Hyperscale - AisleFrame Origin Story

What is and who are Hyperscale? Moore's law states that data consumption will double every two years based on semiconductor transistor technology advancements and the law does not even take into account future, not yet discovered technologies. This data traffic is primarily hosted and contained within large public clouds and the arms race to build these cloud environments have spawned the "hyperscale" industry. Large providers locate geographical regions with a combination of relatively cheap available land, relatively cheap available power, favorable ambient environmental conditions, and a local government willing to reduce the costs of doing business and they race to buy up as much land as possible to build massive facilities to support our growing appetite for data. While the term hyperscale was coined for facilities that could scale rapidly and easily from a small amount of data traffic to an exponentially larger amount of traffic, it is now being used to describe the size of the facility and speed at which they are attempting to be built.

PROBLEM

Data center infrastructure vendors who produce, manage, and build traditional data center infrastructure components cannot keep up with the hyperscale data center industries pace of play. The tech firms that are contracting out these hyperscale facilities are not only some of the largest in the world, they are in fact some of the of the largest in history. To follow the age-old adage that "necessity breeds innovation" the necessity for these companies to go faster to support data consumption that is already breaking existing networks has spawned innovation that contradicts typical data center construction methodology.

Subzero's position as the creator and global leader in containment and data center middle infrastructure allows us to have relationships with many of these organizations that are looking to build at the hyperscale level. Because of this position, we have been partners in their search for innovation, and based on the scale of their deployments we began to target a few simple problems that could be solved and could have a huge impact when extrapolated by the scale at which they are building.

How does a company build a hyperscale data center faster?

1. Use an existing building that was not previously designated as a critical facility.
Traditionally it was unheard of to take an existing non-critical facility and create a hyperscale data center out of it. Modifying the building to utilize traditional infrastructure, such as raised floors and structural ceilings, would be extremely costly and time prohibitive. This caused almost all hyperscale data centers to be greenfield sites subjecting these projects to the added time it takes to prepare the site, pour foundations, deal with inclement weather, and add significant site utilities. Having the ability to walk into an existing structure with 4-walls, a roof, and a slab and "insert" the middle infrastructure necessary to create a hyperscale data center environment would exponentially reduce the time and capital required to build.

2. Limit the number of vendors.
Very few, if any vendors, could operate at a level of excellence sufficient enough to satiate hyperscale data center users. Building hyperscale facilities on a global scale using traditional data center construction methodology heavily dilutes the level of competency and quality experienced from build to build because very few vendors are able to fund the labor requirements necessary to perform work on multiple projects simultaneously. Cutting the number of vendors, by cutting the amount of infrastructure needed through innovation, reduces the amount of front-end construction requirements, re-strengthens the skilled labor pool, and allows for a single vendor to focus on innovative middle infrastructure that is easily replicable from site to site and region to region.

3. If a new building must be built, then simplify non-building supporting infrastructure.

It is not always easy or realistic to find an existing building to turn into a hyperscale data center. When a greenfield building is a must, then a quick way to reduce construction time and capital expenditure is to simplify the infrastructure that is not needed to support the actual building shell. Traditional data center construction methods require significant slab work to accommodate raised floor environments and structural ceilings mandate significant strengthening to the building's structural support systems. Simplification through innovation could allow for simplistic shell buildings to be built with productized infrastructure replacing traditional construction methodology.

4. Create smaller, simplistic, and easily replicable building blocks to stand up faster.

When utilizing traditional data center construction an entire data hall's middle infrastructure would have to be built out before a single rack could be supported. This created a CapEx heavy environment that added extreme pressure to hyperscale project construction timelines and budgets. The ability to break down and simplify a middle infrastructure solution into a "pod" that could be inserted into a facility on an as-needed basis, would allow for a much lower capital expenditure to rack ratio. Then another of these smaller, simpler middle infrastructure "pods" could be stood up at later date when needed with minimal or no impact to the previously installed "pod."

SOLUTION

Their necessity and our innovation produced AisleFrame. AisleFrame is a productized, ground-supported infrastructure solution that replaces the need for raised floors and structural ceilings in many critical facility environments.

- AisleFrame can adapt to almost any existing environment and provide the middle infrastructure necessary to convert an existing space to a critical facility.

- AisleFrame provides the infrastructure support necessary to replace raised floors and structural ceilings, as well as the added flatwork vendors for vertical concrete wall construction and skilled structural steel erectors needed for added steel infrastructure to support these systems. A single vendor can erect identical middle infrastructure pods insuring replicable outcomes in quality and productivity.

- AisleFrame creates a middle infrastructure solution that reduces the complexity of a greenfield construction project. Adding to the previously solved problem, not only can we limit the number of vendors needed for construction through the simplification of the construction, we can also speed up the project delivery and decrease the construction budget. AisleFrame is completely ground supported and a simple flat slab is all that is needed. It also contains the structural components necessary to limit the necessity of a structural ceiling, thus eliminating the need for copious amounts of added steel to support the hanging of the ceiling.

- AisleFrame's innovation is also felt in how it gives the end user the ability to deploy in small, replicable pods. These pods limit the amount of upfront capital spent on building out entire data halls of infrastructure by providing all of the infrastructure necessary at the pod level, while allowing for almost limitless scaling should the situation require it.

SUMMARY

The necessity around the hyperscale data center industry's need to grow bigger, faster, and more diverse in an attempt to keep up with, and even potentially get out in front of, the rapid expansion in data consumption has created the demand for an endlessly adaptable middle infrastructure solution that removes many of the issues mentioned in this document. Subzero's AisleFrame solution single handedly provides these types of customers the ability to re-formulate the way they think about data center construction. Using the innovation driven by the hyperscale industry we can now offer these same benefits to the entire data center industry.