



## DATA CENTRE COOLING OPTIMISATION

*Quantify · Implement · Verify*

# colt

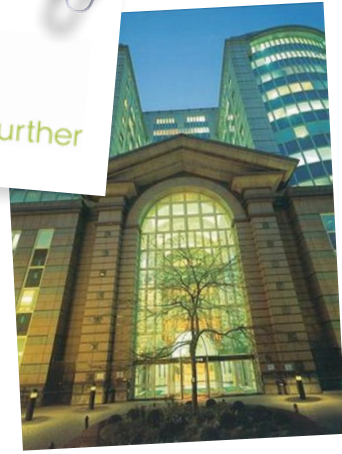
smarter / faster / further

### CLIENT -

**Colt International** -  
one of Europe's  
leading information  
delivery platforms

### PROJECT -

Energy and carbon  
reduction on Data  
centres Powergate  
and Princes Court



# Case Study

### PHASE 1 - Results

- **54%** and **34%** contribution to Colt's corporate PUE 10% objective for 2010
- **9%** average savings on the datacentre cooling load
- **9%** and **4%** savings on non-IT overall site loads
- **68%** and **64%** saving on air delivery plant load
- Fan savings ranging from **56% (min)** to **86% (max)**
- **36%** increase in redundancy (from n+1 to n+3)
- **14 month payback**
- **32%** air pressure delivery capacity increase (average)

### PHASE 2

to carry out floor pressure improvements offers further savings  
with **11 month payback periods**

### RECOMMENDATION

**Alistair Farndale, Chief Engineer, Data Centre Infrastructure Services** says : - *"Efficient Air has brought a new dimension to our data centre energy saving programme. By going beyond the conventional boundaries they have enabled us to achieve excellent results. They have acted professionally and delivered everything that was promised at the outset, and more. We have struck up a good working relationship, and I am very grateful for their support throughout the project."*

### THE BRIEF

The data centre infrastructure services division of Colt accepted that the energy efficiency at it's legacy data centres needed to not only meet best practice standards, but be upgraded to better energy efficiency and reduced CO2 emission as well as prepare for the organisations inevitable scalability. Efficient Air was given the challenging task of showing how this could be achieved and optimised through a series of phases at Powergate and Princes Court.

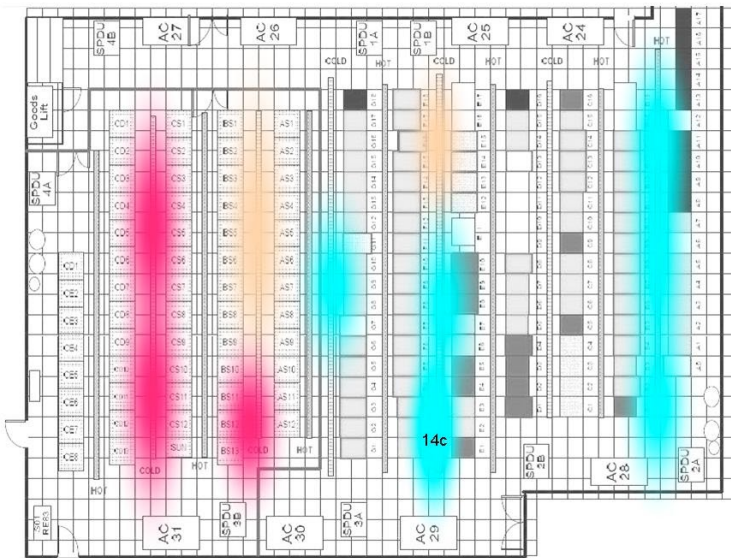
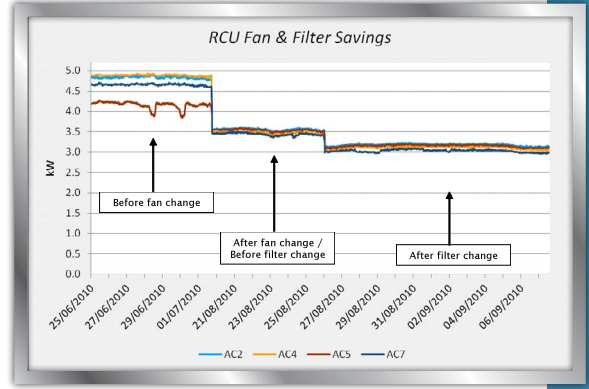
## THE APPROACH

Efficient Air was able to apply it's newly launched data centre service called 'Sphere', a service specifically designed to optimise existing data centres. Sphere's key fundamental, is based on the holistic principle, looking how each of the system components interface as part of a system. A full Sphere survey could typically include an invasive analysis of the chiller, heat rejection plant, through to internal data centre configuration and the cooling infrastructure and distribution. Once potential savings have been identified and quantified, Efficient Air would implement all or some of the initiatives, then verify the savings via ring fenced close monitoring of the equipment, available to the client over a secure portal.



## WHAT WE FOUND

Before work could commence, the configuration, current and future loads were assessed. We then monitored flows, velocities, temperatures, relative humidity and pressures. All monitoring used real-time data rather than simulation, allowing for actual data to be analysed rather than basing decisions on a best guess principle. Our analysis showed that not only could the existing cooling units benefit from new component technology, but delivery of the cooling gave a lot of scope for improvement. Air was bypassing servers, in some cases entirely, with insufficient pressure and velocity being available thus starving servers of cooling leading to hot spots as well as excessive cold spots, as indicated in the following floor plan. In contrast, other areas were over pressurised, leading to wasted energy.



Grille location, velocity, and direction is critical, so each terminal was systematically measured using our Balometer audit pictured below. Corrective measures were then implemented. Bypass is also usually overlooked, our analysis substantiated this by showing that it was considerable and that floor void integrity needed to be addressed.

Along with a floor void pressure improvement regime implemented, the installation of high efficiency fans with backward curved blades suitable for speed regulation on a 0-10volt pressure signal took place. The cooling units were then commissioned with optimised control utilising cooling unit redundancy, a technique spearheaded by Efficient Air. The entire installation and improvement project was then fault tested, summarised and verified in a series of commissioning reports and site reviews which gave recommendations for future improvements.

## FURTHER BENEFITS

Further benefits were achieved including:

- A control strategy that integrated fail-safe modes and manual override
- Reduced maintenance and increased resilience due to new equipment, less fans and belt elimination
- Better air flow over the heat exchanger reducing hot/cold spots leading to increased chiller efficiency.
- Non-overloading fan characteristics allowing for potential fan speed control and savings
- Filter specification could be changed due to the new fan being directly driven without the use of belts
- Further saving from 0-10v speed control without the fear of fan hunt & potential coil freeze apparent when fitting inverters to existing fans.



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For further details on our **SPHERE** legacy data centre cooling optimising, please contact:

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COLT International | Case Study | Jan 2011

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**EFFICIENTAIR**

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