IRON MOUNTAIN®
DATA CENTERS

Infrastructure Planning Report

North America — Northern Virginia

Contents

Iron Mountain Data Centers (IMDC) has compiled this Infrastructure Planner to give you a balanced overview of key colocation markets - their strengths and weaknesses, and the latest issues and opportunities.

2020 to 2030

North America colocation forecast **CAGR 10.9%**

NA MARKET VALUE by 2030 **= $50BN**

40% of total colo spend in 2022 **= $20 BN**

North American Infrastructure

North America is the highest revenue contributor to the $50 BN+ global data center colocation market, accounting for around 40% of demand. The North American market is expected to exceed the current global value of $50 BN by 2030, with a CAGR of 10.9%.

The U.S. is the key force behind North American growth. The bulk of data center infrastructure is located in a number of key strategically-located hotspots - Northern Virginia; Dallas/Fort Worth; Silicon Valley; Chicago; Phoenix; New York Tri-State; and Atlanta. In 2022 data center power capacity in these seven regions alone raced towards the 4,000 MW mark. Costs vary considerably across the regions, with Silicon Valley and Northern Virginia representing the high and low price points respectively.

Key Drivers

The generative AI boom, digital transformation, the growing adoption of multi-cloud, and network upgrades to support 5G are critical drivers of this growth, as well as the rapid expansion of hyper-scalers. User requirements are growing in both size and number while power and supply chain constraints are slowing growth, and prices are rising fast as a result (2022: +14.5%).

On the wholesale/hyperscale side, major deals of 60 MW and above are becoming common. As demand accelerates, space availability is becoming tighter and pre-leasing is becoming more widespread to avoid potential capacity bottlenecks down the line. As a result, vacancy rates in the primary markets dropped to a record low of 3.2% in H2 2022.

Developments in Key North American Markets

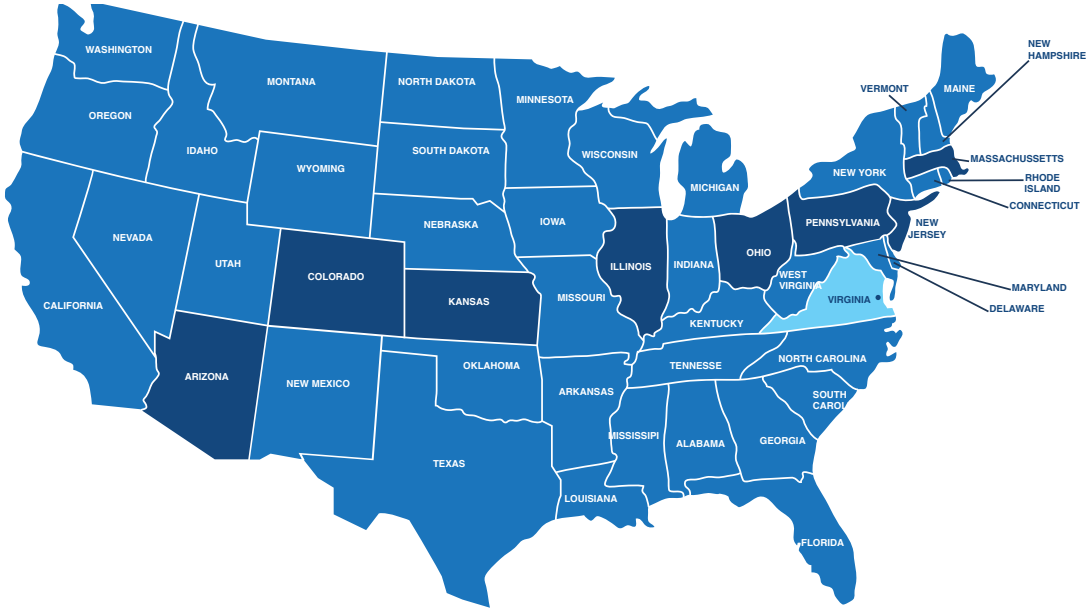
Market	Inventory (MW)	Y-o-Y Change (MW)	Available MW/Vacancy Rate	Y-o-Y Change* (bps)	2022 Net Absorption (MW)	Y-o-Y Change (MW)	Rental Rates (kW/mo)**
Northern Virginia	▲ 2,060.1	371.5	20.1 / 0.98%	▲ -408	436.9	▲ 133.6	$100-$140
Dallas/ Ft. Worth	▲ 392.3	23.0	23.8 / 6.1%	▲ -613	44.3	▲ 15.7	$120-$160
Silicon Valley	▲ 379.6	66.0	8.6 / 2.3%	▼ 71	62.4	▲ 39.1	$155-$250
Chicago	▲ 342.2	32.7	21.1 / 6.2%	▲ -553	48.0	▲ 20.6	$115-$125
Phoenix	▲ 324.5	37.5	27.5 / 8.5%	▲ -346	44.3	▲ 14.5	$120-$140
New York Tri-State	▲ 177.5	16.9	13.9 / 7.8%	▲ -156	18.1	▲ 7.5	$125-$135
Atlanta	▲ 252.5	23.0	9.1 / 3.6%	▲ -472	33.0	▼ -37.4	$115-$130

*Vacancy Y-o-Y changes are calculated by comparing the difference between H2 2022 and H2 2021.
**Rental rates are quoted asking rates for 250+ kW at N+1/Tier III requirements.
Source: CBRE Research, CBRE Data Center Solutions, H2 2022.

The Northern Virginia Market

The Northern Virginia data center market stands head and shoulders above every other data center market in the world. In fact, with over 2000 MW of power deployed and around 12 million square feet of multi-tenant space, Northern Virginia now provides more operational data center capacity than the next six primary North American markets combined.

A lot of this growth has taken place recently, with capacity doubling between 2018 and 2021 and unprecedented levels of construction since then. In 2022, high demand and supply and power constraints drove vacancy rates in the region to a record low of 0.98%. Take-up in 2022 also set a new record of 436.9 MW. As of end 2022 there was over 800 MW of data center space under construction.



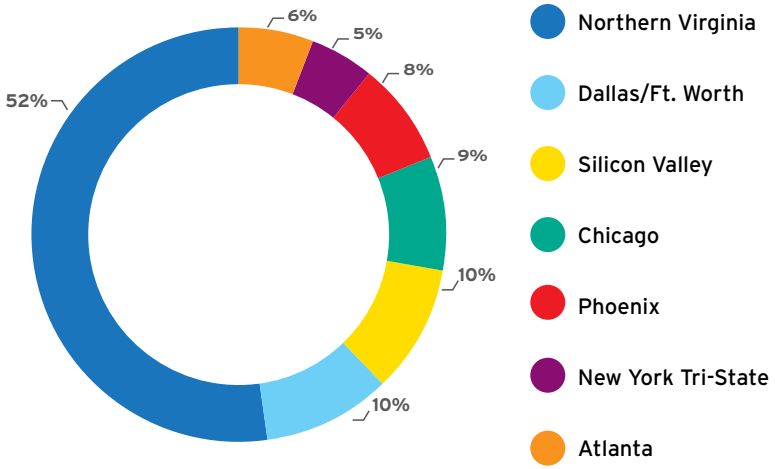
Key Drivers

- Connectivity: The world's densest intersection of fiber networks and data centers
- Power: power pricing is very competitive compared to other North American markets
- Hyperscalers: around 20% of the world's hyperscale facilities are here.
- Competition: the world's widest selection of colocation and cloud offerings
- Location: Low-latency access to the north-east and strong national and transatlantic connections
- Safety: Low natural disaster risks except the occasional tail-ends of hurricanes
- Economy: thriving state economy which includes 19 Fortune 500 companies and 70+ firms with over $500M in revenue
- Incentives: Recognising the major economic dividends the sector brings, Virginia also offers data center operators and their customers strong incentives to colocate here.

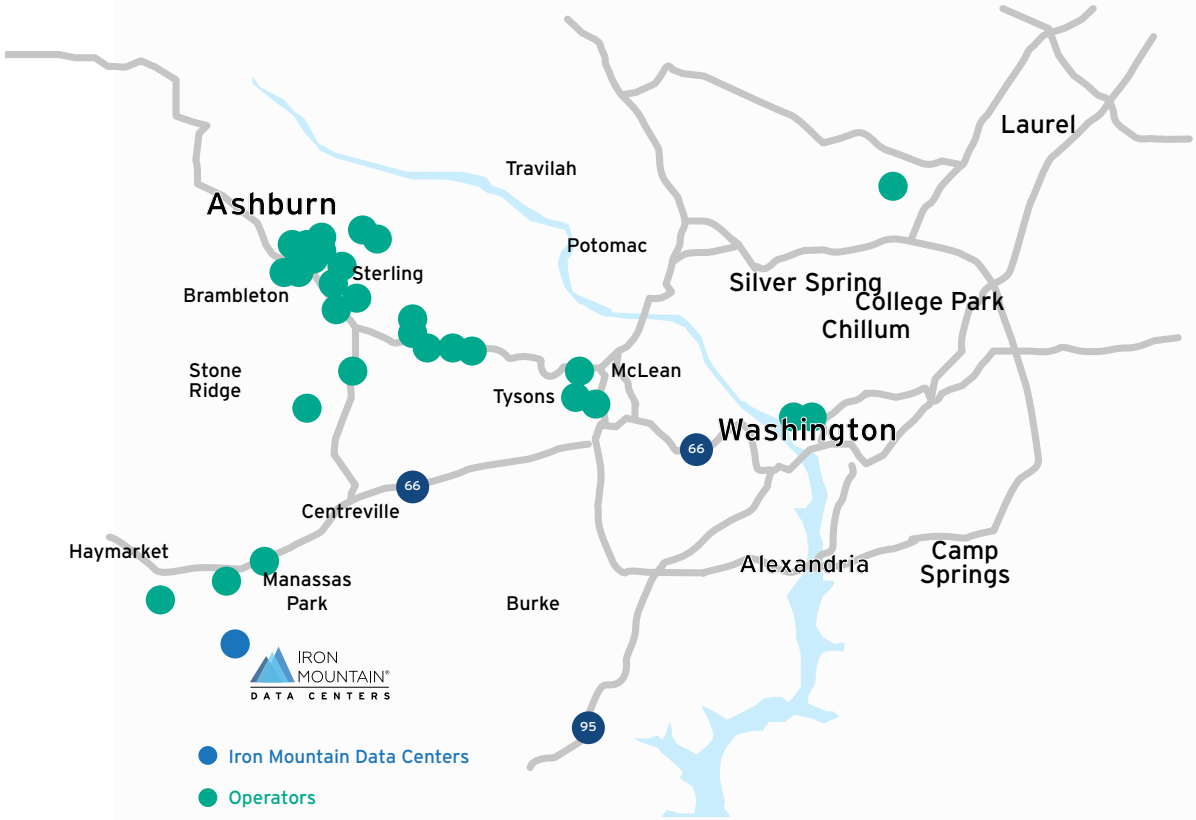
Geography

While there are data centers in the south and west of Virginia - mainly Greater Richmond and Hampton Roads - the overwhelming majority (around 275 of 300 facilities) are in Northern Virginia. Key market zones here are in the Counties of Loudoun, Prince William, Fairfax, and Fauquier. The highest concentrations are found in Loudoun (Ashburn and Sterling) and Prince William (Manassas). Ashburn, where one of the Internet's first shared Network Access Points was established, now has such a high concentration of facilities that it is known as 'Data Center Alley'.

Operational Data Center Capacity



Due to its many attractions and incentives and the network effect, Northern Virginia now provides more operational data center capacity than the next six primary markets combined
Source: CBRE Data Center Solutions



Issues & Opportunities

Both issues and opportunities in Northern Virginia are related to the phenomenal level of infrastructure growth, which brings huge benefits and at the same time has a wide range of challenges.

Sector Contribution

The data center industry has quickly become a key part of the Virginian economy. According to a 2022 study by the Northern Virginia Technology Council, it brings in almost $1.2 billion in tax revenue for Virginia annually, of which $1 billion goes to local municipalities and $174 million to the state. The sector accounts for over half of all new investment and sustains higher average salaries and skills levels.

Incentives

Some of this money goes back to the industry in the form of tax breaks and these have been extremely effective accelerators of growth. Virginia was the first state to offer exemption from retail sales and use tax for certain computer equipment purchased by data centers. In addition, local business property tax rates on computer-and-related equipment for data centers have been reduced in several counties.

Bumps In The Road

While the concentration of data centers in the area has generated great prosperity and valuable tax revenues, there are related growing pains. There have been community campaigns against certain develop ment projects and resistance to the siting of new facilities near residential, agricultural or historic areas. Partly as a result of this, regulations are now becoming stricter. In Loudon County, for instance, the permit and design approval process has become more rigorous and new builds are now restricted to dedicated zones. While local authorities are working hard to process planning applications quickly, this has the potential to slow future data center delivery.

Sustainability

The scale of building activities is having a major impact on the communities and natural environment. Sustainable planning, design and operation standards are now being enforced more actively by local authorities. At the same time, alternative sources of primary and backup power are becoming more common in order to take strain off Dominion Energy, the main power provider, and to reduce carbon emissions.

Power & Interconnection

Power in Northern Virginia has traditionally been cheap and plentiful, but the scale of growth and the climate crisis are putting pressure on both the power and data center providers to innovate.

Costs & Constraints

Power costs in the region are about 25% lower per kilowatt-hour than the United States average, a saving which stands out compared to other East Coast markets. Dominion Energy is the primary utility monopoly in Virginia, but the sector has adapted fast to meet data center demand, with a wide range of new providers/resellers. However, due to the extremely high demand levels, less power will be available for new developments over the next few years until new supply comes online in 2026.

Renewables

Renewable power has been slow to develop in the region, and still represents only 7% of the energy mix. However, Dominion has increased solar capacity by over 630% since 2015 with nearly 895 megawatts (MW) in operation or under development. Wind generation is also in the pipeline with the construction of the largest offshore wind farm on the East Coast off the coast of Virginia, with 2,600 MW of capacity. Alternative low-carbon supplies are also being actively sought by data center owners such as Google's new 500MW agreement with AES which will support their 24/7 carbon-free power pledge.

Connectivity

Northern Virginia sits on the world's densest aggregation of high-capacity backbone cables. The Ashburn interconnection hub grew out of the MAE East Network Access Point (NAP) and Internet Exchange point, one of four key NAPs established in the USA in the 1990s. Fiber-optic networks giving access to this exchange point are exceptionally dense in Ashburn, Sterling, and Manassas.

Subsea cables such as BRUSA (to Brazil), Dunant (to France), and MAREA (to Spain) land at Virginia Beach. New cables are still being laid, such as Confluence-1 (East Coast USA) and South Atlantic Express (SAex; to South Africa).

Latency

The market offers very low-latency reach to Northern and Eastern metros with 6 ms to New Jersey, or 13 ms to Boston. To the west it is 30 ms to Denver and 35 ms to Dallas. Transatlantic latency to London is 74 ms.

Undersea Cable Map?

Iron Mountain Data Centers In Northern Virginia

IMDC owns and operates two data centers on a fast-growing 83-acre interconnected campus in Manassas, Prince William County, with room for two further facilities. Over time we plan to provide over 1,000,000 ft2 of highly efficient sustainable colocation space here for enterprises, federal agencies, service providers and hyperscale clouds.

- Every data center is redundantly connected to the rest of the campus to optimize ecosystem access and choice for our customers.
- There is on-site access to a wide range of service providers, metro access to all the major clouds, 17 in-house carriers and a range of SD WAN providers.
- Our customers here can take advantage of better tax incentives and lower power costs than in nearby Ashburn
- All of our data centers are operated to the highest third-party standards of compliance and run on 100% renewable power
- Offices and conference rooms are provided as standard.
- Design PUE for each data center is between 1.2 and 1.3 for optimal energy efficiency.

VA-1

Completed in 2017, our VA-1 data center has 168,000 ft2 of space and 12.4 MW of total power capacity.

VA-2

Completed in 2019, VA-2 has 221,500 ft2 of space and 36 MW of total power capacity.

VA-3

With its first build-out phase scheduled for completion end 2023, VA-3 will have 389,649 ft2 of space and 44 MW of total power

About Iron Mountain Data Centers

Iron Mountain Data Centers operates a global colocation platform that enables customers to build tailored, sustainable, carrier and cloud-neutral data solutions. As a proud part of Iron Mountain Inc., a world leader in the secure management of data and assets trusted by 95% of the Fortune 1000, we are uniquely positioned to protect, connect and activate high-value customer data. We lead the data center industry in highly regulated compliance, environmental sustainability, physical security and business continuity. We collaborate with our 1,300+ customers in order to build and support their long-term digital transformations across our global footprint, which spans three continents.
IRONMOUNTAIN.COM/DATA-CENTERS

To discuss your plans and requirements please contact us on:

US: +1 833 476 2656
NL: +31 800 272 4433
UK: +44 844 417 8379
DE: +49 800 408 0000

Email: datacenters@ironmountain.com

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