

QUESTnet 2011

Data Centre Design - How Things Change in 5 Years!



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OntheNet - Why we started?

- Gold Coast has always been overlooked by National Carriers as a "Regional City"
- Access to Internet had to be dial into Brisbane
- OntheNet was setup to service the Gold Coast without the expense of paying STD call charges



OntheNet - Today

- Carrier license
- DSLAMs covering 65% of Gold Coast
- Fibre assets around the Gold Coast
- Gold Coast Data Centre
- 3 POPs (GC, Brisbane, Sydney)
- 40 staff

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Local Investments

Millions has been spent over the past 15 years to bring innovative services to the Gold Coast

- DSLAM ADSL 2+ infrastructure
- Data Centre for co-location (5 years ago)
- Cloud computing infrastructure – VStrata.com.au
- Staff training

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Why a new Data Centre?

- 10+ multi-million dollar Data Centres announced within the past 12 months in Capital cities
- Customer have increasing needs for faster computer servers and data storage
- There is no such facility on the Gold Coast that can house today's modern blade servers

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Considerations

- Location
- Room
- Power
- Cooling
- Racks
- Physical Network Distribution
- Environmental Monitoring
- Standards

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Location

- Flood/Tsunami/Earthquake risk
- Proximity to Airport
- Power availability from Energy Grid
- Noise restrictions
- Building physical space
- Building floor load capability

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DC1



DC1 Specifications

- Small room – 22 racks
- Raised floor
- All power and data cabling under floor
- 2.5kW per rack (55 kW total)
- Redundant A+B power feeds including N+N UPS systems
- N+1 Cooling solution – traditional CRAC units, under floor delivery
- Mixture of racks – std became CT enclosures 46RU, 1100 deep
- Pre cabled 8 UTP ports per rack. Fibre distribution rack installed later including overhead duct.
- Gas suppression
- Alarm, cameras, temp monitoring
- Diesel backup generator
- ASCO automatic power fail-over switch

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Lessons learnt

- Customers want more power!
- Under floor cabling is ok for power but difficult to augment data given the limited space in the room – not that power is that easy to augment either!
- Check air conditioning specification meet the requirements! Don't trust suppliers.
- Lack of space behind racks is not a good thing
- The ASCO/diesel generator has more than paid for itself

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Fast forward to 2010/2011

- New design options for data centres
- Single UPS providing both A+B power
- Modular “plug and play” power distribution solutions
- Biggest changes are to improve cooling efficiency
- Aisle containment, in row and over aisle cooling
- No raised floor

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Power/UPS

- Rule of thumb – total power consumption is double that used by the equipment in the room
 - Total Racks: 37
 - OTN Comms (2) 2.0kW
 - Customer Full Rack (35) 6kW
 - UPS Requirements
 - (Max load 100% and 10 minutes run time – below figures are absolute power consumption)
 - Stage 1: Bus A 134kW
 - Bus B 134kW
 - Stage 2: Bus A 214kW
 - Bus B 214kW

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Power/UPS cont'

- Total building power requirement is ~418kW inclusive of cooling. Current data centre is using ~90kW
- N+N UPS – still single points of failure in A+B feed UPS designs
- UPS are modular – can add batteries and additional power modules in increments – saves on initial capex costs. 25-30kW units. Hot swappable
- Power distribution/whips - modular design with APC. Literally plug and play.

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Cooling - Hot vs Cold Aisle containment

- **Hot Aisle solution**
 - Allows for extraction of hot air to outside if required
 - Ensures hot air is directed back through the cooling units – they work more efficiently the hotter the return air
 - Main room temp is cool – this is the expectation when walking into a data centre
- **Cold Aisle solution**
 - Less air to cool – claimed to be more efficient
 - Directed where it is needed
 - Main room is hot – supplementary cooling via building systems can retain comfort levels if required

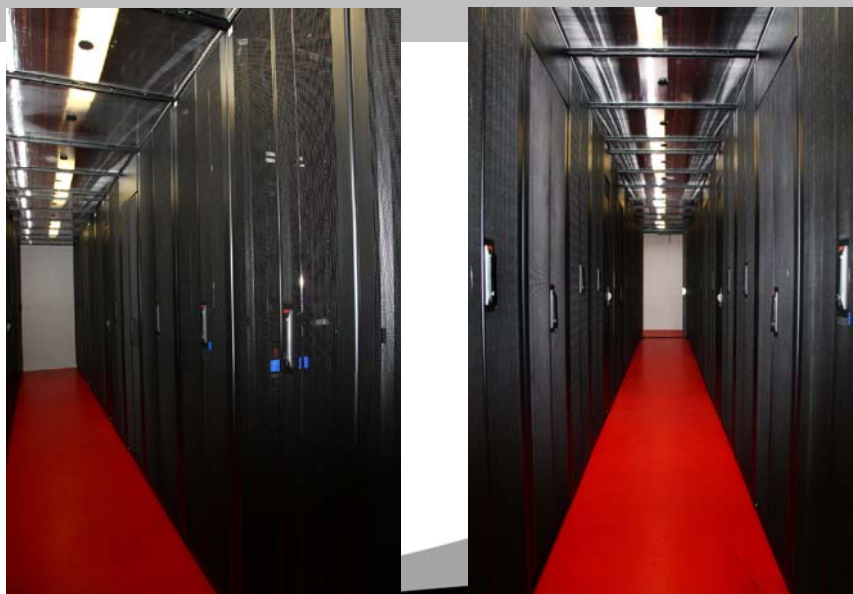
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DC1 Cold Aisle Containment



DC2 Hot Aisle Containment



Cooling cont'

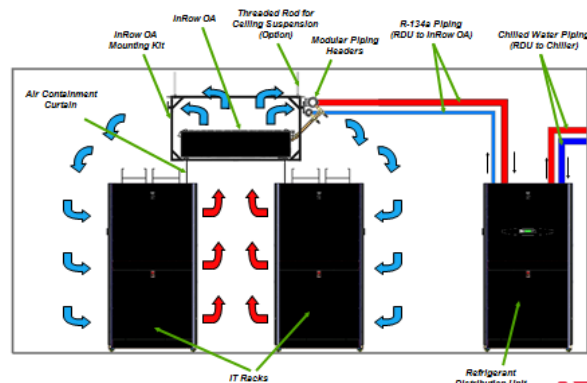
- In Row and Over Aisle contained cooling solutions
- No need for raised floors
- Can use taller racks
- Cabling must all be overhead
- Over Aisle allows for more racks – but at a significant increase in cost
- In row a happy medium vs. traditional CRAC units.
- Can add additional cooling capacity if required.

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Over Aisle Cooling

Overview



JPC by Schneider Electric - Name - Date

APC
by Schneider Electric

OntheNet DC2 - Stage 1

- Build modular – not all in one hit.
- 23 Racks, 22 saleable (1 for Comms)
- 6kW per rack, 2 x 32A feeds, 2kW for Comms with 2 x 16A feeds
- Full hot aisle containment, pod solution
- In row cooling
- A+B Power feeds via independent UPS systems – N+N, N+1 per UPS



OntheNet DC2

- Demolition/Construction/Floor
 - Demolition
 - Included ceilings, partitions, carpet, legacy wiring – we could do this ourselves - and we did!
 - Construction
 - Includes sealing of concrete slab above and below, partitions, making good any old wall junction points, fire rated doors, cavity sliders in the room for access to the windows for repair, insulation, security
 - New Main Switchboard Room



OntheNet DC2

- Electrical works
 - 1 x New Main Switchboard
 - New Consumer Mains
 - New Sub-Mains Cabling
 - Electrical Trays and Data Baskets
 - Lighting and General Power within DC2
 - Cabling to AC Units
 - Manuals and as built drawings

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OntheNet DC2

- Power Distribution/UPS
 - 2 x Symmetra PX 250 scalable unit. This unit supports 250kW in N+1 configuration and can be paralleled for 500kW. Power modules are 25kW.
 - N+N 250kW solution, each UPS being N+1 with regards to batteries and rectifier modules.
 - Battery modules and Rectifier modules are all hot swappable.

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OntheNet DC2

- Cooling
 - Cooling installation units/condensors
 - 3 x APC DX In Row cooling units
 - 1 x APC RP DX In Row cooling unit with humidity control
 - N+1 Solution



OntheNet DC2

- Racks and associated Hardware
 - 48RU and 600x1200deep.
 - 2 x metered PDU inclusive
 - 23 Racks



OntheNet DC2

- Data cabling (UTP/Fibre)
 - UTP ducting/trays overhead
 - Fibre Ducting (installed by in house Fieldtechs)
 - UTP Materials (cable, patch panels), 8 outlets per rack – done in house, Cat6A.
- Security and Cameras
 - Alarm additions
 - Cameras inc. recording system



OntheNet DC2

- Costs
 - Complete Stage 1 solution build (4 in row cooling units, we do demolition)
 - ~\$1 million
 - Per Rack (including Comms): ~\$43 500
 - NOTE:
 - Stage 2 is cheaper as UPS main units are in as is power distribution and all plumbing for condensers





The finished product



In row Cooling and PDMs



UPS, PX-250 x 2



In built UPS Bypass, A+B PDU's



IT Forum Gold Coast Tech Talk

Thanks to APC



Questions?

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