



Simple Network-Enabled Auto-Provisioning for Cisco IAD2420 Series IADs

Feature History

Release	Modification
12.2(2)XB	This feature was introduced on the Cisco IAD2420 series IADs.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T on the G.SHDSL WIC on the Cisco IAD2420 IADs.

This document describes the Simple Network-Enabled Auto-Provision (SNAP) feature for Cisco IAD2420 series integrated access devices (IADs) in Cisco IOS Release 12.2(8)T. The Simple Network-Enabled Auto-Provision feature is an auto-installation system supporting the Cisco IAD2420 series of IADs.

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Feature Overview

The SNAP feature on the Cisco IAD2420 series IAD allows service providers to rapidly deploy and configure services to the Cisco IAD platforms at customer premises without requiring configuration of the IADs at the customer site and with little or no onsite technician intervention. SNAP is part of the



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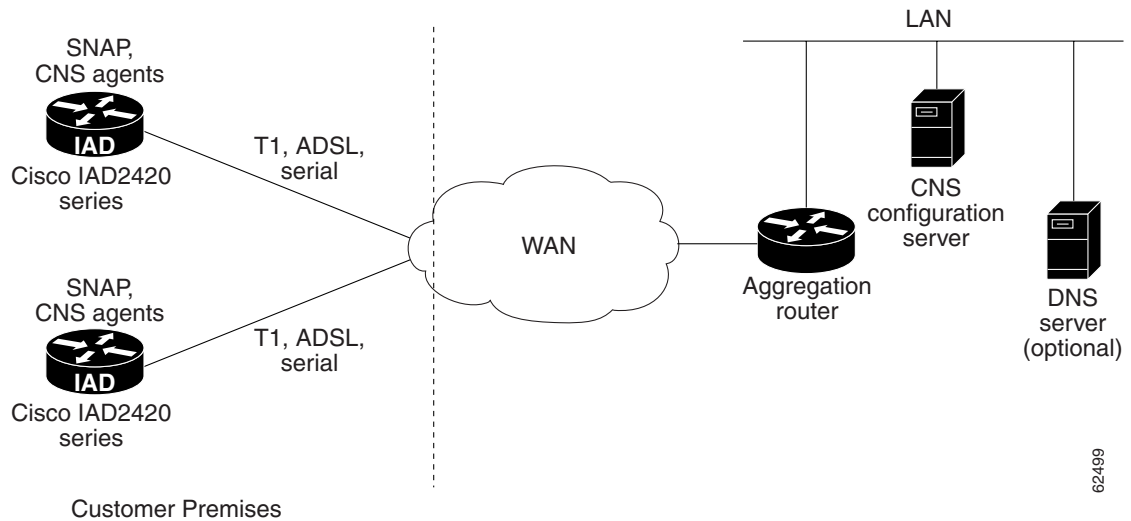
Cisco Networking Services (CNS) technology, which allows network products to be installed and automates many of the configuration tasks. SNAP consists of two basic functions: learning and setting the IP address and downloading the configuration for the IAD.

Each Cisco IAD2420 series IAD using SNAP includes a CNS Configuration Agent and CNS Event Agent that communicates with the CNS Configuration Registrar to enable the configuration of the IAD.

Using SNAP in conjunction with a Cisco aggregation router, a CNS Configuration Registrar, and an optional Domain Name System (DNS) server, SNAP performs the IAD configuration on the CNS Configuration Registrar and downloads the configuration to the IAD at the customer premises.

Figure 1 shows the topology of the SNAP architecture.

Figure 1 SNAP Architecture



How SNAP Works

An initial configuration is installed on the Cisco IAD2420 series IAD using Config Express either by the manufacturer or by the service provider. The IAD is installed at the customer premises site following installation procedures included with the IAD. When the IAD is switched on, the IAD connects with the aggregation router at the central office (CO), where SNAP assigns a unique IP address and an optional hostname to the IAD. After resolving the IP address through either Serial Line Address Resolution Protocol (SLARP), ATM InARP, or PPP/PCP protocols, the system uses the DNS reverse lookup feature to assign the hostname to the IAD.

The CNS Configuration Agent on the IAD then communicates with the CNS Configuration Registrar where the CNS Configuration Registrar determines the configuration of the IAD. The CNS Configuration Registrar searches its database to determine the correct configuration template and downloads that Cisco IOS configuration file in XML format to the IAD.

Once the IOS configuration file is downloaded, the IAD is now functioning. No further configuration on the IAD is required.

The initial configuration is a full configuration of the IAD that runs automatically upon switching on the IAD on the network. This configuration provides all information needed to operate. Incremental or partial configurations are performed to update the configuration information without the network having to shut down. The incremental configuration can be delivered in an event payload in a push operation or upon request in a pull operation.

Updates can be downloaded from the CNS Configuration Registrar in a push operation initiated by the service provider. For more information on the CNS Configuration Registrar, refer to *Cisco Intelligent Engine 2100 Configuration Registrar*, Cisco Release 1.0.

Options for Saving the Configuration File

If the CNS configuration is set to not save the configuration file in the NVRAM of the IAD, the SNAP download procedure repeats each time the IAD turns on. By turning the IAD off and then on, this procedure repeats and permits the IAD to save the current Cisco IOS configuration file so that updates can occur without intervention by a technician.

If the CNS configuration is set to be saved in NVRAM, the original default configuration that was installed during the manufacturing process is overwritten.

For more information about changing the SNAP configuration, see the “[Configuration Tasks](#)” section on [page 6](#).

Benefits

SNAP simplifies the installation by moving the configuration requirements from the customer to the CNS Configuration Registrar and allowing the Cisco IOS configuration to run automatically.

Provides Configuration Through the CNS Configuration Registrar

The CNS Configuration Registrar uses popular industry standards and technologies such as XML, ADSI/Active Directory, HTTP/Web Server, ASP, and Publish-Subscribe Event Bus to enable a mechanism for provisioning the configuration of Cisco IOS devices. The CNS Configuration Agent provides a facility for the CNS Configuration Registrar to configure the IADs in a plug-and-play manner.

The CNS Configuration Agent is a Cisco IOS subsystem that establishes a TCP/IP connection with the CNS Configuration Registrar to retrieve and apply the initial and incremental configurations. The CNS Configuration Registrar can be running on Windows 2000, Solaris, and Linux platforms, such as the Cisco Intelligence Engine 2100 series.

Assigns Unique IP Addresses and Hostname

SNAP applies the DNS reverse lookup feature (optional) to retrieve the hostname by passing the IP address. Then SNAP assigns the IP address and hostname to the IAD. Assigning the hostname is an optional feature.

Reduces Technical Personnel Requirements

SNAP permits Cisco IAD2420 series IADs to be installed by a person with limited or no technical experience. SNAP does not require a network engineer or technician for installation.

Speeds Deployment

Upon receiving the Cisco IAD2420 series IAD at the customer premises, the unit can be immediately installed by following simple installation instructions, without any knowledge or use of Cisco IOS software.

Permits Direct Shipping

SNAP permits the Cisco IAD2420 series IADs to be shipped directly to the end-user site to eliminate warehousing of inventory and manual handling. Configuration occurs automatically upon connection to the network.

Permits Remote Updates

Remote configuration updates, service additions, and deletions are handled through SNAP. The CNS Configuration Registrar performs a push operation to send the information to the Cisco IAD2420 series IAD.

Restrictions

- The aggregation router must be using Cisco IOS Release 12.0(18)ST or later release, or Cisco IOS Release 12.2(4)T or later release. The aggregation router must support a Cisco IOS image that supports CNS Configuration Agent and CNS Event Agent.
- Ports must be prepared on the aggregation router for connection to the network where the IAD will reside.
- The CNS Configuration Registrar must be version 1.0 or higher.
- The Configuration Registrar must have access to an information database of attributes for building the configuration.
- Configuration templates must be prepared on the CNS Configuration Registrar prior to the installation of the IAD.
- The Cisco IAD2420 series IAD must be configured either by the manufacturer or by the service provider using Config Express prior to sending the IAD to the customer premises.
- The user of SNAP and the CNS Configuration Registrar must be familiar with designing the network topology, designing configuration templates, and using the CNS Configuration Registrar.

Related Documents

- [CNS Configuration Agent](#), *Cisco IOS Release 12.2(2)T*
- [CNS Event Agent](#), *Cisco IOS Release 12.2(2)T*
- [Cisco Intelligent Engine 2100 Configuration Registrar](#), Cisco Release 1.0.

The following configuration guides describe the configuration of IP and ATM:

- For more information about configuring IP, see the [Cisco IOS IP Configuration Guide](#), Release 12.2.
- For more information about configuring ATM, see “Configuring ATM” in the [Cisco IOS Wide-Area Networking Configuration Guide](#), Release 12.2.

The following online feature documentation and installation guides describe the configuration and installation of hardware components:

- For information about installing Cisco IAD2420 series hardware, see the documents listed at the following URL:

<http://www.cisco.com/univercd/cc/td/doc/product/access/iad/iad2420/index.htm>

Supported Platforms

- Cisco IAD2420 series IADs

Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that support specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at <http://www.cisco.com/register>.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

<http://www.cisco.com/go/fn>

Supported Standards, MIBs, and RFCs

Standards

- No new or modified standards are supported by this feature.

MIBs

- No new or modified MIBs are supported by this feature.

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

RFCs

- No new or modified RFCs are supported by this feature.

Prerequisites

- The aggregation router must be using Cisco IOS Release 12.0(18)ST or later release, or Cisco IOS Release 12.2(8)T or later release.
- The aggregation router must be configured to support the CNS Configuration Agent and the CNS Event Agent. For more information, see the following documentation:

CNS Configuration Agent, Cisco IOS Release 12.2(2)T

CNS Event Agent, Cisco IOS Release 12.2(2)T

- Depending on the external interface of the IAD, different transport protocols must be configured on the aggregation router. [Table 1](#) lists the supported transport protocols that can be used depending on the IAD interface.
- The configuration template in the CNS Configuration Registrar provisioning database must be preconfigured before the download of the configuration file to the IAD can take place.

Table 1 IAD Interface and Transport Protocols Required by SNAP

Interface	Protocols
T1	SLARP, ATM InARP, PPP (IPCP)
ADSL	ATM InARP, PPP (IPCP)
Serial	SLARP, PPP (IPCP)

Configuration Tasks

The Simple Network-Enabled Auto-Provision feature allows the Cisco IAD2420 series IAD to be connected and configured automatically. Configuration Express loads a minimal set of Cisco IOS configuration commands for the IAD in the startup-configuration file in the NVRAM, either at the manufacturer or at the service provider premises. The IAD is ready to be installed at the customer premises with no further configuration.

If the service provider desires to change the configuration or install a custom configuration, these tasks allow a new configuration to be loaded. Each task in the list is optional and is not required for the initial installation of the Cisco IAD2420 series IAD.

- [Configuring the CNS Configuration Agent \(Optional\)](#)
- [Configuring the CNS Event Agent \(Optional\)](#)
- [Full Configuration of Cisco IAD2420 Series IAD \(Optional\)](#)
- [Incremental Configuration of Cisco IAD2420 Series IAD \(Optional\)](#)

Configuring the CNS Configuration Agent (Optional)

The CNS Configuration Registrar uses templates to build the configuration file. Refer to [Configuration Registrar Administration](#), Cisco Release 1.0, for additional information on using the CNS Configuration Registrar.

Each parameter in the template must have a directory-customized schema attribute associated. Create the template in the CNS Configuration Registrar through the Edit Template graphical user interface (GUI). Each Cisco IAD2420 series IAD object in the CNS Configuration Registrar must be associated with one specific template, although one template may be applied to multiple IAD objects. The template does not have interactive ability. You must enter the value in the Edit Parameter GUI of the CNS Configuration Registrar. If there is no value assigned for the attribute, the attribute value in the configuration file is empty.

Configuring the CNS Event Agent (Optional)

To initiate an event between the IAD and the CNS Configuration Registrar, the connection must be configured by the CNS Event Agent. To configure the CNS Event Agent, use the following commands beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# cns event { <i>ipaddress</i> <i>hostname</i> } { <i>port-number</i> backup }	Configures the Event Gateway for CNS. <i>ipaddress</i> —IP address of the event gateway. <i>hostname</i> —The host name of the event gateway. <i>port-number</i> —(Optional) Port number for the event gateway. The default port number is 11011. backup —(Optional) Indicates that the event agent is the backup gateway.
Step 2	Router(config)# show cns event	Displays information about the CNS Event Agent.

Full Configuration of Cisco IAD2420 Series IAD (Optional)

The full or initial configuration of the Cisco IAD2420 series IAD occurs when the IAD is initialized on the network. This configuration occurs automatically at the customer premises. If desired, this configuration can be performed manually.

After connecting the IAD to the network where the aggregation router resides and switching it on, the IAD boots up and the commands are executed.

SNAP assigns the IAD with the unique IP address or hostname. After resolving the IP address through SLARP, ATM InARP, or PPP protocols, the system uses the DNS reverse look up feature (optional) to assign the hostname to the IAD (optional) and invokes the CNS agents to download the initial configuration from the CNS Configuration Registrar.

To manually perform the initial configuration, use the CNS Configuration Registrar and follow these steps:


-
- Step 1** Connect the IAD to the network where the aggregation router resides and power on.
 - Step 2** Use the table in [“Configuring the Serial Interface”](#) to configure a serial interface. The detailed steps are for the T1 connection, using enhanced SLARP protocol.
 - Step 3** Use the table in [“Configuring the ATM Interface”](#) to configure an ATM interface.

Configuring the Serial Interface

The detailed steps are for the T1 connection by using enhanced SLARP protocol.

	Command	Purpose
Step 1	Router# startup-config	The startup configuration begins to run.


	Command	Purpose
Step 2	Router(config)# ip address slarp retry interval	Obtains an IP address for a serial interface on the IAD from the aggregation router. <i>interval</i> —Retry time interval. This value can be from 1 to 60 seconds.
Step 3	Router(config)# cns id interface {ipaddress hostname dns-reverse mac-address string word}	Passes a unique CNS ID to the CNS Configuration Agent to download the initial configuration file from the configure server. The unique CNS ID could be an IP address from the selected IAD interface. <ul style="list-style-type: none"> • <i>interface</i>—The name of the interface object. The choices are an ATM interface, serial interface, and virtual-template interface. • ipaddress—Uses the IP address as a unique index. • hostname—Uses the name of the host as a unique index. • dns-reverse—Uses the DNS reverse lookup to assign a hostname. • mac-address—Uses the Ethernet MAC address as a unique index. • string—Uses an arbitrary text string as a unique index. • <i>word</i>—Sets a unique ID that is passed to the interface.

	Command	Purpose
Step 4	Router(config)# cns config initial { <i>ipaddress</i> <i>hostname</i> } [<i>port-number</i>] [<i>event</i>] [no-persist] [<i>page</i>] [syntax-check]	<p>Saves the downloaded initial configuration in NVRAM. Upon booting the system, this configuration procedure cannot be repeated.</p> <p> Caution If you write the new configuration to NVRAM, the original factory configuration will be overwritten.</p> <ul style="list-style-type: none"> • <i>ipaddress</i>—The IP address of the CNS Configuration Registrar. • <i>hostname</i>—The name of host. • <i>port-number</i>—The port number of the configuration service. The value is from 0 to 65535. The default is 80. • event—Uses the event agent to report errors. • no-persist—Does not write the configuration to NVRAM. Omitting this keyword permits the configuration to be saved in NVRAM. <p>If you write the new configuration to NVRAM by omitting this keyword, the original factory configuration is overwritten.</p> <ul style="list-style-type: none"> • <i>page</i>—The web page where the configuration is located. The default is /cns/config.asp. • syntax-check—Turns on syntax checking.

Configuring the ATM Interface

Use this table to configure an ATM interface.

	Command	Purpose
Step 1	Router# startup-config	The startup configuration begins to run.
Step 2	Router(config)# inarp 1	Configures the Inverse Address Resolution Protocol (ARP) time period for an ATM permanent virtual circuit (PVC), virtual circuit (VC) class, or VC bundle.
Step 3	Router(config)# ip addr inarp	Retrieves the aggregation router ATM interface IP address or assigns a new IP address

	Command	Purpose
Step 4	<pre>Router(config)# cns id <i>interface</i> { [ipaddress] [hostname] [dns-reverse] [mac-address] [string word] }</pre>	<p>Passes a unique CNS ID to the CNS Configuration Agent to download the initial configuration file from the configure server. The unique CNS ID could be an IP address from the selected IAD interface.</p> <ul style="list-style-type: none"> • <i>interface</i>—The name of the interface object. The choices are an ATM interface, serial interface, and virtual-template interface. • ipaddress—Uses the IP address as a unique index. • hostname—Uses the name of host as a unique index. • dns-reverse—Uses the DNS reverse lookup to assign a hostname. • mac-address—Uses the Ethernet MAC address as a unique index. • string—Uses an arbitrary text string as a unique index. • <i>word</i>—Sets a unique ID that is passed to the interface.
Step 5	<pre>Router(config)# cns config initial {<i>ipaddress</i> <i>hostname</i>} [<i>port-number</i>] [event] [no-persist] [<i>page</i>] [syntax-check]</pre>	<p>Saves the downloaded initial configuration in NVRAM. After booting the system, this configuration procedure cannot be repeated.</p> <p> Caution If you write the new configuration to NVRAM, the original factory configuration is overwritten.</p> <ul style="list-style-type: none"> • <i>ipaddress</i>—The IP address of the CNS Configuration Registrar. • <i>hostname</i>—The name of host. • <i>port-number</i>—The port number of the configuration service. The value is from 0 to 65535. The default is 80. • event—Use the event agent to report errors. • no-persist—Does not write the configuration to NVRAM. Omitting this keyword permits the configuration to be saved in NVRAM. <p>If you write the new configuration to NVRAM by omitting this keyword, the original factory configuration is overwritten.</p> <ul style="list-style-type: none"> • <i>page</i>—The web page where the configuration is located. The default is /cns/config.asp. • syntax-check—Turns on syntax checking.

Full Configuration of Cisco IAD2420 Series IAD Example

```

Router(config)# cns config ?
  initial  Initial Configuration
  partial  Partial Configuration

Router(config)# cns config initial ?
  WORD     Host name or address of configuration server

Router(config)# cns config initial 172.28.129.22 ?
  <0-65535> the port number of the config service, default is 80
  event     Use event agent to report errors
  no-persist Do not write configuration to NVRAM
  page     The web page from where to get the configuration, default is
           /cns/config.asp.
  syntax-check Turn on syntax checking
  <cr>

Router(config)# cns config initial 172.28.129.22 event ?
  no-persist Do not write configuration to NVRAM
  syntax-check Turn on syntax checking
  <cr>

Router(config)# cns config initial 172.28.129.22 no-persist

```

Incremental Configuration of Cisco IAD2420 Series IAD (Optional)

The incremental or partial configuration allows the IAD to be incrementally configured after being initially configured. The configuration changes are done manually through the CNS Configuration Registrar. The CNS Configuration Registrar allows the operator to change the configuration templates, edit the parameters, and submit the new configuration to the IAD without requiring a software or hardware restart.


To manually perform the initial configuration, use the CNS Configuration Registrar and follow these steps:

-
- Step 1** Connect the IAD to the network where the aggregation router resides and power on.
 - Step 2** Use the table in [“Configuring a Serial Interface”](#) to configure a serial interface. The detailed steps are for the T1 connection, using enhanced SLARP protocol.
 - Step 3** Use the table in [“Configuring an ATM Interface”](#) to configure an ATM interface.

Configuring a Serial Interface

The detailed steps are for the T1 connection, using enhanced SLARP protocol.


	Command	Purpose
Step 1	Router# startup-config	Runs the startup configuration.
Step 2	Router(config)# ip address slarp retry interval	Obtains an IP address for a serial interface on the IAD from the aggregation router. <i>interval</i> —Retry time interval. This value can be from 1 to 60 seconds. the default is one second.

	Command	Purpose
Step 3	Router(config)# cns id <i>interface</i> { ipaddress hostname dns-reverse mac-address string <i>word</i> }	<p>Passes a unique CNS ID to the CNS Configuration Agent to download the initial configuration file from the configuration server. The unique CNS ID could be an IP address from the selected IAD interface.</p> <ul style="list-style-type: none"> • <i>interface</i>—The name of the interface object. The choices are an ATM interface, serial interface, and virtual-template interface. • ipaddress—Uses the IP address as a unique index. • hostname—Uses the name of host as a unique index. • dns-reverse—Uses the DNS reverse lookup to assign a hostname. • mac-address—Uses the Ethernet MAC address as a unique index. • string—Uses an arbitrary text string as a unique index. • <i>word</i>—Sets a unique ID that is passed to the interface.
Step 4	Router(config)# cns config partial { <i>ipaddress</i> <i>hostname</i> } [<i>port-number</i>]	<p>Saves the downloaded initial configuration in NVRAM. Upon booting the system, this configuration procedure cannot be repeated.</p> <p> Caution If you write the new configuration to NVRAM, the original factory configuration is overwritten.</p> <ul style="list-style-type: none"> • <i>ipaddress</i>—The IP address of the CNS Configuration Registrar. • <i>hostname</i>—The name of host. • <i>port-number</i>—The port number of the configuration service. The value is from 0 to 65535. The default is 80.

Configuring an ATM Interface

Use this table to configure an ATM interface.

	Command	Purpose
Step 1	Router# startup-config	Runs the startup configuration.
Step 2	Router(config)# inarp 1	Configures the Inverse Address Resolution Protocol (ARP) time period for an ATM permanent virtual circuit (PVC), virtual circuit (VC) class, or VC bundle.

	Command	Purpose
Step 3	Router(config)# ip addr inarp	Retrieves the aggregation router ATM interface IP address or assigns a new IP address.
Step 4	Router(config)# cns id interface { [ipaddress] [hostname] [dns-reverse] [mac-address] [string word]	<p>Passes a unique CNS ID to the CNS Configuration Agent to download the initial configuration file from the configuration server. The unique CNS ID could be an IP address from the selected IAD interface.</p> <ul style="list-style-type: none"> • <i>interface</i>—The name of the interface object. The choices are an ATM interface, serial interface, and virtual-template interface. • ipaddress—Uses the IP address as a unique index. • hostname—Uses the name of host as a unique index. • dns-reverse—Uses the DNS reverse lookup to assign a hostname. • mac-address—Uses the Ethernet MAC address as a unique index. • string—Uses an arbitrary text string as a unique index. • <i>word</i>—Sets a unique ID that is passed to the interface.
Step 5	Router(config)# cns config partial { <i>ipaddress</i> <i>hostname</i> } [<i>port-number</i>]	<p>Saves the downloaded initial configuration in NVRAM. Upon booting the system, this configuration procedure cannot be repeated.</p> <p> Caution If you write the new configuration to NVRAM, the original factory configuration is overwritten.</p> <ul style="list-style-type: none"> • <i>ipaddress</i>—The IP address of the CNS Configuration Registrar. • <i>hostname</i>—The name of host. • <i>port-number</i>—The port number of the configuration service. The value is from 0 to 65535. The default is 80.

To do the partial configuration, the IAD must be configured with CNS agent commands as shown in the following example. In the example, the CNS Configuration Registrar IP address is 172.28.129.22.

Incremental Configuration of Cisco IAD2420 Series IAD Example

```
Router(config)# cns config partial 172.28.129.22 80
Router(config)# cns event 172.28.129.22
```

Configuration Examples

This section provides the following configuration examples:

- [Configuration Express File Using T1 over HDLC Protocol Example](#)
- [T1 Configuration Template Example](#)
- [Voice Configuration Template Example](#)

Configuration Express File Using T1 over HDLC Protocol Example

The Configuration Express file can be used to configure the Cisco IAD2420 series before delivery to a customer. The 172.28.129.22 address is the IP address of the CNS Configuration Registrar.

```
!cns configure and event agents
cns config initial 172.28.129.22 no-persist
    cns event 172.28.129.22

!T1 configuration
controller t1 0
    framing esf
    linecode b8zs
    channel-group 0 timeslots 1-24 speed 64

cns id s0:0 ipaddress

!Assign IP addr to s0:0
interface s0:0
ip address slarp retry 2

!IP static route
ip route 0.0.0.0 0.0.0.0 s0:0
end
```

T1 Configuration Template Example

The T1 Configuration template is used to build the configuration for use on T1. The 172.28.129.22 address is the IP address of the CNS Configuration Registrar.

```
hostname
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOShostname}
enable password
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOSpassword}
    controller T1 0
clock source
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOST1-clocksource}
linecode
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOST1-line}
framing
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOST1-framing}
```

```
channel-group
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOST1-
channel-group} timeslots
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOST1-
timeslots} speed
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOST1-
speed}
```

Voice Configuration Template Example

The Voice Configuration template is used to build the configuration for using voice. The 172.28.129.22 address is the IP address of the CNS Configuration Registrar.

```
voice-port 1/1
codec
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOSvoi
ce-port1}
dial-peer voice 1 pots
application
${LDAP://172.28.129.22/cn=${DeviceID},CN=IOSConfigs,DC=www,DC=cisco,DC=com:attrName=IOSdia
l-peer1}
port 1/1
```

Command Reference

The following commands are introduced or modified in the feature or features documented in this module. For information about these commands, see the *Cisco IOS Network Management Command Reference* at http://www.cisco.com/en/US/docs/ios/netmgmt/command/reference/br_book.html. For information about all Cisco IOS commands, go to the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or to the *Cisco IOS Master Commands List*.

- **cns config initial**
- **cns config partial**
- **cns event**
- **cns id**
- **ip addr inarp (IAD2420)**
- **ip address slarp retry (IAD2420)**

Glossary

ADSI—Microsoft's Active Directory Services Interface.

ADSL—asymmetric digital subscriber line. Available through several telecommunications carriers to accommodate the need for increased bandwidth for Internet access and telecommuting applications.

ARP—Address Resolution Protocol.

ASP—Microsoft's Active Server Pages technology.

ATM InARP—ATM Inverse Address Resolution Protocol.

CLEC—competitive local exchange carrier. A company that builds and operates communication networks in metropolitan, urban, and remote areas and provides its customers with an alternative to the local telephone company.

CLI—command-line interface.

CNS—Cisco Networking Services.

CSU—channel service unit.

codec—code/decoder. An algorithm that transforms analog signals into digital signals and digital signals into analog signals.

CPE—customer premises equipment. Devices such as channel service units (CSUs) and data service units (DSUs), modems, and ISDN terminal adapters, required to provide an electromagnetic termination for wide-area network circuits before connecting to the router or access server. This equipment was historically provided by the telephone company, but is now typically provided by the customer in North American markets.

DNS—Domain Name System.

DSU—data service unit.

HDLC—High-Level Data Link Control.

HTTP—Hypertext Transport Protocol.

IAD—integrated access device. A CPE device used to combine services from various sources onto a common platform for transmission on a common transport span. Typically, an IAD combines various voice and data services such as circuit-based services such as traditional plain old telephone service (POTS) and packet-switched services such as Frame Relay or ATM.

PPP/IPCP—Point-to-Point Protocol / IP Control Protocol.

POTS—plain old telephone service.

PVC—permanent virtual circuit.

SLARP—Serial Line ARP.

XML—eXtensible Markup Language.

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