Shifting clouds, surging M&A
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The cloud – now headed to global markets.
2016 saw incredible absorption driven by cloud demand – today large scale cloud providers are looking overseas to fill out their global footprint.

M&A heavy hitters continue… to the tune of $10 billion.
Several massive acquisitions and buyouts were announced within the industry in 2017 – setting pace for a record breaking year. We’re halfway through and already passing $10B.

Absorption of data center capacity is normalizing – for now.
Coming off a wild year for leasing, the first half of 2017 depicted reserved absorption as users continued to work through capacity they picked up in 2016.

Data center users crave more power, deploy AI and go global.
Our panel of data center industry heavyweights sound off – telling us about their growing need for data security and artificial intelligence, and how it will affect their business going forward.
An insider’s scoop

To get an insider’s perspective on many of the hot topics in the data center market, we interviewed 3 data center user heavyweights to see how changes in the industry are affecting their company and what they expect to see in coming quarters.

Below are the 3 types of users we interviewed:

- Technology and big data company with global reach
- Worldwide online payment & transaction company
- International online retailer and marketplace
Cyber security

How is cyber security affecting your data center strategy and implementation?

Tech & Big Data Company

“From a data center and security viewpoint, we’ve been deploying extra racks for all the new security appliances that continue to grow the network footprint. The additional security measures have been adding to build times for bringing new systems online. Capacity upgrades and planning have become even more challenging as the wait time now includes security devices in addition to circuit upgrades.”

Transaction & Payment Company

“Security is a growing concern and top priority. When looking to expand our presence, we need to ensure business, regulatory and compliance needs are met. We are focused on having a consistent and standardized security posture across all data center locations, as well as proactive framework-level security controls and automated security operations (e.g. patching, vulnerability scanning, product/app testing). We also continue to conduct regular physical and logical vulnerabilities and penetration testing.”

Online Retailer

“Changes in cyber security haven’t had a major effect on our business yet. Security has always been a top focus and must be ubiquitous no matter the location or infrastructure sourcing.”

Cloud

How are you using the cloud today (public vs. private) and will you increase, decrease, or maintain similar usage over the next 24 months?

Tech & Big Data Company

“We use public cloud for locations where we do not have direct managed data centers. In circumstances where applications need to be closer by region to the customer, cloud solutions are great – but for our large processing systems we are moving them to high performance computing (HPC) to reduce cost well below what cloud can offer.”

Transaction & Payment Company

“We’re using both public and private cloud applications today, but we will see an increase in approved use cases going to public cloud over the next 24 months. However, we anticipate a hybrid model being the sustained strategy over time.”

Online Retailer

“We anticipate level cloud usage going forward into the next 24 months for our business. The primary focus will be on private cloud deployments with adaptability for public usage as needed.”
Investment

Where are you spending and focusing your IT budget, today and how do you see that changing over the next 24 months?

Tech & Big Data Company

“Our investment is focused on HPC, data centers, automation, and security. Our next step will be to start to focus on moving virtual machines to non-SAN (storage area network) products. We will still have SAN arrays for databasing but it no longer is required for VM environments.”

Transaction & Payment Company

“Our current IT budget today is focused on commodity based computing hardware. We believe that focus will continue as we work to standardize our hardware, and continually drive higher performance and reduce costs.”

Online Retailer

“It spending for us will be focused on a few core segments; primarily availability of deployments, security of data and infrastructure, focus on technical debt, and growth in our automation capabilities.”

Predictions

What do you believe will be the most impactful changes in technology, relevant to your business, taking place over the next 24 months?

Tech & Big Data Company

“Major heat changes from newer processors will drive us to shutdown data centers that are not at least 200 watts per square foot.”

Transaction & Payment Company

“The most impactful technology changes will come about from larger investments in artificial intelligence (AI). AI will help us reduce human intervention and significantly cut time to restore operations due to failures. Plus, AI will allow us to leverage a greater use of predictive analytics.”

Online Retailer

“The changes in tech that will have the largest impact will be focused around AI, processor technologies and automation.”
Halfway through 2017 – what progress has been made?

Absorption returned to normal levels after record leasing in 2016, M&A heavy hitters came in strong, cloud users remained a tour de force, and construction volumes heated up across the U.S.

Absorption statistics calmed down to sustainable levels in 2017 as cloud users took a breather on leasing and continued to work through the massive amounts of capacity they took on in 2016. U.S. markets absorbed a total of 186.2 MW from January through June this year, compared to 249.1 MW across the same timeframe in 2016. Canadian markets on the other hand, captured 35.1 MW of absorption in H1 2017, nearly 10 MW more than H1 2016, carried by sizeable upticks in Toronto and Montreal.

This also comes at a time where national cloud providers brought significant inventory online within the first half of the year, compared to absorbing availabilities in the market, putting a mild damper on absorption. On the other hand, pent up data center demand from Fortune 1000 companies and enterprise users who previously were unable to grab capacity due to low availability, are expected to lease up moderate to large chunks – driving additional absorption through the year. While the first half of 2017 may have been a bit more reserved than last year, we expect greater H1 to H2 consistency in terms of leasing in 2017 compared to 2016 which was heavily front loaded.

Across the board, revenue and growth is up for data center companies in a big way, both in the United States and globally. Data center stocks and REITs have continued to surge since January, gaining an average of 23.2% in price over the course of 2017, yet only 10.2% over the last 52 weeks, a bit of a slowdown from their upswing of nearly 50% in the first half of 2016. In 2016, however, data center REITs saw a sizeable ‘correction’ after Q2 earnings were released, losing nearly half of that 50% growth due to fear of overvaluation. 2017’s Q2 earnings season is expected to be significantly more sensible due to the sustainable growth evident in prices within the first six months of 2017, compared to the rampant escalations in 2016. On the REIT front in H2 2017, expect continued market movement in response to breaking news stories surrounding additional acquisitions of assets and targets playing out amongst the Big 5 Data Center REITs (activity is nearly guaranteed), as well as continued news as we get closer to the Digital Realty and DuPont Fabros closing.

Under construction inventory in the data center sector increased, with the majority of markets depicting larger pipelines than the same time last year. Today, over 506 MW is under construction across North America, compared to just 353 MW a year ago – large pipeline increases in Northern Virginia (+57 MW YoY), Toronto (+41 MW YoY), and Dallas / Fort Worth (+31 MW YoY) depict booming markets looking to catch up to demand.
Supply and demand fundamentals continue to drive Northern Virginia absorption heading through mid-year 2017. A shortage of available big block spaces has limited some hyperscale leasing options early in the year, but new deliveries will begin to present fresh hyperscale options. Providers continue to scramble to bring new inventory online as quickly as possible to capitalize on the low vacancy and pent up user demand in the market.

Dallas / Fort Worth:
While much of the U.S. saw significant movement on the cloud front in 2016, minimal cloud action played out in Dallas - until 2017. H1 2017 brought changes for the market, with cloud providers officially setting up shop, spurring a 50% bump in absorption. This added activity brought in by the cloud was on top of growing enterprise and industry verticals in the market – signaling meaningful growth across the first two quarters.

Northern California:
Northern California regressed to traditional market levels in the first half of 2017 after hyperscale providers drove incredible absorption in the region throughout 2016. Barriers to entry remain high due to costs and land availability in the mature market, which is just now seeing new inventory come online to ease single digit vacancy.

Atlanta:
Strong growth in Atlanta over the course of 2016 through 2017 was driven not just by the continued success of tenured operators, but also by newer operators entering the market and hitting their stride. Atlanta has historically been an underserved data center market, but operators and users are turning their sights toward the city to anchor their presence in the Southeast.

Montréal:
Following the raging storm of cloud activity in the U.S. in 2016, the big name cloud providers swooped in to Montréal in the first half of 2017, driven by optimal pricing, timing, and power rates in the Canadian market. Cloud activity on top of typical market deals drove absorption up significantly, more than twice H1 2016 levels.
The cloud is shifting to global markets

Building off incredible momentum from past quarters, cloud adoption continues to lead industry activity sucking up large swathes of available space in nearly every North American market, but has it hit its peak? Of the 18 major data center markets that we analyze in the U.S. and Canada, 11 of them are showing **30% or more of their user demand coming from the cloud**. At the top end, cloud users in Northern Virginia, Austin / San Antonio, and Chicago are pushing towards nearly three quarters of demand in the markets. Yet when we compare absorption stats from H1 and H2 2016 to today, some questions arise.

**In 2016, the overwhelmingly predominate absorption driver in the data center sector was cloud focused — by a long shot.** Microsoft Azure, Amazon Web Services (AWS), Oracle, SoftLayer, Google and others captured massive chunks of space across the country, leading to one of the hottest leasing years on record. 2016 racked up over 350 MW of absorption in the U.S. and 46 MW in Canada, setting high expectations for 2017.

Cloud providers continued to be the leading demand generator in the first half of 2017 – the activity they brought was noticeably lighter than 2016, depicted in cloud heavy markets like Northern Virginia and Chicago. This is by no means an omen, as businesses and users continue to flock towards cloud based products, but rather a sign that AWS and Microsoft Azure are still attempting to power through capacity they picked up in the ‘Great Absorption of 2016’.

While cloud movement may have evened out in the first half of 2017 within the U.S., **international data center markets have seen a noticeable uptick in cloud leasing and activity as large cloud services set their sights on international soil.** This intercontinental movement is being spurred by two things; a continued increase in data sovereignty and data privacy policies, and large scale providers pushing towards a worldwide reach to better serve client demand. Data sovereignty remains a hot button topic for many international providers, as more and more government organizations continue to demand user data be stored within international borders, which is having profound impacts on not just Fortune 1000 companies, but also their go-to cloud services group, providers, and operators. Demand from enterprise and hybrid adopters of cloud capabilities are also spurring movement within AWS, Azure and others, as the big players look to globalize their data center solutions. International facilities also caught the eye of many medium and large scale colocation providers looking to keep up with the data center industry. Expect acquisitions of facilities and businesses in international Tier 1 markets to pick up in the second half of 2017 as industry leaders become increasingly more comfortable with foreign deals.

**Cloud users demonstrate incredible activity in H1 2017**
*(Cloud as percentage of absorption in markets)*

<table>
<thead>
<tr>
<th>Location</th>
<th>Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago</td>
<td>70%</td>
</tr>
<tr>
<td>Austin &amp; San Antonio</td>
<td>70%</td>
</tr>
<tr>
<td>Northern Virginia</td>
<td>60%</td>
</tr>
<tr>
<td>Montreal</td>
<td>50%</td>
</tr>
<tr>
<td>Northern California</td>
<td>50%</td>
</tr>
<tr>
<td>Pacific Northwest</td>
<td>40%</td>
</tr>
<tr>
<td>Atlanta</td>
<td>35%</td>
</tr>
<tr>
<td>Dallas / Fort Worth</td>
<td>33%</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>30%</td>
</tr>
<tr>
<td>Las Vegas &amp; Reno</td>
<td>25%</td>
</tr>
<tr>
<td>Toronto</td>
<td>20%</td>
</tr>
<tr>
<td>New York City</td>
<td>20%</td>
</tr>
<tr>
<td>Western Canada</td>
<td>15%</td>
</tr>
<tr>
<td>Phoenix</td>
<td>13%</td>
</tr>
<tr>
<td>Denver &amp; Colorado Springs</td>
<td>6%</td>
</tr>
<tr>
<td>Boston</td>
<td>5%</td>
</tr>
<tr>
<td>New Jersey</td>
<td>3%</td>
</tr>
<tr>
<td>Houston</td>
<td>0%</td>
</tr>
</tbody>
</table>

In the Chicago and Austin / San Antonio markets, **70% of market absorption in the first half of 2017 was driven by cloud users.**
M&A heavy hitters continue... to the tune of $10 billion

2016 was a strong year for acquisitions and mergers in the data center industry, with nearly $2 billion trading hands by year end. 2017 however, is on pace to top the charts in a massive way as providers continue to spend the big bucks. We’re already set for a wild year, with over $10 billion spoken for in the last 6 months. This M&A activity comes at a time when the industry is headed towards larger, more efficient facilities which offer comprehensive and flexible product to users looking for a consistent global vendor.

Advanced facilities are offering:
• Bigger buildings and rooms providing flexibility for users
• Cutting edge technologies in cooling and energy efficiency
• Larger selection of services and amenities, catering to enterprises

M&A in H1 2017 also continued to highlight data center firms’ aim to differentiate their offerings and services from competitors. Digital Realty is acquiring DuPont Fabros to expand their geographic service area. Manny Medina formed Cyxtera Technologies to capture security minded users. Both, prime examples of the providers becoming creative in the face of rising competition.

Mega mergers and acquisitions of H1 2017:

<table>
<thead>
<tr>
<th>Company</th>
<th>Acquired</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Realty acquires</td>
<td>DuPont Fabros</td>
<td>$7.6B</td>
</tr>
<tr>
<td>Cyxtera Technologies formed</td>
<td>via BC Partners, Medina Capital, and CenturyLink assets</td>
<td>$2.8B</td>
</tr>
<tr>
<td>Peak 10 acquires</td>
<td>ViaWest</td>
<td>$1.7B</td>
</tr>
<tr>
<td>Digital Bridge acquires</td>
<td>Vantage</td>
<td>$1.0B</td>
</tr>
</tbody>
</table>

M&As have already made a large splash to kick off 2017, but don’t let that fool you, the second half of the year promises to be just as vibrant. Consolidation is the name of the game within any industry, and even more so with data centers.

Expect large scale providers to continue on acquisition sprees as they look to broaden services they offer, enter new markets and move towards offering comprehensive, yet specialized products. Tenured large scale providers will move towards capacity plays, expanding their footprints through real estate based purchases. Also expect to see inspired M&As in the coming months driven by companies looking to compete (on a smaller scale) with AWS and Azure via acquisitions.
U.S. markets
Atlanta

New colocation operators land in the Atlanta market – making waves with acquisitions.

Market overview
Supply in Atlanta is increasing with two colocation operators, Ascent and Lincoln Rackhouse, entering the market. The firms acquired robust enterprise data centers further enhancing wholesale offerings. Digital Realty has also expanded their data center operations to 250 Williams Street solidifying their commitment to the downtown market. Meanwhile, QTS expanded its operations at Jefferson Street and has acquired the adjacent site for additional expansion. DataSite continues to expand power and cooling in their Marietta location.

Demand in the Atlanta market is active—strength primarily being driven by large kW enterprise users seeking cloud options and range of services. Smaller users continue to fuel organic growth in the market as they decide to outsource their data center needs.

Market trends - Atlanta has historically been an underserved market, but operators and users are turning their sights toward the city to anchor their presence in the Southeast, and will continue to break into the marketplace through acquisition and new builds.

Outlook for Users
- Enterprise, financial tech, and technology continue to be driving forces.
- Low power rates continue to provide attractive options for users
- Several new blocks of space have opened up options for users.

Outlook for Providers
- 10 MW+ has been delivered to the wholesale market in the first half of 2017.
- New providers are continuing to evaluate ways to enter the Atlanta market.
- Enterprise data centers continue to trade in the marketplace.

Supply
Total inventory: 1.73 m.s.f. / 207 MW
Total vacant: 209,000 s.f. / 33 MW
Under construction: 20,000 s.f. / 3 MW
Planned: 100,000 s.f. / 12 MW

Demand
Net absorption: 8 MW

Rental rates
< 250 kW: $225 - $325/kW (all in)
> 250 kW: $130 - $155/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Cent/kWh</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>4.8</td>
<td>4.7</td>
<td>4.8</td>
<td>4.8</td>
<td>4.8</td>
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<tr>
<td>2014</td>
<td></td>
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<tr>
<td>2015</td>
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<td>2016</td>
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<tr>
<td>2017</td>
<td></td>
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</tbody>
</table>

Data Center leverages
H2 15 H1 16 H2 16 H1 17 H2 17

2017 significant data center transactions
Transportation Tenant
TS 1.5 MW
Technology
zColo
1 MW
Digital Realty (Lease)
250 Williams St
3 MW
Austin & San Antonio see hopeful enterprise growth stemming from cloud concentration

Market overview

Supply in Austin remains reasonably stable. DataFoundry continues to build TX2, and Vxchnge is under construction on a 2 MW expansion of the former Sungard facility. CyrusOne, Digital Realty, DataFoundry and Vxchnge all have available turn-key inventory to support the market. Stream and CyrusOne both have turn-key product available in San Antonio.

Demand in the Austin market has remained steady, despite higher electricity costs compared to other Texas markets even as West coast technology companies continue to show an interest in the market. San Antonio has seen incredible demand from continued expansion by Microsoft, both self-developed and in take-down of colocation space. Generally, San Antonio providers service the market through rack and cabinet solutions.

Market trends are pointing to a potential increase in demand as Microsoft continues to grow its presence in the San Antonio marketplace. Quick local access to the cloud service providers (CSP) will drive data center providers to the area to support Microsoft.

Outlook for Users

- Low rental rates will be available due to market conditions and speculative supply
- Access to CSP’s in the area has been, and will continue to become easier
- New offerings will come to market as new product is brought on-line

Outlook for Providers

- Will continue to provide an easy cloud exchange platform for customers
- Flexible lease terms for service providers can be expected
- Incentives will be provided to offset high electricity costs

<table>
<thead>
<tr>
<th>Industry</th>
<th>User demand by industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud</td>
<td>70%</td>
</tr>
<tr>
<td>Technology</td>
<td>5%</td>
</tr>
<tr>
<td>Telecom</td>
<td>10%</td>
</tr>
<tr>
<td>Healthcare</td>
<td>5%</td>
</tr>
<tr>
<td>Banking &amp; Financial Services</td>
<td>5%</td>
</tr>
<tr>
<td>Retail &amp; E-commerce</td>
<td>8%</td>
</tr>
<tr>
<td>Government</td>
<td>8%</td>
</tr>
</tbody>
</table>

Supply

- Total inventory: 526,000 s.f. / 94.5 MW
- Total vacant: 56,000 s.f. / 9.7 MW
- Under construction: 7,000 s.f. / 2 MW
- Planned: 416,000 s.f. / 53 MW

Demand

- Net absorption YTD: 20.5 MW

Rental rates

- < 250 kW: $220 - $290/kW (all in)
- > 250 kW: $110 - $130/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>6.9</td>
<td>7.0</td>
<td>7.2</td>
<td>7.4</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Data Center leverage

- H1 2017: Neutral market
- H1 2018: Neutral market
- H2 2018: Provider favorable market
- H1 2019: User favorable market
- H2 2019: Neutral market
- H1 2020: Neutral market
- H2 2020: Neutral market
- H1 2021: User favorable market
- H2 2021: Neutral market

2017 significant data center transactions

- Microsoft: CyrusOne San Antonio, 18 MW
- Tech Company: CyrusOne Austin, 1.2 MW
- Tech Company: Digital Realty Austin, 943 kW
Connectivity continues to drive demand in Boston

Market overview

Supply continues to be driven by Markley Group, Digital Realty, Coresite, Cyxtera and, increasingly, Tierpoint. Markley brought new product online both at One Summer and their newer location in Lowell. Coresite continues to expand 70 Innerbelt for several existing customers. Supply balance was helped by Digital Realty’s decision to turn down 200 Quannapowitt, and SunGard’s exit as a colo provider from 109 Brookline Avenue.

Demand in the Boston market remains relatively flat due to high power and space costs, although we did see a substantial power cost reduction over the last 24 months. We also continue to see steady growth from major content and service providers aiming to enhance their edge services.

Market trends are fairly consistent with other second tier markets with local companies and connectivity driving growth of colocation while demanding increased cloud access.

Outlook for Users

• Variety new blocks of space available at Markley, and Tierpoint, as well as expected space at Coresite and Cyxtera.
• Power pricing will continue to decline, with largest impact on high efficiency facilities.
• Mass-IX and others developing robust cloud connectivity solutions.

Outlook for Providers

• Energy savings programs providing substantial incentives from utility providers.
• High barriers of entry for competitors/new development.
• Strong institutional investor interest in Telecom properties in Boston.

Supply

| Total inventory: 1.2 m.s.f. / 160 MW |
| Total vacant: 140,000 s.f. / 16 MW |
| Under construction: 60,000 s.f. / 6 MW |
| Planned: 60,000 s.f. / 8 MW |

Demand

| Net absorption: 2.8 MW |

Rental rates

< 250 kW: $275 - $775/kW (all in)
> 250 kW: $115 - $200/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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<tr>
<td>15</td>
<td>18</td>
<td>22</td>
<td>20</td>
<td>16</td>
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</table>

Data Center leverage

<table>
<thead>
<tr>
<th>H2</th>
<th>H1</th>
<th>H2</th>
<th>H1</th>
<th>H2</th>
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<tbody>
<tr>
<td>15</td>
<td>16</td>
<td>16</td>
<td>17</td>
<td>17</td>
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</table>

2017 significant data center transactions

<table>
<thead>
<tr>
<th>Service Provider</th>
<th>Hospital</th>
<th>Service Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>109 Brookline Ave.</td>
<td>Markley 250 kW</td>
<td>Markley 150 kW</td>
</tr>
</tbody>
</table>
Chicago

Hyperscale demand drives explosive growth in Chicago

Market overview

Supply is being developed at a rapid pace due to high hyperscale demand in the market. Digital Realty Trust, QTS, DuPont Fabros and CyrusOne are collectively driving the demand, building 44 MW of spec product, of which 17 MW is already leased. Several providers are also actively looking at new developments and long-term campus opportunities.

Demand in the Chicago market has never been stronger. To date, 27 MW has already been leased. Hyperscale deployments by Apple and Oracle is a large factor, however enterprise leasing is at its highest point in the past 5 years due to users taking action on outsourcing, cloud and colocation strategies.

Market trends We will see sustained cloud development in the market, as well as colocation providers fighting to accommodate enterprise users who will continue to outsource data center capabilities.

Supply

| Total inventory: 3.8 m.s.f. / 508 MW |
| Total vacant: 216,000 s.f. / 30 MW |
| Under construction: 20,000 s.f. / 56 MW |
| Planned: 400,000 s.f. / 45 MW |

Demand

Net absorption: 23.6 MW

Rental rates

< 250 kW: $230 - $325/kW (all in)  
> 250 kW: $135 - $145/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Cents per kWh</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>6.7</td>
<td>7.0</td>
<td>6.5</td>
<td>6.3</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Data Center leverage

2017 significant data center transactions

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2</td>
<td>DuPont CH3</td>
<td>14.5 MW</td>
</tr>
<tr>
<td>H1</td>
<td>Digital Realty CH1</td>
<td>1.2 MW</td>
</tr>
<tr>
<td>H2</td>
<td>Two Sigma Confidential location</td>
<td>2.2 MW</td>
</tr>
</tbody>
</table>

Outlook

for Users

• Several new blocks of space have opened up options for users, but planned cloud expansions and deployments will take down those blocks quickly.  
• Cloud, financial, healthcare and F1000 continue to push the need for growth.  
• Continued aggressive pricing, flexibility and options will benefit users.

for Providers

• Several providers looking at starting new developments or major expansions.  
• Competitive pricing in the downtown and suburban markets.  
• New contractual options emerging, including cloud portability and others.
Dallas / Fort Worth

Significant cloud forms in Dallas / Fort Worth, while enterprise users shine through

Market overview

Supply in D/FW is growing to keep pace with demand, as new purpose built ground-up buildings are being delivered by providers such as RagingWire and Digital Realty. Additionally, QTS, Ascent, and CyrusOne have expansion plans underway in the area, as first half 2017 absorption has outpaced previous years.

Demand in the D/FW market has come from several industry verticals. Technology refreshes among Fortune 500 companies are driving an uptick in net new absorption in wholesale providers. Additionally, locally based IBM/Softlayer continues to take down large amounts of capacity to support their growing cloud platform. Buzz about multiple hyperscale cloud providers circling the market seem to be coming to fruition.

Market trends are pointing to higher density environments with technology refreshes. The constant job creation in North Texas has also fueled new requirements. Additionally, power costs in D/FW continue to be one of the lowest in top national markets.

Supply

| Total inventory: 3.42 m.s.f. / 458 MW |
| Total vacant: 396,000 s.f. / 56 MW |
| Under construction: 296,000 s.f. / 48 MW |
| Planned: 500,000 s.f. / 76 MW |

Demand

| Net absorption YTD: 27 MW |

Rental rates

< 250 kW: $225 - $300/kW (all in)
> 250 kW: $115 - $130/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>5.8</td>
<td>5.6</td>
<td>5.4</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Outlook

for Users

- Low power costs will continue to be a game changer for the market.
- Revenue and capacity portability becoming an offering.
- Providers now offering cloud products with public cloud connectivity.

for Providers

- Offseting migration costs is a key incentive for many users.
- Flexibility in terms of portability and cloud access is increasingly important.
- Offering an array of services has becoming critical to customers.
- Land prices have continued to increase in the market.

Data Center leverage

| H1 15 | H1 16 | H2 16 | H1 17 | H2 17 |

2017 significant data center transactions

<table>
<thead>
<tr>
<th>Travel Tech Company</th>
<th>Technology Company</th>
<th>IBM/Softlayer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aligned D.C. 1 MW</td>
<td>RagingWire 1 MW</td>
<td>Digital Realty 4 MW</td>
</tr>
</tbody>
</table>

User demand by industry

- Cloud (33%)
- Technology (5%)
- Telecom (18%)
- Healthcare (3%)
- Banking & Financial Services (3%)
- Retail & E-commerce (15%)
- Entertainment & Media (22%)
Denver & Colorado Springs

Edge technology strategies spur interest in Colorado

Market overview
Supply ViaWest Compark facility in Inglewood completed and commissioned 50,000 s.f. and 12 MW. EdgeConneX, known for content delivery solutions and applications, is expanding with a new facility to be delivered by year end. In Colorado Springs, Progressive Data Centers is marketing excess capacity to colocation customers.

Demand is being driven by Denver HQ companies and those who want secondary sites centrally located in low disaster zones. Industries such as technology solutions, data management and storage, software, education and healthcare, continue to represent the majority of demand in the market, coming from both local and national companies.

Market trends. We are seeing an increase in clients looking at hybrid architectures with local cloud, or extensions to hyperscale providers. Peak10’s recent announcement of its acquisition of ViaWest will ensure continued expansion in the market.

Supply
Total inventory: 750,001 s.f. / 128 MW
Total vacant: 213,979 s.f. / 28 MW
Under construction: 24,000 s.f. / 3 MW
Planned: 170,000 s.f. / 27 MW

Demand
Net absorption: 3.2 MW

Rental rates
$180-$250/kW
$135-$160/kW

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate (cents/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>7.3</td>
</tr>
<tr>
<td>2014</td>
<td>7.5</td>
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<tr>
<td>2015</td>
<td>7.4</td>
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<tr>
<td>2016</td>
<td>7.1</td>
</tr>
<tr>
<td>2017</td>
<td>7.1</td>
</tr>
</tbody>
</table>

Data Center leverage

Outlook for Users
- New blocks of space will continue to open up options for users to consider.
- Midway through 2017 continues to show favorably to end users.
- Several national operators not located in Denver, potentially expanding in to market.

Outlook for Providers
- With current and future demand strong, providers will continue to benefit by staying ahead of the curve with turnkey space and power availabilities for existing tenant expansions and new tenants entering the market.

User demand by industry
- Cloud 18%
- Technology 15%
- Telecom 18%
- Healthcare 15%
- Banking & Financial Services 18%
- Insurance 18%
- Entertainment & Media 10%

2017 significant data center transactions
- Healthcare: ViaWest – Compark 600 kW
- Technology: H5 350 kW
- Advertising/Media: FORTRUST 600 kW
Energy sector in Houston is looking for some fuel

Market overview

Supply in Houston has stalled along with the struggling oil and gas industry, and providers have paused on speculatively investing in and bringing new product on-line. The major providers have adequate capacity for current demand, with CyrusOne, Skybox, DataFoundry, Digital Realty, and many others having available turn-key inventory to support the market.

Demand in the Houston market has remained very low due to the oil and gas industry pulling back on budgets and capital intensive projects such as data center migrations and new technology investments. Healthcare has continued to increase outsourcing to wholesale colocation providers and we expect growth in to the foreseeable future.

Market trends are pointing to major industry verticals continuing to seek savings on current contracts. Flexibility in future contracts has become increasingly more critical in order to get budgeting approved for data center related projects.

Supply

Total inventory: 935,000 s.f. / 120 MW
Total vacant: 150,000 s.f. / 17.9 MW
Under construction: 9,000 s.f. / 1.5 MW
Planned: 634,000 s.f. / 78 MW

Demand

Net absorption YTD: 1 MW

Rental rates

< 250 kW: $220 - $290/kW (all in)
> 250 kW: $95 - $120/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
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<tbody>
<tr>
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Data Center leverage

<table>
<thead>
<tr>
<th>Quarter</th>
<th>H1 15</th>
<th>H1 16</th>
<th>H2 16</th>
<th>H1 17</th>
<th>H2 17</th>
</tr>
</thead>
</table>

2017 significant data center transactions

- Oil & Gas: CyrusOne 300 kW
- Retail: DataFoundry 20 kW
- Investment Co: Digital Realty 400 kW

Outlook for Users

- All-time low rental rates available due to market conditions and speculative supply.
- Revenue and capacity portability becoming an offering.
- More flexibility available in contracts, encouraging users.

Outlook for Providers

- Offsetting migration costs is a key incentive for many users.
- Immediate rent mitigation or cash savings is key.
- Flexibility in infrastructure design still critical to customers.
Las Vegas & Reno

Supply in Las Vegas & Reno surges, under construction pipeline grows

**Market overview**

**Supply** has surged in Las Vegas with the opening of Switch’s Las Vegas 10 data center in May which added 340,000 s.f. and 40 MW of space. Switch will continue to grow and plans to deliver Las Vegas 11 by Q2 2018. ViaWest, to be acquired by Peak 10, continues to offer space in Las Vegas at its Lone Mountain data center. In Reno, supply consists of Switch’s first building of 1.2 m.s.f. feet on its Citadel Campus which will eventually deliver roughly 7.2 m.s.f. of data center space.

**Demand** remains driven by California companies leaving the high costs and risk areas. However, drivers in demand also include volume users seeking to leverage economies of scale, competitive power pricing, and hybrid cloud architecture.

**Market trends** demonstrate a continued interest by retail clients looking for usage-based pricing models. Of its client base, Switch reports that nearly 40% are interested in small deployments that come with common retail services.

### Supply

- **Total inventory:** 2.1 m.s.f. / 157 MW
- **Total vacant:** 442,000 s.f. / 56 MW
- **Under construction:** 340,000 s.f. / 40 MW
- **Planned:** 300,000 s.f. / 40 MW

### Demand

- **Net absorption:** 19 MW

### Rental rates

- **< 250 kW:** $250 - $350/kW (+E, Retail)
- **> 250 kW:** $135 - $180/kW (+E, Wholesale)

### Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>Cents/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>9.7</td>
</tr>
<tr>
<td>2014</td>
<td>9.7</td>
</tr>
<tr>
<td>2015</td>
<td>9.5</td>
</tr>
<tr>
<td>2016</td>
<td>9.3</td>
</tr>
<tr>
<td>2017</td>
<td>9.2</td>
</tr>
</tbody>
</table>

### Data Center leverage

- **User favorable market**
- **Provider favorable market**
- **Neutral market**

### 2017 significant data center transactions

- **National Retailer**
  - ViaWest
  - Lone Mountain
  - 250 kW

- **Healthcare**
  - ViaWest
  - Lone Mountain
  - 700 kW

- **E-Commerce**
  - Switch
  - Las Vegas
  - 1 MW
Los Angeles

Demand for faster and more reliable content delivery has sparked new interest in the LA market

Market overview

Supply is still primarily controlled by CoreSite, Digital Realty, Rising Realty, and Equinix. CoreSite has been the most active in the market at its 900 N. Alameda location, while One Wilshire remains well leased. The recent announcement of the 25,000 s.f., 2.5 MW Zayo deal polished off their vacancy. One Wilshire is adding power and cooling to keep up with the demand to be in the location for connectivity.

Demand in the LA market has begun to pick up as providers see the need to be closer to clients, we continue to see activity from small users and organic growth. Moreover, Chinese telecommunications companies and cloud users are beginning to expand their presence in the market.

Market trends are fairly consistent with the general California market, where blue-chip companies and proximity plays will continue to drive demand—as will cloud companies looking to solve local market latency and connectivity needs.

Outlook for Users

• Several new large transactions have limited viable space options.
• Entertainment, media, and technology continue to be driving forces.
• Google’s expansion in LA should spur interest in the market.

Outlook for Providers

• Providers are continuing to aggressively compete for tenants.
• Competitive pricing structures still exist for credit tenants.
• Providers are offering more services, upgrades and amenities to remain competitive.

Supply

<table>
<thead>
<tr>
<th>Total inventory: 2.3 m.s.f. / 210 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total vacant: 190,000 s.f. / 18 MW</td>
</tr>
<tr>
<td>Under construction: 20,000 s.f. / 15 MW</td>
</tr>
<tr>
<td>Planned: 30,000 s.f. / 6 MW</td>
</tr>
</tbody>
</table>

Demand

<table>
<thead>
<tr>
<th>Net absorption: 2.4 MW</th>
</tr>
</thead>
</table>

Rental rates

< 250 kW: $250 - $300/kW (all in)
> 250 kW: $90 - $130/kW (+E)

Average power rate (cents/kWh)

Data Center leverage

Assets

<table>
<thead>
<tr>
<th>Google</th>
<th>CoreSite</th>
<th>1.5 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zayo</td>
<td>One Wilshire</td>
<td>2.5 MW</td>
</tr>
<tr>
<td>Telcom</td>
<td>900 N Alameda</td>
<td>400 kW</td>
</tr>
</tbody>
</table>
New Jersey

New Jersey’s data center activity – flat as the bottom of a cumulus cloud

Market overview
Supply remains limited in the market, based on today’s current absorption rates, the addition of new supply has been reserved through the first half of 2017. Most owners, if not all, will only start new deployments of space (turnkey supply) when they are within a few megawatts of remaining capacity. The M&A activity continues to re-shape the competitive landscape.

Demand remains flat, and is still being led by the financial services industry. Most of the requirements are in the 100 kW – 500 kW range which has been relatively consistent for the past 24 months. Interestingly, the resurgence of business continuity or disaster recovery requirements have resurfaced in the market after what feels like a 10 year hiatus. Facilities with “seat space” combined with data space should prevail.

Market trends Electrical rates have been hovering at historic lows for New Jersey averaging approximately 8.5 cents per kWh, which isn’t quite low enough to attract the hyper-cloud providers. 2017 is shaping up to be another year of consolidations among the major providers in the market, as we saw with CyrusOne’s purchase of Sentinel – eliminating another competitor.

Outlook for Users
• Consolidations will soon reduce the diversity of offerings.
• MW pricing has likely bottomed based on the lack of new providers.
• The cloud will continue to be a disrupter for tenants deciding their needs.

for Providers
• Providers are continuing to aggressively compete for tenants.
• Extremely aggressive pricing structures still exist for credit tenants.
• Still view this market as motive with a density of many world class companies.

Supply
Total inventory: 3.1 m.s.f / 327 MW
Total vacant: 247,000 s.f / 30 MW
Under construction: 20,000 s.f / 3 MW
Planned: 826,000 s.f / 116 MW

Demand
YTD Net absorption: 2.0 MW

Rental rates
< 250 kW: $250 - $300/kW (all in)
> 250 kW: $125 - $250/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
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<tbody>
<tr>
<td>Rates</td>
<td>8.5</td>
<td>9.0</td>
<td>9.0</td>
<td>8.5</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Data Center leverage

2017 significant data center transactions

Financial Services
Equinix, Secaucus
300 kW

Confidential
800 Cottontail, Somerset
500 kW

Broadridge Telk / DLR
Clifton
640 kW
New York City

NYC’s demand for smart buildings will drive carrier and colocation growth in the five boroughs

Market overview

Supply in NYC has been primarily retail focused to support the technology and network industries that aim to be near the carrier hotels and cloud access points. Retail supply interest sits with the national and global providers: CoreSite, Digital Realty, Telehouse, and Equinix. Hybrid providers such as Sabey, Datagryd and 1547 are positioned to capture portions of the retail and wholesale supply. Smaller local operators like Cologuard, NYI, Neutrality Properties and Vxchnge round out the supply outside of the core carrier hotel providers.

Demand in the market remains flat due to high power costs but there is continued retail activity from carrier, social media, content and media enterprises. Wholesale demand, on the other hand, has declined to a handful of strategic media and network deployments.

Market trends. Due to tepid demand, smaller and local players are feeling the pressure of developing excess shell space into office space. New Jersey having strong supply is contributing to the sub-average enterprise demand levels in NYC. NYC’s demand for fiber to more buildings, IoT, and smart building initiatives will continue the carrier demand and growth for carrier hotel colocation in the five boroughs.

Supply
Total inventory: 1.17 m.s.f / 164 MW
Total vacant: 145,000 s.f / 19 MW
Under construction: 42,000 s.f / 4 MW
Planned: 290,000 s.f / 38 MW

Demand
Net absorption: 1.1 MW

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>15.2</td>
<td>16.1</td>
<td>15.5</td>
<td>14.6</td>
<td>14.4</td>
</tr>
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</table>

Data Center leverages

<table>
<thead>
<tr>
<th>H1</th>
<th>H2</th>
<th>H1</th>
<th>H2</th>
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</thead>
<tbody>
<tr>
<td>15</td>
<td>16</td>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>

Outlook for Users

- Demand is below the yearly average, with users preferring conditions in nearby markets.
- Supply will no longer be added speculatively.
- Pay-as-you go models will increase in popularity within the market.

Outlook for Providers

- Supply has leveled out and retail rental rates will continue to be stable.
- Wholesale rates are trending down slightly with open vacancies.
- Wholesale users can leverage these trends to negotiate favorable ramp terms and flexible expansion options.

User demand by industry

- Cloud
- Technology
- Telecom
- Healthcare
- Banking & Financial Services
- Retail & E-commerce
- Entertainment & Media

Data Center Outlook  |  North America  |  H1 2017

- Financial Services
  - 32 Ave. of Americas
  - 125 kW

2017 significant data center transactions

- Technology
  - Digital Realty 1 MW

- Social Media
  - Digital Realty 200 kW
Northern California

Northern California market continues to mature as fundamentals remain steady

Market overview

Supply is being driven primarily by large providers like CoreSite, Digital Realty and Equinix, with smaller providers rounding out the market. CoreSite has been the most active via its Santa Clara campus. Vantage, recently acquired by DigitalBridge, is aggressively expanding with 24 MW of development being delivered by end of 2018.

Demand in the market is aligned with historical absorption due to high power costs, higher rents, and lower vacancy relative to nearby markets. Chinese telecom companies and cloud users are searching for lease and acquisition opportunities and we expect this to increase as additional supply opens up, driving larger deals to finish out 2017.

Market trends. Northern California continues to maintain strong fundamentals as the market matures past other secondary and tertiary markets. Longstanding tech tenants and entrenched cloud providers continue to sustain the market. Retail providers also continue to leave the market due to the growing market share of nearby cloud operators.

Supply

<table>
<thead>
<tr>
<th>Total inventory: 4.6 m.s.f. / 424 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total vacant: 167,000 s.f. / 23 MW</td>
</tr>
<tr>
<td>Under construction: 125,000 s.f. / 30 MW</td>
</tr>
<tr>
<td>Planned: 200,000 s.f. / 46 MW</td>
</tr>
</tbody>
</table>

Demand

Net absorption: 3 MW

Rental rates

- < 250 kW: $15 - $200/kW (+E)
- > 250 kW: $125 - $150/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.2</td>
<td>11.9</td>
<td>12.7</td>
<td>12.9</td>
<td>13.4</td>
</tr>
</tbody>
</table>

Outlook for Users

- New blocks of space have opened up options for users as vacancy evens out.
- Technology continues to be a driving force.
- Cloud adoption relative to retail colocation will remain a viable alternative.

Outlook for Providers

- REIT Operators less willing to provide concessions due to lower vacancy.
- Construction and occupancy costs will continue to be driven down.
- Further consolidation and M&A will be pursued.

Data Center leverage

2017 significant data center transactions

- Digital Realty Acquires DuPont Fabros San Francisco
- Digital Bridge Acquires Vantage Silicon Valley
Northern Virginia

Demand in Northern Virginia driving supply to keep pace with pent up demand from historic 2016

Market overview
Supply in Northern Virginia (NoVa) continues to grow at a historic clip, driven by its top tier status in the industry. With all six major data center REITs and the top five cloud providers actively developing in the market, and with 190 MW under construction, NoVa demand continues to drive supply. Providers are continuing to deliver larger and more flexible data centers for users, driving efficiency through scalability, speed, and cost.

Demand continues to be driven by new, tenured users and innovative developing technologies that desire to be in the market. Northern Virginia’s diverse offerings, access to global markets, and fierce competition has created user favorable conditions. Cloud providers, social media, enterprise and tech users remain main demand drivers in NoVa.

Market trends Providers are continuing to be challenged to deliver more on-site services as a key differentiator beyond IaaS. Providers are also seeking cloud hosting to allow for more hybrid colo to cloud solutions to accommodate enterprise workloads.

Outlook for Users
- Cloud providers and hyperscale tech enterprises driving demand, offering greater benefits to enterprise users as competition escalates among providers.
- New provider options to extend services and intra-region marketplace.
- Further investment in AI, mobility, autonomous tech, healthcare, and M2M.

Outlook for Providers
- Expect dynamic pricing structures for diverse users and rapid IT deployments.
- Providers will attempt to capture market demand and continue to grow market share through rapid white space deployments and new quality land holdings.

Supply
Total inventory: 12.6 m.s.f. / 853 MW
Total vacant: 492,696 s.f. / 91 MW
Under construction: 862,157 s.f. / 190 MW
Planned: 1.25 m.s.f. / 172 MW

Demand
Net absorption: 41 MW

Rental rates
< 250 kW: $140 - $160/kW (+E)
> 250 kW: $100 - $130/kW (+E)

Average power rate (cents/kWh)

Data Center leverage

2017 significant data center transactions

Cloud Firm: CyrusOne 10 MW
Technology Company: Digital Realty 4.8 MW
Cloud Firm: DuPont – ACC9 7.2 MW
Pacific Northwest

Large-scale national and global operators hedge their bets and enter key Northwest markets

Market overview
Supply in the Pacific Northwest remains steady but is expected to increase as Dupont (now Digital Realty) and OVH expand in Hillsboro. CyrusOne is also expanding in Quincy along with proposed expansions in Central Washington from Sabey and Digital Bridge.

Demand is solid in the market, though some of the large scale transactions of 2016 remain to be seen in 2017. In addition to West Coast based end users, the market is seeing Asian end user demand — primarily CDNs and web-retailers.

Market trends. We see increased M&A activity in the market, further changing the landscape considerably, as well as new players with committed resources now in the Northwest increasing demand. Major owner/user expansions in play with the hyperscale operators have also had a profound impact, and will continue to do so.

Supply
- Total inventory: 3.9 m.s.f. / 350 MW
- Total vacant: 530,000 s.f. / 54 MW
- Under construction: 20,000 s.f. / 3 MW
- Planned: 723,000 s.f. / 54 MW

Demand
- Net absorption: 16.6 MW

Rental rates
- < 250 kW: $135 - $150/kW (+E)
- > 250 kW: $115 - $145/kW (+E)

Average power rate (cents/kWh)
- 2013: 3.8 cents/kWh
- 2014: 3.9 cents/kWh
- 2015: 4.1 cents/kWh
- 2016: 4.1 cents/kWh
- 2017: 4.3 cents/kWh

Data Center leverage
- H2 15
- H1 16
- H2 16
- H1 17
- H2 17

Outlook
for Users
- Continued new product coming online in 15 months.
- Ample existing opportunities to competitively analyze.
- Multiple new ‘meet me rooms’ underway, further enhancing telecom infrastructure.

for Providers
- End user demand from California is increasing.
- There will be continued interest from Asia as well as continued expansion from the hyperscale operators in the form of shorter term colocation contracts.
- New competitors will be delivering product by Q4 2018.

User demand by industry
- Cloud: 40%
- Technology: 5%
- Telecom: 10%
- Healthcare: 30%
- Banking & Financial Services: 15%
- Retail & E-commerce: 10%
- Entertainment & Media: 5%

2017 significant data center transactions
- Cogent: 32275 32nd Ave Federal Way, WA 2.5 MW
- Cloud Operator: Sabey Data Centers 750 kW
- Submarine & Cable Tenant: ViaWest 180 kW
Interest heats up as cloud players enter Phoenix

Market overview
Supply shows signs of improvement as Aligned Data Centers commissioned space in its Phase I facility. CyrusOne also started construction on three more buildings at its Chandler campus. IO announced it will add 2 MW within its Phoenix location in 2017, and 3 MW of space will be available at Digital Realty’s E Technology Circle in Q4 2017.

Demand has been driven by increase in cloud computing and software-as-a-service (SaaS) companies, organic growth for existing tenants and enterprise migrations transitioning infrastructure and software needs to private and public clouds.

Market trends With the continued growth of cloud computing and the large scale requirements that the cloud operators will inevitably provide, Phoenix is positioned well to appeal to this user group.

Supply
- Total inventory: 1.15 m.s.f. / 145 MW
- Total vacant: 40,300 s.f. / 10 MW
- Under construction: 363,000 s.f. / 38 MW
- Planned: 312,900 s.f. / 46 MW

Demand
- Net absorption: 15.0 MW

Rental rates
- < 250 kW: $260 - $350/kW (all in, Retail)
- > 250 kW: $120 - $160/kW (+E, Wholesale)

Average power rate (cents/kWh)

Data Center leverage

2017 significant data center transactions

- Healthcare
  - Aligned
    - 250 kW
- Oracle
  - IO
    - 1.3 MW
- Financial Services
  - Aligned
    - 1.1 MW
Canada markets
Montréal

Unprecedented demand from cloud service providers drives absorption in Montréal

Market overview
Supply is being driven by a few key companies. ROOT Data Centers in Baie D’Urfé, COLO-D in Longueuil and Drummondville, Urbacon in downtown Montréal and CogecoPEER1 in Kirkland. Smaller providers such as METRO OPTIC also have capacity available in the downtown core.

Demand in the Montréal market remains extremely robust due to low power costs and cloud service providers demand. The demand shows no signs of slowing down and absorption rates remain extremely brisk.

Market trends. Cloud companies continuing to expand rapidly. Government Shared Services RFP is indicative of large organizations moving to the cloud. Renewable energy coupled with competitive power pricing from Hydro Québec make the Greater Montréal an attractive market. Large investment funds are putting money to work through data centre development and acquisitions.

Outlook for Users
• Cloud service providers continue to dominate the market.
• Some users find latency challenges from the Carrier Hotel in Montréal to 151 Front Street West in Toronto.

Outlook for Providers
• Wholesale Colocation providers continue to aggressively compete for larger tenants.
• Aggressive pricing structures exist for credit tenants with retail colocation providers.
• Providers must be flexible addressing tenants expansion needs as well as their design, space and power utilization requirements.

Supply
Total inventory: 3.8 m.s.f. / 131 MW
Total vacant: 101,300 s.f. / 44 MW
Under construction: 149,000 s.f. / 30 MW
Planned: 458,000 s.f. / 150 MW

Demand
Net absorption: 17.3 MW

Rental rates
< 250 kW: $250 - $460/kW (all in)
> 250 kW: $140 - $220/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>4.9</td>
<td>5.1</td>
<td>5.2</td>
<td>5.2</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Data Center leverage

<table>
<thead>
<tr>
<th>Quarter</th>
<th>2017 significant data center transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2</td>
<td>Cloud Provider COLO-D 12 MW</td>
</tr>
<tr>
<td>H1</td>
<td>Cloud Provider ROOT DATA CENTERS 5 MW</td>
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<tr>
<td>eStruxure Acquisition of Netelligent 5.5 MW</td>
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</tbody>
</table>

User demand by industry

- Cloud: 20%
- Technology: 5%
- Telecom: 5%
- Healthcare: 5%
- Banking & Financial Services: 5%
- Retail & E-commerce: 5%
- Entertainment & Media: 10%
Market overview
Supply is being driven by a few key companies—primarily DuPont Fabros (DFT) and Urbacon. DFT’s TOR1 facility (former Toronto Star printing press) will add new wholesale colocation space in Q4 2017. Urbacon has recently announced the addition of 10 MW in Richmond Hill. I.C.E. DATA CENTERS is also bringing new inventory to the market. Further, Ascent purchased the BlackBerry facility in Cambridge, adding another 4.8 MW to supply.

Demand in the Toronto market remains buoyant with traditional financial services and high technology businesses absorbing both space and power. Toronto’s place as the centre of business in Canada continues to provide a safe haven for mission critical infrastructure; however, the demand and supply economics certainly favour end-users.

Market trends find cloud companies looking to solve local market latency and connectivity needs. Financial services remain at the centre of the Greater Toronto Area (GTA) market.

Supply
- Total inventory: 1.3 m.s.f / 193 MW
- Total vacant: 332,060 s.f / 70 MW
- Under construction: 321,000 s.f / 62 MW
- Planned: 296,100 s.f / 156 MW

Demand
- Net absorption: 14.3 MW

Rental rates
- < 250 kW: $200 - $700/kW (all in)
- > 250 kW: $150 - $190/kW (+E)

Average power rate (cents/kWh)

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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<tr>
<td>Rate</td>
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Data Center leverage

<table>
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<th>Year</th>
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<th>H1</th>
<th>H2</th>
<th>H1</th>
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<td>16</td>
<td>16</td>
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</tbody>
</table>

2017 significant data center transactions
- DFT TOR1 Property Acquisition 46 MW
- Ascent TOR1 Property Acquisition (x2) 4.8 MW
- Cloud Service Provider Urbacon 5 MW

Outlook for Users
- Financial services, entertainment, media, and tech continue to be driving forces
- Tenants are enjoying a competitive marketplace, resulting in some price compression
- Users flock to GTA for low latency, high connectivity and access to market

Outlook for Providers
- Due to strong competition, providers need to be flexible in offerings and approach
- Price compression being felt due to new inventory and pressures from other markets
- New wholesale colocation options represent large, experienced U.S players with deep pockets causing further price compression even amongst the retail colocation market.

User demand by industry
- Cloud 20%
- Technology 20%
- Telecom 20%
- Healthcare 10%
- Banking & Financial Services 20%
- Retail & E-commerce 5%
- Entertainment & Media 5%
Western Canada

Activity from U.S. and Chinese hyperscale operators circle Western Canada

Market overview
Supply is high in Calgary, yet low in Vancouver. Calgary is facing a struggling local economy as well as minimal incentives being offered to users – no new projects are expected as operators work to fill vacancies within existing portfolios. Conversely, supply is low in Vancouver with every operator at or near capacity. Yet, in a market performing extremely well, only one expansion is anticipated due to the high costs of building.

Demand for both Calgary and Vancouver is slower than 2016 for multiple reasons but expected to pick up as the big six cloud operators and international colocation operators investigate Western Canada. Also, Calgary is seeing typical transaction sizes significantly lower than in 2016, with the requirements in the market consisting of 60 kW or below.

Market trends. Expect interest to stay consistent until significant rent reductions and other concessions emerge. Initial POPs into Western Canada with primarily US based hyperscale operators will continue to trickle in to satisfy Canadian customers.

Outlook
for Users
• Still no significant downward pressure in rents
• Minimal opportunities to consider over 250 kW

for Providers
• Few large deployment requirements will emerge thru the remainder of 2016
• New provider entrants to the market via M&A may shake up the notoriously high pricing in Western Canada (if they enter the Canadian markets at all)
• New telecom requirements will emerge as the grid for Canada is enhanced.

Supply
Total inventory: 84 MW  1,050,000
Total vacant: 120,000 s.f. / 10.65 MW
Under construction: 20,000 s.f. / 3 MW
Planned: 65,000 s.f. / 4 MW

Demand
Net absorption: 3.5 MW

Rental rates
< 250 kW: $400 - 500/kW (all-in)
> 250 kW: $380 - 400/kW (all-in)

Average power rate (cents/kWh)

<table>
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Data Center leverage

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<th>Quarter</th>
<th>2017 significant data center transactions</th>
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<tr>
<td>H2</td>
<td>Confidential Tenant Rogers Airdrie 100 kW</td>
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<tr>
<td>H1</td>
<td>Confidential Tenant Q9 Calgary 110 kW</td>
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<tr>
<td>H2</td>
<td>Financial Tenant Shaw Calgary 170 kW</td>
</tr>
<tr>
<td>H1</td>
<td>Confidential Tenant Q9 Calgary 110 kW</td>
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</tbody>
</table>
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With the expertise of having managed 1110 megawatts of critical facilities transactions, our team assists companies with total site selection (from greenfield to colocation to cloud) utilizing best in class due diligence, in-depth TCO analysis and comparisons, risk and infrastructure assessments, project development services, migration consulting, contract and SLA negotiations, and budget preparations. Our Capital Markets group has deep experience in the data center industry from investment property sales to debt financing and our critical facilities management team oversees 92 million square feet of critical environments. We understand the technical elements that are crucial to your facility in terms of power, cooling, fiber, latency, utilities, redundancy, taxes, construction, public incentives and security. JLL’s Data Center Solutions team will help you determine the best IT and data center strategy to meet your business objectives.

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