Life with(in) a modular datacenter

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A simple enough idea, but do they deliver? What are they like to use in reality?

Use case: Sun MD S20 aka "Project Blackbox" Site: UC Berkeley, CS Building Backyard
Initial Donation Talks with Sun (now Oracle) Q4 2006, Delivery Q3 2008, Commissioning Q4 2008
Currently hosting portions of research testbeds and clusters for three different projects/groups.

2 yrs from donate to commission

* Site selection/approval took time
  - Campus Committees, NRC had a say
* Delivery/Installation had much fanfare
* Commissioning took about 6 months
  - $150,000 cost for installation/etc

What challenges come with it?

* Service Access x Density = Constant
  - Very Tight Fit - 30" max depth in rack
  - Fully loaded racks weighs 1/2 ton!
* External shelter is useful - otherwise:
  - No access during inclement weather
  - Two person rule after business hours
  - Lots of padlocks - 30 min to get inside
* Other little gotchas
  - Only enough power for 1/2 the circuits
  - Our chilled water supply was **too** cold!

What benefits are there?

* It's high quality Datacenter Space
  - Well provisioned for Power/AC/Network
  - 15+ years younger than our current DCs
* Mere months to bring it online!
  - Most time was spent on site selection
  - DC Refurb would have taken 1-2 years
* Just far enough away to encourage us to 'do things right' lest we screw up.
* Blankslate for DC/Ops Research
* It's an amazing recruiting/PR tool.
  - Grad Student Recruiting during Visit Day
  - Even Non-CS visitors want a tour
* Amazing opportunity for collaboration between IT and Facilities


Big Crane!


What do we do with this?


How do we plug this in?


More Power!


Tight Spaces


1/2 Ton Racks


Be Careful!

We've had this thing for 2 years - what's the verdict?

* Allowed us to rapidly add high quality datacenter capacity
* Can be deployed bare in relatively austere environments
  - But usage benefits from a basic shelter structure
  - A bit of overhead for just one, but 2 or more? Do it.
* Forces us to actually follow operations best practices
* Much greater Facilities - IT interaction - a very good thing
* Increases visibility of Datacenter Operations work
* Sysadmins get more sunlight if forced to go outside.

We would probably do it again - though maybe differently.

Take one Shipping Container, Add:

* Racks - typically 7-8, ~40RU
* Power - 10-30 kW/rack
* Cooling - Watts in = Watts out
* Env/safety - Humidity, Fire
* Networking - How much fibre?
* Security - Shipping Container!
* And of course, Systems. Voila!

Sun, IBM, HP, Rackable, Verari sell MDCs. Microsoft, others developed them for their own internal usage

What kind of facility did we get?

* 7 usable 40RU racks - 4 in use
* Max 12.5kW/rack
* Lots of cooling capacity, Tons.
* Networking - Lots of 10GbE
  - Cisco 6509E with 10GbE to Dept
  - 2 Cisco 4948-10GE / rack
* $2k of locks - keep the kids out

What do we have in there now?

* Cluster/Cloud research testbed
* Part of DETER Security Testbed
* 'Production" Nehalem cluster

What else could go in there?

* Always looking for more but ...
  - Rest of our gear is too big (>30")
  - Has to be 'production' quality gear
* Will usage just move to the cloud?
  - We're still cheaper in-house
  - it will be around for a long while