

Hewlett-Packard Enterprise

A look into Juniper's revenue streams

Maintain Rating: NEUTRAL | PO: 19.00 USD | Price: 16.37 USD

How will Juniper (JNPR) fit into HPE?

Earlier this week, HPE announced an [acquisition of Juniper Networks for about \\$14bn in cash](#). As part of the deal, JNPR will fit into HPE's networking segment and nearly double the company's networking revenue (moving from 18% of total FY23 to 31% of FY23). In this report we look at the breakouts of JNPR's revenues. We maintain our Neutral rating on HPE as positives of long-term mix shift to higher-margin revenue is balanced by the near-term weaker Enterprise spend environment and a trough in JNPR's core businesses.

JNPR's security business accounts for ~12% revenues

JNPR's security business (Figures 1-8) accounted for ~12% of rev in FY22 and is on pace to be ~12% again in 2023 (after 3 quarters) after accounting to 14% in 2020 & 2021. JNPR's security revenue has also been rather volatile over the last few years due to the transition to software which has impacted upfront revenue recognition. ~74% of JNPR's security rev are driven by 3 core products, firewalls, secure routers, and SD-WAN. Gartner has rated JNPR's tech as above average but the segment's low growth is likely to continue as JNPR addresses a limited market opportunity.

Switching accounts for ~20% of JNPR's revenues

Switching (Figures 9-16) accounts for ~20% of JNPR's revenues (22% in FY22 and 19% in 1H23). As a share of the global switching market, JNPR represents 3.1% of global revenue but HPE already had 5.3% share in 2022. Assuming no rev overlap, the combined share would make HPE the 3rd largest player (behind Cisco and Arista) in the global switching market. In 2022 and 1H23 the overall switching market saw above trend growth (32% & 26%) driven by backlog drawdown and we expect meaningful moderation of growth in the sector.

Routing accounts for ~34% of JNPR's revenues

Routing (Figures 17-29) accounts for ~34% of JNPR's revenues and JNPR represents nearly 18% of the total routing market (ex-China). JNPR focuses on the Service Provider (SP) routing market (ex-China) which has seen above trend growth since 2021. Backlog drawdown and SP's modernization of Internet Protocol (IP) backhaul networks has driven recent above trend growth and in our opinion we expect moderation in the coming qtrs.

Estimates (Oct) (US\$)	2022A	2023A	2024E	2025E	2026E
EPS	2.01	2.15	1.88	2.11	2.20
GAAP EPS	0.66	1.54	1.88	2.11	2.20
EPS Change (YoY)	2.6%	7.0%	-12.6%	12.2%	4.3%
Consensus EPS (Bloomberg)			1.92	2.11	2.30
DPS	0.48	0.48	0.52	0.52	0.52
Valuation (Oct)					
P/E	8.1x	7.6x	8.7x	7.8x	7.4x
GAAP P/E	24.8x	10.6x	8.7x	7.8x	7.4x
Dividend Yield	2.9%	2.9%	3.2%	3.2%	3.2%
EV / EBITDA*	6.2x	5.9x	5.9x	5.4x	5.1x
Free Cash Flow Yield*	9.9%	10.5%	9.0%	10.2%	10.9%

* For full definitions of *IQmethod*SM measures, see page 18.

11 January 2024

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Stock Data

Price	16.37 USD
Price Objective	19.00 USD
Date Established	28-Nov-2023
Investment Opinion	B-2-7
52-Week Range	13.66 USD - 18.14 USD
Mrkt Val (mn) / Shares Out (mn)	21,000 USD / 1,282.9
Free Float	99.7%
Average Daily Value (mn)	218.97 USD
BofA Ticker / Exchange	HPE / NYS
Bloomberg / Reuters	HPE US / HPE.N
ROE (2024E)	11.0%
Net Dbt to Eqty (Oct-2023A)	38.1%
ESGMeter TM	High

ESGMeterTM is not indicative of a company's future stock price performance and is not an investment recommendation or rating. ESGMeter is independent of BofA Global Research's equity investment rating, volatility risk rating, income rating, and price objective for that company. For full details, refer to "[BofA ESGMeter Methodology](#)".

SD-WAN: Software-Defined Wide Area Networking

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Timestamp: 11 January 2024 05:06PM EST

iQprofileSM Hewlett-Packard Enterprise

iQmethodSM – Bus Performance*

(US\$ Millions)	2022A	2023A	2024E	2025E	2026E
Return on Capital Employed	6.6%	6.9%	6.5%	6.7%	6.6%
Return on Equity	13.4%	13.8%	11.0%	11.2%	10.6%
Operating Margin	10.2%	10.8%	10.7%	11.3%	11.6%
Free Cash Flow	2,073	2,202	1,896	2,138	2,287

iQmethodSM – Quality of Earnings*

(US\$ Millions)	2022A	2023A	2024E	2025E	2026E
Cash Realization Ratio	1.7x	1.6x	2.0x	1.9x	1.9x
Asset Replacement Ratio	1.0x	0.9x	1.2x	1.1x	1.0x
Tax Rate	14.0%	14.0%	14.0%	14.0%	14.0%
Net Debt-to-Equity Ratio	41.7%	38.1%	27.3%	19.2%	11.9%
Interest Cover	16.1x	20.2x	12.0x	17.1x	17.8x

Income Statement Data (Oct)

(US\$ Millions)	2022A	2023A	2024E	2025E	2026E
Sales	28,496	29,135	29,351	30,137	30,704
% Change	2.6%	2.2%	0.7%	2.7%	1.9%
Gross Profit	9,667	10,273	10,342	10,606	10,793
% Change	2.6%	6.3%	0.7%	2.6%	1.8%
EBITDA	5,506	5,761	5,805	6,328	6,652
% Change	1.1%	4.6%	0.8%	9.0%	5.1%
Net Interest & Other Income	72	147	(260)	(200)	(200)
Net Income (Adjusted)	2,664	2,832	2,471	2,769	2,891
% Change	2.4%	6.3%	-12.8%	12.1%	4.4%

Free Cash Flow Data (Oct)

(US\$ Millions)	2022A	2023A	2024E	2025E	2026E
Net Income from Cont Operations (GAAP)	2,664	2,832	2,471	2,769	2,891
Depreciation & Amortization	2,480	2,616	2,672	2,908	3,089
Change in Working Capital	(570)	(1,032)	(165)	(375)	(470)
Deferred Taxation Charge	(249)	(67)	0	0	0
Other Adjustments, Net	268	79	0	0	0
Capital Expenditure	(2,520)	(2,226)	(3,082)	(3,164)	(3,224)
Free Cash Flow	2,073	2,202	1,896	2,138	2,287
% Change	-44.3%	6.2%	-13.9%	12.7%	7.0%
Share / Issue Repurchase	0	0	0	0	0
Cost of Dividends Paid	(631)	(629)	(684)	(684)	(684)
Change in Debt	(596)	(209)	0	0	0

Balance Sheet Data (Oct)

(US\$ Millions)	2022A	2023A	2024E	2025E	2026E
Cash & Equivalents	4,163	4,270	5,896	7,350	8,953
Trade Receivables	4,101	3,481	3,907	3,985	4,490
Other Current Assets	12,242	11,197	11,442	11,315	11,381
Property, Plant & Equipment	5,784	5,989	6,663	7,183	7,582
Other Non-Current Assets	30,833	32,216	32,216	32,216	32,216
Total Assets	57,123	57,153	60,124	62,049	64,622
Short-Term Debt	4,612	4,868	4,868	4,868	4,868
Other Current Liabilities	18,562	17,014	17,520	17,096	17,197
Long-Term Debt	7,853	7,487	7,487	7,487	7,487
Other Non-Current Liabilities	6,187	6,546	6,546	6,546	6,546
Total Liabilities	37,214	35,915	36,421	35,997	36,098
Total Equity	19,909	21,238	23,703	26,052	28,524
Total Equity & Liabilities	57,123	57,153	60,124	62,049	64,622

* For full definitions of iQmethodSM measures, see page 18.

Company Sector

IT Hardware

Company Description

HP Enterprise consists of six segments: 1) Compute (provides servers), 2) HPC&AI (portfolio includes HPE Apollo and Cray), 3) Storage, 4) Intelligent Edge (enterprise networking and connectivity for campus and branch environments, operating under the Aruba brand), 5) Financial Services (enables flexible IT consumption models), and 6) Corporate Investments and Other (incl. HP labs and business incubation projects). Through GreenLake, HPE offers most of its products as-a-Service.

Investment Rationale

Our Neutral rating is based on risk/reward balance where positives including mix shift to high-margin software/SaaS revs, is balanced by risk from an economic slowdown, headwinds to on-premise deployments from customers moving to cloud, software assets relatively small vs. peers and increased competition.

Stock Data

Average Daily Volume 13,376,194

Quarterly Earnings Estimates

	2023	2024
Q1	0.63A	0.46E
Q2	0.52A	0.45E
Q3	0.49A	0.49E
Q4	0.52A	0.48E

Security market

Figure 1: Cybersecurity Vendor Revenue Growth

Sorted by expected c2024 revenue levels, Juniper Security is expected to grow at a 4.6% 2022-2024 CAGR, below that of most cybersecurity peers

Calendar Year (in \$mn)	2019	2020	2021	2022	2023E	2024E	2022-2024 CAGR
Palo Alto Networks	\$3,121.4	\$3,782.7	\$4,857.5	\$6,155.7	\$7,486.6	\$8,912.9	20.3%
YoY Chg (%)	20.4%	21.2%	28.4%	26.7%	21.6%	19.1%	
Fortinet	\$2,163.0	\$2,594.4	\$3,342.2	\$4,417.4	\$5,403.4	\$6,362.5	20.0%
YoY Chg (%)	19.9%	19.9%	28.8%	32.2%	22.3%	17.7%	
Cisco (Security)	\$3,032.0	\$3,276.0	\$3,477.0	\$3,836.0	\$3,931.1	\$4,104.4	3.4%
YoY Chg (%)	nmf	8.0%	6.1%	10.3%	2.5%	4.4%	
CrowdStrike	\$481.4	\$874.4	\$1,451.6	\$2,241.2	\$3,039.1	\$3,908.7	32.1%
YoY Chg (%)	92.7%	81.6%	66.0%	54.4%	35.6%	28.6%	
Okta	\$586.1	\$835.4	\$1,300.2	\$1,858.0	\$2,212.9	\$2,577.7	17.8%
YoY Chg (%)	46.8%	42.5%	55.6%	42.9%	19.1%	16.5%	
Check Point	\$1,994.8	\$2,064.9	\$2,166.8	\$2,329.9	\$2,414.7	\$2,517.3	3.9%
YoY Chg (%)	4.1%	3.5%	4.9%	7.5%	3.6%	4.2%	
Zscaler	\$360.1	\$536.0	\$859.6	\$1,348.0	\$1,844.3	\$2,304.4	30.7%
YoY Chg (%)	48.2%	48.9%	60.4%	56.8%	36.8%	25.0%	
CyberArk	\$433.9	\$464.4	\$502.9	\$591.7	\$731.5	\$908.1	23.9%
YoY Chg (%)	26.4%	7.0%	8.3%	17.7%	23.6%	24.2%	
SentinelOne	\$46.5	\$93.1	\$204.8	\$422.2	\$605.4	\$798.1	37.5%
YoY Chg (%)	107.4%	100.2%	120.1%	106.1%	43.4%	31.8%	
SecureWorks	\$552.8	\$561.0	\$535.2	\$463.5	\$361.6	\$366.3	-11.1%
YoY Chg (%)	6.6%	1.5%	-4.6%	-13.4%	-22.0%	1.3%	
Juniper (Security)	\$638.2	\$610.8	\$656.8	\$628.6	\$660.8	\$688.0	4.6%
YoY Chg (%)	nmf	-4.3%	7.5%	-4.3%	5.1%	4.1%	

Source: Company report, Bloomberg, BofA Global Research estimates

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Figure 2: Snapshot of Industry Growth Rates

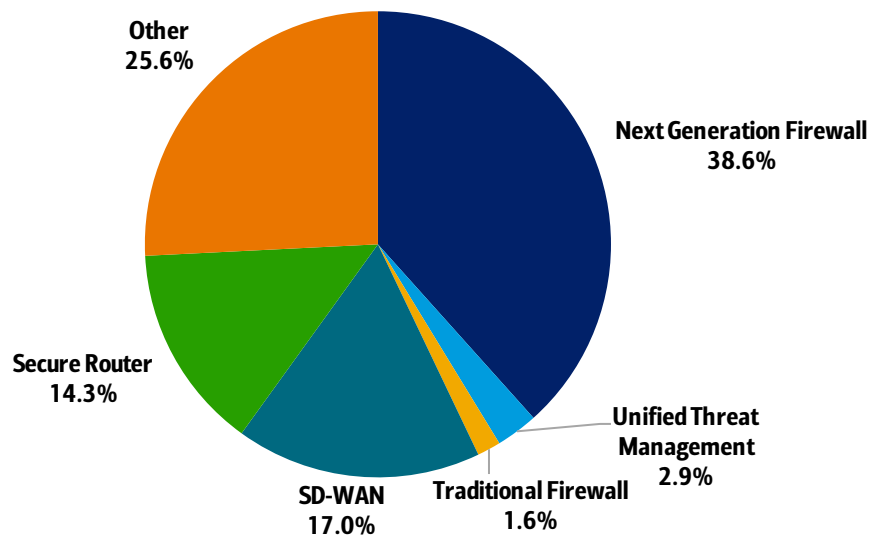
Total firewall, SD-WAN, and secure routers are expected to grow at a respective 3.2%, 10.1%, and -12.1% CAGR from 2022 to 2027

Calendar Year (in \$mn)	2019	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2022-2027 CAGR
Next Generation Firewall (NGFW)	\$6,126.7	\$6,356.7	\$7,109.9	\$8,078.6	\$8,817.7	\$9,038.1	\$9,327.1	\$9,661.9	\$9,733.2	3.8%
YoY Chg	8.8%	3.8%	11.8%	13.6%	9.1%	2.5%	3.2%	3.6%	0.7%	
Unified Threat Management (UTM)	\$1,838.3	\$1,750.0	\$1,824.1	\$1,999.6	\$2,158.3	\$2,187.7	\$2,232.7	\$2,287.2	\$2,278.5	2.6%
YoY Chg	14.8%	-4.8%	4.2%	9.6%	7.9%	1.4%	2.1%	2.4%	-0.4%	
Traditional Firewall	\$493.2	\$452.2	\$419.7	\$473.5	\$473.8	\$441.9	\$411.5	\$380.7	\$338.1	-6.5%
YoY Chg	3.9%	-8.3%	-7.2%	12.8%	0.0%	-6.7%	-6.9%	-7.5%	-11.2%	
Total Firewall	\$8,458.1	\$8,558.9	\$9,353.7	\$10,551.7	\$11,449.7	\$11,667.7	\$11,971.3	\$12,329.8	\$12,349.8	3.2%
YoY Chg	9.7%	1.2%	9.3%	12.8%	8.5%	1.9%	2.6%	3.0%	0.2%	
SD-WAN	\$2,518.9	\$2,977.6	\$3,724.2	\$4,656.1	\$5,149.1	\$5,913.8	\$6,565.5	\$7,098.6	\$7,521.7	10.1%
YoY Chg	79.6%	18.2%	25.1%	25.0%	10.6%	14.9%	11.0%	8.1%	6.0%	
Secure Routers	\$823.3	\$644.9	\$553.6	\$470.8	\$371.8	\$297.0	\$281.2	\$263.9	\$247.7	-12.1%
YoY Chg	1.9%	-21.7%	-14.2%	-15.0%	-21.0%	-20.1%	-5.3%	-6.1%	-6.1%	

Source: Omdia, IDC, BofA Global Research estimates

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Figure 3: 2022 Security Revenue Breakdown
Firewall, including NGFW, UTM, and Traditional Firewall, accounted for 43.1% of Security Revenue in 2022



Source: Omdia, IDC

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Figure 4: Bottom-Up Security Revenue Build and Forecast

We estimate Juniper's Security segment to grow at a 4.9% CAGR from 2022 to 2027

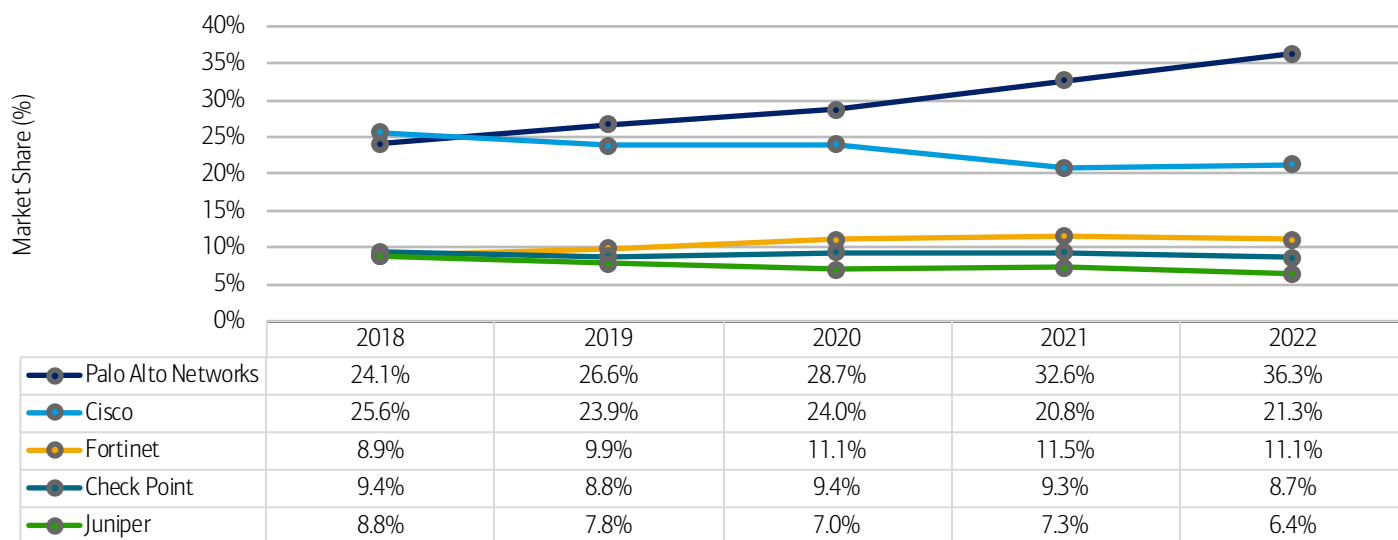
Calendar Year (in \$mn)	2019	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2022-2027 CAGR
Next Generation Firewall (NGFW)	\$234.6	\$204.8	\$235.1	\$242.4	\$264.5	\$271.2	\$279.8	\$289.9	\$292.0	3.8%
YoY Chg (%)	-2.8%	-12.7%	14.8%	3.1%	9.1%	2.5%	3.2%	3.6%	0.7%	
% of Security Revenue	36.8%	33.5%	35.8%	38.6%	40.0%	39.4%	38.4%	37.7%	36.5%	
Market Share (%)	3.8%	3.2%	3.3%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	
Unified Threat Management (UTM)	\$20.5	\$16.1	\$17.8	\$18.4	\$19.9	\$20.1	\$20.5	\$21.0	\$21.0	2.6%
YoY Chg (%)	-6.7%	-21.3%	10.8%	3.1%	7.9%	1.4%	2.1%	2.4%	-0.4%	
% of Security Revenue	3.2%	2.6%	2.7%	2.9%	3.0%	2.9%	2.8%	2.7%	2.6%	
Market Share (%)	1.1%	0.9%	1.0%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	
Traditional Firewall	\$10.5	\$9.2	\$10.0	\$10.3	\$10.3	\$9.6	\$9.0	\$8.3	\$7.4	-6.5%
YoY Chg (%)	-4.0%	-12.6%	8.6%	3.1%	0.0%	-6.7%	-6.9%	-7.5%	-11.2%	
% of Security Revenue	1.6%	1.5%	1.5%	1.6%	1.6%	1.4%	1.2%	1.1%	0.9%	
Market Share (%)	2.1%	2.0%	2.4%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	
Total Firewall	\$265.6	\$230.1	\$262.9	\$271.1	\$294.7	\$300.9	\$309.3	\$319.2	\$320.3	3.4%
YoY Chg (%)	-3.1%	-13.4%	14.3%	3.1%	8.7%	2.1%	2.8%	3.2%	0.4%	
% of Security Revenue	41.6%	37.7%	40.0%	43.1%	44.6%	43.7%	42.5%	41.6%	40.1%	
Market Share (%)	3.1%	2.7%	2.8%	2.6%	3.3%	3.3%	3.3%	3.3%	3.3%	
SD-WAN	\$25.2	\$29.6	\$79.2	\$107.1	\$118.4	\$136.0	\$151.0	\$163.3	\$173.0	10.1%
YoY Chg (%)	nmf	17.5%	167.6%	35.2%	10.6%	14.9%	11.0%	8.1%	6.0%	
% of Security Revenue	3.9%	4.8%	12.1%	17.0%	17.9%	19.8%	20.7%	21.3%	21.6%	
Market Share (%)	1.0%	1.0%	2.1%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	
Secure Router	\$73.8	\$73.0	\$91.1	\$89.7	\$70.8	\$56.6	\$53.5	\$50.3	\$47.2	-12.1%
YoY Chg (%)	18.1%	-1.0%	24.8%	-1.6%	-21.0%	-20.1%	-5.3%	-6.1%	-6.1%	
% of Security Revenue	11.6%	12.0%	13.9%	14.3%	10.7%	8.2%	7.4%	6.5%	5.9%	
Market Share (%)	9.0%	11.3%	16.5%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	
Other	\$273.7	\$278.1	\$223.5	\$160.8	\$176.8	\$194.5	\$214.0	\$235.4	\$258.9	10.0%
YoY Chg (%)	nmf	1.6%	-19.6%	-28.1%	10.0%	10.0%	10.0%	10.0%	10.0%	
% of Security Revenue	42.9%	45.5%	34.0%	25.6%	26.8%	28.3%	29.4%	30.6%	32.4%	
Security Revenue	\$638.2	\$610.8	\$656.8	\$628.6	\$660.8	\$688.0	\$727.9	\$768.1	\$799.4	4.9%
YoY Chg	nmf	-4.3%	7.5%	-4.3%	5.1%	4.1%	5.8%	5.5%	4.1%	
% of Total Juniper Revenue	14.4%	13.7%	13.9%	11.9%						

Source: Omdia, IDC. Company report, BofA Global Research estimates

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Figure 5: Market Share for Data Center and Carrier Firewalls

Juniper held 6.4% of the data center and carrier firewall market in 2022



Source: Omdia

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Figure 6: Snapshot of the Total Firewall Market (\$mn)

Juniper held 2.6% of the total firewall market in 2022

	2019	2020	2021	2022
Next Generation Firewall (NGFW)	\$6,126.7	\$6,356.7	\$7,109.9	\$8,078.6
% of Total	72.4%	74.3%	76.0%	76.6%
YoY Chg (%)	8.8%	3.8%	11.8%	13.6%
Market Share (%)				
Palo Alto Networks	26.3%	29.3%	33.6%	37.4%
Fortinet	15.7%	18.1%	18.5%	17.8%
Cisco	18.8%	16.5%	13.4%	13.9%
Check Point	16.6%	15.7%	14.4%	13.6%
SonicWALL	5.3%	5.7%	6.3%	6.0%
Juniper	3.8%	3.2%	3.3%	3.0%
WatchGuard	2.3%	2.1%	1.9%	1.7%
Other	11.1%	9.3%	8.7%	6.7%
Unified Threat Management (UTM)	\$1,838.3	\$1,750.0	\$1,824.1	\$1,999.6
% of Total	21.7%	20.4%	19.5%	19.0%
YoY Chg (%)	14.8%	-4.8%	4.2%	9.6%
Market Share (%)				
Fortinet	21.0%	24.8%	27.5%	27.3%
Cisco	25.1%	25.4%	23.1%	25.1%
SonicWALL	4.3%	4.9%	5.8%	6.0%
WatchGuard	6.0%	6.0%	5.4%	5.1%
Check Point	3.3%	3.3%	3.4%	3.3%
Juniper	1.1%	0.9%	1.0%	0.9%
Other	39.1%	34.7%	33.8%	32.3%
Traditional Firewall	\$493.2	\$452.2	\$419.7	\$473.5
% of Total	5.8%	5.3%	4.5%	4.5%
YoY Chg (%)	3.9%	-8.3%	-7.2%	12.8%
Market Share (%)				
Fortinet	17.1%	21.7%	23.3%	23.7%
Check Point	18.6%	20.1%	21.0%	19.9%
Cisco	10.2%	7.3%	5.6%	5.9%
Juniper	2.1%	2.0%	2.4%	2.2%
WatchGuard	1.8%	1.9%	1.9%	1.8%
Other	50.0%	46.9%	45.7%	46.5%
Total Firewall	\$8,458.1	\$8,558.9	\$9,353.7	\$10,551.7
YoY Chg (%)	9.7%	1.2%	9.3%	12.8%
Market Share (%)				
Palo Alto Networks	19.1%	21.8%	25.5%	28.6%
Fortinet	17.0%	19.6%	20.5%	19.9%
Cisco	19.7%	17.9%	14.9%	15.6%
Check Point	13.8%	13.4%	12.6%	11.9%
SonicWALL	4.8%	5.2%	5.9%	5.7%
Juniper	3.1%	2.7%	2.8%	2.6%
WatchGuard	3.1%	2.9%	2.6%	2.3%
Other	19.4%	16.5%	15.3%	13.3%

Source: Omdia

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Figure 7: Snapshot of the SD-WAN Market (\$mn)

Juniper held 2.3% of the SD-WAN market in 2022

	2019	2020	2021	2022
SD-WAN	\$2,518.9	\$2,977.6	\$3,724.2	\$4,656.1
YoY Chg (%)	79.6%	18.2%	25.1%	25.0%
Market Share (%)				
Cisco	39.3%	37.9%	37.2%	40.1%
Versa	5.8%	8.6%	11.7%	10.4%
Fortinet	6.8%	8.2%	9.5%	9.2%
VMware	8.8%	9.5%	8.3%	7.7%
HPE/Aruba	7.9%	8.0%	7.0%	7.6%
Palo Alto	4.5%	5.0%	5.1%	4.8%
Huawei	4.0%	4.3%	4.7%	5.8%
Nokia	4.1%	3.7%	3.0%	2.3%
Juniper	1.0%	1.0%	2.1%	2.3%
Other	17.8%	13.9%	11.4%	9.9%

Source: IDC

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Figure 8: Snapshot of the Secure Routers Market (\$mn)

Juniper held 19% of the secure routers market in 2022

	2019	2020	2021	2022
Secure Routers	\$823.3	\$644.9	\$553.6	\$470.8
YoY Chg (%)	1.9%	-21.7%	-14.2%	-15.0%
Market Share (%)				
Cisco	89.9%	87.5%	82.4%	79.6%
Juniper	9.0%	11.3%	16.5%	19.0%
Other	1.2%	1.2%	1.2%	1.3%

Source: Omdia

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Switching market

Total Switching market

Figure 9: Global Switching Revenue Share

The global switching market grew 39.4% YoY in 2Q23, driven by acceleration in both campus and data center switching

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	CY19	CY20	CY21	CY22
	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec				
Revenue (\$mn)	\$5,785	\$6,327	\$7,140	\$7,364	\$6,495	\$6,758	\$7,523	\$8,331	\$7,578	\$8,930	\$10,406	\$10,546	\$10,681	\$12,447			\$27,754	\$26,615	\$29,106	\$37,461
QoQ % Chg	-21.5%	9.4%	12.8%	3.1%	-11.8%	4.1%	11.3%	10.7%	-9.0%	17.8%	16.5%	1.4%	1.3%	16.5%						
YoY % Chg	-11.0%	-7.8%	1.7%	-0.1%	12.3%	6.8%	5.4%	13.1%	16.7%	32.1%	38.3%	26.6%	40.9%	39.4%			2.4%	-4.1%	9.4%	28.7%
Market Share (%)																				
Cisco	50.7%	45.3%	47.8%	42.8%	47.8%	44.1%	44.0%	42.5%	42.3%	40.3%	41.8%	40.3%	42.2%	44.8%			49.3%	46.5%	44.5%	41.1%
Arista	7.1%	6.6%	6.7%	7.0%	8.1%	8.2%	8.1%	8.4%	10.1%	10.8%	9.7%	10.4%	10.1%	9.7%			7.3%	6.9%	8.2%	10.2%
Huawei	8.0%	11.3%	11.0%	14.5%	8.4%	11.2%	11.3%	12.2%	7.6%	10.1%	11.0%	11.3%	6.2%	8.6%			9.7%	11.4%	10.9%	10.2%
White Box Vendors	2.8%	4.7%	4.2%	4.6%	5.2%	1.7%	4.4%	5.5%	6.7%	7.3%	6.9%	7.5%	8.7%	7.1%			2.8%	4.1%	4.2%	7.1%
HPE	6.8%	5.6%	5.3%	6.8%	6.2%	7.5%	6.1%	5.5%	6.1%	5.3%	4.6%	5.4%	6.5%	5.9%			5.7%	6.1%	6.3%	5.3%
H3C	4.8%	8.2%	6.8%	5.8%	5.6%	8.8%	8.2%	7.8%	8.3%	7.7%	6.5%	5.5%	4.7%	4.5%			6.0%	6.4%	7.6%	6.9%
Juniper	3.5%	3.0%	3.0%	3.3%	2.8%	3.6%	3.5%	3.2%	3.0%	3.2%	3.1%	3.1%	2.4%	2.3%			3.1%	3.2%	3.3%	3.1%
Extreme	1.6%	1.5%	2.0%	1.6%	1.9%	0.0%	0.0%	1.1%	1.5%	1.6%	1.5%	1.6%	1.6%	1.5%			2.0%	1.7%	0.8%	1.6%
Dell	2.3%	2.1%	1.8%	1.9%	1.9%	1.7%	1.6%	1.9%	2.0%	1.6%	1.4%	1.8%	1.7%	1.5%			2.0%	2.0%	1.8%	1.7%
Ruijie Networks													1.3%	1.1%						
Ubiquiti	0.9%	0.7%	1.0%	1.0%	1.1%	0.0%	0.0%	0.9%	0.9%	0.9%	0.9%	0.9%	0.8%	0.7%			0.6%	0.9%	0.5%	0.9%
NETGEAR	1.0%	0.7%	0.8%	0.8%	1.0%	0.0%	0.0%	1.0%	1.0%	1.0%	0.9%	1.0%	0.8%	0.5%			0.9%	0.8%	0.5%	1.0%
D-Link	0.8%	0.6%	0.7%	0.7%	0.8%	0.0%	0.0%	0.7%	0.6%	0.6%	0.6%	0.5%	0.5%	0.5%			0.8%	0.7%	0.4%	0.6%
TP-Link	0.8%	0.8%	0.8%	0.8%	0.7%	0.0%	0.0%	0.7%	0.6%	0.3%	0.7%	0.4%	0.7%	0.4%			0.8%	0.8%	0.3%	0.5%
CommScope (Ruckus)	0.7%	0.7%	0.7%	0.6%	0.7%	0.0%	0.0%	0.5%	0.6%	0.5%	0.5%	0.5%	0.4%	0.3%			0.0%	0.7%	0.3%	0.5%
Alcatel-Lucent Enterprise	0.4%	0.3%	0.4%	0.6%	0.4%	0.0%	0.0%	0.5%	0.4%	0.4%	0.5%	0.5%	0.3%	0.3%			0.5%	0.5%	0.2%	0.5%
Ruby Tech	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%			0.1%	0.1%	0.0%	0.1%
Alaxala	0.3%	0.2%	0.2%	0.1%	0.2%	0.0%	0.0%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%			0.2%	0.2%	0.1%	0.1%
Apresia	0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%	0.0%			0.1%	0.1%	0.1%	0.1%
ZTE	0.8%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			1.0%	0.4%	0.0%	0.0%
Arris	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.6%	0.0%	0.0%	0.0%
Adtran	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.1%	0.0%	0.0%	0.0%
Other	6.4%	6.3%	6.6%	6.9%	6.9%	13.2%	12.8%	7.3%	7.9%	8.1%	9.1%	8.9%	10.9%	9.9%			6.2%	6.6%	10.0%	8.6%

Source: Omdia

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**Figure 10: Regional Switching Revenue Share**

Switching growth is supported by regional recovery in North America, which grew from a 41.7% contribution in 2Q22 to 45.5% in 2Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23		CY19	CY20	CY21	CY22
	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec					
North America	42.3%	40.4%	41.7%	38.3%	40.8%	38.0%	40.4%	39.3%	42.0%	41.7%	42.9%	42.3%	44.5%	45.5%				41.6%	40.6%	39.6%	42.3%
EMEA	28.9%	25.9%	26.7%	27.0%	29.5%	27.1%	26.7%	26.0%	28.1%	26.0%	26.3%	27.0%	27.4%	26.9%				27.0%	27.1%	27.2%	26.8%
APAC	26.0%	31.2%	29.3%	32.3%	27.2%	32.6%	30.7%	32.7%	27.7%	30.2%	28.2%	27.6%	25.5%	24.8%				28.4%	29.9%	31.0%	28.4%
CALA	2.8%	2.4%	2.3%	2.4%	2.4%	2.2%	2.3%	2.0%	2.1%	2.1%	2.6%	3.2%	2.6%	2.8%				3.0%	2.5%	2.2%	2.5%

Source: Omdia

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Figure 11: Global Switching Port Speed Revenue Share

1G revenue share grew from 31.7% in 222 to 37.1% in 2Q22, while 100G share declined from 26.7% to 21.5%

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23		CY19	CY20	CY21	CY22
	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec					
100M	1.5%	1.8%	1.5%	1.8%	1.7%	1.2%	1.2%	1.0%	0.5%	1.0%	1.0%	1.0%	0.9%	1.2%				2.5%	1.7%	1.3%	0.9%
1 Gig	42.4%	38.1%	38.8%	36.7%	35.9%	39.9%	33.9%	32.6%	30.6%	31.7%	34.2%	33.9%	34.2%	37.1%				40.8%	38.8%	35.4%	32.8%
2.5 Gig	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.8%	0.8%	0.9%	0.9%	0.9%	1.0%				0.0%	0.0%	0.0%	0.9%
5 Gig	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%				0.0%	0.0%	0.0%	0.2%
10 Gig	22.4%	23.6%	21.2%	22.3%	22.1%	23.0%	24.6%	24.6%	20.9%	19.4%	19.6%	20.2%	18.8%	19.2%				25.2%	22.3%	23.7%	20.0%
25 Gig	7.6%	8.0%	9.4%	8.8%	9.3%	8.2%	9.2%	9.0%	10.6%	9.7%	9.3%	9.1%	9.7%	9.3%				5.7%	8.5%	8.9%	9.6%
40 Gig	5.0%	4.8%	4.5%	4.9%	4.2%	4.5%	4.3%	3.9%	3.6%	3.2%	3.1%	2.4%	2.2%	2.0%				6.8%	4.8%	4.2%	3.0%
50 Gig	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%	0.4%	0.5%	0.0%	0.2%				0.0%	0.0%	0.0%	0.5%
100 Gig	20.7%	23.2%	24.1%	24.9%	26.1%	22.0%	25.4%	25.1%	27.6%	26.7%	24.8%	24.0%	24.8%	21.5%				18.8%	23.4%	24.7%	25.6%
200 Gig	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.3%	0.1%				0.0%	0.0%	0.1%	0.2%
400 Gig	0.3%	0.5%	0.4%	0.5%	0.6%	1.1%	1.4%	3.5%	4.7%	6.7%	6.3%	7.6%	8.0%	8.2%				0.1%	0.4%	1.8%	6.4%
Legacy (100M/1G)	43.9%	39.9%	40.3%	38.5%	37.6%	41.1%	35.1%	33.6%	31.0%	32.6%	35.2%	34.9%	35.0%	38.3%				43.3%	40.5%	36.6%	33.7%
Total ex-100G/200G/400G	79.0%	76.3%	75.5%	74.5%	73.3%	76.9%	73.2%	71.3%	67.6%	66.4%	68.7%	68.2%	66.9%	70.2%				81.1%	76.2%	73.5%	67.8%

Source: Omdia

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Figure 12: Global Switching Revenue per Port Overview

Global switching revenue per port grew 19% YoY in 2Q23, supported by the impact of pricing actions

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23		CY19	CY20	CY21	CY22
	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec					
Revenue per Port (\$)	\$37	\$38	\$38	\$38	\$40	\$28	\$30	\$34	\$36	\$35	\$34	\$35	\$40	\$42				\$38	\$38	\$32	\$35
QoQ % Chg	1.5%	2.2%	0.1%	1.4%	3.2%	-29.5%	6.7%	13.9%	4.7%	-0.6%	-3.0%	0.8%	16.7%	4.2%							
YoY % Chg	-9.2%	-2.8%	-0.9%	5.3%	7.0%	-26.2%	-21.3%	-11.6%	-10.3%	26.5%	15.1%	1.8%	13.5%	19.0%				-2.1%	-1.7%	-14.8%	8.2%
Revenue per Port Speed																					
100M	\$5	\$7	\$5	\$7	\$8	\$4	\$4	\$4	\$2	\$4	\$5	\$5	\$6	\$8				\$7	\$6	\$5	\$4
1 Gig	\$20	\$19	\$19	\$18	\$18	\$14	\$12	\$14	\$14	\$14	\$15	\$15	\$18	\$20				\$21	\$19	\$14	\$15
2.5 Gig	\$20	\$28	\$25	\$28	\$32	\$14	\$16	\$16	\$37	\$30	\$30	\$30	\$33	\$34				\$19	\$26	\$19	\$31
5 Gig	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$45	\$42	\$41	\$41	\$47	\$49				\$0	\$0	\$0	\$42
10 Gig	\$152	\$135	\$137	\$144	\$156	\$123	\$136	\$126	\$102	\$97	\$106	\$105	\$119	\$167				\$159	\$141	\$133	\$103
25 Gig	\$98	\$108	\$136	\$126	\$131	\$127	\$132	\$136	\$145	\$148	\$156	\$154	\$144	\$153				\$131	\$118	\$132	\$151
40 Gig	\$319	\$260	\$320	\$300	\$293	\$309	\$300	\$295	\$351	\$328	\$331	\$299	\$298	\$278				\$363	\$298	\$299	\$327
50 Gig	\$201	\$161	\$102	\$46	\$55	\$58	\$58	\$111	\$408	\$357	\$463	\$418	\$150	\$239				\$371	\$65	\$84	\$410
100 Gig	\$278	\$239	\$288	\$290	\$261	\$308	\$256	\$265	\$271	\$281	\$283	\$271	\$225	\$240				\$291	\$274	\$269	\$276
200 Gig	\$216	\$199	\$243	\$314	\$252	\$239	\$239	\$244	\$318	\$377	\$386	\$354	\$403	\$339				\$0	\$247	\$244	\$362
400 Gig	\$570	\$620	\$537	\$609	\$601	\$560	\$576	\$500	\$516	\$472	\$381	\$391	\$390	\$384				\$495	\$586	\$529	\$421

Source: Omdia

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Campus Switching market

Figure 13: Global Campus Switching Revenue Share

The global campus switching market saw growth of 54.1% YoY in 223, fueled by a resumption of network upgrade projects and an improving supply chain

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	CY19	CY20	CY21	CY22
	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec				
Revenue (\$mn)	\$3,254	\$3,433	\$3,939	\$4,036	\$3,556	\$3,972	\$4,167	\$4,666	\$3,932	\$4,666	\$6,088	\$5,978	\$5,938	\$7,190			\$15,752	\$14,662	\$16,361	\$20,664
QoQ % Chg	-26.2%	5.5%	14.7%	2.5%	-11.9%	11.7%	4.9%	12.0%	-15.7%	18.7%	30.5%	-1.8%	-0.7%	21.1%			1.9%	-6.9%	11.6%	26.3%
YoY % Chg	-10.6%	-9.1%	0.2%	-8.4%	9.3%	15.7%	5.8%	15.6%	10.6%	17.5%	46.1%	28.1%	51.0%	54.1%						
Market Share (%)																				
Cisco	56.8%	52.5%	51.6%	46.8%	53.4%	47.2%	47.3%	48.3%	47.2%	49.1%	50.4%	48.9%	51.5%	55.0%			55.6%	51.6%	48.9%	49.1%
Arista	0.2%	0.4%	0.4%	0.4%	0.3%	0.4%	0.9%	1.9%	2.9%	3.4%	1.7%	2.5%	1.7%	1.4%			0.1%	0.4%	0.9%	2.6%
Huawei	7.2%	9.8%	11.6%	12.5%	7.0%	11.0%	11.2%	10.1%	7.2%	10.5%	10.6%	12.2%	5.8%	9.9%			8.5%	10.4%	9.9%	10.4%
HPE	10.7%	8.9%	8.5%	11.1%	9.9%	11.6%	9.8%	8.9%	10.9%	9.4%	7.3%	8.6%	10.4%	9.1%			8.7%	9.8%	10.0%	8.8%
H3C	4.2%	8.6%	6.1%	6.8%	6.9%	9.1%	9.7%	9.2%	9.2%	5.9%	8.6%	6.3%	4.9%	3.7%			6.5%	6.5%	8.8%	7.4%
Juniper	2.6%	2.8%	2.8%	2.9%	2.2%	2.6%	2.9%	3.0%	2.4%	3.2%	2.6%	2.2%	1.9%	2.0%			2.4%	2.8%	2.7%	2.6%
Extreme	2.9%	2.8%	3.7%	2.9%	3.5%	0.0%	0.0%	2.0%	2.9%	3.1%	2.5%	2.9%	2.9%	2.6%			3.6%	3.1%	1.4%	2.8%
Dell	1.2%	0.9%	0.9%	0.9%	0.8%	0.7%	0.6%	1.0%	1.1%	0.6%	0.3%	0.7%					1.0%	1.0%	0.8%	0.6%
Ruijie Networks													2.4%	1.9%						
Ubiquiti	1.6%	1.3%	1.8%	1.9%	2.0%	0.0%	0.0%	1.6%	1.7%	1.7%	1.6%	1.6%	1.4%	1.3%			1.1%	1.7%	0.9%	1.6%
NETGEAR	1.8%	1.3%	1.4%	1.5%	1.8%	0.0%	0.0%	1.8%	1.9%	2.0%	1.6%	1.7%	1.4%	0.9%			1.6%	1.5%	0.9%	1.8%
D-Link	1.5%	1.0%	1.2%	1.3%	1.5%	0.0%	0.0%	1.3%	1.2%	1.2%	1.0%	0.9%	0.8%	0.9%			1.3%	1.3%	0.7%	1.1%
TP-Link	1.4%	1.5%	1.5%	1.5%	1.2%	0.0%	0.0%	1.2%	1.1%	0.6%	1.2%	0.7%	1.3%	0.7%			1.4%	1.5%	0.6%	0.9%
CommScope (Ruckus)	1.2%	1.3%	1.3%	1.2%	1.3%	0.0%	0.0%	1.0%	1.1%	1.0%	0.8%	0.9%	0.7%	0.6%			0.0%	1.2%	0.5%	1.0%
Alcatel-Lucent Enterprise	0.8%	0.6%	0.7%	1.1%	0.8%	0.0%	0.0%	0.9%	0.8%	0.9%	0.8%	0.8%	0.6%	0.5%			0.9%	0.8%	0.4%	0.8%
Ruby Tech	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.2%	0.2%	0.1%	0.1%	0.2%	0.1%	0.2%			0.2%	0.1%	0.1%	0.1%
Alaxala	0.5%	0.4%	0.4%	0.3%	0.5%	0.0%	0.0%	0.3%	0.4%	0.2%	0.2%	0.2%	0.2%	0.2%			0.3%	0.4%	0.2%	0.3%
Apresia	0.3%	0.2%	0.3%	0.2%	0.2%	0.0%	0.0%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%			0.2%	0.2%	0.1%	0.1%
ZTE	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.4%	0.1%	0.0%	0.0%
Arris	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			1.1%	0.0%	0.0%	0.0%
Adtran	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.2%	0.0%	0.0%	0.0%
Other	4.8%	5.3%	5.9%	6.5%	6.5%	17.4%	17.5%	7.2%	7.4%	6.9%	8.5%	8.5%	11.0%	8.5%			4.8%	5.7%	12.1%	7.9%

Source: Omdia

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Figure 14: Global Campus Switching Port Speed Revenue Share

From the perspective of port speeds, the largest share of revenue in the campus switching market will be from lower to mid-range switches

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23		CY19	CY20	CY21	CY22
	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec					
100M	2.7%	3.3%	2.7%	3.3%	3.1%	2.1%	2.2%	1.8%	0.9%	1.9%	1.8%	1.7%	1.6%	2.1%				4.4%	3.0%	2.2%	1.6%
1 Gig	74.1%	69.3%	69.4%	66.3%	64.5%	67.1%	60.4%	57.6%	58.4%	60.1%	58.2%	59.6%	61.1%	64.0%				70.4%	69.6%	62.1%	59.1%
2.5 Gig	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	1.6%	1.5%	1.5%	1.5%	1.7%	1.7%				0.0%	0.1%	0.1%	1.5%
5 Gig	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.3%	0.3%	0.3%	0.4%	0.4%				0.0%	0.0%	0.0%	0.4%
10 Gig	22.7%	26.5%	25.2%	27.1%	29.8%	30.8%	33.7%	33.6%	31.0%	27.6%	26.2%	28.5%	27.5%	28.2%				24.5%	25.5%	32.1%	28.1%
25 Gig	0.2%	0.2%	0.6%	0.7%	0.7%	-0.5%	0.6%	1.5%	2.0%	1.7%	2.5%	1.7%	1.7%	1.7%				0.1%	0.4%	0.6%	2.0%
40 Gig	0.2%	0.1%	0.3%	0.2%	0.1%	1.1%	1.0%	1.1%	0.9%	1.1%	1.5%	0.5%	0.4%	0.3%				0.4%	0.2%	0.9%	1.0%
50 Gig	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.7%	0.8%	0.0%	0.0%				0.0%	0.0%	0.0%	0.8%
100 Gig	0.1%	0.5%	1.6%	2.3%	1.7%	-0.8%	1.9%	4.0%	3.6%	4.0%	6.9%	5.1%	5.2%	1.9%				0.1%	1.2%	1.8%	5.1%
200 Gig	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%				0.0%	0.0%	0.0%	0.0%
400 Gig	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.3%	0.8%	0.4%	0.2%	0.4%	0.0%				0.0%	0.0%	0.2%	0.4%
Legacy (100M/1G)	76.8%	72.6%	72.2%	69.6%	67.6%	69.2%	62.6%	59.3%	59.2%	62.0%	59.9%	61.4%	62.6%	66.1%				74.9%	72.6%	64.4%	60.7%
Total ex -100G/200G/400G	99.9%	99.5%	98.4%	97.7%	98.3%	100.8%	98.0%	95.6%	96.1%	95.2%	92.7%	94.8%	94.3%	98.3%				99.9%	98.8%	98.0%	94.5%

Source: Omdia

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Data Center Switching market

Figure 15: Global Data Center Switching Revenue Share

The global data center switching market grew 23.3% YoY in 2Q22, below 2Q22's 53.1% YoY on spending moderation

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	CY19	CY20	CY21	CY22
	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec				
Revenue (\$mn)	\$2,531	\$2,894	\$3,200	\$3,328	\$2,939	\$2,786	\$3,357	\$3,664	\$3,647	\$4,264	\$4,318	\$4,568	\$4,743	\$5,257			\$12,002	\$11,953	\$12,745	\$16,797
QoQ % Chg	-14.7%	14.3%	10.6%	4.0%	-11.7%	-5.2%	20.5%	9.2%	-0.5%	16.9%	1.3%	5.8%	3.8%	10.8%			2.9%	-0.4%	6.6%	31.8%
YoY % Chg	-11.5%	-6.2%	3.5%	12.2%	16.1%	-3.7%	4.9%	10.1%	24.1%	53.1%	28.7%	24.7%	30.1%	23.3%						
Market Share (%)																				
Cisco	42.7%	36.7%	43.2%	37.9%	41.1%	39.7%	39.8%	35.2%	36.9%	30.6%	29.6%	29.2%	30.5%	31.0%			41.0%	40.1%	38.8%	31.3%
Arista	15.9%	14.1%	14.5%	15.0%	17.6%	19.4%	17.1%	16.7%	17.8%	18.8%	21.0%	20.8%	20.5%	21.0%			16.8%	14.8%	17.6%	19.7%
White Box Vendors	6.4%	10.4%	9.3%	10.2%	11.5%	4.1%	9.8%	12.4%	14.0%	15.3%	16.7%	17.3%	19.6%	16.8%			6.5%	9.2%	9.7%	15.9%
Huawei	9.2%	13.1%	10.3%	16.8%	10.0%	11.6%	11.4%	14.9%	7.9%	9.5%	11.5%	10.2%	6.6%	6.7%			11.3%	12.6%	12.1%	9.9%
Juniper	4.7%	3.3%	3.2%	3.7%	3.5%	5.0%	4.2%	3.4%	3.7%	3.3%	3.9%	4.2%	2.9%	2.7%			4.1%	3.7%	4.0%	3.8%
H3C	5.4%	7.7%	7.6%	4.5%	4.1%	8.3%	6.3%	6.0%	7.3%	9.6%	3.6%	4.4%	4.3%	5.7%			5.3%	6.3%	6.1%	6.1%
Dell	3.7%	3.6%	3.0%	3.0%	3.2%	3.2%	2.8%	3.1%	3.0%	2.8%	3.0%	3.2%	3.0%	2.9%			3.4%	3.3%	3.1%	3.0%
HPE	1.9%	1.7%	1.4%	1.5%	1.8%	1.6%	1.4%	1.1%	1.0%	0.7%	0.8%	1.3%	1.7%	1.4%			1.8%	1.6%	1.4%	0.9%
NVIDIA														2.1%						
ZTE	1.6%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			1.8%	0.8%	0.0%	0.0%
Other	8.5%	7.5%	7.5%	7.3%	7.4%	7.2%	7.1%	7.3%	8.4%	9.5%	10.0%	9.5%	10.9%	9.6%			7.9%	7.6%	7.3%	9.4%

Source: Omdia

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Figure 16: Global 100G DC Switching Revenue Share

100G DC switching remains a competitive market with the top three vendors accounting for roughly 20%-25% of the market each

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	CY19	CY20	CY21	CY22
	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec				
Revenue (\$mn)	\$1,193	\$1,450	\$1,656	\$1,744	\$1,632	\$1,514	\$1,832	\$1,906	\$1,948	\$2,200	\$2,159	\$2,231	\$2,341	\$2,535			\$5,210	\$6,043	\$6,885	\$8,539
QoQ % Chg	-7.6%	21.5%	14.3%	5.3%	-6.4%	-7.2%	21.0%	4.0%	2.2%	12.9%	-1.9%	3.3%	4.9%	8.3%			31.2%	16.0%	13.9%	24.0%
YoY % Chg	-3.0%	9.3%	21.5%	35.1%	36.8%	4.5%	10.6%	9.3%	19.4%	45.3%	17.8%	17.0%	20.1%	15.2%						
Market Share (%)																				
Cisco	33.9%	31.0%	36.8%	32.3%	34.5%	35.1%	34.1%	31.0%	31.0%	25.9%	24.8%	24.3%	25.6%	26.9%			33.6%	33.6%	33.6%	26.4%
Arista	25.1%	20.8%	20.3%	20.9%	22.1%	27.1%	23.2%	22.9%	23.6%	22.7%	26.0%	25.6%	23.6%	24.2%			26.0%	21.5%	23.7%	24.5%
White Box Vendors	8.6%	16.3%	15.3%	17.2%	19.1%	4.6%	14.7%	14.4%	15.1%	15.9%	17.6%	17.6%	22.6%	16.7%			11.6%	14.8%	13.4%	16.6%
Huawei	9.9%	11.3%	8.7%	14.0%	8.7%	11.0%	10.1%	13.7%	7.2%	8.9%	11.1%	10.3%	6.7%	6.9%			7.7%	11.1%	11.0%	9.4%
Juniper	6.2%	3.5%	3.4%	3.8%	3.4%	5.7%	4.3%	4.0%	4.0%	3.6%	4.2%	4.7%	3.4%	3.2%			5.1%	4.1%	4.3%	4.2%
H3C	4.2%	6.1%	9.4%	4.0%	3.9%	8.4%	5.9%	5.6%	8.7%	11.0%	3.3%	4.0%	4.0%	5.5%			4.1%	6.0%	5.9%	6.7%
Dell	2.1%	2.1%	1.3%	1.3%	1.4%	1.4%	1.2%	1.3%	1.8%	1.7%	1.7%	2.0%	1.6%	1.7%			2.2%	1.6%	1.3%	1.8%
HPE	1.1%	0.7%	0.6%	1.7%	1.7%	1.8%	1.6%	1.6%	1.2%	0.7%	1.2%	1.9%	2.2%	1.4%			0.7%	1.0%	1.7%	1.2%
NVIDIA														3.6%						
ZTE	0.5%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			1.6%	0.5%	0.0%	0.0%
Other	8.4%	6.6%	4.2%	4.9%	5.3%	5.1%	5.1%	5.5%	7.5%	9.7%	10.0%	9.7%	10.4%	9.9%			7.4%	5.8%	5.2%	9.3%

Source: Omdia

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Routing market

Total Routing market

Figure 17: Snapshot of the Total Routing Market ex-China

The total routing market ex-China grew 13.2% YoY in 2Q23, supported by network capacity expansion

	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	CY19	CY20	CY21	CY22
	19-Mar	19-Jun	19-Sep	19-Dec	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec				
Revenue (\$mn)	\$2,104	\$2,255	\$2,216	\$2,366	\$1,733	\$2,099	\$2,126	\$2,553	\$2,213	\$2,355	\$2,384	\$2,713	\$2,291	\$2,534	\$2,606	\$2,851	\$2,741	\$2,868			\$8,940	\$8,511	\$9,665	\$10,282
QoQ % Chg	-17.2%	7.2%	-1.7%	6.8%	-26.8%	21.1%	1.3%	20.1%	-13.3%	6.4%	1.2%	13.8%	-15.5%	10.6%	2.8%	9.4%	-3.9%	4.6%			-0.3%	-4.8%	13.6%	6.4%
YoY % Chg	4.1%	4.9%	-1.9%	-6.9%	-17.6%	-6.9%	-4.1%	7.9%	27.7%	12.2%	12.1%	6.2%	3.5%	7.6%	9.3%	5.1%	19.6%	13.2%						
Revenue Share																								
Huawei	12.8%	15.7%	16.1%	17.8%	16.7%	17.6%	10.5%	24.2%	15.3%	18.0%	17.3%	18.7%	16.2%	19.5%	14.8%	17.1%	14.3%	21.3%			15.7%	17.6%	17.4%	16.9%
Cisco	41.5%	37.9%	37.2%	34.5%	36.0%	36.3%	39.9%	28.3%	38.3%	39.2%	39.7%	36.9%	39.7%	35.0%	38.4%	35.8%	39.4%	39.8%			37.7%	34.7%	38.5%	37.1%
Nokia	23.9%	24.1%	24.1%	25.8%	24.7%	24.0%	27.2%	26.5%	25.4%	23.0%	24.4%	23.7%	23.6%	21.9%	21.9%	25.4%	23.0%	17.2%			24.5%	25.7%	24.1%	23.2%
Juniper	17.6%	18.4%	18.2%	17.8%	17.9%	19.0%	19.9%	17.5%	16.7%	16.0%	15.7%	17.8%	16.1%	17.8%	19.9%	16.3%	16.9%	16.1%			18.0%	18.5%	16.6%	17.5%
ZTE	2.3%	2.0%	2.5%	2.3%	2.0%	1.0%	0.6%	1.7%	2.4%	2.0%	1.1%	1.2%	1.0%	0.8%	0.7%	1.6%	1.6%	1.8%			2.3%	1.3%	1.6%	1.0%
Ciena	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	2.0%	1.7%	1.4%	2.2%	1.8%			0.0%	0.0%	0.0%	1.5%
Ericsson	0.6%	0.6%	0.6%	0.7%	1.3%	0.9%	0.8%	0.7%	0.8%	0.7%	0.7%	0.6%	0.8%	1.5%	1.5%	1.5%	1.2%	1.1%			0.6%	0.9%	0.7%	1.3%
Alaxala	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.1%	0.6%	0.6%	0.3%	0.0%	0.5%	0.1%			0.0%	0.0%	0.1%	0.3%
Infinera	0.4%	0.4%	0.2%	0.4%	0.5%	0.3%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%			0.3%	0.3%	0.2%	0.0%
Other	0.9%	0.9%	0.9%	0.9%	0.8%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.8%			0.9%	0.9%	0.9%	0.9%

Source: Omdia

BoFA GLOBAL RESEARCH





Core Routing market

Figure 18: Snapshot of the Core Routing Market ex-China

Core routing was up 37.5% YoY in 2Q23

	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23		CY19	CY20	CY21	CY22
	19-Mar	19-Jun	19-Sep	19-Dec	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec					
Revenue (\$mn)	\$548	\$530	\$505	\$529	\$412	\$490	\$508	\$500	\$536	\$560	\$557	\$628	\$586	\$569	\$585	\$621	\$684	\$782				\$2,112	\$1,910	\$2,281	\$2,360
QoQ % Chg	-4.2%	-3.4%	-4.7%	4.9%	-22.2%	19.0%	3.8%	-1.7%	7.3%	4.4%	-0.5%	12.6%	-6.7%	-2.9%	2.9%	6.1%	10.2%	14.3%							
YoY % Chg	17.2%	-8.5%	-15.5%	-7.5%	-24.9%	-7.5%	0.7%	-5.6%	30.2%	14.3%	9.6%	25.6%	9.3%	1.6%	5.0%	-1.1%	16.8%	37.5%				-4.7%	-9.6%	19.4%	3.5%
Revenue Share																									
Huawei	11.5%	19.5%	16.4%	18.0%	13.4%	11.4%	14.1%	17.3%	10.3%	12.0%	12.5%	16.9%	9.6%	12.2%	10.7%	15.4%	8.7%	8.9%				16.3%	14.1%	13.1%	12.0%
Cisco	51.9%	39.6%	43.5%	44.6%	49.9%	48.5%	49.2%	43.4%	57.9%	58.2%	56.7%	55.0%	61.8%	59.6%	63.2%	58.3%	67.5%	70.8%				45.0%	47.7%	56.8%	60.7%
Nokia	7.9%	8.7%	9.0%	9.7%	8.3%	7.9%	4.1%	5.9%	3.0%	2.8%	3.1%	3.0%	2.7%	2.8%	4.0%	4.8%	3.8%	1.3%				8.8%	6.4%	3.0%	3.6%
Juniper	26.4%	30.2%	28.7%	24.9%	26.0%	31.0%	31.8%	30.9%	26.3%	25.5%	26.5%	23.7%	24.8%	24.4%	21.0%	19.4%	18.3%	17.6%				27.5%	30.1%	25.4%	22.3%
ZTE	1.8%	1.5%	1.9%	2.4%	1.8%	0.8%	0.4%	2.1%	2.1%	1.1%	0.8%	1.1%	0.6%	0.6%	0.6%	1.7%	1.3%	1.1%				1.9%	1.2%	1.2%	0.9%
Other	0.5%	0.4%	0.4%	0.5%	0.4%	0.4%	0.5%	0.5%	0.4%	0.4%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%				0.4%	0.4%	0.4%	0.4%

Source: Omdia

BofA GLOBAL RESEARCH

Edge Routing market

Figure 19: Snapshot of the Edge Routing Market ex-China

The edge routing market ex-China grew 6.1% YoY in 2Q23 vs. 9.5% a year ago, as SPs and cable companies are moderating their spending levels

	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23		CY19	CY20	CY21	CY22
	19-Mar	19-Jun	19-Sep	19-Dec	20-Mar	20-Jun	20-Sep	20-Dec	21-Mar	21-Jun	21-Sep	21-Dec	22-Mar	22-Jun	22-Sep	22-Dec	23-Mar	23-Jun	23-Sep	23-Dec					
Revenue (\$mn)	\$1,556	\$1,725	\$1,711	\$1,836	\$1,321	\$1,609	\$1,618	\$2,054	\$1,677	\$1,795	\$1,827	\$2,085	\$1,706	\$1,965	\$2,021	\$2,230	\$2,056	\$2,086				\$6,828	\$6,601	\$7,384	\$7,922
QoQ % Chg	-20.9%	10.9%	-0.8%	7.3%	-28.1%	21.8%	0.5%	27.0%	-18.4%	7.1%	1.7%	14.1%	-18.2%	15.2%	2.8%	10.4%	-7.8%	1.4%							
YoY % Chg	0.2%	9.9%	3.0%	-6.7%	-15.1%	-6.7%	-5.5%	11.8%	26.9%	11.6%	12.9%	1.5%	1.7%	9.5%	10.6%	7.0%	20.6%	6.1%				1.1%	-3.3%	11.9%	7.3%
Revenue Share																									
Huawei	13.2%	14.6%	16.0%	17.7%	17.7%	19.5%	9.3%	25.8%	16.9%	19.8%	18.8%	19.2%	18.5%	21.6%	16.0%	17.5%	16.1%	26.0%				15.5%	18.6%	18.7%	18.4%
Cisco	37.8%	37.4%	35.4%	31.6%	31.7%	32.6%	36.9%	24.6%	32.1%	33.3%	34.5%	31.5%	32.1%	27.9%	31.2%	29.6%	30.0%	28.1%				35.4%	31.0%	32.8%	30.1%
Nokia	29.6%	28.8%	28.6%	30.5%	29.8%	28.9%	34.5%	31.5%	32.5%	29.3%	30.9%	29.9%	30.7%	27.5%	27.1%	31.1%	29.4%	23.2%				29.4%	31.3%	30.6%	29.1%
Juniper	14.5%	14.7%	15.1%	15.7%	15.4%	15.3%	16.1%	14.3%	13.6%	13.1%	12.4%	16.0%	13.1%	15.9%	19.6%	15.5%	16.4%	15.5%				15.0%	15.2%	13.9%	16.1%
ZTE	2.5%	2.1%	2.7%	2.2%	2.1%	1.1%	0.6%	1.6%	2.5%	2.2%	1.2%	1.2%	1.1%	0.9%	0.7%	1.6%	1.7%	2.1%				2.4%	1.4%	1.8%	1.1%
Ciena	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	2.6%	2.1%	1.7%	2.9%	2.5%				0.0%	0.0%	0.0%	2.0%
Ericsson	0.8%	0.8%	0.8%	0.8%	1.7%	1.2%	1.1%	0.9%	1.0%	0.9%	0.9%	0.8%	1.0%	1.9%	1.9%	2.0%	1.6%	1.6%				0.8%	1.2%	0.9%	1.7%
Alaxala	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.1%	0.8%	0.7%	0.3%	0.0%	0.7%	0.1%				0.0%	0.0%	0.1%	0.5%
Infinera	0.5%	0.5%	0.3%	0.5%	0.6%	0.4%	0.3%	0.2%	0.3%	0.2%	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%				0.4%	0.4%	0.2%	0.0%
Other	1.1%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	0.9%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.1%	1.0%				1.0%	1.0%	1.0%	1.0%

Source: Omdia

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.

Analyst Certification

I, Wamsi Mohan, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

US - IT Hardware and Technology Supply Chain Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
BUY				
	Amphenol	APH	APH 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
	Sensata Technologies Holdings Plc	ST	ST 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				
	Apple Inc.	AAPL	AAPL US	Wamsi Mohan
	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
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



US - IT Hardware and Technology Supply Chain Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
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IQmethodSM Measures Definitions**Business Performance**

Return On Capital Employed

Return On Equity

Operating Margin

Earnings Growth

Free Cash Flow

Numerator

NOPAT = (EBIT + Interest Income) × (1 – Tax Rate) + Goodwill Amortization

Net Income

Operating Profit

Expected 5 Year CAGR From Latest Actual

Cash Flow From Operations – Total Capex

Denominator

Total Assets – Current Liabilities + ST Debt + Accumulated Goodwill

Amortization

Shareholders' Equity

Sales

N/A

N/A

Quality of Earnings

Cash Realization Ratio

Asset Replacement Ratio

Tax Rate

Net Debt-To-Equity Ratio

Interest Cover

Numerator

Cash Flow From Operations

Capex

Tax Charge

Net Debt = Total Debt – Cash & Equivalents

EBIT

Denominator

Net Income

Depreciation

Pre-Tax Income

Total Equity

Interest Expense

Valuation Toolkit

Price / Earnings Ratio

Price / Book Value

Dividend Yield

Free Cash Flow Yield

Enterprise Value / Sales

Numerator

Current Share Price

Current Share Price

Annualised Declared Cash Dividend

Cash Flow From Operations – Total Capex

EV = Current Share Price × Current Shares + Minority Equity + Net Debt +

Other LT Liabilities

Enterprise Value

Denominator

Diluted Earnings Per Share (Basis As Specified)

Shareholders' Equity / Current Basic Shares

Current Share Price

Market Cap = Current Share Price × Current Basic Shares

Sales

Basic EBIT + Depreciation + Amortization

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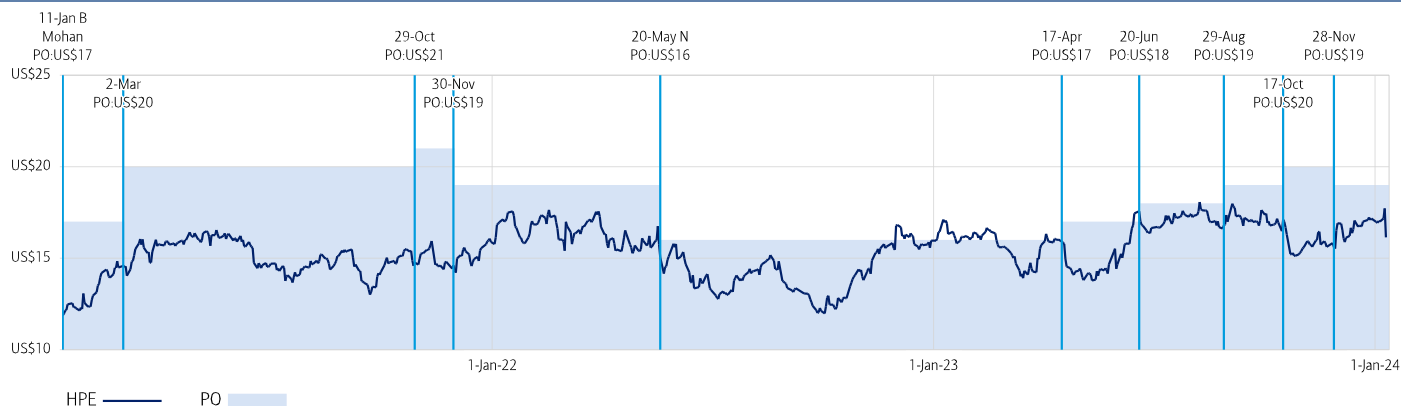
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Important Disclosures

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: Global Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships ^{R1}	Count	Percent
Buy	1895	53.62%	Buy	1083	57.15%
Hold	832	23.54%	Hold	454	54.57%
Sell	807	22.84%	Sell	383	47.46%

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

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

^{R2} Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

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