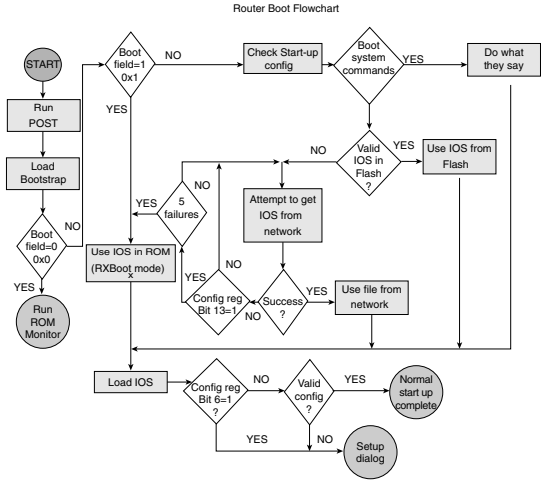
Router Boot Sequence and Verification

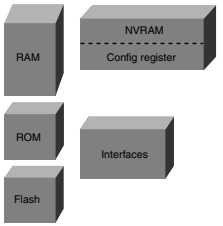
When a router boots up, it goes through the following sequence:

1. The router checks its hardware with a power-on self-test (POST).
2. The router loads a bootstrap code.
3. The Cisco IOS Software is located and loaded using the information in the bootstrap code.
4. The configuration is located and loaded.

When this sequence is complete, the router is ready for normal operation.



Router Components



The major router components are as follows:

- **RAM (random-access memory)**—Contains key Cisco IOS Software and data structures.
- **ROM (read-only memory)**—Contains startup microcode.
- **Flash memory**—Flash contains the Cisco IOS Software image. Some routers run the Cisco IOS image directly from Flash and do not need to transfer it to RAM.
- **NVRAM (nonvolatile RAM)**—Stores the configuration. Uses a battery when power is removed.
- **Config reg**—Controls the boot-up method.
- **Interfaces**—Physical connections can include Token Ring, FDDI, and so on.

Altering the Configuration Register

Before changing the configuration register, use the **show version** command to determine the current setting. The last line contains the register value. Changing the value changes the location of the Cisco IOS load. The **reload** command must be used for the new configuration to be set. The register value is checked only during the boot process.

Configuration Register Boot Field Value	Meaning
0x0	Use ROM monitor mode (manually boot using the **b** command).
0x1	Automatically boot from ROM (provides a Cisco IOS subset).
0x2 to 0xF	Examine NVRAM for boot system commands (0x2 is the default if the router has Flash).

When the Cisco IOS Software is loaded, the router must be configured. Configurations in NVRAM are executed. If one does not exist in NVRAM, the router initiates an auto-install or setup utility. The auto-install routine downloads the config file from a TFTP server.