Dial-Out DS0 Level Trunk Group

The Dial-Out DS0 Level Trunk Group feature directs an outbound synchronous or asynchronous call initiated by dial-on-demand routing (DDR) to use a specific channel of a T1 or E1 circuit.

Feature History for Dial-Out DS0 Level Trunk Group

Release	Modification
12.3(11)T	This feature was introduced.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Contents

Prerequisites for Dial-Out DS0 Level Trunk Groups

You must be familiar with the Large-Scale Dial-Out feature before setting up and configuring dial-out trunk groups. See the "Related Documents" section on page 16 for information about large-scale dial-out.

Americas Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

The Dial-Out DS0 Level Trunk Group feature has been tested for use on only the Cisco AS5800 series access servers.

Restrictions for Dial-Out DS0 Level Trunk Groups

- Dial-out trunk groups must be configured on a network access server (NAS).
- Each trunk group can consist of digital service 0s (DS0s) from various DS1s with similar signaling, but with the restriction that a single DS0 can belong to only one trunk group.
- Dial-out trunk groups are not supported for voice applications.
- Some trunk group features are also not supported for DDR, although the software will allow them to be configured. The following list of features should not be configured for trunk groups that are targeted by DDR:
  - ISDN Two B Channel Transfer (TBCT) supplementary service
  - Telephony Gateway Registration Protocol (TGREP) configuration
  - Translation profiles
  - The **max-retry** trunk group configuration command
  - The **max-call** trunk group configuration command

Information About Dial-Out DS0 Level Trunk Groups

You need to be familiar with the following concepts to use the Dial-Out DS0 Level Trunk Group feature:

- Dial-Out DS0 Level Trunk Group Outbound Call Control, page 2
- Dial-Out DS0 Level Trunk Group Aggregation Requirement, page 3
- Structure and Relationship of a Dial-Out DS0 Level Trunk Group, page 3

Dial-Out DS0 Level Trunk Group Outbound Call Control

In Cisco IOS software prior to Release 12.3(11)T, when a Cisco access gateway initiated a call (dial out triggered by interesting traffic), software controlled the DS1 link over which the call was placed for synchronous or asynchronous interfaces that used an appropriate dialer or a dial-out controller configuration, respectively.

Each DS1 has 24 DS0 channels framed together that can transfer data at 1.544 Mbps. DS0, also known as T1, is a digital interface that occurs as a single time slot on a DS1 and provides a 64-kbps, synchronous, full-duplex data channel.

The Dial-Out DS0 Level Trunk Group feature adds functionality that enhances outbound call routing by giving the user control over individual DS0s for outbound calls. Previous to this feature, outbound DS0s could not be configured separately from DS1s. The dial-out capabilities of a DS1 applied to all DS0s under that DS1.

Currently, the aggregation of DS1s into trunk groups is done using the Trunk Group Resource Manager (TGRM). The Dial-Out DS0 Level Trunk Group feature enables the TGRM subsystem to aggregate DS0s into trunk groups also. The dial-out capabilities of these DS0 trunk groups can then be configured directly at the DS0 level, using TGRM commands and by setting authentication, authorization, and accounting (AAA) attributes.

The configuration of DS0s for outbound calls enables the dial-on-demand feature to initiate outbound calls over a set of DS0s. DS0 is referred to as a B channel for ISDN Non-Facility Associated Signaling (NFAS) circuits and as a Circuit Identification Code (CIC) for Signaling System 7 (SS7).

Dial-out trunk groups are configured on an NAS. The feature provides the ability to direct an outbound synchronous or asynchronous call initiated by DDR to use a specific DS0 on one of the following circuits:

- PRI
- NFAS and SS7
- T1/CAS
- E1/R2

Note Although the tasks and examples in this document focus on T1 trunks, this feature also applies to E1 circuits.

Dial-Out DS0 Level Trunk Group Aggregation Requirement

The Dial-Out DS0 Level Trunk Group feature requires a scalable framework that can aggregate individual DS0s and make the groups available per user on dial out. Dial-out scalability was addressed by the framework of the Large-Scale Dial-Out feature, with a limitation that it was not possible to designate certain DS0s for dial out. This limitation became apparent for dial out over asynchronous lines that required a time-division multiplexing (TDM) cross-connect between an asynchronous device and the DS0 over which the call was finally placed.

The requirement to aggregate DS1s into trunk groups was met by the TGRM feature. TGRM now groups DS0s from various DS1s (which can be either T1 or E1 circuits). These DS0 trunk groups can then be used by DDR to control dial-out call capabilities at the DS0 level.

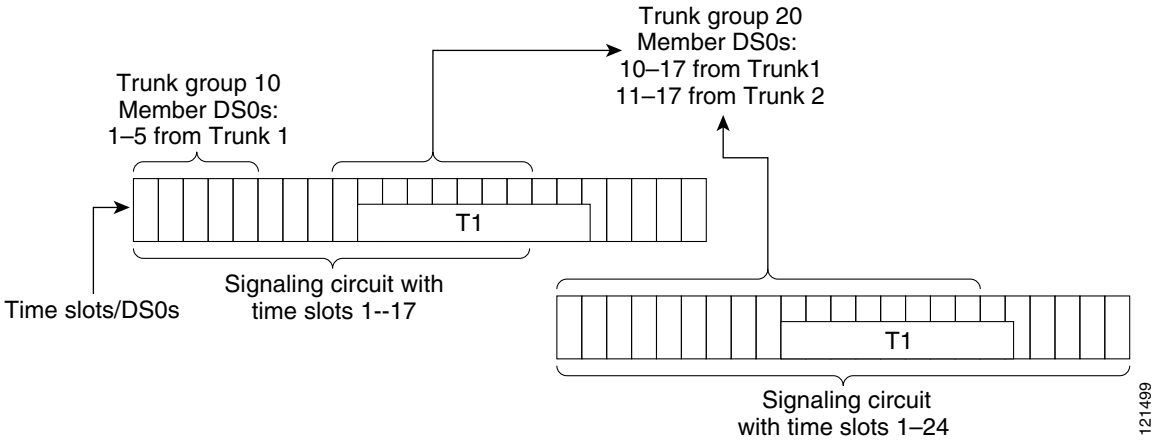
Dial-out trunk groups are actually an extension of the original TGRM framework, which had allowed a logical grouping of DS1s, but are enhanced in the Dial-Out DS0 Level Trunk Group feature to include individual DS0s from various DS1s. The main difference between the existing trunk groups and this enhancement is the manner by which trunk groups are used as targets by different applications. Voice applications use a trunk group that is a pool of DS1s, whereas DDR uses a dial-out trunk group that is a pool of DS0s or DS1s, or a mix of both.

The configuration by which DS0s are made part of a dial-out trunk group can be different for different signaling types. TGRM allocates the DS0s it manages using a hunt scheme such as round robin or least used. ISDN PRI interfaces can be configured to make the outgoing call selection in ascending or descending order. However, this configurable ISDN interface channel allocation scheme is overridden for DS0s that are managed by TGRM.

Structure and Relationship of a Dial-Out DS0 Level Trunk Group

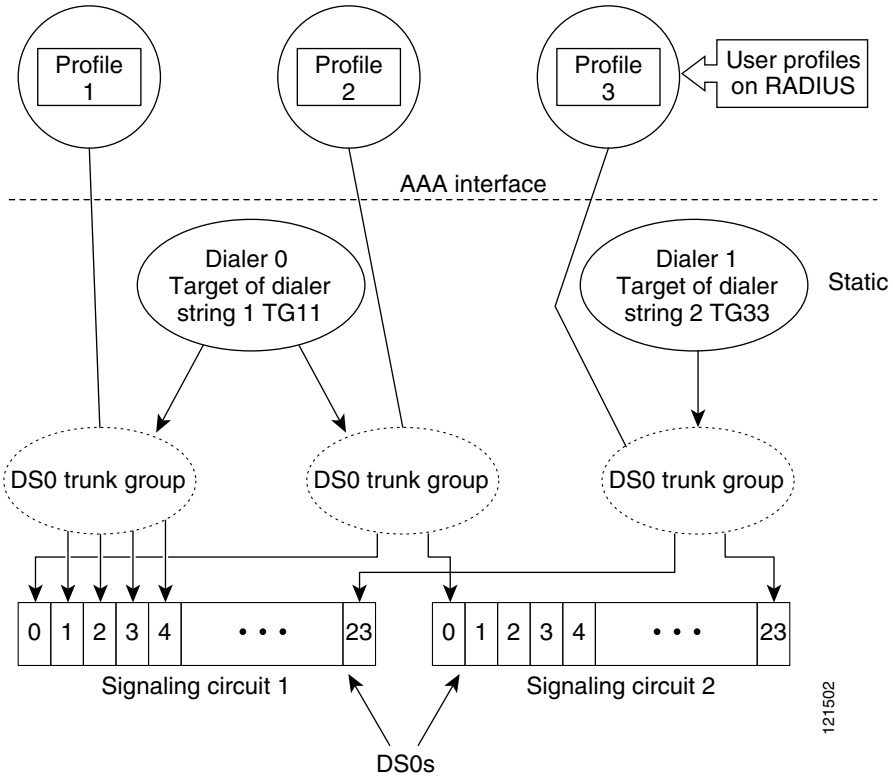
Figure 1 shows the structure of a dial-out trunk group. Each trunk group can consist of DS0s from various signaling circuits, but with the restriction that a single DS0 can belong to only one trunk group.

Figure 1 Dial-Out DS0 Level Trunk Group Structure



Each dial-out trunk group is typically associated with one or more dial-out user profiles. Figure 2 shows various DS0s aggregated into trunk groups, which are referenced by dial-out profiles that reside on a AAA server.

Figure 2 Relationship of Dial-Out DS0 Level Trunk Groups to RADIUS Profiles



The dial-out trunk group configuration must be explicitly defined on the NAS and cannot be set up using other external components such as AAA, because they represent static functional configurations or configurable system resources on the NAS.

How to Configure Dial-Out DS0 Level Trunk Groups and Enable for DDR

This section contains tasks for configuring dial-out trunk groups and enabling them on DDR. Your network configuration will determine which of the following tasks you require:

- Configuring Dial-Out DS0 Level Trunk Groups on a DS1 Configured for CAS Signaling, page 5 (required for CAS)
- Configuring Dial-Out DS0 Level Trunk Groups on an NFAS Member, page 6 (required for NFAS/SS7)
- Configuring Dial-Out DS0 Level Trunk Groups on DS1 Configured for ISDN PRI, page 8 (required for ISDN PRI)
- Associating DS0 Trunk Groups with Dialer, page 9 (required for static configurations)

Configuring Dial-Out DS0 Level Trunk Groups on a DS1 Configured for CAS Signaling

You can configure single or multiple dial-out trunk groups on CAS. The following task shows how to configure a single dial-out trunk group. Repeat steps 4 through 6 to configure additional DS0 groups.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **controller** {**e1** | **t1**} *slot/port*
4. **ds0-group** *ds0-group-number* **timeslots** *timeslot-list*
5. **cas-custom** *channel*
6. **trunk-group** *name* [**timeslots** *timeslot-list* [**preference** *preference-number*]]
7. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**controller** {**e1** | **t1**} *slot*/*port* **Example:** `Router(config)# controller t1 6/1`	Configures a T1 or E1 controller and enters controller configuration mode.
Step 4	**ds0-group** *ds0-group-number* **timeslots** *timeslot-list* **Example:** `Router(config-controller)# ds0-group 4 timeslots 1-24`	Defines channels for the CAS method by which the router connects to the PSTN.
Step 5	**cas-custom** *channel* **Example:** `Router(config-controller)# cas-custom 4`	Customizes signaling parameters for a particular E1 or T1 channel group on a channelized line.
Step 6	**trunk-group** *name* [**timeslots** *timeslot-list* [**preference** *preference-number*]] **Example:** `Router(config-controller)# trunk-group label5 timeslots 1-24 preference 3`	Directs an outbound synchronous or asynchronous call initiated by DDR to use specific DS0 channels of an ISDN circuit. • **timeslots** *timeslot-list*—Selectively adds one or more DS0s from a signaling circuit to a trunk group. The *timeslot-list* argument accepts DS0s numbered from 1 to 24 for T1 links, and from 1 to 15 and 17 to 31 for E1 links. • **preference** *preference-number*—Assigns a preference for DS0 members in a trunk group. Range is from 1 (highest preference) to 64 (lowest preference).

Step 7	`exit`
	
	Example:
	`Router(config-controller)# exit`
		Exits the current configuration mode.

Configuring Dial-Out DS0 Level Trunk Groups on an NFAS Member

When NFAS or SS7 is used, signaling can take place over a circuit different than the one over which the data is being transported. The dial-out trunk group configuration is done in controller configuration mode. If a trunk groups is configured under an NFAS primary serial interface, all NFAS group interface member DS0s are added into the trunk groups. The NFAS primary serial interface will not have the time slot option enabled under its configuration mode.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **controller** {**e1** | **t1**} *slot/port*
4. **pri-group timeslots** *timeslot-range* **nfas_d none nfas_int** *number* **nfas_group** *number*
5. **trunk-group** *name* [**timeslots** *timeslot-list* [**preference** *preference-number*]]

6. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**controller** {**e1** | **t1**} *slot*/*port* **Example:** `Router(config)# controller t1 6/1`	Configures a T1 or E1 controller and enters controller configuration mode.
Step 4	**pri-group timeslots** *timeslot-range* **nfas_d none nfas_int** *number* **nfas_group** *number* **Example:** `Router(config-controller)# pri-group timeslots 1-24 nfas_d none nfas_int 2 nfas_group 0`	Specifies an ISDN PRI group on a channelized T1 controller and releases the ISDN PRI signaling time slots. • *timeslot-range*—A value or range of values for time slots on a T1 or E1 controller that consist of an ISDN PRI group. Use a hyphen to indicate a range. **Note** Values and groups of time slot range values separated by commas (1,3-5,8-23, for example) are accepted. • **nfas_d none**—The D-channel time slot is used as an additional B channel. • **nfas_int** *number*—Specifies the provisioned NFAS interface as a value; value is a number from 0 to 8. • **nfas_group** *number*—Specifies the NFAS group.
Step 5	**trunk-group** *name* [**timeslots** *timeslot-list* [**preference** *preference-number*]] **Example:** `Router(config-controller)# trunk-group label5 timeslots 1-24 preference 3`	Directs an outbound synchronous or asynchronous call initiated by DDR to use specific DS0 channels of an ISDN circuit. • **timeslots** *timeslot-list*—Selectively adds one or more DS0s from a signaling circuit to a trunk group. The *timeslot-list* argument accepts DS0s numbered from 1 to 24 for T1 links, and from 1 to 15 and 17 to 31 for E1 links. • **preference** *preference-number*—Assigns a preference for DS0 members in a trunk group. Range is from 1 (highest preference) to 64 (lowest preference).

Step 6	`exit`
	
	Example:
	`Router(config-controller)# exit`
		Exits the current configuration mode.

Configuring Dial-Out DS0 Level Trunk Groups on DS1 Configured for ISDN PRI

The task in this section configures a dial-out trunk group on a PRI.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **controller** {**e1** | **t1**} *slot/port*
4. **framing** *framing-type*
5. **linecode** *linecode-type*
6. **pri-group timeslots** *timeslot-range*
7. **trunk-group** *name* [**timeslots** *timeslot-list* [**preference** *preference-number*]]
8. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**controller** {**e1** | **t1**} *slot*/*port* **Example:** `Router(config)# controller t1 6/1`	Configures an E1 or T1 controller and enters controller configuration mode.
Step 4	**framing** *framing-type* **Example:** `Router(config-controller)# framing esf`	Selects the frame type for the data line. • Framing type choices are as follows: – **sf**—Specifies super frame as the T1 frame type. This is the default. – **esf**—Specifies extended super frame as the T1 frame type. – **crc4**—Specifies CRC4 frame as the E1 frame type. This is the default for Australia. – **no-crc4**—Specifies no CRC4 frame as the E1 frame type. – **australia** (Optional)—Specifies the E1 frame type used in Australia.

	Command or Action	Purpose
Step 5	**linecode** *linecode-type* **Example:** `Router(config-controller)# linecode b8zs`	Selects the line-code type for the data line. • Line code type choices are as follows: – **ami**—Specifies alternate mark inversion (AMI) as the line-code type. Valid for T1 or E1 controllers. This is the default for T1 lines. – **b8zs**—Specifies B8ZS as the line-code type. Valid for T1 controller only. – **hdb3**—Specifies high density bipolar 3 (HDB3) as the line-code type. Valid for E1 controller only. This is the default for E1 lines.
Step 6	**pri-group timeslots** *timeslot-range* **Example:** `Router(config-controller)# pri-group timeslots 3`	Specifies an ISDN PRI group on a channelized T1 controller and releases the ISDN PRI signaling time slots. • *timeslot-range*—A value or range of values for time slots on a T1 or E1 controller that consists of an ISDN PRI group. Use a hyphen to indicate a range. **Note** Values and groups of time slot range values separated by commas (1,3-5,8-23, for example) are also accepted.
Step 7	**trunk-group** *name* [**timeslots** *timeslot-list* [**preference** *preference-number*]] **Example:** `Router(config-controller)# trunk-group 15 timeslots 1,21-22 preference 1`	Directs an outbound synchronous or asynchronous call initiated by DDR to use specific DS0 channels of an ISDN circuit. • **timeslots** *timeslot-list*—Selectively adds one or more DS0s from a signaling circuit to a trunk group. The *timeslot-list* argument accepts DS0s numbered from 1 to 24 for T1 links, and from 1 to 15 and 17 to 31 for E1 links. • **preference** *preference-number*—Assigns a preference for DS0 members in a trunk group. Range is from 1 (highest preference) to 64 (lowest preference).

Step 8	`exit`
	
	Example:
	`Router(config-controller)# exit`
		Exits the current configuration mode.

Associating DS0 Trunk Groups with Dialer

The large-scale dial-out framework that governs dial-out trunk groups enables the provisioning of dial-out configurations on a AAA server. A trunk group label can also be configured as part of a **dialer string** command, or the large-scale dial-out framework can be used to download the trunk group identifier along with the dialer string. The task in this section shows how to set up a static dial-out configuration for DDR over DS0 trunk groups, and is done by configuring a dialer interface, setting up a profile on the AAA server, and applying a static dial-out trunk configuration on an NAS.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **controller** {**e1** | **t1**} *slot/port*
4. **framing** *framing-type*
5. **linecode** *linecode-type*
6. **pri-group timeslots** *timeslot-range*
7. **trunk-group** *name* [**timeslots** *timeslot-list* [**preference** *preference-number*]]
8. **exit**
9. **interface dialer** *dialer-rotary-group-number*
10. **dialer string** *dial-string* **trunkgroup** *trunkgroup-label*
11. **dialer aaa** [**suffix** *string*] [**password** *string*]
12. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**controller** {**e1** | **t1**} *slot*/*port* **Example:** `Router(config)# controller t1 6/1`	Configures an E1 or T1 controller and enters controller configuration mode.
Step 4	**framing** *framing-type* **Example:** `Router(config-controller)# framing esf`	Selects the frame type for the data line. • Framing type choices are as follows: – **sf**—Specifies super frame as the T1 frame type. This is the default. – **esf**—Specifies extended super frame as the T1 frame type. – **crc4**—Specifies CRC4 frame as the E1 frame type. This is the default for Australia. – **no-crc4**—Specifies no CRC4 frame as the E1 frame type. – **australia** (Optional)—Specifies the E1 frame type used in Australia.

	Command or Action	Purpose
Step 5	**linecode** *linecode-type* **Example:** `Router(config-controller)# linecode b8zs`	Selects the line-code type for the data line. • Line code type choices are as follows: – **ami**—Specifies AMI as the line-code type. Valid for T1 or E1 controllers. This is the default for T1 lines. – **b8zs**—Specifies B8ZS as the line-code type. Valid for T1 controller only. – **hdb3**—Specifies high density bipolar 3 (HDB3) as the line-code type. Valid for E1 controller only. This is the default for E1 lines.
Step 6	**pri-group timeslots** *timeslot-range* **Example:** `Router(config-controller)# pri-group timeslots 3`	Specifies an ISDN PRI group on a channelized T1 controller and releases the ISDN PRI signaling time slots. • *timeslot-range*—A value or range of values for time slots on a T1 or E1 controller that consists of an ISDN PRI group. Use a hyphen to indicate a range. **Note** Values and groups of time slot ranges separated by commas (1,3-5,8-23, for example) are also accepted.
Step 7	**trunk-group** *name* [**timeslots** *timeslot-list* [**preference** *preference-number*]] **Example:** `Router(config-controller)# trunk-group 15 timeslots 1,21-22 preference 1`	Directs an outbound synchronous or asynchronous call initiated by DDR to use specific DS0 channels of an ISDN circuit. • **timeslots** *timeslot-list*—Selectively adds one or more DS0s from a signaling circuit to a trunk group. The *timeslot-list* argument accepts DS0s numbered from 1 to 24 for T1 links, and from 1 to 15 and 17 to 31 for E1 links. • **preference** *preference-number*—Assigns a preference for DS0 members in a trunk group. Range is from 1 (highest preference) to 64 (lowest preference). **Note** Multiple **trunk-group timeslot** command statements can be made in static configurations.

Step 8	`exit`
	
	Example:
	`Router(config-controller)# exit`
		Exits the current configuration mode.

Step 9	**interface dialer** *dialer-rotary-group-number* **Example:** `Router(config)# interface dialer 0`	Defines a dialer rotary group and enters interface configuration mode.
Step 10	**dialer string** *dial-string* **trunkgroup** *trunkgroup-label* **Example:** `Router(config-if)# dialer string rotary1 trunkgroup trunk1`	Specifies the telephone number to be dialed and a dial-out trunk group name for a static configuration on an NAS.

	Command or Action	Purpose
Step 11	**dialer aaa** [**suffix** *string*] [**password** *string*] **Example:** `Router(config-if)# dialer aaa suffix @ciscoDDR password cisco`	Allows a dialer to access the AAA server for dialing information.

Step 12	`exit`
	
	Example:
	`Router(config-if)# exit`
		Exits the current configuration mode.

What to Do Next

Use the following dial-out trunk group statements in the profile file that sets up the AAA server to apply a static dial-out DS0 trunk configuration on an NAS.

RADIUS VSA

```
trunkgroup = trunk-group-label
```

Example:

```
trunkgroup = trunk1
```

AAA Cisco-AVPair

```
Cisco-AVPair = "outbound:trunkgroup=trunk-group-label"
```

Example:

```
dialout-out Password="cisco"
       Cisco-AVPair = "outbound:trunkgroup=16"
      .
      .
      .
```

Note The trunk group specified in the RADIUS vendor-specific attribute (VSA) must match the name defined in the trunk group configuration.

Configuration Examples for Dial-Out DS0 Level Trunk Groups

This section contains the following configuration examples:

Configure a Dial-Out DS0 Level Trunk Group on a DS1 Configured for CAS: Example

The following example shows how to configure a single DS0 group on a CAS:

```
controller t1 0
 ds0-group 2 timeslots 1-24
 cas-custom 2
 trunk-group label3 timeslots 1-12
 trunk-group label4 timeslots 13-24 preference 2

controller t1 2
 ds0-group 4 timeslots 1-24
 cas-custom 4
 trunk-group label5 timeslots 1-24 preference
```

Configure Multiple Dial-Out DS0 Level Trunk Groups on a PRI Trunk: Example

The following example shows how to configure B channels from a PRI channel into a DS0 trunk group:

```
controller T1 0
 pri-group timeslots 1-24
 trunk-group L1 timeslots 1-5 preference 10
!
```

The following example shows how to include all the B channels of the PRI channel into a trunk group:

```
interface serial 0:23
 trunk-group L2 20
```

Note The trunk group configuration under the PRI channel and the controller are mutually exclusive.

Configure Dial-Out DS0 Level Trunk Groups on an NFAS Group: Example

The following example shows how to configure NFAS/SS7 circuits. With these circuits, signaling can take place over a circuit different than the one over which the data is being transported. The DS0 dial-out trunk group configuration is done in controller configuration mode. Because the trunk group is configured under the NFAS primary serial interface, all the NFAS group interface member DS0s are added into the trunk group. The NFAS primary serial interface will *not* have the **timeslots** keyword enabled under its configuration mode. The **timeslots** option is not available in the serial interface configuration mode, because a serial interface may represent an NFAS serial interface.

```
controller T1 0
 pri-group timeslots 1-24 nfas_d primary nfas_int 0 nfas_group 0
 trunk-group L1 timeslots 1-5 preference 1
 trunk-group L2 timeslots 12-14 preference 2
!
controller T1 1
 pri-group timeslots 1-24 nfas_d backup nfas_int 1 nfas_group 0
 trunk-group L3 timeslots 1-5
 trunk-group L4 timeslots 12-14 preference 4
!
controller T1 3
 pri-group timeslots 1-24 nfas_d none nfas_int 2 nfas_group 0
 trunk-group L5 timeslots 7,9,11
 trunk-group L6 timeslots 2,4,6,14-16 preference 6
```

The following example shows how to include all the B channels of the PRI channel into a trunk group:

```
interface serial 0:23
 trunk-group trunk5 20
```

Note The trunk group configuration under the NFAS group member and the corresponding NFAS member serial interface are mutually exclusive.

Configure Dial-Out DS0 Level Trunk Groups in a Dialer Rotary Group: Examples

In the following examples, dial-out trunk groups 15 and 16 have DS0s from PRI interfaces 0:23 and 6:23. These interfaces are also rotary members of dialer interface 0. The AAA profile named dialout-out refers to trunk group 16, implying that a DS0 from trunk group 16 will be assigned for the outgoing call for this user using the dialout-out profile.

AAA Server Configuration

```
dialout-out Password="cisco"
    Cisco-AVPair = "outbound:trunkgroup=16"
    Service-Type = Outbound,
    Cisco-AVPair = "outbound:addr*10.121.94.254",
    Cisco-AVPair = "Outbound:dial-number=5550101",

RAS-5400-1 Password="cisco"
    Service-Type = Outbound,
    Framed-Route="10.121.94.254/32 Dialer0 200 name dialout"
    Framed-Route="10.121.94.0/24 10.121.94.254 200"
```

Dial-Out DS0 Level Trunk Group Configuration on the NAS

```
controller T1 0
 pri-group timeslots 1-24
 trunk-group 16 timeslots 1,21-22 preference 1
 trunk-group 15 timeslots 18-19
.
.
.
interface serial 0:23
 dialer rotary-group 0

controller T1 6
 pri-group timeslots 1-24
 trunk-group 16 timeslots 21-22
 trunk-group 15 timeslots 18-19 preference 2
.
.
.
interface serial 6:23
 dialer rotary-group 0

interface dialer 0
  dialer aaa
```

In the following examples, trunk group 15 has member DS0s from PRI interfaces 0:23, 6:23, and 7:23. PRI interfaces 6:23, and 7:23 are assigned to the same rotary group. When an outgoing call is placed through interface dialer 0, TGRM could return a DS0 that belongs to PRI interfaces 6:23, 7:23, or 0:23. But because PRI interfaces 0:23 are not rotary members of interface dialer 0, the call would fail.

Incorrect AAA Server Configuration

```
dialout-out Password="cisco"
    Cisco-AVPair = "outbound:trunkgroup=16"
    Service-Type = Outbound,
    Cisco-AVPair = "outbound:addr*10.121.94.254",
    Cisco-AVPair = "Outbound:dial-number=5550101",

RAS-5400-1 Password="cisco"
    Service-Type = Outbound,
    Framed-Route="10.121.94.254/32 Dialer0 200 name dialout"
    Framed-Route="10.121.94.0/24 10.121.94.254 200"
.
.
.
```

Incorrect Static Dial-Out DS0 Level Trunk Group Configuration on the NAS

```
 controller t1 0
  pri-group timeslots 1-24
  trunk-group 15 timeslots 1,21-22 preference 1
  trunk-group 16 timeslots 18-19
 interface serial 0:23
  dialer rotary-group 0

 controller t1 6
  pri-group timeslots 1-24
  trunk-group 15 timeslots 21-22
  trunk-group 16 timeslots 18-19 preference 2
 interface serial 6:23
  dialer rotary-group 1

 controller t1 7
  pri-group timeslots 1-24
  trunk-group 15 timeslots 18-19
 interface serial 7:23
  dialer rotary-group 1

interface dialer 0
  dialer aaa
```

Associating a DS0 Trunk Group with a Dialer for DDR: Example

The following example shows the configurations needed to apply a static dial-out trunk group:

Dialer Interface Configuration:

```
interface dialer 0
 dialer string 5550101 trunkgroup 16
```

Static Dial-Out Trunk Group Configuration on the NAS

```
controller T1 6/1
 framing esf
 linecode b8zs
 pri-group timeslots 1-24
```

```
trunk-group 16 timeslots 1,21-22 preference 1
trunk-group 15 timeslots 18-19
```

Additional References

The following sections provide references related to dial-out trunk groups.

Related Documents

Related Topic	Document Title
Large-scale dial-out	"Configuring Large-Scale Dial-Out" *chapter in the Cisco IOS Dial Technologies Configuration Guide, Release 12.3*
ISDN signaling circuits	"Signaling Configuration" part in *the Cisco IOS Dial Technologies Configuration Guide, Release 12.3*
ISDN signaling circuit and large-scale dial-out commands, including syntax and examples	*Cisco IOS Dial Technologies Command Reference, Release 12.3*

Standards

Standards	Title
None	—

MIBs

MIBs	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFCs	Title
None	—

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

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 Dial Technologies Command Reference* at http://www.cisco.com/en/US/docs/ios/dial/command/reference/dia_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*.

New Commands

- **dialer string trunkgroup**
- **trunk-group (timeslots)**

Modified Command

- **show trunk group**