TIETOKONE

Reprint of 2003 article from a leading Finnish IT magazine

KVM over IP

Servers behind the network

Operating servers is traditionally centered on one workstation by using a console switch. The familiar technique has now moved to digital time, and the IP network removes the distance limitations.

Compared devices:

- Avocent Autoview 1000R
- Avocent DSR1161
- Avocent DS1800
- BlackBox Servselect IP KV120A
- BlackBox Servswitch Ultraremote
- Raritan Telereach TR364
- Rose Ultralink
- Startech 5V1100KVMIP

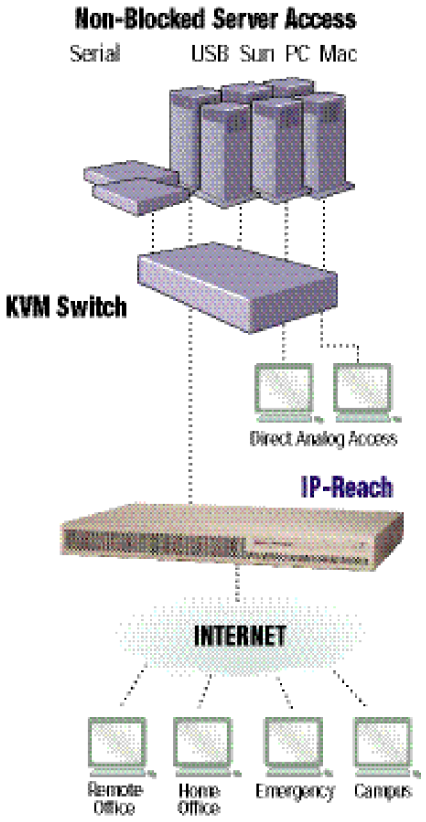
The manufacturers of server devices and operating systems offer many kinds of solutions for the remote management and operation of the servers. However, few solutions work for all situations. This is why the manufacturer independent accessory equipment and the accessory software business are flourishing.

One possibility is the operating systems' own remote console programs or the PC's remote access programs, like PC Anywhere. Many normal support requests and operating situations can be dealt with these; furthermore, even the server can be shut down and restarted.

However, the faults in the hardware and the problems caused by faulty setups of the system programs can not always be solved with the programs that require a functional operating system environment. If the server or the operating system does not start, the only thing the server administrator can do, is to shuffle along towards the server room.

Equipment of the Computer Room

There is usually a mixed collection of servers purchased over the years in the computer room. The oldest can each have their own display, mouse and keyboard. If the company is not very small and can manage with a couple of servers, they have probably decided to rationalize the situation in some point, and switched the joint computers to the server battery by an analogue KVM switch.



In each KVM switch there is an adequate number of interfaces for the server. These interfaces are switched with branch cables to the managed servers' display, keyboard, and mouse connectors. The switch has its own VGA and PS/2-interfaces for the operation, and one server at a time is operated with the KVM devices (keyboard, video, mouse) connected to the interfaces. The console switch is often called KVM switch.

Before, the KVM switches used to be simple devices and the contacted server was chosen using their own push buttons. For years, choosing servers has been much easier by using the special manufacturer-specific or user-installed key combinations that are not transmitted to the servers.

In the latest rack-mountable hardware, not to mention the card servers, the console switch is an almost self-evident standard equipment: otherwise all the space benefits of the rack mounting could not be fully used. It is easy to command the whole rack-full of servers with just one management drive.

Compression and the quality of the picture

Server administrators don't generally get excited about high-resolution displays or true color graphics in the day-to-day management of servers. Nevertheless, the network administrator might also have to browse some manuals saved on the server, which contain graphic elements like photographs and color slides. These are poison to the traditional remote access programs, especially on slow lines.

The programs of the digital console switches tend to reduce the number of the color shades to the minimum, so that the amount of the data transferring on the line can remain small. The compression is of course a compromise, and some programs offer a possibility to influence the compression level and the amount of the color shades.

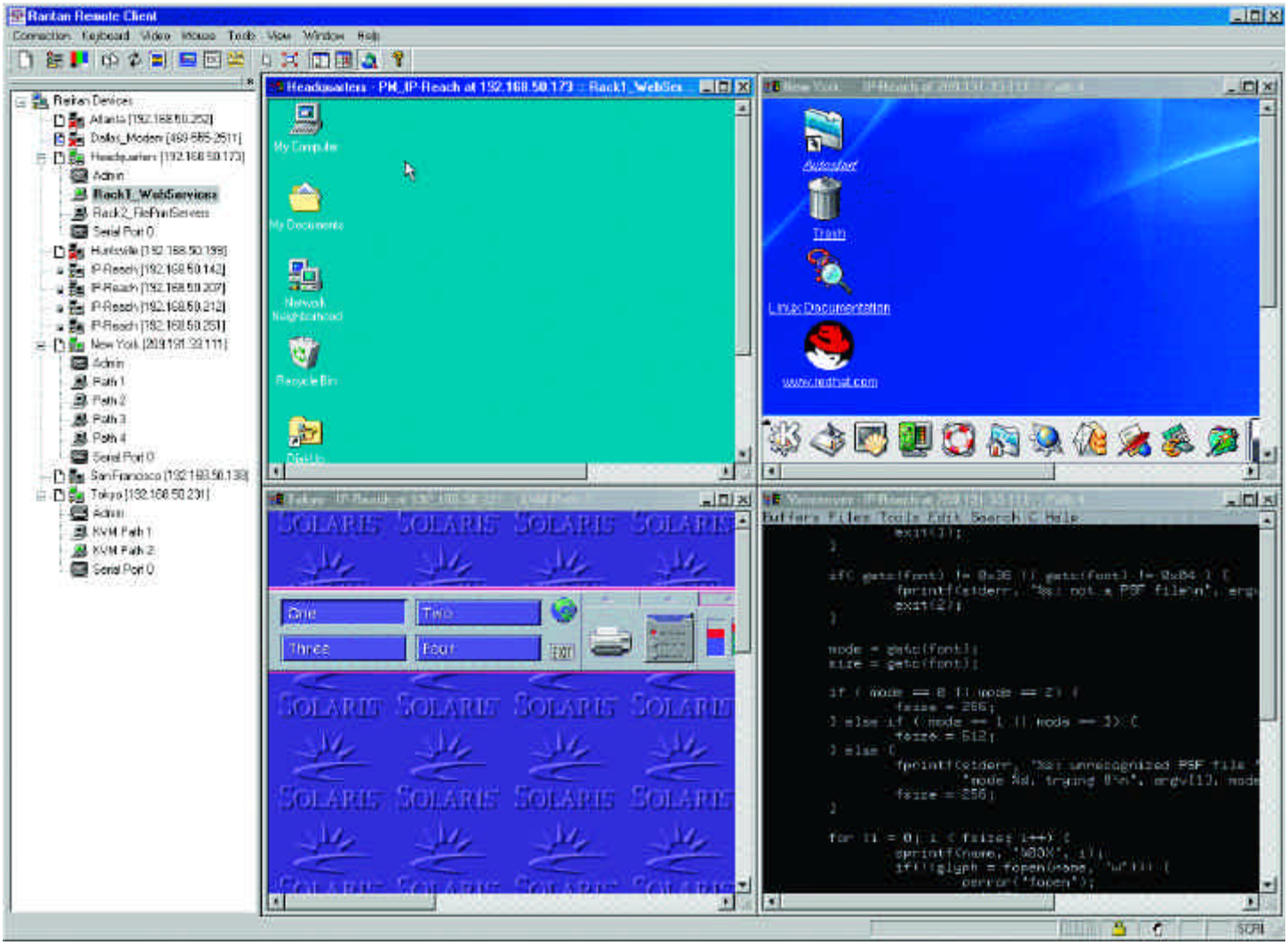
Black Box Ultra Remote and Rose Ultralink gave the smoothest color slides, although the image of the latter was overall a bit odd-shaded.

The package was very similar with all the Avocents: the color slide dissolved into a couple of main shades separated by raster patterns. The same phenomenon appeared in Black Box's Servselect IP product as well. Startech had more intermediate shades than Avocents did, but there was some granularity throughout the screen.

Raritan eliminated the shades the most, and probably because of this it was also the fastest.

Along with the pure resolution, the chosen refresh rates count as well. The console switches usually do not support the highest refresh rates that the display adapters nowadays offer. However, this does not create a problem in the server use.

The choice of the editorial staff: Raritan Telereach TR364



Raritan Telereach is by far the fastest server of the test, and therefore a good choice for an environment, whose existing analogue console switches are shifted into IP time. The good adjustment and information security qualities stress the professionalism of the device.

Comparison

Choice of Monitor Important

The KVM Switches were tested in an environment with two servers and a workstation. The Ethernet-switches of both these servers and the added Cisco 2600 router acted as the network. Through the use of this Cisco 2600 router, we could test all switches in both a pure LAN network environment and simulated slower internet connections or a MAN network environment.

Windows 2000 and Red Hat Linux were used as operating systems for the remote control servers. As was to be expected, there were no functional differences between the two, allowing both systems to establish remote access from all tested switches.

The switches were tested at two speeds. In the Lan network at 10 megabyte per second, and using an ISDN-verbinding at 64 kilobyte. The Ethernet network soon showed significant differences in easy of use, but when using the ISDN line several programs proved useless.

Using the Ethernet, refresh rates for most devices where equally fast if you disregard measurement inconsistencies. Nonetheless, the weaker products clearly showed differences in user friendliness when working with the mouse. True speed measurements were tested on the ISDN line. With the Linux server we measured the conversion of a page from the manual using a VGA screen in text mode. The Windows server was used to measure the conversion of a Adobe Acrobat scanned page of the manual in different resolutions and color depths.

A fairly surprising result from the test was that the different products were obviously optimized for different user environments. For example the Avocent and Black Box products performed slower in standard VGA resolution than with a slightly higher resolution.

A system manager therefore faces a pleasant task of experimenting with digital KVM switches for his server farm to discover the most effective display mode for his own servers. In a LAN environment this is useless, but in case of slower connections, neglecting to optimize can come back to haunt you.

Updating is the most important

The **efficiency**, or speed, with which the screen is refreshed was considered to be the most important factor. In a linked LAN network, flexibility alone is not enough. Response times need to be acceptable, even in heavily used IP networks or slow internet connections.

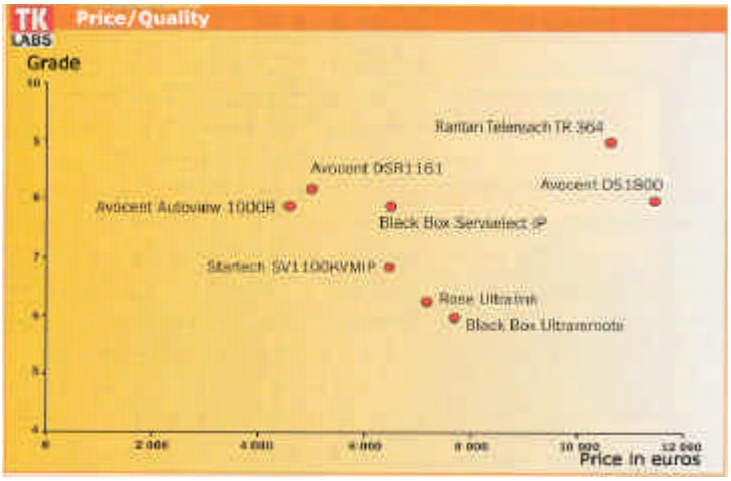
The second most important factor was **availability.** Very important for user friendliness are ease of setting screen parameters, control of cursor delays when using a mouse and the smoothness of switching a user station from remote access to local use and vise versa.

In judging the **functionality of the programs** we looked at user control, the available macro's and the option to create macro's yourself.

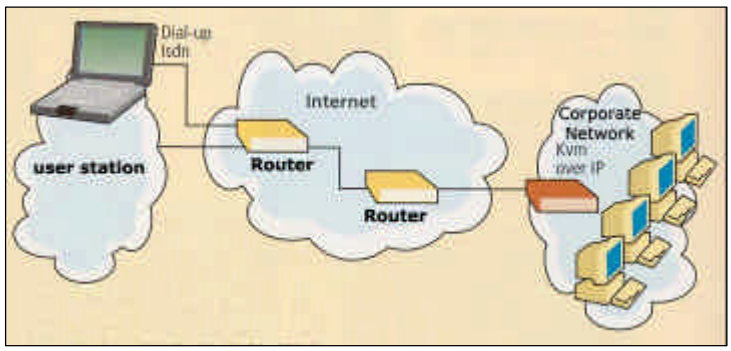
As for product features, specifically a large number of ports and multiple options of use are considered a plus. On the matter of **instructions and documentation,** there were big differences between the products, but because all products are easily understood, not much weight was attached to this.

Why Purchase a Digital KVM Switch?

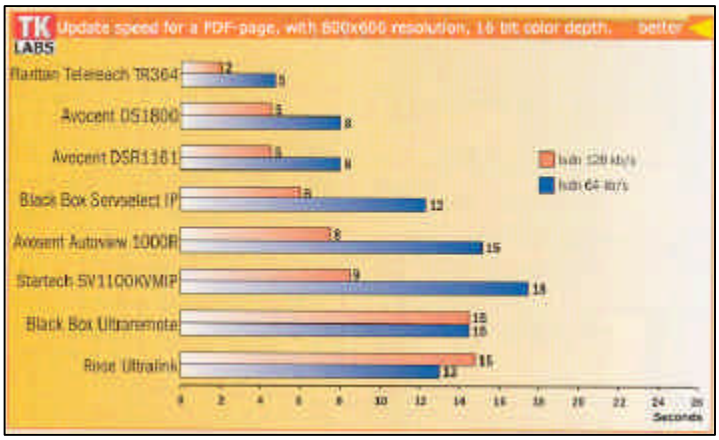
KVM switches with an IP interface are hardly cheap. Where prices for analogue switches for several servers and one work station varies from one hundred Euros up to several hundred Euros, prices for the products in our test go up from five thousand to more than ten thousand Euros.

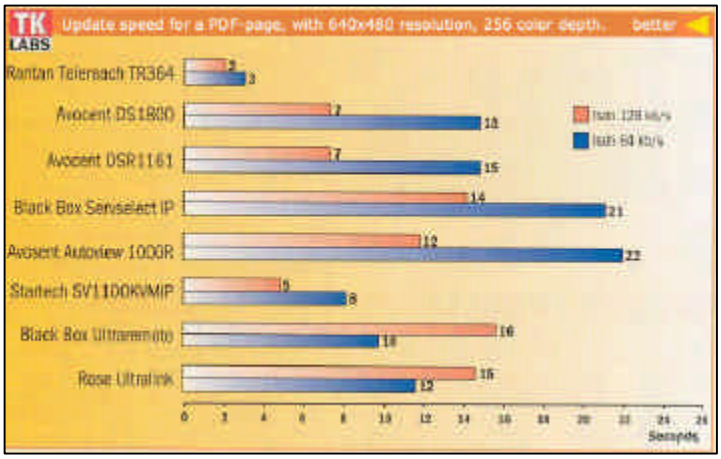


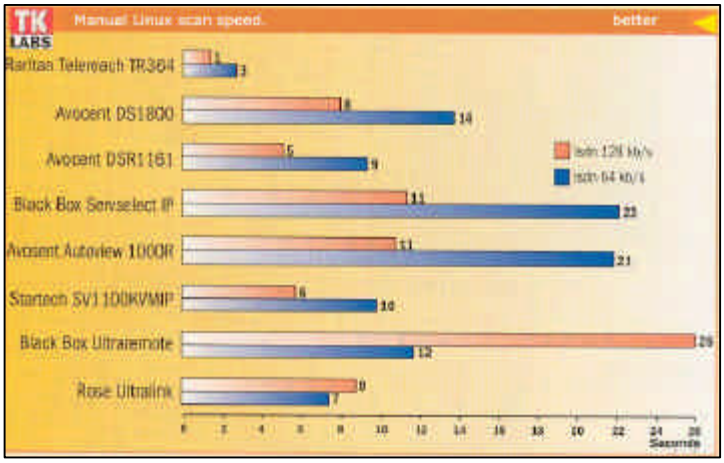
The closer to the top-left corner, the better the price/quality balance of a program. In judging the price/quality balance, we also took into account environment dependant additional investments like for analogue KVM switches, server interface modules and separately licensed software.



These prices are the result of the complex technology of these products and they are justified in light of the many ways to use them. Nonetheless, a careful system manager will consider alternatives.







The switches are apparently optimized for different user environments, since the performance ranking varies somewhat. This variation depends on speed of the line, screen resolution and color depth. Having said this, Avocent and Raritan obviously distinguish themselves as the best products. The shorter the column in the table, the better the performance.

All server manufacturers offer built-in controle measures on different levels. Many of these operate over the IP system, which is an advantage. Compaq users for example, nowadays HP, can take advantage of the excellent Remote Insight Lights-Out control adapter and related Proliant servers supporting programs. In case of many servers, all the specific solutions for each separate server lead to high costs.

Large server farms, containing tens or hundreds of servers, don't want to commit to one single server manufacturer. If the server room is packed with hardware equipment from two or three manufacturers built up over the years, it's not a good idea to use remote management programs that are tailored to one single manufacturer.

At these large server farms, costs of KVM switches per server are competitive after an initial threshold that is reduced per server. The remote access program is also the same, regardless of brands and operating platforms of the servers. This reduces need for employee training and the amount of operational errors.

Switches and Gateways

The tested products are divided into two main categories, based on their purpose. Real KVM switches can be used to connect servers to directly. Gateways are meant to connect traditional analogue KVM switches to the IP network.

It's a thin line, since the interface posts are the same in technique. A bd25-port can just as easily handle a cable that is connected to an individual server as to one that is branched to another console-switch.

The purpose is therefore defined by the number of ports related to the price of the product. If a KVM switch costs thousands of euros and has one single port, it's obvious that it's useless to connect one single server to it. If a product from the same price range has sixteen ports, it's a different situation. The price per port determines how the product should be used sensibly.

Most potential customers have analogue KVM switches in use one way or the other. Connecting these to an IP network is a sensible first step that keeps the costs per port in check. Later on new servers can be connected to digital switches directly.

Weighed value	Palno-arvo	Raritan Teleraech TR364	Avocent DSR1161	Avocent DS1800	Avocent Autoview 1000R	Black Box Servselect IP	Startech SV1100 KVMIP	Rose Ultralink	Black Box Ultraremote
Efficiency	35 %	10	8	8	7	7	6	6	5
Availability	30 %	9	8	8	8	8	7	6	6
Functionality of the program	15 %	8	8	8	9	9	7	7	7
Instructions and documentation	10 %	8	9	9	8	8	9	6	7
Device features	10 %	8	9	7	9	9	7	7	7
Grade	100 %	9,0	8,2	8,0	7,9	7,9	6,9	6,3	6,0

The grade is based on a scale of 4-10. The scores are weighed. Price was not a factor in the division of points.

Avocent DSR1161 *and* Avocent DS1800

The Avocent DSR1161 is a 16 port KVM switch, designed for simultaneous use. The remote controle stations use a separate identification service, the DSAuthentication, to contact the switch. Using the DSAdmin-programma device and user data are stored in its database.

In this way, multiple switches from the DSR series and the different attached Avocent switches can be controlled in a large decentralized environment. The DSR1161 offers one analogue series ports for local control and one fast Ethernet port for remote control. The devices from the series support multiple simultaneous users, but the user licenses and programs are not included in the price.

The servers are connected to the switch using Cat 5 twisted pair cables with a maximum length of 10 meters, just like with the Autoview series. The interface modules are called Dsriq this time and the series don't interfere with eachother.

Control of the switch itself is done from a local user station using Oscar, just like with the Autoview. The menu, that is activated with the Print Screen button, shows a list of servers and a large number of control functions, like defining password for the switch or activating a deactivated keyboard as well as information about the program version.

The servers are controlled by the DSView-program which is easy to use. You change control between screens of the local work station and the remote controller by clicking the cursor in the area of the screen that you wish to go to, which is very convenient. Local and remote cursor stay well in synch.

In case of a slow connection, screen updating is handled by fairly small squares that appear in random order. The local cursor can be used smoothly, even if the remote cursor is still on the other half of the screen.

The program contains a large number of tailored key macro's for Windows and Sun Solaris and you can define your own macro's as well.

The DS1800, that is meant as a gateway, uses the same software and is very similar in performance. Instead of Rj-45-ports, the DS1800 contains eight traditional db25-ports. A big flaw however, is the fact that the DS1800 does not have any interface for local analogue work stations.

Avocent Autoview 1000R *and* BlackBox Servselect IP KV120A

The Avocent Autoview 1000R is a versatile and high quality KVM switch for midsized companies.

The switches come equipped with well-functioning, decentralized device and user control. The AVWorks-software that's active on the work station shows all Autoview-switches and attached traditional switches and servers as a coherent tree structure, from which you can choose the server to manage.

The switch itself is controlled from the local user station using Oscar-software (name stands for On screen configuration and activity reporting). The device has 16 server ports and the connection to the servers is established using twisted pair cables. Intelligent Avriq adapter modules can be connected to the servers as needed.

There is a Linux version of the original remote control program, the Video Session Viewer, which has a user interface that is almost identical to the Windows version. The speed and ease of use are good. Synchronization of local and remote cursor is flawless.

A lovely detail are the video settings that emulate the physical screen settings, including horizontal and vertical adjustments, brightness and contrast.

Raritan Telereach TR364

The Raritan Telereach TR364 was the most versatile IP switch in the test. It has four server ports and no less than four ports for local use. There are also smaller models available in this series with three, two or one port(s) for local use. This IP switch also has a keyboard and monitor interface for the setups. Everything else is controlled from the same remote access as the servers. The switch offers room to four simultaneous remote users: there are 10 standard user licenses included, upgradeable to 100. The Telereach uses SSL for user identification, hiding traffic or both. The information security is further enhanced by the possibility to use the Radius-server for user identification and/or control of use.

The Raritan Telereach was by far and long the fastest switch in the test; it is easy to use, also when using an ISDN-line at 64 kilobyte per second. The speed is gained by the advanced comparison technique that has to be accepted by the server.

The Telereach Control-program offers good optimization options for very slow connections. The color depth can be reduced to 8 bits or less, even to black and white. The smoothing option excludes color nuances based on rasterizing and with the Progressive Update option the screen only refreshes from black once. The program does not offer the possibility to select resolution on-screen, but the screen is composed pixel by pixel. If the monitor of the remote station is smaller than that of the servers it is connected to, the user can scroll within the window. If the positioning of the screen is off, it can be adjusted by changing the numerical positioning values in the video settings, but that takes some effort.

The program offers the possibility create key macro's, however only the much needed Ctrl-Alt-Delete combination is predefined.

The program also offers a web client, with which the user can use to make server connection through a www-browser after installation. That withstanding, there is no real remote access through the browser. The Telereach Control can only start from the www-browser if first the IP address of the KVM switch is entered.

The user manual in PDF-format is exemplary in thoroughness, but unfortunately a help function in the program is missing.

Editor's Choice:
Raritan Telereach TR364
Price: 10.595,-
Manufacturer: Raritan Computer, Inc.
www.raritan.com
In short: A top class digital KVM solution. The fastest product in the test.