Industry Developments:

Portable Cooling Systems

Buildings and rooms constructed to house data centers are getting larger, more congested and warmer. Many of these structures have sophisticated thermal management systems featuring high-powered coolers or harnessing cold local water or air.

For some needs, however, a portable cooling system can provide a much simpler and less costly solution. These systems can deliver direct cooling relief to equipment hot spots, and some can lower a room's temperature when a central cooling system is inadequate or nonexistent. Self-contained, easily installed, and turnkey, portable coolers offer increasingly advanced features to help keep data center electronics running reliably.

Air Conditioning

For room-wide cooling, portable air conditioners (ACs) have many of the same features as installed ACs. They use refrigerant and are very much like standard window units. A vent must typically be installed through a nearby window or a drop ceiling with tiles with an exhaust port to the outside. A condensate pan must also be dumped periodically, when in use; although some models also come with a condensate pump kit or as an option to automatically drain the water.

Data centers are often added to facilities during a retrofit or as an after-thought to the facility. The primary cooling system for these custom-added data centers can have periodic down-times and longer-term outages. The portable air conditioner is designed to supply extra cooling to heat sensitive areas during extreme conditions. These systems can protect equipment and inhabitants from overheating, when the temperature demands overcome a building's permanent HVAC system. [1]

One example is the Office Pro 63 portable cooler from MovinCool. This is a high end, high performance cooler. It provides 17.6 Kw (60,000 Btu/h) cooling performance which can readily cool large spaces such as server/telecom equipment rooms. The Office Pro 63 has a programmable controller for continuous operation, and an automatic condensate pump. MovinCool also

Figure 1. The Office Pro 63 Portable Cooler Provides 17.6 Kw (60,000 Btu/h) Cooling to Lower Temperatures in Electronic Equipment Rooms [2]

produces the CM12, a ceiling-mounted packaged air conditioner. It fits into an existing drop-ceiling to save space in server rooms with limited floor space.

Less powerful, but very versatile is the SRCOOL12K Portable AC unit from Tripp Lite. This system provides 3.5 kW (12,000 Btu/h) of cooling power. Running on 120V, it can be used for room and spot cooling in data centers, server and wiring closets, home and small business offices, conference rooms, warehouses and entertainment centers with heat-sensitive equipment. Its compact size allows it to be placed in areas that facility air conditioning can't reach. The SRCOOL12K can also dehumidify and filter the air, providing better air quality for enhanced equipment performance with minimal noise and power consumption.

The SRCOOL12K has a built-in evaporator that expels the condensed water from the room via a directional exhaust duct. There is no need for a drain tube, drain pan or water collection tank. The system comes equipped with an auto-restart feature that retains all system settings and returns the unit back to its last operational state after AC power is restored. The SRCOOL12K rolls into place on built-in casters and plugs into a standard NEMA 5-15R receptacle with no adapter required. It comes with a kit for use on windows and drop ceilings.

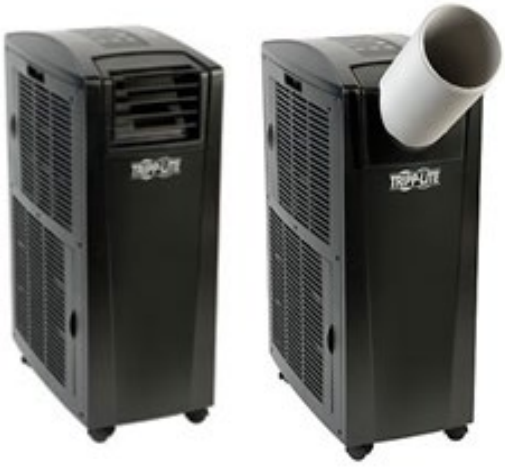

Figure 2. The SRCOOL12K Comes with a Louvered Vent for Room Cooling and a Ducted Vent to Direct Cold Air to Hot Spots [3]

Spot Cooling

Like the Tripp Lite system above, a wide range of portable coolers are available to provide spot cooling in troublesome hot spots. This capability eliminates the need and expense of installing a permanent air conditioning system. These devices are economical and efficient, cooling only the area or object which must be cooled. Portable coolers require minimal installation, and are easily moved from one room to another. Cooling air is delivered instantly.

Figure 3. The 5KK30 Air-Cooled Portable Air Conditioner with 8.5 kW (29,000 Btu/h) Cooling Capacity [4]

For multiple hot spots, the air-cooled portable 5KK30 system from Koldwave delivers cooling air to different locations via three air flexible air outlets. The quiet-running unit is designed for ambient temperature is simple to install and operate. It has a cooling capacity of 8.5 kW (29,000 Btu/h).

The CoolCube 10 from MaxPower is the industry's only modular air conditioning unit—the same 2.9 kW (10,000 Btu/h) base module can be easily adapted to fit into virtually any application.

Using an accessory kit, the small but powerful CoolCube 10 spot cooler can be deployed in a variety of space-saving alternatives, including rack-mounting in a standard 19-inch rack, mounting on a shelf, or hanging from a drop ceiling. Further, multiple CoolCube modules can be stacked for capacity or redundancy, delivering up to 11.7 kW (40,000 Btu/h) with standard 120V power requirement.

The CoolCube 10 is ideal to spot cool hot spots by delivering its cold air directly to the small area producing the heat, such as a large data center being cooled by a Computer Room Air Conditioner (CRAC). This environment often has racks populated with high density servers that are not being cooled properly. Installing a CoolCube 10 into the specific racks will solve the heat problem.

A typical server closet is usually less than 9.2 m^2 and will generally have a heat load ranging from 1 to 2.6 kW (3,500 to 9,000 Btu/h). This is an ideal environment for the compact CoolCube 10.

Figure 4. For Tight Spaces, the CoolCube 10 Portable Units can be Stacked to Provide Spot Cooling to Multiple Hot Spots [5]

Backup Cooling

Disaster avoidance and recover plans should include use of emergency cooling systems in the event of a shutdown to facility air conditioning. One of the main causes of server failure is from overheating, so keeping server room cooling at the optimum temperature is crucial for peak performance. Here are important reasons to have portable cooling units at work or standing by in a data center:

- They provide supplemental cooling for hot spots where equipment is concentrated. Spot coolers are compact and air flow can be directed towards a piece of equipment or an area of heat concentration.
- When temporary cooling is required for planned high heat loads, a portable cooler can help maintain optimal temperatures. For example, when shifting a load from one server cluster to another for maintenance purposes, the hot cluster can be spot cooled during the uptime.
- When a primary air conditioning requires maintenance, portable units can provide substitute cooling until the central A/C is back on line and fully functioning. This becomes even more critical when the central air conditioning system becomes totally incapacitated. [6]

References:

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3. **Tripp Lite, http://www.tripplite.com/en/products/model.cfm?txtModelID=4462**
4. **Koldwave, Inc., http://koldwave.com/products/default.aspx?path=Portable-Air-Conditioning/Air-Cooled/Model-5KK30**
5. **MaxPower Corp., www.coolcube10.com**
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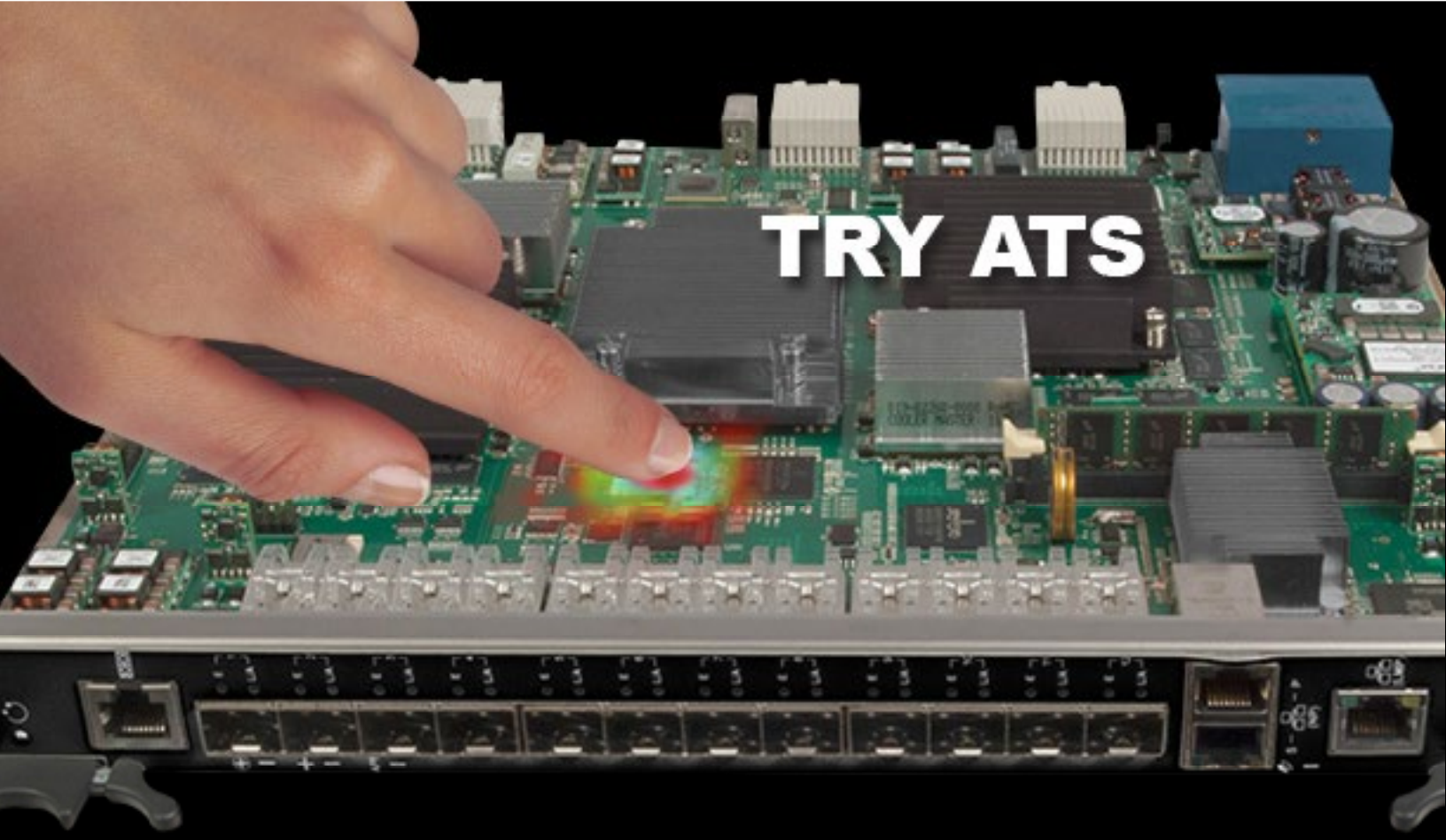

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