CHAPTER 8

Centrex, MLHG, and Voice Mail Provisioning

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This chapter describes how to provision a Centrex group and a multiline hunt group (MLHG) and how to add subscribers. It also describes how to provision voice mail and the automated attendant. This chapter is organized into the following sections:

For a more detailed description of all Cisco BTS 10200 Softswitch tables, tokens, and value ranges, refer to the *Cisco BTS 10200 Softswitch Command Line Interface Reference Guide*.

Provisioning a Centrex Group

Table 8-1 provides an example of the steps required to provision a Centrex group and add subscribers to it and provides example commands with mandatory tokens. Click on each step for a description of the step.

Table 8-1 Centrex Provisioning Steps

	Description	CLI Command
Step 1	Add a Media Gateway Profile, page 8-2	add mgw-profile id=IAD2421; vendor=cisco;
Step 2	Add a Media Gateway, page 8-3	add mgw id=c2421.192; call-agent-id=CA101; mgw-profile-id=IAD2421; type=rgw
Step 3	Add a Termination, page 8-3	add termination prefix=aaln/S1/; port-start=1; port-end=16; type=line; mgw-id=c2421.192;
Step 4	Add a Custom Dial Plan Profile, page 8-4	add custom-dial-plan-profile id=Cisco_Plan;
Step 5	Add a Custom Dial Plan, page 8-4	add custom-dial-plan id=cdp1; digit-string=7; nod=pots-access; cat-string=11111111;
Step 6	Add a Digit Map, page 8-4	add digit-map id=ctxg1; digit-pattern=0|3xx|9|*xx;

Table 8-1 Centrex Provisioning Steps (continued)

	Description	CLI Command
Step 7	Add a Subscriber Profile, page 8-4	add subscriber-profile id=ctxgspf; digit-map-id=ctxg1; dial-plan-id=dp1; pop-id=1;
Step 8	Change the Point of Presence, page 8-5	change pop id=1; cnam_option=local
Step 9	Add the Main Subscriber, page 8-5	add subscriber id=sub1; category=CTXG; name=main-sub; dn1=123-456-7890; sub-profile-id=ctxgspf;
Step 10	Add a Centrex Group, page 8-5	add centrex-grp id=cisco-ctxg; cdp-id=cdp1; call-agent-id=CA101;main-sub-id=sub1;
Step 11	Change the Main Subscriber, page 8-6	change subscriber id=sub1; ctxg-id=cisco-ctxg;
Step 12	Add a Service, page 8-6	add service id=3; fname1=CDP; fname2=CFU;
Step 13	Add a Subscriber Service Profile, page 8-6	add subscriber-service-profile sub-id=sub1; service-id=3;
Step 14	Add a Subscriber, page 8-6	add subscriber id=sub2; category=ctxg-individual; name=Richardson2; dn1=469-255-1231; term-id=aaln/S1/4; mgw-id=c2421.192; sub-profile-id=ctxgspf; ctxg-id=cisco-ctxg; **Note** Each subscriber must have a unique term-id.
Step 15	Add an Extension for a Subscriber, page 8-7	add ext2subscriber ctxg-id=cisco-ctxg; ext=332; sub-id=sub2;
Step 16	Add a Subscriber Service Profile, page 8-7	add subscriber-service-profile sub-id=sub2;service-id=3;
Step 17	Add a Call Park Subscriber Group, page 8-7	add cpsg id=cisco; tcprk=100; ctxg-id=cisco-ctxg;
Step 18	Control a Media Gateway, page 8-8	control mgw id=c2421.192; target-state=INS; mode=forced;
Step 19	Equip a Subscriber Termination, page 8-8	equip subscriber-termination id=c2421.192;
Step 20	Control a Subscriber Termination, page 8-9	control subscriber-termination id=c2421.192;

Add a Media Gateway Profile

A media gateway (MGW) profile provides a template for provisioning one or more media gateways by vendor. It identifies the specifications and settings necessary for communications between the Call Agent and each type of media gateway.

Several tokens have values that can be overwritten after the Call Agent queries the media gateway for supported capabilities. If the media gateway returns a value different from the value you originally provisioned, the returned value automatically replaces the originally provisioned value.

Command	Purpose
`add mgw-profile id=IAD2421; vendor=cisco;`	Adds a media gateway profile

Add a Media Gateway

The Media Gateway (mgw) table holds information about each media gateway managed by the Call Agent. The media gateway can be uniquely addressed by domain name, an IP address, or the TSAP address.

The Media Gateway table has two associated commands: RGW and TGW. The RGW command provisions a gateway as only a residential gateway, with the type token automatically set to RGW. The TGW command provisions a gateway as a trunking gateway only, with the type token automatically set to TGW. Both of these commands provision the Media Gateway table, but a service provider can use these commands to provide user security to certain individuals based on their roles.

Command	Purpose
`add mgw id=c2421.192; call-agent-id=CA101; mgw-profile-id=IAD2421; type=rgw;`	Adds a media gateway

Note The RGW command could also be used to provision the media gateway in this instance. Refer to the *Cisco BTS 10200 Softswitch Command Line Interface Reference Guide* for detailed information about the RGW and TGW commands.

Add a Termination

The Termination (termination) table holds information about each termination/endpoint managed by the Call Agent. Termination structure uniformly addresses analog ports, DS0 ports, ISDN circuits, and allows termination groupings for ISDN PRI and multiline hunt groups (MLHGs) for a single subscriber. Termination events and signals are grouped into packages, which are groupings of events and signals supported by a particular type of endpoint. For instance, one package supports a certain group of events and signals for analog access lines, while another package supports another group of events and signals for video lines. One or more packages can exist for a given endpoint type. The package type is determined by the gateway used.

This table can use commands that do not match command-to-field of the database. If the prefix token is used during provisioning, the termination ID is generated by concatenating prefix and port-start value and incrementing the termination port number until the port number value reaches port-end. The prefix, port-start, and port-end are not in the table as individual fields.

The user enters:

prefix: 1–32 ASCII characters

port-start: 0000–9999 (1–4 numeric characters) (default = 1)

port-end: 0000–9999 (1–4 numeric characters) (default = 24)

Command	Purpose
`add termination prefix=aaln/S1/; port-start=1; port-end=16; type=line; mgw-id=c2421.192;`	Adds a termination

Add a Custom Dial Plan Profile

The Custom Dial Plan Profile (custom-dial-plan-profile) table defines custom dial plan IDs (CDP IDs) assigned to Centrex groups.

Command	Purpose
`add custom-dial-plan-profile id=Cisco_Plan;`	Adds a custom dial plan profile

Add a Custom Dial Plan

The Custom Dial Plan (custom-dial-plan) table translates dialed digits to specific destinations for Centrex calls. If the result of a custom dial plan (CDP) is a POTS access code, call processing uses the POTS Dial Plan table to translate the digits dialed after the POTS access code.

Command	Purpose
`add custom-dial-plan id=cdp1;digit-string=7;nod=pots-access; cat-string=11111111;`	Adds a custom dial plan

Add a Digit Map

The Digit Map (digit-map) table tells a media gateway (MGW) how to collect and report dialed digits. The Call Agent uses a default digit map ID for normal digit collection unless a specific digit map ID is assigned to the subscriber. POTS subscribers use a public dialing plan. Centrex subscribers use a customized dialing plan.

Command	Purpose
`add digit-map id=ctxg1; digit-pattern=0|3xx|9|*xx;`	Adds a digit map

Add a Subscriber Profile

The Subscriber Profile (subscriber-profile) table groups properties that are shared by a group of subscribers. For example, a Centrex group consisting of several subscribers can share a subscriber profile. Because a Call Agent consists of several points of presence (POPs), and POP is one of the tokens in the subscriber profile, POP-specific subscriber profiles must be created.

Command	Purpose
`add subscriber-profile id=ctxgspf; digit-map-id=ctxg1; dial-plan-id=dp1; pop-id=1;`	Adds a subscriber profile

Change the Point of Presence

If Centrex group members subscribe to the Calling Name Delivery (CNAM) feature and require name delivery, the cnam-option token must be specified in the Point of Presence (POP) table. Use the cnam-option values as follows:

- cnam-option=local—Display the name from the calling party's Subscriber table, if present.
- cnam-option=local-or-lidb—Set this option if external line information database (LIDB) CNAM queries are desired when the calling party's name is not present in the Subscriber table, for example, from an outside caller with no Subscriber table record.
- If external LIDB CNAM queries are to be allowed for non-Centrex group calls, set centrex-group internal-cnd-only=n and POP cnam_option=local-or-lidb.

Command	Purpose
`change pop id=1; cnam_option=local`	Displays the name from the calling party's Subscriber table, if present

Add the Main Subscriber

The Subscriber (subscriber) table defines the characteristics of a subscriber or group of subscribers in a Call Agent. All termination numbers reached by a directory number (DN) must be set up as a subscriber. Any termination that can originate in the primary Call Agent must be set up as a subscriber (residential, PBX, business, or Centrex). All terminations to customers, such as MLHG and Centrex, must be defined as well.

When the send-bdn-as-cpn token in the Subscriber table is set to Y, the subscriber can send the billing DN as the CPN. All terminations in the hunt group will send the same DN as the Main-Subscriber in the MLHG.

Command	Purpose
`add subscriber id=sub1; category=CTXG; name=main-sub; dn1=123-456-7890; sub-profile-id=ctxgspf;`	Adds a subscriber

Add a Centrex Group

Both the Call Agent and POTS/Centrex/Tandem (PTC) Feature Server share the Centrex Group (centrex-grp) table. A Centrex group is typically assigned to a business group. Subscribers within a Centrex group can reach each other by intercom (extension) dialing. A Centrex group is an emulation of a PBX by a Class 5 switch. The Centrex Group table defines Centrex groups and their associated Call Agents. The PTC Feature Server provides Centrex group functionality. The properties assigned to the main subscriber ID are applicable to the whole Centrex group.

If external line information database (LIDB) Calling Name Delivery (CNAM) queries are to be allowed for non-Centrex group calls, set internal-cnd-only=n and the POP cnam-option=local-or-lidb. See Change the Point of Presence, page 8-5.

Command	Purpose
`add centrex-grp id=cisco-ctxg; cdp-id=cdp1; call-agent-id=CA101; main-sub-id=sub1;`	Adds a Centrex group

Change the Main Subscriber

After the Centrex group is created, you must add subscribers to it.

Command	Purpose
`change subscriber id=sub1; ctxg-id=cisco-ctxg;`	Adds a subscriber to the Centrex group

Add a Service

The Service (service) table defines services and features. A service is a collection of one or more features. Each feature within a service can have one or more triggers. A service is invoked when a trigger is reached. Services can be dynamically created within the Cisco BTS 10200 Softswitch. The service provider defines a service and the features associated with it. Up to ten commonly used features can be grouped into a service, and up to fifty services can be provisioned per subscriber. The subscriber is then provisioned with a service ID instead of individual features.

Command	Purpose
`add service id=3; fname1=CDP; fname2=CFU;`	Adds a service

Add a Subscriber Service Profile

The Subscriber Service Profile (subscriber-service-profile) table links services to subscribers.

Command	Purpose
`add subscriber-service-profile sub-id=sub1; service-id=3;`	Adds a subscriber service profile

Add a Subscriber

The Subscriber (subscriber) table defines the characteristics of a subscriber or group of subscribers in a Call Agent. All termination numbers reached by a DN must be set up as subscribers. Any termination that can originate in the primary Call Agent must be set up as a subscriber (residential, PBX, business, or Centrex). All terminations to customers, such as MLHG and Centrex, must be defined as well.

Table 8-2 lists the required tokens for each category.

Command	Purpose
`add subscriber id=sub2; category=ctxg-individual; name=Richardson2; dn1=469-255-1231; term-id=aaln/S1/4; mgw-id=c2421.192; sub-profile-id=ctxgspf; ctxg-id=cisco-ctxg;`	Adds a subscriber **Note** Each subscriber must have a unique term-id.

Table 8-2 Required Tokens per Category

Token	Value	Required Tokens
Category	INDIVIDUAL	TERM-ID, MGW-ID
	MLHG	MLHG-ID
	MLHG-INDIVIDUAL	TERM-ID, MGW-ID, MLHG-ID
	MLHG-PREF-INDIV	TERM-ID, MGW-ID, MLHG-ID, MLHG-PREF-LIST-ID
	CTXG-MLHG	MLHG-ID, CTXG-ID
	CTXG	CTXG-ID
	CTXG-INDIVIDUAL	TERM-ID, MGW-ID, CTXG-ID
	CTXG-TG	CTXG-ID, TGN-ID
	PBX	TGN-ID

Add an Extension for a Subscriber

The Ext2subscriber (ext2subscriber) table is populated when a Centrex subscriber is created to map extensions to subscriber IDs.

Command	Purpose
`add ext2subscriber ctxg-id=cisco-ctxg; ext=332; sub-id=sub2;`	Adds an extension to a subscriber

Add a Subscriber Service Profile

The Subscriber Service Profile (subscriber-service-profile) table links services to subscribers.

Command	Purpose
`add subscriber-service-profile sub-id=sub2;service-id=3;`	Adds a subscriber service profile

Add a Call Park Subscriber Group

The Call Park Subscriber Group (CPSG) table defines the Centrex-specific call park subscriber group identification and the call park timeout timer. Call park is similar to placing a call on hold, but the call is retrieved by dialing a call rather than by pressing a line button.

Command	Purpose
`add cpsg id=cisco; tcprk=100; ctxg-id=cisco-ctxg;`	Adds a call park subscriber group

Control a Media Gateway

The control command sets the administrative state (OOS, INS) of media gateways, subscriber terminations, trunks, and trunk groups.

Command	Purpose
`control mgw id=c2421.192; target-state=INS; mode=forced;`	Places the MGW in-service

The status command displays the state of media gateways, subscriber terminations, trunks, and trunk groups.

Enter the following CLI command to verify that the media gateway is in-service:

```
status mgw id=<mgw id>;
```

Reply example:

```
Reply : Success:

MGW ID -> c2421.192
RESULT -> ADM configure result in success
REASON -> ADM executed successful
ADMIN STATE -> ADMIN_INS
OPER STATE -> Media gateway in working status
```

Equip a Subscriber Termination

The equip command enables the subscriber trunk termination to be placed in-service.Table 8-3 lists and defines trunk termination states.

Command	Purpose
`equip subscriber-termination id=c2421.192;`	Enables a subscriber trunk termination to be placed in-service

Table 8-3 Subscriber Trunk Termination States

State	Definition
ADMIN-INS	In Service
ADMIN-OOS	Out of Service
ADMIN-MAINT	Maintenance Mode

Control a Subscriber Termination

The control command sets the administrative state (OOS, INS) of media gateways, subscriber terminations, trunks, and trunk groups.

Command	Purpose
`control subscriber-termination id=c2421.192;`	Places the subscriber termination in-service

Enter the following CLI command to verify that the subscriber termination is in-service:

```
status subscriber-termination id=<subscriber-termination id>;
```

Provisioning a Multiline Hunt Group

This section explains how to provision a MLHG and a preferential hunt list for the MLHG.

Provisioning an MLHG

Table 8-4 provides an example of the steps required to provision a multiline hunt group and add subscribers to it. It lists example CLI commands with mandatory tokens.

Tip For a detailed description of the MLHG features and functions, and detailed guidance on certain provisionable parameters, see the "MLHG feature" section in the *Cisco BTS 10200 Softswitch Network and Subscriber Feature Descriptions* document.

To see a list of all provisionable values for the MLHG, MLHG Terminal, and MLHG Preference List tables, see the "Multiline Hunt Group" chapter of the *Cisco BTS 10200 Softswitch Command Line Interface Reference Guide.*

Table 8-4 Multiline Hunt Group Provisioning Steps

	Description	CLI Command
Step 1	Prerequisites	Enter the appropriated commands to provision the following entities in your network: • pop • mgw-profile • dial-plan-profile • dial-plan • subscriber-profile
Step 2	add a media gateway.	add mgw id=c2421.192; call-agent-id=CA146; mgw-profile-id=IAD2421; type=rgw;

Table 8-4 Multiline Hunt Group Provisioning Steps (continued)

	Description	CLI Command
Step 3	Add a set of terminations that will be used for the terminals of the MLHG.	add termination prefix=aaln/S1/; port-start=1; port-end=16; type=line; mgw-id=c2421.192;
Step 4	Add the main subscriber for the MLHG. Setting category = mlhg identifies this subscriber as the main subscriber of a MLHG.	add subscriber id=sub1; sub-profile-id=mlhgprof; name=mlhg1-main; dn1=212-555-7777; term-type=none; category=mlhg; **Note** The system does not allow you to assign the mlhg-id yet. This will be done in a later step in this procedure.
Step 5	Add the MLHG and assign the main subscriber.	add mlhg id=mlhg1; call-agent-id=CA146; main-sub-id=sub1;
Step 6	Link the main subscriber record to the MLHG.	change subscriber id=sub1; mlhg-id=mlhg1;
Step 7	Add a terminal (a physical line) to the MLHG. Additional considerations: • You can provision category as mlhg-individual or mlhg-pref-indiv. The system treats these settings identically. • Any termination reachable through an individual DN must be set up as a subscriber, and any termination to a physical line must be defined with a unique term-id. • For a termination to make outgoing calls, it must be set up as a subscriber. **Note** For detailed guidance on certain provisionable parameters, see the "MLHG feature" section in the Cisco BTS 10200 Softswitch Network and Subscriber Feature Descriptions document.	add subscriber id=sub2; category=mlhg-individual; grp=y; name=Richardson2; dn1=972-555-1232; term-id=aaln/S1/4; mgw-id=c2421.192; sub-profile-id=mlhgprof; mlhg-id=mlhg1;
Step 8	Add MLHG terminals.	add mlhg-terminal mlhg-id=mlhg1; terminal=17; term-id=aaln/S1/4; mgw-id=c2421.192; add mlhg-terminal mlhg-id=mlhg1; terminal=102; term-id=aaln/S1/5; mgw-id=c2421.192;
Step 9	Control an MGW in service.	control mgw id=c2421.192; target-state=INS; mode=forced;

Table 8-4 Multiline Hunt Group Provisioning Steps (continued)

	Description	CLI Command
Step 10	Equip a subscriber termination.	equip subscriber-termination id=*@c2421.192;
Step 11	Control a subscriber termination in service.	control subscriber-termination id=*@c2421.192; target-state=INS; mode=forced;

Provisioning a Preferential Hunt List

Table 8-5 provides an example of the steps required to provision a preferential hunt list and add subscribers to it. It lists example CLI commands with mandatory tokens.

Table 8-5 Preferential Hunt List Provisioning Steps

	Description	CLI Command
Step 1	Prerequisites	Enter the appropriated commands to provision the MLHG as shown in Table 8-4.
Step 2	Add a MLHG preferential hunt list.	add mlhg-pref-list id=prefhuntlist33; mlhg-id=mlhg1;
Step 3	Assign subscribers to the preferential hunt list.	change subscriber id=sub2; mlhg-pref-list-id=prefhuntlist33;
Step 4	Assign relative terminal positions to each terminal of a preferential hunt list.	change mlhg-pref-list id=prefhuntlist33; mlhg-id=mlhg1; rel-terminal1=102; rel-terminal2=17;

Provisioning Voice Mail

Table 8-6 provides an example of the steps required to provision the Cisco BTS 10200 Softswitch to support voice mail and the automated attendant. It lists example CLI commands with mandatory tokens. Click on each step for a description of the step.

Table 8-6 Voice Mail Provisioning Steps

	Description	CLI Command
Step 1	Add a Softswitch Trunk Group Profile, page 8-12	add softsw-tg-profile id=10; protocol-type=SIP;
Step 2	Add Trunk Groups, page 8-12	add trunk-grp id=21; softsw-tsap-addr=ipunity.ipclab.cisco.com;5060; call-agent-id=CA146; tg-type=softsw; tg-profile-id=10; dial-plan-id=cdp1;

Table 8-6 Voice Mail Provisioning Steps

	Description	CLI Command
Step 3	Add a Voice Mail Subscriber, page 8-12	add subscriber id=VM; category=PBX; dn1=972-789-3000; tgn-id=21; sub-profile-id=sp1; term-type=TG;
Step 4	Add the Automated Attendant Subscriber, page 8-13	add subscriber id=AA; category=PBX; dn1=972-789-4000; tgn-id=22; sub-profile-id=sp1; term-type=tg;

Add a Softswitch Trunk Group Profile

The Softswitch Trunk Group Profile (softsw-tg-profile) table holds all the information specific to a Softswitch trunk, such as ID, protocol, indicators, and echo suppression. The softsw-tg-profile record can be shared by multiple softswitch trunk groups. An ID must be created in this table before entries can be added to the Softswitch Trunk Group table.

Command	Purpose
add softsw-tg-profile id=10; protocol-type=SIP;	Adds a softswitch trunk group profile.

Add Trunk Groups

The Trunk Group (trunk-grp) table identifies the trunk group and maps it to the associated media gateway.

Command	Purpose
`add trunk-grp id=21; softsw-tsap-addr=ipunity.ipclab.cisco.com;5060; call-agent-id=CA146; tg-type=softsw; tg-profile-id=10; dial-plan-id=cdp1;`	Adds trunk groups

Add a Voice Mail Subscriber

The Subscriber (subscriber) table defines the characteristics of a subscriber or group of subscribers in a Call Agent. All termination numbers reached by a DN must be set up as subscribers. Any termination that can originate in the primary Call Agent must be set up as a subscriber (residential, PBX, business, and Centrex). All terminations to customers, such as MLHG and Centrex, must be defined as well.

Command	Purpose
add subscriber id=VM; category=PBX; dn1=972-789-3000; tgn-id=21; sub-profile-id=sp1; term-type=TG;	Adds a voice mail subscriber

Add the Automated Attendant Subscriber

An automated attendant helps manage the flow of incoming calls by automatically answering them without the intervention of a live operator.

Command	Purpose
add subscriber id=AA; category=PBX; dn1=972-789-4000; tgn-id=22; sub-profile-id=sp1; term-type=tg;	Adds the automated attendant