

Objectives

- On completion of this course, you will be able to:
 - Understand VRP basics.
 - Learn how to use CLI.
 - Master basic CLI commands.

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- VRP Overview
- Command Line Basics

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What Is VRP?

The diagram shows a central yellow circle labeled "VRP". Surrounding it are several light blue circles, each containing a network function: "Routing", "Security", "Wireless", and "Switching".

- VRP is a universal OS platform for Huawei datacom products. It serves as the software core engine of Huawei's full series of routers from low-end to core ones, Ethernet switches, service gateways, and so on.

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VRP User Interfaces

- When a user logs in to a device through a CLI-supported mode, the system allocates a user interface to manage and monitor the current session between the user terminal and device.
- Such a user interface can be a console user interface or virtual type terminal (VTY) user interface.

Console User Interface

- A console user interface is used to manage and monitor users who log in to a device through the console port.
- The serial port of a user terminal can be directly connected to the console port of a device for local access.

VTY User Interface

- The VTY user interface is used to manage and monitor users who log in to a device by means of VTY.
- After a Telnet or STelnet connection is established between a user terminal and a device, a VTY channel is established to implement remote access to the device.

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VRP User Levels

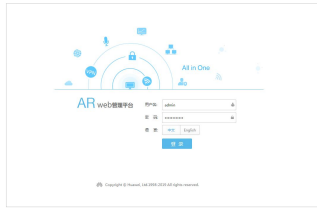
- VRP provides basic permission control functions. It defines the levels of commands that each level of users can execute to restrict the operations of users at different levels.

User Level	Command Level	Name	Available Command
0	0	Visit level	Network diagnosis commands (such as ping and tracert), commands for accessing external devices from the local device (such as Telnet client commands), and some display commands
1	0 and 1	Monitoring level	System maintenance commands, including display commands
2	0, 1, and 2	Configuration level	Service configuration commands, including routing commands and IP configuration commands, to directly provide users with network services
3-15	0, 1, 2, and 3	Management level	Commands for controlling basic system operations and providing support for services, including the file system, FTP, TFTP download, user management, and command level commands, as well as debugging commands for fault diagnosis

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Login to the Web System

Take the web system for a Huawei AR router as an example. Start a browser on a PC, enter <https://192.168.1.1> in the address bar, and press **Enter**. Then, the web system login page is displayed.



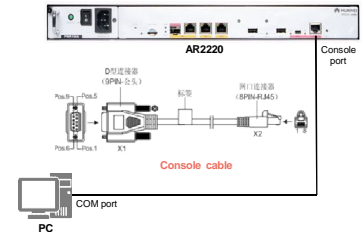
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CLI - Local Login (1)

You can log in to a device in local or remote mode. Local login mode:

- Use this mode when you need to configure a device that is powered on for the first time. You can use the console port of the device for a local login.
- The console port is a serial port provided by the main control board of a device.
- To implement the login, directly connect your terminal's serial port to the device's console port, and use PuTTY to log in to the device. You can then configure the device after the login succeeds.



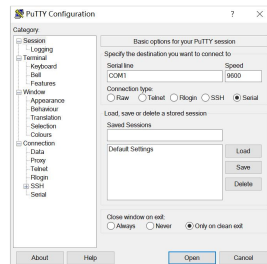
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CLI - Local Login (2)

PuTTY is a connection software for login through Telnet, SSH, serial interfaces, and so on.

In local login, the terminal is connected to the console port of the Huawei device through a serial port. Therefore, set **Connection type** to **Serial**. Set **Serial line** based on the actually used port on the terminal. Set **Speed** to **9600**.



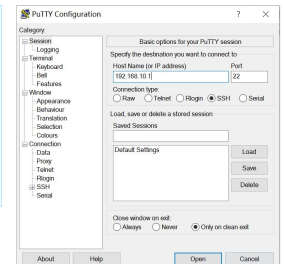
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CLI - Remote Login

Remote login means that you log in to a device that can function as a remote login server, allowing you to centrally manage and maintain network devices. Remote login methods include Telnet and SSH.

- If you use the SSH login mode, set **Connection type** to **SSH**, enter the IP address of the remote login server, and use the default port number 22.
- If you use the Telnet login mode, set **Connection type** to **Telnet**, enter the IP address of the remote login server, and use the default port number 23.

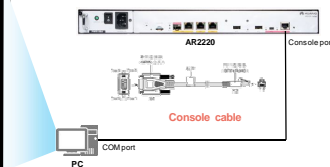
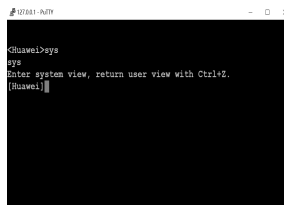


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CLI

- After a login succeeds, the command line interface (CLI) is displayed.
- The CLI is a common tool for engineers to interact with network devices.



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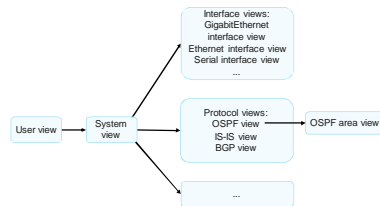
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- Command Line Basics
 - Command Line Overview
 - Basic Configuration Commands
 - Case Analysis

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Command Views (1)

- A device provides various configuration and query commands. To facilitate the use of these commands, VRP registers the commands in different views according to their functions.

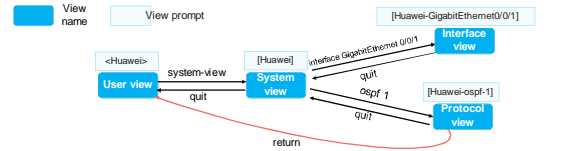


- User view:** In this view, you can check the running status and statistics of a device.
- System view:** In this view, you can set system parameters and enter the configuration views of other commands.
- Other views:** In other views, such as the interface view and protocol view, you can set interface parameters and protocol parameters.

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Command Views (2)



Command examples:

```

<Huawei>system-view      #This command is used to enter the system view from the user view. The user view is the
                           first view that is displayed after you log in to a device.
[Huawei]interface GigabitEthernet 0/0/1      #This command is used to enter the interface view from the system
                                              view.
[Huawei-GigabitEthernet0/0/1]ip address 192.168.1.1 24      #This command is used to set an IP address.
[Huawei-GigabitEthernet0/0/1]quit              #This command is used to return to the previous view.
[Huawei]ospf 1                      #This command is used to enter the protocol view from the system view.
[Huawei-ospf-1]area 0                #This command is used to enter the OSPF area view from the OSPF view.
[Huawei-ospf-1-area-0.0.0.0]return      #This command is used to return to the user view.
  
```

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Editing a Command (1)

- The CLI of a device provides basic command editing functions. Common editing functions are as follows:

1. Command editing through function keys

- Backspace: deletes the character before the cursor and moves the cursor to the left. When the cursor reaches the beginning of the command, an alarm is generated.
- Left cursor key ← or **Ctrl+B**: moves the cursor one character to the left. When the cursor reaches the beginning of the command, an alarm is generated.
- Right cursor key → or **Ctrl+F**: moves the cursor one character to the right. When the cursor reaches the end of the command, an alarm is generated.

2. Incomplete keyword input

- A device allows the input of incomplete keywords. Specifically, if an entered character string can match a unique keyword, you do not need to enter the remaining characters of the keyword.

```

<Huawei>d cu
<Huawei>d cu
<Huawei>dis cu
<Huawei>d c
^
Error:Ambiguous command found at '^' position.
<Huawei>dis c
^
Error:Ambiguous command found at '^' position.
  
```

For example, the **display current-configuration** command is identified when you enter **d cu**, **di cu**, or **dis cu**. However, the command cannot be identified if you enter **d c** or **dis c** because the character string **d c** or **dis c** matches more than one command.

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Editing a Command (2)

3. Command editing through the Tab key

- If an entered character string matches a unique keyword, the system automatically supplements the keyword after you press **Tab**. If the keyword is complete, it remains unchanged even if you press **Tab** repeatedly.

```

[Huawei] info-          #Press Tab.
[Huawei] info-center
  
```

- If an entered character string matches more than one keyword, you can press **Tab** repeatedly. The system will then circularly display the keywords beginning with the entered character string to help you find the desired keyword.

```

[Huawei] info-center log      #Press Tab.
[Huawei] info-center logbuffer #Press Tab repeatedly to circularly display all matched keywords.
[Huawei] info-center logfile
[Huawei] info-center loghost
  
```

- If an entered character string cannot identify any keyword, the entered string remains unchanged after you press **Tab**.

```

[Huawei] info-center loglog   #Enter an incorrect keyword and press Tab.
[Huawei] info-center loglog
  
```

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Using Command Line Online Help

- You can use command line online help to obtain real-time help without memorizing a large number of complex commands.
- The online help can be classified into full help and partial help. To obtain the online help, enter a question mark (?) when using a command.

Full Help

- To obtain full help, press ? after a view displayed. The system will then display all commands in the view and their descriptions.

```

<Huawei> ?
User view commands:
arp-ping  ARP-ping
autosave  <Group> autosave command group
backup    Backup information
cd        Change current directory
clear     Clear
clock     Specify the system clock
...
  
```

Partial Help

- To obtain partial help, press ? after you enter the start character or character string of a command. The system will then display all the commands that start with this character or character string.

```

<Huawei> d?
debugging <Group> debugging command group
delete    Delete a file
dialer    Dialer
dir       List files on a filesystem
display   Display information
  
```

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Using Undo Command Lines

- If a command begins with the keyword **undo**, it is an undo command. An undo command is generally used to restore a default configuration, disable a function, or delete a configuration. For example:

- Run an undo command to restore a default configuration.

```

<Huawei> system-view
[Huawei] sysname Sener
[Sener] undo sysname
[Huawei]
  
```

- Run an undo command to disable a function.

```

<Huawei> system-view
[Huawei] ftp server enable
[Huawei] undo ftp server
  
```

- Run an undo command to delete a configuration.

```

[Huawei] interface g0/0/1
[Huawei-GigabitEthernet0/0/1] ip address 192.168.1.1 24
[Huawei-GigabitEthernet0/0/1] undo ip address
  
```

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Using Command Line Shortcut Keys

- A device provides command shortcut keys to speed up and simplify command input.
- Command shortcut keys are classified into user-defined shortcut keys and system shortcut keys.

User-defined Shortcut Keys

- There are four user-defined shortcut keys: **Ctrl+O**, **Ctrl+L**, **Ctrl+Q**, and **Ctrl+U**.
- You can associate a user-defined shortcut key with any command. After you press a shortcut key, the system will automatically run the command associated with the shortcut key.

```
<Huawei> system-view
[Huawei] hotkey ctrl_o "display top status"
```

System Shortcut Keys

- CTRL_A**: moves the cursor to the beginning of the current line.
- CTRL_B**: moves the cursor one character to the left.
- CTRL_C**: stops the running of the current command.
- CTRL_E**: moves the cursor to the end of the current line.
- CTRL_X**: deletes all characters on the left of the cursor.
- CTRL_Y**: deletes the character at the cursor and all characters on the right of the cursor.
- CTRL_Z**: returns to the user view.
- CTRL+]** : terminates the current connection or switches to another connection.



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- Command Line Basics
 - Command Views and Use of Command Views
 - Basic Configuration Commands**
 - Case Analysis



Common File System Operation Commands (1)

- Check the current directory.

```
<Huawei>pwd
```

- Display information about files in the current directory.

```
<Huawei>dir
```

- Display the content of a text file.

```
<Huawei>more
```

- Change the current working directory.

```
<Huawei>acd
```

- Create a directory.

```
<Huawei>mkdir
```



Common File System Operation Commands (2)

- Delete a directory.

```
<Huawei>rmdir
```

- Copy a file.

```
<Huawei>copy
```

- Move a file.

```
<Huawei>move
```

- Rename a file.

```
<Huawei>rename
```

- Delete a file.

```
<Huawei>delete
```



Common File System Operation Commands (3)

- Restore a deleted file.

```
<Huawei>undelete
```

- Permanently delete a file in the recycle bin.

```
<Huawei>reset recycle-bin
```



Basic Configuration Commands (1)

- Configure a system name.

```
[Huawei] sysname name
```

- Configure a system clock.

```
<Huawei> clock timezone time-zone-name { add | minus } offset
```

This command configures a local time zone.

```
<Huawei> clock datetime [ utc ] HH:MM:SS YYYY-MM-DD
```

This command configures the current or UTC date and time.

```
<Huawei> clock daylight-saving-time
```

This command configures the daylight saving time.



Basic Configuration Commands (2)

3. Configure a command level.

```
[Huawei] command-privilege level level view view-name command-key
```

This command configures a level for commands in a specified view. Command levels are classified into visit, monitoring, configuration, and management, which are identified by the numbers 0, 1, 2, and 3, respectively.

4. Configure the password-based login mode.

```
[Huawei]user-interface vty 0 4
[Huawei-ui-vty0-4]set authentication password cipher information
```

This **user-interface vty** command displays the virtual type terminal (VTY) user interface view, and the **set authentication password** command configures the password authentication mode. The system supports the console user interface and VTY user interface. The console user interface is used for local login, and the VTY user interface is used for remote login. By default, a device supports a maximum of 15 concurrent VTY-based user accesses.

5. Configure user interface parameters.

```
[Huawei] idle-timeout minutes [seconds]
```

This command sets a timeout period to disconnect from the user interface. If no command is entered within the specified period, the system tears down the current connection. The default timeout period is 10 minutes.



Basic Configuration Commands (3)

6. Configure an IP address for an interface.

```
[Huawei]interface interface-number
[Huawei-interface-number]ip address ip address
```

This command configures an IP address for a physical or logical interface on a device.

7. Display currently effective configurations.

```
<Huawei>display current-configuration
```

8. Save a configuration file.

```
<Huawei>save
```

9. Check saved configurations.

```
<Huawei>display saved-configuration
```



Basic Configuration Commands (4)

10. Clear saved configurations.

```
<Huawei>reset saved-configuration
```

11. Check system startup configuration parameters.

```
<Huawei> display startup
```

This command displays the system software for the current and next startup, backup system software, configuration file, license file, and patch file, as well as voice file.

12. Configure the configuration file for next startup.

```
<Huawei>startup saved-configuration configuration-file
```

During a device upgrade, you can run this command to configure the device to load the specified configuration file for the next startup.

13. Restart a device.

```
<Huawei>reboot
```



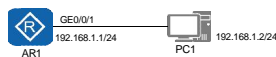
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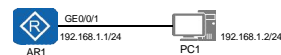


Case 3: VRP Basic Configuration Commands

- As shown in the figure, an engineer needs to configure a router. The requirements are as follows:
 - Connect the router and PC. Assign the IP addresses shown in the figure to the router and PC.
 - Allow other employees of the company to use the password **huawei123** to remotely log in to the router through the PC. Allow them to view configurations but disable them from modifying configurations.
 - Save current configurations and name the configuration file **huawei.zip**. Configure this file as the configuration file for the next startup.



Configuration Procedure (1)



Configure an interface IP address.

```
<Huawei>system-view
[Huawei]sysname AR1
[AR1]interface GigabitEthernet 0/0/1
[AR1-GigabitEthernet0/0/1]ip address 192.168.1.1 24
[AR1-GigabitEthernet0/0/1]quit
```

Configuring a user level and a user authentication mode.


```
[AR1]user-interface vty 0 4
[Huawei-ui-vty0-4]authentication-mode password
Please configure the login password (maximum length 16):huawei123
[AR1-ui-vty0-4]user privilege level 1
[AR1-ui-vty0-4]quit
```

The password configuration command may vary according to devices. For details, see the product documentation.

192.168.1.1/24

192.168.1.2/24

Configuration Procedure (2)




Specify the configuration file for next startup.

```
<HUAWEI>save huawei.zip
Are you sure to save the configuration to huawei.zip? (y/n)[n]y
It will take several minutes to save configuration file, please wait.....
Configuration file had been saved successfully
Note: The configuration file will take effect after being activated
<HUAWEI>startup saved-configuration huawei.zip
```

By default, configurations are saved in the `vrpcfg.cfg` file. You can also create a file for saving the configurations. VRPv5 and VRPv6 have the same command that is used to specify the configuration file for the next startup, but different directories for saving the file.

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Checking Configurations



```
<AR1>display startup
MainBoard:
Startup system software:          null
Next startup system software:    null
Backup system software for next startup: null
Startup saved-configuration file:  flash:/vrpcfg.zip
Next startup saved-configuration file: flash:/huawei.zip
Startup license file:             null
Next startup license file:        null
Startup patch package:            null
Next startup patch package:       null
Startup voice-files:              null
Next startup voice-files:         null
```

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