



CUTTING THE CORD

IP KVM SWITCHES ALLOW REMOTE HARDWARE ACCESS FROM ANY LOCATION.

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A company's servers and other gear can number in the dozens, hundreds or even thousands. Offering a central point of control, keyboard/video/mouse (KVM) switches can play a key role in helping IT administrators manage hardware and software.

Unlike Microsoft Remote Desktop Protocol (RDP) or other remote-access software, KVM switches don't require the operating system or network to be available. What's more, they're hardware agnostic. And they allow Basic Input/Output System (BIOS)-level management, ideal for high-density server rooms and data centers.

Historically, KVM switches have been "analog," or "direct-connect." This means the administrators' keyboard, mouse and display peripherals are directly connected to the KVM switch by cables. The limiting factor, of course, is the maximum possible length of the connecting cable.

When a problem occurred, an IT staffer would need to get to one of these areas, regardless of location. As many companies are discovering, direct-connect KVM switches are no longer sufficient for their IT management requirements.

With the introduction of Network KVM switches, also known as digital KVM switches or KVM over IP switches, network administrators can have the best of both worlds. They can access their hardware from any location.

"One of the strongest industry trends we're seeing is the move to more consolidated and larger data centers," says Andreas M. Antonopoulos, senior vice president and founding partner, Nemertes Research. "And each center has fewer and fewer local staff."

"Data centers are getting denser and fewer in number," he says. "And the staff inside them is dropping. So the KVM has changed from a device to help manage devices by people within the vicinity, to staff who are hundreds, even thousands, of miles away in multiple locations."

» CUTTING THE CABLE

The term "network" refers to the administrator's connection to the KVM switch. A network KVM switch lets administrators access it from a notebook or desktop computer, typically using a web browser.

Network KVM switches from APC, ATEN, Avocent, Black Box, Raritan and other vendors are replacing, or being put in front of, existing direct-connect KVM switches. Network KVM switches are enabling IT to respond to problems more quickly and manage systems more cost-effectively. This, in turn, is adding to productivity.

If the company's IP KVMs are on their network, the computer that the administrator is using can be anywhere on the company LAN/WAN. Access is also available from the Internet, which can include using Wi-Fi or mobile broadband connections from outside the office.

Many companies also provision "out-of-band" access. For example, dial-up connectivity can ensure that IT can access its KVM infrastructure when there is a problem on the primary network.

This allows IT administrators and managers to manage their servers not only from their offices, but almost anywhere. And it allows them to respond to problems instantly, without the delay and wasted time of travel.

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» NETWORK KVM FEATURES

New KVM features in both network and analog KVM switches give IT powerful new abilities that improve productivity, help them reduce system downtimes and increase the flexibility of IT staff and equipment. New KVM capabilities include:

- **Power Control** — This is the ability to turn the power to a device on or off by controlling an associated Power Distribution Unit (PDU). It allows IT to boot or reboot systems — what may be needed to resolve a hung server — and do selective power load-shedding.
- **Virtual Media** — This consists of the ability to map (use) a local media device, like a USB flash drive, a CD/DVD or the hard drive on the IT administrator's computer, as if it were on the target remote device.
- **Serial Port Capability** — Devices like network routers, switches and some servers have to be managed from a serial port console, which is a slightly different technology from KVM. To accommodate, some network KVM switches include one serial port — in addition to multiple ports — to let IT manage a wider range of devices, all from a single switch.
- **Single-Console Control of Physical Hardware and Virtual Machines** — As companies make increasing use of server virtualization for consolidation, availability, flexibility and cost-effectiveness, this capability will become increasingly important.
- **See Multiple Devices on One Display** — Some IP KVMs allow for the viewing of multiple devices via "tiles," allowing at-a-glance analysis.
- **Dual-Power Connectors and Dual-Power Supplies** — These ensure the KVM switch is available in the event of component or power failures.
- **CAT Cabling** — Today's network KVMs can use standard CAT 5, CAT 5e, or CAT 6 UTP LAN cabling, instead of the traditional bulky, expensive and hard-to-manage KVM cables.

KVM SECURITY REQUIREMENTS

Today's IP KVM switches and their control consoles include standard network security features like access-authentication and encryption-based secure connections between remote users and the switch. Still, the switches themselves have potential security risks, namely "leakage" of sensitive data.

Leakage includes "crosstalk" — signals bleeding through from one switching path to another. This could let someone on one server detect traffic to another server, or Electro-Magnetic Frequency (EMF) signals, emitted by the KVM, that could be detected by an eavesdropper up to several hundred feet away.

"With about \$1000 worth of equipment, I could monitor your computer's EMF emissions and make strong deductions about what you're typing," says Mike McCurry, product manager at Black Box Corporation. "If you had multiple computers, I could single out one server from another, as each has its own EMF signature."

LEAKAGE SECURITY

According to McCurry, Black Box Network Services, with its ServSwitch Secure family, offers KVM switches with security against data leakage.

"Each port on these switches is isolated from each other, so that there is no 'bleed-through,'" McCurry says. "The channel-to-channel isolation protects against inter-network data flow.

"Additionally, our ServSwitch Secure switches are TEMPEST-approved — the entire enclosure is secured against electronic snooping," he says. TEMPEST is a code name for methods that protect against unwanted electrical emanations.

TEMPEST was originally intended for areas that couldn't be secured, like naval ships. But, McCurry points out, even when servers are in secure facilities, companies like lending centers or pharmaceutical companies often need to put KVM switches in unsecured areas, where contractors or the public might be able to access them.

ANALOG KVMs

Black Box's ServSwitch Secure KVM switches, available in two- and four-port models, and with USB and Digital Visual Interfaces (DVI), are "analog" KVMs, connecting to the keyboard, mouse and display peripherals by direct-wire connections, not by IP network links.

However, McCurry points out, ServSwitch Secure KVMs are often used to isolate and provide secure control over IP KVM switches, which are themselves in secure areas. They are used by government agencies and military/defense contractors, as well as financial and pharmaceutical/medical companies.

- **Blade Server Management** — Many blade vendors are incorporating KVM support into their blades and blade chassis. For example, HP has a special connector on each of their p-Class and c-Class BladeSystems allowing KVM control.
- **Out-of-Band Access** — Today's KVM switches may have dual Ethernet interfaces, allowing access to fail over to the other port, and/or a modem port.

» KVMs FOR ALL NEEDS

Today's vendors offer a wide range of network KVM switches for the central and remote needs of medium- and large-sized businesses, supporting from one-to-eight concurrent remote or local users, and from one-to-32 or -64 attached servers.

APC, for example, offers its AP5610, a 16-port digital KVM. The firm also offers two 32-port network KVMs, the AP5615, supporting two simultaneous users and the eight-user AP5616.

"Our CN8000 'KVM on the Net' is a zeroU product, and can be mounted on the side of a rack," says Aaron Johnson, field application engineer with ATEN Technology.

"We can cascade KVMs to manage up to 1,000 devices," he says. "Our 32-port KVM supports up to eight users. And our KVM Matrix switches let you increase that up to 32 users."

For use in branch environments, Avocent KVMs range from the single-target Avocent DSR1024 KVM-over-IP switch and four-to-eight port KVMs, notes Mark Nicolas, product manager for analog and digital KVM products, Avocent Corporation.

"The eight-port DSR1021 KVM is very popular because we offer a serial IT module for managing serial devices," he says. "This lets IT have control through one appliance." Avocent digital KVM switches for data centers include the 32-port, 2-user DSR2035 and 32-port, 8-user DSR8035.

Raritan's network KVMs include the Dominion KX II KVM-over-IP switch. The firm also offers two products optimized for remote offices, the Dominion KSX II and Dominion KX II-101. "We go from one user by 16 servers to four users by 64 servers," say Raritan's Henry Hsu, director of enterprise products.

Most network KVMs can be controlled via a web browser. (The web browser may need to support Java.) ATEN also offers a Win32 viewer for companies that don't want JRE (Java Runtime Environment), notes ATEN's Johnson.

KVM vendors typically offer central management console software or appliances. For example, APC's Network Access Software and Avocent's DSView 3 simplify network access and authentication, to provide single-point access to multiple KVM switches.

» KVM SWITCH ADVANTAGES

Network (or IP) KVM switches offer great benefits to IT departments and to the company overall. Some of the plusses include:

- **IT Staff Convenience** — Remote access lets IT staff be centralized, or be geographically distributed, so experts don't have to be all in one place.
- **Purchasing Flexibility** — KVM switches are hardware-agnostic in terms of what they can manage. Therefore, IT doesn't have to worry about standardizing on one brand or type of server.
- **IT Productivity** — Network KVM switches let a company do more with fewer people.
- **Improving System Availability** — Having remote access lets IT monitor system health to predict failures. When a problem occurs, IT can quickly gain access to diagnose and restore operation, thereby reducing Mean Time To Recovery (MTTR).
- **Business Continuity-Disaster Recovery** — In addition to managing IT gear in the data center and in remote/branch offices, network KVMs let IT manage disaster-recovery sites remotely.

» FLEXIBILITY AND GROWTH

If you're looking at network KVM switches, plan for growth. In other words, buy more ports than you currently need, or select products that will let you upgrade or expand gracefully.

Look for digital KVMs that include a direct-connect analog port. This will let you add a direct-connect KVM switch to the digital KVMs in the racks, and provide easy one-tray access for IT staff when they're inside the data center.

Consider cross-technology cascading for cost-effective KVM access. This includes adding network remote access to an existing analog KVM infrastructure by putting a network KVM switch in front of them. "Our CN8000 can provide IP access to analog KVM switches," says ATEN's Johnson.

"APC's IP Gateway can give a single user remote access to existing analog KVMs," says Eric Torell, product manager for rack accessories, American Power Conversion Corp.

"The more complete or recommended solution is to incorporate IP/Digital KVMs that can be cascaded to existing KVMs," he says. "Depending on the type, it gives more ports and user access to these analog KVMs."

Finally, be sure to include support for Virtual Media — even if you aren't using this feature currently. You're likely to in the future, particularly if you begin to use server virtualization. ♦

KVM RACK CONSOLES

Network KVM switches are being embraced to provide administrators with remote access. At the same time, IT needs to provide console access within computer room and data center facilities.

"Space inside data centers is an issue," says Justin Tarsiuk, product marketing manager for KVM switches at Belkin International. "The more you can fit into a 1U space, the better it is for IT."

In the past, IT would have a regular CRT monitor sitting on a shelf, taking up 5-to-10Us of space, he says. Flat-screen LCD technology has changed all this.

Today, KVM rack consoles, like Belkin's LCD Rack Console family, fit a 15-inch or 17-inch flat-screen monitor, plus a keyboard and a touchpad, folded down into a 1U slide-out tray, fitting into any standard 19-inch rack.

Other vendors offering KVM rack consoles include ATEN and Avocent. "A rack mount lets data center staff slide the LCD out and open it up," says Aaron Johnson, field application engineer, ATEN Technology, Inc.

Aten's family of LCD KVM Switches, for example, have flat screens up to 19 inches and can fit the screen, keyboard and a 16-port KVM into a 1U space.

KVM rack consoles come in single-rail and dual-rail configurations. "Single-rail, with everything on one sliding tray, are the best-sellers, because of price," says Belkin's Tarsiuk.

"However, many companies prefer dual-rail, which let you push the keyboard and mouse back in, but keep the display up and visible," he says. "This allows IT to lock the rack — so someone can still see what's happening.

"And by using the AutoScan mode, which all our business KVMs offer, the display will automatically cycle among the devices it's connected to," he adds. "This lets an IT staffer see how the systems are doing without having to use the controls."

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