Hot aisle/cold aisle system

The hot aisle/cold aisle system is an innovative approach to managing temperatures in a data center. Most of the energy required to run data center collocation is spent on cooling efforts. When cooling fails, servers and equipment can also fail. Every method used to tackle the heat problem of running several machines at the same time in one space has its own deficiencies and the ultimate solution remains to be discovered. The hot aisle/cold aisle approach is known as the best cooling design because it directs hot and cold air to designated areas so that the two do not interfere with each other, thus creating separate spaces where cold can stay cold and hot can stay hot.

In a hot aisle/cold aisle design, servers are placed on racks in parallel rows. The front ends of servers are arranged so as to be facing each other, and the back ends likewise. Floors in the aisles where the front ends meet are punctured so that air conditioning coming from beneath can flow upward and onto the air-intake vents of the servers. Adjacent to this 'cool' aisle (which literally is cold), you have the 'hot' aisle, where the servers are spitting out hot air and releasing it up into the data center's vents where it can be disposed of.

The weak spot of a hot aisle/cold aisle cooling system lies in the fact that not all servers exhaust hot air out from their back ends. Some are designed to take cold air in from the top or sides and let hot air out from the bottom or tops. This can nullify the efficiency of the hot aisle/cold aisle system because air traffic won't flow to its designated areas. In effect, you can end up with a 'mix' of hot and cold air in an aisle, disturbing the cooling process and putting a crunch on energy expenses.

There are, however, ways of working around the hardware ventilation variations. In some cases, it may be possible to redirect air flow within the hardware to ensure cold air comes in through the front and hot air goes out through the back. In other scenarios, data centers can flock together similarly-designed servers in different areas of the facility and arrange them so that air traffic follows the same direction in every instance.

Still, the hot aisle/cold aisle system creates the best conditions for server survival. As in any system, measures need to be taken to ensure it is installed and working properly. For example, duties might include patching up holes in hot aisles that can invade cold temperatures in the adjacent aisles.