

Application Note

Cisco Router and Security Device Manager **Dial-Backup** Solution

Introduction

Point-to-Point Protocol over Ethernet (PPPoE) and IP Security (IPSec) VPN deployments are increasing and require a reliable backup solution. Cisco IOS® Software provides a Reliable Static Routing Backup using Object Tracking feature. Through the use of Internet Control Message Protocol (ICMP) pings, this feature can identify when a PPPoE or IPSec VPN tunnel goes down, and can allow for the initiation of a dial-on-demand routing (DDR) connection from an alternative port. Currently, the Reliable Static Routing Backup using Object Tracking feature is supported in Cisco IOS Software Release 12.3(2)XE and later for the Cisco® 830 Series Secure Broadband Router and the Cisco 1700 Series Modular Access Router.

This document describes this feature on analog modem and ISDN interfaces. PPPoE and IPSec VPNs are not covered.

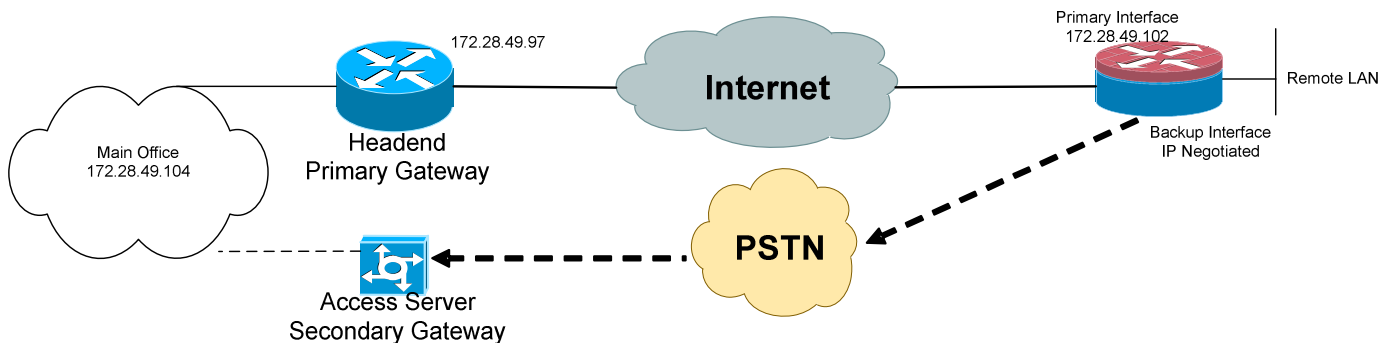
Technology

Reliable Static Routing Backup Using Object Tracking

The Reliable Static Routing Backup using Object Tracking feature introduces the ability to reliably back up PPPoE or IPSec VPN deployments by initiating a DDR connection from an alternative interface if the circuit to the primary gateway goes down. Figure 1 shows a typical scenario.

Traffic from the remote LAN is forwarded to the main office from the primary WAN interface of the remote router. If the connection to the main office is lost, the status of the tracked object changes from “up” to “down” and the static route is removed. Traffic destined for the main office triggers DDR, and the preconfigured floating static route is installed on the secondary interface. Traffic is then forwarded to the preconfigured destination from the secondary interface. The backup interface can be configured to use the public switched telephone network (PSTN) or the Internet.

Figure 1 DDR Initiates Call to Designated Access Server





Service Assurance Agent

The Reliable Static Routing Backup using Object Tracking feature uses ICMP pings to monitor the state of the connection to the primary gateway. A Service Assurance Agent (SA Agent) is created to ping the primary gateway at a configurable interval. The pings are routed from the primary interface only. A track object is created to monitor the status of the SA Agent. The track object informs the client (the static route) if the state of the object changes, allowing the initiation of a backup DDR connection when the object state changes from “up” to “down.”

Dial-On-Demand Routing

Dial-On-Demand Routing (DDR) is a technique whereby a router can automatically initiate and close a circuit-switched session as transmitting stations demand. DDR permits routing over ISDN or telephone lines using a modem.

Benefits of Reliable Static Routing Backup Using Object Tracking

PPPoE and IPSec VPN deployment provide cost-effective and secure Internet-based solutions that can replace traditional dialup and Frame Relay circuits. The Reliable Static Routing Backup using Object Tracking feature introduces a reliable backup solution for PPPoE and IPSec VPN deployments, allowing these solutions to be used for critical circuits that must not go down without a backup circuit automatically engaging.

How to Configure Reliable Static Routing Backup Using Object Tracking

Several tasks are involved in the configuration:

1. Configuring the primary WAN interface
2. Configuring the backup interface
3. Configuring the SA Agent
4. Configuring the routing policy
5. Configuring the default route for the primary WAN interface using the static routing
6. Configuring a floating static default route on the backup interface

The following is an example of the Cisco IOS Software commands necessary to configure an analog modem interface as the backup interface for the scenario shown in Figure 1.

Analog Modem Sample Configuration

```
!  
!  
! Primary Wan interface  
!  
interface FastEthernet0  
  ip address 172.28.49.102 255.255.255.224  
!  
! modem configuration  
!  
line 1
```



```
autoselect ppp
modem InOut
exit
!
! Backup Interface: Logic/interface Dialer, Physical/interface Async
!
interface Dialer1
  no shutdown
  ip address negotiated
  no ip route-cache
  dialer pool 1
  dialer-group 1
  encapsulation ppp
  dialer string 1234567
  dialer idle-timeout 120
  dialer fast-idle 20
  ppp authentication chap callin
  ppp chap hostname cisco123
  ppp chap password 0 *****
  exit
interface Async1
  description backup_link
  async mode dedicated
  encapsulation ppp
  dialer in-band
  dialer pool-member 1
dialer-list 1 protocol ip permit
!
! Create an SA Agent to ping the target address. This task applies to both static
! routing
!
rtr 1
```



```
type echo protocol ipIcmpEcho 172.28.49.104 ! configure an SA Agent end-to-end
                                         ! echo response time probe operation
timeout 1000                             ! sets the amount of time the SAA operation waits
                                         ! for a response from its request packet/milliseconds
frequency 3                              ! sets the rate at which ICMP pings are sent into the
                                         ! network/seconds
threshold 2                              ! the threshold that generates a reaction event for
                                         ! the SA Agent operation/milliseconds
track 1 rtr 1 reachability                ! track whether a router is reachable
rtr schedule 1 start-time now life forever ! time parameters for an SAA operation
!
! Configure a routing policy if the primary interface is configured for static routing
! and the primary gateway is a multipoint gateway
!
access-list 100 permit icmp any host 172.28.49.104 echo
!
! defines the conditions for redistributing routes from one routing protocol into
! another
!
route-map SDM_BACKUP_RMAP_1 permit 1
!
! Distributes any routes that have a destination network number address that is
! permitted by access-list 100, or performs policy routing on packets.
!
match ip address 100
set ip next-hop 172.28.49.97 ! indicates where to output packets that pass a
                             ! match clause of a route map for policy routing
set interface null0         ! indicates where to output packets that pass a
                             ! match clause of a route map for policy routing
!
! Apply the route map for local policy routing
```



```
!  
ip local policy route-map SDM_BACKUP_RMAP_1  
!  
! configure the static default route since static route is used  
! track number specifies that the static route will be installed only if the configured  
! track object is UP  
!  
ip route 0.0.0.0 0.0.0.0 172.28.49.97 1 track 1  
!  
! configure a floating static default route on the backup interface.  
!  
ip route 0.0.0.0 0.0.0.0 Dialer0 2  
!  
! target address is sent out through the primary WAN interface  
!  
ip route 172.28.49.104 255.255.255.255 FastEthernet0 1
```

Cisco Security Device Manager Dial-Backup Support

The Cisco IOS Software Dial backup feature requires users to fully understand how to configure the backup interface, the Reliable Static Routing Backup using Object Tracking feature, the SA Agent, the routing policy, the default route for the primary interface, and the floating static default route on the backup interface using static routing.

Cisco Router and Security Device Manager (SDM) allows users to easily configure backup interfaces and the Dial backup feature. The following steps are used to configure the same scenario as previously described, this time using Cisco SDM as opposed to Cisco IOS Software command-line interface (CLI).

The Dial backup feature is supported on One-port ISDN BRI, One-Port Analog Modem, and Two-Port Analog Modem by Cisco SDM. Cisco SDM makes a few assumptions while configuring the Dial backup feature:

- The primary interface is a WAN interface.
- If only one default route exists, Cisco SDM assumes that the primary WAN interface uses the default route to route traffic. If no default route exists, Cisco SDM will ask the user to specify the primary WAN interface.
- The primary WAN interface and the backup interface cannot both have dynamic IP addresses.

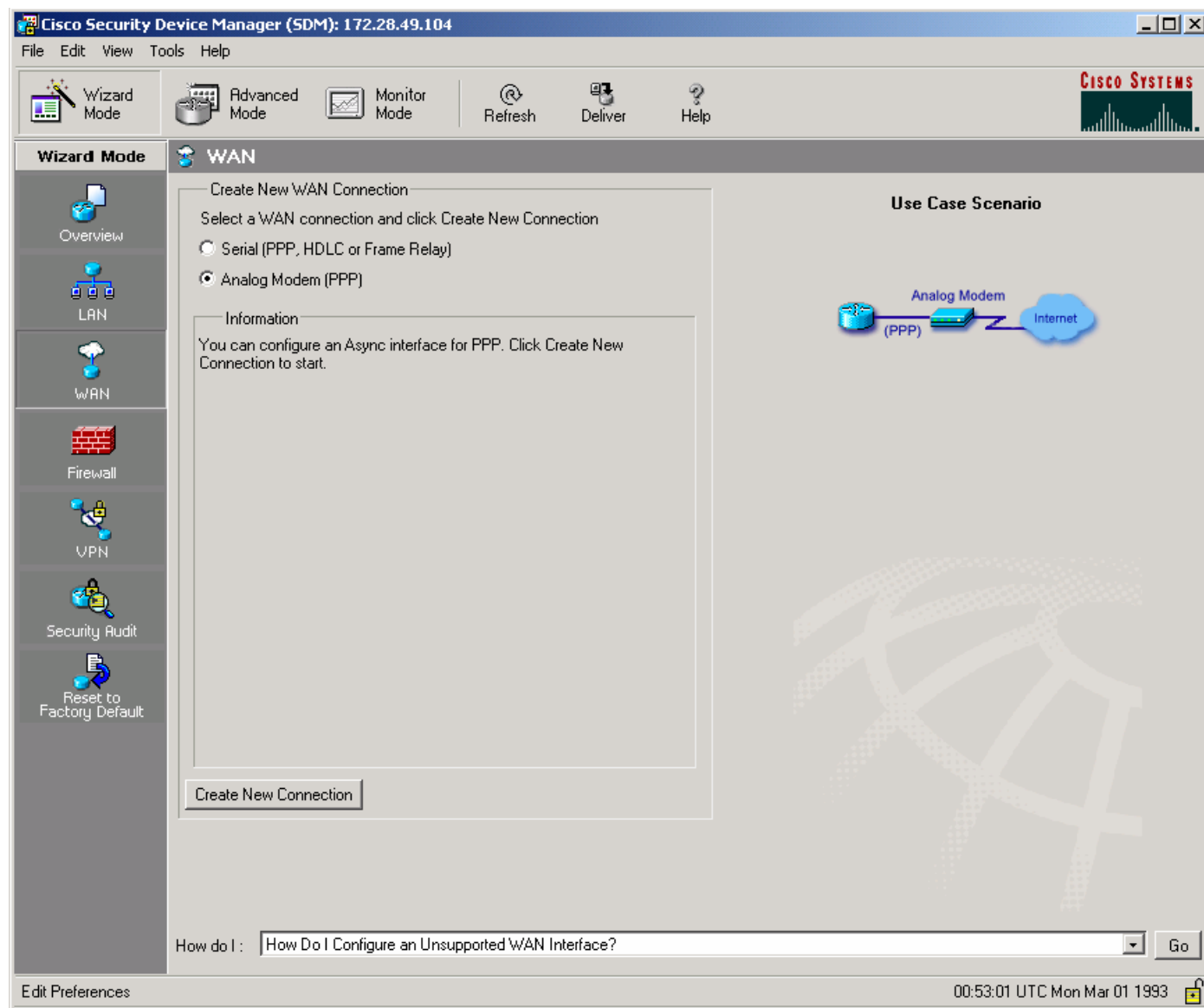


Configuring Reliable Static Routing Backup Using Object Tracking on an Analog Modem ¹

In Figure 2, the remote routers next-hop gateway is the headend router 172.28.49.97. The VPN peer for the remote router is 172.28.49.104, which is located at the main office, so it becomes the tracking object.

The user clicks on the WAN icon while in the Wizard mode to create a new WAN connection.

Figure 2 Create New WAN Connection Wizard

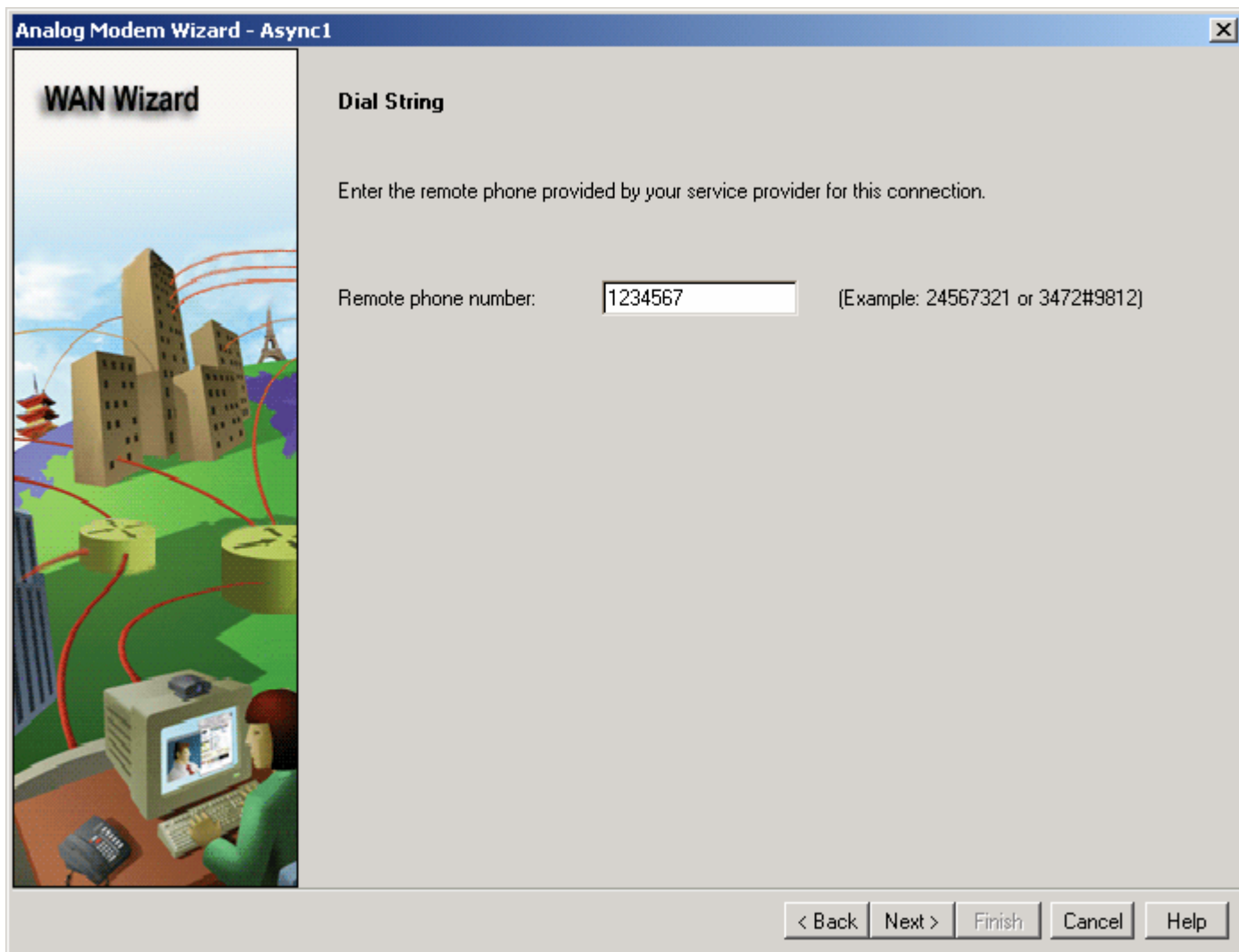


¹ The primary WAN interface and default route configurations are not covered in this document. In this example, the primary WAN interface, FastEthernet0, is configured with a static IP address, and a default route is configured with a multipoint gateway, 172.28.49.97, in the network.



Next, enter the remote phone number: **1234567**, and click **Next** (Figure 3).

Figure 3 Dial String

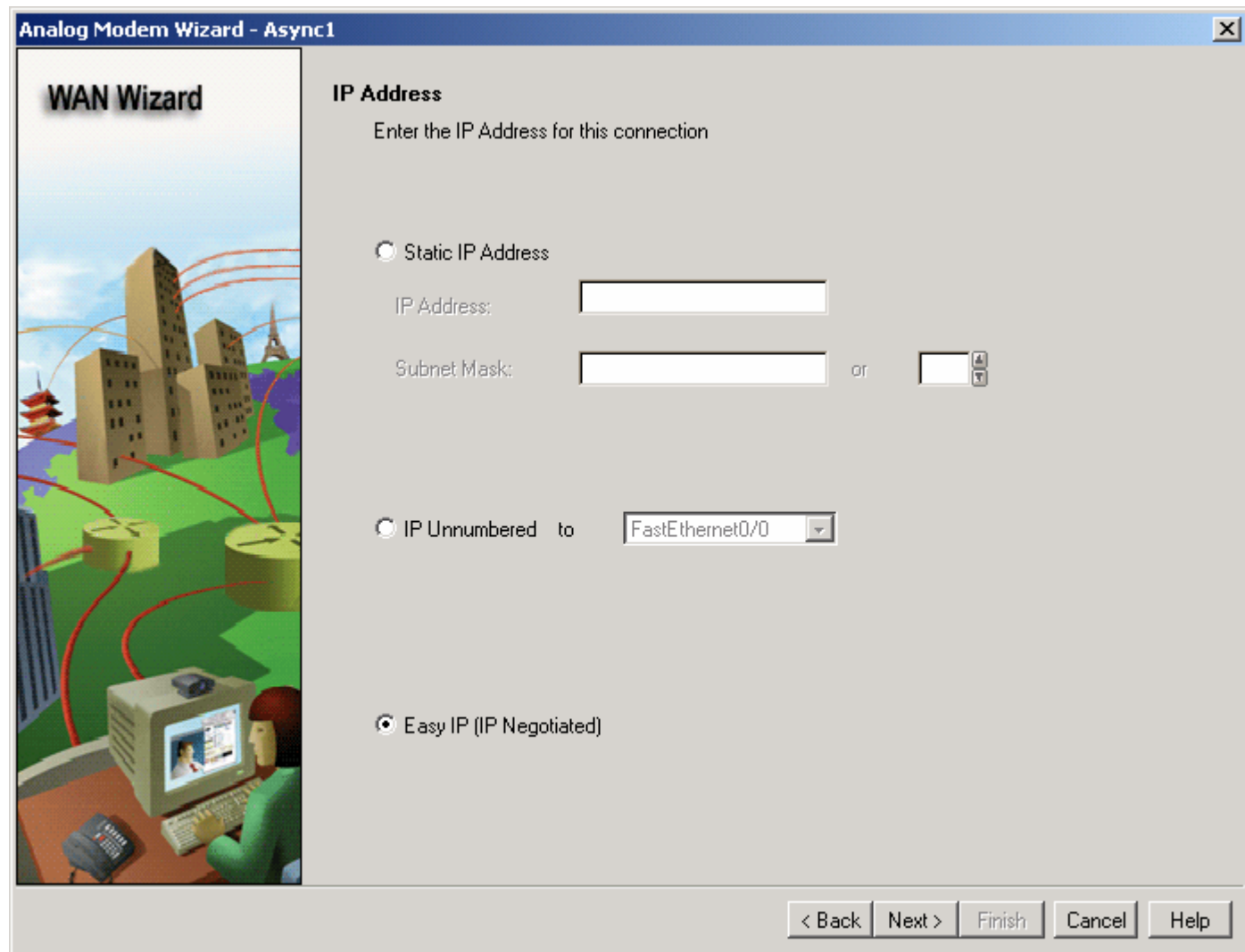


Then select the IP address. Figure 4 shows **Easy IP (IP Negotiated)**. Click **Next**.

Note: The IP address for the dialer interface can be obtained dynamically via IPCP (IP negotiated) from the service provider, as in this case, therefore Easy IP (IP Negotiated) is used.



Figure 4 IP Address

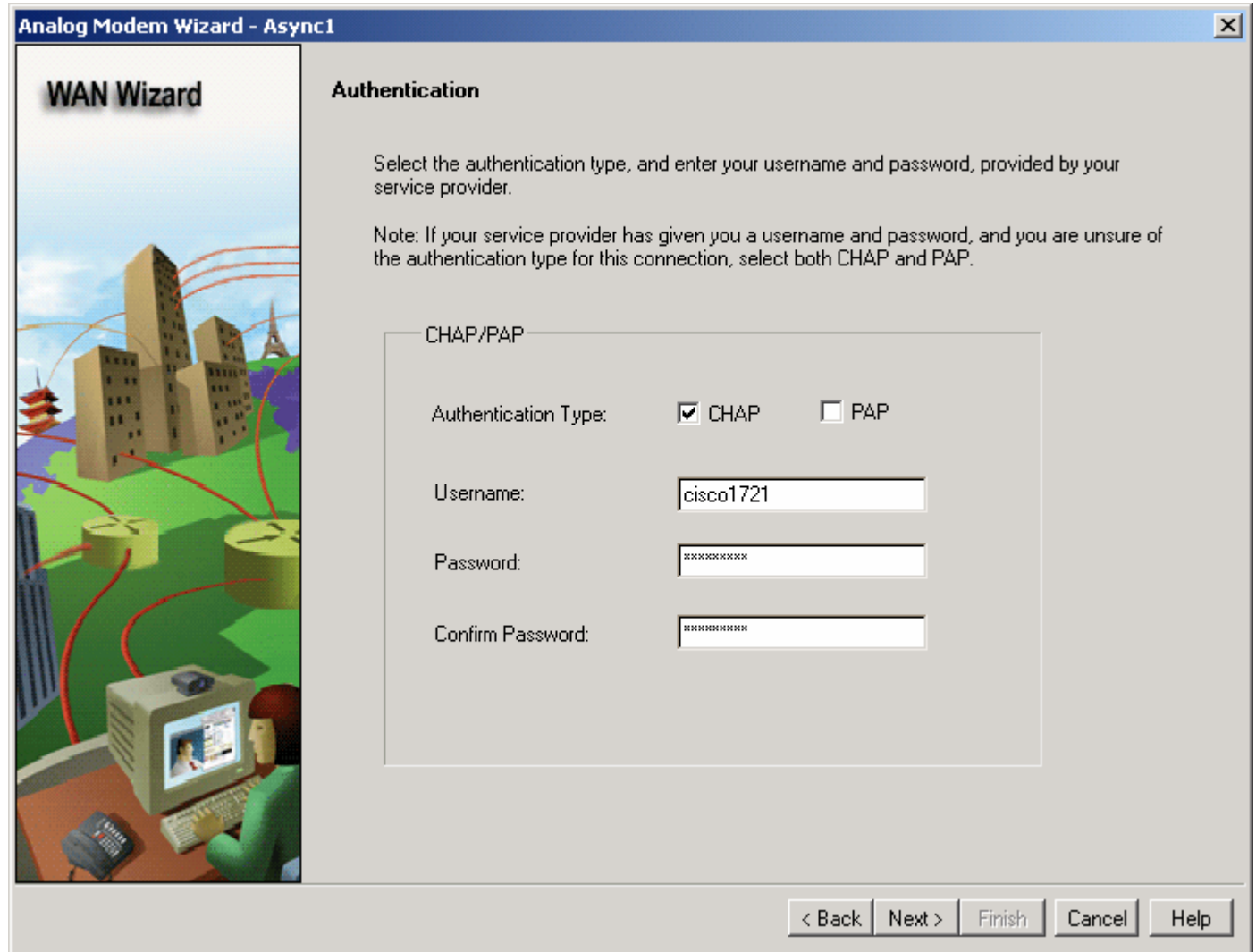


For authentication configuration (Figure 5), take the following steps:

- Select the Authentication Type: in this scenario, **CHAP** is used
- Username: **cisco1721**
- Password: **cisco1721** (the Password is displayed encrypted on screen)
- Confirm Password: **cisco1721** (the Confirm Password is displayed encrypted on screen)



Figure 5 Authentication

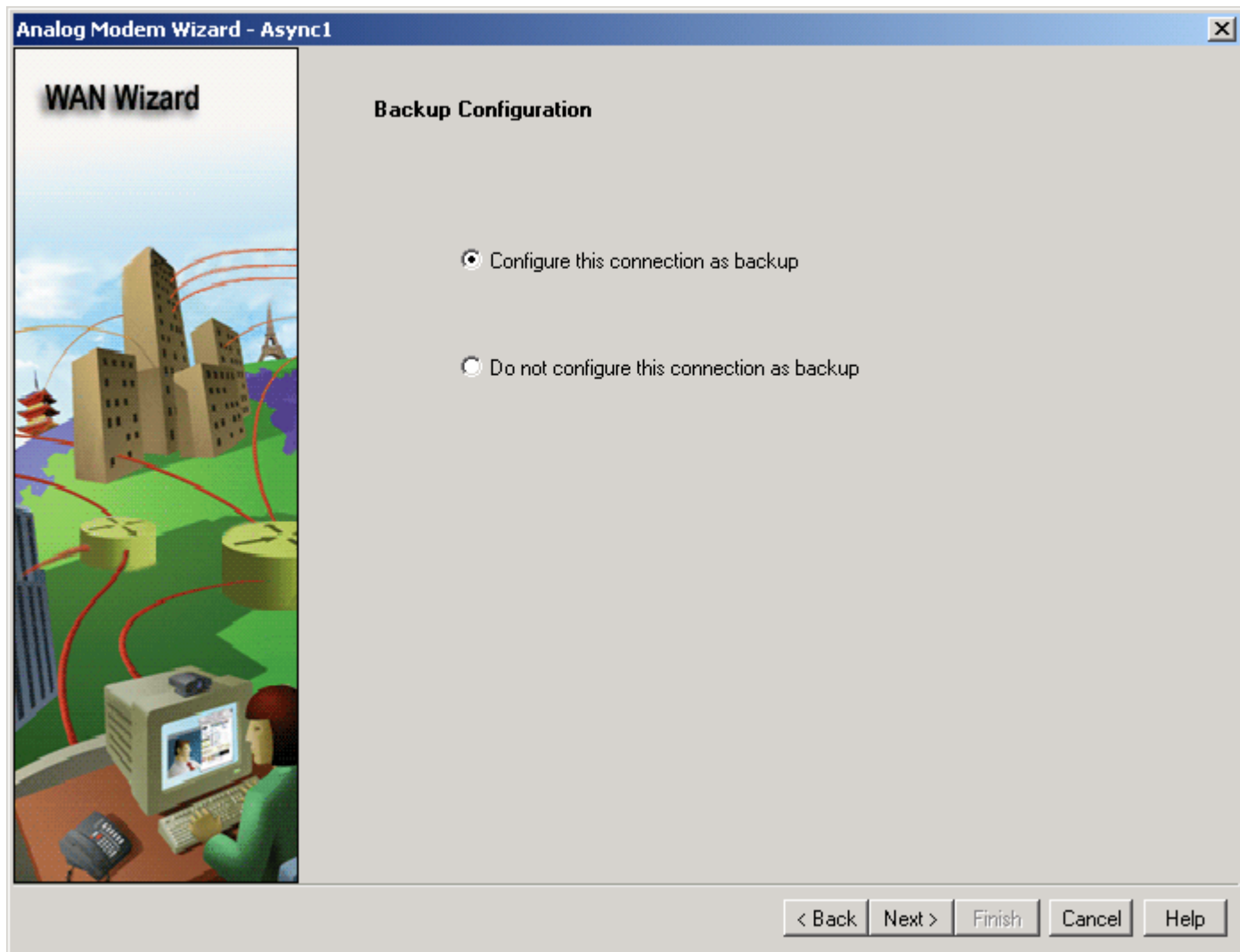






- Select **Configure this connection as backup**, then click **Next** (Figure 6)

Figure 6 Backup Configuration



For the backup configuration (Figure 7), take the following steps:

- Select the interface that acts as a primary connection: in this scenario the **FastEthernet0** is used
- Primary next-hop IP address: **172.28.49.97** (the primary gateway in Figure 1)
- Secondary next-hop IP address: **(left blank in this example)**
- Click **Next**



Figure 7 Backup Configuration—Primary Interface

Analog Modem Wizard - Async1

WAN Wizard

Backup Configuration

Select the interface that acts as a Primary connection.

Primary Interface:

You can provide the next hop IP address for the primary and secondary connection. If next hop is not specified, then the corresponding interface will be used for the static route configuration.

Primary next hop IP address: (Optional)

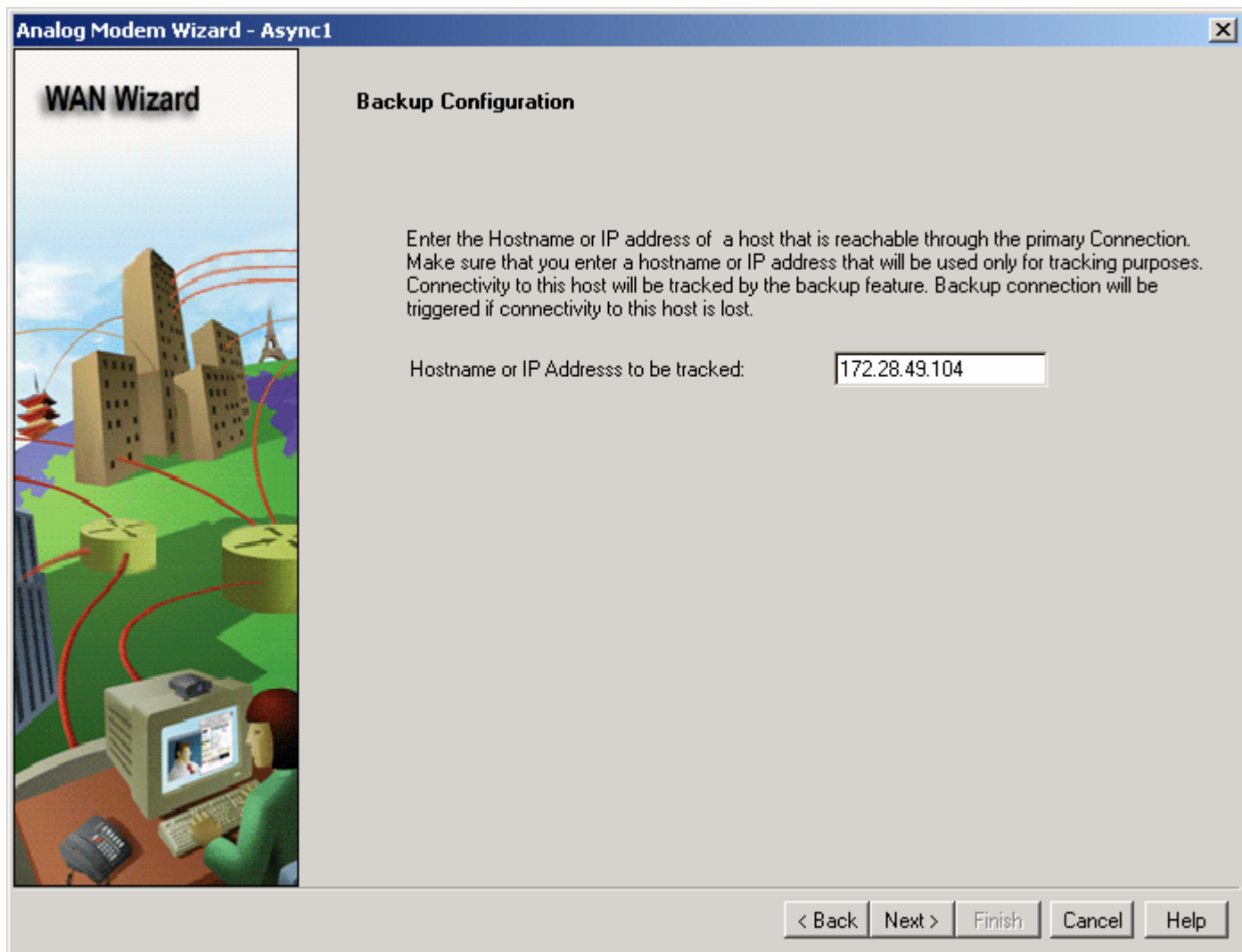
Secondary next hop IP address: (Optional)

< Back Next > Finish Cancel Help



- Configure the Hostname or IP Address (Figure 8) of the object being tracked: **172.28.49.104** (the VPN peer router at the main office in Figure 1)
- Click **Next**

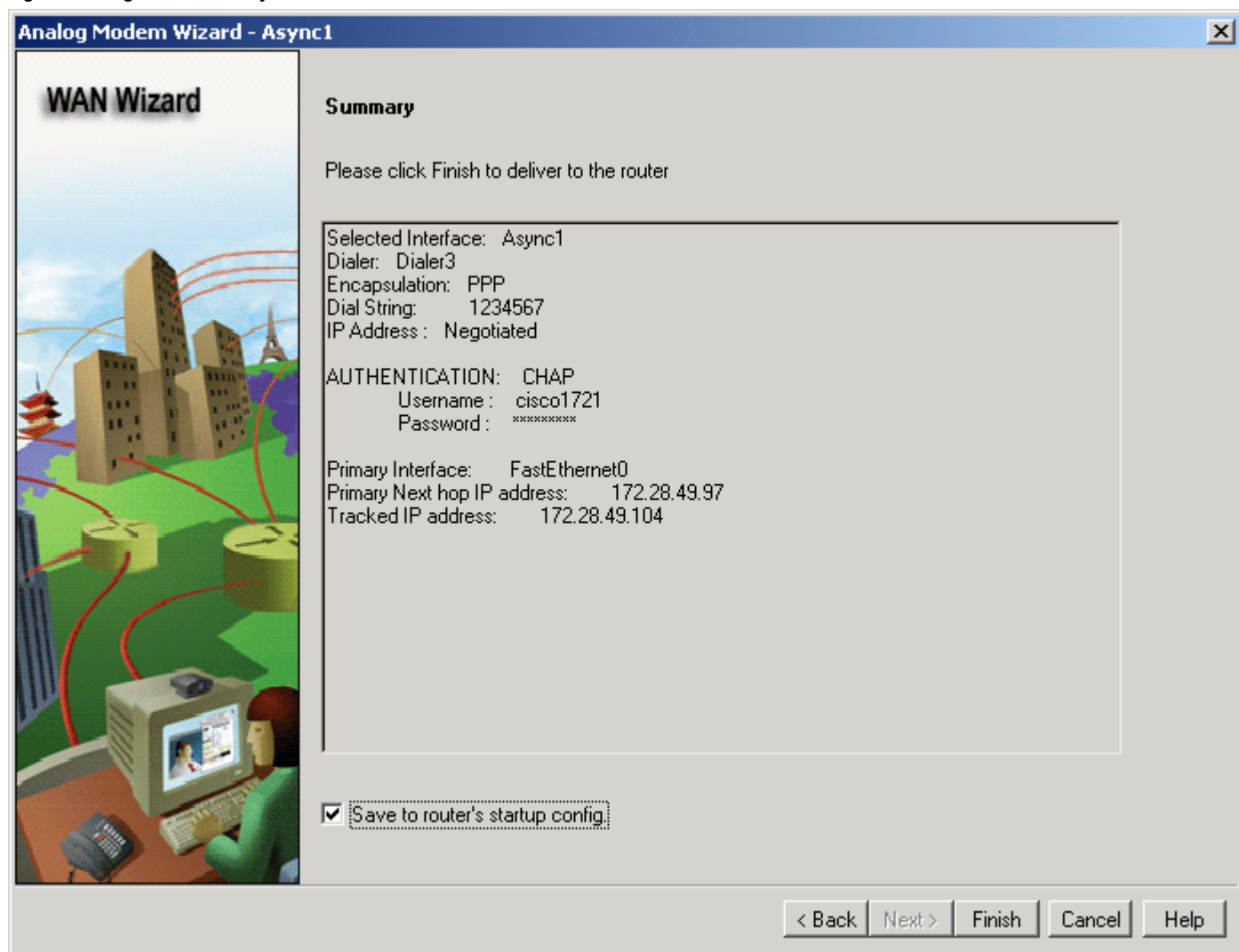
Figure 8 Backup Configuration—IP Address to Be Tracked





- Summary screen displays the configuration; click **Finish** to deliver the configuration (Figure 9)

Figure 9 Configuration Summary



Once the Backup Interface and the Dial backup features are configured using the Wizard, use the Advanced Mode/Interfaces and Connections to display and alter the configuration further if desired. The Backup Interface and Dial backup feature configurations are also supported by the Advanced Mode.

In summary, by using Cisco SDM WAN Wizard, users can generate the same complex configuration for Backup Interface and Dial backup features easily and quickly with minimal knowledge of Cisco IOS Software commands and minimal knowledge of Reliable Static Routing Backup using Object Tracking, SA Agent, and DDR.



References

Enhanced Object Tracking of Service Assurance Agent Operations:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123newft/123t/123t_4/gtfhrp.pdf

Term IP Netmask-Format:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios123/123tcr/123tip1r/ip1_t1gt.pdf

DC: Cisco IOS Dial Technologies Configuration Guide, Release 12.2:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cgcr/fdial_c/index.htm

Preparing to Configure DDR:

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cgcr/fdial_c/fnsprt5/dcdhwddr.pdf

Dialer Profile

http://www.cisco.com/en/US/tech/tk801/tk133/tk159/tech_protocol_home.html



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