QTS

A Standardized and Modular Approach to the Data Center Drives Big Results

QTS Freedom standard data center design streamlines build cycles and introduces logistical efficiencies that strengthen and speed deployments

Executive Overview

To address intense digital business pressures and position themselves for future growth, hyperscalers and enterprises are leaning more heavily on third-party data center services. QTS' Freedom standard data center design pairs its unrivaled experience operating massive-scale facilities that serve the complex needs of these markets with its innovative approach to service delivery. By standardizing the data center electrical and mechanical layouts, specifications and logistics—and modularizing power and cooling methodologies—the Freedom design speeds deployments and improves operational and logistical efficiencies to deliver more value to customers.

This consistent, predictable data center model also provides organizations with a best-in-class, highly efficient and scalable environment. The repeatable design provides customers with the confidence that they have access to the same space, critical capacity and logistical design with every Freedom data center deployment.

Standard Build Design Keeps Pace with Intensifying Data Center Demands

In a fast-paced, volatile business landscape, hyperscalers and enterprises need to quickly scale and flex their data center services to match their rapidly evolving needs. COVID-19 amplified this situation, testing organizations' abilities to adapt to a newly distributed workforce, growing supply chain challenges, and a dramatic uptick in digitalization. To meet these challenges, organizations are increasingly relying on third-party data center providers.

As a leading data center provider, QTS is ahead of the curve in recognizing and addressing organizations' large-scale needs. Applying its forward-looking business approach, QTS created the Freedom standard design data center, a standardized and modular data center model that caters to the most sophisticated buyers in the industry. This standard building design offers a best-in-class, highly efficient environment with a repeatable build strategy that supports hyperscale and large enterprise customers' growing need for data center services.

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The Freedom design is rooted in QTS' Operational Maturity and leap-forward approach to delivering data center services. With a long history of operating

massive data centers and addressing complex customer requirements across the hyperscale and enterprise markets, QTS has achieved an intense level of operational excellence that it has packaged in a standardized design.

Standardizing and Modularizing the Data Center

The QTS Freedom data center design standardizes every facet of the data center—from the building architecture and layout to critical equipment and logistical deployment. It also modularizes crucial electrical and mechanical components, offering power and cooling capacity in 1.5 megawatt (MW) blocks which allows scalable flexibility to meet market demand. This uniform design enables predictable timelines and costs to improve efficiency, time to market, scalability, cost effectiveness and more.

QTS first deployed its Freedom design in its Hillsboro facility in 2020. Since then, it has introduced the cutting-edge design in the Ashburn and Atlanta markets with plans to bring it to Phoenix, Dallas, Fort Worth, Manassas, New Albany, Richmond, Denver, San Antonio and additional markets over the next few years.

"The Freedom design will be the go-forward standard for QTS Data Centers," said Laney Marinich, EVP Development at QTS. *"Its consistent, predictable and repeatable design allows us to provide customers with the same level of space, power and service, regardless of where the data center is located."*

Standard Data Center Design Promotes Efficiency and Streamlines Operations

The Freedom data center provides a consistent build design that utilizes standardized equipment, materials and logistical elements to maximize space, enable scalability, ease operability, improve efficiency and fortify security.

Offering 48 megawatts of critical power and 334,000 square feet (SF) of total gross area, the two-story building features four data halls that deliver a combined 186,500 SF of data hall space. The facility also offers a power density of approximately 250 watts per square foot (W/SF) with a block redundant electrical topology of up to 8+1 per data hall. Distributed redundant topologies are also possible with the flexible build nature of the Freedom Prototype.

QTS Freedom Standard Design Specs

- Two Stories
- Critical Power capacity ranging between 36MW to 72MW
- Total Gross Building Areas ranging between 285,000 SF and 570,000 SF
- Scalable Data Hall modules
- Power Density: up to 350W/SF
- Topology: Block Redundant with flexibility for Distributed Redundant

In creating the Freedom design, QTS assessed the needs of the hyperscale customer, considering how the design could optimize data center flow, accessibility, space plan and throughput.

Flow. To ease movement throughout the data center, the Freedom design offers two identical, expansive loading docks—one on each side of the building—for

receiving and staging purposes. Each loading dock features multiple bays for uninhibited shipping and receiving. Spacious customer storage areas with rollup bay doors are adjacent to the loading dock and provide access to each data hall to speed equipment delivery. The layout also minimizes the distance between the receiving areas and data halls to just 140 feet.

A series of logistical designs—including oversized hallways, no ramps and minimal 90-degree turns between the loading docks and data halls—improve the ability to navigate the facility and transport equipment.

Accessible. To deliver user-friendly access, the Freedom design employs a "2N accessibility" design approach. This redundancy permeates the design, offering two multi-bay loading docks, two freight elevators, two data hall modules on each floor, two Meet-Me rooms with separate intra-building room connectivity paths and more. The multi-bay loading docks also accommodate full-sized trucks and provide direct access to secured shipping and receiving areas to enable simultaneous, non-interfering delivery schedules.

Space Plan. By offering a consistent, predictable, and repeatable design, QTS can situate its Freedom design data center on virtually any geographic plot of land. Customers can also plan their deployments with QTS far in advance, with the peace of mind that regardless of where in the world QTS builds a data center, it will offer the same size data hall modules and critical power infrastructure systems.

The Freedom design also efficiently uses space to provide a flexible floor plan that can be adjusted as needs change. To facilitate teamwork, the design integrates a variety of meeting spaces, including large and small conference rooms, open huddle areas and open office space for both its internal team and its customers. Customer office space is located on both floors and is adjacent to the data hall for easy access. The design also offers an enclosed space near the reception area for security personnel.

Throughput. By analyzing real-world throughput scenarios that could limit the speed and ease in which customers unload, deliver and transport equipment

throughout the building, QTS Freedom design has right-sized hallways, doorways, freight elevators and pathways to accommodate equipment sizes and typical logistics-based routing preferences. The result delivers oversized hallways (10'-0" wide by 12'-0" tall) that enable equipment to be easily moved from the loading docks to the data halls, 10,000-pound freight elevators with 10-foot-tall doors and 12-foot tall cabs that provide access to second floor storage and data halls.

MODULAR UNITS SUPPORT FLEXIBILITY

With the Freedom design, both the electrical and mechanical designs can be deployed modularly, with each block providing 1.5 total megawatts (MW) of critical capacity to streamline equipment procurement and construction schedule. These deployment blocks serve hyperscalers' large-scale needs and are also meeting enterprise market demand for larger deployments that range between 1MW and 12MW of capacity at a time. The modular design also offers "plug-and-play" capabilities that allow organizations to build solutions offsite and install them in the necessary facility, when ready.

While customers can procure power and cooling capacity in 1.5MW blocks—up to the full capacity of facility— QTS also allows these blocks to be carved into smaller segments to match customers' unique specifications.

> Power and cooling capacity is available in 1.5MW blocks—up to the full capacity of facility

"*QTS partners with our customers to understand their needs and deliver on them,*" said Marinich. "*By understanding how much space and power they need and how quickly they plan to consume it, we can right-size their environments to provide cost-effective, high-performing solutions.*"

Unleashing the Power of the Freedom Design

The Freedom design provides hyperscale and enterprise customers with a high-performing and effective data center solution that delivers unmatched value.

Benefits of the Freedom Design
- Supports Flexibility
- Fortifies the Supply Chain
- Speeds Time to Market
- Improves Efficiency
- Enhances Security and Staffing
- Enriches the Customer Experience
- Easily Scales
- Supports Sustainability

SUPPORTS FLEXIBILITY

The Freedom design's heightened level of flexibility enables customers to more easily adapt their deployments to their changing needs, whether adding capacity in 1.5MW modules or smaller deployments.

"*Our competitors struggle to deliver this level of flexibility,*" said Marinich. "*Some data center providers require customers to purchase space according to the existing availability—even if it exceeds the customer's needs. QTS works with customers to create the right environment. Our Freedom design allows us to do this more quickly, effectively and cost efficiently.*"

The standardized approach to equipment sourcing also offers flexibility around deployment timelines. With consistent equipment across all Freedom design facilities, QTS can divert equipment from one facility to meet a tighter deployment timeframe at another facility without impacting customers' deployment schedules.

FORTIFIES THE SUPPLY CHAIN

Moving equipment between facilities to satisfy tighter delivery requirements is made possible through the combination of standardized equipment and QTS' robust supply chain. By using the same products in all its Freedom data centers, QTS can buy at scale from multiple vendors to build its purchasing power and supply chain diversity.

As the fastest growing data center company in the nation, QTS also employs forward-purchasing practices, buying equipment in bulk, up to 18 months out, to further ensure a ready supply of product, when needed. This purchasing power insulates QTS and its customers from the supply chain challenges that were magnified by COVID-19.

SPEEDS TIME TO MARKET

Freedom's standard build design also accelerates time to market by allowing vendors to predictably plan QTS builds. By minimizing the time necessary to source equipment and materials, QTS shortens the construction timeline, bringing the QTS solutions online faster for its customers.

IMPROVES EFFICIENCIES

Every element of the Freedom design focuses on improving the ease in which customers can collaborate, build and move equipment, and do business with QTS. The result is tremendous time and cost efficiencies.

ENHANCES SECURITY AND STAFFING

The Freedom design also offers a series of benefits from security and staffing perspectives. Security protocols and physical security, including access points, camera placement and security monitoring stations, are standardized across all facilities. This allows QTS to seamlessly move trained security personnel between sites without unnecessary exposure.

To support customers in complex and volatile times, QTS has also begun interacting with first responders, including the FBI, Homeland Security, and local fire and police departments. The uniform layout of the facility allows QTS to introduce law enforcement teams to one

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facility, knowing the design translates across its fleet of Freedom design facilities to strengthen its security posture.

The consistent environment also enables experienced site directors to effectively train new site directors by sharing operational knowledge that applies to all Freedom facilities. Similar to security personnel, technical and support staff can transition between Freedom data centers to lend support, as needed. Customers with workloads split between multiple Freedom design data centers also benefit from this interoperability.

ENRICHES THE CUSTOMER EXPERIENCE

With a history of NPS scores in the 90s—well above the industry average—QTS is committed to continually enhancing the customer experience. The Freedom design supports this commitment.

"*Anything we can do to standardize the data center helps us from an operational perspective,*" said Marinich. "*The consistency of information coming from our data centers provides our internal teams and centralized Operations Support Center with a deeper understanding and expertise that helps deliver a consistently high level of service across our facilities.*"

The continuous innovations QTS delivers are also integral to the customer experience. Committed to full data center transparency, QTS digitized the data center, collecting data from every device, power unit and sensor within each facility to provide customers with real-time visibility into and control of their data center environments using its proprietary Service Delivery Platform (SDP). By delivering more consistent data, the Freedom design minimizes friction, enabling QTS' innovation team to advance the insights and capabilities offered by SDP to strengthen the customer experience.

EASILY SCALES

The design of the facility also supports scalability. With CRAH galleries separated from the data halls, customers have more room to grow a contiguous

space. The modular aspect of the design also promotes rapid scalability, offering customers more readily accessible electrical and mechanical components to grow their deployments in 1.5MW blocks.

SUPPORTS SUSTAINABILITY

As an organization, QTS is dedicated to creating a more sustainable future. In alignment with this commitment, QTS integrates a series of environmentally focused efforts that minimize negative global and local environmental impact and promote long-term life cycle cost savings.

Reducing Waste. QTS facilities employ robust recycling programs for paper, plastics, cartons, metals and glass to minimize waste; as well as recycling of construction waste.

Minimizing Impact. QTS employs environmentally sensitive and sustainable design practices, material selection, procurement and construction methods in all its projects. This includes utilizing FSC-certified wood products; paints without volatile organic compounds (VOCs); adhesives and other products with low VOCs; and recycled or reused materials. QTS also equips each facility with EV charging stations.

Conserving Water. The Freedom standard design uses high-efficiency, low-water plumbing fixtures, where possible. The Freedom mechanical design utilizes a split-system cooling solution with indirect air and pumped refrigerant to promote water efficiency. Economization is also utilized when outdoor temperatures are below the return air temperature to deliver a sustainable solution.

Energy Efficiency. Each Freedom facility is LEED-capable and uses Energy Star-capable appliances, LED lightning and energy-efficient cooling. The data centers also employ a series of energy-efficient practices, including switching off hot water and beverage equipment after hours and installing occupancy sensors for lighting and daylight zones. The Freedom design also delivers a lower, consistent power usage effectiveness (PUE).

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Conclusion

In an increasingly complex and rapidly growing digital business environment, hyperscalers and enterprises are looking for every opportunity to improve efficiencies, control costs, meet customer expectations and strengthen their businesses. As they engage more and more data center services to support digital initiatives, QTS' Freedom design can provide them with the competitive edge necessary to meet market demand and rapidly deploy the precise environment they need, where and when they need it.

ABOUT QTS Data Centers

QTS is a global data center leader with unrivaled access to scalable infrastructure across North America and Europe. Powered by people and driven by purpose, QTS provides state-of-the-art data center solutions, robust connectivity and premium customer service to leading hyperscale technology companies, enterprises and government entities. QTS is a Blackstone portfolio company.

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