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# Technology Watch

LAN Newsletter

1st Quarter 2009

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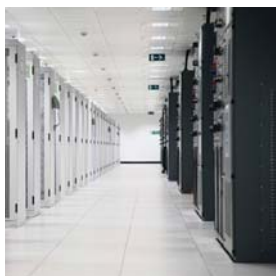
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## 1.0 General Market Trends

There is great anticipation in the USA that with the election of a new president, the data communications industry will see an increase in business. A tech-savvy leader who is dedicated to having the country run more efficiently could certainly lead to a boom in LAN activity and datacenter growth. The White House has made the digitizing and storage of medical records one of its policy cornerstones. Will this fact translate into added new business for the LAN market? The answer remains to be seen.

There is already a definite push towards more energy-efficient *and* sustainable networking systems in data center and enterprise networks. Consolidating equipment and making data communications systems more modular, too, are popular trends. Better ways of cooling while increasing the port/node density in equipment racks will be the catalyst for more and more innovation among companies. All of these trends are driving the need for increased flexibility in data center design and will have a lasting impact on the cabling solutions that will be necessary for the immediate future. As data rates migrate from 10 to 40 Gbps, higher performing shielded and unshielded copper cabling, as well as the adoption of some multimode fiber solutions, will become prevalent. These trends all come during an economic climate during which cost reduction is a major goal.

Most analysts are predicting a general slowdown in new infrastructure builds; however, many facilities must replace aging CAT 5e cabling because it cannot handle the continuously increasing bandwidth requirements. This situation could mean additional growth for CAT 6 and above copper cabling even in a generally contracting market.

## 2.0 Google's Data Center Migration

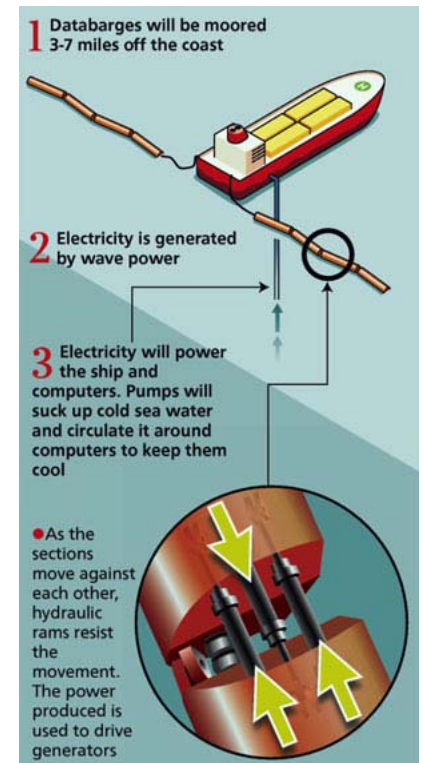
*(Search-Engine goes out to Sea)*

Google is again showing off its ability to innovate by developing a unique solution for the energy consumption and real-estate needs of green-field data centers. The company has filed for a patent (*US2008/0209234 A1*) that describes a “water-based data center,” in essence a data center on a floating barge. These floating platforms out at sea would be constructed by stacking containers filled with servers, storage systems and networking gear, not unlike the “Data Center in a Box” concept previously described in the competence center’s third quarter “Technology Watch” newsletter.

Google’s floating data centers would be located 3 to 7 miles off shore in 50 to 70 meters of water. It is also

presumed that as the technology is perfected, these 40 megawatt data centers would be immune from real-estate or property taxes.

If successful, this development also means that Google could locate data centers closer to populations in regions where it would otherwise have been impossible. Another intriguing aspect is that Google could theoretically power these floating platforms from wave motion or from sea-based wind farms. The water could also be used for cooling.





Google’s innovation is not lost on its competitors because most of the major server makers, including HP, IBM, Dell, and Sun Microsystems, have also created their own data centers in

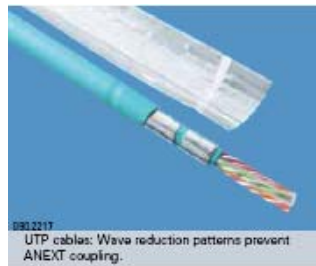


shipping containers. These items are typically sold to service providers, the military, and research labs. Although this modular data center trend might intuitively seem to mean a reduction in LAN cabling, the need to connect clusters of these modules should keep these cables in high demand.

### 3.0 Copper LAN Cabling

#### 3.1 Market

At least two cable vendors are pursuing a new marketing tactic for UTP cables that are designed with a floating shield but are not classified as being shielded. These manufacturers avoid the “shielded” classification by applying a shield that has transversal breaks; that is, the shield is not continuous. This tactic is a concern for true manufacturers of UTP cabling because the argument being used with this design is that it has better alien crosstalk (ANEXT) performance than standard unshielded cable. The UTP classification of this new design also avoids the fear, uncertainty and doubt (FUD) usually associated with shielding in the United States. The manufacturers also claim that the uniqueness of the design is that the transversal breaks in the



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UTP cables: Wave reduction patterns prevent ANEXT coupling.

shield (metalized) are short enough to prevent any antenna effects but close enough together to suppress the alien crosstalk. These claims seem plausible but warrant investigative testing. The patented 10 Gb Ethernet compliant designs are being sold by Superior Essex & General Cable under the respective names of NextLAN® 10G<sup>c</sup> AXi and GenSpeed® 10 MTP™.

#### 3.1.1 Cooling the Data Center might be free

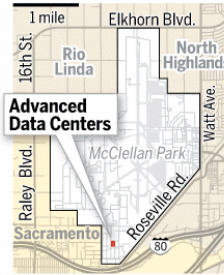
The increased computing capacity for data centers means greater heat generation and, thus, higher electricity use for cooling to prevent equipment failure. Most data centers today are cooled using internal air conditioning units (CRAC units) that operate continuously regardless of the outside ambient air temperature. To reduce the power demand, organizations like General Electric (GE) and Advanced Data Centers (ADC) use outside air for cooling, a technique called “air-side economization.” This technique pulls outside air into the data center through a series of air filters and then over chillers where the air is further cooled before being distributed in the data center. The bank of tubes carrying refrigerated water within the chiller is used for only about 25% of the year, on very hot days. In the fall and winter months, this cooler air is basically free, a fact which makes this system more than 30% more efficient than conventional data center cooling systems.

*See diagram below.*



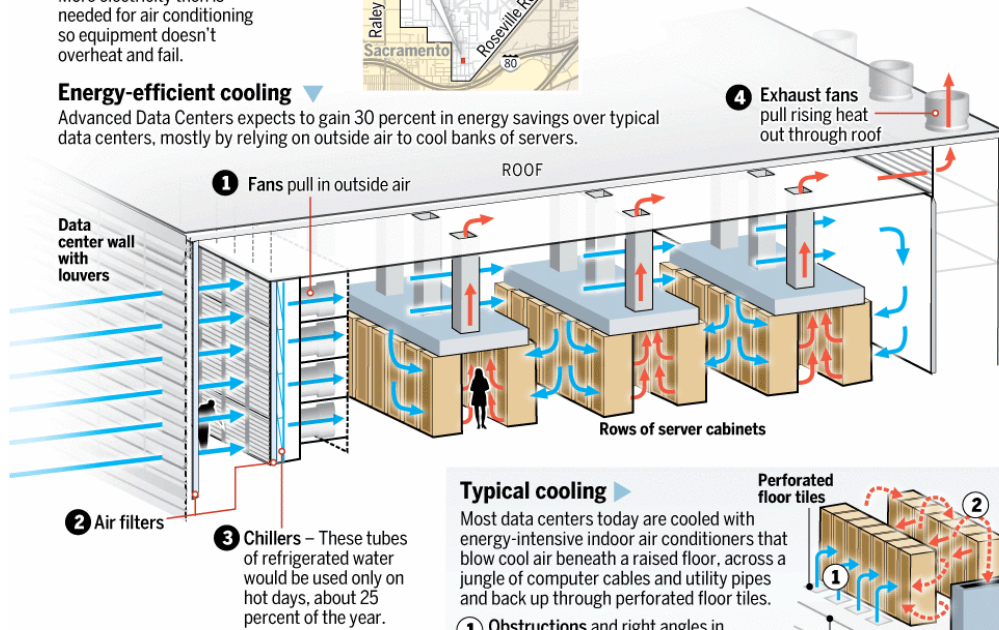
## COOL COMPUTING

The energy efficiency of data centers has lagged behind computing capabilities. Higher performance demands more electricity, resulting in hotter exhaust from computing equipment. More electricity then is needed for air conditioning so equipment doesn't overheat and fail.



### Energy-efficient cooling

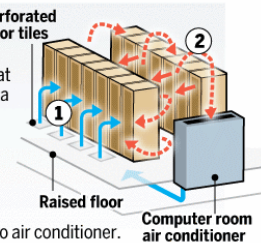
Advanced Data Centers expects to gain 30 percent in energy savings over typical data centers, mostly by relying on outside air to cool banks of servers.



### Typical cooling

Most data centers today are cooled with energy-intensive indoor air conditioners that blow cool air beneath a raised floor, across a jungle of computer cables and utility pipes and back up through perforated floor tiles.

- 1** Obstructions and right angles in the air flow wastes energy
- 2** Hot exhaust from computer servers takes energy-wasting detours en route to air conditioner.



Sources: Advanced Data Centers, Bee research by Chris Bowman  
Photo by **HECTOR AMEZCUA** hamezcua@sacbee.com  
Graphic by **SHARON OKADA** sokada@sacbee.com

## 3.2 Technology: Mellanox Targets data centers with 40Gb/s InfiniBand

Mellanox has introduced their BridgeX product in an effort to persuade datacenters to adopt 40 Gbps InfiniBand as the primary high-speed converged network fabric. Since the product supports both Fiber Channel over Ethernet (FCoE) and Fiber Channel over InfiniBand (FCoIB), it provides servers with SAN and NAS connectivity via either a 10Gbps Ethernet or 40Gbps InfiniBand switch. Mellanox claims that one InfiniBand adaptor would replace multiple Gigabit Ethernet cards plus a Fiber Channel adaptor. This product allows data centers to keep legacy storage via ethernet and fiber channel

switches, but use InfiniBand switches for low-latency server interconnect and converged I/O fabric. Mellanox is not the only manufacturer offering these bridges; both Qlogic and Voltaire offer similar products although they offer bridges to ethernet or fiber channel without the capability of converged operation. Applications, development tools, storage, servers, and network services that businesses currently buy as products will be accessible on an as-needed basis from a virtual source.

The technology encompasses many different outsourcing models, from the traditional Manager/ Host relationship to the emerging concept of software-as-a-service (SaaS) approach.





In this latter approach, the customer employs a packaged application service on a pay-as-you-go basis. The emergence of this “cloud computing” concept (see Q4 2008 Technology Watch) couldn’t have come at a better time for businesses with limited cash and lines of credit. This allows customers to take advantage of a data center’s vast computing ability without the cost.

### **3.3 Cisco’s Unified Computing System (Re: *New Blade Server*)**

Cisco’s Unified Computing System (UCS) is designed to unify the components of the data center into a single footprint in an effort to reduce the total cost of ownership by about 20% in capital expenses (fewer switches, adapters and cables needed) and 30% in operating expenses (lower power, cooling & labor costs). In support of this goal, Cisco just released their new Blade Server system which accelerates the push for modularity in the data center. The partnership between Cisco and VMware marks Cisco’s move to dominate corporate data centers with virtualization tools and a new platform that brings together computing, network and storage hardware. The servers, based on new Intel Nehalem processors, will fit into an eight-bay chassis designed to take seven blades and one Cisco Nexus switch.

This design creates a single system that wires the blades and consolidates the networking functions of the LAN, SAN and computing networks in a single unit. The architecture incorporates a unified network fabric [based on 10 Gb Ethernet](#) while supporting Fiber Channel over Ethernet (FCoE) for connecting storage. VMware’s virtualization technology will facilitate a more scalable and flexible environment for the delivery of IT services in the data center. This event probably marks the inflection point for a major shift towards the use of more virtual machines in the data center.

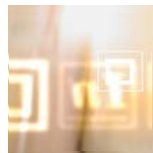
With the launch of this new Cisco system, the consolidation of networking equipment could mean a reduction over time in the amount of ethernet cabling required to support client-to-access connections.



## Data Communications Competence Center

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Nexans' Data Communications Competence Center, located at the Berk-Tek Headquarters in New Holland, Pennsylvania, focuses on advanced product design, applications and materials development for networking and data communication cabling solutions. The Advanced Design and Applications team uses state-of-the-art, proprietary testing and modeling tools to translate emerging network requirements into new cabling solutions. The Advanced Materials Development and Advanced Manufacturing Processes teams utilize sophisticated analytical capabilities that facilitate the design of superior materials and processes. The Standardization and Technology group analyzes leading edge and emerging technologies and coordinates data communication standardization efforts to continuously refine Nexans' Technology Roadmap. An international team of experts in the fields of cable, connectors, materials, networking, standards, communications and testing supports the competence center. The competence center laboratories are a part of an extensive global R&D network that includes eight competence centers, four application centers and two research centers dedicated to advanced technologies and materials research.



Global expert in cables and cabling systems

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