# Upgrading data centers

Data and communication intensive firms, such as telecom, banks and security organizations, are facing a thermal crisis. Their data centers are being driven to deliver ever increasing performance, which, in turn, is increasing power demands. Over recent years, power consumption per rack has risen dramatically. A rack that used to draw a few kilowatts, now commonly consumes well over ten kilowatt, and in extreme cases, many tens per rack.

When one of the largest telecommunications companies in the world, France Telecom (Orange), wanted to boost performance in two data centers in Israel, the company enlisted the help of thermal design experts, CAS, Ltd to perform a CFD analysis and make recommendations. The data centers had been built to handle low power density racks, and previous performance enhancements had pushed temperatures to borderline conditions. Each data center contained 80 racks cooled by four CRACs mounted in pairs at opposite ends of the room. Cold air passed through the perforated tile floor, entered the racks and then returned to the CRACs. The front of some racks reached 30C, even though the recommended limits were no more than 27C. As a result, the racks were populated only up to 2/3 their height because the tops were too hot.

CAS started the process from modeling existing conditions and verified the model by comparing calculated temperatures and airflows to actual measurements. The CoolitDC predictions proved accurate to within 5%. CAS engineers then proposed a redesign, with a "cold aisle" created by enclosing the two center rack-rows and placing additional cooling units inside. The enclosure bounded the cooling air flow and prevented uncontrolled mixing of hot and cold air.

CoolitDC analysis of this configuration showed that it would significantly decrease temperatures throughout the entire room, and that the center rows would not exceed 25C - well below the recommended equipment limits. Mission accomplished!