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## Tier1Research

### GreenEdge Data in Melbourne brings us the 'colo-tainer'

Datacenters and Colocation

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We've seen server manufacturers push containers, some colocation and wholesale datacenter providers position their facilities as 'container friendly' and even a trailer park-style container provider, but up until recently we haven't really seen anyone put the two together. **GreenEdge Data**, however, based in Melbourne, Australia, is aiming to change that with its 2,000-square-meter (roughly 21,500 square feet) datacenter park in Melbourne (and a demonstration location in Brisbane) that will couple colocation and datacenter containers together.

The containers house cooling and electrical distribution for five (for the 20' container) or 14 (for the 40' container) standard, vendor-neutral, 42U racks with a power capacity of between 7kW and 15kW per rack. T1R thinks this is a lot more palatable in terms of power density, and we're not talking about cramming 30 or 40kW per rack into a small container. Being vendor neutral, it is closer to where we expect the modular datacenter of tomorrow actually being.

What are the external connections? GreenEdge indicates that it has hookups for utility power, 'on-site' power, backup (generator) power and data. The park will apparently be outfitted with power-producing gas turbines supplying power back to the local grid in normal operation. In the event of a utility loss, the on-site gas turbines will pick up the load and if they fail, backup generators will take over.

Worth noting is the omission of water seen in some other containerized datacenters (SGI's ICE Cube, for example). GreenEdge indicated that the cooling used 'indirect free air', without providing clarification as to what that actually entails. T1R thinks the cooling is likely to be a combination of DX cooling and an air-to-air heat exchanger similar to a car's intercooler. How much cooling are we talking? GreenEdge shared that the container has the capacity to cool approximately 70kW.

On the UPS front, the container also has four 40kVA UPSs in parallel, though the company did not reveal the manufacturer of these UPSs, nor did it disclose what UPS topology was implemented (see section below for explanation). Assuming N+1 redundancy and a 0.8 power factor, this equates to approximately 19.2kW of UPS power available per rack. VESDA fire protection and alarms are also installed, as well as security access.

#### T1R take

We think this is an interesting combination and implementation of containers and colocation. Back-end power distribution infrastructure will be required (switchgear, generators, etc.), but the fact that each 'chunk' is deployed in 5- or 14-rack increments is interesting. We don't think this will appeal to customers with large, wholesale requirements, but on the smaller side, it just might have some legs. GreenEdge will, of course, have to work out the non-trivial details of total site power provisioning and communication carriers, but initial indications seem to be at least somewhat positive. This, along with the modularization of the other back-end elements of the datacenter park to support these containers, would make for a very powerful combination. T1R thinks GreenEdge and this design concept are worth keeping an eye on.

#### UPS topologies

For the purposes of this discussion, there are two types of UPSs: double-conversion and line-interactive.

- Double-conversion UPSs do just as the name would indicate: they take incoming AC, convert it to DC, and then convert this DC back to AC power on the output. Why do this conversion? Double-conversion offers complete isolation, generating the signal independent of incoming power. Double-conversion UPSs are able to perform frequency conversion (e.g., 50Hz in, 60Hz out) as well as compensate for what are referred to as 'non-linear' loads, which can cause harmonics that might damage sensitive electronic equipment.
- Line-interactive UPSs, during normal operation, in essence act as isolation transformers and don't provide constant AC/DC/AC conversion. Line-interactive UPSs are more passive in nature and 'activate' only when something goes wrong (e.g., out-of-tolerance input, power surges, power dips, etc.).

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