



CHAPTER 9

Route Provisioning

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This chapter describes how to provision the Cisco BTS 10200 Softswitch to communicate with another Cisco BTS 10200 Softswitch, a Cisco public switched telephone network (PSTN) gateway, or another call agent. This chapter contains the following sections:

- [Provisioning Trunk Routing, page 9-1](#)
- [Provisioning Policy Routing, page 9-3](#)
- [Provisioning Equal Access Routing, page 9-10](#)

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 Trunk Routing

[Table 9-1](#) provides an example of the steps required to provision the Cisco BTS 10200 Softswitch to communicate with another Cisco BTS 10200 Softswitch, a Cisco PSTN gateway, or another call agent and lists example CLI commands with mandatory tokens. Click on each step for a description of the step.

Softswitch trunk group routing is being used in this example of basic trunk group routing. Other trunk group types, for example, SS7 or ISDN, could be used.

Table 9-1 Trunk Routing Provisioning Steps

| | Description | CLI Command |
|--------|--|---|
| Step 1 | Add a Softswitch Trunk Group Profile, page 9-2 | <code>add softsw-tg-profile id=softprf1; protocol-type=sip-t; sipt-isup-ver=Q761_HONGKONG;</code> |
| Step 2 | Add a Trunk Group, page 9-2 | <code>add trunk-grp id=1; softsw-tsap-addr=sia-trn2CA102.trnglab.cisco.com:5060; call-agent-id=CA101; tg-type=softsw; tg-profile-id=sspf1; cost=3; dial-plan-id=dp1;</code> |
| Step 3 | Add a Route, page 9-2 | <code>add route id=siprt1; tgn1-id=1;</code> |
| Step 4 | Add a Destination, page 9-2 | <code>add destination dest-id=sip1; call-type=toll; route-type=route; route-guide-id=siprg1;</code> |

Table 9-1 Trunk Routing Provisioning Steps (continued)

| | Description | CLI Command |
|---------------|---|---|
| Step 5 | Add a Dial Plan, page 9-3 | add dial-plan id=sub; digit-string=469-255; noa=national; dest-id=local_call; |
| Step 6 | Control a Trunk Group, page 9-3 | control trunk-gp id=1;mode=forced;target-state=ins; |

Add a Softswitch Trunk Group Profile

The Softswitch Trunk Group Profile (softsw-tg-profile) table holds all the information specific to a Cisco BTS 10200 Softswitch trunk, such as id, protocol, indicators, and echo suppression. The softsw-tg-profile record can be shared by multiple softswitch trunk groups.

| Command | Purpose |
|--|---------------------------------------|
| add softsw-tg-profile id=softprfl; protocol-type=sip-t; sipt-isup-ver=Q761_HONGKONG; | Adds a softswitch trunk group profile |

Add a Trunk Group

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

Refer to the Trunk Group table in Chapter 2 of the *Cisco BTS 10200 Softswitch Command Line Interface Reference Guide* to determine if specific tokens are mandatory or optional for each trunk group type.

| Command | Purpose |
|--|--------------------|
| add trunk-grp id=1; softsw-tsap-addr=sia-trn2CA102.trnlab.cisco. com:5060; call-agent-id=CA101; tg-type=softsw; tg-profile-id=sspf1; cost=3; dial-plan-id=dp1; | Adds a trunk group |

Add a Route

The Route (route) table contains a list of up to ten trunk groups to route a call. If all the trunk groups are busy or not available, call processing uses the alt-route-id (if specified) to route the call. The Element Management System (EMS) provisions the Call Agent ID field based on the Trunk Group table.

| Command | Purpose |
|---------------------------------|--------------|
| add route id=siprt1; tgn1-id=1; | Adds a route |

Add a Destination

The Destination (destination) table defines the call type and the routing information for the dialed digits. Multiple digit strings in the Dial Plan table can use the same destination ID.

| Command | Purpose |
|---|--------------------|
| <pre>add destination dest-id=sip1; call-type=toll; route-type=route; route-guide-id=siprg1;</pre> | Adds a destination |

Add a Dial Plan

Dial plans analyze, screen, and route calls based on dialed digits. The Dial Plan (dial-plan) table holds dial plan information for a specific type of call. It defines valid dialing patterns and determines call routing. All records that share a common dial-plan-profile-id are considered a dial plan.

| Command | Purpose |
|--|------------------|
| <pre>add dial-plan id=sub; digit-string=469-255; noa=national; dest-id=local_call;</pre> | Adds a dial plan |



Note

A dial plan profile must be added before adding the dial plan unless you use one that has already been added. Refer to [Add a Dial Plan, page 9-3](#), for more information about adding a dial plan profile.

Control a Trunk Group

The command-line interface (CLI) control command displays and modifies the status of a Cisco BTS 10200 Softswitch trunk group.

| Command | Purpose |
|--|---------------------------------|
| <pre>control trunk-gp id=1;mode=forced;target-state=ins;</pre> | Places a trunk group in-service |



Note

There are no trunk terminations associated with Cisco BTS 10200 Softswitch trunk groups because these are virtual trunks over IP.

Provisioning Policy Routing

[Table 9-2](#) provides an example of the steps required to provision policy routing and lists example CLI commands with mandatory tokens. Click on each step for a description of the step

Table 9-2 Policy Routing Provisioning Steps

| | Description | CLI Command |
|---------|---|---|
| Step 1 | Add a Route, page 9-2 | add route id=dallas1; tgn1-id=dallas-tg; pfx-digits1=972; del-digits1=0; |
| Step 2 | Add a Region Profile, page 9-4 | add region-profile id=e911; digit-string=210-470; region=sanantonio; |
| Step 3 | Add Policy Origin Dependent Routing, page 9-5 | add policy-odr id=odr_ID; digit-string=512; policy-type=tod; policy-id=tod102; |
| Step 4 | Add Policy Originating Line Information Routing, page 9-5 | add policy-oli id=normalroute; oli=00; policy-type=tod; policy-id=holiday; |
| Step 5 | Add Policy Percent Routing, page 9-5 | add policy-percent id=texaspercent; begin-range1=1; end-range1=90; policy-type1=tod; policy-id1=tod001; |
| Step 6 | Add Policy Point of Presence Routing, page 9-5 | add policy-pop id=car9999; pop-id=dallaspop; policy-type=tod; policy-id=tod101; |
| Step 7 | Add Policy Prefix Routing, page 9-6 | add policy-prefix id=standard; prefix1=national; policy-type1=tod; policy-id1=tod01; |
| Step 8 | Add Policy Region Routing, page 9-6 | add policy-region id=ca200; region=sanantonio; policy-type=tod; policy-id=tod101; |
| Step 9 | Add Policy Time of Day Routing, page 9-6 | add policy-tod id=basictime; doy1=03-01; doy1-policy-type=route; doy1-policy-id=dallasaustin; start-dow1=mon; stop-dow1=fri; start-time1=07:00; stop-time1=17:00; policy-type1=per; policy-id1=texaspercent; default-policy-type=route; default-policy-id=dallasaustin; |
| Step 10 | Add Policy NXX Routing, page 9-7 | add policy-nxx id=normalroute; |
| Step 11 | Add a Route Guide, page 9-7 | add route-guide id=rg200; policy-type=tod; policy-id=tod101; |
| Step 12 | Add a Destination, page 9-7 | add destination dest-id=dallasaustin; call-type=toll; route-type=route; route-guide-id=rg10; |
| Step 13 | Add a Dial Plan, page 9-7 | add dial-plan id=sub; digit-string=972-671; noa=national; dest-id=richardson; |

Add a Route

Refer to [Add a Route, page 9-2](#), for instructions for adding a route.

Add a Region Profile

The Region Profile (region-profile) table groups North American Numbering Plan (NANP) digits to an originating region. You can have many ID and digit-string combinations to a given region. In this conceptual relationship, a number of digit patterns (digit-strings) can belong to a given region, and a number of originating regions comprise a region profile (id). Use the value specified in the ca-config record as the default region where type=default-region.

A region can be specified for a subscriber using the REGION token in the Subscriber Profile table.

| Command | Purpose |
|---|-----------------------|
| <code>add region-profile id=e911; digit-string=210-470; region=sanantonio;</code> | Adds a region profile |

Add Policy Origin Dependent Routing

The Policy Origin Dependent Routing (policy-odr) table is used for origin dependent routing. The Numbering Plan Area (NPA) (or NPA-NXX) of the calling party number selects a route. If no match is found based on the calling party number, the route marked as default routes the call.

| Command | Purpose |
|---|-----------------|
| <code>add policy-odr id=odr_ID; digit-string=512; policy-type=tod; policy-id=tod102;</code> | Adds policy ODR |

Add Policy Originating Line Information Routing

The Policy Originating Line Information (policy-oli) table performs routing based on the originating line information of the calling party number.

| Command | Purpose |
|---|-------------------------|
| <code>add policy-oli id=normalroute; oli=00; policy-type=tod; policy-id=holiday;</code> | Adds policy OLI routing |

Add Policy Percent Routing

The Policy Percent (policy-percent) table distributes traffic based on percent allocation. This type of traffic distribution is used primarily for local 8XX routing and Tandem applications.

| Command | Purpose |
|--|-----------------------------|
| <code>add policy-percent id=texaspercent; begin-range1=1; end-range1=90; policy-type1=tod; policy-id1=tod001;</code> | Adds policy percent routing |

Add Policy Point of Presence Routing

The Policy Point of Presence (policy-pop) table routes a call to the nearest trunk group when there are multiple trunk groups. There are several situations where a policy POP can be used. If a Call Agent serves several POPs, each POP can have its own announcement server. A POP-specific announcement server can be more efficient than a centralized announcement server. InterLATA carriers also have a point of presence in each POP. Route interLATA or international calls to the nearest carrier location using policy POP routing.

| Command | Purpose |
|--|-------------------------|
| <pre>add policy-pop id=car9999; pop-id=dallaspop; policy-type=tod; policy-id=tod101;</pre> | Adds policy POP routing |

Add Policy Prefix Routing

The Policy Prefix (policy-prefix) table provides information for call routing based on the prefix (type of call). Typical call types include 1+ dialing, international calls, and toll-free. This table is used mainly for carrier routing.

| Command | Purpose |
|---|----------------------------|
| <pre>add policy-prefix id=standard; prefix1=national; policy-type1=tod; policy-id1=tod01;</pre> | Adds policy prefix routing |



Note

If you cannot use an 800 number carrier to route an operator call (00), provision the 800 number carrier and the translated number in the Policy-NXX table.

Add Policy Region Routing

The Policy Region (policy-region) table performs region-based routing. The region is derived using the Region Profile table from the Route Guide table and the calling party number automatic number identification (ANI). If ANI is not available or the Region Profile table is not provisioned, the region assigned to the trunk group is used for trunk origination. If a record cannot be found based on the region, the record with region=default (if provisioned) is used for routing.

| Command | Purpose |
|--|----------------------------|
| <pre>add policy-region id=ca200; region=sanantonio; policy-type=tod; policy-id=tod101;</pre> | Adds policy region routing |

Add Policy Time of Day Routing

The Policy Time of Day (policy-tod) table provides routing information based on the following values, in order of preference (highest preference to lowest):

- Day of year
- Day of week
- Time of day

| Command | Purpose |
|--|-------------------------|
| <pre>add policy-tod id=basictime; doyl=03-01; doyl-policy-type=route; doyl-policy-id=dallasaustin; start-dowl=mon; stop-dowl=fri; start-time1=07:00; stop-time1=17:00; policy-type1=per; policy-id1=texaspercent; default-policy-type=route; default-policy-id=dallasaustin;</pre> | Adds policy TOD routing |

Add Policy NXX Routing

The Policy-NXX (policy-nxx) table is used when a number services call results in a translated number, carrier ID, translated number and a carrier ID, or a route ID.

| Command | Purpose |
|---|-------------------------|
| <pre>add policy-nxx id=normalroute;</pre> | Adds policy nxx routing |

Add a Route Guide

The Route Guide (route-guide) table holds routing information based on policy-type.

| Command | Purpose |
|---|--------------------|
| <pre>add route-guide id=rg200; policy-type=tod; policy-id=tod101;</pre> | Adds a route guide |

Add a Destination

The Destination (destination) table defines the call type and the routing information for the dialed digits. Multiple digit strings in the Dial Plan table can use the same destination ID.

| Command | Purpose |
|---|--------------------|
| <pre>add destination dest-id=dallasaustin; call-type=toll; route-type=route; route-guide-id=rg10;</pre> | Adds a destination |

Add a Dial Plan

Dial plans analyze, screen, and route calls based on dialed digits. The Dial Plan (dial-plan) table holds dial plan information for a specific type of call. It defines valid dialing patterns and determines call routing. All records that share a common dial-plan-profile-id are considered a dial plan.

| Command | Purpose |
|--|------------------|
| <pre>add dial-plan id=sub; digit-string=972-671; noa=national; dest-id=richardson;</pre> | Adds a dial plan |

**Note**

If you have not already provisioned a dial plan profile, do so before provisioning this table. Refer to [Add a Dial Plan, page 9-3](#), for more information about adding a dial plan profile.

Provisioning 911 Region (County) Routing

911 region (county) routing connects subscribers' 911 calls to the correct emergency authority based on the physical location of the calling subscriber. The following procedure provides an example of the steps required to provision 911 region (county) routing and lists example CLI commands with mandatory tokens.

Step 1 Add an emergency route for each county and a default 911 route.

```
add route id=e911-county1; tgn1-id=1;
add route id=e911-county2; tgn1-id=2;
add route id=e911-county3; tgn1-id=3;
add route id=e911-default; tgn1-id=4;
```

Step 2 Create a route guide for 911 region routing.

```
add route-guide id=e911rg; policy-type=region; policy-id=e911county;
region-profile-id=e911;
```

Step 3 Provision policy region routing for each county and the default route.

```
add policy-region id=e911county; region=county1; policy-type=route;
policy-id=e911-county1;
```

```
add policy-region id=e911county; region=county2; policy-type=route;
policy-id=e911-county2;
```

```
add policy-region id=e911county; region=county3; policy-type=route;
policy-id=e911-county3;
```

```
add policy-region id=e911county; region=default; policy-type=route;
policy-id=e911-default;
```

Step 4 Add a destination.

```
add destination dest-id=e911dest; call-type=emg; route-type=route; route-guide-id=e911rg;
```

Step 5 Add a dial plan.

```
add dial-plan id=sub; digit-string=911; noa=national; dest-id=e911dest;
```

Step 6 Add a subscriber profile for each county.

```
Add subscriber-profile id=subpf1; dial-plan-id=sub; pop-id=1; region=county1;
```

```
Add subscriber-profile id=subpf2; dial-plan-id=sub; pop-id=1; region=county2;
```

```
Add subscriber-profile id=subpf3; dial-plan-id=sub; pop-id=1; region=county3;
```

**Note**

In the example above, county is assigned as calling region. This can easily be replaced by any other value, if desired. For example, if zip code based routing is required, then zip code values can be assigned to Region.

If the Region token is not available, then Region can be derived from the Calling Party Number using the following procedure:

Step 1 Create a route guide.

```
add route-guide id=e911rg; policy-type=region; policy-id=e911county;
region-profile-id=e911;
```

Step 2 Add a region profile for each NPA, NPA-NXX or full 10 digit DN.

```
add region-profile id=e911; digit-string=214; region=dallas;
add region-profile id=e911; digit-string=281; region=houston;
add region-profile id=e911; digit-string=817; region=fortworth;
add region-profile id=e911; digit-string=972; region=dallas;
add region-profile id=e911; digit-string=469; region=dallas;
add region-profile id=e911; digit-string=469-255; region=richardson;
add region-profile id=e911; digit-string=469-255-0603; region=rcdn5;
```

Provisioning Origin Dependent Routing (ODR)

The BTS also supports ODR based routing, where the call is routed based on the calling party number at NPA, NPA-NXX, or NPA-NXX-X(X)(X)(X).

Perform the following steps to provision ODR based routing:

Step 1 Create a route guide.

```
add route-guide id=e911rg; policy-type=odr; policy-id=e911odr;
```

Step 2 Add an emergency route for each NPA.

```
add route id=e911npa214; tgn1-id=1;
add route id=e911npa817; tgn1-id=2;
add route id=e911npa281; tgn1-id=3;
```

Step 3 Add origin dependent routing for each NPA.

```
add policy-odr id=e911odr; digit-string=214; policy-type=route; policy-id= e911npa214;
add policy-odr id=e911odr; digit-string=817; policy-type=route; policy-id= e911npa817;
add policy-odr id=e911odr; digit-string=281; policy-type=route; policy-id= e911npa281;
```

Combining ODR and Region Based Routing

In addition to simple ODR based routing or REGION based routing, the two policies can be combined to perform complex routing, as illustrated by the following example.

Step 1 Set up ODR based routing.

```
add route-guide id=e911rg; policy-type=odr; policy-id=e911odr;
```

Step 2 Provision calls originating from 214 area code to be routed based on county.

```
add policy-odr id=e911odr; digit-string=214; policy-type=region; policy-id= e911county;
```

Step 3 Provision policy region routing for each county specific route.

```

add policy-region id=e911county; region=county1; policy-type=route;
policy-id=e911-county1;

add policy-region id=e911county; region=county2; policy-type=route;
policy-id=e911-county2;

add policy-region id=e911county; region=county3; policy-type=route;
policy-id=e911-county3;

```

Provisioning Equal Access Routing

This section defines how to set up a subscriber and the Cisco BTS 10200 Softswitch for equal access dialing based on interexchange carrier (IXC) carrier PIC. This applies to direct dial domestic (DDD) and international direct dial domestic (IDDD) dialing and dial plans. This procedure can also be applied to local service provider equal access using the PIC2 field in the Cisco BTS 10200 Softswitch Subscriber table.

This procedure assumes that all residential gateways, trunking gateways, and all other translations support the commands below.

For general carrier and U.S. domestic dialing information, see <http://www.nanpa.com>.

To set up a subscriber for equal access routing, complete the following steps:

- Step 1** Add the carrier ID. This sets up the carrier and puts it in-service.
- ```

add CARRIER ID=0288; STATUS=INS; INTER=Y; INTRA=Y; INTL=Y; CASUAL=Y; CUT-THRU=Y;
OP-SERVICES=Y; SEND-CN=N; SEND-CSP=Y; USE-DIAL-PLAN=N;

```
- Step 2** Change PIC1 to the appropriate interlata and international carrier PIC. This presubscribes a subscriber to a carrier so the subscriber does not have to dial 101+4 digit carrier code + the number to make the call.
- ```

change subscriber; id=motfb4/1;name=John Doe;PIC1=0288;PIC2=NONE;PIC3=NONE;

```
- Step 3** Add an interlata dummy route. This is required to set up a dial plan.
- ```

add route id=EA-IXC;lcr=n;tgn1-id=null;

```
- Step 4** Add a route guide. This is required to set up a dial plan.
- ```

add route-guide id=EA-IXC;policy-type=route;policy-id=EA-IXC;

```
- Step 5** Add a destination for interlata calls. This is required to set up a dial plan.
- ```

add destination dest-id=Interlata-IXC;call-type=InterLata;route-type=route;
route-guide-id=EA-IXC;

```
- Step 6** Add dial plan entries for all U.S.-supported NPAs. This allows verification that a subscriber can call a particular NPA.
- ```

add dial-plan id=dp-mot;digit-string=201;reqd-digits=10;dest-id=Interlata-IXC

```
- Step 7** Add an international dummy route. This is required to set up an international dial plan.
- ```

add route id=INTL-IXC;lcr=n;tgn1-id=null

```
- Step 8** Add the international route guide. This is required to set up an international dial plan.
- ```

add route-guide id=INTL-IXC;policy-type=route;policy-id=INTL-IXC;

```

Step 9 Add the international destination. This is required to set up an international dial plan.

```
add destination dest-id=INTL-IXC;call-type=INTL;route-type=route;route-guide-id=INTL-IXC;
```

Step 10 Add international dial plans for all supported country codes. This allows verification that a subscriber can call a particular country.

```
add INTL-DIAL-PLAN ID=RTP01; CC=34; MIN-DIGITS=6; MAX-DIGITS=16;dest-id=INTL-IXC
```

Step 11 Add the SS7 Feature Group D (FGD) equal access trunk group to the IXC switch. This builds a trunk to the next service provider.

```
add ss7-tg-profile id=IXC-FGD; type= A7; cot-orig=y; cot-freq=10;T-IAM=20;
add trunk-grp id=205;call-agent-id=CA146; tg-type=ss7;
dpc=214-110-205;traffic-type=tandem;
sel-policy=DSC;glare=all;tg-profile-id=IXC-FGD;dial-plan-id=Incoming;No-answer-tmr=240;CLL
I=RLGHIXC;
```



Note Consult GR-394 for SS7 parameters that must be sent in SS7 messages through the FGD interface.

Step 12 Add the SS7 trunks to the IXC switch. This sets up the actual bearer channel.

```
add trunk cic-start=1; cic-end=24; tgn-id=205; mgw-id=C0201_VISM5;
termination-prefix=vism/t1-1/; termination-port-start=1; termination-port-end=24;
equip trunk-termination tgn-id=205; cic=1-48;
```



Note This assumes that the trunks will be controlled in service when ready.

Step 13 Add the route to the IXC switch. This provides the path to the service provider providing equal access.

```
add route id=SS7-IXC;lcr=N;tgn1-id=205;
```

Step 14 Add the route guide to the IXC switch. This is required to route to a service provider.

```
add route-guide id=SS7-IXC;policy-type=route;policy-id=SS7-IXC;
```

Step 15 Add the route guide to the Carrier table. This provides the path to route directly to a service provider.

```
change CARRIER ID=0288; STATUS=INS; INTER=Y; INTRA=Y; INTL=Y; CASUAL=Y; CUT-THRU=Y;
OP-SERVICES=Y; SEND-CN=Y; SEND-CSP=Y; USE-DIAL-PLAN=N; route-guide-id=SS7-IXC;
```



Note The parameters datafilled above may differ based on the IXC carrier, however, this should be typical data fill for most IXCs.

Step 16 Add the circuit code (only if the TNS parameter is required).

```
add circuit-code tgn-id=205; nat-cc=9; opr-cc=14; nat-opr-cc=14; sac-cc=9; da-cc=9;
```



Note The parameters datafilled above may differ based on the IXC carrier; however, this table is datafilled only if there are special requirements. The Cisco BTS 10200 Softswitch default values work for most IXCs.

