN market by acquiring Silver Peak in 2020. Prior to the acquisition, HPE held only roughly 1.5% market share in 2019 vs. Silver Peak's 6.4% share (accounting for the combined 7.9% share represented in Exhibit 14). The acquisition continued HPE's track record of buying established vendors; at the time of acquisition, Silver Peak had a customer base of greater than 2,000 using its scalable SD-WAN product, dubbed Unit EdgeConnect. Since then, HPE has been able to ramp the pace of client acquisition by utilizing Aruba sales channels.

Cisco is the major incumbent vendor in the SD-WAN market with 41.9% market share in 1H23. A consolidated HPE/Juniper would climb to the third revenue position, capturing shy of 10% market share, trailing only slightly behind Fortinet.

We note that acquisitions play a key role in the market with Cisco acquiring Viptela in 2017, VMware bought VeloCloud in 2017, Oracle acquired Talari in 2018, HPE acquired Silver Peak in 2020, Juniper acquired 128 Technology in 2020, and Palo Alto Networks acquired CloudGenix in 2020.

Financial Highlights

Exhibit 15: Summary of Model Changes
We revise our estimates downwards to reflect the weak spend environment

	Sales			EPS		
	Old	New	Change	Old	New	Change
FY2023						
Q1	$1,371.8	$1,371.8	$0.0	$0.48	$0.48	$0.00
Q2	$1,430.1	$1,430.1	$0.0	$0.58	$0.58	$0.00
Q3	$1,397.8	$1,397.8	$0.0	$0.60	$0.60	$0.00
Q4	$1,400.8	$1,364.8	-$36.0	$0.63	$0.61	-$0.03
Total	**$5,600.5**	**$5,564.5**	**-$36.0**	**$2.29**	**$2.26**	**-$0.03**
FY2024E						
Q1E	$1,258.0	$1,234.9	-$23.1	$0.43	$0.41	-$0.02
Q2E	$1,357.5	$1,330.7	-$26.7	$0.56	$0.53	-$0.03
Q3E	$1,422.9	$1,399.6	-$23.3	$0.63	$0.62	-$0.02
Q4E	$1,473.4	$1,464.3	-$9.1	$0.72	$0.70	-$0.03
Total	**$5,511.8**	**$5,429.5**	**-$82.3**	**$2.34**	**$2.25**	**-$0.09**
FY2025E						
Q1E	$1,337.3	$1,319.2	-$18.0	$0.51	$0.48	-$0.03
Q2E	$1,417.3	$1,391.8	-$25.4	$0.62	$0.59	-$0.04
Q3E	$1,471.4	$1,445.7	-$25.7	$0.69	$0.67	-$0.03
Q4E	$1,523.5	$1,500.8	-$22.7	$0.77	$0.74	-$0.02
Total	**$5,749.5**	**$5,657.6**	**-$91.8**	**$2.59**	**$2.48**	**-$0.11**

Source: BofA Global Research estimates, company report

BofA GLOBAL RESEARCH

Exhibit 16: Income Statement

Updated summary of financials; we decrease our FY24 revenue estimate by $82.3mn to $5,429.5mn to reflect the impact of expected spending weakness with Service Providers

FY Ends in December	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1E	Q2E	Q3E	Q4E	Q1E	Q2E	Q3E	Q4E					
($mn except EPS)	**Mar-22**	**Jul-22**	**Sep-22**	**Dec-22**	**Mar-23**	**Jul-23**	**Sep-23**	**Dec-23**	**Mar-24**	**Jun-24**	**Sep-24**	**Dec-24**	**Mar-25**	**Jun-25**	**Sep-25**	**Dec-25**	**FY2022**	**FY2023**	**FY2024E**	**FY2025E**	**FY2026E**
Product Revenues	744.3	839.8	967.5	988.3	912.6	963.2	898.1	858.6	764.2	848.2	894.9	949.4	826.0	890.5	924.3	970.5	3,539.9	3,632.5	3,456.7	3,611.3	3,723.5
Service Revenue	423.9	429.8	447.1	460.5	459.2	466.9	499.7	506.2	470.8	482.5	504.7	514.8	493.2	501.4	521.4	530.3	1,761.3	1,932.0	1,972.9	2,046.4	2,109.7
Total Revenues	**$1,168.2**	**$1,269.6**	**$1,414.6**	**$1,448.8**	**$1,371.8**	**$1,430.1**	**$1,397.8**	**$1,364.8**	**$1,234.9**	**$1,330.7**	**$1,399.6**	**$1,464.3**	**$1,319.2**	**$1,391.8**	**$1,445.7**	**$1,500.8**	**$5,301.2**	**$5,564.5**	**$5,429.5**	**$5,657.6**	**$5,833.2**
Gross Profits	**671.3**	**714.0**	**809.8**	**847.8**	**792.6**	**834.3**	**832.3**	**830.0**	**733.9**	**793.1**	**840.9**	**887.9**	**788.8**	**836.3**	**875.9**	**913.3**	**3,042.9**	**3,289.2**	**3,255.7**	**3,414.3**	**3,523.6**
Gross Margin	**57.5%**	**56.2%**	**57.2%**	**58.5%**	**57.8%**	**58.3%**	**59.5%**	**60.8%**	**59.4%**	**59.6%**	**60.1%**	**60.6%**	**59.8%**	**60.1%**	**60.6%**	**60.9%**	**57.4%**	**59.1%**	**60.0%**	**60.3%**	**60.4%**
Research & Development	231.3	226.5	247.4	246.5	257.7	255.0	253.6	244.0	239.0	243.0	247.0	252.0	248.0	250.0	252.0	255.0	951.7	1,010.3	981.0	1,005.0	1,040.0
SG&A	302.6	310.6	318.7	324.8	331.9	337.2	333.9	335.8	325.8	331.8	339.8	349.8	341.8	343.8	346.8	350.8	1,256.7	1,338.8	1,347.2	1,383.2	1,431.2
Operating Income	**137.4**	**176.9**	**243.7**	**276.5**	**203.0**	**242.1**	**244.8**	**250.2**	**169.1**	**218.3**	**254.1**	**286.1**	**199.0**	**242.5**	**277.1**	**307.5**	**834.5**	**940.1**	**927.5**	**1,026.1**	**1,052.4**
Operating Margin	**11.8%**	**13.9%**	**17.2%**	**19.1%**	**14.8%**	**16.9%**	**17.5%**	**18.3%**	**13.7%**	**16.4%**	**18.2%**	**19.5%**	**15.1%**	**17.4%**	**19.2%**	**20.5%**	**15.7%**	**16.9%**	**17.1%**	**18.1%**	**18.0%**
Interest Income (Expense)	(9.8)	(8.9)	(8.1)	(12.6)	(9.7)	(8.8)	(5.4)	(7.1)	(6.1)	(6.1)	(8.1)	(8.1)	(8.1)	(9.1)	(12.1)	(12.1)	(39.4)	(31.0)	(28.4)	(41.4)	(57.4)
Income Tax Expense	26.0	31.6	44.8	50.1	36.7	44.3	45.5	46.2	31.0	40.3	46.7	52.8	36.3	44.4	50.4	56.1	152.5	172.7	170.9	187.1	189.1
Pro-Forma Net Income	**101.6**	**136.4**	**190.8**	**213.8**	**156.6**	**189.0**	**193.9**	**196.9**	**132.0**	**171.9**	**199.2**	**225.1**	**154.6**	**189.0**	**214.6**	**239.3**	**642.6**	**736.4**	**728.3**	**797.6**	**805.9**
Net Margin	**8.7%**	**10.7%**	**13.5%**	**14.8%**	**11.4%**	**13.2%**	**13.9%**	**14.4%**	**10.7%**	**12.9%**	**14.2%**	**15.4%**	**11.7%**	**13.6%**	**14.8%**	**15.9%**	**12.1%**	**13.2%**	**13.4%**	**14.1%**	**13.8%**
Pro-Forma EPS (ex-stock comp)	**$0.31**	**$0.42**	**$0.58**	**$0.65**	**$0.48**	**$0.58**	**$0.60**	**$0.61**	**$0.41**	**$0.53**	**$0.62**	**$0.70**	**$0.48**	**$0.59**	**$0.67**	**$0.74**	**$1.95**	**$2.26**	**$2.25**	**$2.48**	**$2.51**
Diluted Shares Outstanding (mn)	331.1	328.1	328.9	329.9	329.1	326.0	323.8	324.6	324.5	324.2	323.5	323.2	323.1	322.3	321.9	321.5	329.5	325.9	323.8	322.2	320.7
Margin Analysis																					
Gross Margin	**57.5%**	**56.2%**	**57.2%**	**58.5%**	**57.8%**	**58.3%**	**59.5%**	**60.8%**	**59.4%**	**59.6%**	**60.1%**	**60.6%**	**59.8%**	**60.1%**	**60.6%**	**60.9%**	**57.4%**	**59.1%**	**60.0%**	**60.3%**	**60.4%**
As a % of Total Revenues																					
Research & Development	19.8%	17.8%	17.5%	17.0%	18.8%	17.8%	18.1%	17.9%	19.4%	18.3%	17.6%	17.2%	18.8%	18.0%	17.4%	17.0%	18.0%	18.2%	18.1%	17.8%	17.8%
SG&A	25.9%	24.5%	22.5%	22.4%	24.2%	23.6%	23.9%	24.6%	26.4%	24.9%	24.3%	23.9%	25.9%	24.7%	24.0%	23.4%	23.7%	24.1%	24.8%	24.4%	24.5%
Operating Expenses	45.7%	42.3%	40.0%	39.4%	43.0%	41.4%	42.0%	42.5%	45.7%	43.2%	41.9%	41.1%	44.7%	42.7%	41.4%	40.4%	41.7%	42.2%	42.9%	42.2%	42.4%
Operating Margin	**11.8%**	**13.9%**	**17.2%**	**19.1%**	**14.8%**	**16.9%**	**17.5%**	**18.3%**	**13.7%**	**16.4%**	**18.2%**	**19.5%**	**15.1%**	**17.4%**	**19.2%**	**20.5%**	**15.7%**	**16.9%**	**17.1%**	**18.1%**	**18.0%**
Tax Rate	20.4%	18.8%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.2%	19.0%	19.0%	19.0%	19.0%
QoQ % Growth:																					
Product Revenues	-14.9%	12.8%	15.2%	2.1%	-7.7%	5.5%	-6.8%	-4.4%	-11.0%	11.0%	5.5%	6.1%	-13.0%	7.8%	3.8%	5.0%					
Service Revenue	-0.3%	1.4%	4.0%	3.0%	-0.3%	1.7%	7.0%	1.3%	-7.0%	2.5%	4.6%	2.0%	-4.2%	1.7%	4.0%	1.7%					
Total Revenues	**-10.1%**	**8.7%**	**11.4%**	**2.4%**	**-5.3%**	**4.2%**	**-2.3%**	**-2.4%**	**-9.5%**	**7.8%**	**5.2%**	**4.6%**	**-9.9%**	**5.5%**	**3.9%**	**3.8%**					
Operating Income	**-42.3%**	**28.7%**	**37.8%**	**13.5%**	**-26.6%**	**19.3%**	**1.1%**	**2.2%**	**-32.4%**	**29.1%**	**16.4%**	**12.6%**	**-30.4%**	**21.8%**	**14.3%**	**11.0%**					
Net Income	**-45.0%**	**34.3%**	**39.9%**	**12.1%**	**-26.8%**	**20.7%**	**2.6%**	**1.5%**	**-33.0%**	**30.2%**	**15.9%**	**13.0%**	**-31.3%**	**22.2%**	**13.5%**	**11.5%**					
YoY % Growth:																					
Product Revenues	10.7%	10.6%	25.3%	13.0%	22.6%	14.7%	-7.2%	-13.1%	-16.3%	-11.9%	-0.4%	10.6%	8.1%	5.0%	3.3%	2.2%	15.0%	2.6%	-4.8%	4.5%	3.1%
Service Revenue	5.4%	4.0%	7.2%	8.3%	8.3%	8.6%	11.8%	9.9%	2.5%	3.3%	1.0%	1.7%	4.8%	3.9%	3.3%	3.0%	6.3%	9.7%	2.1%	3.7%	3.1%
Total Revenue	**8.7%**	**8.3%**	**19.0%**	**11.5%**	**17.4%**	**12.6%**	**-1.2%**	**-5.8%**	**-10.0%**	**-6.9%**	**0.1%**	**7.3%**	**6.8%**	**4.6%**	**3.3%**	**2.5%**	**11.9%**	**5.0%**	**-2.4%**	**4.2%**	**3.1%**
Operating Income	**5.6%**	**-4.3%**	**23.2%**	**16.1%**	**47.7%**	**36.9%**	**0.5%**	**-9.5%**	**-16.7%**	**-9.8%**	**3.8%**	**14.3%**	**17.7%**	**11.1%**	**9.1%**	**7.5%**	**11.1%**	**12.7%**	**-1.3%**	**10.6%**	**2.6%**
Net Income	**3.1%**	**-3.3%**	**25.5%**	**15.8%**	**54.1%**	**38.6%**	**1.6%**	**-7.9%**	**-15.7%**	**-9.1%**	**2.7%**	**14.3%**	**17.1%**	**10.0%**	**7.7%**	**6.3%**	**11.5%**	**14.6%**	**-1.1%**	**9.5%**	**1.0%**

Source: BofA Global Research estimates, company report

Glossary

- AI = Artificial Intelligence
- AI/ML = Artificial Intelligence / Machine Learning
- DCI = Data Center Interconnect
- DHCP = Dynamic Host Configuration Protocol
- EVPN = Ethernet Virtual Private Network
- GPU = Graphics Processing Unit
- LAN = Local Area Network
- MPLS = Multi-Protocol Label Switching
- NaaS = Network as a Service
- NAC = Network Access Control
- NAT = Network Address Translation
- RAN = Radio Access Network
- SaaS = Software as a Service
- SASE = Secure Access Service Edge
- SD-WAN = Software-Defined Wide Area Network
- SSE = Security Service Edge
- SP = Service Provider
- TAM = Total Addressable Market
- WAN = Wide Area Network
- WLAN = Wireless Local Area Network

Exhibit 17: Stocks mentioned
Prices and ratings for stocks mentioned in this report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
JNPR	JNPR US	Juniper Networks	US$ 37.00	-6-
HPE	HPE US	Hewlett-Packard	US$ 15.28	B-2-7

Source: BofA Global Research

BofA GLOBAL RESEARCH

Price objective basis & risk

Hewlett-Packard Enterprise (HPE)

Our PO is $19 based on 10x our C24E EPS of $1.93. Our target multiple is slightly higher than the median (9x) of the historical range (6x-13.0x). In our opinion, this multiple is justified as it balances positives including that HPE now has a better growth profile, and lower Tier-1 server sales and free cash flow is more in-line with normalized values, vs. near-term macro headwinds and risk from high backlog and slower customer acceptances.

Downside risks to our PO are larger than expected economic slowdown due to inflation and rising interest rates, on-going component availability concerns, COVID19 related shutdowns in China, more aggressive server pricing from competitor Dell, a faster than expected adoption of As-a-Service offerings which can pressure revenues in the near-term, unexpected share loss and slower than expected mix shift to higher margin products and services, FX headwinds, restructuring and execution challenges.

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

Juniper Networks (JNPR)

We have removed the investment opinion on the company's stock. Investors should no longer rely on our previous opinion or price objective.

Analyst Certification

We, Tal Liani and Wamsi Mohan, hereby certify that the views each of us has expressed in this research report accurately reflect each of our respective personal views about the subject securities and issuers. We also certify that no part of our respective compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

US - 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
	Palo Alto Networks	PANW	PANW US	Tal Liani
	SentinelOne, Inc.	S	S US	Tal Liani
UNDERPERFORM				
	Cloudflare	NET	NET US	Madeline Brooks
	CommScope	COMM	COMM US	Tal Liani
	F5 Inc	FFIV	FFIV US	Tal Liani
	Okta Inc	OKTA	OKTA US	Madeline Brooks

US - Telecom and Data Networking Equipment Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
	SecureWorks	SCWX	SCWX US	Tal Liani

US - IT Hardware and Technology Supply Chain Coverage Cluster

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

*iQ*method℠ Measures Definitions

Business Performance	Numerator	Denominator
Return On Capital Employed	NOPAT = (EBIT + Interest Income) × (1 – Tax Rate) + Goodwill Amortization	Total Assets – Current Liabilities + ST Debt + Accumulated Goodwill Amortization
Return On Equity	Net Income	Shareholders' Equity
Operating Margin	Operating Profit	Sales
Earnings Growth	Expected 5 Year CAGR From Latest Actual	N/A
Free Cash Flow	Cash Flow From Operations – Total Capex	N/A
Quality of Earnings	**Numerator**	**Denominator**
Cash Realization Ratio	Cash Flow From Operations	Net Income
Asset Replacement Ratio	Capex	Depreciation
Tax Rate	Tax Charge	Pre-Tax Income
Net Debt-To-Equity Ratio	Net Debt = Total Debt – Cash & Equivalents	Total Equity
Interest Cover	EBIT	Interest Expense
Valuation Toolkit	**Numerator**	**Denominator**
Price / Earnings Ratio	Current Share Price	Diluted Earnings Per Share (Basis As Specified)
Price / Book Value	Current Share Price	Shareholders' Equity / Current Basic Shares
Dividend Yield	Annualised Declared Cash Dividend	Current Share Price
Free Cash Flow Yield	Cash Flow From Operations – Total Capex	Market Cap = Current Share Price × Current Basic Shares
Enterprise Value / Sales	EV = Current Share Price × Current Shares + Minority Equity + Net Debt + Other LT Liabilities	Sales
EV / EBITDA	Enterprise Value	Basic EBIT + Depreciation + Amortization

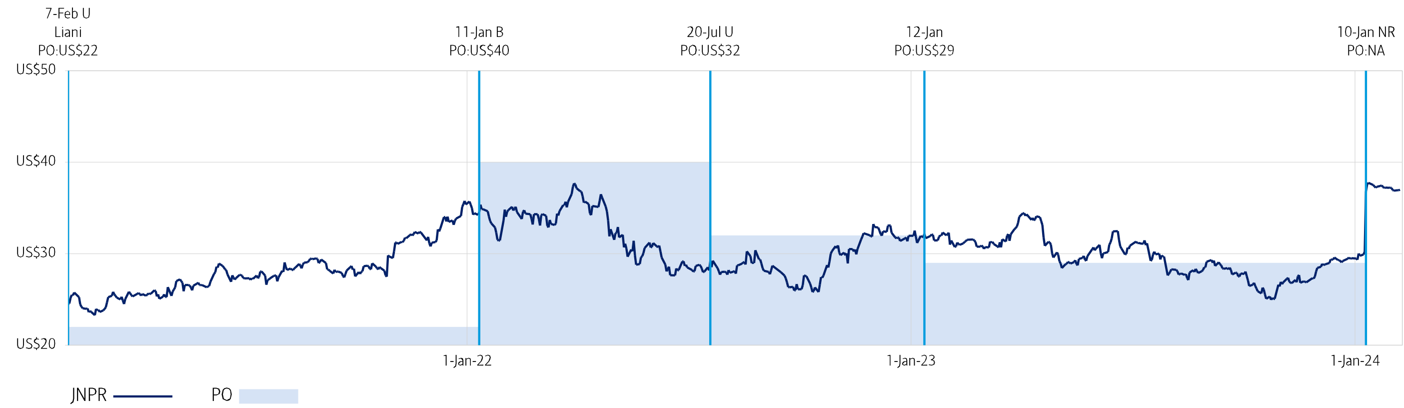
iQmethod℠ is the set of BofA Global Research standard measures that serve to maintain global consistency under three broad headings: Business Performance, Quality of Earnings, and validations. The key features of iQmethod are: A consistently structured, detailed, and transparent methodology. Guidelines to maximize the effectiveness of the comparative valuation process, and to identify some common pitfalls.

iQdatabase® is our real-time global research database that is sourced directly from our equity analysts' earnings models and includes forecasted as well as historical data for income statements, balance sheets, and cash flow statements for companies covered by BofA Global Research.

Disclosures

Important Disclosures

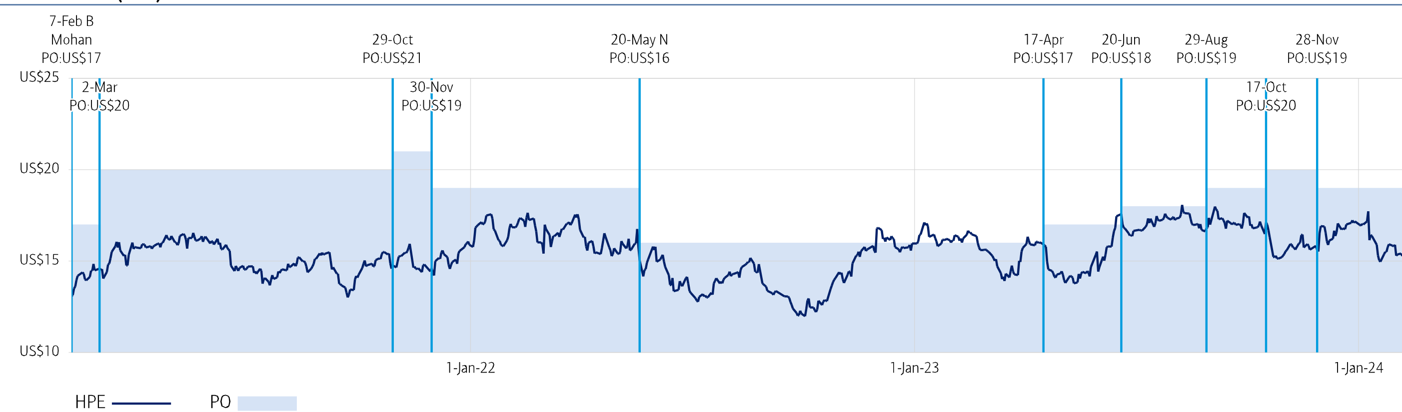
Juniper Networks (JNPR) Price Chart



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

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

Hewlett-Packard (HPE) Price Chart



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

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

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

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

Equity Investment Rating Distribution: 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.

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

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster[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.

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

Price Charts for the securities referenced in this research report are available on the Price Charts website, or call 1-800-MERRILL to have them mailed.
BofAS or one of its affiliates acts as a market maker for the equity securities recommended in the report: Hewlett-Packard, Juniper Networks.
BofAS or an affiliate was a manager of a public offering of securities of this issuer within the last 12 months: Hewlett-Packard.
The issuer is or was, within the last 12 months, an investment banking client of BofAS and/or one or more of its affiliates: Hewlett-Packard, Juniper Networks.
BofAS or an affiliate has received compensation from the issuer for non-investment banking services or products within the past 12 months: Hewlett-Packard, Juniper Networks.
The issuer is or was, within the last 12 months, a non-securities business client of BofAS and/or one or more of its affiliates: Hewlett-Packard, Juniper Networks.
BofAS or an affiliate has received compensation for investment banking services from this issuer within the past 12 months: Hewlett-Packard, Juniper Networks.
BofAS or an affiliate expects to receive or intends to seek compensation for investment banking services from this issuer or an affiliate of the issuer within the next three months: Hewlett-Packard, Juniper Networks.
BofAS together with its affiliates beneficially owns one percent or more of the common stock of this issuer. If this report was issued on or after the 9th day of the month, it reflects the ownership position on the last day of the previous month. Reports issued before the 9th day of a month reflect the ownership position at the end of the second month preceding the date of the report: Hewlett-Packard.
BofAS or one of its affiliates is willing to sell to, or buy from, clients the common equity of the issuer on a principal basis: Hewlett-Packard, Juniper Networks.
The issuer is or was, within the last 12 months, a securities business client (non-investment banking) of BofAS and/or one or more of its affiliates: Hewlett-Packard, Juniper Networks.
BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

Other Important Disclosures

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.
Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.
The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.
Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.
Refer to BofA Global Research policies relating to conflicts of interest.
"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.
Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:
BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofaml.com/BofASEdisclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSFC); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Canadian Investment Regulatory Organization; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSFC; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the Electronic Communications Disclaimers for further information.

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

General Investment Related Disclosures:

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

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

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

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

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

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

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

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

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

BofA ESGMeter Methodology:

ESGMeter is a proprietary metric based on quantitative analysis and fundamental analyst inputs that reflects our assessment of a company's Environmental, Social and Governance-related attributes. The ESGMeter is intended to indicate a company's likelihood of experiencing stronger financial stability (higher return on equity and lower earnings and price volatility) over the next three years relative to peer group. There are three ESGMeter levels - Low, Medium, and High - which indicate whether a company has attributes most likely to translate into superior financial stability (in the case of a High level) or weaker financial stability (in the case of a Low level) over the next three years relative to its peer group. A Medium level suggests that a company exhibits ESG characteristics that are likely associated with financial stability results in line with its peer group over the next three years. Full details of our methodology, financial stability definition and disclaimers are available at BofA ESGMeter methodology. ESGMeter is not indicative of a company's future stock price performance and is not an investment recommendation or rating. ESGMeter is independent of the BofA Global Research fundamental equity analyst's investment rating, volatility risk rating, income rating or price objective for that company.

Copyright and General Information:

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

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

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

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

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

Subject to the quiet period applicable under laws of the various jurisdictions in which we distribute research reports and other legal and BofA Securities policy-related restrictions on the publication of research reports, fundamental equity reports are produced on a regular basis as necessary to keep the investment recommendation current.

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

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

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