Data centre design and build is evolving – here's why:

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With new data centre capacity needed at an ever-accelerating pace, rushing the delivery of a new facility significantly increases risk. Find out how off-site construction, integration and testing prior to final on site commissioning can deliver a fully customised data centre, on budget, with greatly reduced risk and in a fraction of the time required for a traditionally constructed facility.

During the past decade the data centre market has grown significantly. The pace of that growth has varied in different parts of the world – faster in the developed nations (with the establishment of hyperscale enterprise and colocation data centres) than in emerging economies – but there is no doubt that it is accelerating everywhere.

This, of course, is not surprising. Businesses have become extremely data dependant. They need data for myriad activities, including explaining the behaviour of their customers, predicting market trajectories, securing the processes for revenue management, ensuring compliance and detecting irregularities and fraud. Our national economies are increasingly digitally dependent. Governments and regulators depend on data for more accurate insights in to the societies they serve. And consumers and businesses in general generate huge amounts of data in the ever more connected world in which they live and operate.

The deployment of hyperscale data centres has typically been in a relatively small number of central locations. However, this has to change. The development of new IoT applications; the caching of content to reduce latency for data users; the emergence of technologies that require processing power to be available closer to where the data is generated or needed (such as autonomous vehicles); and the expansion of mobile telecom networks into previously unconnected areas of the world is all fuelling a boom in the deployment of data centres in more geographically dispersed locations.

Data and data handling is increasingly moving to the edge of the networks and closer to the users. This does not mean that the growth of data centres in central locations will decrease. On the contrary, it will continue to grow at a good pace. It will be outstripped though by the growth of new smaller data centres in the range of 0.5-5MW. In some smaller or less-developed countries they'll be core facilities, while in developed economies they'll be known as edge data centres. The naming is somewhat irrelevant though – the result is that the size of the total data centre market will expand very fast.

But can they be safely built as fast as they're needed?

Every new building project has its challenges, especially data centres. And anyone who has built a data centre will be painfully aware of the risks involved. This is borne of the necessary integration of the building itself with a vast array of sensitive high-tech equipment: power systems, cooling systems, security systems, air flow structures, fire detection and fighting systems, facility management systems, etc. They all need to be dimensioned and installed in such a way as to interoperate optimally. Systems and space need to be tightly integrated into a highly tuned machine.

And in order to achieve this, there needs to be a high degree of coordination between civil works builders, equipment vendors, system integrators and general contractors. This, of course, can present significant challenges and the risks of running over budget and over time are high. So if data centre capacity is to grow as fast as we need it to, it's time to consign traditional construction processes to history and rethink the way we should be deploying data centres going forward. The good news is there is a solution...

Off-site prefabrication and pre-integration for increased speed and reduced risk

There are four main construction methodologies for building new data centres:

- It can be done the traditional way, constructing a new brick and mortar building at the location, followed by on-site installation and integration of the technical equipment. As described above, the risks inherent in a project managed this serial way should not be acceptable.
- 2 A modular building can be built remotely and then put together at the site once the foundations have been laid. However, while some construction time might be saved with this approach, the risks associated with shipping, installing and integrating all the technical equipment on-site, mean this option is not much of an improvement.
- 3 Taking the prefabricated concept a step further, it's possible to build single-function modular blocks in a factory (cooling modules, power modules, white space modules, etc.) and then ship them to the site for installation. The potential disadvantage is that these single-function blocks are predefined and therefore the overall datacentre solution may not be fully adapted to the customer's exact needs. It is certainly a better solution than the first two options above though, as this approach allows for more pre-installation and pre-integration in the factory.
- 4 Many new data centres will still undoubtedly be built using the three methodologies described above. However, it's clear that the segment promising the greatest growth will be entire bespoke data centre buildings that are completely prefabricated, with all technical equipment and systems pre-installed and functionally-tested prior to shipping to site, where they will simply be put together and commissioned. The advantage of this approach is that with most of the installation done in a clean-room factory environment, it's possible to gain a high degree of control over vendor coordination, risk reduction, quality of installation and integration, cost management and on-time delivery.

I believe that this industrialisation of the data centre building process in a specialised offsite factory environment is not only the logical and sensible way to build new data centres, it is the only way that new edge data centre facilities will be able to be delivered in pace with the anticipated demand.

eCentre: Industrialised process with bespoke design

This off-site industrialization of data centre construction, installation and integration is not limiting in any way. On the contrary, it allows businesses to adapt and grow faster. Such

data centres are fully adaptable to the requirements of the data centre operator, they scale better with business growth and costs of expansion are predictable.

Combining bespoke design with this industrialized process – as Flexenclosure's eCentre does – allows a facility to be created according to specific individual customer requirements and can include Uptime Institute tier certification – for both design and build. In fact, there is no limitation to what can be achieved, which allows the data centre to be fully aligned with business goals and to secure the shortest possible delivery time, lowest possible costs, highest possible quality and best possible scalability.

Most importantly of all, this industrialisation of the data centre build process significantly reduces risk – the critical shared requirement of both data centre operators and their customers. The future of reliable data centre construction is secure.