

# Exploring the DRAC 5:

## The Next-Generation Dell Remote Access Controller

Dell™ remote access controllers provide administrators with the necessary tools and functionality to monitor, troubleshoot, and repair servers whether they are around the corner or around the world. This article discusses the features and functionality of the Dell Remote Access Controller 5—available in ninth-generation Dell PowerEdge™ servers—and explores how administrators can help reduce the time required to manage servers, enable fast recovery of remote servers, and lower total cost of ownership.

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Chief among concerns for many IT professionals is managing change—particularly when large numbers of remote servers are involved. Dell remote access controllers (RACs) can help administrators cope efficiently with change, and the RAC available in ninth-generation Dell PowerEdge servers, the Dell Remote Access Controller 5 (DRAC 5), provides enhancements over previous-generation RACs.

The baseline Dell remote access architecture in the Dell OpenManage™ suite consists of hardware and software components that enable administrators to do the following:

- Access a server after a server failure, power outage, or loss of network connection using a network interface card (NIC)
- Remotely view server internal event logs for diagnostic purposes

- Manage servers at multiple locations from a central location
- Manage servers by redirecting the console output (graphics and text) to a remote console
- Perform an orderly shutdown of a server for maintenance tasks
- Diagnose a server failure and restart the server
- Receive alerts through e-mail or Simple Network Management Protocol (SNMP) traps when the server detects an error

### Hardware for remote access

The DRAC 5 is an optional hardware controller powered by an AMD Alchemy Au1550 333 MHz processor. It can be integrated into a Dell PowerEdge server as a daughter-card that connects to the system motherboard, and it is compatible with all Dell PowerEdge ninth-generation servers (x9x0 model numbers).

The DRAC 5 interfaces with the baseboard management controller (BMC) chip on the server motherboard. The BMC is based on the Intelligent Platform Management Interface (IPMI) 2.0 standard, which helps Dell provide cost-effective remote management capabilities.

The DRAC 5 uses a flash file system that allows various alert configurations and up to 16 defined local administrators. As an alternative, an administrator may choose to implement the Microsoft® Active Directory® directory service to manage security. The DRAC 5 supports an integrated Web server that allows up to four DRAC administrators to be connected at the same time using a supported Web browser; at any given time, two administrators with redirection privileges may use the console redirection feature and one administrator with virtual media privileges may use the virtual media feature.

### Accessing the DRAC 5

Multiple interfaces can be used to access the DRAC 5. These interfaces include the following:

- **Dell OpenManage Server Administrator:** Installed on the managed server, the Server Administrator application provides a comprehensive Web-based graphical user interface (GUI) to configure and launch the DRAC 5 GUI.
- **DRAC 5 GUI:** The DRAC 5 provides a dedicated Web-based GUI to configure the RAC and monitor the server through the DRAC 5 network adapter. Although access to this user interface is provided in Dell OpenManage Server Administrator, it does not need to be installed on the managed server or the management station server. This interface allows stand-alone operation using any supported Web browser.
- **Racadm command-line interface (CLI):** The racadm interface provides a scriptable CLI that enables an administrator to configure the RAC locally or remotely through the DRAC 5 network adapter. This interface requires installation of a small client-side executable, which then interacts directly with the DRAC 5 across the network. No other software is required on the managed server.
- **Dell OpenManage IT Assistant:** IT Assistant can configure and launch the DRAC 5 GUI and operates much like Dell OpenManage Server Administrator, except that it is installed on the management station and displays groups of servers installed on the network.
- **Serial and Telnet console:** Serial and Telnet console commands allow administrators to power up, power down, power cycle, and reset servers; view logs and sensor status; and configure the DRAC 5. The serial and Telnet console supports the racadm command, which is useful for scripting one serial client connection and up to four Telnet client connections at one time.

- **Secure Shell (SSH):** SSH provides a fully encrypted username and password LAN interface to the DRAC 5. This access method allows administrators to connect to the DRAC 5 and perform actions on the server, and is similar to the serial and Telnet interfaces. Up to four SSH connections are supported at one time.
- **IPMI:** IPMI out-of-band interfaces, including IPMI Over LAN, IPMI Over Serial, and IPMI Serial Over LAN (SOL), are supported on the DRAC 5. The ipmish BMC management utility and IPMItool open source utility may also be used to manage a system.
- **Systems Management Architecture for Server Hardware Command-Line Protocol (SMASH CLP):** The industry-standard Server Management Working Group SMASH CLP interface defines a CLI to remotely monitor and manage hardware resources.

### Returning features from the DRAC 4

Features from the DRAC 4 that remain in the DRAC 5 include the following:

- Ability to configure the RAC network, alerts, administrators, and security settings from the RAC GUI
- Ability to assign administrator groups and permissions
- OS-independent console, keyboard, and mouse redirection functionality
- Virtual floppy and virtual CD media functionality
- Support for Active Directory authentication
- Secure connections using Secure Socket Layer (SSL) and SSH interfaces
- Automatic registration of DRAC name to Domain Name System (DNS)

### Features and enhancements introduced in the DRAC 5

The DRAC 5 introduces the following features and enhancements:

- Enhanced GUI
- IPMI out-of-band interfaces
- Enhanced virtual media functionality
- Enhanced virtual KVM (keyboard, video, mouse) functionality
- Enhanced network connectivity
- Enhanced connectivity using the SMASH CLI
- Enhanced security features

### Enhanced GUI

The DRAC 5 GUI includes additional usability features compared to previous-generation RACs. The interface offers a combination of tabs and links to logically divide common functionalities between system-level activities and remote management activities. Each

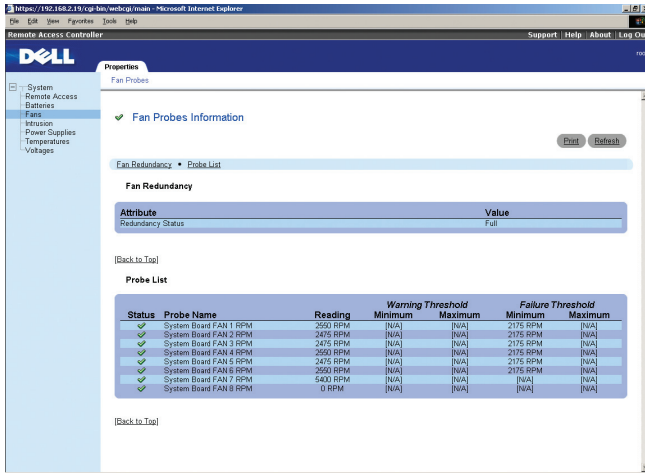


Figure 1. Viewing the status of server hardware components with the DRAC 5 GUI

major tab allows administrators to select various submenus that display status information or an assortment of available actions. One of the many enhancements is the ability to view the status of the server hardware components such as batteries, fans, or power supplies with a single click from the GUI main page (see Figure 1). Another enhancement enables administrators to view the username, connection method, and IP address of each administrator logged in to the DRAC 5—and with the appropriate permission level, they can even disconnect the remote session.

### IPMI out-of-band interfaces

In addition to the interfaces used in previous-generation RACs, the DRAC 5 can use the following interfaces to connect to the server:

- **IPMI Over LAN with Remote Management Control Protocol +:** Allows an administrator to remotely manage a system by sending industry-standard IPMI commands to the DRAC 5 over the LAN
- **IPMI Over Serial:** Supports both basic and terminal IPMI modes over a serial connection
- **IPMI SOL:** Provides a mechanism to redirect a text serial console over a LAN session

### Enhanced virtual media functionality

The DRAC 5 virtual media feature has been redesigned from an IDE interface to a USB 2.0 interface (see Figure 2). The USB interface supports the functionality of a virtual floppy and virtual CD, and is designed to provide the following benefits:

- Virtual media performance with up to 1.5 MB/sec transfer speeds
- Data storage through remote and local 16 MB USB keys

- Support for ISO images
- Support for persistence boot images
- SSL encryption of data transferred over the LAN, for enhanced security

### Enhanced virtual KVM functionality

The DRAC 5 virtual KVM functionality has been enhanced with the following improvements:

- Improved maximum supported screen resolution from 1,024 × 768 to 1,280 × 1,024
- Console redirection that supports a localized keyboard (including English, French, German, and Spanish) and programmable function keys
- Console redirection viewer that supports a native plug-in for both the Linux® and Microsoft Windows® operating systems, removing any requirement for Java to be installed on the client system
- SSL encryption of KVM data transferred over the LAN, for enhanced security

### Enhanced network connectivity

The DRAC 5 has the following network enhancements (see Figure 3):

- **Support for virtual LANs (VLANs):** This feature allows a single physical network cable to be partitioned into multiple logical networks, helping administrators enhance network performance by limiting the number of broadcasts to a small group of devices. VLANs also help improve network security by limiting network access to subscribers defined in the VLAN group, even if the devices are on the same physical LAN.
- **Shared NIC:** The server and the DRAC 5 share the same physical network cable, which allows the administrator to

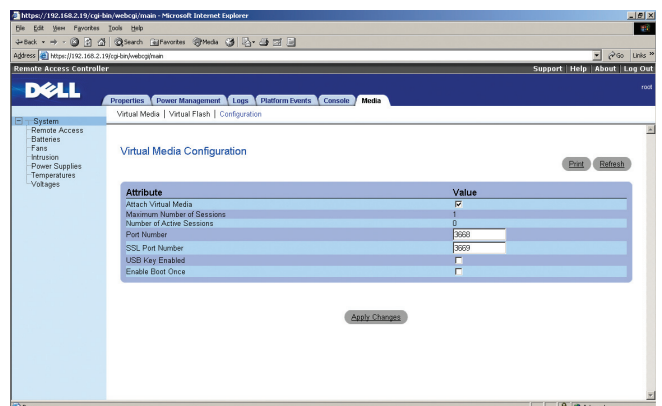


Figure 2. Configuring virtual media with the DRAC 5 GUI

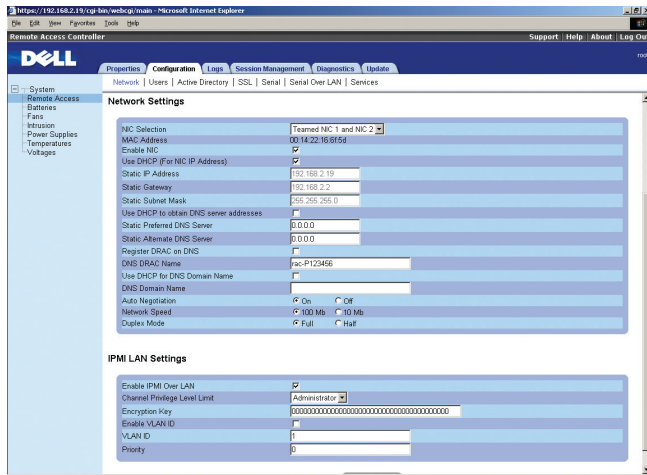


Figure 3. Configuring network settings with the DRAC 5 GUI

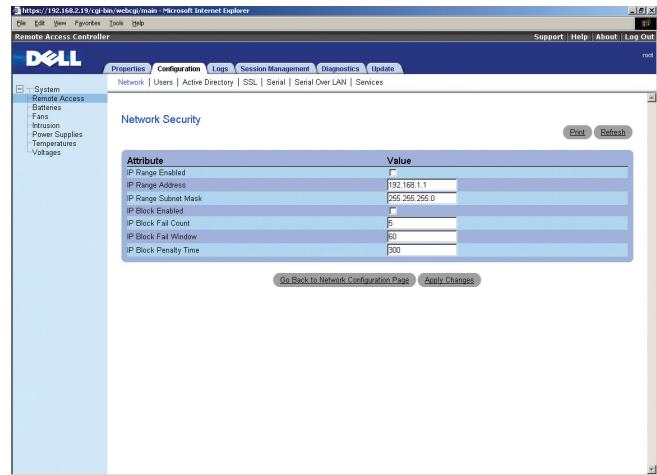


Figure 4. Configuring network security with the DRAC 5 GUI

connect to the DRAC 5 through the system NIC instead of the dedicated NIC built into the DRAC 5. This feature is advantageous because it allows administrators to install only a single network cable connected to each server instead of requiring two cables, one to the server and one to the DRAC 5.

- **Shared NIC with failover:** NIC failover is provided by the DRAC 5 as a way of providing fault tolerance in servers. Fault tolerance is provided by allowing a failed or inactive network link to fail over to the second active link.

### Enhanced connectivity using the SMASH CLI

The DRAC 5 supports a Distributed Management Task Force (DMTF) SMASH-compliant CLI, accessible with the Telnet, SSH, and serial interfaces. The DRAC 5 SMASH CLI is designed to help reduce total cost of ownership by providing an industry-standard interface that enables interoperability over a large heterogeneous hardware environment. The DRAC 5 SMASH CLI supports industry-standard commands that allow administrators to do the following:


- View the system event log
- View the server power status
- Power up a server
- Power down a server
- Reset a server

### Enhanced security features

Security is an important aspect in any remote management application that is transmitting potentially sensitive data over the Internet. The DRAC 5 enhances security through the following features (see Figure 4):

- SSL encryption of all virtual media data
- SSL encryption of all KVM console redirection data
- 128-bit encryption of all data, which can be turned on or off dynamically by the administrator to help improve performance
- Use of VLAN groups to limit network access to devices subscribed to the VLAN group
- Ability to configure all network port numbers
- Ability to limit remote access control by specifying a limited range of valid IP addresses
- Ability to limit login retries to prevent retry attacks

### Centralized remote access for managing global networks

In distributed computing environments, the ability to remotely manage a large number of servers is not simply a helpful option—it is a fundamental requirement. With administrators managing large networks of servers globally through centralized support centers, the need for improved remote management capabilities plays a critical role in the success of an IT organization. The functionality provided by the DRAC 5 to remotely manage, upgrade, troubleshoot, and repair systems is increasingly important to enterprises whose goals include reducing time spent on maintenance activities. 

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