Comprehensive Summary of Basic Router Configuration

Initial Router Settings

Configuring the initial settings on a router is crucial for basic functionality and security. This involves various steps:

- **Configuring the device name:** `Router(config)# hostname hostname`
    - This command assigns a unique name to the router, which is essential for identification and management purposes. For example, `R1(config)# hostname R1` sets the hostname of the router to "R1".
- **Securing privileged EXEC mode:** `Router(config)# enable secret password`
    - Privileged EXEC mode provides administrative access to the router. This command sets a password to protect unauthorized access to this mode. In the example, `R1(config)# enable secret class` sets the password "class" for privileged EXEC mode.
- **Securing user EXEC mode:** `Router(config)# line console 0` → `Router(config-line)# password password` → `Router(config-line)# login`
    - User EXEC mode allows limited access to the router. This set of commands configures a password for the console line, which is used for direct physical access to the router. For example, the commands set the password "cisco" for the console line.
- **Securing remote Telnet/SSH access:** `Router(config)# line vty 0 4` → `Router(config-line)# password password` → `Router(config-line)# login` → `Router(config-line)# transport input {ssh | telnet}`
    - This set of commands configures passwords and access methods for remote connections using Telnet or SSH. `line vty 0 4` specifies the virtual terminal lines for remote access. The example configures the password "cisco" and allows both SSH and Telnet access.
- **Encrypting all plaintext passwords:** `Router(config)# service password encryption`
    - This command encrypts all passwords stored in the router's configuration file, enhancing security by making the passwords unreadable in plain text.

- **Providing legal notification:** `Router(config)# banner motd # message #`

    - The `banner motd` command allows you to display a message when someone accesses the router. This message can include legal notifications, warnings, or other relevant information. For example:

```
R1(config)# banner motd #
Enter TEXT message. End with a new line and the #
**********************************************
WARNING: Unauthorized access is prohibited!
**********************************************
R1(config)#
```

-
- **Saving the configuration:** `Router# copy running-config startup-config`

    - This command saves the current configuration in the running memory to the startup configuration file, ensuring that the changes are preserved after a reboot.

Configuring Router Interfaces

To enable communication between different networks, you need to configure the router's interfaces. This involves assigning IP addresses, subnet masks, and other parameters to each interface. The following commands are used:

- `Router(config)# interface type-and-number`

    - This command selects the interface to be configured. The interface type and number are specified. For example, `interface gigabitEthernet 0/0/0` selects the GigabitEthernet interface 0/0/0.
- `Router(config-if)# description description-text`

    - Adding a description for each interface helps in identifying the purpose and the connected network of the interface. For instance, `description Link to LAN` describes an interface connected to a local area network (LAN).
- `Router(config-if)# ip address ipv4-address subnet-mask`

    - This command assigns an IPv4 address and subnet mask to the interface. For example, `ip address 192.168.10.1 255.255.255.0` assigns the IP address 192.168.10.1 and the subnet mask 255.255.255.0 to the interface.
- `Router(config-if)# ipv6 address ipv6-address/prefix-length`

    - This command assigns an IPv6 address and prefix length to the interface. For example, `ipv6 address 2001:db8:acad:10::1/64` assigns the IPv6 address 2001:db8:acad:10::1 and a prefix length of 64 to the interface.
- `Router(config-if)# no shutdown`
    - This command activates the interface, enabling it to send and receive data.

It is highly recommended to use the `description` command to document the purpose of each interface.

Verification Commands

After configuring the router, it is important to verify that the configurations are correct. Several commands are available for this purpose:

- `show ip interface brief` and `show ipv6 interface brief`: These commands display a summary of all interfaces on the router, including their IP addresses, operational status, and protocol status.
- `show ip route` and `show ipv6 route`: These commands display the routing table of the router, which shows the routes that the router knows about for reaching different networks.
- `show interfaces`: This command displays detailed statistics for all interfaces on the router, including information about the physical layer, data link layer, and network layer.
- `show ip interface` and `show ipv6 interface`: These commands display detailed statistics for all interfaces specifically related to IPv4 and IPv6, respectively.

Default Gateway

- **For hosts:** The default gateway is the IP address of the router interface that connects the host's local network to other networks. It is used when a host needs to send traffic to a device outside its own network. The default gateway for a host is typically configured in the host's network settings.
- **For switches:** A switch also needs a default gateway for management traffic originating from the switch itself, allowing administrators to remotely manage the switch from other networks. This is configured using the command `ip default-gateway ip-address`.

The IP address of the host and the router interface acting as the default gateway must be on the same network.

This comprehensive summary provides a detailed overview of the key aspects of basic router configuration, including initial settings, interface configuration, verification commands, and the concept of the default gateway.