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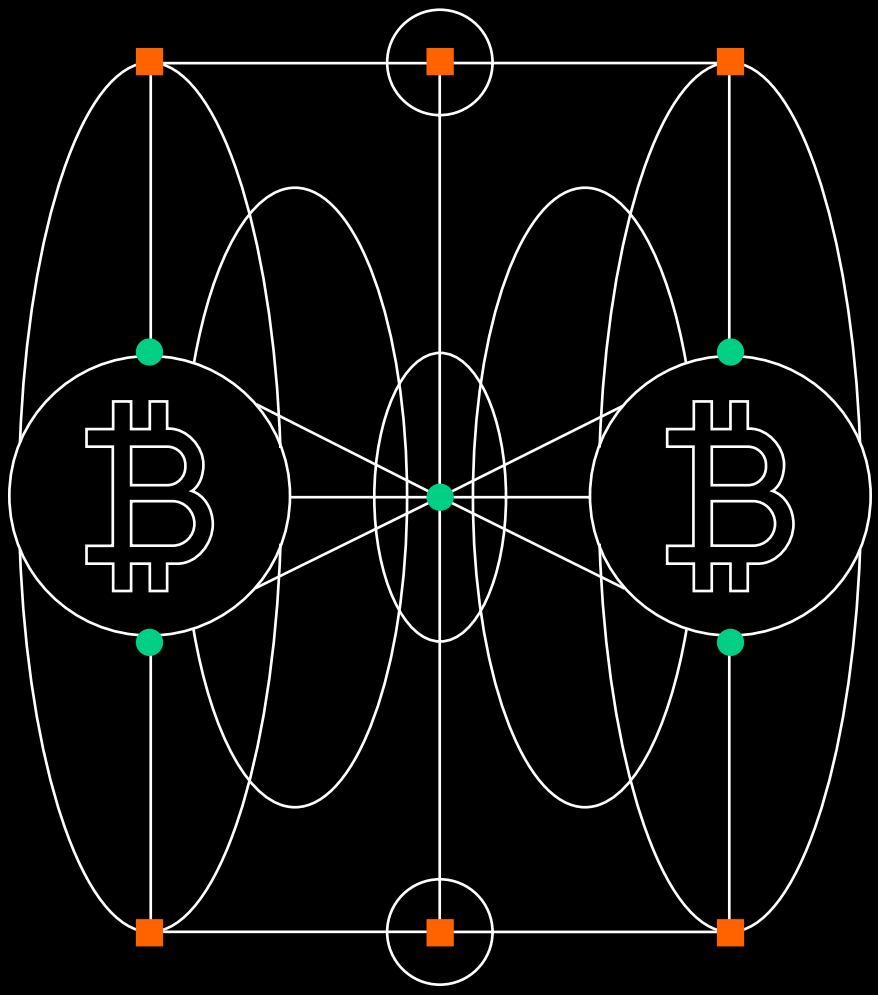
Galaxy Research

Bitcoin Miners Powering the AI Revolution

DECEMBER 18, 2024



Author & Acknowledgements

Simrit Dhinsa
Mining Associate

Sebastian Orejas
Mining Analyst

Gabe Parker
Research Analyst

This report is a product of Galaxy Research, a research organization within Galaxy, the leading provider of financial services in the digital assets, cryptocurrency, and blockchain technology sector. Galaxy Research provides top-tier market commentary, thematic views, tactical insights, and deep protocol research.

This report was written December 2024.

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Contents

Key Takeaways

- Bitcoin miners with large scale acreage, water for cooling, dark fiber, reliable power, a skilled labor force, power approvals, and critical long-lead time infrastructure components are in a prime position to increase the value of their assets by meeting demand in the rapidly growing AI/HPC data center market.
- Goldman Sachs Research forecasts U.S. data center demand to reach 45 GW by 2030, with power demand growing at a 15% CAGR from 2023-2030, driven by AI.
- By 2038, JP Morgan projects hyperscaler AI capex will reach $370bn, a 127% increase from the estimated AI capex in 2024
- There has been a sharp rise in connection requests for facilities ranging from 300 MW to 1,000 MW or more which is straining the capacity of local grids to deliver power at this accelerated pace, causing interconnection and construction timelines to extend 2- 4 years
- Traditional data centers don't have large power capacities and cannot support high density computing operations. Server racks that once maxed out at around 40 kW per rack now need to support over 132 kW per rack that is required for cutting-edge systems like the GB200 NVL72
- The cash flow predictability, active financing markets, and significant valuation upside of AI/HPC operations make the opportunity highly attractive and accretive for miners with the right assets
- Miners can unlock significant value by transitioning into AI/HPC markets, by arbitraging their 6-12x EV/EBITDA valuation with current 20-25x multiples typical of leading data center operators.

Introduction

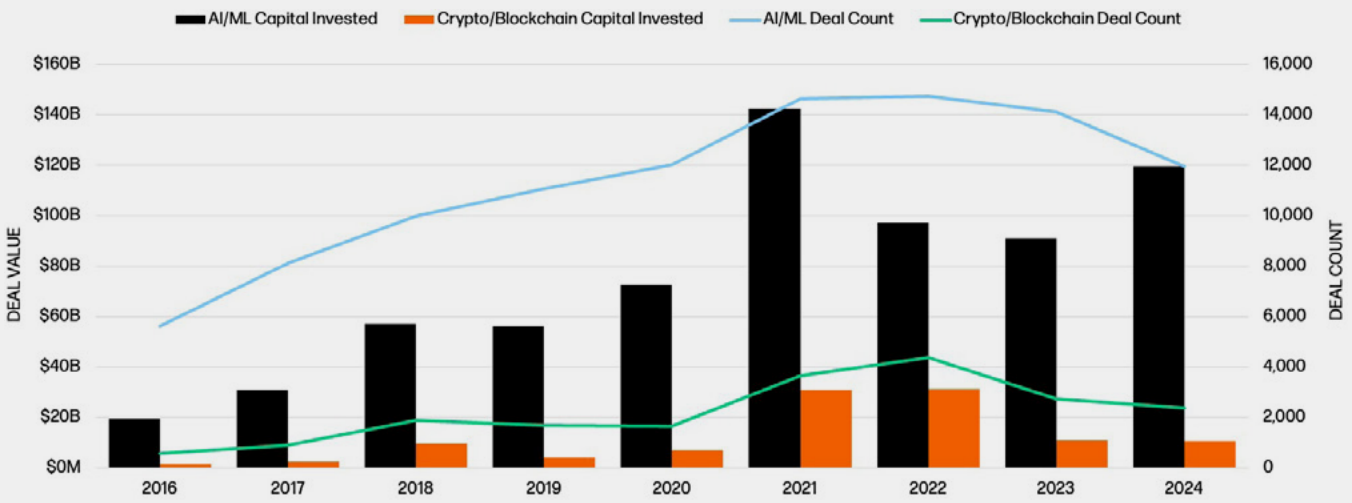
The rise of artificial intelligence (AI) is creating unprecedented demand for high-capacity computing (HPC) facilities. This surge is leading to substantial investment by hyperscalers for new data center capacity. Traditional data centers, however, are struggling to meet these demands due to limited power capacities and extended construction timelines of 2-4 years for new facilities.

Bitcoin miners are uniquely positioned to capitalize on this market opportunity, having already secured access to large-scale power infrastructure and critical components needed for data center operations. While not all mining facilities can be converted to AI data centers due to specific requirements for cooling, networking, and redundancy systems, those with the right assets and expertise stand to benefit from the high cash flow margins and immense valuation potential of AI/HPC operations. The report examines the current landscape for traditional data centers and highlights specific hurdles in meeting AI computing demands. The report then analyzes why certain types of Bitcoin miners are well-positioned to fill this gap and explores future trends at the intersection of Bitcoin mining and AI infrastructure.

What is the AI Data Center Opportunity?

AI has boomed in 2024, driven by increased adoption of generative AI (GenAI) technologies. According to Pitchbook, more than $680bn has been invested into AI and machine learning startups across more than 100k deals since 2016, with $120bn invested just in 2024.

AI/ML. vs. Crypto/Blockchain Venture Investment vs. Deal Count (2016-2024)
Source: Galaxy Research



Data: Pitchbook Data, Inc

2024 data complete through Dec. 1, 2024

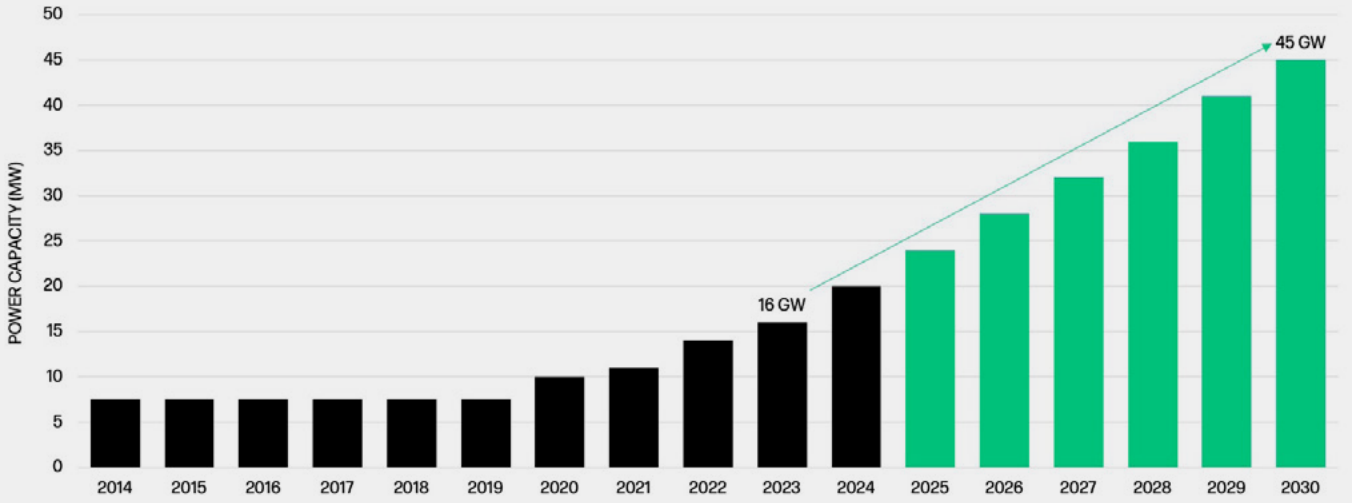
This surge in AI and high-performance computing (HPC) is creating massive demand for data center capacity. Data centers are crucial for AI/HPC operations, providing both the infrastructure and power needed for GPU-intensive computing. New AI applications like large language models (LLMs) are particularly power intensive. A single ChatGPT query requires 2.9 watt-hours of electricity, compared with 0.3 watt-hours for a Google search, according to the International Energy Agency.

The emergence of new energy intensive AI/HPC businesses in the U.S is contributing to increased demand for data centers. Goldman Sachs Research estimates that in 2024, U.S data center demand will reach 21 GW (31% YoY increase). For reference, data center demand growth in the U.S from 2022-2033 is estimated at 15.8% CAGR. Based off the sizable YoY increase in data center demand in 2024, Goldman Sachs Research projects U.S data center demand to increase to 45 GW by 2030. At 45 GW in 2030, U.S data centers will consume up to 8% of total U.S power capacity.

The market opportunity for U.S data centers will be supported by increased investment into AI infrastructure for hyperscalers, which are large scale data center businesses like Google Cloud and AWS that rapidly scale data center capacity to service other corporate clients. Hyperscalers like these are positioning themselves for the increased data center demand by committing to invest over $100bn in AI-focused data centers over the next 10 years. JP Morgan Asset Management estimated that $163bn in investment will go into expanding hyperscaler businesses by the end of 2024, a 28% YoY increase. By 2038, the report projects hyperscaler AI capex will reach $370bn, a 127% increase from the estimated AI capex in 2024.

Projected AI Data Center Demand

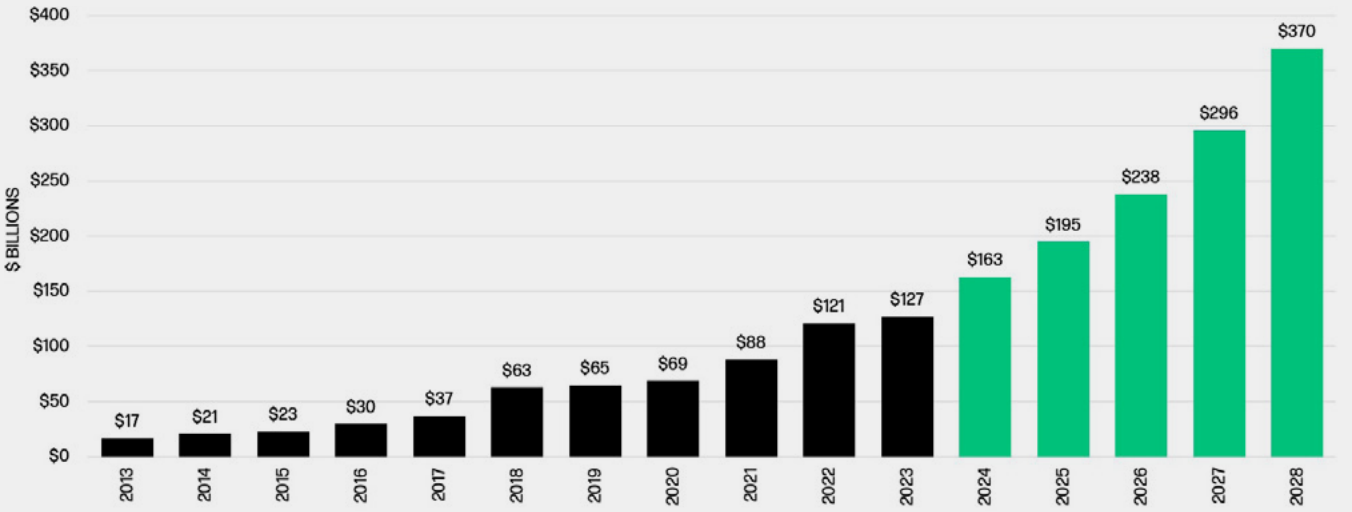
Source: Galaxy Research



Data: Goldman Sachs Investment Research

Hyperscaler Current and Projected Annual AI Capex Spend

Source: Galaxy Research



Data: JP Morgan Asset Managment

The current and projected growth in AI and HPC technology is transforming the data center landscape. As processing demands intensify, hyperscalers and data centers are increasingly evolving from traditional computing facilities into advanced AI infrastructure hubs. These facilities are becoming the foundational infrastructure powering breakthrough technologies like autonomous vehicles, advanced medical research, and next-generation AI applications. The future of digital innovation will largely depend on the continued evolution and expansion of these critical computing facilities, marking a new era in technological infrastructure.

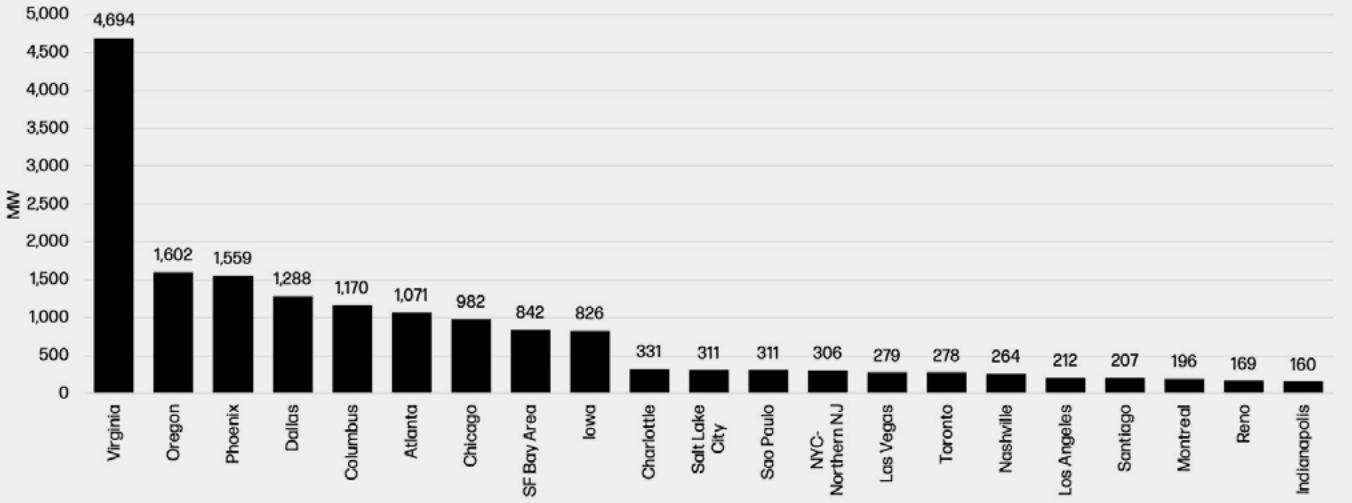
Overview of the Current Data Center Market

The current data center market consists of several public and private players that together manage a vast portfolio of data centers. Notable companies in this space include Digital Realty, Equinix, Vantage, EdgeConnex, and QTS, among others. The largest data center region in the U.S. is currently in Northern Virginia, though growth across all regions has been immense, causing vacancy rates to reach all-time lows according to CBRE.

Data centers are the backbone to several different industries, supporting everything from streaming services like Netflix to cloud computing, artificial intelligence, and numerous other applications. Not all data centers are the same, though. Each can be tailored to a specific function and can be categorized under different umbrellas including hyperscale, edge, cloud, and enterprise data centers. And data centers are getting larger and more power dense. Competition to provide infrastructure to rapidly scaling industries like AI has led to an arms race between hyperscalers to build out data center capacity on an accelerated timeline.

Total Operational IT Load By Region

Source: Galaxy Research



Data: Cushman and Wakefield Research

Hurdles for Traditional Data Centers in Meeting the Demand from AI

Traditional data center providers that serve non-AI industries have typically utilized portfolios of smaller, geographically dispersed data centers, many of which were originally built for lower density applications. Over the past decade, traditional data centers have operated with relatively modest energy requirements. Despite being two of the largest data center companies in the world, Digital Realty ($62bn market cap) and Equinix ($94bn market cap) primarily operate smaller data centers. For instance, Digital Realty has data centers that typically range from 0.5 MW to 40 MW per facility. Similarly, Equinix's xScale program consists of a global network of data centers with a combined total operational capacity of only 292 MW across 20 facilities (Equinix Q3 2024 Investor Presentation, 11/8/2024). In comparison, some mining operations have access to comparable energy capacities at individual sites.

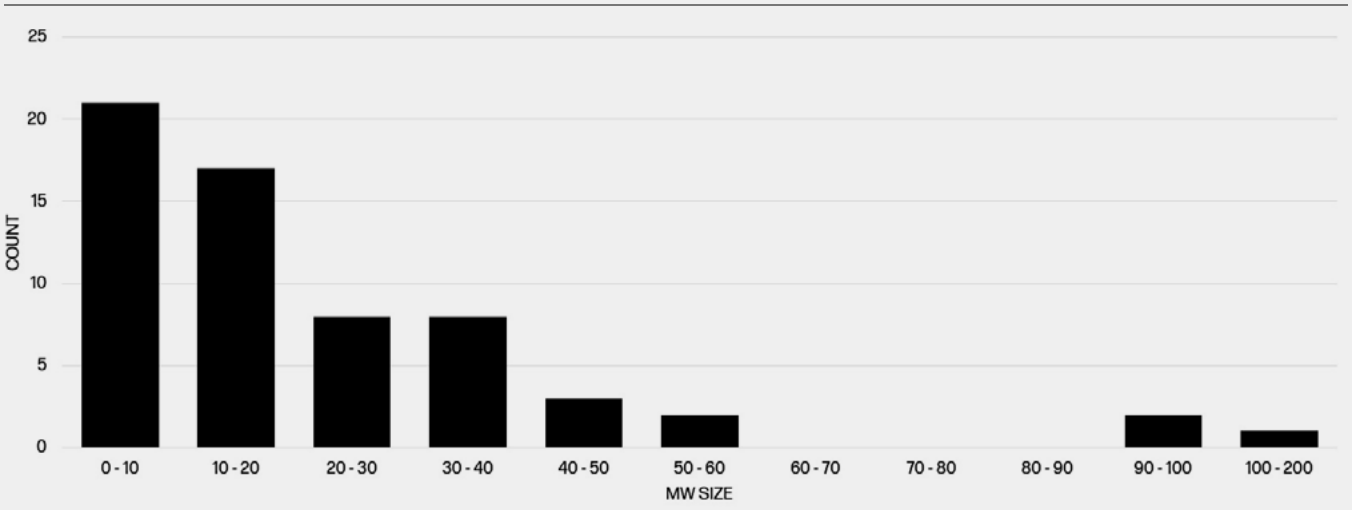
Historically, operators saw little incentive to scale up rapidly because streaming services, telecommunications, data storage, and many cloud applications had limited computational density. However, with advancements in artificial intelligence and the increasing complexity of these algorithms, data centers now must operate state-of-the-art facilities, with the newest generation of GPUs, and at a massive scale in order to optimize training execution.

The increase in scale is enabled by advances in GPU compute power and the benefits of parallel computing, enabling data centers to build larger clusters with greater computational capacity. Parallel computing allows workloads to be seamlessly distributed across additional GPUs, making it efficient to scale up by adding more units. Crucially, large clusters at single sites offer reduced latency between GPUs, enhancing the performance of parallel computing. This advantage makes a single 200MW cluster drastically more effective for AI training than four geographically distributed 50MW clusters, as low-latency communication between GPUs is essential for maximizing computational efficiency. Consequently, hyperscalers are prioritizing single locations with access to large power capacities to meet the demands of advanced AI workloads.

This type of capacity is currently in short supply, with many legacy facilities struggling to meet the substantial energy demands required for modern AI/HPC workloads. Older facilities are not able to be easily retrofitted due to differences in networking, cooling, and rack density requirements between low and high compute use cases, among other factors.

Digital Reality Data Center Composition

Source: Galaxy Research

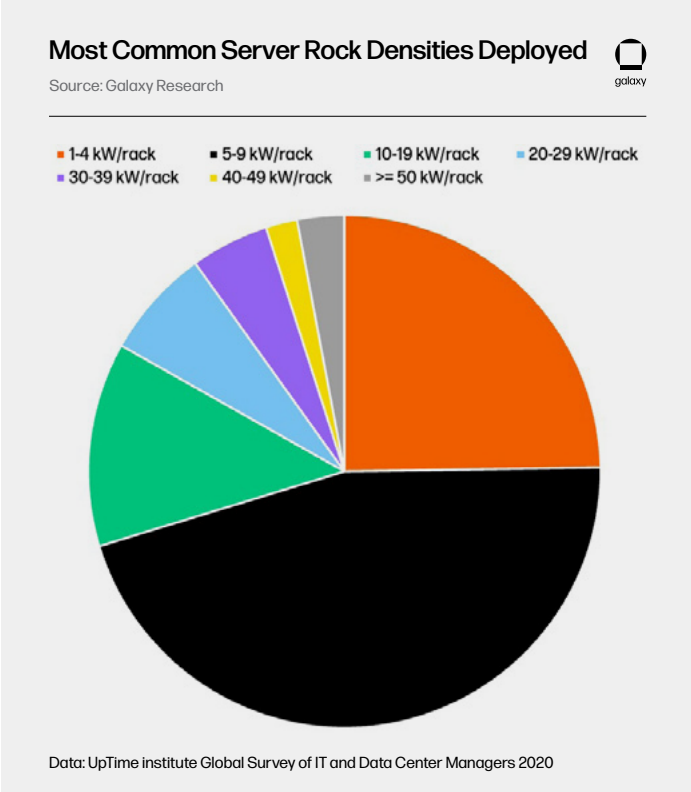


Data: Datacenters.com: Digital Reality Website

Today, hyperscalers require data centers with much higher energy capacities to support the training of their highly energy-intensive models, such as large language models. According to a December 2020 article from the Uptime Institute, the average rack density for that year was 8.4 kW/rack, excluding the 30+ kW/rack high-performance outliers. These data centers with server racks that once maxed out at around 40 kW per rack now need to support over 132 kW per rack that is required for cutting-edge systems like NVIDIA's GB200 NVL72 —a more than threefold increase in just a few years. Industry experts project that advancing compute density and the evolution of Moore's Law could drive server rack power requirements to unprecedented levels.

As a result, traditional data center operators have shifted their focus towards greenfield developments to accommodate this new generation of AI/HPC-specific data centers, which will have multi-year timelines for energy approval and buildout. According to a recent U.S. Department of Energy report, there has been a sharp rise in connection requests for facilities ranging from 300 MW to 1,000 MW or more which is straining the capacity of local grids to deliver power at this accelerated pace, causing interconnection and construction timelines to extend 2- 4 years, according to CBRE.

Hyperscalers are now aiming to build the largest GPU clusters possible to train AI/HPC models, with several companies targeting gigawatt-scale data centers to house hundreds of thousands of next generation GPUs. While hyperscalers are constructing their own data centers, they continue to rely heavily on third-party providers with established power capacity to energize GPUs on an accelerated timeline. Yet, only a few existing data centers are capable of handling such immense power demands and high rack energy densities. This shortfall largely stems from the lack of anticipation for the exponential growth in data center demand.



Why Bitcoin Miners Can Fill a Critical Gap

Bitcoin miners are positioned to supply the energy demands needed from hyperscalers because they possess large-scale, power-ready facilities. For years, miners have sought locations with abundant and affordable energy and secured access to substantial power capacities at single locations, along with long-lead infrastructure items such as substations components and medium-to-high voltage equipment. Some mining sites are already power-ready, which addresses one of the biggest constraints for hyperscalers: access to reliable, large-scale power.

By stepping into these power-ready Bitcoin mining sites, hyperscalers can bypass the lengthy process of securing energy availability and focus on retrofitting and customizing the infrastructure to meet their specific needs. Many miners control multi-hundred MW sites, a scale very few traditional data center operators have managed to secure at single locations. Several major mining operations have established access to industrial-scale power infrastructure, securing energy pipelines with capacities exceeding 2 gigawatts (GW), making miners uniquely suited to benefit from the increased demand for power capacity. Despite key differences between traditional Bitcoin mines and AI data centers, miners bring valuable experience in large-scale construction and data center management, often with established electrical, mechanical, facilities, and security teams in place. This expertise can further streamline the transition for hyperscalers looking to scale quickly.

Only Some Miners Can Benefit from AI

Not all miners can capitalize on the AI/HPC opportunity. To build AI/HPC suitable data centers, several critical factors must be met, including access to large scale acreage, water for cooling, dark fiber, reliable power, and a skilled labor force. Unfortunately, even if these qualifications are met, companies that don't already have the necessary approvals in place (i.e. for power capacity, land, and zoning) or already possess critical long-lead time infrastructure components will encounter roadblocks and delays in development.

Another critical reason why not all Bitcoin miners can capitalize on the AI/HPC opportunity is that existing infrastructure for miners is not directly transferable or suitable for AI data centers due to differences in design and operational requirements. While there are some similarities on the key electrical infrastructure, including high voltage substation components and the distributions systems, there are specific requirements for AI data centers that require nuanced expertise and a skilled labor force.

AI data centers are a level up in complexity in almost all parts of an operation including the mechanical, cooling, and networking systems, which makes converting a Bitcoin mining facility into an AI/HPC data center a challenging endeavor. Below, we outline some of the major upgrades needed for miners to retrofit existing facilities into AI data centers:

1. Networking Infrastructure:

AI/HPC workloads demand high-speed, low-latency connections between GPUs in the data center. As such, internal network fabrics for AI/HPC workloads are drastically more convoluted than for mining as GPUs are constantly communicating with one another. Key to the success of an AI operation is development of an optimal network spine to ensure fast execution of workloads. Additionally, one must establish connectivity to dark fiber from the site and meet latency requirements, which mining sites do not need.

2. Cooling Systems:

Miners use a variety of cooling designs including air-cooled, water cooled, and immersion cooled systems. Cooling is primarily focused on the actual machines themselves, with less attention on supporting infrastructure. On the other hand, AI data centers will require more advanced cooling solutions, such as direct-to-chip liquid cooling, to cool the latest generation of power dense NVIDIA servers, combined with additional air-cooled systems for supporting networking and mechanical infrastructure.

3. Redundancy:

AI data centers have more stringent redundancy requirements than Bitcoin mining data centers. Mining operations are flexible in nature, making it unnecessary to have robust backup power generation. AI data centers, on the other hand, generally utilize at least N+1 redundancy across operations, with more mission critical components, such as core networking and storage components, requiring even further degrees of redundancy to ensure uninterrupted operations or at least proper caching and checkpointing of data in case of equipment failure. This means that for every essential piece of infrastructure, such as cooling equipment, there must be a backup (N+1 redundancy). For instance, while performing maintenance on one cooling unit, an additional unit must be available to maintain continuous operation. This level of redundancy is rarely found in mining facilities, which do not have such uptime requirements.

4. Form Factor Redesign:

AI data centers use rack-mounted servers, which are vastly different from the shoebox form factor of ASICs used in bitcoin mining. To accommodate AI hardware, a complete redesign of the facility's internal physical infrastructure would be necessary to support rack-mounted systems and their specific cooling, networking, and electrical needs.

5. Other Differences:

Differences & Minimum Threshold Requirements	Mining	AI/HPC Data Centers
Access to Water	Not Required	Yes, required
Dark Fiber Connectivity	Not Required	Yes, required
Proximity to Metropolitan Area	Good to have but not required	Yes, preferred
Uptime Requirements	N/A – Miners can benefit from economic curtailment, demand response programs, and colocation with intermittent renewable energy sources	Near 100% uptime, supported by power redundancy
Infrastructure CapEx, excluding hardware ($/MW)	$300k - $800k per MW	$5m - $20m per MW (varies significantly depending on client requirements and existing infrastructure on site)

Collectively, these factors demonstrate that retrofitting a mining facility to meet AI/HPC data center requirements is a design and engineering challenge. The enhanced infrastructure requirements also cause AI/HPC data center capex costs to run up substantially relative to bitcoin mining construction costs.

Upside Potential Exists for Miners that can Capitalize on AI Data Center Demand

While miners may possess suitable infrastructure and locations, transitioning to AI/HPC operations requires more than just physical assets – it demands specialized expertise, different technology stacks, and new business models. Those with experienced management teams that can successfully build out AI/HPC operations have a tremendous opportunity to bring significant incremental value to their companies. Below are some of the key benefits that can be value accretive to companies that choose to allocate their power and data center resources from bitcoin mining to AI/HPC:

- **High Cash Flow Margin and Predictability**: AI/HPC data center operations, in particular colocation/build-to-suit models, have long-term contracts with fixed and recurring cash flows typically agreed upon even before the buildout of the data center has begun. These are predictable and high margin cash flow streams, typically with credit worthy counterparties, where the data center operator can pass on much of the costs to the tenant, including energy and operating expenses depending on the lease structure.
- **Diversification of Cash Flows:** Not only is revenue more predictable than bitcoin mining, it's also uncorrelated to crypto markets, which smooths revenue profiles of companies with high exposure to the volatile crypto markets. In bitcoin bear markets, this can enhance financial stability, allowing miners to continue to raise cash through equity or debt without incurring excessive dilution or interest burden
- **Deep Capital Markets that can Assist in Scaling Operations:** Although infrastructure is much more expensive than bitcoin mining, it's more straightforward to underwrite the investment because of the predictability of cash flows, thus opening data center projects to new sources of debt and equity capital. Private equity firms, infrastructure investments, pension funds, life insurance companies, among many others, are eager to get exposure to the data center space for the yields they offer. Data center operators that have a lease in hand with a credit worthy counterparty can take that lease and raise substantial sums of project financing to construct the data center.

According to Newmark's 2023 Annual Data Center Market Overview Report, 2023 saw record setting term debt financing volume, with the pace not slowing down, and $18bn of development financings underwritten in Q1 2024 alone. Interest rates also are reasonable, with Newmark showing a range of roughly 2.25% - 4.50% spread over SOFR, depending on the lender.

- **Significant Valuation Accretion Potential:** Once an asset has been built and stabilized, there also exists a significant valuation differential between mining and AI/HPC that makes AI/HPC a very attractive opportunity. Bitcoin miners have historically traded within a 6-12x EV/EBITDA multiple range, whereas some of the largest data center operators in the world are valued at 20-25x EV/EBITDA. This is justified given the high margins, growth trajectory of the industry, predictable cash flows, and reduced volatility in the market compared to crypto. To further give a sense of the scale of the current differential, the combined EV for Hybrid Mining/AI companies is 23% of Digital Realty's EV, despite having 3.5x the total potential MW capacity.

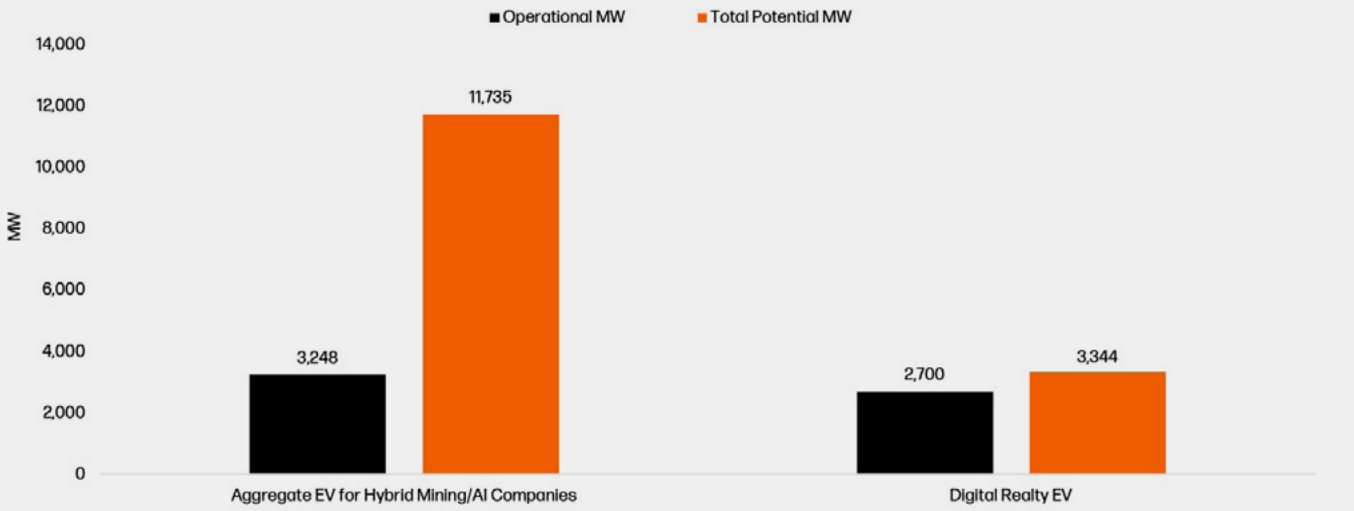
Enterprise Value Comparison (as of 12/13/2024)

Source: Galaxy Research

Data: Factset, Company Filings. Hybrid Mining/ AI Companies include Care Scientific, Bitfarms, Cipher Mining, Hut8, Tera Wulf, IREN and Bitdeer

MW Comparison

Source: Galaxy Research



Data: Factset, Company Filings. Hybrid Mining/ AI Companies include Care Scientific, Bitfarms, Cipher Mining, Hut8, Tera Wulf, IREN and Bitdeer

Therefore, the cash flow predictability, active financing markets, and significant valuation upside make the AI/HPC opportunity highly attractive and accretive for miners with the right assets. These miners are on track to make meaningful headway into the traditional data center market and become some of the largest operators in the industry.

Outlook for Bitcoin Mining

AI/HPC has taken the spotlight over the past several months, yet we still expect to see a continued rise in hashrate and growth in the bitcoin mining network. The growth in mining has continued parallel with the growth in AI/HPC. A rise in Bitcoin price has increased miner profitability, and mining could become even more profitable if price continues to move higher and outpaces growth in network difficulty. But with both Bitcoin and AI/HPC rising, what does the mining landscape look like in the future? Below we outline some major trends within the intersection of AI/HPC and Bitcoin mining that could unfold in the foreseeable future:

Miners Maximizing the Value of an Electron

Most bitcoin miners have always prioritized maximizing the value of their energy access. Currently, AI data centers are the most profitable route for those with adaptable sites. Given the value accretion of an AI/HPC site, it's likely that a mining site capable of being converted into an AI/HPC data center will follow that path to maximize shareholder value. However, this doesn't necessarily signify a drawback for Bitcoin miners. We still expect network hashrate to grow, but at a slower rate than if none of the major US miners converted sites to AI/HPC data centers. Those conversions benefit miners remaining on the network by removing competing hashrate.

Bitcoin Mining as the Driving Force for Monetizing Stranded Power

As AI/HPC grows in prominence, we anticipate that miners will further focus attention on deploying their capacity in more remote areas, as hyperscalers outbid them in more developed markets with large sites that can be used for AI/HPC. The permissionless, location agnostic, and flexible nature of bitcoin mining makes it one of the best ways to capitalize on stranded generation capacity.

We expect a larger portion of Bitcoin mining will be pushed to the boundaries to monetize stranded power capacity—especially in remote regions in the US and internationally in countries like Ethiopia, Paraguay, and other emerging markets where cheap, excess energy is abundant.

Bitcoin Mining as a Strategic Bridge for Infrastructure Investment and AI/HPC Optionality

In addition, as different regions in the US work to build out transmission infrastructure and fiber connectivity, bitcoin mining can act as a bridge to underwrite larger capacity energy infrastructure projects, such as substation and generation buildouts, even in cases where there is no immediate or clear opportunity to utilize the capacity for AI/HPC. By using bitcoin mining for opportunistic real estate and generation-related investments, investors can generate returns while waiting for other long-term energy use cases to materialize, positioning it as an attractive strategy for infrastructure growth and investment.

Bitcoin mines can still be run as long-term profitable businesses for miners unable to convert to AI/HPC data centers. Several miners have purchased large-load facilities without an existing AI/HPC tenant and have also been investing in sites at various stages of development. As we outlined earlier, some of these sites likely don't have the necessary traits that are optimal for AI/HPC, but still would be useful for bitcoin mining. Other miners don't have the teams or in-house expertise to sign with a major off-taker and take-on challenging engineering and a major construction project. The hope for miners seeking to maximize value would be to lock in an AI client, but in instances where AI/HPC opportunities don't materialize, these miners still have the optionality to build a profitable BTC mining business.

Emerging Synergies Between AI/HPC Data Centers and Mining

ASIC manufacturers such as Bitmain have started developing ASICs with form factors similar to GPUs for data center racks. Further alignment of ASIC form factor with next generation GPU form factors would allow data centers to monetize their underutilized server racks by installing server-sized miners in empty rack spaces that could help streamline retrofitting the data center for AI/HPC if similar racks are utilized. Going forward, miners could prefer purchasing these machines, as they maintain flexibility in data center design and can help miners more easily pivot to AI/HPC if higher value opportunities arise.

As AI/HPC data centers grow in capacity, so does their impact on the grid. While these data centers have to be online nearly all the time, it doesn't necessarily mean that the total energy consumed is constant. In fact, load profiles for AI/HPC training can be quite volatile, as periods of intense computational execution draw more power and periods of checkpointing draw less. The frequency of checkpointing varies and depending on the infrastructure deployed and size of the model, the process can take anywhere from a couple minutes to tens of minutes. As models grow in size, more data will have to be stored, increasing the time it takes to save all of the data.

Likewise, for AI/HPC inferencing workloads, load profiles are expected to align closely with customer demand, as each model query is processed directly within the data center. Initially, these profiles may exhibit significant volatility as demand for models fluctuates. However, over time, as specific models gain widespread adoption, load could become more predictable, with peak demand during daytime hours followed by a decline at night. This daily load cycle presents an ideal opportunity for Bitcoin mining, as mining operations can dynamically scale up or down to complement the fluctuating energy demands of AI inference processes.

As a result, in the future bitcoin mining could be used as a load balancing mechanism, where mining ramps up during periods of lower load and ramps down when AI load recovers. There may also be periods where tenants don't need to use all of the GPU capacity, allowing miners to ramp up.

The benefit is obvious for the data center operator, as they are able to extract further value from the capacity that can be online, and for the tenant, this offers a degree of load stability to the data center and the overall grid. As data centers clusters grow in size, power consumption and the impact to the grid will be increasingly scrutinized and ensuring load stability will be critical.

Diversion of MW to AI/HPC Should Slow the Rate of Growth of Hashrate

Miners entering into AI/HPC operations are actively diverting capacity that could otherwise be used for bitcoin mining, which should slow the rate of growth of network hashrate. This is particularly important when considering a potential bull market in bitcoin, where a rise in bitcoin price would not have an equal and offsetting increase in network hashrate, thereby driving hashprice higher. That being said, we still expect network hashrate to rise as more efficient mining machines are energized, whether it be for replacing older generation machines or net new energizations at sites that are not conducive to AI/HPC businesses.

Conclusion

Data center demand in the United States could surge at unprecedented rates, with projections indicating a 31% YoY increase in 2024 alone. These same forecasts predict that U.S. data center capacity will more than double over the next five years, jumping from the current 21 GW data center capacity to an estimated 45 GW. This explosive growth, combined with hundreds of billions in committed investments from hyperscale providers over the next 5-10 years, creates compelling opportunities for businesses that can offer two critical resources: abundant affordable energy and robust infrastructure capable of supporting AI and HPC operations.

The current AI and HPC boom exposed a critical weakness in legacy data centers, their inability to retrofit existing facilities to meet the intense power demands of modern AI workloads. This void in the market creates a significant opportunity for Bitcoin mining operations, which already possess what AI/HPC companies desperately need: large-scale sites with accelerated energization schedules. Hyperscalers have limited options to expand their operations in a timely manner to keep up with the explosive demand from AI/HPC businesses. Bitcoin miners are emerging as a logical viable option for Hyperscalers to expand their businesses and remain competitive in a growing market. However, this generational opportunity for Bitcoin miners remains selective. Only a small subset of Bitcoin mining operations possesses the necessary infrastructure and capabilities to successfully support the demanding requirements of modern AI/HPC workloads. Those miners that own these scarce assets and seek to maximize their value will convert to AI/HPC data centers.

Although some critics argue that Bitcoin miners diversifying into AI/HPC services could weaken network security by reducing computing power dedicated to mining blocks, this shift may actually benefit the broader mining ecosystem. Miners who cannot meet the demands for AI/HPC sites could see increased profitability from improved hashprice. As more miners come offline, and bitcoin price appreciates, increases in hashprice will significantly improve profit margins for all Bitcoin miners. With bitcoin price up as high as 135% YTD, along with a new pro-bitcoin President in the Oval Office, Bitcoin mining in the U.S is positioned to enter its strongest era yet.

The intersection of crypto and AI is arguably one of the hottest crypto sectors in 2024. As of December 2024, the total market cap for crypto projects with liquid tokens building AI projects sits at approximately $33bn. Additionally, Galaxy Research estimates that over $382mm of VC investment has been allocated to early-stage crypto AI startups in 2024. While most crypto AI projects lack a product market fit, Bitcoin mining's intersection with the growth in AI/HPC businesses is clear. Bitcoin mining's entrance into the AI realm stands out from other overlaps between the two spaces because of the potential to supply at scale the most essential component to AI/HPC businesses – energy. As a result, Bitcoin miners that hold AI/HPC convertible assets could be one of the only pure play and scalable crypto x AI investments in the industry today.

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For all inquiries, please email contact@galaxy.com.

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