

Dell Serial and Telnet Interfaces Ease Migration from UNIX to Linux

Administrators migrating enterprise systems from a UNIX® operating system (OS) to a Linux® OS must support heterogeneous environments. Using consistent interfaces to control and access both UNIX and Linux servers helps enterprises retain investment in system administrator skills and minimizes retraining needs. This article explains how administrators can use serial and Telnet interfaces provided by Dell to perform configuration and server management in a Linux environment.

BY WENDY STRESAU AND PAUL VANCIL

Many enterprises today are migrating their computing environments from the UNIX® operating system (OS) to the Linux® OS, or integrating Linux-based systems into UNIX infrastructures. Administrators responsible for carrying out such tasks face the challenge of managing heterogeneous environments, a job that can be made easier by using consistent interfaces. Remote Access Controllers (RACs) support serial, Telnet, and remote command-line interfaces (CLIs), giving administrators more flexibility in accessing and managing their systems.

A RAC is a service processor designed and optimized especially for managing servers in a Linux data center. The interfaces that RACs provide allow administrators to remotely configure and manage Linux servers. Hardware management features include server power management, log viewing, and sensor access. In addition, the RAC has a Web browser interface that provides server management and configuration capabilities through a remotely accessible, intuitive graphical user interface (GUI). Online help, a user's guide, and man pages provide documentation of the available features.

Controlling and accessing UNIX server configurations

Enterprise data centers often use serial connections to manage UNIX-based servers (see Figure 1). Each UNIX server connects to a serial terminal concentrator with a one-to-one serial cable, and the terminal concentrator is connected to a secure management network. Administrators telnet to the terminal concentrator from a management station, authenticate, and then connect the Telnet session to any of the server serial ports. Administrators can run multiple Telnet sessions because the terminal concentrator allows administrators to open a separate Telnet window for each server.

Administrators therefore use a single serial interface to access the UNIX console and to perform basic hardware management, such as a reset. First, administrators configure the server to direct all preboot and kernel messages to the serial port. Second, administrators select the serial port as the main UNIX console, `/dev/console`. Finally, administrators can enter special break sequences to break out of the console session and go to a low-level command shell that can be used to enter reset and boot commands, if needed.

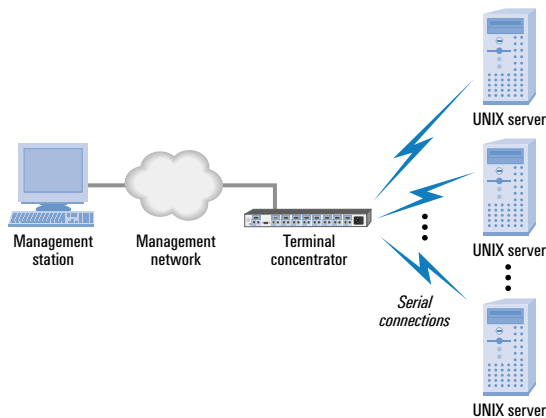


Figure 1. Common UNIX configuration using serial connections

In a second common UNIX model (see Figure 2), the UNIX server contains an integrated service processor, which has internal interfaces to the kernel messages and UNIX console. The service processor provides command interfaces to reset the system, boot the system, and display hardware status. Using Telnet or a serial interface, administrators can connect to the service processor, authenticate, and then connect to the UNIX console or a service-processor command prompt.

Using Dell Remote Access Controller features with Linux servers

Dell™ servers equipped with RACs gain interfaces and features that give administrators significant flexibility and efficiency when migrating from UNIX to Linux-based Dell servers and when integrating with existing infrastructures.

The RAC supports the integrated service-processor model. Internal hardware interfaces give the RAC access to the server’s COM2 serial port and its keyboard, video, mouse (KVM) and hardware management interfaces. For the configuration shown in Figure 2, the Linux-based Dell server can redirect power-on self test (POST) messages to the RAC using COM2, and the Linux console is directed at COM2.

An operator can telnet to the RAC or connect through the serial interface. Both interfaces support a login prompt and an identical command shell interface. The command shell supports command-line editing and history. Commands allow the operator to power up, power down, power cycle, or reset the system; view logs; view sensor status; or configure the RAC. From the command shell, operators can also enter `connect com2` to connect their serial or Telnet sessions to COM2, where the POST or Linux console was directed. A quit key sequence terminates the connect session and returns the operator to the command shell.

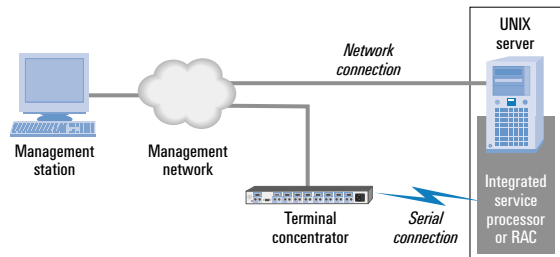


Figure 2. Server configuration including a service processor, such as a Dell RAC

COM2 console stream

The `connect com2` command provides a stream interface for Linux consoles by allowing all characters output to the Linux console to appear on the remote Telnet or serial interface. System administrators typically use an xterm window with a large scroll buffer to telnet to the RAC or to a terminal concentrator. After entering the `connect com2` command, the xterm window will display the Linux console output. System administrators can then scroll back the xterm buffer and view the saved Linux console output.

Video redirection

From the Telnet or serial command shell, the operator can also enter the `connect video` command to view any text being output to the video controller. Keyboard entry is also supported when connected to video. The RAC simply writes keyboard text entered through the Telnet or serial input to the system keyboard controller input.

This redirection method uses VT-100 cursor control to update the remote terminal interface with video text screen changes. Since the video text screens may be displaying text graphics, the output is not a pure stream of data as provided by the COM2 console stream.

RACs support serial, Telnet, and remote command-line interfaces, giving administrators more flexibility in accessing and managing their systems.

VT-100 block screens

In addition to the UNIX-style command-line shell with command-line editing, the RAC provides a menu-based VT-100 block screen

interface for easy operation of commonly used commands. This connection also offers system power management features, such as reset and power cycle, and text console redirection.

Remote command for scripting

The RAC also supports `racadm`, a command-line status and configuration utility that is useful for scripting. The `racadm` utility supports the same commands and syntax that the RAC Telnet and serial command shell provides and can be executed on the local server or remotely.

Administrators install the local `racadm` utility as a root execution privilege application that sends commands to the RAC through a Peripheral Component Interconnect (PCI) interface as a trusted (that is, root) client. Remote execution uses a TCP socket to send commands much as the UNIX `rcmd(3)` command does, but `racadm` uses a challenge-response authentication protocol for added authentication security. Remote execution requires the user to enter the username, password, IP address of the target RAC, and the `racadm` command.

Administrators can use the `racadm` utility to power up, power down, or reset the server; view logs; view sensors; and configure the RAC, just as they use the RAC command shell. In addition, `racadm` supports configuration from an ASCII configuration file (in `.ini` format) and supports generation of configuration files. Administrators commonly use the remote `racadm` capabilities to power up, power down, and reset servers that are parts of groups or clusters, or to configure groups of RACs from scripts.

Power management using RAC


Administrators can perform remote server power management, a key administrative function, through RAC, which supports the following power management actions:

- **Graceful power cycle:** Turns off the server module power and turns it on again (equivalent to pressing the power button twice) through its OS.
- **Graceful shutdown:** Shuts down a server module through its OS.
- **Graceful server restart:** Shuts down and restarts a server module through its OS.
- **Server module reset:** Resets a server module (equivalent to pressing the reset button); does not turn off the power.
- **Server module power cycle:** Turns off the server module power and turns it on again (equivalent to pressing the power button twice).
- **Server module power-up:** Turns on the server module power (equivalent to pressing the power button).
- **Server module power-down:** Turns off the server module power (equivalent to pressing the power button).

Dell servers equipped with RACs gain interfaces and features that give administrators significant flexibility and efficiency when migrating from UNIX to Linux-based Dell servers and when integrating with existing infrastructures.

The RAC also provides access to the data showing server hardware health and any logged errors. These error logs include the system event log and the RAC log, which can be viewed remotely. In addition, operators can configure the RAC to send alerts on specified events. To troubleshoot these alerts, administrators can view the server sensors and RAC sensors remotely through the serial and Telnet interfaces, which provide readouts on all server sensors, including power, fan, disks, temperature, and voltage.

Facilitating efficiency through familiarity

Whether adding Dell servers to data centers to expand a business or to replace existing servers, administrators can benefit from the familiar interfaces provided by Dell. These interfaces ease the migration to Linux-based systems and facilitate remote management of servers. Dell provides command-line interfaces, Telnet and serial interfaces, and Web-based user interfaces that administrators can use for remote hardware management. The Web site for the Dell OpenManage™ systems management suite at <http://www.dell.com/openmanage> provides additional information about Remote Access Controllers and these interfaces. 

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