

US Data-Centre Valuation under Lower Compute-Cost Scenarios

A Cash-Flow Framework for Contracts, Utilisation, Power and Expansion Capital

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Abstract

The cost of delivering a unit of computing can fall because processors improve, software becomes more efficient, workload scheduling advances, model architectures change or cloud providers reduce prices. The valuation consequence for a United States data-centre owner is not automatic. Lower compute cost can stimulate demand, reduce the physical infrastructure required for a fixed task, increase power density, change customer bargaining power or alter the pace at which older halls become commercially obsolete. The cash effect depends on contracts, renewal dates, customer workloads, facility design, power availability, capital requirements and competitive supply.

This paper develops a US Data-Centre Compute-Cost Transmission Framework for boards, investors, lenders, operators, developers and transaction advisers. It separates facility economics from customer compute economics; defines a capacity ladder from utility right to collected cash; maps six customer-contract archetypes; and tests how alternative compute-cost paths affect utilisation, pricing, density, power consumption, churn, expansion capital and terminal value. It combines discounted cash flow, replacement cost and market evidence while rejecting the use of a single enterprise-value-per-megawatt multiple as a complete valuation method.

The worked case is wholly hypothetical. It examines a 360 MW stated portfolio with 246 MW of commissioned critical capacity, 178 MW of customer-usable IT load, 142 MW contracted, 116 MW installed and 98 MW billable. The illustrative capital structure includes USD 7.4 billion of enterprise value, USD 2.1 billion of committed, reliability and growth capital, and USD 3.2 billion of acquisition debt. Alternative compute-service cost indices decline from 100 to 75, 55 or 35 over five years. These paths are modelling assumptions rather than forecasts and do not describe an identified company or transaction.

The analysis finds that compute cost reaches data-centre cash only through identifiable transmission channels. Contracted power with fixed minimums may delay the effect. Usage-based cloud demand may respond quickly. Higher rack density can lift revenue per square foot while increasing cooling, electrical and retrofit requirements. Demand elasticity can offset unit-cost declines, while customer concentration, renewal exposure and regional power constraints can amplify downside. A defensible valuation therefore links every scenario to customer contracts, capacity conversion, power cost, capital expenditure and debt service; separates current cash from contingent growth; and preserves explicit board gates for expansion.

JEL Classification: G12, G31, G32, L86, L94, Q41

Keywords: US data centres, data-centre valuation, compute cost, artificial intelligence infrastructure, utilisation, power capacity, colocation contracts, DCF, megawatt multiple, expansion capital

1. Frame the valuation decision

The decision question is whether the asset earns durable cash from present service, contracted conversion and financeable expansion. The analysis should begin with audited cash, executed contracts, customer acceptance, metered power, engineering records and approved capital plans. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that a market narrative can capitalise uncommitted demand and unavailable power as current value. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to separate operating value, conversion value, expansion value and strategic option value. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

2. Separate facility economics from compute economics

The decision question is which party buys processors and software, bears technology risk and pays the data-centre owner. The analysis should begin with service descriptions, customer contracts, equipment ownership, metering, cloud architecture and responsibility matrices. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that a decline in compute cost can be mistaken for an equal decline in rent even when the facility sells committed power or space. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to trace the economic unit from customer workload to contracted facility charge. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

3. Adopt a capacity dictionary

The decision question is how stated megawatts convert into usable, contracted, installed, billable and collected service. The analysis should begin with utility agreements, substations, commissioning, redundancy design, cooling limits, contracts, invoices and receipts. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that reported capacity can mix land-bank potential, utility allocation, construction and operating load. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to reconcile each capacity layer with one definition, owner, source and date. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Figure 1. Proposed data-centre capacity-to-cash ladder

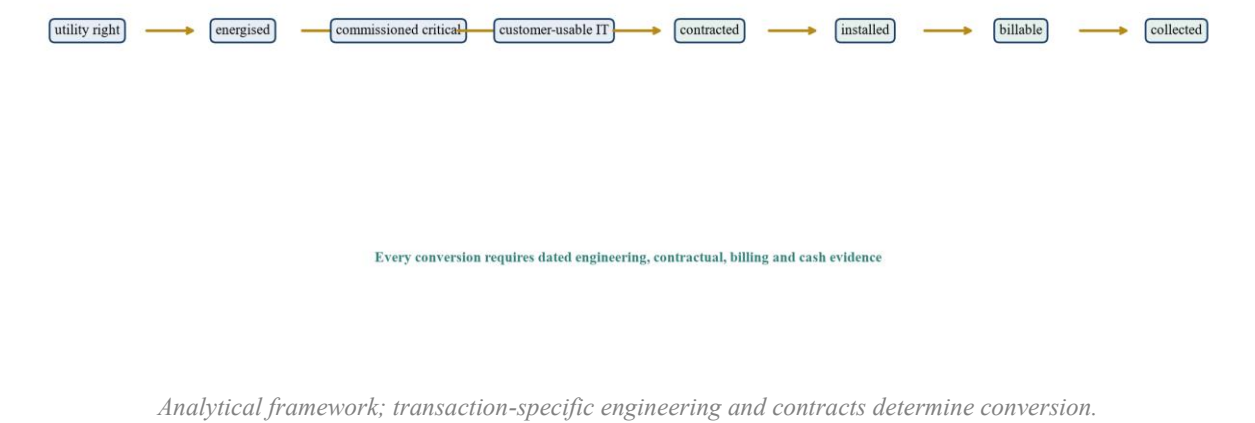


Table 1. Capacity definitions for valuation

Layer	Evidence	Valuation use
utility right	executed service and delivery terms	dependency and option
commissioned critical	completed and tested systems	operating capacity
customer-usable IT	density, redundancy and cooling-adjusted	saleable denominator
contracted	executed customer commitment	conversion value
installed	accepted customer equipment and service	ramp evidence
billable	invoice supported by accepted service	operating revenue
collected	reconciled cash receipt	cash-quality test

Proposed definitions; engineering and contracts determine actual treatment.

4. Map the customer-contract transmission channels

The decision question is which price, volume, minimum, escalation, renewal and pass-through clauses transmit a compute-cost change. The analysis should begin with executed agreements, amendments, order forms, service schedules, invoices, credits and renewal notices. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that average revenue per kilowatt can conceal different contract exposure and customer options. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in

one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to model every material contract according to its enforceable cash mechanism. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

5. Classify customer and service archetypes

The decision question is how hyperscale, wholesale, retail colocation, managed hosting, interconnection and powered-shell services respond differently. The analysis should begin with customer master data, product catalogue, contracts, rack and power records, sales pipeline and collections. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that one demand elasticity can be applied to customers with incompatible economics and switching costs. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to build archetype-specific revenue, churn, density and capital assumptions. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Table 2. Customer-contract archetypes

Archetype	Typical charging unit	Compute-cost channel	Principal valuation test
hyperscale build-to-suit	committed MW	renewal and expansion	credit, term and residual use
wholesale colocation	kW or MW commitment	utilisation and price	ramp, minimum and renewal
retail colocation	rack, cabinet and power	density and churn	customer cohort economics
interconnection	cross-connect or port	network demand	ecosystem and migration cost
managed hosting	service bundle	direct efficiency and competition	hardware and service margin
powered shell	lease and power rights	tenant capital and take-up	fit-out, credit and reletting

Illustrative classification; executed terms govern each exposure.

6. Measure utilisation quality

The decision question is whether occupied capacity produces durable margin and collected cash at an appropriate capital burden. The analysis should begin with commissioned capacity, installed equipment, meters, billing, collections, support tickets and service credits. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that headline utilisation can count reservations, testing load or low-margin legacy contracts. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding

them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to publish physical, contractual, billing and cash utilisation as separate measures. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

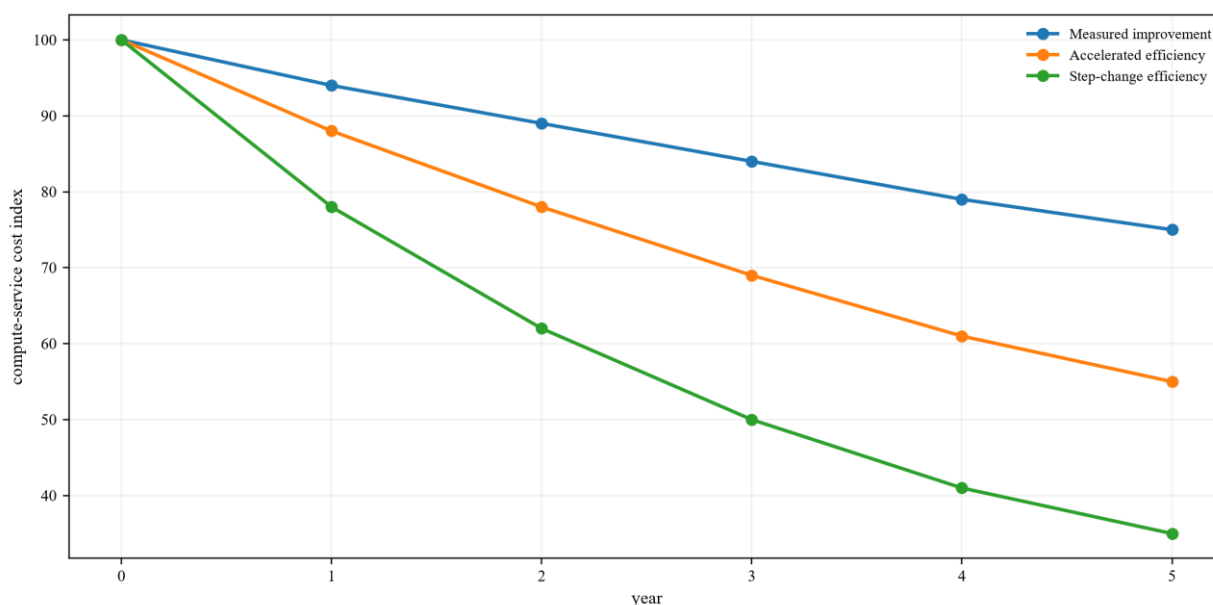
7. Construct alternative compute-cost paths

The decision question is how a lower cost per unit of useful computation could develop without treating one path as a forecast. The analysis should begin with processor performance, software efficiency, cloud prices, workload mix and customer disclosures. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that precision in a technology forecast can create false confidence in long-dated cash flows. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to use transparent indices, ranges, trigger points and regular re-estimation. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Figure 2. Illustrative compute-service cost paths



Wholly hypothetical indices; these are scenario assumptions rather than forecasts.

Table 3. Compute-cost scenario design

Path	Year-five index	Possible demand response	Possible facility effect
measured improvement	75	broader but gradual adoption	stable ramp; selective density capex
accelerated efficiency	55	strong workload expansion	higher density; mixed MW demand

Path	Year-five index	Possible demand response	Possible facility effect
step-change efficiency	35	rapid new use with consolidation risk	winners by power, network and design

Hypothetical indices; no path is a forecast.

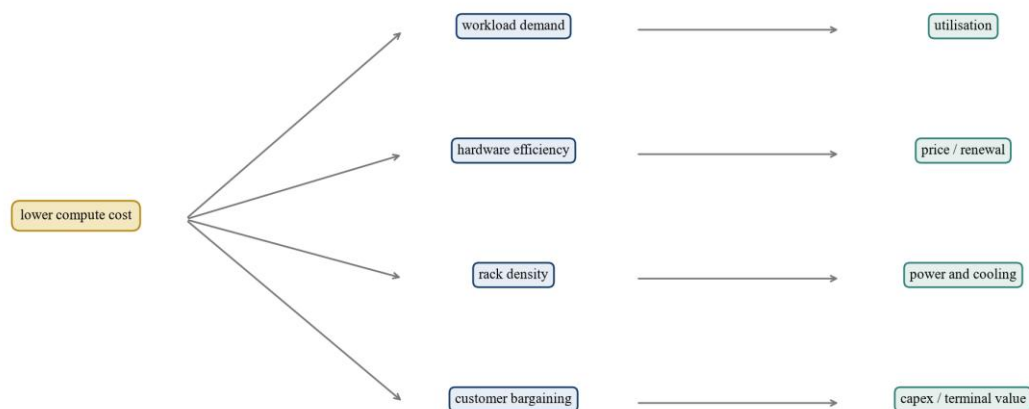
8. Estimate demand elasticity by workload

The decision question is whether lower unit cost expands inference, training, storage, networking or enterprise workloads enough to offset efficiency. The analysis should begin with customer cohort history, workload telemetry where contractually permitted, bookings, cancellations and industry evidence. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that aggregate demand growth can hide falling demand from a particular customer or facility generation. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to estimate response by workload, customer, location and contract. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Figure 3. Compute-cost transmission into data-centre cash



Proposed causal map; each arrow requires transaction-specific evidence.

9. Model density and facility compatibility

The decision question is whether rising kilowatts per rack can be served by electrical, cooling, floor, fire and operational systems. The analysis should begin with design drawings, nameplates, commissioning, thermal studies, rack inventories and customer specifications. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that portfolio megawatts can remain available while commercially relevant high-density capacity is scarce. This can move value through revenue, operating cost, capital

expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to value density-compatible service separately and cost retrofit constraints. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

10. Underwrite power availability and price

The decision question is whether utility rights, delivery dates, tariffs, generation mix and network constraints support each cash scenario. The analysis should begin with utility contracts, interconnection studies, tariffs, FERC and regional operator records, metering and bills. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that an executed customer contract can precede deliverable utility capacity or expose the owner to volatile power cost. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to model physical availability, timing, basis, pass-through and curtailment separately. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

11. Test interconnection and network value

The decision question is how carrier density, cloud on-ramps, latency and cross-connect economics affect retention and pricing. The analysis should begin with network maps, cross-connect inventory, traffic, customer dependencies, prices and service records. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that power-only valuation can miss durable network effects or duplicate connectivity capital. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to measure network revenue, customer dependence and replacement difficulty. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

12. Model renewal, churn and migration

The decision question is when customers can renegotiate, consolidate, relocate or change architecture under each scenario. The analysis should begin with contract expiry, renewal notice, installation history, migration cost, service quality and customer strategy. Each item needs a source, period, owner and

reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that long average tenure can mask a concentrated renewal wall. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to forecast contract-level renewal with explicit timing and probability. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

13. Assess customer concentration and credit

The decision question is how a small number of customers influence price, capital, utilisation and financing. The analysis should begin with customer revenue, margin, receivables, parent support, ratings, security and contract remedies. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that investment-grade customer names can obscure entity, termination and concentration risk. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to link credit and bargaining power to revenue and covenant cases. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

14. Reconcile expansion and reliability capital

The decision question is which expenditure sustains service, converts contracts and creates new saleable capacity. The analysis should begin with condition assessments, capex ledgers, construction contracts, schedules, permits, commissioning and customer milestones. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that growth capex can include deferred maintenance or infrastructure unavailable to the target workload. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to classify sustaining, compliance, conversion, density, resilience and expansion capital. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Table 4. Capital-expenditure classification

Class	Purpose	Value treatment	Release evidence
sustaining	preserve service	operating cash requirement	condition and maintenance plan
compliance	meet law and code	unavoidable requirement	permit and remediation scope
reliability	protect uptime	risk-adjusted cash	failure and resilience evidence
conversion	deliver contracted load	contracted growth	customer and commissioning milestones
density retrofit	serve higher-density workloads	scenario value	design, customer and return
expansion	create new saleable capacity	contingent growth	land, power, permit, demand and funding

Proposed classification; transaction-specific engineering controls amounts.

15. Model technological and economic obsolescence

The decision question is when an operating hall loses competitiveness despite remaining physically functional. The analysis should begin with density, cooling, efficiency, reliability, network, certifications, customer pipeline and retrofit economics. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that straight-line depreciation can understate commercial obsolescence or overstate required replacement. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to use facility-generation cohorts and cash-based impairment indicators. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

16. Build the discounted-cash-flow model

The decision question is how contract cash, utilisation, price, power, operating cost, capex, tax and working capital create value. The analysis should begin with monthly customer cash, operating records, tax basis, capital schedules and financing assumptions. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that a top-down revenue growth rate can disconnect value from capacity and contracts. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to build from customer and capacity cohorts with auditable scenario drivers. Central, upside and downside cases should state the contract mechanism, capacity consequence,

required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

17. Use megawatt multiples with discipline

The decision question is which capacity definition, cash maturity, geography and capital obligation make a comparable transaction relevant. The analysis should begin with public filings, transaction disclosures, operating metrics, capacity definitions and remaining capex. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that enterprise value per stated megawatt can reward undeveloped power and ignore liabilities. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to normalise multiples to commissioned, usable and billable capacity and reconcile to DCF. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Table 5. Valuation-method reconciliation

Method	Strength	Principal limitation	Required reconciliation
DCF	links contracts and capital to cash	sensitive to long-term assumptions	scenario and terminal-value bridge
EV per MW	rapid market comparison	capacity definitions differ	commissioned, usable and billable MW
EBITDA multiple	cash-oriented comparison	maturity and capex differ	leases, power, capex and growth
replacement cost	tests scarcity and recreation	cost can exceed economic value	time, utility feasibility and demand
transaction evidence	observes control value	disclosure and cycle vary	date, perimeter, synergies and liabilities

Each method requires consistent perimeter and capacity definitions.

18. Apply replacement cost and land-power evidence

The decision question is what it would cost and how long it would take to recreate land, power, buildings, systems and network position. The analysis should begin with land evidence, utility works, engineering quantities, procurement, labour, permits and commissioning. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that replacement cost can exceed economic value where customer demand or returns are insufficient. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to use depreciated replacement cost as a cross-check with time and feasibility adjustments. Central, upside and downside cases should state the contract mechanism, capacity

consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

19. Govern AI-assisted valuation

The decision question is how models extract contracts, reconcile capacity, detect anomalies and simulate scenarios under accountable review. The analysis should begin with data lineage, model cards, validation, access controls, exception logs and reviewer approvals. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that automated summaries can propagate source errors or conceal model uncertainty. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to assign human owners, preserve citations and validate consequential outputs. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

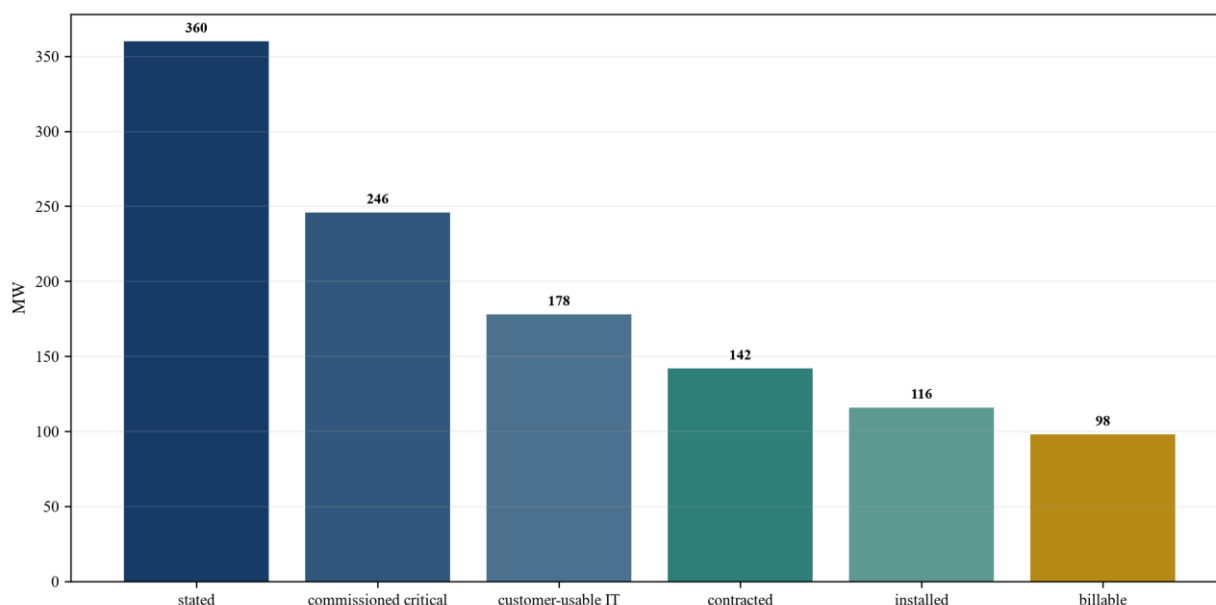
20. Define the hypothetical portfolio

The decision question is how the worked case converts 360 stated megawatts into billable capacity and cash. The analysis should begin with the illustrative capacity ladder, contract mix, capital plan, operating costs and debt. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that a single 360 MW denominator would overstate current operating scale. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to value only the capacity layer supported by the relevant evidence. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Figure 4. Hypothetical conversion of stated capacity to billable load



Wholly hypothetical megawatts; figures do not describe an identified portfolio.

21. Translate scenarios into cash

The decision question is how compute-cost indices change demand, renewal price, density, power, capex and margin. The analysis should begin with central, demand-led and efficiency-led assumptions with explicit elasticities and contract lags. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that a lower cost index can be applied directly to data-centre revenue without an economic channel. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to calculate each channel independently and show interactions. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Table 6. Hypothetical cash-flow scenario assumptions

Driver	Central	Demand-led upside	Efficiency-led downside
billable load in year five	142 MW	165 MW	118 MW
renewal price change	0%	+4%	-9%
average power density	+28%	+45%	+20%
five-year capital	USD 2.1bn	USD 2.5bn	USD 1.7bn
expansion delay	9 months	3 months	24 months
terminal utilisation	86%	92%	74%

Wholly hypothetical; values do not describe an identified company.

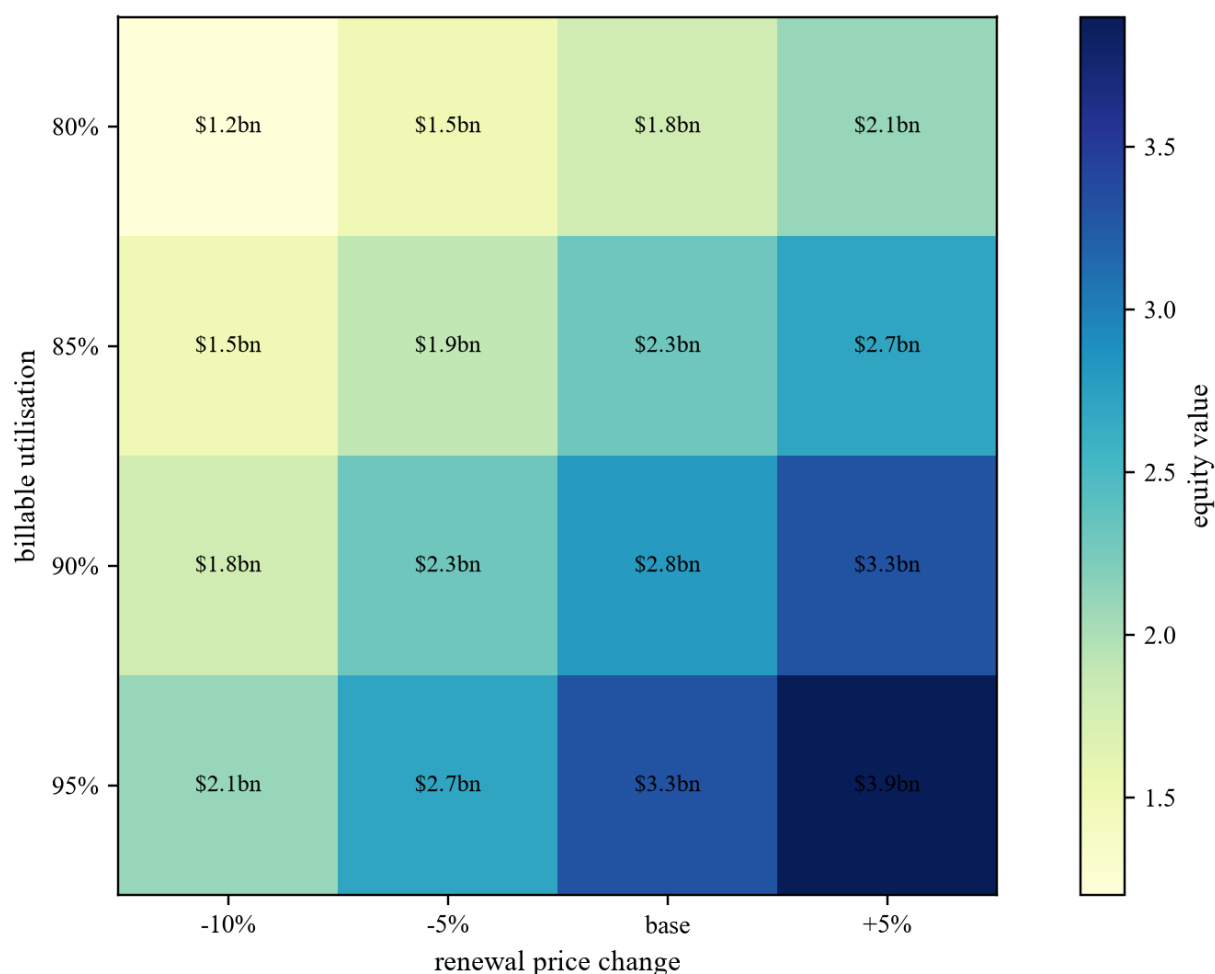
22. Bridge enterprise value to equity value

The decision question is how operating assets, contracted conversion, expansion, debt, leases, tax and contingencies reach equity value. The analysis should begin with DCF outputs, debt, cash, lease obligations, committed capex and transaction adjustments. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that headline enterprise value can conceal funding obligations and debt-like items. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to show a transparent bridge with downside liquidity. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Figure 5. Hypothetical equity-value sensitivity to billable utilisation and renewal price



Wholly hypothetical USD billions; this is not a valuation opinion.

23. Run sensitivity and tornado analysis

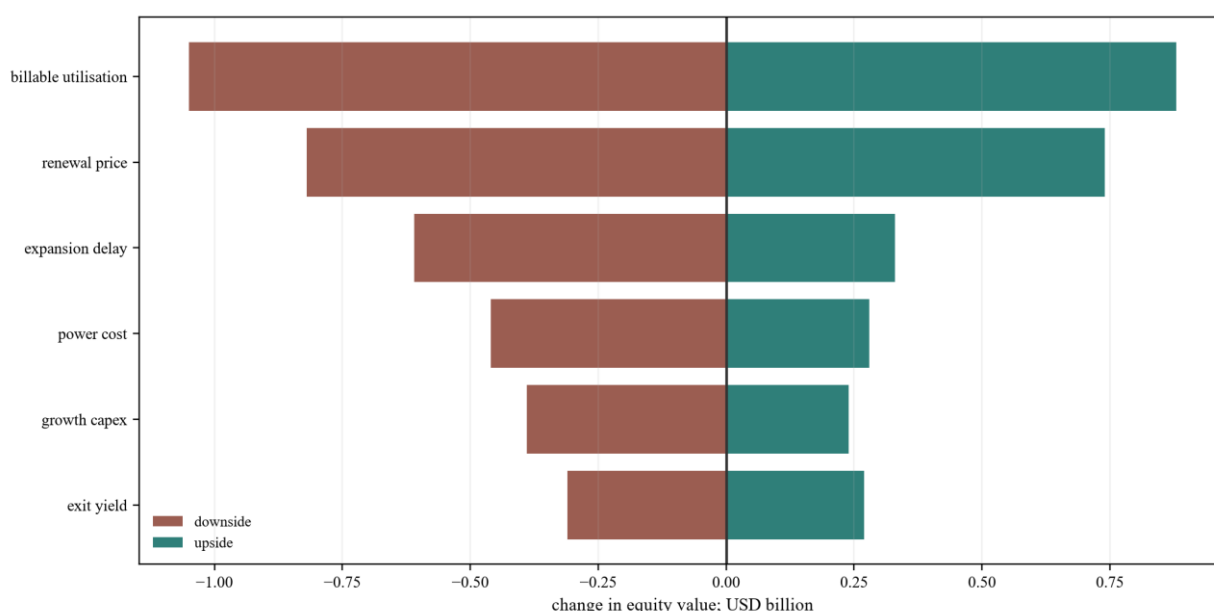
The decision question is which assumptions explain the greatest change in value and covenant resilience. The analysis should begin with contract renewal, billable capacity, price, power cost, capex, delay, exit

yield and terminal growth. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that many small sensitivities can distract from a few decisive exposures. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to rank variables by equity and debt-service impact and assign evidence priorities. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Figure 6. Hypothetical equity-value tornado



Wholly hypothetical sensitivities around the central case.

24. Size debt to resilient cash

The decision question is what leverage, amortisation, reserve and covenant structure survives realistic downside. The analysis should begin with contracted EBITDA, maintenance capital, taxes, working capital, interest, maturity and liquidity. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that debt can be sized to projected expansion that lacks power, customer acceptance or funding. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to base leverage on resilient cash and stage growth debt against milestones. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

25. Translate findings into transaction terms

The decision question is which price adjustments, escrows, earn-outs, indemnities, conditions and covenants allocate uncertainty. The analysis should begin with diligence findings, legal rights, financing requirements and integration plan. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that valuation caveats can disappear from definitive agreements. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to attach each material uncertainty to a quantified protection and owner. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

26. Set board gates for expansion

The decision question is when land, power, permitting, customer demand, design, funding and returns permit capital release. The analysis should begin with approved business cases, utility evidence, customer commitments, engineering and financing. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that strategic urgency can accelerate spending before dependencies are secured. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to use sequential gates with stop, redesign and repricing decisions. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Table 7. Board capital-release gates

Gate	Minimum evidence	Stop or redesign trigger
land and control	title, lease, access and environmental baseline	unresolved control or remediation
power	executed rights, delivery path and price	speculative timing or unaffordable upgrade
customer	enforceable commitment and credit	non-binding pipeline or concentrated option
design	density, cooling, resilience and cost	incompatible target workload
funding	committed sources, liquidity and covenant headroom	reliance on unfinanced growth
construction	fixed scope, schedule, interfaces and contingency	critical-path dependency unresolved

Gate	Minimum evidence	Stop or redesign trigger
commissioning	tested systems and customer acceptance	failed performance or acceptance

Proposed governance; each investment requires project-specific approval.

27. Monitor post-close value and refinancing

The decision question is which leading indicators identify variance before cash and covenant failure. The analysis should begin with capacity conversion, bookings, renewals, metering, incidents, capex, collections and liquidity. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that quarterly financial reporting can reveal problems after intervention options narrow. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to operate a monthly evidence dashboard tied to board actions. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

28. Reach a defensible conclusion

The decision question is whether the asset remains valuable across transparent compute-cost and operating scenarios. The analysis should begin with reconciled evidence, scenario results, protections, financing and accountable approvals. Each item needs a source, period, owner and reconciliation to the financial model. External market growth provides context; it does not establish the cash earned by a particular facility, contract or customer.

The principal valuation failure is that one point estimate can hide incompatible paths and concentrated risk. This can move value through revenue, operating cost, capital expenditure, timing, tax, liquidity and the cost of capital. The model should expose those paths instead of embedding them in one growth rate or terminal multiple. Management estimates can be used for planning when they are clearly identified as assumptions and remain separate from observed evidence.

The recommended response is to approve a value range, protection package and trigger-based operating plan. Central, upside and downside cases should state the contract mechanism, capacity consequence, required capital, timing and responsible decision owner. The board should see the earliest observable indicator, the value at risk and the action available before it releases capital or accepts leverage.

Frequently asked questions

Q: Does lower compute cost necessarily reduce data-centre value? A: No. The result depends on demand elasticity, customer contracts, workload architecture, density, power availability, competitive supply and capital requirements. A lower compute cost can expand workloads, reduce required infrastructure per task or do both.

Q: Why is enterprise value per megawatt insufficient? A: Megawatts can describe utility rights, construction, commissioned systems, usable IT load, contracted load or billable service. These layers have different remaining capital, timing and cash. A multiple requires a consistent capacity definition and a DCF reconciliation.

Q: How should hyperscale contracts be modelled? A: The model should use enforceable minimums, ramp dates, escalation, power pass-through, service levels, renewal options, termination rights, customer credit and remaining owner capital. Portfolio averages can conceal renewal and concentration risk.

Q: Can artificial intelligence perform the valuation? A: AI can extract terms, reconcile identifiers, detect anomalies and run scenarios. Accountable specialists remain responsible for source validation, engineering conclusions, legal interpretation, assumptions and investment decisions.

Q: How should planned capacity be valued? A: Planned capacity should receive contingent or option value after evidence of land control, deliverable power, permits, compatible design, customer demand, funding and return. It should not be treated as current billable capacity.

Q: What is the most important downside test? A: The most important test varies by asset. Common decisive exposures are concentrated renewals, delayed power, lower billable utilisation, retrofit capital, power-cost mismatch, expansion delay and refinancing pressure. A tornado analysis identifies the dominant variables.

Q: How does higher rack density affect value? A: Higher density can increase revenue per square foot and make constrained power more valuable. It can also require new cooling, electrical distribution, controls and maintenance practices. Value depends on price, capital, downtime and customer acceptance.

Q: How should debt be sized? A: Debt should be sized to resilient contracted cash after power, maintenance capital, tax and working-capital requirements. Growth debt can be staged against utility, construction and customer-acceptance milestones.

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