

Beyond the Numbers

What Does Hyperscaler Capex Have to Earn?

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Executive Summary

The first half of 2026 was a tale of two quarters for U.S. equity markets, as the S&P 500 experienced a drawdown of ~4.5% in the first quarter, followed by a ~15% rally in the second quarter. As investors look forward to the second half, the artificial intelligence (AI) trade maintains its leading position in mindshare, much as it has over the last three plus years. With second quarter (Q2) earnings season well underway, attention is laser-focused on capital expenditure (capex) spending signals from the cloud computing “hyperscalers” driving the majority of spend. The start of the second half of 2026 has seen a cool-down in the AI-driven momentum trade, as gravity and AI spending scrutiny reasserts itself into the market’s collective mentality, putting even greater focus on the hyperscalers’ upcoming Q2 earnings calls. Alphabet (GOOGL) reports after-market close on July 22, with Microsoft (MSFT), Meta Platforms (META), and Amazon.com (AMZN) reporting the following week.

The market’s read from the massive capex commitments from this group of mega cap tech companies has been to buy the beneficiaries (chips, power, data center hardware) of the spend first and ask questions later. This is a generalization, of course, but investor scrutiny of the level of spending and the anticipated returns on said spending has largely been a secondary concern during this capex cycle. We recently steel-manned (a contrarian thought exercise) a future scenario where data center demand massively undershoots the planned supply (“[The Unthinkable Scenario for AI Investors](#)”). In this month’s edition of *Beyond the Numbers*, we take a data-driven approach to help investors frame the debate on the return on invested capital (ROIC) on hyperscaler AI capex, using various scenarios for a hypothetical “average hyperscaler.” We then compare those return profiles to similar return generating businesses, with the end goal being a clear-minded approach to thinking about the hyperscaler business model for long-term investors.

Key Takeaways

- **The Hyperscaler Business Is Not Software.** Hyperscale cloud has software-like margins and platform-like customer lock-in, but the AI buildout makes the business materially more capital intensive than traditional software, shifting the analytical focus from revenue growth to returns on invested capital.
- **The Economics of the “Average Hyperscaler Cloud Business.”** We build, from the bottom up, a hypothetical aggregated “average hyperscaler” to better understand the return profile of the business. Based on consensus estimates, it’s an attractive business, generating mid-teens ROIC throughout the cycle, though revenue must compound north of 30% from 2025 to 2030 to get there.
- **From Software Multiples to Infrastructure Math.** As capital intensity rises, valuation should increasingly be anchored in ROIC, depreciation burden, free cash flow conversion, and capital durability rather than software-style revenue multiples alone.
- **The Business Drivers That Decide the Return.** The ultimate return on AI infrastructure spending will be determined by utilization, pricing, asset efficiency, depreciation timing, power costs, enterprise adoption, and whether capex growth normalizes after the current buildout.
- **Scenario Analysis: What Has to Be True?** The difference between a premium platform outcome and a capital-cycle disappointment depends less on whether AI demand exists and more on whether revenue growth can outpace the rapidly expanding asset base.

What Does Hyperscaler Capex Have to Earn?

The AI investment cycle has become one of the defining capital allocation questions in public markets. The largest technology companies are spending at a scale that would have seemed implausible only a few years ago. The market has largely rewarded that spending because the near-term signals imply that cloud growth is accelerating and AI demand is supply constrained.

For investors, the question is whether the capital being deployed today will earn attractive returns over the life of the assets being built, not how much or how quickly that capital is being deployed. Rather than make an overtly bullish or bearish call attempting to answer this question, we can build a framework around the three major public hyperscaler cloud businesses (Amazon Web Services, Microsoft Azure, and Google Cloud) to ascertain what an “average hyperscaler cloud business” has to earn on its capital for today’s investment cycle to make sense. Note, we do not include Meta Platforms or Oracle Corp (ORCL) in our framework, as these companies’ external cloud businesses are not mature enough to provide reliable historical data in our aggregate “average hyperscaler” build.

The proceeding analysis will focus largely on the ROIC that a hyperscaler cloud business generates. As a corporate finance refresher, ROIC measures how effectively a company converts the capital invested in the business (both debt and equity) into operating profit. The simple rule is that investments earning ROIC above the company’s weighted-average cost of capital (WACC) create economic value and are accretive to shareholder value, while investments earning ROIC below WACC destroy value and should generally not be pursued unless there is a credible path to higher future returns or a strategic reason that justifies the near-term value destruction.

The Economics of the “Average Hyperscaler Cloud Business”

To understand the “average hyperscaler,” we must construct a hypothetical aggregate of the cloud computing infrastructure business segments of the three major hyperscalers previously outlined, with some necessary adjustments due to reporting nuances. These segments are just single business lines within larger businesses, and we recognize that each are at slightly different levels of maturity and their revenue is not wholly generated from “AI-compute.” However, much of the traditional non-AI cloud business infrastructure is deeply integrated into the segment’s AI-compute capability that is being heavily invested in today. Thus, we take a best-effort approach to isolate what matters to create an “average hyperscaler” business. Our build begins with calendar year-end 2025 as our baseline, and we define the core building blocks below.

- **Revenue**
 - **Amazon Web Services (AWS):** Segment revenue as reported
 - **Google Cloud:** Segment revenue as reported
 - **Microsoft Azure and Other Cloud Services:** Implied sub-segment revenue of business that sits within broader “Intelligent Cloud” reported segment; implied via company-provided quarterly growth rates
- **Operating Income and Margins**
 - **Amazon Web Services (AWS):** Segment operating income as reported
 - **Google Cloud:** Adjusted estimate; full segment operating income is reported, but excludes shared expenditures that sit in “Corporate costs, unallocated operating income” that company management notes is primarily AI-related research & development (R&D). We allocate 30% of these to the Google Cloud segment’s operating income.
 - **Microsoft Azure and Other Cloud Services:** Estimated sub-segment operating income of business that sits within broader “Intelligent Cloud” reported segment; Azure is growing faster than the broader Intelligent Cloud segment, while the broader segment’s margins are compressing, showing incremental margins that are less than the total reported segment’s margins. This implies a margin for Azure that is less than the total Intelligent Cloud segment.
- **Capital Expenditures (Capex)**

- **Amazon Web Services (AWS):** Segment-level additions to property, plant, and equipment (PP&E) as reported.
- **Google Cloud:** Estimated share of total company capex.
- **Microsoft Azure and Other Cloud Services:** Estimated allocation of total company capex, including capital leases.
- ***Depreciation of Property, Plant, and Equipment (PP&E)***
 - **Amazon Web Services (AWS):** Segment level depreciation as reported.
 - **Google Cloud:** Estimated share of total company capex allocated to Google Cloud segment.
 - **Microsoft Azure and Other Cloud Services:** Estimated share of total company capex allocated to Azure and Other Cloud Services segment.
- ***Deployed Infrastructure Asset: Property, Plant, and Equipment (PP&E) + Operating Lease ROU (right-of-use)***
 - **Amazon Web Services (AWS):** Segment-level PP&E, net of accumulated depreciation, as reported, plus an estimate of operating lease (ROU) assets for the segment derived from the non-PP&E portion of AWS' total assets (which is explicitly reported).
 - **Google Cloud:** Alphabet does not explicitly report segment level PP&E or operating leases, but they do separately disclose gross PP&E by type of asset. We estimate an allocation of the Technical Infrastructure and the Assets Not Yet in Service (primarily technical infrastructure assets) PP&E buckets to come up with an estimated capital base supporting Google Cloud's hyperscaler business. We add a pro-rata share of operating leases to the asset base.
 - **Microsoft Azure and Other Cloud Services:** Estimated share of total company PP&E and operating lease ROU assets allocated to Azure and Other Cloud Services segment.

From Software Multiples to Infrastructure Math

Our calendar 2025 starting point shows these are very large, very profitable businesses. AWS reported roughly \$129 billion for 2025, and Google Cloud reported ~\$59 billion for 2025. Microsoft does not disclose Azure revenue directly, but the Intelligent Cloud segment generated ~\$120 billion in revenue in calendar 2025. Based on company disclosures and our math, we believe Azure and other cloud services was a ~\$90B revenue business, representing roughly 75% of the reported Intelligent Cloud segment. Across the three, cloud infrastructure market share remains concentrated, with AWS, Azure, and Google Cloud estimated at roughly 31%, 24%, and 12% of the global market, respectively, per industry research.

The segment margin story has also improved materially. AWS generated \$14.2 billion of operating income in Q1 2026, implying a 37.7% operating margin. Google Cloud's margin progression has been especially notable, moving from low-single-digit profitability earlier in the cycle to reported margins in the mid-20s to 32% in Q1 2026, though the reported calculation does not include shared AI R&D reported at the corporate level. Microsoft's Intelligent Cloud segment has historically operated at even higher margins, though it includes more than Azure alone.

The complication is capex. Amazon, Microsoft, and Alphabet collectively spent more than \$300 billion on capex at the corporate level in calendar 2025, with anywhere from 60–75% of that total dedicated to AI compute and data center buildouts. The numbers are clearly rising again in 2026, with outside estimates pointing to very large increases across all three companies. By our estimates, combined cloud capex as a percentage of cloud-specific revenue approached the 75–80% range for the three hyperscalers in calendar 2025. These capex to sales levels are more commonly associated with infrastructure-heavy industries than traditional software platforms.

The hyperscaler's cloud businesses still generate software-like margins, but the incremental investment profile increasingly looks infrastructure-like. Therefore, the relevant question becomes should this business be valued like a software platform, infrastructure asset, or something in between?

The Business Drivers That Decide the Return

A useful way to think about the return math is to build a composite cloud ROIC using the previously defined building blocks of our aggregated “average hyperscaler cloud business.” The numerator is relatively straightforward: cloud segment operating income, tax-adjusted into an estimate of net operating profit after tax (NOPAT). The denominator, invested capital, is the “deployed infrastructure asset” base, which includes estimated net PP&E and operating lease ROU assets utilized in the hyperscaler cloud business. These are the core drivers of ROIC, but we must also determine two additional drivers that greatly influence the results. These additional drivers are capital expenditures (which are added to the deployed infrastructure capital asset base as gross PP&E) and depreciation of the capital asset base (which is reported as an operating expense over time, reducing operating income, and is recorded on the balance sheet as accumulated depreciation, thus reducing PP&E over time). Effectively, total capex today does not reduce operating income on a one-for-one basis today. Our approach takes the estimated useful life of the incremental PP&E assets into account, where much of the chips/server equipment has a shorter useful life (and thus larger annual depreciation hit over a shorter period), while buildings and land assets have a longer useful life.

Scenario Analysis: What Has to Be True?

In order to derive a baseline market consensus read on what these returns are currently estimated to be, we first build a calendar year 2025–2030 ROIC composite that aggregates consensus estimates for the core drivers of each cloud business, with necessary adjustments previously outlined. Once we have this baseline, we can create several scenarios that shift the core drivers of ROIC up or down, based on the specific scenario we are modeling. Our scenario analysis includes four hypothetical futures over this time: one that reflects the consensus baseline; one more bullish scenario than the already plenty bullish consensus baseline; one slightly bearish but perhaps more realistic scenario; and one downright bearish “impaired capital-cycle” scenario. In the following sections, we detail the core assumptions implicit in the consensus baseline ROIC build, as well as the shifted estimates and outcomes for each of the three ROIC scenarios. Finally, we provide a summary of each, with a brief outline of industries with comparable margin and return profiles alongside valuation frameworks for the scenario. Please note these are hypothetical scenarios only and not indicative of any particular company, security, or investment. The hypothetical average hyperscaler is a modeled construct developed by LPL Research and does not represent an actual company or investable entity.

Scenario 1: Market Consensus Baseline

In Scenario 1, the market-consensus baseline, the hypothetical average hyperscaler remains an attractive business, but one that is absorbing a major front-loaded capital cycle. Revenue compounds at roughly 34% annually from 2025–2030E, while operating margin expands by ~500 basis points. The capital intensity is the key nuance: capex/revenue peaks at 104.2% in 2026E, and remains very elevated at 96.5% in 2027E before steadily declining to 50.8% by 2030E. Depreciation/revenue continues rising through the period, from 16.8% in 2025 to 31.6% by 2030E, reflecting the lagged profit and loss (P&L) impact of the current buildout. ROIC troughs at 13.9% in 2027E, then recovers to 17.1% by 2030E as revenue growth begins to outrun incremental capital deployment. This baseline outcome is effectively the assumption made by most; the AI infrastructure cycle is not a capital misallocation, but a period of heavy investment that the business ultimately grows into.

Exhibit 1: Market Consensus Baseline

Scenario 1 Market Consensus Baseline	2025	2026E	2027E	2028E	2029E	2030E	2025 - 2030E CAGR / Change
Annual Revenue Growth, %	28.4%	42.4%	36.7%	35.1%	28.7%	26.2%	33.7%
Operating Margin	30.8%	32.1%	33.0%	33.4%	34.7%	35.8%	504 bps
Capex / Revenue	79.1%	104.2%	96.5%	75.8%	61.1%	50.8%	-28.3%
Depreciation / Revenue	16.8%	20.9%	24.9%	29.5%	31.2%	31.6%	14.8%
Return on Invested Capital (ROIC)	16.7%	15.2%	13.9%	14.0%	15.2%	17.1%	N/A

Source: LPL Research, Bloomberg 07/21/26

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Scenario 2: Consensus Demand + Scale Efficiencies Realized

Scenario 2 is the clean bull case: demand follows the consensus baseline, but scale efficiencies and infrastructure optimization prove more powerful than expected. Revenue still compounds at roughly 34% annually from 2025–2030E, but operating margin expands by more than 1,000 basis points, reaching 41.3% by 2030E. The difference is capital efficiency. Capex/revenue still peaks at 104.2% in 2026E, but falls much faster than in the baseline, declining to 36.1% by 2030E, while depreciation/revenue peaks at 27.5% in 2029E and begins to fall in 2030E. That combination drives a materially better return profile: ROIC bottoms at 14.3% in 2027E, then rises to 22.9% by 2030E. This is the scenario in which hyperscaler cloud begins to look more software-like despite its physical infrastructure base: the industry does not merely build more capacity, it generates substantially more revenue and profit per dollar of capital deployed.

Exhibit 2: Consensus Demand + Scale Efficiencies Realized

Scenario 2 Consensus Demand + Scale Efficiencies Realized	2025	2026E	2027E	2028E	2029E	2030E	2025 - 2030E CAGR / Change
Annual Revenue Growth, %	28.4%	42.4%	36.7%	35.1%	28.7%	26.2%	33.7%
Operating Margin	30.8%	32.1%	33.4%	35.7%	38.5%	41.3%	1051 bps
Capex / Revenue	79.1%	104.2%	87.7%	64.9%	47.9%	36.1%	-43.0%
Depreciation / Revenue	16.8%	20.9%	24.5%	27.2%	27.5%	26.1%	9.3%
Return on Invested Capital (ROIC)	16.7%	15.2%	14.3%	15.8%	18.6%	22.9%	N/A

Source: LPL Research, Bloomberg 07/21/26

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Scenario 3: AI Demand Underwhelms + Spending Pulled Back

Scenario 3 is the moderate downside scenario, and one which we view as a realistic and feasible outcome. In this scenario, AI demand underwhelms, but spending is pulled back before the capital cycle becomes deeply impaired. Revenue growth decelerates sharply after 2026E, falling from 42.4% in 2026E to 25.0% in 2027E, 20.0% in 2028E, 15.0% in 2029E, and 10.0% by 2030E, producing a still-healthy 22% revenue compound annual growth rate (CAGR) over the full period. The issue is that the cost structure and asset base do not reset quickly enough. Operating margin compresses from 32.1% in 2026E to 24.4% by 2030E, while depreciation/revenue rises steadily to 43.0% by 2030E. Capex/revenue does decline meaningfully after peaking around 105.5% in 2027E, falling to 47.7% by 2030E, but the pullback comes after the capital base has already expanded. ROIC falls from 16.7% in 2025 to 8.7% by 2030E. In this outcome, AI demand is real, but not strong enough to support premium platform returns; the business migrates toward a high-quality but capital-intensive infrastructure model. The key lesson from this scenario is that hyperscaler capex does not need to be “wasted” for equity returns to disappoint; it only needs revenue growth to slow faster than the asset base can be digested.

Exhibit 3: AI Demand Underwhelms + Spending Pulled Back

Scenario 3 AI Demand Underwhelms + Spending Pulled Back	2025	2026E	2027E	2028E	2029E	2030E	2025 - 2030E CAGR / Change
Annual Revenue Growth, %	28.4%	42.4%	25.0%	20.0%	15.0%	10.0%	22.0%
Operating Margin	30.8%	32.1%	30.6%	26.6%	26.5%	24.4%	-639 bps
Capex / Revenue	79.1%	104.2%	105.5%	83.5%	61.7%	47.7%	-31.4%
Depreciation / Revenue	16.8%	20.9%	27.2%	36.3%	39.4%	43.0%	26.2%
Return on Invested Capital (ROIC)	16.7%	15.2%	11.8%	9.3%	9.1%	8.7%	N/A

Source: LPL Research, Bloomberg 07/21/26

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Scenario 4: AI Demand Weakens + Higher Committed Fixed Costs

Scenario 4 is the capital-cycle failure case: demand weakens materially while fixed costs and committed capital remain elevated. Revenue growth slows from 42.4% in 2026E to 20.0% in 2027E, 15.0% in 2028E, 10.0% in 2029E, and just 5.0% by 2030E, reducing the 2025–2030E revenue CAGR to 17.8%. That would still be attractive growth in many industries, but it is not enough against an infrastructure base built for a much larger demand curve. Operating margin falls by more than 1,300 basis points, from 30.8% in 2025 to 17.5% in 2030E, as depreciation, underutilization, power costs, and contractual commitments become increasingly difficult to absorb. Unlike Scenario 3, capex/revenue does not normalize; it remains above 80% through 2030E, while depreciation/revenue rises to 52.5%. ROIC deteriorates from 16.7% in 2025 to 4.7% by 2030E. This is the scenario where useful assets still exist, and demand has not disappeared, but the industry has overbuilt relative to profitable utilization, pushing returns below the cost of capital, the minimum hurdle investors would normally require for a capital-intensive business. In other words, hyperscaler cloud economics stop looking like a premium digital infrastructure platform and begin to resemble a capital-intensive industry caught on the wrong side of the capital cycle.

Exhibit 4: AI Demand Weakens + Higher Committed Fixed Costs

Scenario 4 AI Demand Weakens + Higher Committed Fixed Costs	2025	2026E	2027E	2028E	2029E	2030E	2025 - 2030 CAGR
Annual Revenue Growth, %	28.4%	42.4%	20.0%	15.0%	10.0%	5.0%	17.8%
Operating Margin	30.8%	32.1%	30.6%	24.8%	19.8%	17.5%	-1323 bps
Capex / Revenue	79.1%	104.2%	109.9%	95.6%	86.9%	82.7%	3.7%
Depreciation / Revenue	16.8%	20.9%	28.4%	38.2%	45.2%	52.5%	35.7%
Return on Invested Capital (ROIC)	16.7%	15.2%	11.3%	7.8%	5.7%	4.7%	N/A

Source: LPL Research, Bloomberg 07/21/26

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Summary, Industry Comparables, and Valuation Frameworks

The summary of our scenario analysis below is intended less as a point forecast than as a valuation translation exercise. Across all four cases, the hypothetical average hyperscaler remains a large and strategically important business; what changes is the appropriate comparable industry and valuation framework as growth, margins, capital intensity, depreciation burden, and ROIC move through the cycle. In upside cases, the business retains enough platform economics to justify a premium to traditional infrastructure, and in the strongest case, begins to resemble software-like infrastructure. In the downside cases, however, the valuation lens shifts materially: first toward high-quality data center/telecom infrastructure, and then, in the most adverse outcome, toward an asset-heavy overbuild framework where replacement value, normalized free cash flow, balance-sheet flexibility, and cost of capital matter more than revenue growth alone.

Exhibit 5: Summary, Industry Comparables, and Valuation Frameworks

Scenario Analysis Summary 2025 - 2030E	Scenario 1 Market Consensus Baseline	Scenario 2 Consensus Demand + Scale Efficiencies Realized	Scenario 3 AI Demand Underwhelms + Spending Pulled Back	Scenario 4 AI Demand Weakens + Higher Committed Fixed Costs
Revenue CAGR (Compound Annual Growth Rate)	~34%	~34%	~22%	~18%
Operating Margin	Expands to >35%	Expands to >40%	Compresses below 25%	Compresses below 20%
Capex / Revenue	Peaks 2026/27, steadily declines	Peaks 2026, quickly declines	Peaks 2026/27, steadily declines	Remains elevated >80%
Depreciation / Revenue	Rises then stabilizes	Rises, peaks, then falls	Keeps rising to >40%	Keeps rising to >50%
ROIC (Return on Invested Capital)	2027-30 Average ~15% Troughs 2027, rises thereafter	2027-30 Average ~18% Troughs 2027, rises thereafter	2027-30 Average ~10% Declines from 2025 to 2030E	2027-30 Average ~7% Declines sharply from 2025 to 2030E
Margin and ROIC Comparable Industry	Premium digital infrastructure platform Economically between cloud software, towers, data centers, railroads, and industrial gases. Too capital-intensive for pure software, but too profitable and fast-growing for traditional infrastructure.	Software-like infrastructure platform Closest to scaled enterprise software / cloud platform economics, but with a physical infrastructure wrapper. The business increasingly earns like software despite owning hard assets.	High-quality infrastructure / telecom / data center-like Valuable and growing, but returns migrate toward capital-intensive infrastructure rather than platform software. Similar to a well-run network infrastructure business with fading operating leverage.	Impaired infrastructure / telecom overbuild analogue Useful assets, real demand, but overbuilt relative to profitable utilization. Closest to capital-intensive network businesses caught on the wrong side of the investment cycle.
Valuation Framework	Premium to infrastructure, discount to software Valuation should be anchored on ROIC durability, revenue growth, and FCF conversion rather than pure revenue multiples.	Software/platform multiple justified if FCF follows Highest justified valuation range; investors would likely underwrite premium multiples if capex intensity falls and ROIC approaches mid-20s by 2030.	Infrastructure multiple / FCF yield framework Valuation should compress toward EV/EBITDA, EV/NOPAT, and FCF yield discipline; less credit for long-duration optionality.	Asset-heavy / cost-of-capital framework Valuation shifts toward replacement value, normalized FCF, and balance-sheet flexibility; little to no premium for growth if ROIC falls below WACC.

Source: LPL Research, Bloomberg 07/21/26

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Conclusion

The hyperscaler AI capex cycle is not easily classified as either a bubble or a straightforward software growth story. The more useful framing is that the largest cloud platforms have become something of a hybrid business model that is part software platform, part digital infrastructure network, part capital-intensive industrial system. Our hypothetical “average hyperscaler” build and scenario analysis provides just a few directions this hybrid business model could go in terms of returns on invested capital. In the consensus-driven base case, that hybrid can still earn attractive returns, with revenue growth strong enough to absorb the current investment wave. In the upside case, capital efficiency improves fast enough that the business begins to look increasingly software-like, with operating margins above 40% and ROIC moving into the 20%+ range.

But the downside scenarios highlight why the burden of proof has risen. If demand merely underwhelms, returns can fall toward infrastructure-like levels even while revenue continues to grow. If demand disappoints while fixed costs, depreciation, and commitments remain elevated, the economics can deteriorate quickly, with useful assets earning sub-cost-of-capital returns.

The conclusion is therefore balanced but disciplined. Hyperscaler cloud businesses may deserve a premium valuation to traditional infrastructure, but it should no longer be analyzed as pure software. The right framework is

ROIC-driven: how much capital is being deployed, how quickly is that capital monetized, and whether the incremental dollar of AI infrastructure earns platform-like returns or infrastructure-like returns.

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