

# T1/E1 및 디지털 모뎀 네트워크 모듈로 Cisco 3600 라우터 구성

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## 소개

많은 환경에서 비동기 및 ISDN 사용자 모두로부터 걸려오는 전화를 수락하려면 액세스 서버를 구성해야 합니다. 이러한 사용자는 마치 물리적으로 존재하는 것처럼 네트워크에 원활하게 연결할 수 있습니다. 따라서 이 설정은 주로 이동 및 재택 근무 사용자와 SOHO(Small Office-Home Office) 사이트를 위한 네트워크 연결을 제공하는 데 사용됩니다.

이 문서에서는 ISDN T1(PRI 또는 CAS(Channel Associated Signaling) 회로에서 수신 비동기 통화를 수락하도록 Cisco 3600 Series 라우터를 구성하는 방법에 대해 설명합니다. 이 컨피그레이션에는 NAS(Network Access Server)가 통화를 수락하는 데 필요한 최소 베어(bare minimum)만 포함됩니다. 필요에 따라 이 구성에 추가 기능을 추가할 수 있습니다.

**참고:** 이 컨피그레이션에는 3600 Series 라우터에서 BRI를 통한 비동기 다이얼인을 구성하는 방법이 표시되지 않습니다. 자세한 내용은 [Cisco 3640 BRI를 사용한 모뎀 연결 구성 문서](#)를 참조하십시오.

## 사전 요구 사항

### 요구 사항

이 문서에 대한 특정 요건이 없습니다.

## [사용되는 구성 요소](#)

이 구성은 아래의 소프트웨어 및 하드웨어 버전을 사용하여 개발 및 테스트되었습니다.

- 1포트 Channelized T1/ISDN-PRI Network Module(NM-1CT1-CSU) 및 24포트 NM-24DM(Digital Modem Network Module)이 포함된 Cisco 3640 Series 라우터
- Cisco 3640 라우터는 Cisco IOS® Software 릴리스 12.1(5)T9를 실행하고 있습니다.
- T1 PRI 회로 1개
- T1 CAS 회로 1개

이 문서의 정보는 특정 랩 환경의 디바이스를 토대로 작성되었습니다. 이 문서에 사용된 모든 디바이스는 초기화된(기본) 컨피그레이션으로 시작되었습니다. 라이브 네트워크에서 작업하는 경우, 사용하기 전에 모든 명령의 잠재적인 영향을 이해해야 합니다.

## [관련 제품](#)

이 컨피그레이션은 T1/E1 네트워크 모듈 및 디지털 모뎀 네트워크 모듈이 있는 모든 Cisco 3600 Series 라우터에서 사용할 수 있습니다.

AS5x00 Series 라우터와 관련된 샘플 컨피그레이션은 수신 [비동기 및 ISDN 통화에 대해 PRI를 사용하여 액세스 서버 구성](#) 문서를 참조하십시오.

이 컨피그레이션은 E1 또는 PRI 포트와 함께 사용하도록 수정할 수도 있습니다. Telco에서 제공하는 라인 인코딩, 프레이밍 및 기타 물리적 특성으로 E1 컨트롤러를 구성합니다. PRI D-channel 컨피그레이션(E1의 경우 Serial x:15 인터페이스)은 여기에 표시된 것과 유사합니다.

## [표기 규칙](#)

문서 규칙에 대한 자세한 내용은 [Cisco 기술 팁 표기 규칙](#)을 참조하십시오.

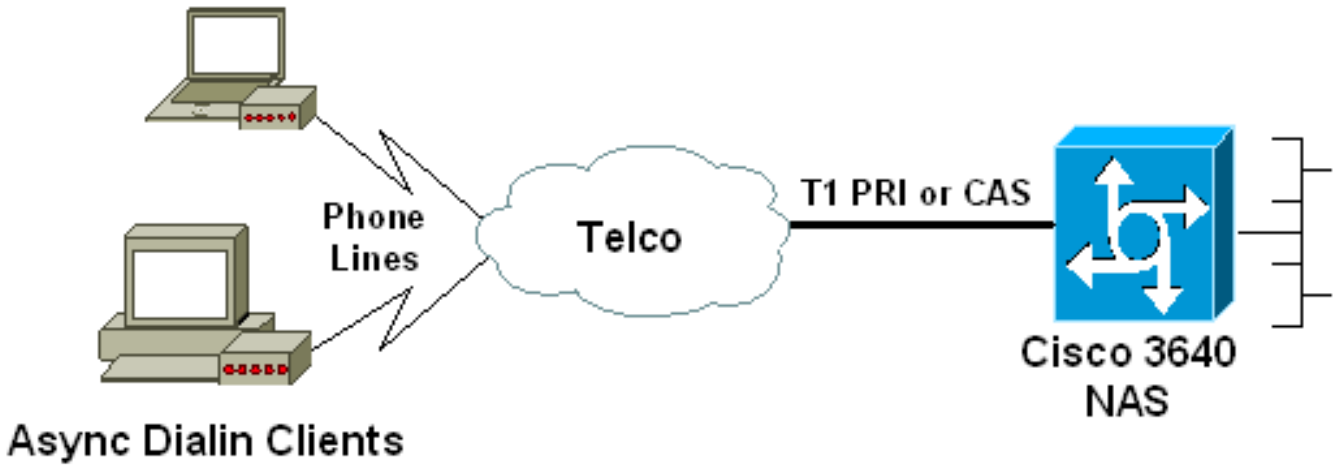
## [구성](#)

이 섹션에는 이 문서에서 설명하는 기능을 구성하기 위한 정보가 표시됩니다.

**참고:** 이 문서에 사용된 명령에 대한 추가 정보를 찾으려면 [IOS 명령 조회 도구](#)([등록된](#) 고객만 해당)를 사용합니다.

## [네트워크 다이어그램](#)

이 문서에서는 아래 다이어그램에 표시된 네트워크 설정을 사용합니다.



## 사전 구성 작업

### 작업 1

디지털 모뎀이 설치된 슬롯 번호를 확인합니다. `show diag EXEC` 명령을 사용하여 모듈이 설치된 슬롯을 확인합니다. 다음은 `show diag EXEC` 명령의 샘플 출력입니다.

```
acc-3640-6a#show diag
Slot 0:
    CT1 (CSU) Port adapter, 1 port
! -- NM-1CT1-CSU is in slot 0. ! -- The T1 interfaces are addressed as controller t1 slot/port.
! -- In this example, controller t1 0/0. Port adapter is analyzed Port adapter insertion time
unknown EEPROM contents at hardware discovery: Hardware revision 1.1 Board revision D0 Serial
number 22677234 Part number 800-01228-04 Test history 0x0 RMA number 00-00-00 EEPROM format
version 1 EEPROM contents (hex): 0x20: 01 26 01 01 01 5A 06 F2 50 04 CC 04 00 00 00 00 0x30: 68
00 00 00 00 12 19 00 FF FF FF FF FF FF FF FF Slot 1:
    Digital Modems Port adapter, 24 ports
! -- Digital modems are in slot 1. Note that there are 24 modems. Port adapter is analyzed Port
adapter insertion time unknown EEPROM contents at hardware discovery: Hardware revision 0.3
Board revision UNKNOWN Serial number 0 Part number 00-0000-00 Test history 0x0 RMA number 00-00-
00 ... .. ! -- Irrelevant Output omitted ....
```

### 작업 2

모뎀 모듈과 연결된 회선 번호 또는 비동기 인터페이스 범위를 확인합니다.

행 범위를 결정하려면 [Cisco 3600 Series Routers에서 How Async Lines are Numbered in Cisco 3600 Series Routers\(비동기 회선 번호 매기기 방법\) 문서](#)에서 찾은 표를 참조하십시오.

이 예에서는 Digital Modem Network Module이 Cisco 3640 라우터의 슬롯 1에 있습니다. 위에서 언급한 문서를 참조하여 라인 번호 범위는 33~64입니다. 그러나 모뎀 모듈에 24개의 포트만 있으므로 범위는 33줄부터 56줄까지입니다(나머지 8개의 라인은 사용되지 않음).

**팁:** 아래 표시된 공식을 사용하여 라인 범위를 찾을 수도 있습니다.

```
line number = (<slot> * 32) + <unit> + 1
```

따라서 예를 들어, 시작 라인 번호는  $(1 * 32) + 0 + 1 = 33$ 이고 최종 라인 번호는 56입니다.

## 구성

다음은 비동기 호출을 수락하는 Cisco 3640 라우터의 샘플 컨피그레이션입니다. 첫 번째 예에서는 T1 CAS 회로를 사용하는 반면 두 번째 샘플은 T1 PRI 회로를 사용합니다. 보유한 T1/E1 회로에 따라 적절한 컨피그레이션을 선택합니다.

### Cisco 3640 with T1 CAS

```
acc-3640-6a#show running-config
Building configuration...

Current configuration : 1137 bytes
!
version 12.1
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
service internal
!
hostname acc-3640-6a
!
logging rate-limit console 10 except errors
!
username dialin password 0 user
! -- Usernames for local authentication of the call. ! -
- The client presents the username/password and the NAS
! -- authenticates the peer. ip subnet-zero ! no ip
finger no ip domain-lookup ! async-bootp dns-server
10.98.1.220 ! -- Specifies (for async clients) the IP
address of domain name server. async-bootp nbns-server
10.98.1.221 ! -- Specifies (for async clients) the IP
address of WINS server. call rsvp-sync ! controller T1
0/0 ! -- T1 Physical interface controller configuration.
! -- Interfaces are addressed as controller slot/port. !
-- In this example, the NM-1CT1-CSU module is in slot 0.
framing esf ! -- Framing for this T1 is Extended Super
Frame (ESF). ! -- Obtain this information from the
telco. linecode b8zs ! -- Linecoding for this T1. Obtain
this information from the telco. ds0-group 0 timeslots
1-24 type e & m-immediate-start; ! -- CAS T1 with E & M
Immediate Start provided by telco. ! -- Verify your
signaling type with your local provider. Prior to Cisco
IOS ! -- Software Release 12.0(5)T, this command was
known as cas-group. ! interface Ethernet2/0 ip address
10.98.1.51 255.255.255.0 half-duplex ! interface Group-
Async1 ! -- This group-async interface is the
configuration template for all modems. ! -- Individual
async interface do not have to be configured since they
! -- can be cloned from one managed copy. ip unnumbered
Ethernet2/0 encapsulation ppp dialer in-band dialer-
group 1 !--- Apply interesting traffic definition from
dialer-list 1. ! -- Note: The specified dialer-group
number must be the same as ! -- the dialer-list number;
in this example, defined to be "1". ! -- Interesting
traffic specifies the packets that should reset the idle
timer.

dialer idle-timeout 600
! -- Sets Idle timer to 600 seconds (10 minutes). async
mode dedicated ! -- Allows only PPP dialup. Prevents
```

users from establishing ! -- an "EXEC session" to the router. If the async interface is to answer ! -- different connection types (exec,ppp,slip etc), ! -- use async mode interactive in conjunction with autoselect ppp ! -- under the line configuration to auto detect the connection type. peer default ip address pool dialin ! - - Clients are assigned addresses from the ip address pool named "dialin".

```
ppp authentication chap pap
group-range 33 56
! -- Modems 33 through 56 are members of this group
async interface. ! -- This range was determined in the
section Pre-configuration Tasks. ! ip local pool dialin
10.98.1.15 10.98.1.39 ! -- IP address pool for dialin
clients. ip classless ip route 0.0.0.0 0.0.0.0 10.98.1.1
no ip http server ! dialer-list 1 protocol ip permit ! -
- Specifies all IP traffic as interesting. Interesting
traffic ! -- specifies the packets that should reset the
idle timer. ! -- This is applied to interface Group-
Async 1 using dialer-group 1. ! -- Note: The specified
dialer-list number must be the same as the ! -- dialer-
group number; in this example, defined to be "1".
```

```
!
dial-peer cor custom
!
line con 0
  transport input none
line 33 56
  ! -- TTY lines for the NM-24DM Modems. ! -- This line
  range was determined in the section Pre-configuration
  Tasks. modem InOut ! -- Support incoming and outgoing
  modem calls. transport input all line aux 0 line vty 0 4
login ! end
```

## Cisco 3640(T1 PRI 포함)

```
acc-3640-6a#show running-config
Building configuration...
```

```
Current configuration : 1200 bytes
```

```
!
version 12.1
no service single-slot-reload-enable
service timestamps debug datetime msec
service timestamps log uptime
no service password-encryption
!
hostname acc-3640-6a
!
logging rate-limit console 10 except errors
!
username dialin password 0 user

! -- Usernames for local authentication of the call. The
client ! -- presents the username/password and the NAS
authenticates the peer. ! -- To use AAA with RADIUS or
TACACS+ refer to the document ! -- Implementing the
Server-Based AAA Subsystem ip subnet-zero !! no ip
finger no ip domain-lookup ! async-bootp dns-server
10.98.1.220! -- Specifies (for async clients) the IP
address of domain name server. async-bootp nbns-server
```

```

10.98.1.221 ! -- Specifies (for async clients) the IP
address of WINS server. isdn switch-type primary-5ess
call rsvp-sync ! controller T1 0/0 ! -- T1 Physical
interface controller configuration. ! -- Interfaces are
addressed as controller slot/port. ! -- In this example,
the NM-1CT1-CSU module is in slot 0. framing esf ! --
Framing for this T1 is Extended Super Frame (ESF). ! --
Obtain this information from the telco. linecode b8zs !
-- Linecoding for this T1. Obtain this information from
the telco. pri-group timeslots 1-24 ! -- For T1 PRI
scenarios, all 24 T1 timeslots are assigned as ! -- ISDN
PRI channels. The router will now automatically create !
-- the corresponding D-channel: interface Serial 0/0:23.

!
interface Serial0/0:23
! -- D-channel configuration for T1 0/0. no ip address
encapsulation ppp isdn switch-type primary-5ess isdn
incoming-voice modem ! -- All incoming voice calls on
this T1 are sent to the modems. ! -- This command is
required if this T1 is to accept async calls. ! -- The
controller will now pass voice calls (bearer cap
0x9090A2) to the modem bank. ! interface Ethernet2/0 ip
address 10.98.1.51 255.255.255.0 half-duplex ! interface
Group-Async1 ! -- This group-async interface is the
configuration template for all modems. ! -- Individual
async interface do not have to be configured since they
can ! -- be cloned from one managed copy. ip unnumbered
Ethernet2/0 encapsulation ppp dialer in-band dialer-
group 1 !--- Apply interesting traffic definition from
dialer-list 1. ! -- Note: The specified dialer-group
number must be the same as ! -- the dialer-list number;
in this example, defined to be "1". ! -- Interesting
traffic specifies the packets that should reset the idle
timer.

dialer idle-timeout 600
async mode dedicated
! -- Allows only PPP dialup. Prevents users from
establishing an ! -- "EXEC session" to the router. If
the async interface is to answer different ! --
connection types(exec,ppp,slip etc), use async mode
interactive in ! -- conjunction with autoselect ppp
under the line configuration ! -- to auto detect the
connection type. peer default ip address pool dialin ! -
- Clients are assigned addresses from the ip address
pool named "dialin". ppp authentication chap pap group-
range 33 56 ! -- Modems 33 through 56 are members of
this group async interface. ! -- This range was
determined in the section Pre-configuration Tasks. ! ip
local pool dialin 10.98.1.15 10.98.1.39 ! -- IP address
pool for dialin clients. ip classless ip route 0.0.0.0
0.0.0.0 10.98.1.1 no ip http server ! dialer-list 1
protocol ip permit ! -- Specifies all IP traffic as
interesting. ! -- Interesting traffic specifies the
packets that should reset the idle timer. ! -- This is
applied to interface Group-Async 1 using dialer-group 1.
! -- Note: The specified dialer-list number must be the
same as the ! -- dialer-group number; in this example,
defined to be "1".

dial-peer cor custom
!
line con 0

```

```
transport input none
line 33 56
  ! -- TTY lines for the NM-24DM Modems. ! -- This line
  range was determined in the section Pre-configuration
  Tasks. modem InOut ! -- Support incoming and outgoing
  modem calls. transport input all line aux 0 line vty 0 4
  login ! end
```

## [다음을 확인합니다.](#)

이 섹션에서는 컨피그레이션이 제대로 작동하는지 확인하는 데 사용할 수 있는 정보를 제공합니다.

일부 **show** 명령은 [출력 인터프리터 툴](#)에서 지원되는데(등록된 고객만), 이 툴을 사용하면 **show** 명령 출력의 분석 결과를 볼 수 있습니다.

- **show isdn status** - 라우터가 ISDN 스위치와 제대로 통신하는지 확인합니다. 출력에서 Layer 1 Status ACTIVE이고 Layer 2 Status = MULTIPLE\_FRAME\_ESTABLISHED 나타나는지 확인합니다. 이 명령은 활성 통화 수도 표시합니다.
- **show caller user username detail** - 지정된 IP 주소, PPP 및 PPP 번들 매개변수 등 특정 사용자에게 대한 매개변수를 표시합니다. 사용 중인 버전의 Cisco IOS 소프트웨어가 이 명령을 지원하지 않는 경우 **show user** 명령을 사용합니다.
- **show dialer map** - 구성된 동적 및 정적 다이얼러 맵을 표시합니다. 이 명령을 사용하여 동적 다이얼러 맵이 생성되었는지 확인할 수 있습니다. 다이얼러 맵이 없으면 패킷을 라우팅할 수 없습니다.

## [문제 해결](#)

이 섹션에서는 컨피그레이션 문제를 해결하는 데 사용할 수 있는 정보를 제공합니다.

### [문제 해결 리소스](#)

필요에 따라 다음 문제 해결 리소스를 사용합니다.

- [수신 모뎀 통화 문제 해결](#) - 아날로그 통화 오류 문제 해결용
- [PRI Async Modem Call](#) - 아날로그 통화 실패 문제 해결에 대한 추가 정보입니다.
- [T1 문제 해결 순서도](#) - T1 회로가 제대로 작동하지 않는다고 생각되면 이 순서도를 사용합니다.
- [T1/56K 회선에 대한 루프백 테스트](#) - 라우터의 T1 포트가 올바르게 작동하는지 확인합니다.

### [문제 해결 명령](#)

특정 **show** 명령은 **show** 명령 출력의 분석을 볼 수 있는 출력 인터프리터 도구에서 지원됩니다.

**참고:** debug 명령을 실행하기 전에 [디버그 명령에 대한 중요 정보를 참조하십시오](#).

- **debug dialer** - 다이얼러 인터페이스에서 수신된 패킷에 대한 DDR 디버깅 정보를 표시합니다. 이 정보는 다이얼러 인터페이스를 사용할 수 있는 흥미로운 트래픽이 있는지 확인하는 데 도움이 될 수 있습니다.
- **debug isdn q931** - ISDN 네트워크 연결의 통화 설정 및 해제(레이어 3)를 표시합니다.
- **디버그 모뎀** - 액세스 서버의 모뎀 회선 활동을 표시합니다. 모뎀 회선 상태가 변경되면 출력에

표시됩니다.

- **debug modem csm** - 내부 디지털 모뎀이 있는 라우터에서 CSM(Call Switching Module) 문제를 해결하기 위한 EXEC 명령입니다. 이 명령을 사용하면 수신 및 발신 통화 전환의 전체 시퀀스를 추적할 수 있습니다.
- **debug ppp negotiation** - LCP(Link Control Protocol), Authentication 및 NCP(Network Control Protocol)를 협상하는 동안 PPP 트래픽 및 교환에 대한 정보를 표시합니다. 성공적인 PPP 협상이 먼저 LCP 상태를 연 다음 Authentication(인증)하고 마지막으로 NCP를 협상합니다. LCP 협상 중에 MRRU(Maximum Receive Reguired Unit)와 같은 멀티링크 매개변수가 설정됩니다.
- **debug ppp authentication** - CHAP 패킷 교환 및 PAP(Password Authentication Protocol) 교환을 비롯한 PPP 인증 프로토콜 메시지를 표시합니다.
- **debug ppp error** - PPP 연결 협상 및 작업과 관련된 프로토콜 오류 및 오류 통계를 표시합니다.

다음은 성공한 통화(T1 CAS 사용)에 대한 디버그 출력입니다. 굵게 표시된 섹션과 출력에 제공된 코멘트를 확인합니다. 가져온 출력을 아래 표시된 결과와 비교합니다.

```
acc-3640-6a#show debug
```

```
CSM Modem Management:
```

```
Modem Management Call Switching Module debugging is on
```

```
PPP:
```

```
PPP authentication debugging is on
```

```
PPP protocol negotiation debugging is on
```

```
! -- Only debug modem csm, debug ppp authentication and ! -- debug ppp negotiation were activated.
```

```
acc-3640-6a#
```

```
00:13:42: Modem 255/255 CSM: received EVENT_CALL_DIAL_IN with call_id 0000
```

```
00:13:42: src 0/0/0 dest 255/0/255 cause 512
```

```
00:13:42: CSM: Next free modem = 1/0; statbits = 10020
```

```
00:13:42: Modem 1/0 CSM: modem is allocated, modems free=23
```

```
! -- The Call Switch Module (CSM) is informed of the call. ! -- The CSM allocates modem 1/0 to the incoming call. 00:13:42: Modem 1/0 CSM: (CSM_PROC_IDLE)<--DSX0_CALL 00:13:42: Modem 1/0 CSM: (CSM_PROC_IC_CAS_CHANNEL_LOCKED)<--CSM_EVENT_MODEM_SETUP 00:13:42: Modem 1/0 CSM: received EVENT_START_RX_TONE with call_id 0000 00:13:42: src 0/0/0 dest 1/0/0 cause 0 00:13:42: Modem 1/0 CSM: (CSM_PROC_IC_CAS_ANSWER_CALL)<--DSX0_START_RX_TONE 00:13:42: Modem 1/0 CSM: received EVENT_CHANNEL_CONNECTED with call_id 0000 00:13:42: src 0/0/0 dest 1/0/0 cause 0 00:13:42: Modem 1/0 CSM: (CSM_PROC_IC_CAS_ANSWER_CALL)<--DSX0_CONNECTED 00:14:04: Modem 1/0 CSM:
```

```
(CSM_PROC_CAS_WAIT_FOR_CARRIER)<--MODEM_CONNECTED
```

```
! -- Modem 1/0 is Connected. 00:14:07: %LINK-3-UPDOWN: Interface Async33, changed state to up
```

```
! -- Modem 1/0 corresponds to int async 33 (and line 33). 00:14:07: As33 PPP: Treating connection as a callin 00:14:07: As33 PPP: Phase is ESTABLISHING, Passive Open [0 sess, 0 load]
```

```
00:14:07: As33 LCP: State is Listen
```

```
! -- LCP negotiation begins. 00:14:08: As33 LCP: I CONFREQ [Listen] id 2 len 23 ! -- Incoming LCP CONFREQ. ! -- For more information on interpreting PPP debugs refer to the document ! -- Dialup Technology: Troubleshooting Techniques. 00:14:08: As33 LCP: ACCM 0x000A0000
```

```
(0x0206000A0000) 00:14:08: As33 LCP: MagicNumber 0x00ADDA8E (0x050600ADDA8E) 00:14:08: As33 LCP:
```

```
PFC (0x0702) 00:14:08: As33 LCP: ACFC (0x0802) 00:14:08: As33 LCP: Callback 6 (0x0D0306)
```

```
00:14:08: As33 LCP: O CONFREQ [Listen] id 12 len 25 00:14:08: As33 LCP: ACCM 0x000A0000
```

```
(0x0206000A0000) 00:14:08: As33 LCP: AuthProto CHAP (0x0305C22305) 00:14:08: As33 LCP:
```

```
MagicNumber 0xD0653B57 (0x0506D0653B57) 00:14:08: As33 LCP: PFC (0x0702) 00:14:08: As33 LCP:
```

```
ACFC (0x0802) 00:14:08: As33 LCP: O CONFREQ [Listen] id 2 len 7 00:14:08: As33 LCP: Callback 6
```

```
(0x0D0306) 00:14:08: As33 LCP: I CONFACK [REQsent] id 12 len 25 00:14:08: As33 LCP: ACCM
```

```
0x000A0000 (0x0206000A0000) 00:14:08: As33 LCP: AuthProto CHAP (0x0305C22305) 00:14:08: As33
```

```
LCP: MagicNumber 0xD0653B57 (0x0506D0653B57) 00:14:08: As33 LCP: PFC (0x0702) 00:14:08: As33
```

```
LCP: ACFC (0x0802) 00:14:08: As33 LCP: I CONFREQ [ACKrcvd] id 3 len 20 00:14:08: As33 LCP: ACCM
```

```
0x000A0000 (0x0206000A0000) 00:14:08: As33 LCP: MagicNumber 0x00ADDA8E (0x050600ADDA8E)
```

```
00:14:08: As33 LCP: PFC (0x0702) 00:14:08: As33 LCP: ACFC (0x0802) 00:14:08: As33 LCP: O CONFACK
```

```
[ACKrcvd] id 3 len 20 00:14:08: As33 LCP: ACCM 0x000A0000 (0x0206000A0000) 00:14:08: As33 LCP:
```

```
MagicNumber 0x00ADDA8E (0x050600ADDA8E) 00:14:08: As33LCP: PFC (0x0702) 00:14:08: As33 LCP:
```

```
ACFC (0x0802) 00:14:08: As33 LCP: State is Open
```



```
! --- LCP negotiation is complete. 00:14:08: As33 PPP: Phase is AUTHENTICATING, by this end [0
sess, 0 load] 00:14:08: As33 CHAP: O CHALLENGE id 1 len 32 from "acc-3640-6a" 00:14:08: As33
AUTH: Started process 0 pid 94 00:14:08: As33 CHAP: I RESPONSE id 1 len 27 from "dialin"
00:14:08: As33 CHAP: O SUCCESS id 1 len 4
! -- CHAP authentication is successful. ! -- If this fails verify that the username and password
are correct. ! -- Refer to Dialup Technology: Troubleshooting Techniques. 00:14:08: As33 PPP:
Phase is UP [0 sess, 0 load]
! -- IPCP negotiation begins. 00:14:08: As33 IPCP: O CONFREQ [Closed] id 1 len 10 00:14:08: As33
IPCP: Address 10.98.1.51 (0x03060A620133) 00:14:08: As33 IPCP: I CONFREQ [REQsent] id 1 len 40
00:14:08: As33 IPCP: CompressType VJ 15 slots CompressSlotID (0x0206002D0F01) 00:14:08: As33
IPCP: Address 0.0.0.0 (0x030600000000) 00:14:08: As33 IPCP: PrimaryDNS 0.0.0.0 (0x810600000000)
00:14:08: As33 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000) 00:14:08: As33 IPCP: SecondaryDNS
0.0.0.0 (0x830600000000) 00:14:08: As33 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000) 00:14:08:
As33 IPCP: Pool returned 10.98.1.15 ! -- The IP Address Pool "dialin" provides the address for
the client 00:14:08: As33 IPCP: O CONFREQ [REQsent] id 1 len 22 00:14:08: As33 IPCP:
CompressType VJ 15 slots CompressSlotID (0x0206002D0F01) 00:14:08: As33 IPCP: SecondaryDNS
0.0.0.0 (0x830600000000) 00:14:08: As33 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000) 00:14:08:
As33 CCP: I CONFREQ [Not negotiated] id 1 len 15 00:14:08: As33 CCP: MS-PPC supported bits
0x00000001 (0x120600000001) 00:14:08: As33 CCP: Stacker history 1 check mode EXTENDED
(0x1105000104) 00:14:08: As33 LCP: O PROTREQ [Open] id 13 len 21 protocol CCP 00:14:08: As33
LCP: (0x80FD0101000F12060000000111050001) 00:14:08: As33 LCP: (0x04) 00:14:08: As33 IPCP: I
CONFACK [REQsent] id 1 len 10 00:14:08: As33 IPCP: Address 10.98.1.51 (0x03060A620133) 00:14:10:
As33 IPCP: TIMEOUT: State ACKrcvd 00:14:10: As33 IPCP: O CONFREQ [ACKrcvd] id 2 len 10 00:14:10:
As33 IPCP: Address 10.98.1.51 (0x03060A620133) 00:14:10: As33 IPCP: I CONFACK [REQsent] id 2 len
10 00:14:10: As33 IPCP: Address 10.98.1.51 (0x03060A620133) 00:14:11: As33 IPCP: I CONFREQ
[ACKrcvd] id 2 len 34 00:14:11: As33 IPCP: Address 0.0.0.0 (0x030600000000) 00:14:11: As33 IPCP:
PrimaryDNS 0.0.0.0 (0x810600000000) 00:14:11: As33 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000)
00:14:11: As33 IPCP: SecondaryDNS 0.0.0.0 (0x830600000000) 00:14:11: As33 IPCP: SecondaryWINS
0.0.0.0 (0x840600000000) 00:14:11: As33 IPCP: O CONFREQ [ACKrcvd] id 2 len 16 00:14:11: As33
IPCP: SecondaryDNS 0.0.0.0 (0x830600000000) 00:14:11: As33 IPCP: SecondaryWINS 0.0.0.0
(0x840600000000) 00:14:11: As33 IPCP: I CONFREQ [ACKrcvd] id 3 len 22 00:14:11: As33 IPCP:
Address 0.0.0.0 (0x030600000000) 00:14:11: As33 IPCP: PrimaryDNS 0.0.0.0 (0x810600000000)
00:14:11: As33 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000) 00:14:11: As33 IPCP: O CONFREQ
[ACKrcvd] id 3 len 22 00:14:11: As33 IPCP: Address 10.98.1.15 (0x03060A62010F) 00:14:11: As33
IPCP: PrimaryDNS 10.98.1.220 (0x81060A6201DC) 00:14:11: As33 IPCP: PrimaryWINS 10.98.1.221
(0x82060A6201DD) 00:14:11: As33 IPCP: I CONFREQ [ACKrcvd] id 4 len 22 00:14:11: As33 IPCP:
Address 10.98.1.15 (0x03060A62010F) 00:14:11: As33 IPCP: PrimaryDNS 10.98.1.220 (0x81060A6201DC)
00:14:11: As33 IPCP: PrimaryWINS 10.98.1.221 (0x82060A6201DD) 00:14:11: As33 IPCP: O CONFACK
[ACKrcvd] id 4 len 22 00:14:11: As33 IPCP: Address 10.98.1.15 (0x03060A62010F) 00:14:11: As33
IPCP: PrimaryDNS 10.98.1.220 (0x81060A6201DC)
! -- The Primary DNS server is agreed upon. ! -- This was configured using the async bootp
commands. 00:14:11: As33 IPCP: PrimaryWINS 10.98.1.221 (0x82060A6201DD)
! -- The Primary WINS server is agreed upon. ! -- This was configured using the async bootp
commands. 00:14:11: As33 IPCP: State is Open
! -- IPCP negotiation is complete. The user is now connected. 00:14:11: As33 IPCP: Install route
to 10.98.1.15
! -- The NAS installs a route to the client.
```

원격 피어에 대한 ICMP ping에 성공했습니다.

```
acc-3640-6a#ping 10.98.1.15
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 10.98.1.15, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 124/138/148 ms
```

```
acc-3640-6a#
```

다음은 성공한 통화(T1 PRI 사용)에 대한 디버그 출력입니다. 굵게 표시된 섹션과 출력에 제공된 코멘트를 확인합니다. 가져온 출력을 아래 표시된 결과와 비교합니다.

acc-3640-6a#show debug

CSM Modem Management:

Modem Management Call Switching Module debugging is on  
PPP:

PPP authentication debugging is on  
PPP protocol negotiation debugging is on

ISDN:

ISDN Q931 packets debugging is on  
ISDN Q931 packets debug DSLs. (On/Off/No DSL:1/0/-)  
DSL 0 --> 31

1 - - - - -

**! -- Only debug modem csm, debug ppp authentication, debug ppp negotiation and ! -- debug isdn q931** were activated.

acc-3640-6a#

```
*Mar 1 00:22:43.743: ISDN Se0/0:23: RX <- SETUP pd = 8 callref = 0x32
! -- Incoming Q.931 SETUP message. Indicates an incoming call. ! -- For more information on
Q.931 refer to the document. ! -- Troubleshooting ISDN Layer 3 using the debug isdn q931
Command. *Mar 1 00:22:43.747: Bearer Capability i = 0x9090A2 *Mar 1 00:22:43.747: Channel ID i =
0xA98393 *Mar 1 00:22:43.747: Calling Party Number i = 0x2183, '9194722001', Plan:ISDN,
Type:National *Mar 1 00:22:43.747: Called Party Number i = 0xC1, '9194724137', Plan:ISDN,
Type:Subscriber(local) *Mar 1 00:22:43.755: CSM: MODEM_REPORT from 0/0:18, call_id=0x4,
event=0x1, cause=0x0, dchan_idb=0x62442AB8 *Mar 1 00:22:43.755: CSM: Next free modem = 1/3;
statbits = 10020 ! -- The Call Switch Module (CSM) is informed of the call. ! -- The CSM
allocates modem 2/0 to the incoming call. *Mar 1 00:22:43.755: Modem 1/3 CSM: modem is
allocated, modems free=23 *Mar 1 00:22:43.755: Modem 1/3 CSM: Incoming call from 9194722001 to
9194724137, id 0x4 *Mar 1 00:22:43.755: Modem 1/3 CSM: (CSM_PROC_IDLE)<--ISDN_CALL *Mar 1
00:22:43.803: ISDN Se0/0:23: TX -> CALL_PROC pd = 8 callref = 0x8032
*Mar 1 00:22:43.803: Channel ID i = 0xA98393
! -- The Call Proceeding Message is sent through the D-channel. *Mar 1 00:22:43.807: ISDN
Se0/0:23: TX -> ALERTING pd = 8 callref = 0x8032 *Mar 1 00:22:43.807: ISDN Se0/0:23: TX ->
CONNECT pd = 8 callref = 0x8032
! -- D-channel transmits a CONNECT. *Mar 1 00:22:43.907: ISDN Se0/0:23: RX <- CONNECT_ACK pd =
8 callref = 0x32
! -- Received the Q.931 CONNECT_ACK. *Mar 1 00:22:43.911: ISDN Se0/0:23: CALL_PROGRESS:
CALL_CONNECTED call id 0x4, bchan 18, dsl 0 *Mar 1 00:22:43.911: CSM: MODEM_REPORT from 0/0:18,
call_id=0x4, event=0x4, cause=0x0, dchan_idb=0x62442AB8 *Mar 1 00:22:43.911: Modem 1/3 CSM:
MODEM_REPORT rcvd DEV_CONNECTED for call_id 0x4 *Mar 1 00:22:43.911: Modem 1/3 CSM:
(CSM_PROC_MODEM_RESERVED)<--ISDN_CONNECTED 00:22:43: %ISDN-6-CONNECT: Interface Serial0/0:18 is
now connected to 9194722001 *Mar 1 00:23:06.291: Modem 1/3 CSM: (CSM_PROC_WAIT_FOR_CARRIER)<--
MODEM_CONNECTED
! -- Modem is connected. 00:23:08: %LINK-3-UPDOWN: Interface Async36, changed state to up
! -- Modem 1/3 corresponds to int async 36 (and line 36). *Mar 1 00:23:08.755: As36 PPP:
Treating connection as a callin *Mar 1 00:23:08.755: As36 PPP: Phase is ESTABLISHING, Passive
Open [0 sess, 0 load] *Mar 1 00:23:08.755: As36 LCP: State is Listen
! -- LCP negotiation begins. *Mar 1 00:23:09.399: As36 LCP: I CONFREQ [Listen] id 2 len 23
! -- Incoming LCP CONFREQ. ! -- For more information on interpreting PPP debugs refer to the
document ! -- Dialup Technology: Troubleshooting Techniques. *Mar 1 00:23:09.399: As36 LCP: ACCM
0x000A0000 (0x0206000A0000) *Mar 1 00:23:09.399: As36 LCP: MagicNumber 0x009B41FA
(0x0506009B41FA) *Mar 1 00:23:09.399: As36 LCP: PFC (0x0702) *Mar 1 00:23:09.399: As36 LCP: ACFC
(0x0802) *Mar 1 00:23:09.399: As36 LCP: Callback 6 (0x0D0306) *Mar 1 00:23:09.399: As36 LCP: O
CONFREQ [Listen] id 1 len 25 *Mar 1 00:23:09.399: As36 LCP: ACCM 0x000A0000 (0x0206000A0000)
*Mar 1 00:23:09.399: As36 LCP: AuthProto CHAP (0x0305C22305) *Mar 1 00:23:09.403: As36 LCP:
MagicNumber 0xD06D7DF1 (0x0506D06D7DF1) *Mar 1 00:23:09.403: As36 LCP: PFC (0x0702) *Mar 1
00:23:09.403: As36 LCP: ACFC (0x0802) *Mar 1 00:23:09.403: As36 LCP: O CONFREQ [Listen] id 2 len
7 *Mar 1 00:23:09.403: As36 LCP: Callback 6 (0x0D0306) *Mar 1 00:23:09.523: As36 LCP: I CONFACK
[REQsent] id 1 len 25 *Mar 1 00:23:09.523: As36 LCP: ACCM 0x000A0000 (0x0206000A0000) *Mar 1
00:23:09.523: As36 LCP: AuthProto CHAP (0x0305C22305) *Mar 1 00:23:09.523: As36 LCP: MagicNumber
0xD06D7DF1 (0x0506D06D7DF1) *Mar 1 00:23:09.523: As36 LCP: PFC (0x0702) *Mar 1 00:23:09.523:
As36 LCP: ACFC (0x0802) *Mar 1 00:23:09.527: As36 LCP: I CONFREQ [ACKrcvd] id 3 len 20 *Mar 1
00:23:09.531: As36 LCP: ACCM 0x000A0000 (0x0206000A0000) *Mar 1 00:23:09.531: As36 LCP:
MagicNumber 0x009B41FA (0x0506009B41FA) *Mar 1 00:23:09.531: As36 LCP: PFC (0x0702) *Mar 1
00:23:09.531: As36 LCP: ACFC (0x0802) *Mar 1 00:23:09.531: As36 LCP: O CONFACK [ACKrcvd] id 3
len 20 *Mar 1 00:23:09.531: As36 LCP: ACCM 0x000A0000 (0x0206000A0000) *Mar 1 00:23:09.531: As36
```

```
LCP: MagicNumber 0x009B41FA (0x0506009B41FA) *Mar 1 00:23:09.531: As36 LCP: PFC (0x0702) *Mar 1
00:23:09.531: As36 LCP: ACFC (0x0802) *Mar 1 00:23:09.531: As36 LCP: State is Open
! --- LCP negotiation is complete. *Mar 1 00:23:09.531: As36 PPP: Phase is AUTHENTICATING, by
this end [0 sess, 0 load] *Mar 1 00:23:09.531: As36 CHAP: O CHALLENGE id 1 len 32 from "acc-
3640-6a" *Mar 1 00:23:09.651: As36 CHAP: I RESPONSE id 1 len 27 from "dialin" *Mar 1
00:23:09.655: As36 CHAP: O SUCCESS id 1 len 4
! -- CHAP authentication is successful. ! -- If this fails verify that the username and password
are correct. ! -- Refer to Dialup Technology: Troubleshooting Techniques. *Mar 1 00:23:09.655:
As36 PPP: Phase is UP [0 sess, 0 load] *Mar 1 00:23:09.655: As36 IPCP: O CONFREQ [Closed] id 1
len 10 *Mar 1 00:23:09.655: As36 IPCP: Address 10.98.1.51 (0x03060A620133) *Mar 1 00:23:09.771:
As36 IPCP: I CONFREQ [REQsent] id 1 len 40 *Mar 1 00:23:09.771: As36 IPCP: CompressType VJ 15
slots CompressSlotID (0x0206002D0F01) *Mar 1 00:23:09.771: As36 IPCP: Address 0.0.0.0
(0x030600000000) *Mar 1 00:23:09.771: As36 IPCP: PrimaryDNS 0.0.0.0 (0x810600000000) *Mar 1
00:23:09.771: As36 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000) *Mar 1 00:23:09.771: As36 IPCP:
SecondaryDNS 0.0.0.0 (0x830600000000) *Mar 1 00:23:09.771: As36 IPCP: SecondaryWINS 0.0.0.0
(0x840600000000) *Mar 1 00:23:09.771: As36 IPCP: Pool returned 10.98.1.15
! -- The IP Address Pool "dialin" provides the address for the client. *Mar 1 00:23:09.771: As36
IPCP: O CONFREQ [REQsent] id 1 len 22 *Mar 1 00:23:09.771: As36 IPCP: CompressType VJ 15 slots
CompressSlotID (0x0206002D0F01) *Mar 1 00:23:09.771: As36 IPCP: SecondaryDNS 0.0.0.0
(0x830600000000) *Mar 1 00:23:09.771: As36 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000) *Mar 1
00:23:09.779: As36 CCP: I CONFREQ [Not negotiated] id 1 len 15 *Mar 1 00:23:09.779: As36 CCP:
MS-PPC supported bits 0x00000001 (0x120600000001) *Mar 1 00:23:09.779: As36 CCP: Stacker history
1 check mode EXTENDED (0x1105000104) *Mar 1 00:23:09.779: As36 LCP: O PROTREQ [Open] id 2 len 21
protocol CCP *Mar 1 00:23:09.779: As36 LCP: (0x80FD0101000F12060000000111050001) *Mar 1
00:23:09.779: As36 LCP: (0x04) *Mar 1 00:23:09.783: As36 IPCP: I CONFACK [REQsent] id 1 len 10
*Mar 1 00:23:09.783: As36 IPCP: Address 10.98.1.51 (0x03060A620133) *Mar 1 00:23:11.655: As36
IPCP: TIMEOUT: State ACKrcvd *Mar 1 00:23:11.655: As36 IPCP: O CONFREQ [ACKrcvd] id 2 len 10
*Mar 1 00:23:11.655: As36 IPCP: Address 10.98.1.51 (0x03060A620133) *Mar 1 00:23:11.759: As36
IPCP: I CONFACK [REQsent] id 2 len 10 *Mar 1 00:23:11.759: As36 IPCP: Address 10.98.1.51
(0x03060A620133) *Mar 1 00:23:12.759: As36 IPCP: I CONFREQ [ACKrcvd] id 2 len 34 *Mar 1
00:23:12.763: As36 IPCP: Address 0.0.0.0 (0x030600000000) *Mar 1 00:23:12.763: As36 IPCP:
PrimaryDNS 0.0.0.0 (0x810600000000) *Mar 1 00:23:12.763: As36 IPCP: PrimaryWINS 0.0.0.0
(0x820600000000) *Mar 1 00:23:12.763: As36 IPCP: SecondaryDNS 0.0.0.0 (0x830600000000) *Mar 1
00:23:12.763: As36 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000) *Mar 1 00:23:12.763: As36 IPCP:
O CONFREQ [ACKrcvd] id 2 len 16 *Mar 1 00:23:12.763: As36 IPCP: SecondaryDNS 0.0.0.0
(0x830600000000) *Mar 1 00:23:12.763: As36 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000) *Mar 1
00:23:12.871: As36 IPCP: I CONFREQ [ACKrcvd] id 3 len 22 *Mar 1 00:23:12.871: As36 IPCP: Address
0.0.0.0 (0x030600000000) *Mar 1 00:23:12.871: As36 IPCP: PrimaryDNS 0.0.0.0 (0x810600000000)
*Mar 1 00:23:12.871: As36 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000) *Mar 1 00:23:12.871: As36
IPCP: O CONFNAK [ACKrcvd] id 3 len 22 *Mar 1 00:23:12.871: As36 IPCP: Address 10.98.1.15
(0x03060A62010F) *Mar 1 00:23:12.871: As36 IPCP: PrimaryDNS 10.98.1.220 (0x81060A6201DC) *Mar 1
00:23:12.871: As36 IPCP: PrimaryWINS 10.98.1.221 (0x82060A6201DD) *Mar 1 00:23:12.979: As36
IPCP: I CONFREQ [ACKrcvd] id 4 len 22 *Mar 1 00:23:12.979: As36 IPCP: Address 10.98.1.15
(0x03060A62010F) *Mar 1 00:23:12.979: As36 IPCP: PrimaryDNS 10.98.1.220 (0x81060A6201DC) *Mar 1
00:23:12.983: As36 IPCP: PrimaryWINS 10.98.1.221 (0x82060A6201DD) *Mar 1 00:23:12.983: As36
IPCP: O CONFACK [ACKrcvd] id 4 len 22 *Mar 1 00:23:12.983: As36 IPCP: Address 10.98.1.15
(0x03060A62010F) *Mar 1 00:23:12.983: As36 IPCP: PrimaryDNS 10.98.1.220 (0x81060A6201DC)
! -- The Primary DNS server is agreed upon. ! -- This was configured using the async bootp
commands. *Mar 1 00:23:12.983: As36 IPCP: PrimaryWINS 10.98.1.221 (0x82060A6201DD)
! -- The Primary WINS server is agreed upon. ! -- This was configured using the async bootp
commands. *Mar 1 00:23:12.983: As36 IPCP: State is Open
! -- IPCP negotiation is complete. The user is now connected. *Mar 1 00:23:12.983: As36 IPCP:
Install route to 10.98.1.15
! -- The NAS installs a route to the client.
```

원격 피어에 대한 ICMP ping에 성공했습니다.

acc-3640-6a#ping 10.98.1.15

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.98.1.15, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 124/132/140 ms

## 관련 정보

- [Cisco 3640용 Digital Modem Network Module](#)
- [Cisco 3640 Digital Modem Network Module에 대한 T1 CAS 지원](#)
- [E1 및 T1 회선에서 ISDN PRI 및 기타 신호 구성](#)
- [다이얼 액세스에 사용되는 인터페이스, 컨트롤러 및 회선 개요](#)
- [Technical Support - Cisco Systems](#)