CHAPTER 29

ClickStart Technical Details

This page provides the technical background about how ClickStart works. In most cases, you do not need to understand the technical background in order to use ClickStart. This background information is provided primarily for network administrators. For more information about the terms used on the page, refer to the Cisco IOS Release 11.1 Router Products Configuration Guide, which is located on this CD-ROM underCisco Products:Cisco IOS:Cisco IOS Release 11.1.

Configuring a Router with a Web Browser

When using a web browser to configure a router, there are two broad issues:

- Setting the Initial IP Address
- Choosing Configuration Options

Setting the Initial IP Address

When using a web browser to configure a router, the trickiest part is the initial configuration because the router does not yet have an IP address. Traditionally, you use protocols such as BOOTP or DHCP and their corresponding server programs to configure a router initially. In fact, the router can use BOOTP to get an initial IP address, and Windows NT has a DHCP server. However, using thse protocols assumes you have moderate computer and networking expertise.

When a router without a valid configuration file in nonvolatile RAM (NVRAM) starts up , it tries several ways to locate a configuration file, including RARP, BOOTP, and the setup console dialog. The router can also get a configuration file using HTML.

When a router without a configuration file starts up, the Cisco IOS software listens on Ethernet interface 0 for a DNS request to the name `new-router.cisco.com`. This name is reserved within Cisco for initial router configuration. No system will ever have this name, and name servers do not respond to requests for this name, not even with a Name Error response.

When the Cisco IOS software receives the DNS request for `new-router.cisco.com`, the request contains the IP address of the PC that issued the DNS request. The Cisco IOS software then uses ARP to probe for an unused IP address near the PC's IP address, staying within likely subnet boundaries. If a machine responds to the ARP probe, the Cisco IOS software tries the next IP address. If, after several tries, there is no response to an ARP probe, the Cisco IOS software uses that address as the IP address of the router. The software sends a DNS reply to the PC toanswer the DNS request for `new-router.cisco.com` with the address it just found.

The IP address discovery process presents some possible problems:

- The PC must issue a DNS request. To do this, the PC must be configured with a DNS server address of `255.255.255.255`. If the PC is configured with a different DNS server address, it will send an ARP request for the IP address before it sends the DNS request. If there is no local DNS server, which is a likely situation, no machine will answer the ARP request and the PC will never send the DNS request.
- If a DNS server is reachable from the local network and it is not connected to the Internet, that DNS server will see the request for `new-router.cisco.com` and will send a Name Error response, probably before the Cisco IOS sofware can locate an available address using ARP probes. The web browser will report that it could not find an IP address for `new-router.cisco.com`. In this case, trying again from the browser sometimes works because the router will have finished its ARP probing and can respond promptly to the DNS request.
- If the Cisco IOS software ARP probes return an IP address in response to the DNS query for `new-router.cisco.com`, and if the router is restarted before the configuration is completed and the process is repeated, the web browser remembers the name-to-address mapping and the DNS request is not sent out again. The solution to this problem is to exit the browser and restart it. The PC's local DNS resolver should not remember the name-to-address mapping because the response sent by the Cisco IOS software has a time to live (TTL) of only 30 seconds. Browsers typically cache mappings without honoring TTLs.

Choosing Configuration Options

A second issue in configuring a router with a web browser is that the Cisco IOS software can be configured with an enormous variety of options. While these options are useful for an experienced network manager, the sheer number of commands and possible approaches to configue even a simple dialup ISDN router is a formidable barrier if you simply want to configure the router.

ClickStart translates the information you fill in on the EZ Setup form to a standard configuration template. The standard configuration assumes that you will dial only one destination and use PPP/CHAP or CPP static routing. It requires values for the following parameters:

- *`hostname`* – Name of the router
- *`remote-name`* – Name of the remote router (used by CHAP)
- *`remote-number 1`* – Telephone number to dial
- *`remote-number 2`* – Telephone number to dial
- *`remote-mac address`* – Remote router mac address (used by CPP)
- *`IP-address-idsn`* – IP address for the ISDN interface (used by CPP)
- *`switch-type`* – Service provider switch type
- *`isdn-spid1`* – Service profile identifier number assigned by the ISDN server provider for the B1 channel
- *`isdn-spid2`* – Service profile identifier number assigned by the ISDN server provider for the B2 channel
- *`ip-address`* – IP address of Ethernet interface
- *`ip-mask`* – Address mask for Ethernet interface
- *`mode-of-operation`* – Bridging or routing

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