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Constructing a Data Center: 2023 Update



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Construction

Although there is a recent trend of employees returning to the office on a more regular basis, continued reliance on and demand for data centers that help support remote and hybrid work only appear to be increasing. For example: [Gartner estimates](#) cloud services will grow at least 20% throughout 2023 to a total spend of almost \$600 billion. In our [previous article regarding data center construction](#), we outlined some of the key construction and legal issues to consider in the planning and constructing of your data center. In this update, we will discuss new trends and considerations for both new and existing data center projects.

Artificial Intelligence

As is true with most industries, machine learning programs and other artificial intelligence (AI) platforms are paving the way for a more automated future. Although AI is relatively new to many fields, and many are still racing to develop and understand how, and when, it can be used most efficiently, it has the potential to impact data centers as well. As we previously discussed, data centers consume massive amounts of power and typically require powerful and expensive cooling systems to maintain operating temperatures within the facility. AI may be able to aid with monitoring facility infrastructure, assist with providing capacity needs and forecasts, and lower operating costs – all of which can be significant depending on the size of the facility.

Additionally, maintenance issues can be confronted early to reduce any significant downtime for equipment malfunctions or failures. Finally, AI has the potential to direct consumer requirements to the most appropriate servers to help reduce latency and improve system performance. Any data center operator should consider whether the inclusion of advanced AI platforms in the planning of the data center would be both available and practical.

Remote Monitoring

Similarly, as AI increasingly becomes more prevalent, so does the need for automation. First, depending on the available workforce in the locale of your facility, automation of your facility may become more of a necessity than an option.

The ability to use automation in place of humans is often more of a necessity than a luxury given high employment rates, especially in those rural or exurban areas where data centers are often located. Monitoring also comes into play with equipment functionality as well. Having historical data at your disposal can help guide you in assessing future power consumption needs, and an understanding of trends can aid in keeping your equipment running longer.

Additionally, real time data pertaining to your equipment status can enable you to make quicker decisions pertaining to overall operation and anticipated maintenance issues. By effectively monitoring your facility's operation, you will reduce the possibility of having stranded capacity as well (i.e., unusable capacity resulting from system flaws, issues with system layout, cooling/heating, etc.).

Edge Computing

With the increasing need of businesses to access the cloud, a data center's location in relation to where its users are is key. Edge computing is a phrase that has been used in the industry to describe processing that occurs at the "edge" of the network itself. This potentially impacts data center design by requiring data centers to be closer to their actual users.

While many users are located in dense urban areas, placing a large expansive data center in such an area is highly unlikely. As a result, some are turning to more, but smaller, data centers that are located closer to their end users to help provide lower latencies among other things. Smaller footprints can impact not only equipment layout but cooling and maintenance needs as well.

Sustainable Designs

Likewise, sustainability is yet another factor to consider when looking at data center design or modification. Although AI and remote monitoring features coupled with efficient systems can help reduce overall consumption, companies are continuing to look to ways to reduce overall environmental impacts and energy consumption. This is not surprising since [it is estimated](#) that data centers consume up to 3% of global electricity consumption. Reducing overall construction materials through unique design processes can also aid in limiting overall carbon footprints. Modular designs and pre-assembled features that are manufactured offsite and connected at the project location can also reduce overall cost and timelines with the construction of the facility itself.

Location and Site Procurement: Unprecedented Weather Conditions

With the unprecedented climate impacts we have seen across the United States, Canada and Europe in recent months, it is important to reiterate that location and site procurement is of utmost importance. Flooding, droughts, wildfires and heatwaves, among others, not only can impact the operation of your facility, but also how efficiently it will perform. Location selection can be crucial for a variety of considerations:

- Is your facility designed in an area prone to flooding? If so, will the design be capable to withstand any resulting damage if impacted by high water levels?
- How will potential droughts impact available water supplies and, in turn, cooling capabilities?
- How will increased ambient temperatures affect your system's cooling capabilities and how will these increased temperature levels impact the operation of your equipment within the facility itself?
- What backup systems are in place in the event your facility may be impacted by flooding or fires and, given your location to surrounding resources, how long could it take to have your facility back up and running?

Given the era in which we find ourselves, these climate trends have to be understood and accounted for in site location.

Conclusion

As with any platform connected to internet technology and cloud computing, the landscape is constantly evolving, and staying abreast of such advances is key to ensure your data center is not only utilizing the most up-to-date features, but also being efficiently monitored so as to keep pace with needs while limiting any prolonged downtime.

In addition to operating a successful data center project, considerations must also be given during the preliminary phases of pre-construction and with the construction project itself. As always, identifying and limiting potential risks, equipment malfunction, delays and contractor issues hinge on establishing, monitoring and understanding contract requirements, along with a complete understanding of the project schedule.

For more information or to discuss any of these topics, please contact a member of Gould & Ratner's [Construction Practice](#).