



## Server Room Solutions:

How small to midsize IT departments can make their budgets appear larger than they are

## Overview

Managers of small and midsize IT departments must deliver uninterrupted service 24/7. Undersized budgets, bare bones staff, increasingly complex infrastructures and miniature workspaces are all part of the equation they're expected to solve. But there's a danger in this juggling act, and even the most skillful managers are vulnerable.

Managers of small to midsize IT departments, engulfed with day-to-day operational problems, have little time to make plans to expand capacity. Without additional capability, revenue is stagnant and budgets remain low. It's a negative cycle that not only restrains their growth but also threatens their survival.

A large business data center, on the other hand, has the financial resources to upgrade to new technology whenever necessary. They use the advantage of scale to provide their clients with ongoing service improvements. It's a cycle that leads to continual growth.

Fortunately, data management tools are available that can optimize the utility of existing technology, boost security and strengthen disaster fail-safe programs. They have the effect of "leveling the playing field" with regard to large business data centers so that smaller IT operations can enter a cycle of growth.

## Choose the Right Tools

If a management tool is to be effective, it must possess one essential virtue irrespective of individual needs. This virtue is simplicity. Hardware and systems must be easy to install and simple for the staff to master. Complicated tools can consume resources to the point that they erase the benefits that had justified their purchase. This requirement is the point of entry for this category.

### **In Band vs. Out of Band**

The trend in technology development is to design tools that help IT administrators do more with less, which is good news for companies with limited resources. Today, there is a range of affordable, centralized IT management solutions that offer you 24/7 control over your data center, whether you're right there at the rack, in your office, on your laptop at home or anywhere in the world.

But first, some definitions:

### **In Band, Out of Band: What's the difference?**

Generally, there are two ways to access the OS level of your servers and networking devices – through in-band and out-of-band methods.

**In-band management** is a way to access a target device using the network's existing data stream as a conduit.

Most equipment – like switches, routers, network appliances and servers – includes a TCP/IP stack that provides some type of service (i.e., routing packets, serving Web pages, etc.). Within these packet processing functions are management packages that are addressed to the device itself.

So if protocols such as TELNET and SSH are supported by a networking device, a terminal interface is available to the user. In-band management tools for servers typically come in the form of remote desktop software. It's through these interfaces – and their management packets – that an IT administrator can access, or talk to, the target devices.

For in-band access methods to work, however, the network, or the OS of the target devices, must be available. If there is a network outage, or the server's OS is frozen, there may not be another way to access and troubleshoot the target devices.

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**Out-of-band** management, on the other hand, uses external equipment – including switches – to access target devices outside the channels used by the network. This allows users to monitor and access target devices even if the OS or network is down.

**Analog KVM** and **digital KVM** devices help IT administrators manage servers. Both are stand-alone devices that fit in an open space in the server rack. Server management can also come in the form of embedded technology. Called **Baseboard Management Controllers (BMC)**, these are specialized microcontrollers directly installed on the motherboard of the server.

There are also appliances that can access and manage the company's networking and telecommunications devices. These are commonly called **Serial Console Servers**, or **Serial-over-IP Switches**.

All switching solutions have their advantages. All can also be used separately, or together, to meet the needs of your business. So which should you choose?

## Out-of-Band Options and Solutions

### Server Management: KVMs to the rescue

A KVM switch allows a user to control multiple IT devices from a single keyboard, video monitor and mouse. Matrix KVM switches allow multiple users, each using a KVM console, to connect to multiple devices.

### Advantages of KVM Switches

KVM switches are easy to install and offer BIOS-level control of your servers, even if the target server's operating system is down. They replace multiple keyboards, monitors and mice, so they reduce clutter in your server room. They offer maximum scalability. Plus, there is less cabling, saving you money and disruption to the work environment.

### Analog KVM: Local heroes

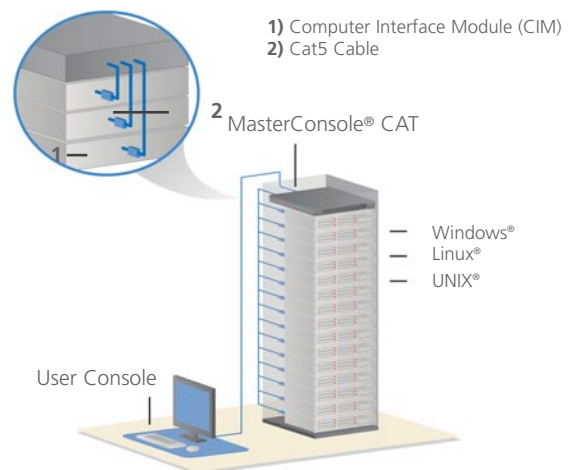
Analog KVMs operate by having a direct cable connection from your computer to the KVM switch to the server. Cables are generally Coax or Cat5.

### Advantages of Analog KVM Switches

Analog KVMs, like all KVMs, operate independently of your network, enabling BIOS-level access to your servers. Because they're wired directly to the server, analog KVMs provide a high level of security, plus high-quality, real-time video and superior mouse performance.

### What to Look for in a Product

- ▶ Scalability, to grow as your needs grow.
- ▶ Usability – Is it easy to set up and use? How easy is it to add servers and network devices? Or add/change administrative settings?
- ▶ Flexibility – What is the maximum distance that users can be from the target servers? Does it work with all the leading industry servers?



Analog KVM switches are perfect for environments where computers and servers are within close proximity. They offer high-security, high-performance video and nearly perfect mouse synchronization.

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### KVM over IP: Remote access pros

KVM over IP uses the TCP/IP infrastructure you already have in place, allowing you to manage and troubleshoot remote servers from virtually anywhere. It gives you a centralized management solution, is easily accessible, and also frees you to be more productive.

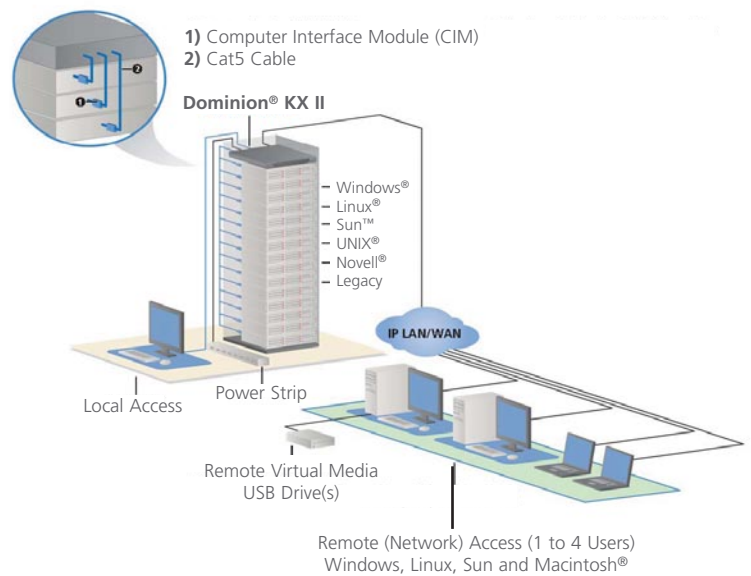
### Advantages of KVM over IP

KVM-over-IP switching solutions can be tailored to meet the needs and budgets of businesses with midsize server rooms and data centers, helping you improve operations uptime and reduce maintenance costs. They offer:

- ▶ At-the-rack access to systems from anywhere in the world.
- ▶ Access to multiple platforms within one switching system.
- ▶ Reduced downtime by providing easy access and control to any connected IT asset.

### What to Look for in a Product

- ▶ Near real-time video and mouse at various connection speeds.
- ▶ File-transfer capabilities like virtual media, which allow users to install patches or upgrades to remote servers from any location.
- ▶ Advanced mouse synchronization capabilities, which allow perfect mouse synchronization out of the box without the need to adjust mouse settings on every remote server.
- ▶ Multitiered security – Built-in authentication and support for external authentication servers, such as LDAP, Active Directory® and RADIUS; SSL or AES encryption for all data; and control of user access rights.
- ▶ Intuitive Web-based user interface for both local and remote access.



In the diagram above, the KVM-over-IP switch offers the user secure access to the server from any location within or outside the data center. Advanced models offer high quality video and mouse synchronization.

### Network Equipment Management: The serial console server's calling

A serial console server provides access to a system's network devices, or any other IT equipment that requires serial connectivity.

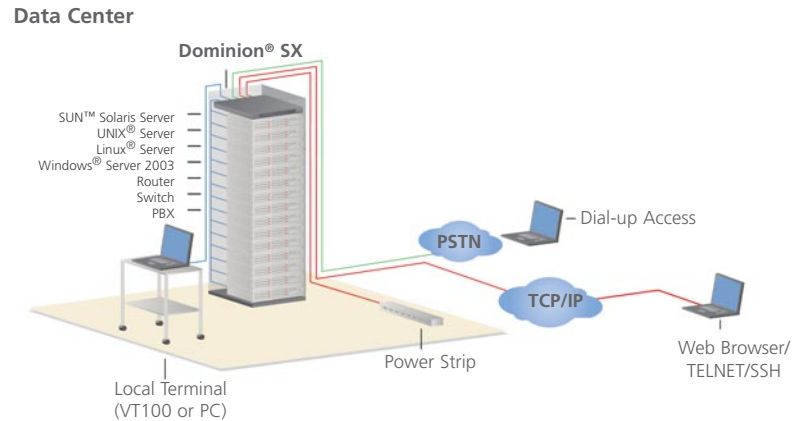
A console server typically provides a number of serial ports, which are then connected to the serial ports of other equipment, such as servers, routers or switches. Dedicated console server appliances are available in many configurations, with the number of serial ports going up to 32 or more, with varying features provided by their embedded software.

### Advantages of Serial Console Servers

Remote users can log onto the various consoles without being physically nearby. IT administrators can also centralize the management of serial devices with a single IP address. The consoles of the connected devices can be accessed by connecting to the console server over a network with terminal emulator software such as TELNET or SSH, or via a modem for out-of-band access.

### What to Look for in a Serial Console Server

- ▶ Access – Can you access network devices via SSH/TELNET or browser? Or troubleshoot your remote network devices even if the primary network connection is unavailable?
- ▶ Security – Does it offer encryption such as RC4 or AES? Can an administrator manage the permissions of each console server port?
- ▶ Can it set up common authentication and authorization for all local and remote users and administrators?
- ▶ Does it offer models with dual power supplies, built-in modem and redundant network interface cards?



Serial Console Servers, or Serial over IP, let you access your system's network devices from any location that has an Internet connection.

### Combined KVM and Serial Console Servers: The best of both worlds

A combined KVM switch and serial console server (see descriptions above) lets you access, maintain and control all the devices in a remote office or server room. Advanced models offer integrated power control, virtual media and advanced data encryption.

### Advantages of Combined Devices

Hardware-based solutions offer secure, remote KVM access, serial device management and power control in a single, space-saving unit. It allows IT staff to securely restore service in less time – eliminating the need to travel to remote locations to fix problems. This is ideal for locations that have limited space, or just a few servers and serial devices.

### What to Look for in a Combined Device

- ▶ One consolidated view of all IT equipment.
- ▶ A single, platform-independent solution that offers centralized, integrated and secure control.
- ▶ BIOS-level control of KVM equipment and console-level control of serial devices.
- ▶ Network-independent access via a built-in modem if the network is unavailable.
- ▶ Security features like AES encryption.

### Intelligent Power Strips: The power to manage power

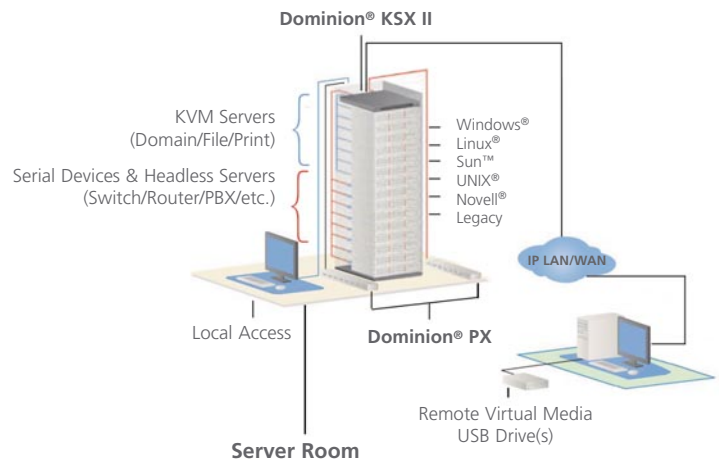
Intelligent power strips provide network managers with the ability to determine how much power the equipment in a remote cabinet or rack consumes, and the ability to remotely reboot any locked-up server or router. Units can also provide an accurate, real-time measurement of the current draw for all the devices connected, as well as environmental conditions of server rooms.

## Advantages of Intelligent Power Strips

Instantly reboot, start or stop equipment in remote locations from your Web browser, eliminating service calls and increasing reliability.

### What to Look for in a Product

- ▶ Does it provide outlet-level power metering and switching, plus user-defined sequenced switching, thresholds and alerts?
- ▶ Does it support outlet-level permissions and LDAP(S), RADIUS and Active Directory®?
- ▶ Is it flexible enough to provide protocol support, including IPMI, SMASH-CLP, SSH, TELNET and SNMP?
- ▶ Does it use fuses, which can trip during normal current fluctuations, or does it use circuit breakers?



Combined KVM and Serial-over-IP devices provide server and network device access in a single unit – perfect for small server rooms or remote offices. Intelligent rack PDUs offer a high level of control over the devices in the rack.

## An Information Journey Lies Ahead

The information and examples presented in this paper were compiled by Raritan. Raritan is one of many sources for the management products and solutions described here.

It is crucial, however, that managers in small and midsize data centers make informed decisions about which of these sources can best address their problems. It will take much more than window-shopping to arrive at the most advantageous decision. The challenges outlined here can serve as a starting point for in-depth research.

## In Raritan's Opinion

Whether you begin your research with Raritan, or end it with Raritan, you'll find that we offer one of the widest ranges of compatible, secure IT management devices in the industry. Our solutions are currently working – non-stop – in thousands of installations worldwide, from small offices to enterprise-scaled data centers.

With Raritan, you can:

- ▶ Access and repair servers and networking equipment out of band from remote locations.
- ▶ Respond quickly to problems, even if the WAN is down or the OS is not available.
- ▶ Reboot equipment and monitor power conditions remotely.
- ▶ Centralize multiple operations into a single management device.
- ▶ Maintain and enhance the security of every IT device you manage.

Raritan is confident that no other company offers better management tools to solve the innate problems of small and midsize IT data centers. After you complete your research, we believe you'll come to the same conclusion.

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## About Raritan

Raritan is a leading provider of secure IT infrastructure management solutions that provide IT directors, managers and administrators the control they need to improve data center productivity, enhance branch office operations and increase overall power management efficiency. In over 50,000 locations around the world, our integrated, secure in-band and out-of-band server access, control and power management products help companies better monitor and manage server access, utilization and energy consumption. Our intelligent PDUs offer remote power control and monitoring at the rack and device level, empowering data center owners with information to improve uptime and capacity planning, and efficiently utilize energy to save power and money. Raritan's OEM division provides embedded hardware and firmware for server and client management, including KVM over IP, IPMI, intelligent power management and other industry standards-based management applications.

Based in Somerset, N.J., Raritan has 38 offices worldwide, serving 76 countries. For more information, please visit [Raritan.com](http://Raritan.com)