



Chatsworth Products

Cooling scenarios in the Data Centre

In today's Data Centre, the strategy for cooling and optimising efficiency has taken the user into the realm of containment. From 1998 through to current day, the DC has taken on a metamorphosis from standard Hot Aisle / Cold Aisle to separate low kW compute to where we are today at an average of 6-10kW per rack and users designing for usage over 20kW.

The only way to achieve such high electrical demand and output temperatures is to contain the air or eliminate any connection of the high & low temperature air.

Cold Aisle Containment (CAC) was the first to make its mark and this has proven itself to be a flexible scenario in brown and green field sites over the years. It gives the users a 12-15kW per cabinet ability was seen to be enough and this had a large following. The introduction of Blade Server Technology moved the industry beyond CAC into what is known as HAC (Hot Aisle Containment).

By switching the room inside out, creating a hot aisle and utilising the void in the false ceiling as the return path back to the CRAH, you now can sustain a larger delta T across your IT loads, allowing for higher kW per cabinet, whilst still seeing efficiency gains and the lowering of your PUE.

Whilst both CAC & HAC have been successful in their deployments, both have down sides and the industry, consultants, customers and server manufacturers have pushed for new technologies for cooling.

CAC has a kW maximum that cannot be expanded due to the amount of air you can squeeze into the aisle in limited by the floor tiles and the over pressure in the aisle would be too much for the server fans to handle.

HAC was a better solution, as the room became the cold aisle, giving to a larger thermal mass of cooling, but created different issues. The hot aisle became very hot with temperatures normally in the 40°C +, even as high as 55C. This became a health and safety issue and end users ended up having to use a buddy system for normal rear of cabinet work.

The largest downside to both options is if the POD became full and the user wanted to deploy more servers, another POD would have to be constructed, high in CAPEX and not an efficient way to deploy servers.

Water had some interest, but the cost of running these systems and the maintenance required yearly, deemed this system too expensive over the life span of the DC.

The answer although a simply solution, came from Chatsworth products in 2001. By combining the standard deployment ease of Hot Aisle / Cold Aisle and HAC into a single unit. We put a Vertical Exhaust Duct (chimney) on the cabinet.



This allowed CPI to have the complete separation of the elements in the DC, by using the void / plenum space in the ceiling as our return air path, we are able to get very high return temperatures back the CRAHs in the DC, thus eliminating an extra power demand from them to de-humidify the air before cooling and raising the cooling temperature from 16°C -18°C to an efficient 24°C-27°C.

Your water loop on your cooling towers could now be raised from 7C to 18C.

This gives you the customer a 1-3% saving per 1C on your cooling costs. At minimum an 11% saving up to 33% and more.

We work closely with a CoLo provider called Telecity in North London, who have shown a 20% saving on their cooling costs in 2009 and as the site becomes higher density that percentage is rising.

By offering innovative airflow management techniques, CPI Passive Cooling Solutions allow you to maximise your cooling efficiencies without the need for additional CRAC units, in-row air conditioners or risky liquid cooling solutions.

From small applications with heat loads of 2 kW per cabinet to large data centre applications with heat densities beyond 30 kW, CPI Passive Cooling Solutions provide advanced thermal management with zero points of failure, thus delivering a Tier IV solution.

CPI Passive Cooling benefits:

- Lowers construction costs relative to active cooling solutions and containment system
- Saves up to 40% on total data centre energy costs
- Allows for higher a Delta T between the data centre supply air and exhaust air
- Allows for Tier IV operation because there are no points of failure
- Permits chilled water temperatures to be increased, providing means for more hours of economisation under high IT loads
- Fast deployment, literally add a cabinet at a time

CPI Passive Cooling Applications:

- Mitigating problem cooling areas/hot spots
- Upgrading equipment to higher heat/power densities while using the same footprint
- Deployed in either Brownfield or Greenfield data centres

For more information regarding Passive Cooling, please contact:

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