DATA CENTER Frontier Special Report

2021 Data Center Market Overview
Phoenix

Written by Rich Miller

A view of the mountains in Mesa, Arizona, as seen from the Elliott Road Technology Corridor.

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Introduction

This report was prepared by Data Center Frontier, in conjunction with datacenterHawk.

ABOUT DATA CENTER FRONTIER

DATA CENTER Frontier

http://datacenterfrontier.com

Data Center Frontier charts the future of data centers and cloud computing. We write about what's next for the Internet, and the innovations that will take us there. The data center is our prism. We tell the story of the digital economy through the facilities that power the cloud and the people who build them. In writing about data centers and thought leaders, we explain the importance of how and where these facilities are built, how they are powered, and their impact on the Internet and the communities around them.

Data Center Frontier is edited by Rich Miller, the data center industry's most experienced journalist. For more than 15 years, Rich has profiled the key role played by data centers in the Internet revolution.

ABOUT DATACENTERHAWK

DATACENTER HAWK

http://www.datacenterhawk.com

Experts use datacenterHawk's online tools for instant access to hard-to-get info on the data center industry.

For strategic leaders, we aggregate and analyze our data at the market level each quarter, spanning 20+ markets in North America and 5 in Europe, with historical data on 15+ quarters for most markets.

For professionals, our search tool lets you instantly find and drill down on individual data center facilities across 120+ markets.

On datacenterHawk, you can also find:

- Capacity figures broken out into commissioned, available, under construction, and planned power and space at both the markets and facility level
- Pricing for different transaction sizes across markets
- Data centers owned by private companies

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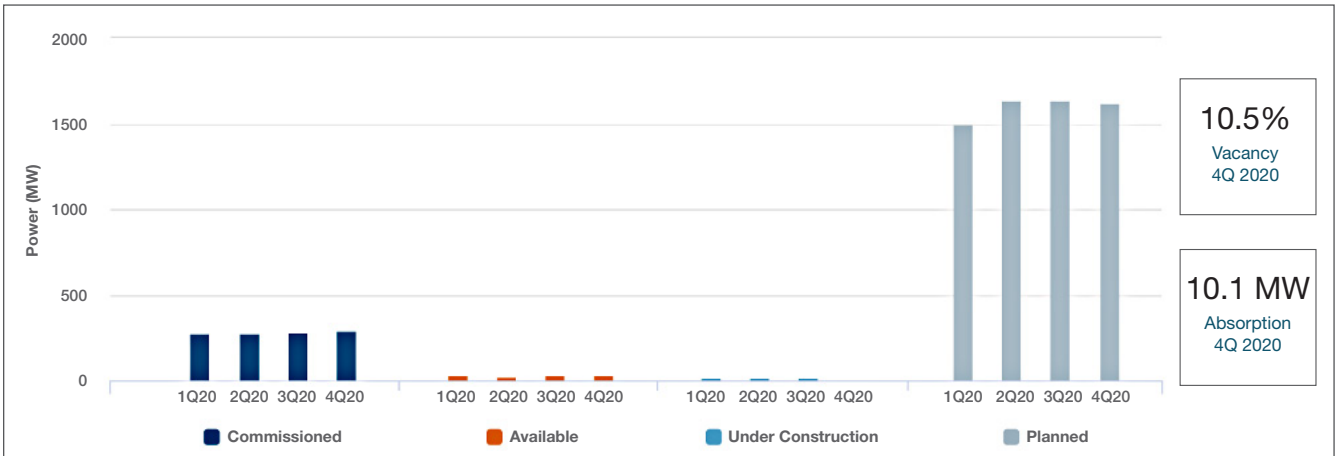
Market Overview & Analysis

Phoenix has established itself as a major market for cloud computing, and nearly every major hyperscale platform and wholesale data center developer has lined up land for future capacity in Greater Phoenix. The region is positioned for continued data center expansion, and the pace and location of that growth will be guided by deployment trends for large customers, especially regarding how they position their capacity and availability zones.



Source: datacenterHawk

Phoenix has become one of the most dynamic data center growth markets in the U.S. Users have long sought space in Phoenix as an alternative to California locations with higher cost and disaster risk.

Phoenix has now become a data center destination in its own right, attracting a larger concentration of both customers and service providers in the process. It is positioned for additional growth as customers continue to seek alternatives to California due to recent changes in its risk profile.

The Phoenix market is home to 1.97 million square feet (SF) of commissioned data center space, representing 295 megawatts (MW) of commissioned power at the end of 2020, according to market research from datacenterHawk. That makes Phoenix the fifth-largest market for data center capacity in the U.S., trailing Northern Virginia, Silicon Valley, Dallas and Chicago.

The most extraordinary data point for the Phoenix market is the planned future capacity, which is now approximately 1.6 gigawatts (GWs) of power and nearly 8.8 million SF of space. What's less clear is the timing of when these data centers will be built and leased.

The Greater Phoenix market had 43.5 MWs of leasing in 2020, up slightly from about 35 MWs in annual absorption through 2018-19 and about 24 MWs in 2016-7. The leasing activity in 2020 included 6.3 MWs of absorption in 3Q and 10.1 MW in 4Q.

The most extraordinary data point for the Phoenix market is the planned future capacity, which is now approximately 1.6 gigawatts (GWs) of power and nearly 8.8 million SF of space.

At present, data center supply and demand remain in balance, as the region's vacancy rate of 10.5 percent is only slightly higher than the 2018 rate of 9.4 percent. Given the enormous volume of future capacity planned for the Phoenix area, this suggests that developers are staying disciplined in their deployment timelines. At the end of 2020, there was 31 MW of commissioned space available in the Phoenix market, and about 12 MW of new capacity under construction.

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A key factor is whether providers are able to successfully pre-lease space, or opt to build new projects on speculation in order to have inventory available for large deals – a strategy which is more common in highly competitive markets.

The list of companies with projects planned for Phoenix is lengthy. In the Eastern suburb of Mesa, EdgeCore is online with its first building and new capacity is planned by Digital Realty, CyrusOne, NTT Global Data Centers Americas and EdgeConneX. To the West of Downtown, Compass Datacenters, Stream Data Centers, Microsoft, STACK Infrastructure and Vantage Data Centers all have outlined plans for projects in Goodyear.

There are several key trends to watch in the Phoenix market in 2021. These include attitudes on the "build or buy" question, the emergence of competing "data center districts" in Mesa and Goodyear, and how the course of the COVID-19 pandemic and recovery influence cloud deployment patterns. We will examine these topics in depth, but first, it's important to understand the fundamentals of the Phoenix market and why it has become a magnet for data center development.

WHAT'S HOT ABOUT PHOENIX?

Phoenix offers data center customers and site selectors users a combination of compelling benefits. These include:

1. **Low Natural Disaster Risk**
   The city has almost no history of damage associated with seismic, tornado, and flooding events
2. **Inexpensive Power Cost**
   A diverse fuel mix and competition from several power providers create a reliable and competitive power environment
3. **Tax Abatement Opportunities**
   Legislation passed in 2013 enhances the state's ability to compete on large, national data center requirements. Arizona offers a 10-year wavier on state, county, and local sales taxes on both equipment purchases and labor services for data centers.
4. **Competitive Colocation/Cloud Environment**
   Quality colocation and cloud providers have invested significantly in Phoenix over the past few years, creating a competitive market for data center users.

As Lee McPheters, research professor of economics at Arizona State University noted in his 2020 economic outlook for Arizona, the state has rebounded to pre-2007 conditions, employing 2.93 million people, with over 80,000 new jobs created in 2019. That's the highest employment Arizona has seen since October 2007.

Power cost is a critical decision point for both data center providers and users, and the difference of a few cents per kilowatt can mean millions of dollars saved for data center transactions.

Phoenix is the primary contributing factor to Arizona's economic growth, with 92% of new Arizona jobs coming from Phoenix. As such, the Phoenix data center market has seen similar growth in the last several years, growing by more than 135 MW of commissioned power since 2015.

The Phoenix market benefits from its reasonably low power cost, especially when compared to the highly-occupied Northern California and Los Angeles data center markets, where there is a significant price difference. Power cost is a critical decision point for both data center providers and users, and the difference of a few cents per kilowatt can mean millions of dollars saved for data center transactions.

In addition, Phoenix is viewed as a disaster recovery market specifically tied to its low threat for natural disasters. For example, according to the United States Geological Survey, the city ranks on the lowest scale of earthquake threat. In addition, the threat for tornadoes and floods is at a minimum. Compared to nearby primary data center markets, Phoenix is a market companies feel safe investing in.

Phoenix's desert environment also provides opportunities for the use of fresh-air cooling at night, directly impacting a data center's power usage effectiveness (PUE) and operational cost. Arizona's politicians have increased the appeal of the market to data center users by offering 10-year tax breaks on both data center equipment and labor services.

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TRENDS IN DEMAND

Demand in Phoenix originates from companies in the market and companies outside that favorably view the Phoenix market as a primary or disaster recovery location. When compared to other major U.S. data center markets, Phoenix is very competitive as it relates to colocation rates, power cost, and tax incentive opportunities.

These market attributes enable Phoenix to compete for data center requirements, with the largest deals coming from hyperscale deployments. Other companies consistently searching the Phoenix market include those in the e-commerce, financial, insurance, healthcare, and technology industries.

The Exodus from California

Much of the opportunity for Phoenix is rooted in its status as a leading alternative to California, which boasts a large concentration of data centers. The California market has been roiled by the troubles of utility PG&E, which filed for bankruptcy protection in 2019 due to wildfire-related liabilities. The prospect of higher future utility bills, along with PG&E's imposition of rolling service outages during periods of heightened wildfire risk, has customers looking beyond California's borders for their West Coast data center workloads.

Phoenix is hardly alone as a destination for data center customers migrating out of California, as Las Vegas, Reno, Salt Lake City and the Pacific Northwest are other options. Some market watchers say firms migrating from Southern California typically look to Phoenix and Las Vegas as options, while customers from the Bay Area are more likely to consider the Pacific Northwest.

The Impact of the COVID-19 Pandemic

It's impossible to discuss demand trends without addressing the impact of the COVID-19 pandemic, as health concerns have driven a nearly overnight shift to online services for business and education. The societal shift to online services made 2020 an extraordinary year for the data center industry, with record leasing and a historic boom in the construction of new facilities, especially in Northern Virginia.

Leasing has been less robust in Phoenix, but there have been some large deals, most notably a Fortune 100 customer pre-leasing 12-megawatts at Iron Mountain's AZP-2 data center, achieved through two 6-megawatt deals. The first 6 MW lease will commence in 3Q 2021. The AZP-2 facility is an expansion of the former IO Data Centers project, which spans 41 MWs and 588,000 SF.

Several trends tied to the pandemic figure to boost local demand. These include the focus on automation and autonomous driving, as Phoenix is an early deployment site for Google's Waymo driverless ride service. The region also has an active cluster of genomics research, which is data-intensive and likely to see additional investment.

Cloud Platform Expansion Strategies

But perhaps the largest factor in data center growth in Phoenix will be trends in the architecture of cloud growth. Availability zones, which spread capacity across regions—and across multiple data centers within a single geographic market – are an increasingly important factor in cloud real estate. The strategy was developed by Amazon Web Services, but rivals Microsoft, Google and Oracle are rushing to create similar diversity in major markets.

There are several reasons that the focus on availability zones matter in Phoenix.

- A zone strategy may guide large customers to view site selection decisions about Western U.S. markets as "both/and" rather than "either/or"—specifically, that some cloud, video and SaaS providers are not choosing between Hillsboro and Phoenix, but could consider zones in both locations.
- It could also lead to cloud platforms placing more than one availability zone in Greater Phoenix, which applies similar logic to emerging choices between sub-markets—i.e., placing a facility in Mesa doesn't rule out adding capacity either Downtown or in Goodyear.
- There is also the question of whether hyperscale players will build their own facilities or lease space from third-party wholesale data center developers. Google, Microsoft and AWS have all purchased land, so the presumption is that for now, Phoenix will be a "build" market.

It's always possible that large customers will lease wholesale space to scale up while their new campuses are under construction, a trend seen in Northern Virginia. Microsoft already has a substantial leased footprint in Greater Phoenix.

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TRENDS IN SUPPLY

From a geographic perspective, the present and future of the Phoenix market will look quite different. Most of the region's colocation data center providers are located in Phoenix proper and Chandler, AZ, a city approximately 25 miles to the southeast of downtown Phoenix. A combination of lower electricity prices and real estate costs have lured data center providers, including Digital Realty, CyrusOne, and NextFort (acquired by H5) to create facilities designed to meet the needs of large users.

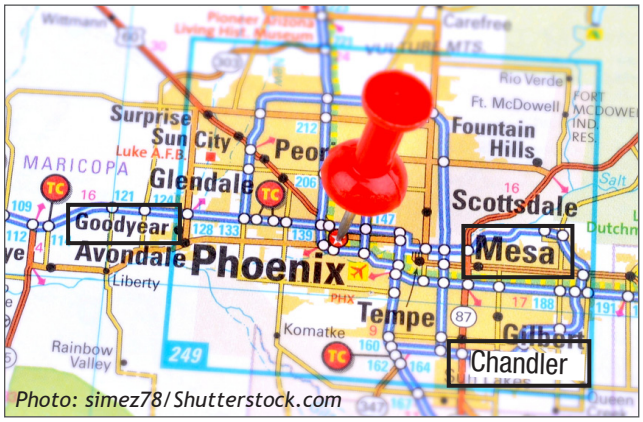

Photo: simez78/Shutterstock.com

A Digital Realty-owned data center at 120 East Van Buren is also the prime carrier hotel in the downtown Phoenix market. Digital Realty purchased the property back in 2006 and has grown it to be among the largest in the market. Several other providers, including Iron Mountain, Cyxtera, and PhoenixNAP are located east of downtown Phoenix, near Phoenix Sky Harbor International Airport. In addition, other areas including Tempe, Scottsdale, and Deer Valley have several data center providers.

Phoenix has the highest planned data center capacity outside of Northern Virginia. The available power in the market is steadily shrinking, which may prompt some providers to move into the construction phase.

Going forward, the vast majority of data center investment in Phoenix will be built in the suburbs of Mesa to the East and Goodyear to the West. The two towns are each developing "data center districts" with targeted incentives and opportunity zones.

The intentional approach of local economic development officials has paid big dividends. There is currently 732 MW of capacity planned for Mesa, while 461 MW is planned in Goodyear.

Mesa, Arizona

The city of Mesa is home to an Apple data center in a large facility previously owned by Apple supplier GT Advanced Technologies. Last year EdgeCore opened the doors on a 178,000 SF two-story data center offering 32 MWs in the Elliot Road Technology Corridor, where the company has land to support up to seven data center buildings.

In addition to robust power infrastructure, the Elliot Road Technology Corridor has Foreign Trade Zone status, and the city of Mesa has created a Planned Area Development Overlay Zone that "reduces entitlement risk and expedites the development process." The area also offers a recycled water loop.

These steps have laid the groundwork for a robust data center district. Here's an overview of the projects in the pipeline:

- NTT Global Data Centers Americas has broken ground on a 240MW, 102-acre campus in Mesa, which can support up to seven planned data centers. The company expects to complete an electrical substation in the spring of 2021, with the first 36MW building to follow in early 2022.
- Digital Realty is developing a 56-acre site in Mesa where it has filed plans to construct five data center buildings, ranging from 232,000 SF to as large as 1.2 million SF. The site, which will also include a substation, was acquired through its 2018 purchase of DuPont Fabros Technology.
- CyrusOne has purchased a 68-acre land site in Mesa to construct their second Phoenix data center campus. The campus is designed to accommodate up to five buildings and 198 MW of commissioned power.
- EdgeConneX has purchased 120 acres of land and has filed plans to build a 30 MW data center.
- Google plans to invest at least $1 billion to create a data center campus on 187 acres in the Elliot corridor. The company has until 2025 to begin development, and plans to build at least 750,000 SF of server farms.

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Goodyear, Arizona

A similar data center district is poised to emerge to the West of Phoenix in Goodyear, which is building momentum around a major cloud computing project.

- The largest projects in Goodyear are several data centers for Microsoft, which has acquired 420 acres of land to support two data centers, as well as 150 acres in nearby El Mirage. All three locations will be multi-phase developments.
- Stream says the first of five buildings planned for its Goodyear Campus went live in August, along with an agreement with Cox Business that will allow tenants to interconnect their Stream services with other data centers.
- Compass is marketing up to 242 MWs of data center capacity on its 190-acre campus in Goodyear, which includes an on-site 230kV substation.
- STACK Infrastructure has acquired 79 acres of land for a data center campus in Avondale, which is immediately adjacent to Goodyear, which can support as much as 150 megawatts of capacity and 1 million SF of build-out.
- Vantage Data Centers has bought a 50-acre site in Goodyear, which will be home to three data centers spanning 1 million SF and 160 MWs of critical load.
- In July 2020 Amazon Web Services bought 91 acres of land in the growing data center cluster in Goodyear.

Business Environment

The Phoenix market sees demand from local businesses, but it has become a destination for providers from other markets—particularly California—who are seeking to place data center assets in a location with low disaster risk, either for primary or backup data centers.

CONNECTIVITY

Phoenix has good fiber infrastructure. CenturyLink, Electric Lightwave/Integra, Level 3, Sprint, XO, and Zayo all run long-haul fiber connections through Phoenix. Carriers such as ICFN, Syringa, Tru Com, and Windstream have developed locally-focused fiber networks. Municipal fiber is also available in Mesa, AZ to serve the area's data centers.

POWER

Power costs in Arizona are well below the national average. Similar to the Los Angeles market, Phoenix is served by a public utility provider of power and water, the Salt River Project (SRP). An integrated utility, SRP provides electric generation, transmission, and distribution services in the Phoenix metro area. A privately-owned competing electric provider, Arizona Public Service (APS), serves most of the Phoenix market where data centers are clustered. Both SRP and APS offer a diverse fuel mix that includes renewable sources such as hydroelectric and solar. Phoenix's plentiful sunshine is a double-edged sword for the data center industry: It offers an almost year-round source of "green" energy (driving public and private investments in solar power infrastructure construction, largely to accommodate a major Apple manufacturing facility in the area) but also requires more electricity to cool data centers during the area's numerous days of over 100-degree Fahrenheit temperatures.

In an effort to lure data centers to the Phoenix market, Arizona offers a ten-year wavier on state, county, and local sales taxes on both equipment purchases and labor services for data centers.

HAZARD RISK OVERVIEW

Phoenix is rated as a low risk for all types of natural disasters. Hurricane damage is non-existent, floods are uncommon, and there are no major fault lines to cause seismic events in the Phoenix market.

ECONOMIC DEVELOPMENT AND INCENTIVES

In an effort to lure data centers to the Phoenix market, Arizona offers a ten-year wavier on state, county, and local sales taxes on both equipment purchases and labor services for data centers. If the data center qualifies as a Sustainable Redevelopment Project, however, the waiver is increased to twenty years.

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Overview of Major Providers

NTT GLOBAL DATA CENTERS AMERICAS

(Formerly known as RagingWire)

NTT Global Data Centers operates more than 160 data centers spanning more than 20 countries, making it the third-largest global data center provider. Clients will have access to full-stack technology solutions (from data center and network infrastructure to applications) and full-lifecycle services (from consultancy to fit-out services to ongoing management) with end-to-end managed services. The company was created through the consolidation of 28 IT brands owned by NTT Communications, including data center providers RagingWire, e-shelter, Gyron, Netmagic, NTT Nexcenter and Digital Port Asia.

The company provides colocation and network solutions for users needing cabinets, cages or private suites, as well as wholesale data center space. The Americas division, previously known as RagingWire, operates 2 million SF of data center space in the United States delivering 265 MW of critical IT load, with an additional 3 million SF currently under development.

In 3Q 2019, NTT purchased a 102-acre site in Mesa where it plans to construct its first data center in the area. The current plan is to construct a 240MW, seven building, 1.5 million SF campus. The first phase will start with a 36MW data center scheduled to open early 2022.

ALIGNED DATA CENTERS

Aligned Data Centers, a division of Aligned Energy, offers consumption-based pricing for on-demand data center capacity to enterprises, service providers, and governments. The company operates large data centers in Phoenix and suburban Dallas and is building a project near Salt Lake City.

Phase I of the company's 2500 West Union Hills data center in Phoenix was delivered in 2Q 2017. It has four separate 69 kV utility feeds provided by the Salt River Project (SRP) and a dedicated on-site substation. The secure, carrier-neutral 550,000 SF facility is capable of delivering 65 MW of utility power. Designed to Tier 3 reliability standards, the data center's power and cooling infrastructure is configured for 2N. Aligned Data Centers also guarantees a power usage effectiveness (PUE) rating of 1.15 and designed this desert data center to use less water. Aligned's data center in Phoenix won the Global Data Center Alliance's "Data Center Energy Efficiency Project of the Year" award for 2016.

NTT clients will have access to full-stack technology solutions (from data center and network infrastructure to applications) and full-lifecycle services (from consultancy to fit-out services to ongoing management) with end-to-end managed services.

In 4Q 2017, Aligned executed a lease with Sharp Healthcare in their Phoenix data center. In 1Q 2018, Aligned began an expansion to add another 60 MW of commissioned power to its Phoenix data center. The facility received the Uptime Institute's M&O Stamp of Approval in 2019.

COMPASS DATACENTERS

Compass Data Centers is headquartered in Dallas, TX and delivers data centers for customers throughout the United States. Their product, which is typically constructed as 10,000 SF and 1200 kW, can be built anywhere, delivered in six months, and is Tier 3 Designed and Certified by the Uptime Institute, ensuring customers that the data center purchased is the data center delivered. In addition, the product is easily scalable in equal amounts over time.

Compass acquired a 200-acre parcel of land in 2019 in Goodyear, where they plan to construct a multi-building campus with 260 MW at full build. Construction of the first two buildings on the campus began in 3Q 2019.

CYRUSONE

CyrusOne is a global colocation company headquartered in Dallas, TX. They have 40 data center facilities throughout the United States, Europe and Asia and are continually growing. In efforts to drive down operational costs for customers, CyrusOne delivers their "Massively Modular" data center concept, which brings power/space to the market quickly in large facilities. CyrusOne went public in 1Q 2013, steadily growing through both construction of new data center facilities in top markets and strategic acquisitions of rivals.

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CyrusOne has significantly invested in capacity in the Phoenix market. The company owns a 57-acre site in Chandler, AZ, approximately 20 miles southeast of downtown Phoenix. In June, CyrusOne announced the purchase of 69 acres in Mesa, another emerging sub-market just to the north of Chandler.

CyrusOne's Chandler complex currently consists of two separate data center buildings, Phoenix 1 and Phoenix 2 and 3. The campus has its own 110 MW electric substation and is capable of producing 90 MW of critical power when fully built out.

CyrusOne says it plans to build a five-building campus on its property in Mesa, which will support as much as 198 MW in additional capacity.

Phoenix 1 was the first building completed on the campus and features approximately 25 MW of total power and 80,000 SF of commissioned data center space. Much of Phoenix 1's capacity was originally dedicated to a bitcoin user, which traditionally take larger power requirements but with less redundancy. The bitcoin user left the data center in 2015, and CyrusOne re-leased a smaller portion of the capacity by the end of 2016. Phoenix 2 supplies 12 MW of commissioned data center power and approximately 60,000 SF of commissioned data center space. Phoenix 3, was delivered in 3Q 2016 and provides 72,000 SF and approximately 6.0 MW of commissioned power.

In 3Q 2016, CyrusOne announced the acquisition of an additional 27-acres directly adjacent to their current Chandler campus. In 3Q 2017, CyrusOne delivered two new data centers to their Phoenix campus, Chandler IV and Chandler V. Chandler V is a fully leased data center offering approximately 73,000 SF of raised floor and 12 MW of critical capacity. Chandler V is a 185,000 SF powered shell capable of supporting up to 22 MW of capacity. CyrusOne is also under construction with Chandler VI, a 9 MW, 74,000 SF data center which will be delivered in 4Q 2017. Chandler VI will also feature 96,000 SF of shell space.

CyrusOne says it plans to build a five-building campus on its property in Mesa, which will support as much as 198 MW in additional capacity.

CYXTERA

When private equity firms BC Partners and Medina Capital acquired CenturyLink's colocation portfolio in 2017, they combined the assets gained to create a brand-new company called Cyxtera Technologies. Cyxtera is a global colocation business with 57 data centers in more than 30 markets. The company offers highly secure solutions to meet strict requirements such as those expected in financial and government entities. Cyxtera Technologies is headquartered out of Coral Gables, Florida and is comprised of Cryptzone, Catbird, Easy Solutions, and Brainspace to offer a reliable and cloud-ready infrastructure platform for more than 3,500 customers.

The Cyxtera PH1 data center is leased space inside IO Data Centers' main Phoenix campus. This data center offers CenturyLink Cloud services such as managed hosting, cloud, security as a service, and cloud storage. In 2Q 2019, Cyxtera opened their second Phoenix data center, leased inside Digital Realty's 2055 E Technology Circle facility. Cyxtera can offer up to 4 MW of commissioned power from the data center.

zColo's data center footprint of 51 facilities extends to over twenty United States markets.

DATABANK (ZCOLO)

DataBank is the new parent of zColo, a carrier-neutral data center provider created by Zayo, a publicly-traded global provider of bandwidth infrastructure services. zColo's data center footprint of 51 facilities extends to over twenty United States markets. They also offer their Metro Interconnect Service in eleven major U.S. markets, providing connections to multiple data centers across their network. In 2015, the company purchased Latisys, a provider of hybrid Infrastructure-as-a-Service (IaaS) solutions for cloud and colocation customers, for $675 million.

Designed to support their managed cloud clients, the DataBank/zColo data center is located in the Park Central Mall at 3110 North Central near downtown Phoenix. zColo has 1.2 MW of commissioned power off the 9 MW total SRP utility power and is configured

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for N+1 power/cooling redundancy. zColo has 8,200 SF of commissioned space for suites, private cages, and cabinets.

In 3Q 2020, DataBank announced their plans to purchase zColo's data center assets. DataBank is led by CEO Raul Martynek and has been an active consolidator of regional and edge data centers, buying C7 Data Centers (2017), Edge Hosting (2017), a data center portfolio from 365 Data Centers (2017), Lightbound (2017), and now zColo (2020) and a stake in EdgePresence (2020).

This series of deals has transformed DataBank from a regional specialist into one of the largest U.S. data center operators, with 64 data centers, 1.2 million SF of data center space, and 138 megawatts of installed UPS capacity.

DIGITAL REALTY

Digital Realty (DLR) is a real estate investment trust (REIT) and the largest wholesale data center provider in the world. Digital Realty delivers colocation, powered shell, private suite, and custom data center solutions in more than 180 global facilities. In July 2015, Digital Realty acquired Telx for $1.89 billion in a deal that expanded and expedited Digital Realty's ability to provide integrated services for SMB-to-enterprise customers.

In 2Q 2017, Digital Realty announced their merger with DuPont Fabros, with Digital Realty absorbing DuPont's data centers over the coming months, including the 56 acres of Phoenix land, to Digital Realty's portfolio.

Digital Realty's 120 East Van Buren building in downtown Phoenix is a four-story, multi-tenant facility with 10.0 MW of commissioned power. The facility is capable of 33.8 MW total power delivery, enabling a number of other colocation providers and users to lease space on a triple-net lease basis from DLR and then commission power on their own. The Internet Gateway building is highly connected with fiber infrastructure, drawing interest from users with colocation and connectivity needs in the area.

Digital Realty's other large investment in the Phoenix market is at 2121 South Price in Chandler, a 519,000 SF data center where DLR has delivered 36.2 MW of commissioned data center space. Digital Realty has three other locations designed as development opportunities in the Phoenix market: two in Chandler, and one in Tempe.

In 2Q 2017, Digital Realty announced their merger with DuPont Fabros, with Digital Realty absorbing DuPont's data centers over the coming months, including the 56 acres of Phoenix land, to Digital Realty's portfolio. Digital Realty has filed plans to construct five data center buildings in Mesa, ranging from 232,000 SF to as large as 1.2 million SF.

EdgeConneX's Edge Data Centers (EDC) enable distribution of content at the edge of the Internet. All EdgeConneX EDCs are designed to support extremely high power densities with a simplified per kW pricing model.

EDGECONNEX

EdgeConneX is a colocation and network services company headquartered in Herndon, VA. The company created a network of over twenty smaller "edge-of-network" data centers throughout the United States designed to lower latency and increase application performance. The company's Edge Data Centers (EDC) enable distribution of content at the edge of the Internet. All EdgeConneX EDCs are designed to support extremely high power densities with a simplified per kW pricing model.

EdgeConneX's carrier-neutral Edge Data Center in the Phoenix market is located at 3011 South 52nd Street, Suite 107 in Tempe. Designed to support extremely high power densities with a simplified per kW pricing model, their Tempe EDC is capable of delivering 8,600 SF of commissioned data center space. Designed to SOC 2 Type 2 standards as well as the Open-IX certification, the Tempe EDC supports power densities of up to 600 W/SF with power and cooling infrastructure configured for N+1 redundancy.

EdgeConnex has also purchased 120 acres of land in Mesa and has filed plans with the city to build a 30 MW data center.

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EDGECORE

EdgeCore is national provider of Tier III designed, highly connected, scalable data center solutions. Founded in 2017, EdgeCore has plans to develop campuses in Dallas, Phoenix, and Reno by the end of 2018. Each campus is designed to accommodate over 100 MW of critical capacity. Their large-scale approach coupled with diverse cloud connections make their facilities an ideal candidate for enterprise and hyperscale users.

EdgeCore's Phoenix campus is located in Mesa, adjacent to Apple's data center. EdgeCore plans to build seven data centers on the campus, totaling approximately 224 MW of commissioned power and 980,000 SF of commissioned space. Each 32 MW, 140,000 SF data center will be fed by an on-site substation and operate at a PUE of 1.25 or better. The first building opened in 2019.

Founded in 2000, Flexential concentrates on managed cloud services such as infrastructure as a service (IaaS) and disaster recovery with compliance regimes that include SOC 1 Type 2, SOC 2 Type 2, SOC 3 Type 2, PCI, and HIPAA.

FLEXENTIAL

Flexential provides cloud computing, data center, and other scalable technology infrastructure solutions and managed services, primarily for mid-market businesses. The company is headquartered in Charlotte, NC and has a growing data center footprint in the southeastern corner of the United States. Founded in 2000, Flexential concentrates on managed cloud services such as infrastructure as a service (IaaS) and disaster recovery with compliance regimes that include SOC 1 Type 2, SOC 2 Type 2, SOC 3 Type 2, PCI, and HIPAA. In 3Q 2017, Peak 10 completed their acquisition of ViaWest, giving the company a portfolio spanning 40 data centers across 20 different markets. In 1Q 2018, the combined companies rebranded as Flexential.

Flexential entered the Phoenix market in 1Q 2014 after purchasing a data center owned and operated by Cox Communications. Cox remained in the facility as the anchor tenant, and Flexential converted the additional data center footprint to multi-tenant use. Flexential will provide 42,500 SF of commissioned data center space and 5.4 MW of commissioned power at full build.

In 1Q 2019, H5 debuted a demo suite in Phoenix that utilizes JouleForce cooling technology. JouleForce uses heat conduction instead of liquid or air conditioning to cool data center equipment in a highly efficient manner.

H5 DATA CENTERS

H5 Data Centers purchased NextFort's Chandler, AZ colocation facility in 1Q 2016. The company's 130,000 SF facility at 2600 West Germann Road is just a few minutes southeast of downtown Phoenix. The facility was designed to be a carrier-neutral data center to offer clients their trademarked "High Density Computing Suites (HCS)."

Each HCS is a separate concrete and steel room inside the 2600 West Germann facility that enables clients to lease a turnkey self-contained secure data center. Each suite is designed to house up to 20 racks with power densities of up to 600 W/SF or 225 kW per suite. From a cooling and energy-efficiency design standpoint, the facility uses 100% free cooling and will achieve a better than 1.25 PUE rating.

In 2Q 2017, H5 completed an expansion on the private data suites at their Phoenix facility, doubling the density in the suites.

In 4Q 2017, H5 executed a lease for wholesale space to colocation provider LeaseWeb at their Phoenix data center. The long-term lease is LeaseWeb's first with H5, but the company has indicated they will explore leases with H5 at other locations.

In 1Q 2019, H5 debuted a demo suite in Phoenix that utilizes JouleForce cooling technology. JouleForce uses heat conduction instead of liquid or air conditioning to cool data center equipment in a highly efficient manner. With the cooling system, H5 estimates they can achieve a density of 32 kW per rack.

In 2Q 2019, H5 began construction on the next phase of development in Phoenix, adding 6 MW and 25,000 SF of capacity.

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INAP

INAP is a global colocation company headquartered in Atlanta, GA. INAP has a presence in fifteen different cities around the world, offering colocation, cloud, and managed services to each market. The company's focus on the technology, healthcare, financial, online education, and gaming industries has propelled their growth over the last few years. In addition, INAP's focus on low latency/high availability network services provide vertically-integrated services to their clients. INAP markets their OpenStack-based AgileCLOUD service as a scalable, high-performance cloud solution for small-to-mid sized companies.

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INAP operates two data centers in the Phoenix market. The first is located inside Digital Realty's data center at 2121 S Price Rd in Chandler. The second, their flagship Phoenix facility, is a former Bank of America data center acquired by Lincoln Rackhouse in 2Q 2018. In 3Q 2018, INAP assumed operations of the data center, which currently holds 5 MW, with another 5 MW available in the future.

In 3Q 2019, Lincoln Rackhouse sold their Phoenix data center to CBRE Global Investors. INAP will remain in the facility and provide the data center operations. INAP also signed a renewal lease for Bank of America, extending their lease until 2028.

IRON MOUNTAIN DATA CENTERS

Iron Mountain is a data center operator headquartered in Boston, MA. The company has offered wholesale data center services from underground data centers since the 1980's, but has recently made headlines with the acquisitions of EvoSwitch Netherlands, IO Data Centers, FORTRUST data centers and two Credit Suisse data centers (London, Singapore). Iron Mountain now offers colocation services in Amsterdam, Boston, Denver, Kansas City, New Jersey, London, Northern Virginia, Ohio, Pennsylvania, Scottsdale, Singapore, and Western Pennsylvania.

In 4Q 2017, Iron Mountain purchased colocation provider IO Data Centers for $1.3 billion, adding

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a presence in Phoenix, New Jersey, and Columbus, OH. The purchase gives Iron Mountain ownership over a 98,000 SF data center in Scottsdale and a 500,000 SF campus in Phoenix. IO had historically been the largest provider in the Phoenix market, has also built an impressive customer base among enterprise customers, including clients in finance, aerospace and technology.

In 3Q 2018, Iron Mountain broke ground on their newest Phoenix development, three story 24 MW data center adjacent to their existing Phoenix facility. The first 4 MW, 21,000 SF data hall on the third floor was delivered in 3Q 2019. Once fully delivered, Iron Mountain can construct an additional identical building on the site.

In 3Q 2020, Iron Mountain signed a 6 MW pre-lease at the next phase of their AZP-2 data center. In 4Q 2020 the company announced that the same client had pre-leased an additional 6 MWs.

PHOENIXNAP

Founded in 2009, PhoenixNAP is a global IT services provider offering high-performance Infrastructure-as-a-Service (IaaS) solutions from locations worldwide. The company focuses on bare metal servers, cloud, hardware leasing, and colocation options built to meet the evolving technology demands enterprises. The company has locations in Atlanta, Phoenix, Northern Virginia, Belgrade, Singapore, and Amsterdam.

The company's data center at 3402 East University in Phoenix is a carrier-neutral facility with dual feeds from nearby SRP substations. PhoenixNAP commissioned 4.5 MW with another 3 MW planned for their 90,000 SF of commissioned data center. Their modular design enables power densities for compute and storage environments of up to 500 W/SF with power and cooling infrastructure configured for 2N redundancy.

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QTS DATA CENTERS

QTS Realty Trust (QTS) is a data center provider and REIT with twenty-two data center properties worldwide. The company traditionally finds large, robust facilities and transforms them into LEED-certified data centers. Integrating real estate services with data center operational experience, QTS enables their mostly Fortune 1000 customers to utilize the "3Cs" of custom data centers (C1), colocation (C2), and cloud services (C3).

The QTS data center in Phoenix, located in DLR's 120 East Van Buren facility, is designed as both a colocation and disaster recovery facility for the company's private cloud platform. As a tenant in Digital Realty's facility, the QTS data center meets HIPAA, PCI, and FISMA data privacy requirements and sits on the backbone of more than a dozen major network providers. Power to the data center is delivered by APS from diverse underground feeds. QTS's data center power and cooling infrastructure is configured for N+1 redundancy.

In 4Q 2017, QTS completed the purchase of an 84-acre land site in Phoenix for $25 million. QTS will construct a multi-building campus on the site, but is waiting on an anchor tenant before it begins development.

STACK INFRASTRUCTURE

Launched in 2019, Stack Infrastructure is a data center company branded and sponsored by investment company IPI Partners. Designed to meet the needs of both rapidly scaling enterprises and hyperscale companies, Stack offers an array of tailored infrastructure services to customers across the US. The company provides three data center solutions: HYPER STACK (hyperscale campuses and build-to-suit options), POWER STACK (powered shells), and READY STACK (readily available wholesale colocation and private suites). Stack's current assets include nine data centers spanning seven US markets, with expansion sites located adjacent to six of those facilities and plans to build in new markets.

In 2Q 2020, Stack purchased a 79-acre parcel in Goodyear where they intend to construct a 1 million SF campus.

Stream's data centers are built to attract users that value private infrastructure in multiple forms—including the physical data hall, UPS, PDU, generator units, equipment yards and office space.

STREAM DATA CENTERS

Stream Data Centers is an expanding U.S. colocation provider with a presence in Dallas, Houston, San Antonio, Denver, Minneapolis, Montreal, and Chicago. They are a privately held company focused on delivering secure and independent data centers for corporate users. Stream's data centers are built to attract users that value private infrastructure in multiple forms—including the physical data hall, UPS, PDU, generator units, equipment yards and office space. Stream Data Center tenants have the opportunity to control their own infrastructure, and their facilities are typically dual fed from two separate substations, delivered with 2N electrical redundancy. The company is headquartered in Dallas.

In 1Q 2019, Stream Data Centers purchased a 160-acre land site in Goodyear, where they will construct a 2 million SF data center campus. The site has an existing 418,000 SF building, which Stream will convert into a 50 MW data center. The company delivered the first 4.5 MW hall in 3Q 2020.

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About Our Sponsor NTT

The most recent data center project for NTT Global Data Centers Americas is in Chicago.

NTT Global Data Centers Americas *(formerly RagingWire)*

datacenter.hello.global.ntt/

RagingWire was one of the early companies that helped to build what would one day become a multi-billion dollar global industry—data center colocation. RagingWire has been owned by NTT since 2014, and has been operating as an independent entity since that time. Now NTT is combining 28 of its affiliate companies (including NTT Communications, Dimension Data, and NTT Security) into one new entity called NTT Ltd.

Within NTT Ltd. is the new Global Data Centers division, which incorporates e-shelter, Gyron, Netmagic, NTT Indonesia Nexcenter, RagingWire and other data center companies. This division operates one of the largest data center platforms in the world, now with over 160 data centers spanning more than 20 countries and regions, and provides NTT clients and partners with access to a powerful digital ecosystem with global reach and local expertise.

NTT Global Data Centers Americas has operations in key U.S. markets including Ashburn (VA), Sacramento (CA), Dallas (TX), Hillsboro (OR), and Chicago (IL), with expansion plans in place for Silicon Valley (CA) and Phoenix (AZ). Other divisions within NTT Global Data Centers have facilities in Tokyo, Osaka, Hong Kong, Singapore, Cyberjaya, Bangkok and Jakarta in the APAC region. In EMEA, locations include London, Amsterdam, Frankfurt, Berlin, Munich, Vienna, Zurich, Madrid, and Johannesburg. In India, NTT Global Data Centers has significant data center operations in Mumbai, Bangalore, Noida, and Chennai.

NTT Ltd. has vast expertise in building technologically advanced data centers with low total cost of ownership (TCO) and high redundancy. NTT Ltd.'s global presence supports and enables end-to-end solutions while offering flexibility for clients to balance their critical IT load across various locations.

The global data centers platform of NTT Ltd. features efficient, mission-critical power and cooling to maximize performance and minimize costs. Customizable space configurations and reliable, carrier-neutral connectivity, including integration with hybrid or multi-cloud, are standard. Customers are supported 24x7x365 by highly-trained, in-house staff experts in operations, facilities management, security, and shipping and receiving.

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datacenterHawk Methodology

datacenterHawk continuously monitors data center activity for 35 regional markets in North American. Regional markets are placed into one of two categories:

1. **Primary -** Large markets with multiple colocation and cloud data center facilities
2. **Secondary -** Mid-to-small markets with data centers.

We define our market sizes based on the total amount of power and space in the market. The total amount of power and space in each market is calculated by datacenterHawk's team of analysts based on four key attributes:

- The amount of commissioned power and space
- The amount of available power and space
- The amount of under construction power and space
- The amount of planned power and space

As an example, Data Center Provider A builds a 75,000 gross square foot (SF) data center facility, with 3 separate data halls of 1,200 kilowatts (kW) and 10,000 raised floor square feet (RFSF) each. Data Center Provider A leases one of the data halls (1,200 kW/10,000 RFSF) to a user, and makes the second data hall (1,200 kW/10,000 RFSF) available by completing construction to be ready to lease the next opportunity. The third data hall is in shell condition and therefore considered planned space.

In addition, the datacenterHawk analysis considers that many colocation and cloud providers lease infrastructure from larger data center providers. In our analysis, we count power and space leased from one data center provider to another only once.

As an example, if the lease completed by Data Center Provider A in the scenario above was completed with Data Center Provider B with the intent to sublease that 1,200 kW/10,000 RFSF to users, the analysis would only include the 1,200 kW and 10,000 RFSF of space one time.

We define absorption as "net leasing", which includes pre-leasing + leasing of vacant capacity – move outs

At datacenterHawk, we track these attributes in each market throughout the year and frequently refresh them. By continuously monitoring these attributes, we can calculate a baseline for each market, rate how a market grows relative to their baseline score, and deliver the most current and valuable information needed by our customers.

datacenterHawk has made every attempt to ensure the accuracy and reliability of the information provided. However, the information is provided "as is" without warranty of any kind. datacenterHawk does not accept any responsibility or liability for the accuracy, content, completeness, legality, or reliability of the information provided.

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