Running Head: HVAC SYSTEM

HVAC System: Plush Packet Incorporated

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Plush Packet Incorporated requires a new data center to support a cooling capacity of 85 tons. Additionally, their environment is a rectangular space which is wholly run by PPI. There are many different data center configurations which could be made from this setup. However, two suggested environments are the Aisle Containment Cooling method and the Chimney Rack method.

The first cooling method is that of an Aisle Containment Cooling implementation. This method has doors blocking airflow access from hotspots to cold areas. Thereby control airflow inefficiencies do not occur from hot air entering intakes or cold air being recirculated through the cooling system. This method of cooling the data center is the easiest to model and mimic into the future. Moreover, having door access to each server area adds an additional layer of security to the system.

As for expansion, the data center will be built in modular fashion. That is, the initial design will be the overall template for future data center expansion. Each enclosure will effectively be a clone of the first enclosure, thereby making the datacenter future proof based on the current 200% projections. Initial CRAC requirements would be five units with an expected expansion up to twelve units. This should cover initial cooling requirements and support the 200% expected expansion into the future.

The alternative cooling method is that of Chimney Cabinet Cooling. Each cabinet has ducts which feed cold air in and recycle hot air out, from the top of the cabinets. This method effectively isolates airflow patterns so that there is no mixing of ambient air temperatures in the data center, or of hot air mixing with cold air from the CRAC. In essence, cold air is delivered exactly where it is required and hot air is immediately evacuated for cooling.

Since it is likely that chimney racks will be more expensive then the Aisle Containment method, all required racks will be bought at bulk discount and installed so as to take advantage of wholesale prices. This method will have a similar outlay of five CRAC units with an expected expansion projection of twelve to support the 200% projected increase in data center architecture. This has the downside of higher initial costs, but will likely be cheaper in the long run.

The entire bonus to this implementation is in the sheer amount of space saved. Since the cooling takes place in the racks themselves, the amount of aisle space required can be cut by nearly a third. This saved space can be used for any future expansions, returned the organization for office space, or returned to the leasing entity to save on rental costs. In any case, space saved is money saved.

Inclusion in the above two implementations, both methods will use economizers, whereby, outside ambient air temperatures offset the CRAC liquid cooling mechanisms. This is preferred as it will lower overall cooling costs. Additionally, both implementations will have overhead vents for cold air to drop down and reach server inlets, rather than having raised floors where air is pumped into the room. This method of cooling works through air’s natural tendency to drop when cold and rise when hot. In other words, less electricity is used to move air as it will automatically drop from the top racks to the bottom racks without any effort.

Aisle Containment Cooling



Chimney Rack Cooling



Reference

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