



ENERGY STAR

# TOP 12 WAYS TO DECREASE THE ENERGY CONSUMPTION OF YOUR DATA CENTER

Server and data center energy consumption is projected to nearly double from 2006 to 2011 nationally, contributing to electricity costs in excess of \$7.4 billion. U.S. EPA encourages you to improve your data center's energy efficiency and help your organization limit its energy consumption growth while also contributing to a cleaner environment.

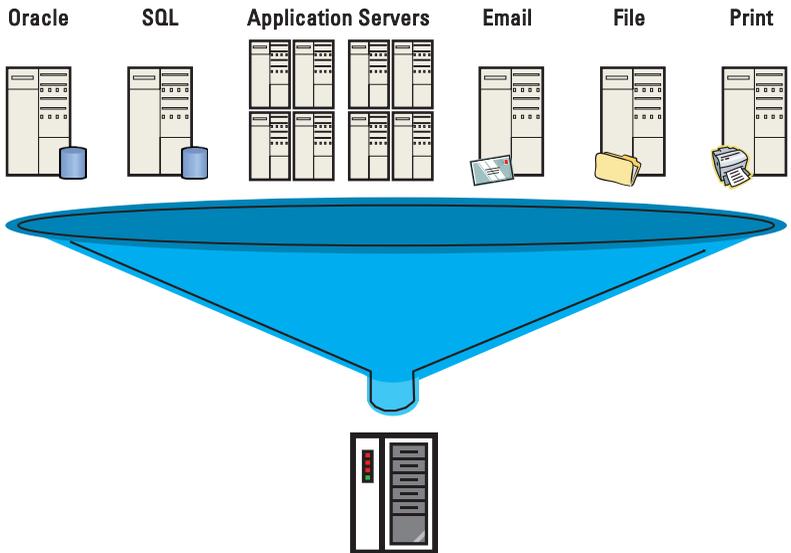
## UPGRADE AND CONSOLIDATE YOUR TECHNOLOGY

### 1. Virtualize your servers—

By consolidating multiple, independent servers to a single physical server, those servers can operate more efficiently and reduce energy costs by 10% to 40%.

2. Decommission your comatose servers—15% to 30% of the equipment running in your data center consumes electricity without doing any computing.

3. Consolidate your lightly used servers—A typical server's utilization is about 5% to 15%, yet it draws full power.



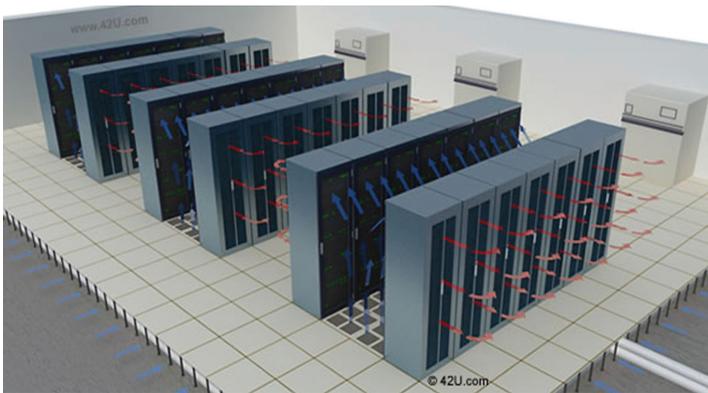
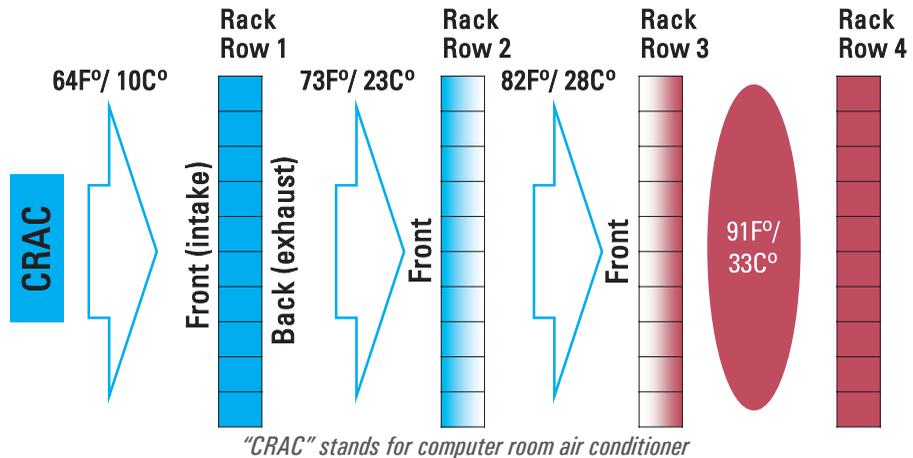
4. Organize and improve your stored data—Storage utilization averages only around 30%. It is common for organizations to have 20 or more copies of the same data—wasting storage space.

5. Invest in technologies that use energy more efficiently—An ENERGY STAR qualified server uses 30% less energy than a conventional server.



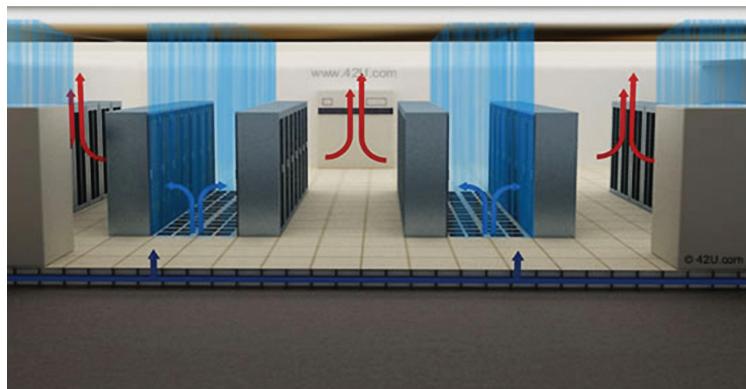
# GO WITH THE FLOW – MANAGE DATA CENTER AIR FLOW

6. Take advantage of the “Hot Aisle/Cold Aisle” layout—If your server racks are currently arranged this way...



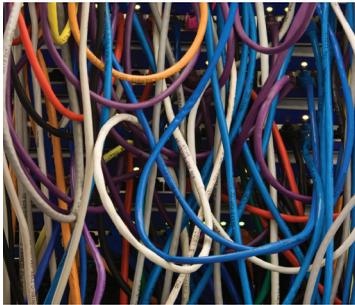
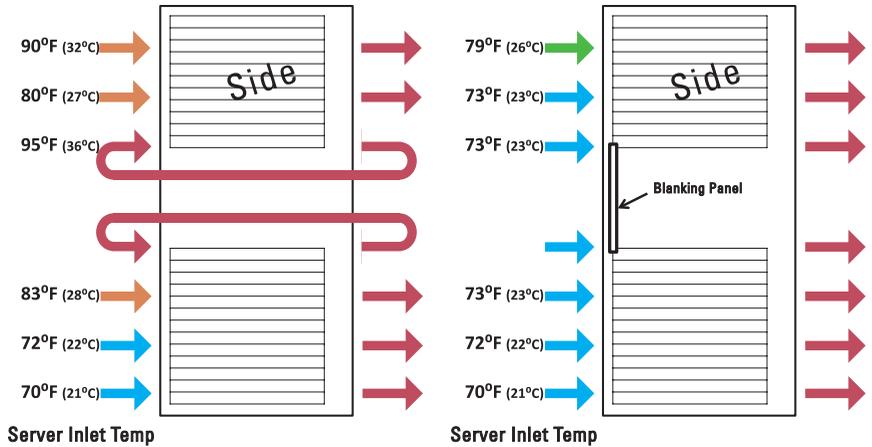
...Try arranging them so that the fronts of the server racks face each other and, therefore, the backs of the server racks face each other. This arrangement reduces mixing of hot and cold air to improve efficiency.

7. Contain or enclose your server racks—To further reduce mixing the cold supply air with the hot exhaust air (e.g., using flexible strip curtains or rigid enclosures).



# GO WITH THE FLOW – MANAGE DATA CENTER AIR FLOW

8. Review general air flow improvement tips—Install blanking panels to decrease server inlet air temperatures and increase the temperature of air returning to the CRAC, both of which improve operational efficiency.



*Unstructured and Structured*

Use structured cabling to avoid restricting air flow to your servers.

Install grommets to seal areas where cables enter and exit plenums (such as a raised floor). Less leakage helps direct more cold air to the equipment that needs cooling.



*(Photo courtesy of 42U.com)*

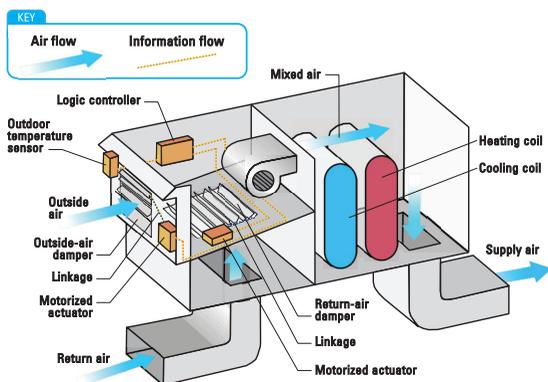
A professional air flow assessment can help identify ways to improve cooling efficiency.

# ADJUST AND IMPROVE YOUR HVAC SYSTEM

**9. Adjust the temperature and humidity in your data center**—In 2008, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) established new recommended temperature and humidity ranges at the inlet of the server. However, many data centers set their temperatures as low as 55°F (when the recommended range is 65°F to 80°F) and keep very tight controls on humidity. Data centers can save 4% to 5% in energy costs for every 1°F increase in server inlet temperature.



**10. Retrofit your air conditioning with variable speed fan drives**—Retrofit kits for your CRACs have a two year payback by being able to adjust fan speed to accommodate changing cooling loads in your data center.



**11. Install an air-side economizer**—Bring outside cooling air into a building. Because data centers must be cooled 24/7, 365 days per year, air-side economizers may even make sense in hot climates, where they can take advantage of cooler evenings and winter air temperatures to save 60% on cooling.

**12. Install a water-side economizer**—Use the evaporative cooling capacity of a cooling tower to produce chilled water during the winter months. During water-side economizer operation, costs of a chilled water plant are reduced by up to 70%.

## Assess the Energy Efficiency of Your Data Center

Measuring and tracking the energy consumption of your data center is an important means for effective management. ENERGY STAR's free Portfolio Manager Tool, [www.energystar.gov/benchmark](http://www.energystar.gov/benchmark), enables you to assess your energy performance relative to your peers using a 1-100 scoring system, as well as track changes in use over time.

Please visit <http://www.energystar.gov/datacenterenergyefficiency> for more details.

ENERGY STAR® is a U.S. Environmental Protection Agency program helping businesses and individuals fight climate change through superior energy efficiency.

