



DATA CENTER CONTROL:

GUIDELINES TO ACHIEVE
CENTRALIZED MANAGEMENT

What can **CENTRALIZED MANAGEMENT** do for you?



In the past, big applications ran data in big mainframe computers that had to be replaced when it was time to upgrade.

Things have changed. Today, some of the most powerful computer systems in the world are built as large clusters of small servers composed of commodity hardware. Now you don't have to have a large area to control a large area.

The new data center requires systems that provide more control, flexibility and scalability than ever before. You need more than server management. You need a system that reduces your Mean-Time-To-Repair (MTTR) while leveraging the existing IT resources you already have. If you need to manage data centers and branch offices anytime from anywhere, there is an answer. A centralized management approach with out-of-band capability can increase data center control, allow you to do more with less, and provide remote access from anywhere in the world.

Today's support-minded network administrators need around the clock access to servers 365 days a year – both at the rack and in remote locations. Fortunately, with centralized management (including both in-band and out-of-band connectivity), your data center has never been so close.

Innovative serial console server and KVM over IP switching solutions allow you to leverage the IP connectivity and security models in your network. Centralized management software lets you control an appliance that can be connected to servers, serial devices, even power distribution units and environmental monitoring. With centralized management, you can control multiple servers and network devices no matter where they are located. Virtual media is a more recent addition. It increases administrator efficiency by allowing you to conduct a large host of tasks remotely such as file transfers.

Whether you need access at the rack, in the Network Operating Center (NOC), or from your laptop at home, there are solutions available that will provide unprecedented, secure access and help you show a quick return on your investment.

WHY CENTRALIZE?

The trend in network administration is doing more with less, and centralized management can address the growing need to maximize administrators' time both in and out of the data center. Administrators gain the best of both worlds: access and control of local systems, and remote control of systems across town or in branch offices around the world.

GETTING AROUND THE NETWORK TO GET TO THE NETWORK: OUT-OF-BAND MANAGEMENT

How does out-of-band management fit into your data center's centralization? When a piece of your data infrastructure is down, you can't use that same resource to fix itself. In the event of an OS, hardware, power or network failure, you'll need an alternative path to reach the network – a "back door" through direct management port access.

While in-band management tools are needed to manage application availability and performance, up to twenty percent of unplanned downtime is caused by infrastructure failure and can only be addressed by out-of-band management tools.

Out-of-band management helps to minimize human and operational/environmental errors by simplifying failure detection and recovery procedures.

WHY DO I NEED OUT-OF-BAND NETWORK MANAGEMENT?

Out-of-band management tools can provide different levels of access to the network infrastructure for remote data center management:

- **Access to Management Ports** – You need remote access to the management console of servers (BIOS, OS console) and other network elements (routers, switches, telephony, UPS, etc.).
- **Access to User Interface or System Consoles** – Console servers and KVM gateways can provide remote access to the user interface of a remote server.
- **Remote Power Control** – Intelligent power distribution units can offer the ability to power on/off remote equipment for operational control or recovery from software/hardware issues.
- **Health Monitoring and Environmental Control** – Out-of-band management gateways can offer the ability to monitor temperature, intrusion, voltage on power circuits, and control the operation of alarms, HVAC systems, electronic locks, etc.
- **Coverage** – Many pieces of manageable equipment in the data center may not have a native connection to the data network. Examples are uninterruptible power supplies, PBX phone systems, HVAC equipment, security alarms, environmental sensors, etc. Those devices only support out-of-band management.
- **Low-level control** – To troubleshoot a problem, you may need to monitor a server's hardware self-test and BIOS information or power-cycle a network device – even before the operating system is loaded and the network interfaces are active.

CONSOLIDATED MANAGEMENT APPROACH

A typical data center is comprised of a wide range of IT assets, ranging from server and information processing engines to network connectivity switching and routing devices for voice, video and data. Deploying an architecture for remote management which allows for all of the various mechanisms required to communicate with these assets is key to a cost-effective solution. With that in mind, data centers will find the need to deploy KVM access technologies, intelligent power controllers and serial console servers which adheres to a common security framework.

A centralized management solution is not complete unless it supports local and remote access to console ports. Look at the back panel of any piece of data center equipment, and you'll find a management port labeled "COM," "AUX" or "Console."

All UNIX operating systems (Linux, Solaris, etc.) provide OS system console access on serial ports. Even Windows operating systems, initially designed for desktop with only a KVM user interface, now offer a system console on serial ports.

Serial consoles and KVM are a truly universal out-of-band access media for most network equipment in a data center – including routers, switches, firewalls and gateways, power systems (uninterruptible power supplies, power generators), telephony systems (switches, PBX systems) and environmental control systems (sensors, HVAC, alarms, and actuators).

MANAGEMENT APPLIANCE CORE VALUES

- **Scalability** – The chosen solution should be capable of being deployed in situations ranging from one lone server to the situation of thousands of servers.
- **Port Density** – The ability to handle all equipment in a rack full of other active devices, with minimal impact to the precious rack units available for mounting.
- **Mechanical Robustness** – The management server unit must be rackmountable, have a minimum of external cabling, absence of moving parts, and a high level of integration.
- **Power Supply** – The power supply should consume a minimal amount of power for normal operations, conserving energy, generating less heat and reducing MTTR due to this lighter operating temperature range.
- **Compatibility** – Make sure your servers are compatible with all network equipment. Do they support a full RS-232 interface? Are cables/converters provided for any target device?
- **Security** – The product should support SSH version 2 as well as the required authentication method (RADIUS, LDAP, etc.). It should allow multi-level user access control and log console sessions and activities.
- **Hardware Flexibility** – The unit should be able to connect to more than one LAN, while supporting a built-in dial-up modem for out-of-band access. Consider future needs: Will it integrate with Integrated Server Management cards and with power control units?
- **Software Flexibility** – Because out-of-band management is evolving fast, make sure the console server is flexible enough to incorporate such change.
- **Cost and Service** – Before purchasing, make sure the vendor is committed to a roadmap in network management and completely understands the application.

THE VALUE OF KVM AND KVM OVER IP

Keyboard-Video-Mouse multiplexers (KVM switches) can also be used as out-of-band management tools. They connect to the I/O ports of multiple systems and provide centralized access to multiple servers from a single workstation.

KVM over IP offers a great amount of flexibility and scalability for your data center. It leverages your existing network infrastructure and eliminates monitoring and maintenance at the rack, freeing network administrators from the server room. The most advanced KVM systems provide much more than just point-and-click control for connected servers; they also provide secure KVM over IP control of virtually any device connected to the KVM switch, all from a single computer screen.

KVM switches are ideal for local out-of-band management of small clusters of servers because they allow access to the user interface as if the user was at the local KVM console. KVM-over-IP gateways capture video frames, mouse clicks and keystrokes, and then compress them to send over the network. This allows similar functionality over remote network connections.

THE VALUE OF SERIAL CONSOLE SERVERS

Serial console servers give IT professionals and network operations center (NOC) personnel the ability to perform secure remote data center management and out-of-band management of serial-controlled IT assets from anywhere in the world in a manner similar to using KVM over IP gateways for graphical IT assets.

The console server provides enterprise and telecom networks with a complete, secure console management solution. When combined with integrated power management and centralized administration, console servers offer a secure and consolidated out-of-band infrastructure management solution.

So, how does a true KVM over IP switching system work?

KVM over IP takes advantage of the TCP/IP infrastructure you already have in place:

- The analog signals are captured from a keyboard, monitor and mouse.
- The signals are converted into digital packets.
- The signals are digitized and the packets are compressed and securely transmitted across your existing infrastructure using TCP/IP connections.

With TCP/IP networking, and the easy world-wide availability of the Internet, there is no longer any reason why you cannot access and manage any of the servers and devices in your data center. A centralized management solution centered around KVM over IP can securely and successfully cut distance ties to your rack and free your IT staff to be more productive.

The Many Advantages of Centralized Management with KVM over IP

- Saves space and money by eliminating multiple sets of keyboards, monitors and mice
- Reduces downtime by providing easy access and control to any connected IT asset
- Requires no special software or hardware modifications to the targeted device
- Provides access to multiple platforms within one switching system
- Offers at-the-rack access to systems from anywhere in the world

What to Look For in a Centralized Management System

As the number of servers and network devices in your data center continues to grow, you need to know the facts when evaluating serial or KVM over IP solutions.

Following is an overview of centralized management, with five guidelines to consider when evaluating best practice solutions for your data center.

Five best practice guidelines for evaluating data center management solutions:

- **Centralized Control** – A hub and spoke architecture with one-screen management of all your connected devices
- **Scalability** – Your network will grow; choose a solution designed to grow with you
- **Remote Access** – Secure, single sign-on control from a browser interface
- **Security** – Settle for nothing less than industry-standard, enterprise-class security
- **Flexibility** – Add servers and network devices; easily add or change administrator settings

1. CENTRALIZED CONTROL

A hub and spoke architecture with one-screen management of all your connected devices.

Make sure the solution you decide on is compatible with software management that provides, on a single computer monitor, an easy-to-see, combined view of all of your connected servers and devices, regardless of their location. You should be able to check the status of a rack of servers at a glance without having to “click” or scroll through different views. Being able to view multiple servers on one monitor at the same time allows you to spot problems more quickly and helps reduce response time.

Your vendor should be able to incorporate a hub and spoke model for IT data center management. The hub and spoke engine provides a solid failover system; if your “hub” server suffers a problem or shuts down for routine maintenance, a “spoke” server becomes the primary without loss of data or transactions. As a user, you can prepare for disaster recovery or any outage with up to 15 separate, remote spokes. All components of this type of system are kept in sync to ensure the integrity of the entire system.

Your centralized management solution should also permit you to schedule tasks daily, weekly or monthly. You gain the convenience, for example, of being able to power on devices, export audit log files or upgrade appliances without physically having to be on site.





2. SCALABILITY

Your network will grow; choose a solution designed to grow with you.

Email notifications should also be a part of the software management system so your managers know instantly when important events take place. And insist on configurable SNMP traps so you are alerted when your system experiences failed authentication, server reboots and user or appliance changes, among other events.

When considering a centralized management system, specify a solution that will provide KVM, serial and power control of not only your PC servers, but your USB, Sun and IT devices as well. It should be easily accessible over the network, using a non-proprietary technology such as SSH and SSL for encryption.

Check to see if the cabling has intelligence built in that helps facilitate device naming and detection. The administration platform should provide a detailed audit log of user access. Look at what type of reporting capabilities the solution offers. Ask if audit logs and event reports can be exported into CSV format for integrated reporting. Your management solution should pull server port names from the local databases that reside inside the appliances. Insist on the power to know who accesses your system and when.

The first thing that comes to mind when you think of scalability in terms of server management is probably the clutter of a lot of equipment, monitors, cables, racks and other critical infrastructure components in your data center. The right centralized management solution will help meet the growing needs of your business and expand with you.

You should consider how often you will need to add servers or users and how you will access your data center devices – TCP/IP connections or direct analog connections. You should also consider whether access at the rack is enough, or if you will need to control servers from 100 feet away or hundreds of miles from your data center.

You should feel confident that your serial port or KVM over IP solution is based on your infrastructure, so it will not need any special design considerations for scaling. As the number of users, servers and network devices grow in your data center, your system should easily expand with your business. This type of scalability is absolutely critical when implementing a server management solution. If you are starting with a small number of servers, you want a system that can grow with you.



Avoid blocked access to mission-critical servers or devices in your data centers. Appliances that support more than two user paths will increase data center efficiency. A centralized serial or KVM over IP system can support many users at one time. Ask for TCP/IP connectivity so that adding users and servers is as simple as adding a device on your network.

You should also expect to have a graphical user interface (GUI) so you will not have to retrain your staff after each upgrade or reconfiguration. A standard Windows® application should provide a familiar interface for busy IT staff that needs to quickly access and control any network device from just one screen. Insist on centralized management software that easily fits with your existing network and desktop operating system.

Another important consideration is programmability. As data centers move more towards “autonomic computing” – where systems can configure, manage and even repair themselves – solutions that can be pre-programmed to allow automatic detection and decision making will require less direct intervention on your part. Ask your vendor how a system like this can drastically reduce your workload and personnel costs, while anticipating changes.

One thing is certain: Your network will grow and change. As it does, you’ll need a reliable, manageable, scalable centralized management solution that can grow with you and accommodate a large number of simultaneous users without requiring internal architecture restructuring.

3. REMOTE ACCESS

Eliminate distance limitations and downtime; experience the secure control of TCP/IP-based connectivity.

Whether your servers are deployed down the hall or around the world, you want the same level of access you have sitting directly in front of your server. Your administrators should have access wherever they need it, with information transmitted over standard TCP/IP connections. You want control using a single interface.

Virtual media enables administrators to achieve increased operational efficiency in remote server management. They can remotely load software by mapping a local removable media or a mass storage device to a remote server. This ability to remotely conduct file transfers and other tasks from a CD makes for a more efficient work day by keeping IT administrators at their desks.

Again, the ideal system incorporates hub and spoke architecture to provide multiple failover capabilities. Having the luxury to use an alternate software server if your primary is

Applications

Local control

The government of one of America’s fastest growing counties was able to maximize rack space and gain the ability to connect to their servers from any location by installing KVM over IP switches. The solution helped reduce the number of consoles in their server racks and allow for multiple support personnel to access the switch at the same time via their workstations.

Branch control

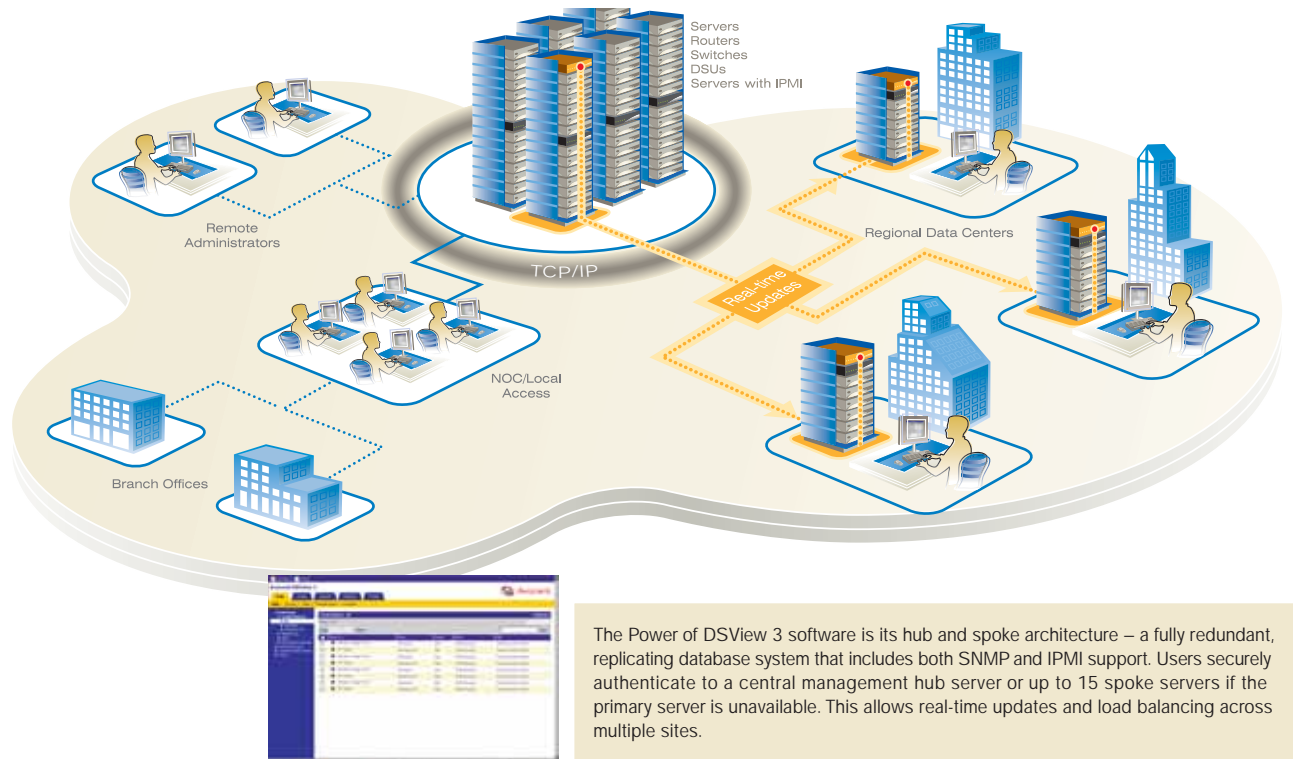
Network administrators at a leading enterprise software firm learned the value of their centralized management solutions when an after-hours troubleshooting need arose several states away at a branch office. Most valuable was the ability to troubleshoot in “real time” by accessing their devices remotely and securely as if they were sitting in front of the server. No longer is there a need to call and walk someone through troubleshooting, have technical staff at each location or absorb the high cost of service calls. When changes need to be made at a branch location, they can be done securely and remotely.

Enterprise

Ticketmaster, a leading event promoter and ticketing service with five domestic data centers, uses centralized solutions to manage hundreds of servers and gain superior remote capability, as well as better space utilization in their data centers – allowing them to deploy new solutions to their customers. Because the solution is built on NT architecture, it also allows them to leverage existing security standards on their administrative network.



DSView® 3 management software and DS Series appliances give administrators secure browser-based remote access to regional data centers and branch offices, all from a single interface.



The Power of DSView 3 software is its hub and spoke architecture – a fully redundant, replicating database system that includes both SNMP and IPMI support. Users securely authenticate to a central management hub server or up to 15 spoke servers if the primary server is unavailable. This allows real-time updates and load balancing across multiple sites.

unavailable is huge. It means that all your users, without fail, can authenticate and access devices for which they are responsible no matter where they or the devices are located.

Centralized serial and KVM over IP solutions leverage your network configuration to provide local and remote BIOS-level access to virtually any number of servers or network devices from any location in the world. Insist on an interface that is customizable, browser-based and provides simple, fast and reliable centralized management.

Your system should include keyboard pass-through, eliminating the need to create numerous commands to send specific combinations of keystrokes to target devices. It's beneficial to purchase a system that includes a scaling feature. Scaling permits you to resize session windows to view multiple connections without taking up your entire desktop.

Ask your vendor if their management system is a centralized Windows application that manages multiple serial and KVM over IP appliances, remote or otherwise, with a wide range of digital path options. More digital paths per appliance, means more user access.

A Windows application that simplifies access and control of any network appliance is critical for point-and-click

administration. Adding serial devices such as power devices, firewalls and routers should only require a few clicks of the mouse within one centralized Windows application. And, if network problems prevent access to any of your devices, be sure your system has external modem support so you can reach your serial or KVM over IP appliance, and the attached devices, using a dial-up connection.

4. SECURITY

Settle for nothing less than industry-standard, enterprise-class security.

Reducing your physical security risk is one initial benefit of using a centralized management approach that includes out-of-band serial port and KVM over IP solutions. Servers can be locked away in a room and controlled from miles away in a "lights-out" data center. With that in mind, place a premium on a system with virtual media capabilities. Administrators gain the ability to conduct file transfers, application and OS patches, and diagnostic testing without ever setting foot in the data center.

Beyond physical security, you will want single sign-on and centralized authentication based on industry standards. Consider if the system includes audit logs and the ability to assign individual user rights. Ask if the system includes

multiple levels of security. Make sure it leverages Windows NT/2000 security in addition to providing multilevel authentication and password protection as well as encryption.

Ask if the solution has Lightweight Directory Access Protocol (LDAP) capability for identifying and utilizing other network assets. Clients should be able to authenticate users via LDAP, Active Directory (AD) and NT Domain. The KVM system or Serial console server should either provide the flexibility to assign individual user rights, or it should assign permission by group settings only. Ensure that the packetized KVM data is encrypted to prevent “snooping” of your sensitive management information.

In addition to requesting features such as privacy and stealth mode, where administrators can preempt a session, find out if the system provides detailed reporting and event logging. Can you use the activity log from any hour of the day to track users and events in the system? Check if information such as failed authentication attempts, channel blocked and insufficient access rights are collected and stored from all appliances in the network and available to be exported into CSV format for integrated reporting.

Make sure the system management tool implements selectable data and video encryption modes and provides compression along the entire path of the connected session. Keystroke, mouse movements and video should be transmitted with AES, DES, 3DES and 128bit Secure Sockets Layer (SSL) encryption depending on your particular security policy.

One of the perils of suffering a network failure, client machine

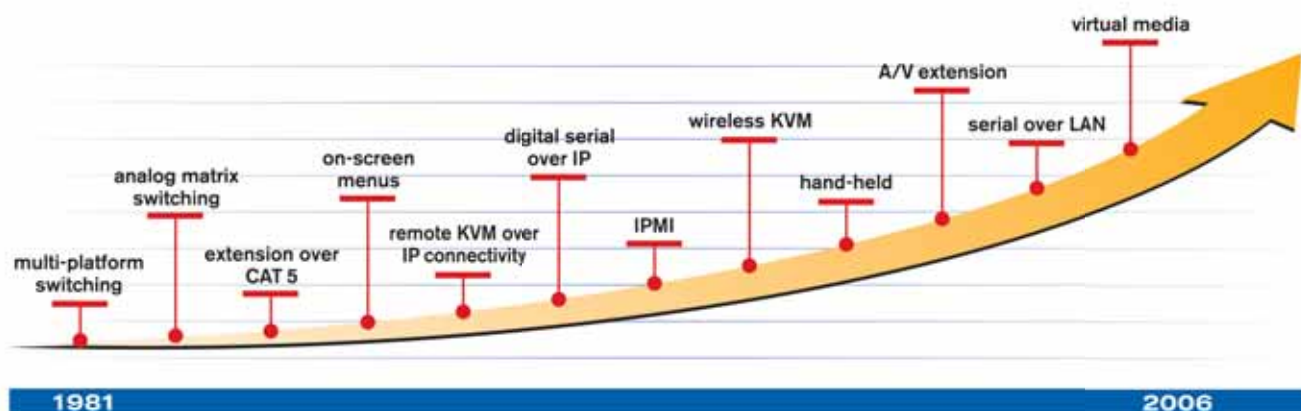
lockup or inactivity disconnection is exposure to outside manipulation or attacks. Your servers are still basically “open,” logged in, and highly vulnerable. Be sure to select a vendor with management software that provides exit macros. Exit macros send the keystrokes required to log out each user when a session is terminated for any reason. This protects your system against one user accessing a server under the assumed identity of the person previously on the same server.

When you integrate a KVM or serial console switch into your network, it inherits many of the aspects of the security model you already have in place. With IP-based management systems, users access a switch not connected to an Ethernet port on the target computer, only to the KVM or serial port. Any system that provides this type of powerful access must also feature multilevel passwords, authentication and a strict industry-standard security model to leverage the industry-standard features of Windows already being used in your network.

Your management appliances should support SSH and/or SSL, as well as the authentication method (RADIUS, LDAP, Token-based, etc.) required to support your security policies. It should also allow multi-level user access control and be able to log console sessions and activities.

Added peace of mind comes in the form of hub and spoke technology. The hub and spoke system assures you of having multiple failover capabilities. It requires all users on your system to authenticate to a management software server where their activities are logged for your review. If their primary server is unavailable they can still use a “spoke” server to establish their credentials as a legitimate user on your system.

THE AVOCENT HISTORY OF innovation





"Originally, KVM technology was used as a method of controlling multiple computers with one keyboard and mouse. It has since developed into a data center management tool used to control everything from power supply to network devices...Avocent is ranked as the leading player in the global KVM market by IDC."
– Australian Reseller News

5. FLEXIBILITY

Add servers and network devices; easily add or change administrator settings.

Change is part of the nature of a data center. Re-engineering data centers or managing newly acquired data centers or branch offices is more and more common. It seems there is always a need to upgrade, resulting in the integration of multiple hardware and software programs. When choosing a centralized management solution, look for one that can accommodate such complexities.

Advanced cabling options such as CAT 5 network cable help protect your investment in time and money right from the beginning. Today's solutions no longer require bulky cable runs.

Ask your vendor how your IT staff will be able to control the devices in the data center. They should be able to easily point-and-click to any server or network device from any location. Your staff should have direct analog access and IP-based connectivity at the rack at the same time. Find out if the system combines this connectivity in one chassis. Having both types of access makes your solution much more valuable and useful in the rack.

When choosing a centralized management system, make sure it supports single sign-on access and control. The interface should help you easily manage passwords and permissions for each user. The software should provide control of not only servers but serial devices, power consoles and environmental monitors – all from a single screen. It should also integrate with your existing directory service and be flash-upgradeable?

Ask for software that includes a customized view so each user can organize servers and other resources in ways that are useful to their daily task or individual responsibilities. This speeds up the process of connecting to a server or other devices.

By giving your IT staff a choice of how they can access and control data center devices, you can improve productivity. By using a standard Windows GUI, your IT staff will be able to quickly begin working with a server management interface they already know.

Look for a solution designed to provide a centralized view of all of your data center devices, and not just PC-based. Ask your vendor if you can easily use one console to gain BIOS-level control of any device or PC, including PS/2, USB, Sun computers or any IT asset.

With IT budgets continuously scrutinized, it is imperative to choose flexible solutions that meet the changing needs of your data center. Choose a manageable Serial or KVM over IP solution with a security model based on industry standards that offers multi-user, multi-location solutions with both local and IP access for all major server platforms and devices.

Multi-platform control is important.

Because the world is made up of devices other than PCs, you need a centralized management system designed for multi-platform control. While the majority of your data center today may be PC-based, you cannot easily predict that your network will not involve multiple platforms, devices, operating systems and locations. Your vendor should have a solution that handles multiple platforms in a single, managed system.

INTEGRATED SERVER MANAGEMENT

Server and management equipment vendors are also developing management agents that can be installed inside a server or a network box to further extend the reach of out-of-band management. Technologies such as Intelligent Platform Management Interface (IPMI) act as hardware management agents that collect health information (temperature, speed of ventilation fans, and voltage on the power supply), redirect system console information, and perform power cycle and hardware resets independent of the server operating system. In a large data center environment, these agents greatly extend the management abilities of an out-of-band management gateway connected to them using a serial or LAN interface.



ROI – HOW to spend money TO MAKE MONEY

Investing in a centralized management solution offers a dramatic return on investment (ROI) through time saved, increased productivity and improved efficiencies in your data center.

You gain 24/7 secure access and control almost immediately when you experience the power of centralized management of your data center. Distance limitations are eliminated. Remote access increases IT staff productivity by cutting unnecessary treks down the hall or across the campus to work on your systems. Car and plane travel expenses for troubleshooting technicians are practically eliminated. Access to your data center is available without ever needing to leave your desk.

In addition to increasing the time and effectiveness of IT staff, your solution will improve air flow in the racks, reducing cooling expenses; increase data center real estate for other devices; and provide a superior security structure, all to help you perform at a higher level – and save money.

For example, the acquisition cost of an advanced console server solution is around \$100 per managed port. If this investment eliminates at least one trip where the technician travels to the remote location to push a button (or to power cycle a box), or saves just one visit of the system administrator to the data center during the year, the investment will pay itself back quickly.

Whatever method you decide you need for data center management, you'll find that it does indeed pay to centralize. By combining out-of-band network with in-network management, you'll not only cover more area, but you and your data will be covered, too.

Read what our customers have to say about us...

"The Avocent solution allows us to keep our data center accessible and secure. We are able to provide console access to our customers via the network or over IP. The Avocent solution provides a centralized management solution." – Microsoft Technology Center in Chicago

"The Avocent DSR exceeded all of our expectations. Its use of KVM switching over the network meets our crucial need for issues management for the Xbox Live online gaming service." – Microsoft

"The Avocent solution enables us to leverage our existing security standards on our administrative network and maintain those password policies and password expirations that were overlooked by our previous solution." – Ticketmaster

"Using Avocent KVM switches in my data center helps reduce the number of consoles in our server racks and allows multiple support personnel to access the switch at the same time via their workstations. This saves time and allows us to be more productive when troubleshooting problems." – Center for Enterprise Information Technology in Clark County, NV

"One of the key benefits is that we can actually lock down a specific port on an Avocent switch to only permit access to authorized individuals." – Sydney Water Corporation (Australia)

"Not only do we gain the navigation options of controlling multiple servers with one keyboard, mouse and monitor, but some Avocent power capabilities have allowed us to support our environment better and actually decrease costs by our co-location facility provider." – Ultimate Software

"The Avocent solution is meeting and exceeding our business needs. We are limiting traffic to the data center and getting high productivity from our workers, who have full console access. I don't have to think about it and that's the biggest compliment. It just works." – Long & Foster Realtors

"Without a KVM solution, we would need a keyboard, a mouse and a monitor for each of our 2,000 servers. Such a situation would simply be impossible to deal with. It would be expensive and could even prove risky. At the end of the day, customer service would suffer." – Integra (e-business hosting)

Avocent in the News...

"The DS Series virtual media feature will let administrators remotely move local data to and from servers to perform a variety of tasks across heterogeneous platforms." – Network World

"The Avocent EVR1500 makes setting up an environmental monitor system in the server room a snap, and the large number of sensors supported makes the EVR1500 a good choice for large sites as well. The EVR1500 is also a good choice for monitoring high-security areas because it can detect motion, vibration and audio conditions." – eWEEK

"The Avocent move to using IPMI is a natural evolution of its KVM background. The platform-agnostic capabilities will offer customers more options than what they could get from the server vendors." – IDC



DISTANCE LIMITATIONS ELIMINATED

Centralized management solutions eliminate distance limitations by allowing access and control of servers and other network devices from the desk, the NOC or any location in the world. The most advanced systems combine digital and analog technology into one powerful switch. Systems that are integrated with a Windows-based management application provide more secure and powerful control.

THE MANY ADVANTAGES OF KVM AND SERIAL OVER IP SOLUTIONS FROM AVOCENT

- *Saves space and money by eliminating multiple sets of keyboards, monitors and mice*
- *Reduces downtime by providing easy access and control to any connected IT asset*
- *Requires no special software or hardware modifications to the targeted device*
- *Provides access to multiple platforms within one switching system*
- *Offers at-the-rack access to systems from anywhere in the world*

Avocent centralized management appliances

The Avocent DS Series provides secure control over TCP/IP connections, for maximum scalability and flexible control with a single browser-based interface. The DS Series includes DSView® 3 management software, DSR® KVM over IP switches and a host of other managed appliances.

This technology is a powerful combination for access and control of servers, serial devices and other appliances at the rack, in the NOC or from anywhere in the world.

"The Avocent DSR Series is a logical, follow-on from the digital KVM leaders, making global server access and control accessible and practical for a broader range of data center environments." – IDC



This single sign-on interface includes the ability to conduct KVM over IP, serial over IP, serial over LAN, environmental over IP and power control over IP. DSView 3 management software leverages existing network infrastructure and security models by validating user permissions and access to your data center devices. DSView 3 software supports NT Domain, Active Directory, LDAP, TACACS+, Radius and RSA SecurID authentication protocols.

DSVIEW 3 MANAGEMENT SOFTWARE

DSView 3 software is the cornerstone to achieve centralized management with the Avocent suite of patented KVM over IP and Serial over IP managed solutions.

DSView 3 management software incorporates Avocent hub and spoke technology to provide the industry's most secure and reliable KVM and Serial over IP centralized management system for the data center and branch locations.

The hub and spoke architecture is a fully redundant, replicating database with a central management server (hub) and up to 15 mirror servers (spokes). Network administrators enjoy multiple failover capabilities because system users may use an alternate DSView 3 server if their primary is unavailable. Traffic on the central hub site is reduced and load balancing is achieved because the centralized permissions database is distributed in real time. Customers at remote locations have direct access to their spokes.

DSView 3 software with virtual media support furthers physical security by allowing software for tasks such as file transfers, application and OS patches, and diagnostic testing to be loaded remotely. The virtual media solution is available exclusively on Avocent DSRxx3x switches.

DSView 3 management software lets you securely control user permissions across diverse network appliances; configure, manage, upgrade and back up any device; and view and export detailed event logs --- all from a centrally managed interface. It provides selectable encryption modes including AES, DES, 3DES and 128bit SSL encryption during keystroke, data and video transmissions. Exit macros provide added security when you terminate a session.

DSView 3 software offers ease of management features that include automatic discovery of appliances during initial setup and "wizards" to assist with a variety of tasks such as system settings, event scheduling and simultaneous flash upgrades.

Avocent centralized management appliances

"It has good security features and flexible configuration options...a flexible and well-designed unit that can manage servers and devices with equal ease." – SC Magazine review on the Avocent DSR KVM switch

Business Solutions ENTERPRISE SOLUTIONS

All Avocent DS Series switches are 16-port network appliances that combine analog and digital technology into one KVM switch. You gain access and control of servers and other network devices no matter where they are located.

DSR switches support VGA and multi-platform servers, including USB and PS/2. With DSR switches you also have the convenience of choice – 1, 2, 4 or 8 digital paths depending on the system you select.

All models are controlled with DSView 3 management software with hub and spoke architecture for remote IP access, and a patented OSCAR® graphical user interface (GUI) for local access at the rack. SNMP and IPMI support are provided. The Avocent DSRIQ module interface allows servers to be attached using standard CAT 5 cabling to reduce your cable clutter.

All DSR switching systems are scalable, flash-upgradeable and require only 1U of rack space per switch. The DSRxx3x suite includes virtual media capability, a feature especially well-suited for supporting enterprise physical security objectives. Software can be loaded to all your connected servers without a trip to the data center.

SMALL AND MEDIUM BUSINESS SOLUTIONS

Several of the Avocent DS Series switches feature direct appliance access – allowing you to tap into your devices via a Web browser without using software. As your networking system grows, you can easily add DSView 3 management software to bring in all the same centralized management solutions Avocent provides to enterprise customers.

BRANCH SOLUTIONS

The Avocent DSR series of branch management switches are specifically designed for IT administrators who need to easily troubleshoot, reboot or even power cycle servers or serial devices in branch offices, avoiding the need for costly on-site service calls.



KVM IP SERIAL IP



You have a choice of 1, 4 or 8-port digital-analog switches to match your branch or remote location needs. Each switch includes a power control port and external modem support. External modem support will allow you to manage remote devices when the network is down.

The patented OSCAR® GUI provides local access and control and DSView 3 management software, with SNMP and IPMI support, provides secure KVM over IP access and control anywhere, anytime. With browser-based DSView 3 software, you have BIOS-level boot up access and control of a branch office's servers, routers, DSU devices and switches.

Unique Features

SERIAL OVER IP

SERIAL OVER LAN

With 1, 4, 8, 16, 32 or 48-port Avocent serial over IP network appliances and DSView 3 management software you have centralized access and control of major server platform environments, routers and other serially-managed devices. Console servers also support industry-standard Telnet and SSH clients.

Avocent's console servers are the industry's first serial over LAN console appliance. The CCM appliance provides access to virtual Remote Management Control Protocol (RMCP)

console ports as well as physical console ports. The most notable benefit to you is the ability to send and receive console commands with serial cabling.

The Cyclades™ ACS family of advanced console servers provide secure, remote access to IT devices and console port management for UNIX-style and Windows-based servers. The ACS console servers give IT professionals and network operations center (NOC) personnel the ability to perform interactive or automated secure remote data center management and out-of-band management of IT assets from anywhere in the world. These serial console servers include the industry's most advanced user defineable security framework which provides a set of pre-defined security best practices as well as the ability for IT managers to customize their own security profiles to comply with existing network security policies.

IPMI SUPPORT

The Avocent Intelligent Platform Management Interface (IPMI) proxy appliance is managed by DSView 3 software. This provides a browser-based, out-of-band interface to securely monitor and control power and system health on IPMI-enabled servers. DSView 3 software allows access to these servers only after user authentication and uses the same interface as KVM, serial and external-managed power connections.

Data center IPMI technology is also accessible through Avocent CCM serial console appliances. IPMI is a valuable tool for administrators to monitor and control mechanical elements of server hardware such as processor temperature, fan speeds and power supply voltage.

POWER CONTROL

The 4, 8, 10, 16 or 20-port power over IP devices provide you with secure power management for all connected data center devices. Working in conjunction with DSView 3 software and an Avocent console server appliance, the power management device allows for remote reboot, power status monitoring and power cycling (on/off commands).



Choose wisely; choose a proven partner in the industry

Avocent invented and patented KVM over IP, and offers an extended array of serial console solutions as well. Avocent is the most experienced KVM vendor today with the largest install base in the world. Clients include a growing number of Fortune 100 and Fortune 500 businesses. For more than two decades, Avocent has provided IT managers in any industry with centralized management solutions to access and control of multiple servers and network devices. Avocent representatives can help you custom design a solution to match your needs.

Our centralized management solutions feature DSView 3 management software and the DS Series KVM over IP switching systems for both enterprise and branch locations. There is an Avocent solution for every data center or location, no matter the size. Other solutions include serial network appliances, power management devices, environmental monitoring, wireless access and mobile devices.

Avocent continues to introduce new technology that advances centralized data center management through the hub and spoke multiple failover architecture. Now more than ever, IT managers have a choice for how to manage growing data centers.

Avocent was formed from the merger of the world's two largest KVM (keyboard, video and mouse) switch manufacturers: Apex and Cybex Computer Products Corporation. More than two decades of experience goes into Avocent KVM switches, remote access and serial connectivity solutions and customer service. Avocent has sales, operations and R&D centers worldwide. Corporate headquarters are in Huntsville, Ala.

For more information about the centralized management solutions that best meet your needs, contact Avocent today for a consultation:

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www.avocent.com

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