

IT Hardware

Positive capex outlook from US CSPs

Key message

1. US CSPs have released positive 2024F capex outlooks with main investments in AI.
2. Weak server demand in 1Q24F on seasonality; better recovery in 2H24F with new CPU platform launch.
3. AI server to be key sales and earnings growth driver for ODMs and components firms in 2024-25F.

Event

Meta (US), Google (US), Amazon (US) and Microsoft (US), the top four CSPs, announced better-than-expected capex plans for 2024F, with server to be the major investment, especially AI server.

Impact

Positive capex outlook of US CSPs. At recent earnings calls, US CSPs gave positive views on 2024F capex outlook, and said AI will be the major investment this year. Meta raised capex from US\$30-35bn to US\$30-37bn, up 19% YoY (mid-point), recovering from a 13% decline in 2023. It announced a target of 350k H100 GPUs at end-2024F; including other GPUs, it will have 600k GPUs to support AI services and will continue to invest aggressively in this area. Google's capex was up 2% YoY to US\$32bn in 2023, and it expects significantly higher capex this year. Amazon also guided for a capex increase this year, with around 60% going to infrastructure (majorly for Amazon Web Services (AWS)). Microsoft guides 1Q24 (3Q FY24) capex to grow materially QoQ driven by investments in cloud and AI infrastructure and delayed delivery of a third-party capacity contract (shifting from 4Q23 (2Q FY24)). Market consensus now forecasts the big four CSPs' capex to grow an average of 23% YoY in 2024F, versus a 2% decline last year. We think the positive capex outlook will benefit the Taiwan supply chain, especially AI related firms.

Slow season in 1H24F; server shipments growth in 2024F. Intel (US) guides data center sales to decline by double digits QoQ in 1Q24F due to weak FPGA sales and general server slow season, below consensus expectation. AMD (US) expects data center sales to be flat QoQ in 1Q24F thanks to a strong ramp up of data center GPUs, offsetting the impact of lower server CPU sales QoQ. Despite mixed market conditions and seasonality in 1H24F, AMD is positive on server business in 2H24F, thanks to a next-generation CPU (Turin, Zen 5 core) launch. Intel will also launch Granite Rapids CPU (Birch Stream) in 2H24F. We think new CPU platform launches will drive server demand in 2H24F-2025F. We forecast global server shipments to grow 15% YoY in 2024-25F with AI server driving the growth and comprising 14% and 22% of total server shipments.

AI server the key driver in 2024-25F. AI server will be the main catalyst for 2024F server sales growth. We forecast AI server demand to ramp up this year following improved GPU supply after 2Q24F amid booming demand. We maintain our forecast that training GPU shipments will grow from 1.53mn units last year to 4.57mn units in 2024F, and to 5.96mn units in 2025F. Total training server shipments (assuming eight training GPUs per server) were 191k units (up 56% YoY) in 2023F, and will rise to 572k units (up 200% YoY) in 2024F and to 993k units (up 74% YoY) next year. With a higher ASP, surging AI server demand will boost the sales growth of ODMs in 2024-25F. Components suppliers will also benefit from higher ASPs and margins (e.g. thermal, power supply, chassis, rail kit and PCB). Key beneficiaries include GPU module and baseboard suppliers Hon Hai (2317 TT, NT\$102, OP) and Wistron (3231 TT, NT\$120, OP), ODMs Quanta Computer (2382 TT, NT\$253, OP), Wiyynn (6669 TT, NT\$2,310, OP), Inventec (2356 TT, NT\$56.3, OP) and Gigabyte (2376 TT, NT\$333, OP), and components makers AVC (3017 TT, NT\$478, OP), Auras Technology (3324 TT, NT\$425, OP), King Slide (2059 TT, NT\$1,085, OP), Gold Circuit (2368 TT, NT\$241, OP) and EMC (2383 TT, NT\$475, OP). In addition, general server demand will also recover this year driven by new CPU platform upgrades, after a 15-20% drop in 2023F due to inventory correction. We think these positives will drive server supply chain sales growth in 2024F.





Stocks for Action

We maintain our positive view on the AI server supply chain and expect decent 2024-25F EPS growth. We recommend stocks with higher CSP exposure and content value growth driven by AI server, namely Quanta, Wiyynn, Wistron, AVC, Auras, Gold Circuit, and EMC.

Risks




Weak demand; AI server overbooking by CSPs.

Figure 1: Top four US CSPs' capex outlooks – Positive growth trend, with better-than-expected guidance

Company	Date	Actual & guidance
	4Q23	<ul style="list-style-type: none"> 4Q23 (FY 2Q24) was US\$11.5bn, missing consensus by 4% due to delivery for a third-party capacity contract shifting from FY 2Q24 to 3Q24 To increase materially QoQ on investments in cloud and AI infrastructure and delayed delivery from a third-party provider
	1Q24F	<ul style="list-style-type: none"> Bloomberg consensus is US\$10.74bn (+10% QoQ)
	2024F	<ul style="list-style-type: none"> Higher spending to continue to boost capacity in coming quarters Bloomberg consensus is US\$45.6bn (+30% YoY)
	4Q23	<ul style="list-style-type: none"> US\$11bn (+ 45% YoY & 37% QoQ), beating consensus by 10% on investment in technical infrastructure, with largest component for server, followed by data center
	2023	<ul style="list-style-type: none"> Up 2% YoY to US\$32bn, above consensus by 2%
	2024F	<ul style="list-style-type: none"> To continue to grow notably YoY in 2024F (Bloomberg consensus: +17%)
	4Q23	<ul style="list-style-type: none"> Up 16% QoQ, down 14% YoY to US\$7.9bn, in line with consensus
	2023	<ul style="list-style-type: none"> Down 13% YoY to US\$28.1bn, in line with previous guidance of US\$27-29bn and consensus
	2024F	<ul style="list-style-type: none"> To increase to US\$30-37bn, up 19% YoY (mid-point), raised from previous guidance of US\$30-35bn to reflect AI capacity demand Growth will be driven by investment in server including AI and non-AI hardware and data centers
	4Q23	<ul style="list-style-type: none"> US\$14.6bn, down 12% YoY but up 17% QoQ, in line with consensus
	2023	<ul style="list-style-type: none"> Down 17% YoY to US\$48.4bn, missing consensus of 3%, driven by lower spending on fulfillment and transportation
	2024	<ul style="list-style-type: none"> To grow YoY, with around 60% to support infrastructure (mainly for AWS), including additional investments in generative AI and large language models Consensus forecast capex growth of 23% YoY to US\$59bn



Source: Company data, Bloomberg, KGI Research

Figure 2: Top four US CSPs' cloud outlooks

Company	Date	Actual & guidance
	4Q23	<ul style="list-style-type: none"> Intelligent cloud sales US\$25.9bn, up 6% QoQ and 20% YoY (+19% YoY in CC) driven by Azure, beating consensus by 2% Server products and cloud services sales rose 22% YoY (+20% in CC), slightly beating consensus by 1% Azure and other cloud services revenue grew 30% YoY (28% in CC with 6ppts growth from AI service), beating consensus by 2%
	1Q24F	<ul style="list-style-type: none"> Guides intelligence cloud 1Q24 (FY 3Q24) sales of US\$26-26.3bn, up 19% YoY (mid-point), beating consensus by 1%, driven by Azure Azure sales to grow 28% YoY in CC, same growth as previous quarter, higher than consensus by 1ppts
	FY24F	<ul style="list-style-type: none"> Consensus for intelligent cloud sales to grow 19% YoY in FY 2024
	FY25F	<ul style="list-style-type: none"> Consensus for Azure sales to grow 27% YoY in CC in FY 2025
	2024F	<ul style="list-style-type: none"> Consensus for cloud sales to grow 24%
	4Q23	<ul style="list-style-type: none"> Cloud sales rose 26% YoY and 9% QoQ to US\$9.2bn, above consensus by 3% on GCP increasing contribution from AI
	2023	<ul style="list-style-type: none"> Cloud sales grew 26% YoY, slightly beating consensus by 1% Sees strong demand for vertically-integrated AI portfolio creating new opportunities for Google Cloud across product areas
	2024F	<ul style="list-style-type: none"> Consensus for cloud sales to grow 24%
	4Q23	<ul style="list-style-type: none"> AWS revenue US\$24.2bn, up 13% YoY & 5% QoQ, in line with consensus, as customers continue to bring new workloads to the cloud
	2023	<ul style="list-style-type: none"> AWS revenue increased 13% YoY to US\$90.8bn, slightly beating consensus by 1%
	2024F	<ul style="list-style-type: none"> Sees impact of cost optimization diminishing, causing customers to turn attention to newer initiatives and re-accelerating existing Bloomberg consensus of AWS revenue is US\$104.5bn, up 15% YoY

Source: Company data, Bloomberg, KGI Research

Figure 3: CPU vendors' server outlooks

Company	Date	Actual & guidance
	4Q23	<ul style="list-style-type: none"> Data center & AI (DCAI) sales US\$4bn, up 4% QoQ but down 10% YoY, lower than consensus by 1% due to FPGA inventory correction, offsetting growth from server (up double digits QoQ) Over 1/3 of 4th Gen Xeon shipments demand driven by AI Have shipped more than 2.5mn units of 4th Gen Xeon CPU (Eagle Stream) in 2023
	1Q24F	<ul style="list-style-type: none"> DACI sales to fall by double digits QoQ, shy of consensus given weak FPGA sales 5th Gen Xeon processor, Emerald Rapids, on track to ship with OEMs in February, with 42% higher AI inference performance vs. previous version
	2024F	<ul style="list-style-type: none"> CPU compute cores growth to return to normal historical rates Discrete accelerator sales over US\$2bn Gaudi3 AI accelerator on track to launch Consensus for data center sales to grow 4% YoY
	4Q23	<ul style="list-style-type: none"> Data center revenue rose 38% YoY and 43% QoQ to US\$2.3bn, in line with consensus Data center GPU sales over US\$400mn, ahead of guidance of US\$400mn due to faster ramp of MI300X for AI customers Server CPU & data center GPU sales both set quarterly and annual revenue records, driven by data center products' accelerated demand through the year.
	1Q24F	<ul style="list-style-type: none"> Data center revenue to be flat, with the seasonal decline in server sales offset by strong data center GPU ramp, in line with consensus
	2024F	<ul style="list-style-type: none"> Data center GPU sales guidance raised from US\$2bn to above US\$3.5bn, implying over 35% sales weighting of data center, up from high single digits in 2023 Data center sales to grow YoY (Bloomberg: +81% YoY) driven by market share in server market and ramp up of MI300 Traditional server market still mixed in 1H24F while some cloud clients maintain optimization and some enterprise clients are cautious. However, AMD is confident of gains in market share on a strong product portfolio, especially in next-gen CPU (Turin, Zen 5 core) to launch in 2H24F

Source: Company data, Bloomberg, KGI Research

Figure 4: Top-four US CSP capex fell 2% in 2023F, to grow 23% in 2024F

Capex (US\$m)	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	2019	2020	2021	2022	2023	2024F	2025F
Meta (Facebook)	4,272	4,612	4,313	5,370	5,441	7,572	9,375	9,043	6,842	6,216	6,543	7,665	15,102	15,115	18,567	31,431	27,266	33,409	36,121
Amazon	12,082	14,288	15,748	18,935	14,951	15,724	16,378	11,268	14,207	11,455	12,479	14,588	16,861	35,044	55,396	58,321	48,133	59,077	63,921
Microsoft	5,089	6,452	5,810	5,865	5,340	6,871	6,283	6,274	6,607	8,943	9,917	9,735	13,546	17,592	23,216	24,768	35,202	45,586	47,307
Google	5,942	5,496	6,819	6,383	9,786	6,828	7,276	7,595	6,289	6,888	8,055	11,019	23,548	22,281	24,640	31,485	32,251	37,822	40,269
US hyperscale subtotal	27,385	30,848	32,690	36,553	35,518	36,995	39,312	34,180	33,945	33,502	36,994	43,007	69,057	90,032	121,819	146,005	142,852	175,895	187,618
YoY (%)	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	2019	2020	2021	2022	2023	2024F	2025F
Meta (Facebook)	20.1	41.7	16.9	16.4	27.4	64.2	117.4	68.4	25.7	(17.9)	(30.2)	(15.2)	8.0	0.1	22.8	69.3	(13.3)	22.5	8.1
Amazon	77.8	91.6	42.3	27.7	23.7	10.1	4.0	(40.5)	(5.0)	(27.1)	(23.8)	29.5	25.6	107.8	58.1	5.3	(17.5)	22.7	8.2
Microsoft	35.1	36.0	18.4	40.5	4.9	6.5	8.1	7.0	23.7	30.2	57.8	55.2	(4.8)	29.9	32.0	6.7	42.1	29.5	3.8
Google	(1.0)	1.9	26.1	16.5	64.7	24.2	6.7	19.0	(35.7)	0.9	10.7	45.1	(6.3)	(5.4)	10.6	27.8	2.4	17.3	6.5
US Hyperscale subtotal	36.1	48.0	30.4	25.7	29.7	19.9	20.3	(6.5)	(4.4)	(9.4)	(5.9)	25.8	3.4	30.4	35.3	19.9	(2.2)	23.1	6.7
QoQ (%)	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	2019	2020	2021	2022	2023	2024F	2025F
Meta (Facebook)	(7.4)	8.0	(6.5)	24.5	1.3	39.2	23.8	(3.5)	(24.3)	(9.1)	5.3	17.1							
Amazon	(18.5)	18.3	10.2	20.2	(21.0)	5.2	4.2	(31.2)	26.1	(19.4)	8.9	16.9							
Microsoft	21.9	26.8	(10.0)	0.9	(9.0)	28.7	(8.6)	(0.1)	5.3	35.4	10.9	(1.8)							
Google	8.5	(7.5)	24.1	(6.4)	53.3	(30.2)	6.6	4.4	(17.2)	9.5	16.9	36.8							
US Hyperscale subtotal	(5.9)	12.6	6.0	11.8	(2.8)	4.2	6.3	(13.1)	(0.7)	(1.3)	10.4	16.3							

Source: Company data; Bloomberg; KGI Research

Figure 5: CSP capex declined in 2023F, but will return to growth in 2024F

Capex, US\$m	2019	2020	2021	2022	2023F	2024F	2025F
Meta	15,102	15,115	18,567	31,431	27,266	33,409	36,121
Amazon	16,861	35,044	55,396	58,321	48,133	59,077	63,921
Microsoft	13,546	17,592	23,216	24,768	35,202	45,586	47,307
Google	23,548	22,281	24,640	31,485	32,251	37,822	40,269
Baidu	931	738	1,689	1,586	1,687	1,749	1,839
Alibaba	6,517	6,379	8,311	5,014	3,187	5,886	6,831
Tencent	3,927	5,719	4,808	4,611	4,371	5,139	5,338
Hyperscale subtotal	80,432	102,867	136,627	157,216	152,097	188,669	201,626
Apple	9,247	8,702	10,388	11,692	9,564	11,644	11,935
IBM	2,286	2,618	2,062	1,346	1,488	1,810	2,048
Oracle	1,591	1,833	3,118	6,678	6,935	9,701	9,107
Paypal	704	866	908	706	759	942	1,040
eBay	508	463	444	420	455	491	502
Salesforce	643	710	717	798	813	890	987
Netflix	253	498	525	408	349	426	453
Uber	588	616	298	252	238	387	396
Enterprise subtotal	15,820	16,306	18,460	22,300	20,601	26,290	26,467
Total	96,793	119,173	155,086	179,516	172,698	214,959	228,093
YoY growth, percent	2019	2020	2021	2022	2023F	2024F	2025F
Meta	8.5	0.1	22.8	69.3	(13.3)	22.5	8.1
Amazon	25.6	107.8	58.1	5.3	(17.5)	22.7	8.2
Microsoft	6.0	29.9	32.0	6.7	42.1	29.5	3.8
Google	(6.3)	(5.4)	10.6	27.8	2.4	17.3	6.5
Baidu	(29.9)	(20.7)	129.1	(6.1)	6.3	3.7	5.2
Alibaba	(11.9)	(2.1)	30.3	(39.7)	(36.4)	84.7	16.1
Tencent	17.0	45.6	(15.9)	(4.1)	(5.2)	17.6	3.9
Hyperscale subtotal	4.0	27.9	32.8	15.1	(3.3)	24.0	6.9
Apple	(26.7)	(5.9)	19.4	12.6	(18.2)	21.7	2.5
IBM	(32.7)	14.5	(21.2)	(34.7)	10.5	21.6	13.2
Oracle	8.4	15.2	70.1	114.2	3.8	39.9	(6.1)
Paypal	(14.5)	23.0	4.8	(22.2)	7.6	24.1	10.4
eBay	(22.0)	(8.9)	(4.1)	(5.3)	8.2	7.8	2.2
Salesforce	8.1	10.4	1.0	11.3	1.8	9.5	10.9
Netflix	45.5	96.8	5.4	(22.3)	(14.5)	22.1	6.4
Uber	5.4	4.8	(51.6)	(15.4)	(5.6)	62.7	2.4
Enterprise subtotal	(22.0)	3.1	13.2	20.8	(7.6)	27.6	0.7
Total	(1.3)	23.1	30.1	15.8	(3.8)	24.5	6.1

Source: Company data; Bloomberg; KGI Research

Figure 6: AI server shipments rising in 2023-25F

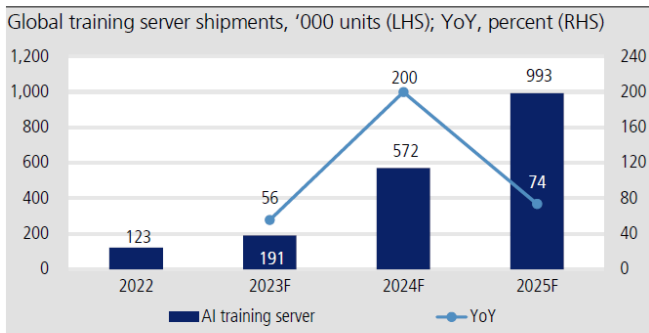
GPU shipments (k units)	2022	2023F	2024F	2025F
A100/H100 GPU	875	1,125	3,550	4,615
Others (AMD MI300 / Google TPU)	105	400	1,022	1,341
Total training GPU	980	1,525	4,572	5,956
Server shipments (k units)	2022	2023F	2024F	2025F
A100/H100 GPU server	109	141	444	769
Other server (AMD MI300 / Google TPU)	13	50	128	223
Training AI server shipment	123	191	572	993
Total AI server (training & inference)	371	578	1,905	3,309
Total server (regular & AI server)	13,815	11,532	13,262	15,251
YoY growth (%)				
Training AI server	-	56	200	74
AI server (training & inference)	-	56	230	74
Total server (regular & AI server)	7	(17)	15	15
Training server weighting of total server (%)	0.9	1.7	4.3	6.5
AI server weighting of total server (%)	2.7	5.0	14.4	21.7
<i>Assumptions:</i>				
A100/H100 GPU share of total training GPU (%)	89	74	78	77
GPU units per server	8	8	8	6
Training server share of total AI server (%)	33	33	30	30

Source: Gartner; KGI Research estimates

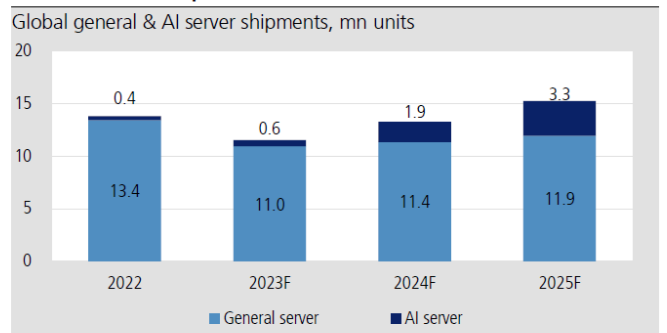
Figure 7: AI server shipments weighting up from 5% in 2023F to 22% in 2025F

Shipments (k units)	2022	2023F	2024F	2025F
AI server	371	578	1,905	3,309
General server	13,444	10,954	11,357	11,942
Total server	13,815	11,532	13,262	15,251
YoY (%)	2022	2023F	2024F	2025F
AI server		56	230	74
General server		(19)	4	5
Total server	7	(17)	15	15
Weighting (%)	2022	2023F	2024F	2025F
AI server	3	5	14	22
General server	97	95	86	78
Total server	100	100	100	100

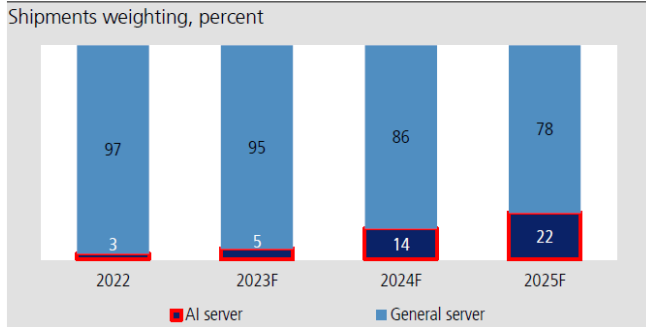
Source: Gartner; KGI Research estimates

Figure 8: Training server shipments to grow from 191k units in 2023F to 572k units in 2024F


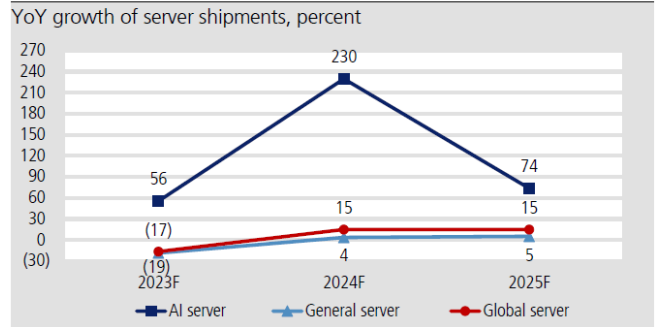
Source: Gartner; KGI Research estimates

Figure 9: AI server training & inference business to boost server revenue uptrend


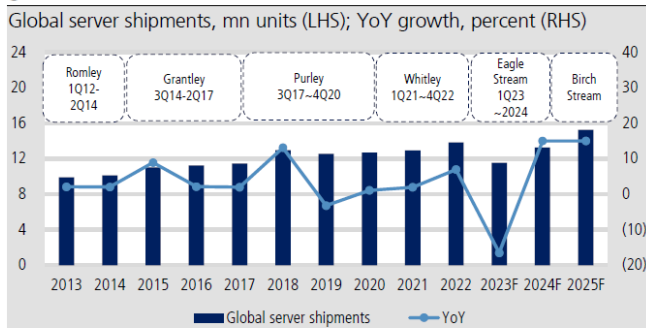
Source: Gartner; KGI Research estimates

Figure 10: AI weighting of server shipments to expand from 5% in 2023F to 22% in 2025F


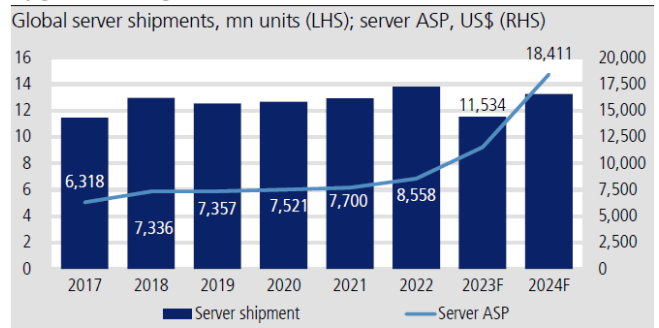
Source: Gartner, KGI Research estimates

Figure 11: AI server sales growth will be higher than general server sales in 2023-25F


Source: Gartner, KGI Research estimates

Figure 12: Server demand declined in 2023F & will resume growth in 2024-25F


Source: Gartner, KGI Research estimates

Figure 13: Server ASP uptrend on computing performance upgrades & high AI server demand


Source: Gartner, KGI Research estimates

Figure 14: Server platform launches by Intel & AMD in 2023F; shipments ramp-up has experienced delays

Platform	Intel Purley	Intel Purley	Intel Cedar Island	Intel Whitley	Intel Eagle Stream	Intel Eagle Stream	Intel Birch Stream	AMD Zen 2	AMD Zen 3	AMD Zen 4	AMD Zen 4c	AMD Zen 4	AMD Zen 5
Time of launch	3Q17	3Q19	2H20	2Q21	1Q23	2H23F	2024F	2Q19	1Q21	4Q22	1H23F	2023F	2024F
CPU	Skylake-EP Cannon Lake-EP	Cascade Lake	Cooper Lake	Ice Lake	Sapphire Rapids (Intel 7)	Emerald Rapids (Intel 7)	Granite Rapids (Intel 3)	Rome	Milan	Genoa	Bergamo	Siena	Turin
Process	14nm/ 14nm+	14nm++	14nm	10nm	10nm	10nm++	7nm	7nm	7nm+	5nm	5nm	5nm	3nm / 4nm
CPU sockets	LGA 3647	LGA 3647	LGA 4189	LGA 4189	LGA 4677	LGA 4677	LGA 7529	FC LGA 4094	FC LGA 4094	FC LGA 6096	FC LGA 6096	FC LGA 4844	FC LGA 6096
CPU cores	28	28	48	26	60	64	120	64	64	96	128	64	256
DRAM	6-channel DDR4	6-channel DDR4	8-channel DDR4	8-channel DDR4	8-channel DDR5	DDR5	DDR5	8-channel DDR4	8-channel DDR4	12-channel DDR5	DDR5	DDR5	TBA
PCIe	PCIe 3.0	PCIe 3.0	PCIe 3.0	PCIe 4.0	PCIe 5.0	PCIe 5.0	PCIe 5.0	PCIe 4.0	PCIe 4.0	PCIe 5.0	PCIe 5.0	PCIe 5.0	TBA
CPU TDP	45-165W	165-250W	up to 300W	up to 270W	up to 350W	350-400W	400W+	120-225 W	225-280W	320-400W	320-400W	70-225W	480-600W

Source: Company data, KGI Research

Figure 15: Peers comparison – Valuation

Sector	Company	Ticker	Market cap. (US\$m)	Share price (LCY)	Rating	Target Price (LCY)	EPS (LCY)			EPS YoY (%)			PE (x)			PB (x)			ROE (%)			Cash yield (%)	
							2023F	2024F	2025F	2023F	2024F	2025F	2023F	2024F	2025F	2023F	2024F	2025F	2023F	2024F	2025F	2023F	2024F
ODM	Hon Hai	2317 TT	45,276	102.0	Outperform	126	8.55	10.40	12.92	(16.2)	21.6	24.3	11.9	9.8	7.9	0.9	0.9	0.9	8.0	9.3	11.1	4.4	5.3
	Inventec	2356 TT	6,467	56.3	Outperform	53	1.57	2.42	2.93	(8.1)	54.3	20.9	35.9	23.3	19.2	3.3	3.2	3.1	9.4	14.1	16.5	2.2	3.4
	Quanta	2382 TT	31,291	253.0	Outperform	310	10.13	13.43	17.52	34.8	32.6	30.4	25.0	18.8	14.4	5.5	5.2	4.9	22.6	28.4	34.8	3.2	4.2
	Wistron	3231 TT	11,143	120.0	Outperform	140	4.08	6.03	7.93	1.7	47.9	31.5	29.4	19.9	15.1	3.2	2.9	2.6	11.3	14.9	17.5	2.1	3.2
	Wiiwinn	6669 TT	12,932	2,310.0	Outperform	2,280	68.88	102.53	125.45	(15.0)	48.8	22.3	33.5	22.5	18.4	8.4	6.7	5.5	27.7	33.1	32.7	1.6	2.4
	Gigabyte Tech	2376 TT	6,778	333.0	Outperform	285	7.72	12.47	16.00	(24.9)	61.5	28.3	43.1	26.7	20.8	5.6	5.2	4.7	13.3	20.1	23.6	1.4	2.3
	Asrock	3515 TT	927	238.0	Neutral	245	7.01	11.12	12.33	(19.3)	58.6	10.9	33.9	21.4	19.3	3.4	3.3	3.1	10.3	15.6	16.4	2.0	3.1
Mitac Holdings*	3706 TT	1,742	45.1	Not rated	N.A.	1.78	2.02	N.M.	(77.1)	13.8	N.A.	25.4	22.3	N.A.	N.A.	N.A.	N.A.	N.M.	N.M.	N.M.	N.A.	N.A.	
Socket/ Connector/cable	Lotes	3533 TT	3,600	1,010.0	Outperform	1,075	53.78	63.90	79.82	(8.4)	18.8	24.9	18.8	15.8	12.7	4.2	3.7	3.2	24.4	25.8	28.2	2.8	3.3
	Fit Hon Teng Ltd*	6088 HK	858	0.92	Not rated	N.A.	0.08	0.13	0.20	222.3	70.5	47.4	11.8	6.9	4.7	2.7	2.5	N.A.	6.0	6.5	7.3	0.0	0.0
	Argosy*	3217 TT	508	176.0	Not rated	N.A.	8.15	10.58	N.M.	19.8	29.9	N.A.	21.6	16.6	N.A.	3.9	3.7	N.A.	17.2	20.5	N.M.	3.6	4.8
Alltop	3526 TT	357	188.5	Outperform	215	11.32	12.91	14.13	20.2	14.1	9.5	16.7	14.6	13.3	4.2	4.0	3.8	25.9	28.1	29.2	4.9	5.6	
Rail kit	King Slide Works	2059 TT	3,311	1,085.0	Outperform	980	30.62	37.52	47.70	(28.1)	22.5	27.1	35.4	28.9	22.7	6.0	5.4	4.8	17.7	19.5	22.1	1.5	1.8
Thermal module	Sunonwealth	2421 TT	1,174	134.5	Outperform	130	5.78	7.08	8.24	33.2	22.6	16.3	23.3	19.0	16.3	6.0	5.5	5.0	26.8	30.2	32.1	3.1	3.7
	Auras	3324 TT	1,203	425.0	Outperform	445	15.86	21.09	26.47	8.0	33.0	25.5	26.8	20.1	16.1	7.9	5.1	4.4	23.0	26.6	28.6	1.6	2.1
Heat spreader	AVC*	3017 TT	5,867	478.0	Outperform	455	14.19	18.35	22.97	20.4	29.3	25.2	33.7	26.0	20.8	10.1	8.5	7.0	31.6	35.3	36.9	1.4	1.9
	Jentech*	3653 TT	3,702	821.0	Not rated	N.A.	18.22	22.57	N.M.	(6.8)	23.9	N.A.	45.1	36.4	N.A.	N.A.	N.A.	N.A.	21.5	21.3	N.M.	0.5	0.6
BBU	Simplo Tech	6121 TT	2,342	395.5	Outperform	420	29.13	34.97	41.04	(25.5)	20.1	17.4	13.6	11.3	9.6	2.1	2.0	1.9	15.9	18.2	20.3	5.4	6.5
	AES-KY	6781 TT	1,778	650.0	Neutral	700	22.25	30.45	44.15	(40.9)	36.9	45.0	29.2	21.3	14.7	4.1	3.7	3.3	14.4	18.2	23.7	1.7	2.3
Chassis	Chenbro	8210 TT	1,104	286.0	Outperform	290	8.55	14.13	18.14	2.8	65.2	28.4	33.4	20.2	15.8	6.4	5.5	4.7	19.9	29.2	32.3	1.5	2.6
BMC	Aspeed Tech*	5274 TT	3,706	3,060.0	Not rated	N.A.	27.10	49.31	79.46	(51.4)	81.9	61.1	112.9	62.1	38.5	31.5	25.3	20.1	26.0	49.2	59.7	1.0	1.3
Silicon photonics	Lanid Mark Opto	3081 TT	372	126.5	Neutral	115	(2.31)	2.25	5.39	N.M.	N.M.	139.6	N.M.	56.3	23.5	2.8	2.8	2.8	(5.0)	5.0	12.1	0.4	1.8
CCL	Iteq*	6213 TT	1,008	86.7	Not rated	N.A.	1.82	5.03	6.38	(63.2)	176.9	26.8	47.7	17.2	13.6	1.7	1.6	1.6	3.6	10.4	12.2	1.6	3.3
	Elite Material	2383 TT	5,196	475.0	Outperform	550	16.88	23.07	27.00	10.8	36.7	17.0	28.1	20.6	17.6	6.4	5.7	5.0	24.1	29.3	30.0	2.0	2.7
ABF	Unimicron Tech	3037 TT	8,790	180.0	Outperform	185	7.45	9.28	15.43	(62.9)	24.5	66.2	24.2	19.4	11.7	3.0	2.7	2.4	12.7	14.6	21.8	1.7	2.1
PCB	Gold Circuit	2368 TT	3,795	241.0	Outperform	275	7.65	13.42	17.01	(13.7)	75.5	26.7	31.5	18.0	14.2	7.7	6.3	5.0	25.3	38.7	39.5	1.2	2.2
Power	Delta	2308 TT	23,787	286.0	Neutral	297	12.84	13.10	15.16	2.1	2.0	15.7	22.3	21.8	18.9	3.8	3.5	3.2	17.5	16.8	17.8	2.4	2.4
	Lite-On Tech	2301 TT	8,401	111.5	Restricted	N.A.	6.75	7.90	9.04	9.0	17.1	14.4	16.5	14.1	12.3	2.9	2.7	2.5	18.2	19.9	21.3	4.5	5.4
	Chicony Power	6412 TT	1,904	149.0	Not rated	N.A.	7.83	10.11	11.71	(4.8)	29.2	15.8	19.0	14.7	12.7	4.0	3.6	3.4	22.6	26.8	28.1	4.0	3.8
	AcBel Polytech*	6282 TT	1,141	41.4	Not rated	N.A.	0.40	1.82	2.14	(67.2)	351.6	17.6	102.6	22.7	19.3	1.4	1.4	1.4	1.4	5.2	7.3	1.5	0.2
Foundry	TSMC	2330 TT	527,260	635.0	Outperform	688	32.3	38.15	44.21	(17.5)	18.0	15.9	19.6	16.6	14.4	4.7	3.9	3.3	26.0	25.6	24.9	1.8	2.1
Design service	Alchip Tech	3661 TT	9,483	3,985.0	Outperform	4,650	45.7	78.06	108.00	77.8	70.9	38.4	87.2	51.1	36.9	15.2	12.2	9.9	21.3	29.0	32.3	0.6	1.0
	Global Unichip	3443 TT	6,823	1,590.0	Neutral	1,570	27.0	31.35	40.03	(2.6)	16.3	27.7	59.0	50.7	39.7	21.7	17.5	13.8	40.5	38.2	38.9	0.9	1.0
IC package/testing	Winway Technolog	6515 TT	868	779.0	Outperform	865	15.9	34.57	N.A.	(50.7)	117.8	N.A.	49.1	22.5	N.A.	7.6	6.2	N.A.	15.1	30.4	N.A.	1.5	3.3
	Chroma	2360 TT	2,772	203.5	Outperform	322	10.9	12.72	N.A.	(10.3)	16.8	N.A.	18.7	16.0	N.A.	3.8	3.5	N.A.	20.7	22.5	N.A.	3.5	4.1
Networking	Luxnet	4979 TT	654	145.0	Outperform	210	3.5	10.47	N.A.	71.5	197.9	N.A.	41.3	13.8	N.A.	11.0	6.1	N.A.	30.9	57.0	N.A.	0.3	0.3
	Accton Tech	2345 TT	10,080	562.0	Outperform	630	16.6	20.95	N.A.	13.2	26.4	N.A.	33.9	26.8	N.A.	12.5	10.1	N.A.	40.5	41.4	N.A.	1.4	1.8

* Bloomberg consensus

Source: Bloomberg; KGI Research estimates

Figure 16: Global server shipments by brand

Vendor	Server shipments ('000 units)																				
	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	2018	2019	2020	2021	2022	1-3Q23
Dell EMC	474	433	503	541	489	529	499	548	542	496	526	484	366	362	343	2,267	2,050	1,950	2,064	2,048	1,071
HPE	323	364	331	373	322	339	316	342	300	269	345	380	252	238	209	1,691	1,546	1,392	1,319	1,294	699
Inspur Electronics	238	365	323	305	231	348	356	388	343	340	348	337	212	285	333	1,061	1,131	1,230	1,323	1,368	830
Lenovo	154	190	161	196	169	202	216	186	126	197	236	216	173	152	160	765	755	702	773	775	485
Supermicro	114	147	111	125	133	157	152	171	171	208	227	217	151	120	116	N.A.	N.A.	496	614	823	387
xFusion Digital Technologies	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	154	120	136	139	144	90	114	105	N.A.	N.A.	N.A.	154	539	309
H3C	55	88	94	108	86	109	129	134	88	109	92	132	73	90	79	178	254	345	458	422	243
Cisco	53	55	60	61	55	48	46	51	40	48	40	31	35	29	36	280	279	228	200	160	99
PowerLeader	18	23	34	44	20	22	27	81	61	60	62	75	47	54	57	86	109	119	150	258	157
ZTE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	44	102	77	N.A.	N.A.	N.A.	N.A.	N.A.	223
Sugon	63	64	40	42	30	34	48	101	28	36	50	46	29	52	50	333	347	209	213	160	131
Fujitsu	47	42	36	44	41	42	36	31	28	23	33	37	36	26	26	223	212	168	150	122	88
Huawei	136	180	190	278	141	82	66	21	8	10	13	20	19	22	25	898	746	784	310	50	65
Others	1,242	1,299	1,035	1,472	1,023	1,333	1,248	1,585	1,452	1,455	1,268	1,634	1,138	1,163	1,299	5,173	5,107	5,048	5,189	5,808	3,600
Total	2,917	3,248	2,919	3,588	2,739	3,245	3,140	3,794	3,307	3,387	3,379	3,754	2,664	2,809	2,915	12,956	12,537	12,672	12,918	13,827	8,388
	YoY (%)																				
Dell EMC	(8.5)	(9.8)	(0.0)	(1.6)	3.1	22.3	(0.9)	1.3	11.0	(6.3)	5.6	(11.7)	(32.6)	(26.9)	(34.8)	10.9	(9.6)	(4.9)	5.8	(0.8)	(31.5)
HPE	(11.3)	(7.2)	(10.8)	(10.7)	(0.2)	(7.1)	(4.6)	(8.3)	(7.1)	(20.6)	9.0	11.2	(16.0)	(11.6)	(39.3)	(7.5)	(8.6)	(10.0)	(5.2)	(2.0)	(23.5)
Inspur Electronics	7.4	39.2	(7.9)	2.6	(3.0)	(4.6)	10.3	27.4	48.8	(2.3)	(2.3)	(13.2)	(38.2)	(16.2)	(4.2)	44.0	6.6	8.8	7.5	3.4	(19.5)
Lenovo	13.7	5.0	(21.0)	(16.4)	9.2	6.0	34.1	(4.9)	(25.4)	(2.4)	9.1	16.2	37.2	(22.7)	(32.3)	22.4	(1.3)	(7.1)	10.1	0.3	(13.3)
Supermicro	N.A.	N.A.	N.A.	N.A.	16.9	7.2	37.7	37.4	28.8	32.2	49.0	26.6	(12.1)	(42.3)	(48.7)	N.A.	N.A.	N.A.	23.8	34.1	(36.2)
xFusion Digital Technologies	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	(6.3)	(25.0)	(15.8)	(24.9)	N.A.	N.A.	N.A.	N.A.	250.5	(21.8)
H3C	34.5	88.7	20.8	21.6	56.6	23.6	36.4	24.3	2.4	0.4	(28.3)	(1.3)	(16.8)	(17.3)	(14.2)	20.2	43.1	35.7	32.6	(7.8)	(16.2)
Cisco	(27.6)	(17.8)	(15.1)	(11.0)	3.5	(12.4)	(23.2)	(15.4)	(27.0)	0.4	(12.4)	(39.5)	(13.4)	(39.4)	(11.7)	(11.5)	(0.6)	(18.0)	(12.4)	(20.3)	(22.7)
PowerLeader	(19.6)	(17.4)	22.0	44.7	7.7	(3.4)	(19.9)	84.2	206.8	171.3	126.1	(7.2)	(22.6)	(10.6)	(8.2)	10.7	26.4	9.6	25.9	71.4	(13.8)
ZTE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Sugon	(39.1)	(49.2)	(26.5)	(33.9)	(52.6)	(46.4)	19.3	137.8	(5.0)	6.0	3.9	(54.7)	4.8	43.2	(0.9)	16.4	4.3	(39.8)	1.9	(24.8)	14.5
Fujitsu	(14.8)	(15.8)	(38.3)	(11.0)	(12.8)	1.2	1.1	(29.3)	(30.9)	(44.7)	(8.5)	20.9	28.3	11.3	N.A.	0.5	(5.1)	(20.6)	(10.7)	(18.7)	4.3
Huawei	(17.3)	48.7	(1.8)	4.0	3.7	(54.6)	(65.0)	(92.4)	(94.4)	(88.1)	(80.9)	(6.4)	139.9	124.8	N.A.	21.9	(16.9)	5.0	(60.4)	(83.9)	115.9
Others	8.4	20.1	(4.1)	(18.2)	(17.6)	2.7	20.6	7.6	41.9	9.1	1.6	3.1	(21.6)	(20.1)	2.5	16.7	(1.3)	(1.2)	2.8	11.9	(13.8)
Total	2.6	14.6	(2.4)	(7.2)	(6.1)	(0.1)	7.6	5.7	20.7	4.4	7.6	(1.1)	(19.4)	(17.1)	(13.7)	13.1	(3.2)	1.1	1.9	7.0	(16.7)
	QoQ (%)																				
Dell EMC	(13.7)	(8.8)	16.3	7.5	(9.6)	8.3	(5.8)	9.9	(1.0)	(8.6)	6.2	(8.1)	(24.4)	(1.0)	(5.2)	(22.6)	12.8	(9.1)	12.6	(13.6)	5.0
HPE	(22.6)	12.8	(9.1)	12.6	(13.6)	5.0	(6.7)	8.2	(12.4)	(10.2)	28.1	10.4	(33.9)	(5.4)	(12.1)	(20.0)	53.5	(11.5)	(5.6)	(24.3)	51.0
Inspur Electronics	(20.0)	53.5	(11.5)	(5.6)	(24.3)	51.0	2.3	9.0	(11.6)	(0.9)	2.3	(3.2)	(37.1)	34.4	17.0	(34.0)	23.2	(15.2)	21.3	(13.8)	19.5
Lenovo	(34.0)	23.2	(15.2)	21.3	(13.8)	19.5	7.3	(14.0)	(32.3)	56.3	20.0	(8.4)	(20.1)	(11.9)	5.0	N.A.	29.1	(24.7)	12.6	6.8	18.4
Supermicro	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	(22.0)	13.1	2.8	3.3	(37.6)	26.9	(8.3)	(37.9)	59.6	7.6	14.1	(20.1)	26.0
xFusion Digital Technologies	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	(22.0)	13.1	2.8	3.3	(37.6)	26.9	(8.3)	(22.7)	4.2	8.5	1.8	(10.1)	(11.7)
H3C	(37.9)	59.6	7.6	14.1	(20.1)	26.0	18.7	3.9	(34.1)	23.5	(15.2)	43.1	(44.5)	22.9	(12.1)	(39.8)	24.7	49.4	29.0	(55.2)	11.8
Cisco	(22.7)	4.2	8.5	1.8	(10.1)	(11.7)	(4.9)	12.1	(22.4)	21.3	(17.0)	(22.7)	11.1	(15.0)	21.0	(39.8)	N.A.	N.A.	N.A.	N.A.	N.A.
PowerLeader	(39.8)	24.7	49.4	29.0	(55.2)	11.8	23.9	196.9	(25.4)	(1.2)	3.2	21.8	(37.8)	14.3	6.0	(2.7)	2.0	(36.7)	5.3	(30.3)	15.3
ZTE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Sugon	(2.7)	2.0	(36.7)	5.3	(30.3)	15.3	40.9	109.9	(72.1)	28.6	38.1	(8.4)	(35.6)	75.9	(4.4)	(5.1)	(10.8)	(13.4)	21.5	(7.1)	3.5
Fujitsu	(5.1)	(10.8)	(13.4)	21.5	(7.1)	3.5	(13.5)	(15.0)	(9.3)	(17.1)	43.1	12.3	(3.7)	(28.1)	1.7	(48.9)	31.7	5.4	46.5	(49.1)	(42.3)
Huawei	(48.9)	31.7	5.4	46.5	(49.1)	(42.3)	(18.8)	(68.0)	(62.9)	23.6	30.2	56.9	(5.0)	15.9	12.4	(31.1)	4.6	(20.3)	42.2	(30.5)	30.3
Others	(31.1)	4.6	(20.3)	42.2	(30.5)	30.3	(6.4)	27.0	(8.4)	0.2	(12.9)	28.9	(30.3)	2.2	11.7	(24.6)	11.4	(10.1)	22.9	(23.7)	18.5
Total	(24.6)	11.4	(10.1)	22.9	(23.7)	18.5	(3.2)	20.8	(12.8)	2.4	(0.2)	11.1	(29.0)	5.4	3.8						
	Global market share (%)																				
Dell EMC	16.3	13.3	17.2	15.1	17.8	16.3	15.9	14.4	16.4	14.6	15.6	12.9	13.7	12.9	11.8	17.5	16.4	15.4	16.0	14.8	12.8
HPE	11.1	11.2	11.4	10.4	11.8	10.4	10.1	9.0	9.1	7.9	10.2	10.1	9.4	8.5	7.2	13.1	12.3	11.0	10.2	9.4	8.3
Inspur Electronics	8.1	11.2	11.1	8.5	8.4	10.7	11.3	10.2	10.4	10.0	10.3	9.0	8.0	10.1	11.4	8.2	9.0	9.7	10.2	9.9	9.9
Lenovo	5.3	5.9	5.5	5.5	6.2	6.2	6.9	4.9	3.8	5.8	7.0	5.8	6.5	5.4	5.5	5.9	6.0	5.5	6.0	5.6	5.8
Supermicro	3.9	4.5	3.8	3.5	4.9	4.9	4.9	4.5	5.2	6.1	6.7	5.8	5.7	4.3	4.0	N.A.	N.A.	3.9	4.8	6.0	4.6
xFusion Digital Technologies	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	4.1	3.6	4.0	4.1	3.8	3.4	4.1	3.6	N.A.	N.A.	N.A.	N.A.	1.2	3.9
H3C	1.9	2.7	3.2	3.0	3.1	3.3	4.1	3.5	2.7	3.2	2.7	3.5	2.8	3.2	2.7	1.4	2.0	2.7	3.5	3.1	2.9
Cisco	1.8	1.7	2.0	1.7	2.0	1.5	1.5	1.4	1.2	1.4	1.2	0.8	1.3	1.0	1.2	2.2	2.2	1.8	1.5	1.2	1.2
PowerLeader	0.6	0.7	1.2	1.2	0.7	0.7	0.9	2.1	1.8	1.8	1.8	2.0	1.8	1.9	1.9	0.7	0.9	0.9	1.2	1.9	1.9
ZTE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	1.7	3.6	2.7	N.A.	N.A.	N.A.	N.A.	N.A.	2.7
Sugon	2.1	2.0	1.4	1.2	1.1	1.1	1.5	2.7	0.9	1.1	1.5	1.2	1.1	1.8	1.7	2.6	2.8	1.7	1.6	1.2	1.6
Fujitsu	1.6	1.3	1.2	1.2	1.5	1.3	1.2	0.8	0.9	0.7	1.0	1.0	1.4	0.9	0.9	1.7	1.7	1.3	1.2	0.9	1.1
Huawei	4.7	5.5	6.5	7.7	5.2	2.5	2.1	0.6	0.2	0.3	0.4	0.5	0.7	0.8	0.8	6.9	6.0	6.2	2.4	0.4	0.8
Others	42.6	40.0	35.5	41.0	37.4	41.1	39.7	41.8	43.9	43.0	37.5	43.5	42.7	41.4	44.6	39.9	40.7	39.8	40.2	42.0	42.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Gartner, KGI Research

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