



# AOC Generation for PRI

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## Document Release History

Publication Date	Comments
October 7, 2004	Initial release of this document.
July 21, 2005	Revised to support tariff change based on call duration and changed maximum number of tariff descriptors per day from 6 to 11.
August 30, 2005	Incorporated reviewer comments.

## Feature History

Release	Modification
9.5(2)	This feature was introduced on the Cisco MGC Software Release 9.5(2).

This document describes the AOC Generation for PRI feature. This feature is described in the following sections:

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# Feature Overview

The Advice of Charge (AOC) Generation over PRI feature enables the Cisco Media Gateway Controller (MGC) 2200 to support the Advice of Charge Supplementary Service as a charge determination point for phones that are connected to Private Branch Exchange (PBX) switches. The MGC determines the applicable tariff rates and sends AOC-S, AOC-D, and/or AOC-E messages over Primary Rate Interface (PRI) links, as defined in ETS 300 182.

AOC is a group of supplementary services that provides the served user with usage-based charging information. The MGC supports all three AOC supplementary services:

- Charging information at call setup time (AOC-S): The AOC-S supplementary service enables a user or subscriber to receive charging information about the charging rates at the call set-up time; or at the latest, at call connection and also during the call, if charging rates change.
- Charging information during the call (AOC-D). The AOC-D supplementary service enables the user or subscriber to periodically receive the charging information on the recorded charges for a call during the active phase of the call. The MGC provides the charging information to the served subscriber or user in a facility message and also in a control message when clearing the call.
- Charging information at the end of the call (AOC-E). The AOC-E supplementary service enables the user or subscriber to receive charging information on the recorded charges for a call when the call is terminated. When clearing the call, the MGC provides the charging information to the served subscriber or user in a call control message.

When the AOC Generation for PRI feature is enabled in the MGC, AOC is applicable only for the user or subscriber when that person is connected to the originating network. Also, if AOC is enabled and configured, the charging information for any of the three supplementary services can be provided for:

- All calls (AOCInvokeType is set to 2) received from the originating network on a configured trunk, which is referred to as “all calls”;
- or
- A specified call (AOCInvokeType is set to 1) on the originating network, after the subscriber or user has requested the MGC to provide the charging information.

The MGC activates an AOC supplementary service on a per call basis when the user has included in the SETUP message a Facility Information element containing a ChargingRequest invoke component. The ChargingRequest invoke component indicates the AOC supplementary service to activate. Each AOC supplementary service is activated independently. Thus, one, two, or three AOC activations can occur in the same SETUP message.

Upon receiving the ChargingRequest invoke component (depending on the parameters configured), the MGC activates the requested AOC supplementary service and acknowledges the request by returning a ChargingRequest return result component within a Facility Information element in a subsequent call control message to the subscriber or user indicating that “chargingInfoFollows.”

If a proper per call configuration does not exist for the call requesting an activation, and the MGC cannot activate the requested AOC supplementary service, the MGC sends a Facility Information element. The element includes the requested type of AOC supplementary service (AOCSCurrency, AOCDChargingUnit, AOCEChargingUnit, and so on), the invoke component indicating that “NoChargingInfoAvailable” or another error from the General Error list to the subscriber or user.

The MGC continues processing the call normally, even if the AOC supplementary service requested was not activated. The subscriber or user must take the action that is suitable for the call.

Additionally, AOC over PRI can be configured to charge rates for a specified duration of the call, followed by a flat rate charged for the remaining call duration. This change to AOC allows for tariff changes during the call that are based on the duration of the call. For example, support for one tariff rate

charge rate for the first 2 minutes of the call (that is, 40 units for the first 2 minutes or less), followed by a standard tariff rate of 10 units per minute for the remaining call duration. The remaining call tariff rate may or may not change based on the time of day or day of week.

## Benefits

The AOC Generation for PRI feature provides the following benefits.

### **Flexible Charge Determination**

Advice of Charge is an ETSI PRI Supplementary Service that allows service providers to define tariff rates for users connected over PRI/DSS1 links, as defined in ETS 300 182. Availability of the service on the MGC allows service providers to offer the service over IP-enabled voice networks.

### **Accurate Charge Information**

AOC is a PRI supplementary service, which when activated on the MGC, provides the subscriber or user with charging information for the specific call at the beginning of the call, during the call, or at the end of the call.

### **Selective Supplementary AOC Services**

Enables setup of all or any of the AOC supplementary services for all calls or on a per-call basis as requested by the subscriber.

### **Selective Tariff Rates Based on Call Duration**

Enables setup of tariff rates for all calls, based on the duration of the call (that is flat-rate) or based on a specified time duration.

## Restrictions

The AOC Generation for PRI feature is available on the Cisco MGC Software Release 9.5(2) Patch gs035/nn029, and above.

The number of tariff rate changes per day is 10, for a total of 11 different tariff rates in one day.

## Related Features and Technologies

The AOC Generation for PRI feature provides functions for PRI AOC capabilities on the MGC (that is the PGW 2200).

## Related Documents

This document contains information on the AOC Generation for PRI feature and the AOC Over PRI Tariff Changes Based on Call Duration feature. The documents that contain additional information related to the Cisco MGC are listed below:

- *Release Notes for Cisco Media Gateway Controller Software Release 9.5(2)*
- *Cisco Media Gateway Controller Hardware Installation Guide*
- *Regulatory Compliance and Safety Information for the Cisco Media Gateway Controller*

- *Cisco Media Gateway Controller Software Release 9 Installation and Configuration Guide*
- *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*
- *Cisco Media Gateway Controller Software Release 9 Dial Plan Guide*
- *Cisco Media Gateway Controller Software Release 9 MML Command Reference*
- *Cisco Media Gateway Controller Software Release 9 Messages Reference Guide*
- *Cisco Media Gateway Controller Software Release 9 Billing Interface Guide*
- *Cisco Media Gateway Controller Software Release 9 Management Information Base Guide*
- *Cisco Media Gateway Controller Software Release 9 Operations, Maintenance, and Troubleshooting Guide*

## Supported Platforms

The hardware platforms supported for the Cisco MGC software are described in the *Release Notes for Cisco Media Gateway Controller Software Release 9.5(2)*.

## Supported Standards, MIBs, and RFCs

### Standards

The AOC Generation for PRI feature is based on the following standards:

- ETS 300 178—Integrated Services Digital Network (ISDN); Advice Of Charge: Charging Information at Call Set-up Time (AOC-S) Supplementary Service Service Description
- ETS 300 179—Integrated Services Digital Network (ISDN); Advice of Charge: Charging Information During the Call (AOC-D) Supplementary Service Service Description
- ETS 300 180—Integrated Services Digital Network (ISDN); Advice of Charge: Charging Information at the End of the Call (AOC-E) Supplementary Service Service Description
- EST 300 181—Integrated Services Digital Network (ISDN); Advice of Charge (AOC) Supplementary Service Functional Capabilities and Information Flows

### MIBs

No new or modified MIBs are supported by this feature.

For more information on the MIBs used in the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Management Information Base Guide*.

### RFCs

No new or modified RFCs are supported by this feature.

## Prerequisites

There are no prerequisites for the AOC Generation for PRI feature.

# AOC Data Structure

The following sections describe the AOC data structure, the PRI Charge table and the PRI Tariff table (both shown in [Figure 1](#). They also show how the provisioned information is accessed.

## PRI Charge Table

The PRI Charge table can be accessed by using the following keys:

- charge origin
- charge destination
- day of the week

The PRI Charge table (shown in [Figure 1](#)) contains the tariff descriptors for each of the three AOC supplementary services that are applied (determined by identifiers and separated by a semicolon). The resultant tariff descriptor for each AOC supplementary service is in a string format and can contain either a single tariff ID to be applied for the entire day or a list of different tariffs and the time at which each tariff is applied (delimited by spaces).

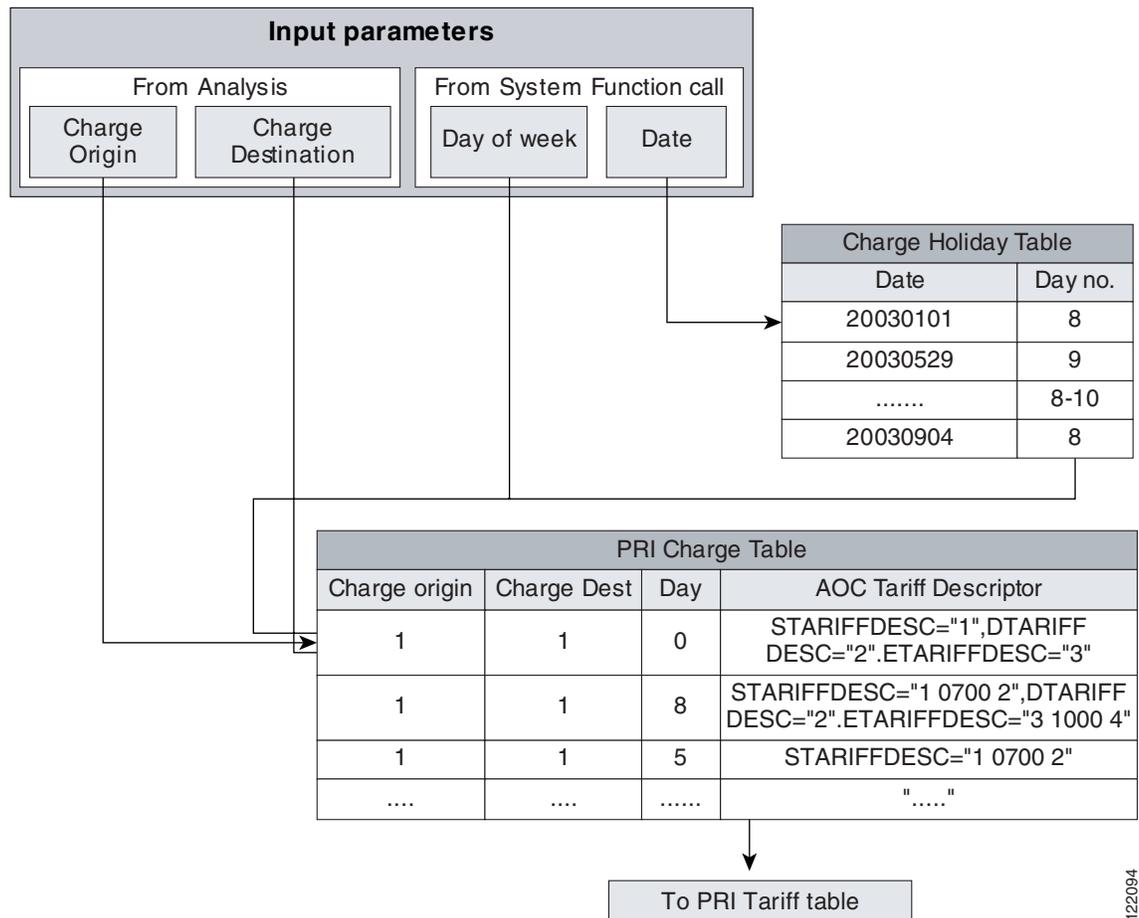
If the tariff descriptor for each AOC supplementary service is a list of different tariffs and the time at which each tariff is applied, the initial entry is the tariff rate to be applied from 0000 hour until the next specified time period, at which time the tariff ID following the time switch is applied. A maximum of 10 tariff changes is allowed for one day. For example, a day can contain a total of 10 different tariff rates. That is, the starting (default) tariff rate and 10 tariff rate changes, for a total of 11 tariff rates.

A tariff descriptor time period value of 0000 indicates the end of time-dependent tariff data and the last found (previous) tariff ID continues until midnight.

The charge origin can be defaulted (a value of 0) when the charging tariff rates are not origin dependent. The day of the week can be defaulted (a value of 0) by the craftperson when the same tariff rate is to be applied to more than one day of the week.

The Holiday table allows you to specify days of the year that are charged differently from the actual day of the week on which the holiday occurs.

Figure 1 PRI Charge Table Access



In the sample PRI Charge table (shown in Figure 1), the charge origin and charge destination combination have three entries: 1,1,0 in the first row, 1,1,8 in the second row, and 1,1,5 in the third row. The second entry (1,1,8) defines a split-day holiday tariff for AOC-S and AOC-E, and a fixed-day tariff for AOC-D supplementary service. The third entry (1,1,5) defines a split-day tariff for day 5 (Friday) for only the AOC-S supplementary service. The default entry (1,1,0) defines the fixed tariff for the day to be applied for all other days that are not configured (Monday through Wednesday, Saturday, Sunday, and the remaining holiday days 9 and 10) for AOC-S, AOC-D, and AOC-E supplementary service.

The split-day tariff (the second entry) is charged as follows:

- Apply tariff 1 from 0000 to 0700 hours for AOC-S
- Apply tariff 2 from 0700 to 2400 hours for AOC-S
- Apply tariff 2 from 0000 to 2400 hours for AOC-D
- Apply tariff 3 from 0000 to 1000 hours for AOC-E
- Apply tariff 4 from 1000 to 2400 hours for AOC-E



**Note**

A tariff descriptor for each AOC supplementary service is configured independently. It is possible to configure a split-day tariff for one AOC service and a fixed-day tariff for one or more additional AOC services, as shown in the PRI Charge table in Figure 1.

## PRI Tariff Table

The PRI Tariff table is indexed using the tariff identifier (TariffID) retrieved from the PRI Charge table. The PRI Tariff table supports a maximum of 9999 (values from 1 to 9999) distinct tariffs with user-defined tariff identifiers.

[Table 1](#) lists the PRI Tariff table fields and a description of each field.

**Table 1** PRI Tariff Table Fields and Field Descriptions

Field	Description
Tariff ID	Mandatory for every AOC supplementary service. This is an independently definable integer. Value range: 1 through 9999.
AOC-S Charged Item	Mandatory for AOC-S supplementary service. Defines the charged item type. Value range: 0 through 4. If the charged item is Basic Communication, select 0. If the charged item is Call Attempt select 1. If the charged item is Call Setup, select 2. If the charged item is User to User Info, select 3. If the charged item is Operation of supplementary services, select 4.
AOC-S SCA	Mandatory for AOC-S supplementary service. AOC-S Special Charging Arrangement is used when the AOC – S recorded charge is special. Value range: 1 through 10.
AOC-S Recorded Charge	Mandatory for AOC-S supplementary service. Defines the type of AOC-S subscribed by the user. Value range: 1 through 6. If the type of AOC-S subscribed is for Duration Rate, select 1. If the type of AOC-S subscribed is for Flat Rate, select 2. If the type of AOC-S subscribed is for Volume Rate, select 3. If the type of AOC-S subscribed is for Free of Charge, select 4. If the type of AOC-S subscribed is for Info Not Available, select 5. If the type of AOC-S subscribed is for Special, select 6.
AOC-D Recorded Charge	Mandatory for AOC-D supplementary service. Defines the type of AOC-D subscribed by the user. Value range: 1 through 3. If the type of AOC-D subscribed is for Charging Unit, select 1. If the type of AOC-D subscribed is for Currency Unit, select 2. If the type of AOC-D subscribed is for Free Of Charge, select 3.
AOC-E Recorded Charge	Mandatory for AOC-E supplementary service. Defines the type of AOC-D subscribed by the user. Value range: 1 through 3. If the type of AOC-E subscribed is for Charging Unit, select 1. If the type of AOC-E subscribed is for Currency Unit, select 2. If the type of AOC-E subscribed is for Free Of Charge, select 3.

**Table 1** PRI Tariff Table Fields and Field Descriptions (continued)

Field	Description
Currency	<p>Mandatory for AOC-S supplementary service, only if the AOC-S Recorded Charge is configured as Duration Rate, Flat Rate, or Volume Rate.</p> <p>Mandatory for AOC-D supplementary service, only if the AOC-D Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Mandatory for all AOC-E supplementary service if the AOC-S Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Defines the currency in which the charge is calculated.</p> <p>Value range: an IA5 string with a maximum of 10 characters.</p>
Amount	<p>Mandatory for AOC-S supplementary service, only if the AOC-S Recorded Charge is configured as Duration Rate, Flat Rate, or Volume Rate.</p> <p>Mandatory for AOC-D supplementary service, only if the AOC-D Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Mandatory for AOC-E supplementary service if the AOC-E Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Defines the amount to be charged per charging unit.</p> <p>Value range: 0 through 16777215.</p>
Amount Multiplier	<p>Mandatory for AOC-S supplementary service only if the AOC-S Recorded Charge is configured as Duration Rate, Flat Rate, or Volume Rate.</p> <p>Mandatory for AOC-D supplementary service only if the AOC-D Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Mandatory for AOC-E supplementary service if the AOC-E Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Defines the multiplier used with the amount defined for each charging unit.</p> <p>Value range: 0 through 6. If the amount per charged unit is 1/1000 (0.001) of the amount, set 0 as the multiplier. If the amount value per charged unit is 1/100 (0.01) of the amount, set 1 as the multiplier. If the amount per charged unit is 1/10 (0.1) of the amount, set 2 as the multiplier. If the amount per charged unit is equal to the amount, set 3 as the multiplier. If the amount per charged unit is 10 times the amount, set 4 as the multiplier. If the amount per charged unit is 100 times the amount, set 5 as the multiplier. If the amount per charged unit is 1000 times the amount, set 6 as the multiplier.</p>

**Table 1** *PRI Tariff Table Fields and Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
Time Length	<p>Mandatory for AOC-S supplementary service only if the AOC-S Recorded Charge is configured as Duration Rate, Flat Rate, or Volume Rate.</p> <p>Mandatory for AOC-D supplementary service only if the AOC-D Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Mandatory for AOC-E supplementary service if the AOC-E Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Defines the time duration that constitutes one charging unit.</p> <p>Value range: 0 through 16777215.</p>
Time Scale	<p>Mandatory for AOC-S supplementary service only if the AOC-S Recorded Charge is configured as Duration Rat, Flat Rate, or Volume Rate.</p> <p>Mandatory for AOC-D supplementary service only if the AOC-D Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Mandatory for AOC-E supplementary service if the AOC-E Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Defines the time scale for the time length value.</p> <p>Value range: 0 through 6. If the time is 1/100 of a second of the value configured for Time Length, set 0 as the scale. If the time is 1/10 of a second of the value configured for Time Length, set 1 as the scale. If the time is 1 second of the value configured for Time Length, set 2 as the scale. If the time is 10 seconds time the configured for Time Length, set 3 as the scale. If the time is 1 minute of the value configured for Time Length, set 4 as the scale. If the time is 1 hour times the configured for Time Length, set 5 as the scale. If the time is 24 hours of the value configured for Time Length, set 6 as the scale.</p>
Granularity Length	<p>Optional for AOC-S supplementary service only if the AOC-S Recorded Charge is configured as Duration Rate, Flat Rate, or Volume Rate.</p> <p>Optional for AOC-D supplementary service only if the AOC-D Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Optional for AOC-E supplementary service if the AOC-E Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Defines the time duration that constitutes one charging unit.</p> <p>Value range: 0 through 16777215.</p>

**Table 1** PRI Tariff Table Fields and Field Descriptions (continued)

<b>Field</b>	<b>Description</b>
Granularity Time Scale	<p>Optional for AOC-S supplementary service only if the AOC-S Recorded Charge is configured as Duration Rate, Flat Rate, or Volume Rate.</p> <p>Optional for AOC-D supplementary service only if the AOC-D Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Optional for AOC-E supplementary service only if the AOC-E Recorded Charge is configured as Charging Unit or Currency Unit.</p> <p>Defines the time scale for the time length.</p> <p>Value range: 0 through 6. If the time is 1/100 (0.01) of a second for the value configured for Time Length, set 0 as the scale. If the time is 1/10 of a second (0.1) for the value configured for Time Length, set 1 as the scale. If the time is 1 second of the value configured for Time Length, set 2 as the scale. If the time is 10 seconds for the value configured for Time Length, set 3 as the scale. If the time is 1 minute for the value configured for Time Length, set 4 as the scale. If the time is 1 hour times the value configured for Time Length, set 5 as the scale. If the time is 24 hours times the value configured for Time Length, set 6 as the scale.</p>
Volume Unit	<p>Mandatory for AOC-S supplementary service only if the AOC-S Recorded Charge is configured as Volume Rate.</p> <p>Defines the type of the each volume for which the charge is calculated.</p> <p>Value range: 0 through 2. If the charge is calculated for each octet, then set 0 as the value. If the charge is calculated for each segment, then set 1 as the value. If the charge is calculated for each message, then set 2 as the value.</p>
SCU	<p>Optional for AOC-E supplementary service only if the AOC-E Recorded Charge is configured as Duration Rate or Flat Rate.</p> <p>Defines the Special Charging Unit for the charging information.</p> <p>Value range: 0 through 16777215.</p>

**Table 1** PRI Tariff Table Fields and Field Descriptions (continued)

Field	Description
Billing ID	<p>Mandatory for AOC-D supplementary service only if the AOC-D Recorded Charge is configured as Currency Unit.</p> <p>Mandatory for AOC-E supplementary service if the AOC-E Recorded Charge is configured as Currency Unit.</p> <p>Defines the Billing Identification for the charging information.</p> <p>Value range: 0 through 7.</p> <p>0—Charges are incurred due to normal charging            1—Charges are incurred due to reverse charging            2—Charges are paid by means of credit card            3—Charges are incurred due to call forwarding unconditional supplementary service            4—Charges are incurred due to the invocation of call forwarding busy supplementary service            5—Charges are incurred due to the invocation of call forwarding no reply supplementary service            6—Charges are incurred due to the invocation of call deflection supplementary service            7—Charges are incurred due to the invocation of call transfer supplementary service</p>
Charge Units	The number of charging units for the defined time length. Value range: 1 through 16777215.
Duration	The duration. Time period, in milliseconds, for which this tariff remains in effect. A 0 value indicates an ongoing tariff (the tariff does not expire after a fixed duration). Value range: 0 through 16777215.
Rate Type	The rate type. The rate type is either a flat rate (0), or a duration-based rate (1).
Initial Tariff	The initial tariff. A list of up to 3 tariffs that are applied before this tariff is applied, only if this tariff is the first tariff applied to the call.

PRI Tariff field explanations:

**Note**

- Charge Amount = Amount / (amount x amount multiplier) x charge unit.
- Charge unit = Elapsed Time number of charging units per time length / (time length x time scale) x (granularity x granularity scale) for charging analogous to time. And for flat rate, the Charge unit = Number of charging units per time length. Or, when defining pritariff, you can insert a value for charging units that is the amount of units you are going to send in the defined time.
- The currency value is affected by the granularity value and the granularity scale value during the charge unit calculation.
- AOCDMinPeriodicTimerDuration is applicable for calls where charging is analogous to the time, and it defines the interval after which the charging unit is updated to the subscriber by sending a facility message.

## PRI Tariff Table Provisioning Examples

If `AOCDMinPeriodicTimerDuration` is set to 30 seconds, the time length value is 7, the timescale is 1 second, the granularity is 1, and the granularity scale is 1second, the `DTariffPeriodicTimer` is set to 35 seconds.

Similarly, if `AOCDMinPeriodicTimerDuration` is set to 30 seconds, the time length value is 70, the timescale is 1 second, the granularity is 1, and the granularity scale is 1second, the `DTariffPeriodicTimer` is set to 70 seconds.



### Note

When provisioning the `AOCDMinPeriodicTimerDuration` property value, be aware that its value setting can affect the call throughput. The effect on call throughput is determined by the number of calls, the call hold time, the number of calls with AOC enabled, and the `AOCDMinPeriodicTimerDuration` value. The lower the `AOCDMinPeriodicTimerDuration` value, the more messages are sent per AOC-enabled call.

## CLI Charge Origin Table

The CLI Charge Origin table is accessed during generic analysis. The CLI Charge Origin table is referenced after A-number digit tree analysis when AOC is enabled against the incoming trunk group or `sigPath`. Valid CLI Charge Origin table values are 1 through 9999. [Table 2](#) provides a visual indication of the information present in the CLI Charge Origin table.

**Table 2** CLI Charge Origin Table Sample

CLI Key	Charge Origin
02087568791	2
01711234567	2
0403123456	3
...	...

## Tariff Rate Types

When the combination of tariff type, duration, and rate type is used, there are effectively four types of tariffs:

- Duration based tariff that does not expire (until a Time of Day or Day of Week switchover occurs). This is the current tariff operation.
- Duration based tariff that expires after a time period.
- Flat rate tariff that expires after a time period.
- Ongoing flat rates. Continuous flat-rate periods until a Time of Day or Day of Week switchover occurs.

## Tariff Rate Selection

The following sequence of events occurs when you select a tariff rate:

Upon call connect, the MGC determines the current Tariff ID for this call from the priCharge table (based on Charge Origin, Charge Destination, Day of Week, and Time of Day).

The MGC then looks up this Tariff ID in the priTariff table and reads in the tariff information.

If there is an initial tariff descriptor defined, the MGC first applies the initial tariffs.

After the initial tariffs have been applied, the MGC applies the specified tariff. For example, if Tariff ID 3 has an initial tariff defined as “5 7”, then it first applies tariff 5, then applies tariff 7, and then applies tariff 3.

The tariff remains in effect until a Time of Day or Day of Week tariff switchover (same as the current behavior).

Initial tariffs are used only at the beginning of a call. If a tariff is switched into during the call, the initial tariff is not used.

## Tariff Rate Selection Provisioning Restrictions

The following provisioning restrictions are enforced by the MGC:

- The tariffs described in the priCharge tariff descriptors must each have a duration of 0 (that is, all tariffs listed cannot expire after some duration into the call).
- The tariffs with a duration greater than 0 can be used only as initial tariffs.
- Initial tariffs can only be defined for tariffs with durations equal to 0.

## PRI Charge Operation

When you are provisioning the PRICHARGE component, all tariffs described here must have duration set to 0, which means you cannot specify a tariff that will expire after a duration.

The tariff rates can have initial tariffs that are applied at the beginning of the charging (specified in the PRITARIFF component).

The following is an example of an entry in the priCharge table:

ORIG	DEST	DOW	S-TARIFFDESC	D-TARIFFDESC	E-TARIFFDESC
----- All Originations	1	Default	-----	1 0900 2 1500 3 2000 4	-----

From the priCharge table example, the AOC-D tariff descriptor indicates that the following four tariff IDs are to be used:

- Tariff ID 1 from 00:00 to 09:00
- Tariff ID 2 from 09:00 to 15:00
- Tariff ID 3 from 15:00 to 20:00
- Tariff ID 4 from 20:00 to 00:00

## PRI Tariff Operation

Figure 2 provides an example of the elements present in the priTariff table for the following MML command:

```
mml> prov-add:pritariff:tariffid=1,drecchrg=1,currency="dollars",amount=1,mtmult=3,
timelen=60,timescale=2,granularity=1,granularityscale=2,billingid=0,chargingunits=50,
duration=0,ratetype=1,initialtariff="8 5 6"
```

**Figure 2** *pritariff Table Example*

TARIFF ID	CHRG ITEM	SCA	SREC CHRG	DREC CHRG	EREC CHRG	CURRENCY	AMT	AMT MULT	TIME LEN	TIME SCALE	GRANUL SCALE	GRAN SCALE	VOL	SCU	BILL ID	CHRG UNITS	DURATION	RATE	INITIAL TYPE	TARIFF
1	-	-	-	1	-	dollars	10	3	60	2	1	2	-	-	0	50	0	1	"8 5 6"	
2	-	-	-	1	-	dollars	10	3	60	2	1	2	-	-	0	20	0	1	"	
3	-	-	-	1	-	dollars	10	3	60	2	1	2	-	-	0	60	0	1	"5 7"	
4	-	-	-	1	-	dollars	10	3	120	2	1	2	-	-	0	40	0	0	"	
5	-	-	-	1	-	dollars	10	3	60	2	1	2	-	-	0	60	60000	0	"	
6	-	-	-	1	-	dollars	10	3	120	2	1	2	-	-	0	40	120000	0	"	
7	-	-	-	1	-	dollars	30	3	60	2	1	2	-	-	0	60	60000	1	"	
8	-	-	-	1	-	dollars	10	3	60	2	1	2	-	-	0	50	60000	0	"	

Table 3 lists the tariff IDs from the PRI Tariff table shown in Figure 2 and provides a description of the associated tariff behavior.

**Table 3** *PRI Tariff Table Tariff ID Behavior*

Tariff ID	Description of Behavior
1	A duration based tariff (50 units for 60 seconds) with initial tariffs of 8, 5, and 6.
2	A duration based tariff (20 units for 60 seconds).
3	A duration based tariff (60 units for 60 seconds) with initial tariffs of 5 and 7.
4	An ongoing flat rate tariff (40 units for 120 seconds). Each 120 second period is charge as a flat rate.
5	A flat rate tariff (60 units for 60 seconds) which expires after 60 seconds.
6	A flat rate tariff (40 units for 120 seconds) which expires after 120 seconds.
7	A duration based tariff (60 units for 60 seconds) which expires after 60 seconds.
8	A flat rate tariff (50 units for 60 seconds) which expires after 60 seconds.

## Provisioning Tasks

The AOC Generation for PRI feature is controlled by the ingress trunk group property `AOCInvokeType`, which specifies if the feature is invoked on a per call basis or for all calls. The `AOCInvokeType` property specifies if the AOC Generation for PRI feature is invoked based on the subscription (per call) from the user or is invoked automatically for all the calls (all calls). For all calls, a default configuration in the Tariff table is used (`TariffID = 0`). If `AOCInvokeType` is configured for all calls, then the default is required to prevent no charge generation being set up and invoked.

## Provisioning PRI AOC Supplementary Services

PRI AOC supplementary services provisioning is accomplished in following stages:

- Defining charge origins—Can be assigned to trunk groups or signaling paths, area codes (in the A-digit trees), or in a CLI Charge Origin table.
- Defining charge destinations in B-number tables.
- Defining customer-specific holidays using the Charge Holiday table.

- Creating the PRI Charge table and populating the required tariff IDs for the identified charge origin, charge destination, and day of week combination.
- Populating the tariff rates within the PRI Tariff table.
- Configuring AOCInvokeType against the trunk groups.
- Configuring AOCDefaultTariffId against the trunk groups.
- Configuring AOCDMinPeriodicTimerDuration against the signaling paths.
- Enabling AOC against the ingress trunk groups or signaling paths.

## What to Provision

The following sections describe what to provision for the PRI AOC supplemental services. The provisioning order is:

- Trunk group properties (AOCDefaultTariffId, AOCEnabled, and AOCInvokeType)
- Charge table (charge origin for A-numbers or charge destination for B-numbers)
- priTariff table
- CHARGE result type

### Charge Origins (Optional)

Charge origins are integer values (1–9999) that are assigned as a property against the trunk group or signaling path, a result type in the A-number analysis, or an entry in the CLI Charge Origin table. These values can be assigned incrementally during planning or you can assign any valid value at any time.

### Trunk Group or Signaling Path Property

The ChargeOrigin property can be assigned to trunk groups or to signaling paths. For example, TG-2.ChargeOrigin=123.

### A-Number Result

The ChargeOrigin result type has been created for AOC. Only the first data word is significant (carries the charge origin value). This result type is assignable against the ADIGTREE component only and is treated as an intermediate result (digit analysis can continue past this result type). For example,

```
mml> numan-add:resultset:custgrpid="t002",name="settwo"
```

```
mml> numan-add:resulttable:custgrpid="t002",name=result2,resulttype="chargeorigin",
dw1="1",setname="settwo"
```

### CLI Charge Origin Table

Dial plan component ACHGORIGIN has been created. This component is provisionable using the following generic format of the MML dial plan commands:

```
NUMAN-<verb>:ACHORIGIN:CUSTGRPID=<customer group ID>,CLI=<cli>,CORIGIN=<charge origin>
```

The following MML commands provide an example of provisioning the ACHORIGIN result type:

```
mml> numan-add:achgorigin:custgrpid="t001",cli="02087568000",corigin=1
```

## Charge Destinations

### CHARGE Result Type

The CHARGE result type can return a charging destination for the Metering Pulse Tariff table. This is achieved by setting dataword3 to a value of 5 for the ChargeDataDiscriminator field. The CHARGE result type is assigned against the BDIGTREE component only and is treated as an intermediate result. The values of the accompanying data is listed in [Table 4](#).

**Table 4** Data Values for the CHARGE Result Type

Data Word	Data Description	Values
1	Tariff Rate or Charge Destination	Meter pulse destinations—range is 1–9999
2	Scale Factor	Always set to 1 for metering pulses
3	Charge Data Discriminator	Determines the type of data in dataword1: 1—Tariff Rate 2—Charge Destination 3—Charge Band 4—Charge Unit 5—Meter Pulse
4	Charge Type	Charge Type 1—AOC

An MML provisioning example for the CHARGE result type is:

```
mml> numan-add:resultset:custgrpId="t001",name="setone"
```

```
mml> numan-add:resulttable:custgrpId="t001",name=result1,resultttype="charge",dw1="1",dw3="2",setname="setone"
```

### Charge Mode Indicator Result Type

The Charge Mode Indicator (CHARGE\_MODE\_IND) result type indicates how the metering pulses generated by the MGC are applied in relation to other possible other metering pulses (pulses generated by some other node). The CHARGE\_MODE\_IND result type is assignable against the ADIGTREE or BDIGTREE component and it is treated as an intermediate result. The values of the accompanying data is listed in [Table 5](#).

**Table 5** Data Values for the CHARGE\_MODE\_IND Result Type

Data Word	Data Description	Values
1	Charge Mode Indicator	Charge Mode Indicator 1—Add on charge 2—Replace charge 3—Free of charge

### Charge Indication Result Type

The Charge indication result type indicator (CHARGE\_IND) indicates if the MGC should change the value of the charge indicator. The CHARGE\_IND result type is assignable against the ADIGTREE or BDIGTREE component and it is treated as an intermediate result. The values of the accompanying data is listed in [Table 6](#).

**Table 6** Data Values for the CHARGE\_IND Result Type

Data Word	Data Description	Values
1	Charge Indicator	Charge Indicator 0—Leave as it is (default) 1—Charge 2—No charge

**Holiday Table (Optional)**

You can create a Holiday table, and you can add, edit, and delete rows within the table. The MML provisioning commands (PROV-ADD, PROV-RTRV, and so on), can be used to access these tables. Each row is referenced by the DATE (STRING value), broken down into three integers that represent the year, month, and day of week (yy.mm.dd). The corresponding holiday (HDAY) row entry is HOL1, HOL2, or HOL3.

An example adding a holiday for December 25, 2005:

```
mml> prov-add:holiday:date="041225",hday="hol1"
```

**PRI Charge Table**

You can create a PRI Charge table, and you can add, edit, and delete rows within the table. The provisioning commands (PROV-ADD, PROV-RTRV, and so on) are used to access these tables, as listed in [Table 7](#). Each row is referenced by means of three keys:

- charge origin—range: 1 through 9999
- charge destination—range: 1 through 9999
- day of the week—range: 1 through 10 (Monday through Sunday, holiday1, holiday2, or holiday3)

**Note**

Charge destination is the only mandatory key. Charge origin and day of the week are set to 0 in the table row entry if they are not used.

**Table 7** Charge Table Provisioning Examples

Charge Table Example	Command
Add Charge table for all three supplementary services (fixed daily tariff)	<code>prov-add:chargetable:chorig=1,chdest=1,dow=monday,stariffdesc="1",dtariffdesc="2",etariffdesc="3"</code>
Add Charge table for all three supplementary services (variable daily tariff)	<code>prov-add:chargetable:chorig=1,chdest=1,dow=monday,stariffdesc="1 0700 2 1000 1 1600 3 1900 1",dtariffdesc="1 0700 2 1000 1 1600 3 1900 1",etariffdesc="1 0700 2 1000 1 1600 3 1900 1"</code>
Add Charge table for all three supplementary services (all charge origins and days)	<code>prov-add:chargetable:chdest=1,stariffdesc="1",dtariffdesc="1",etariffdesc="1"</code>

**Table 7** Charge Table Provisioning Examples (continued)

Charge Table Example	Command
Add Charge table for any one of the supplementary services (fixed daily tariff)	<pre>prov-add:chargetable:chorig=1,chdest=1,dow=monday,stariffdesc="1" or prov-add:chargetable:chorig=1,chdest=1,dow=monday,dtariffdesc="2" or prov-add:chargetable:chorig=1,chdest=1,dow=monday,etariffdesc="3"</pre>
Add Charge table for any one of the supplementary services (variable daily tariff)	<pre>prov-add:chargetable:chorig=1,chdest=1,dow=monday,stariffdesc="1 0700 2 1000 1 1600 3 1900 1" or prov-add:chargetable:chorig=1,chdest=1,dow=monday,dtariffdesc="1 0700 2 1000 1 1600 3 1900 1" or prov-add:chargetable:chorig=1,chdest=1,dow=monday,etariffdesc="1 0700 2 1000 1 1600 3 1900 1"</pre>
Add Charge table for any one of the supplementary services (all charge origins and days)	<pre>prov-add:chargetable:chdest=1,stariffdesc="1" or prov-add:chargetable:chdest=1,dtariffdesc="1" or prov-add:chargetable:chdest=1,etariffdesc="1"</pre>
Add Charge table for any two of the supplementary services (fixed daily tariff)	<pre>prov-add:chargetable:chorig=1,chdest=1,dow=monday,stariffdesc="1",dtariffdesc="2" or prov-add:chargetable:chorig=1,chdest=1,dow=monday,stariffdesc="1",etariffdesc="3" or prov-add:chargetable:chorig=1,chdest=1,dow=monday,dtariffdesc="2",etariffdesc="3"</pre>
Add Charge table for any two of the supplementary services (variable daily tariff)	<pre>prov-add:chargetable:chorig=1,chdest=1,dow=monday,stariffdesc="1 0700 2 1000 1 1600 3 1900 1",dtariffdesc="1 0700 2 1000 1 1600 3 1900 1" or prov-add:chargetable:chorig=1,chdest=1,dow=monday,stariffdesc="1 0700 2 1000 1 1600 3 1900 1",etariffdesc="1 0700 2 1000 1 1600 3 1900 1" or prov-add:chargetable:chorig=1,chdest=1,dow=monday,dtariffdesc="1 0700 2 1000 1 1600 3 1900 1",etariffdesc="1 0700 2 1000 1 1600 3 1900 1"</pre>
Add Charge table for any two of the supplementary services (all charge origins and days)	<pre>prov-add:chargetable:chdest=1,stariffdesc="1",dtariffdesc="1" or prov-add:chargetable:chdest=1,stariffdesc="1",etariffdesc="1" or prov-add:chargetable:chdest=1,dtariffdesc="1",etariffdesc="1"</pre>

**Note**

If the charge origin is not used, the entered rows refer to all origins for that destination (unless explicitly entered in another row). Similarly, if the day of the week is not used, day of week refers to all days of the week which are not otherwise explicitly entered.

**PRI Tariff Table**

You can create a PRI Tariff table. The provisioning commands (PROV-ADD, PROV-RTRV, and so on) are used to access this table. Each row is referenced by a tariff ID that call processing obtains from the Charge table. The retrieved row entry contains the tariff rate and other required information for generating the charging information.

PRI Tariff table example:

```
mml> prov-add:pritariff:tariffid=2,schargeditem=1,sca=1,srecchrg=1,drecchrg=1,erecchrg=1,
currency=USD,amount=1,amtmult=3,timelen=1,timescale=2,granularity=1,granularityscale=2,
vol=1,scu=1,billingid=1
```

**Activation Type for AOC Supplementary Services/AOCInvokeType**

The AOC Generation for PRI feature is controlled by the ingress trunk group property AOCInvokeType, which specifies if the feature is invoked on a “PER CALL” basis or for “ALL CALLS” received on the ingress trunkgroup. It is controlled by the AOCInvokeType Property in the properties.dat file (1=PER CALL, 2=ALL CALL). If the feature defined as “PER CALL” the MGC expects to receive the invoke component from the subscriber. If it is defined as “ALL CALL”, the MGC generates the charging information and sends it to the subscriber.

**Note**

If configured as “ALL CALL” and the MGC receives the invoke component in the setup message then the call is treated as “PER CALL.”

**Note**

If configured as “ALL CALL” and for the Charge Destination there is no configuration, the default tariff is used to set up the charge. If no default exists, then an appropriate result message is sent to the subscriber.

AOCInvokeType example:

```
mml> prov-add:trnkgrpprop:name="3333",custgrpid="1111",AOCInvokeType=1
```

**Default Tariff for AOC Supplementary Service/AOCDefaultTariffId**

If the AOCInvokeType is configured as “ALL CALL” (that is, AOCInvokeType = 2) and there is no entry for the Charge Destination, the default tariff is used to set up the charge. This default tariff value is configured in the PRI Tariff table. It is controlled by the AOCDefaultTariff property in the properties.dat file. Value range: 1 (default) through 9999.

AOCDefaultTariff example:

```
mml> prov-add:trnkgrpprop:name="101",custgrpid="ABC234",AOCDefaultTariffId=99
```

## Default Charging Unit Duration for AOC-D Supplementary Service/AOCMinPeriodicTimerDuration

The MGC periodically sends accumulated charging units to the subscriber. The MGC controls the rate of sending charging information, so charging information is not sent more frequently than the configured value or after accumulation of at least one charging unit, whichever is later. The sending rate is controlled by the AOCMinPeriodicTimerDuration signalling path property, in the properties.dat file. Value range is 5 – N seconds.

AOCMinPeriodicTimerDuration example:

```
mml> prov-add: sigsvccprop:NAME="ABCNET1",AOCMinPeriodicTimerDuration="5"
```



### Note

If the time for accumulating one charging unit is less than the configured AOCMinPeriodicTimerDuration value, then the timer is set to a value greater than the configured value, and the charging unit accumulated is an integer value. For example, if 1 charging unit is accumulated every 0.692 second and the AOCMinPeriodicTimerDuration is 5 seconds, the value for this timer is set to 173 seconds, and the number of charging units accumulated is 25 on expiry of this timer, which is then sent to the subscriber or user. Similarly, if 1 charging unit is accumulated every 0.6 second and the AOCMinPeriodicTimerDuration is 5 seconds, the value for this timer is set to 6 seconds, and the number of charging units accumulated is 10 on expiry of this timer, which is then sent to the subscriber or user.

## PRI AOC Supplementary Services Activation

The AOC Generation for PRI feature is controlled by the AOCEnabled property in the properties.dat file (1—enabled or 0—disabled).



### Note

To reduce the number of alarms received when you are provisioning AOC (due to charging information pointing to unpopulated tables), disable AOC on the relevant trunk groups until the charge table has been correctly updated.

AOCEnabled example:

```
mml> prov-add: trnkgrpprop: name="2000", aocenabled="1"
```

### When to Provision

Charging data should be defined during installation (after the creation of each customer dial plan). More charging data can be added at any time.

Use the following suggestions to avoid alarms being generated because of inconsistent data for calls in progress while charging data is being added or modified:

- Provision the charge and holiday tables before making changes to the dial plan that references them.
- Disable PRI AOC supplementary services for all the trunk groups or sigPaths that use the dial plan that references the data to be changed until all updates have been completed.

## Planning for Provisioning

When planning for provisioning the AOC Generation for PRI feature, collect the information listed in the following paragraphs to populate the data tables.

## Collecting PRI Charge Data

CHORIG:  
CHDEST:  
DOW:  
STARIFFDESC:  
DTARIFFDESC:  
ETARIFFDESC:

## Collecting PRI Tariff Data

TARIFFID:  
SCHARGEDITEM:  
DCALLSTATE:  
ECALLSTATE:  
SCA:  
SRECCHRG:  
DRECCHRG:  
ERECCHRG:  
CURRENCY:  
AMOUNT:  
AMTMULT:  
TIMELEN:  
TIMESCALE:  
GRANULARITY:  
GRANULARITYSCALE:  
VOL:  
SCU:  
BILLINGID:  
CHARGINGUNITS:  
DURATION:  
RATETYPE:  
INITIALTARIFF:

For more information on planning the provisioning for the rest of the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

## Provisioning Procedures

Provision the AOC Generation for PRI feature of the Cisco PGW 2200 by performing the procedures contained in the following sections.

This section covers the following provisioning topics:

- [Provisioning Basics, page 22](#)
- [Adding Elements to the PRI Charge Table, page 26](#)
- [Modifying Elements from the PRI Charge Table, page 27](#)
- [Deleting Elements from the PRI Charge Table, page 27](#)
- [Retrieving an Element from the PRI Charge Table, page 27](#)
- [Adding Elements to the PRI Tariff Table, page 27](#)
- [Modifying Elements in the PRI Tariff Table, page 28](#)
- [Retrieving an Element from the PRI Tariff Table, page 28](#)
- [Deleting Elements from the PRI Tariff Table, page 29](#)

## Provisioning Basics

Use the procedures in this section to start a provisioning session and to save and activate the changes you have made.

- [Starting a Provisioning Session, page 22](#)
- [Saving and Activating Your Provisioning Changes, page 23](#)
- [Ending a Provisioning Session Without Activating Your Changes, page 24](#)
- [Retrieving Provisioning Data, page 24](#)
- [Retrieving Data for an Individual Component, page 24](#)
- [Retrieving Data for Select Components, page 25](#)
- [Retrieving Data for All Components of a Particular Type, page 25](#)
- [Retrieving Data on the Current Provisioning Session, page 26](#)
- [Retrieving Data on Supported Signaling Protocols, page 26](#)

For more detailed information about provisioning your Cisco PGW 2200, refer to the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

### Starting a Provisioning Session

You might need to start a provisioning session as part of your system operations. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> prov-sta::srcver="curr_ver",dstver="mod_ver"
```

Where:

- *curr\_ver*—The name of the current configuration version. In place of the name of the current configuration version, you can also enter:
  - new—A new default session configuration. Use this option when no existing source configuration is available.
  - active—Selects the active configuration as the source for configuration changes.



**Note** You can use “new” as the source configuration only when there is no existing, active set of provisioning data in the configuration library. Therefore, “new” cannot be used as the source configuration once a provisioning session has been saved and activated through use of **prov-cpy** or **prov-dply**. Once you have saved and activated a set of data, you must use either “active” or the name of the set of provisioning data as the source configuration.



**Note** If you do not know the name of your current configuration session, you can use the procedure in the [“Retrieving Data on the Current Provisioning Session”](#) section on page 26.

- *mod\_ver*—A new configuration version name that contains your provisioning changes.

For example, to use a configuration version called ver1 as the basis for a version to be called ver2, you enter the following command:

```
mml> prov-sta: :srcver="ver1",dstver="ver2"
```

Once a provisioning session is underway, you can use the **prov-add**, **prov-ed**, and **prov-dlt** MML commands to add, modify, and delete components on your system. This document describes how to add, modify, and delete AOC components. For more information on provisioning other components on your Cisco PGW 2200, refer to the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

There are two ways to close your provisioning session: saving and activating your provisioning changes, as described in the [“Saving and Activating Your Provisioning Changes”](#) section on page 23, or ending your provisioning session without saving and activating your changes, as described in the [“Ending a Provisioning Session Without Activating Your Changes”](#) section on page 24.

## Saving and Activating Your Provisioning Changes

When you have completed making provisioning changes in your session, you must enter a command to save and activate your changes. There are two different provisioning MML commands that do this: **prov-cpy** and **prov-dply**.



### Caution

Using the **prov-cpy** and **prov-dply** MML commands can severely impact your system’s call processing performance, depending on the extent of your provisioning changes. We recommend that these commands be issued during a maintenance window, when traffic is minimal.

Use the **prov-cpy** MML command to save and activate your changes on the active Cisco MGC. This command is typically used to save and activate changes on a Cisco MGC in a simplex configuration. However, you can use the **prov-cpy** MML command on Cisco MGCs in a high-availability or continuous-service configuration to save and activate your changes on the active Cisco MGC. If you choose to do this, you should enter the **prov-sync** MML command immediately afterwards, to have your changes saved and activated on the standby Cisco MGC.



### Note

When you enter the **prov-cpy** command, your provisioning session is also automatically ended. If you want to make additional provisioning changes, you must start a new provisioning session, as described in the [“Starting a Provisioning Session”](#) section on page 22.

**Caution**

Using the **prov-sync** MML command can severely impact your system's call processing performance. We recommend that this command be issued during a maintenance window, when traffic is minimal.

**Note**

When the **prov-sync** MML command is used to synchronize the provisioning settings on the standby MGC host with current settings on the active MGC host, the system does not indicate when the synchronization process has failed.

The **prov-dply** MML command is used to save and activate your changes on the active and standby Cisco MGCs. This command is typically used to save and activate changes on Cisco MGCs in high-availability or continuous-service configurations. This command should not be used on a Cisco MGC in a simplex configuration.

**Note**

When you enter the **prov-dply** command, your provisioning session is also automatically ended, unless an error occurs during execution. If you want to make additional provisioning changes, you must start a new provisioning session, as described in the [“Starting a Provisioning Session” section on page 22](#).

## Ending a Provisioning Session Without Activating Your Changes

You may find that you want to end a provisioning session without saving and activating the changes you have entered during your session. If this is the case, you can enter the **prov-stp** MML command. This command ends your current provisioning session and your changes are not entered.

## Retrieving Provisioning Data

You can use the **prov-rtrv** MML command to retrieve information about your current provisioning settings. The ways in which you can use this command to retrieve provisioning data are described in the following sections:

- [Retrieving Data for an Individual Component, page 24](#)
- [Retrieving Data for Select Components, page 25](#)
- [Retrieving Data for All Components of a Particular Type, page 25](#)
- [Retrieving Data on the Current Provisioning Session, page 26](#)
- [Retrieving Data on Supported Signaling Protocols, page 26](#)

## Retrieving Data for an Individual Component

You can retrieve provisioning data on any individual component on your system. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> prov-rtrv:component:name=MML_name
```

Where:

- *component*—The MML component type associated with the desired component. You can find a complete list of MML component types in the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.
- *MML\_name*—The MML name for the desired component. You can determine the MML names for the various components using the **prov-rtrv:all** MML command.

For example, to view the provisioning data for an IUA signaling service called `iu1`, you would enter the following command:

```
mml> prov-rtrv:sigsvccprop:name="iu1"
```

## Retrieving Data for Select Components

You can retrieve data on select components provisioned on your system. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> prov-rtrv:all
```



### Note

This command returns data on all signaling components, except for signaling service and linkset properties.

## Retrieving Data for All Components of a Particular Type

You can retrieve provisioning data on all components of a particular type on your system. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> prov-rtrv:component:"all"
```

Where *component* is the MML component type associated with the desired component group. You can find a complete list of MML component types in the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.



### Note

Components that are used to retrieve signaling or routing properties (that is *sigsvccprop*, *lnksetprop*, and *trnkgrpprop*) cannot use this command. The properties for only one signaling or routing component can be listed per command instance. Please use the following format:

```
prov-rtrv:propComp:name="compName" | name="ss7famName"
```

Where:

*propComp*—MML component name appropriate to the property type you want to retrieve, as listed below:

**sigsvccprop**—Provides maintenance access to the properties of signaling services.

**trnkgrpprop**—Provides maintenance access to the properties of trunk groups

**lnksetprop**—Provides maintenance access to the properties of linksets.

*compName*—MML name of a previously provisioned signaling service or trunk group.

*ss7famName*—MML name of the SS7 family associated with the desired linkset.

You can retrieve provisioning data on all components of a particular type on your system. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> prov-rtrv:component:"all"
```

Where *component* is the MML component type associated with the desired component group. You can find a complete list of MML component types in the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

For example, to view the provisioning data for all SS7 signaling services, enter the following command:

```
mml> prov-rtrv:ss7path:"all"
```

## Retrieving Data on the Current Provisioning Session

You can retrieve provisioning data on the current provisioning session. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> prov-rtrv:session
```

The system returns a response similar to the following:

```
MGC-02 - Media Gateway Controller 2004-07-17 13:39:19
M RTRV
  "session=jtest:session"
  /*
Session ID = mml1
SRCVER = active
DSTVER = jtest
*/
```

## Retrieving Data on Supported Signaling Protocols

You can retrieve protocol data for the current provisioning session. To do this, log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> prov-rtrv:variants
```

For more information on provisioning for the rest of the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.

## Adding Elements to the PRI Charge Table

**Step 1** Start a provisioning session as described in the [“Starting a Provisioning Session”](#) section on page 22.

**Step 2** Use the following MML command to make an entry in the PRI Charge table:

```
mml> prov-add:pricharge:chorig=10,chdest=15,dow="MONDAY",stariffdesc="tariff 1 timeChange 1",dtariffdesc="tariff 1 timeChange 1",etariffdesc="tariff 1 timeChange 1"
```



**Note** In the MML command, “chorig” and “dow” are optional key elements. Each one is entered as 0 in the table if no value is entered in the MML command.



**Note** Enclosing the etariffdesc in quotes (“”) with nothing between the quotes sets the end time to 24 hours.

**Step 3** Perform [Step 2](#) for each entry you make in the PRI Charge table.



**Note** A maximum of 10 time changes are allowed for each entry in the PRI Charge table.

**Step 4** When all PRI Charge table entries have been made, close and save the provisioning session data by performing the procedure described in the [“Saving and Activating Your Provisioning Changes”](#) section on page 23.

## Modifying Elements from the PRI Charge Table

- 
- Step 1** Start a provisioning session as described in the “[Starting a Provisioning Session](#)” section on page 22.
- Step 2** Use the following MML command to modify an existing entry in the PRI Charge table:
- ```
mml> prov-ed:pricharge:chorig=11,chdest=15,dow="MONDAY",stariffdesc="tariff 1 timeChange 1",dtariffdesc="tariff 1 timeChange 1",etariffdesc="tariff 1 timeChange 1"
```
- Step 3** Perform [Step 2](#) for each entry you modify in the PRI Charge table.
- Step 4** When all PRI Charge table entries have been modified, close and save the provisioning session data by performing the procedure described in the “[Saving and Activating Your Provisioning Changes](#)” section on page 23.
- 

## Deleting Elements from the PRI Charge Table

- 
- Step 1** Start a provisioning session as described in the “[Starting a Provisioning Session](#)” section on page 22.
- Step 2** Use the following MML command to delete an entry in the PRI Charge table:
- ```
mml> prov-dlt:charge:pricharge=11,chdest=15,dow="MONDAY"
```
- Step 3** Perform [Step 2](#) for each entry you delete in the PRI Charge table.
- Step 4** When all PRI Charge table entries have been deleted, close and save the provisioning session data by performing the procedure described in the “[Saving and Activating Your Provisioning Changes](#)” section on page 23.
- 

## Retrieving an Element from the PRI Charge Table

- 
- Step 1** Start a provisioning session as described in the “[Starting a Provisioning Session](#)” section on page 22.
- Step 2** Use the following MML command to retrieve an entry in the PRI Charge table:
- ```
mml> prov-rtrv:charge:chorig=10,chdest=15,dow="monday"
```
- 

## Adding Elements to the PRI Tariff Table

- 
- Step 1** Start a provisioning session as described in the “[Starting a Provisioning Session](#)” section on page 22.
- Step 2** Use the following MML command to make an entry in the PRI Tariff table:
- ```
mml> prov-add:pritariff:tariffid=2,schargeditem=1,sca=1,srecchrg=1,drecchrg=1,erecchrg=1,currency=USD,amount=1,amtmult=3,timelen=1,timescale=2,granularity=1,granularityscale=2,vol=1,scu=1,billingid=1
```
- Step 3** Perform [Step 2](#) for each entry you make in the PRI Tariff table.
- Step 4** When all PRI Tariff table entries have been made, close the provisioning session and save data by performing the procedure described in the “[Saving and Activating Your Provisioning Changes](#)” section on page 23.
-

For the preceding MML command, the priTariff.dat entry appears as:

```
2 0 1 1 1 1 USD 1 4 1 4 1 4 0 1 1
```

For the following MML commands,

```
mml> prov-add:pritariff:tariffid=3,schargeditem=2,sca=1,srecchrg=3,drecchrg=2,erechrg=2,
currency=USD,amount=1,amtmult=3,timelen=1,timescale=2,granularity=1,granularityscale=2,
vol=0,scu=1,billingid=1
```

```
mml> prov-add:pritariff:tariffid=4,schargeditem=0,sca=2,srecchrg=2,drecchrg=2,erechrg=2,
currency=USD,amount=1,amtmult=3,timelen=1,timescale=2,granularity=1,granularityscale=2,
vol=0,scu=1,billingid=1
```

The corresponding priTariff.dat entries appear as:

```
3 1 1 3 2 2 USD 1 4 1 4 1 4 0 1 1
4 0 2 2 2 2 USD 1 3 1 2 1 2 0 1 1
```

As another example, the following MML command

```
mml>
prov-add:pritariff:tariffid=99,schargeditem=0,sca=2,srecchrg=2,currency=Dollars,amount=1,
amtmult=3,timelen=1,timescale=2
```

adds an entry that appears in the priTariff.dat entry as:

```
99 0 2 2 255 255 Dollars 1 3 1 2 1677216 255 255 255 255
```

## Modifying Elements in the PRI Tariff Table

- Step 1** Start a provisioning session as described in the [“Starting a Provisioning Session”](#) section on page 22.
- Step 2** Use the following MML command to modify an existing entry in the PRI Tariff table:

```
mml> prov-ed:pritariff:tariffid=9,chargeditem=<AocSChargedItemRange>,
dcallstate=<AocDCallStateRange>,ecallstate=<AocECallStateRange>,sca=<AocSSCArrRange>,
srecchrg=<AocSRecordedChrgRange>,drecchrg=<AocDRecordedChrgRange >,
erechrg=<AocERecordedChrgRange>,currency=<IA51-10>,amount=<0-16777215>,
amtmult=<AmountMultiplierRange>,timelen=<0-16777215>,timescale=<TimeScaleRange>,
granularity=<0-16777215>,granularityscale=<GranularityTimeScaleRange>,vol=<VolumeRange>,
scu=<1-10>,billingid=<BillingIdRange>,chargingunits=<0-16777215>,duration=<0-16777215>,
ratetype=<0-1>,initialtariff=<up to 3 tariffs>
```

## Retrieving an Element from the PRI Tariff Table

- Step 1** Start a provisioning session as described in the [“Starting a Provisioning Session”](#) section on page 22.
- Step 2** Use the following MML command to retrieve an entry from the PRI Tariff table:

```
mml> prov-pritariff:tariffid=9
```



**Note** You can retrieve all entries from the PRI Tariff table file by using the following MML command:

```
mml> prov-rtrv:pritariff:"all"
```

## Deleting Elements from the PRI Tariff Table

- 
- Step 1** Start a provisioning session as described in the [“Starting a Provisioning Session”](#) section on page 22.
- Step 2** Use the following MML command to delete an entry in the PRI Tariff table:
- ```
mml> prov-dlt:pritariff:tariffid=9
```
- Step 3** Perform [Step 2](#) for each entry you delete in the PRI Tariff table.
- Step 4** When all PRI Tariff table entries have been deleted, close and save the provisioning session data by performing the procedure described in the [“Saving and Activating Your Provisioning Changes”](#) section on page 23.
- 

## Verifying Tariff Table Entries

To verify PRI Tariff table entries, use the **rtrv-all** MML command. You can verify the returned values against the input values.

- 
- Step 1** Start a provisioning session as described in the [“Starting a Provisioning Session”](#) section on page 22.
- Step 2** Use the following MML command to retrieve an entry in the PRI Tariff table for PRI AOC supplementary services:
- ```
mml> prov-rtrv:pritariff:tariffid=<range 1-9999>
```
- Step 3** The following MML command is used to retrieve all entries in the PRI Tariff table for PRI AOC supplementary services:
- ```
mml> prov-rtrv:pritariff:"all"
```
- 

## AOC-D Tariff Provisioning Example

The following MML commands are an example of AOC-D tariff provisioning. [Figure 2 on page 14](#) shows the priTariff table entries that result from the following provisioning commands:

```
mml> prov-add:pritariff:tariffid=1,drecchrg=1,currency="dollars",amount=1,amtmult=3,
timelen=60,timescale=2,granularity=1,granularityscale=2,billingid=0,chargingunits=50,
duration=0,ratetype=1,initialtariff="8 5 6"
```

```
mml> prov-add:pritariff:tariffid=2,drecchrg=1,currency="dollars",amount=1,amtmult=3,
timelen=60,timescale=2,granularity=1,granularityscale=2,billingid=0,chargingunits=20,
duration=0,ratetype=1,initialtariff=""
```

```
mml> prov-add:pritariff:tariffid=3,drecchrg=1,currency="dollars",amount=1,amtmult=3,
timelen=60,timescale=2,granularity=1,granularityscale=2,billingid=0,chargingunits=60,
duration=0,ratetype=1,initialtariff="5 7"
```

```
mml> prov-add:pritariff:tariffid=4,drecchrg=1,currency="dollars",amount=1,amtmult=3,
timelen=120,timescale=2,granularity=1,granularityscale=2,billingid=0,chargingunits=40,
duration=0,ratetype=0,initialtariff=""
```

```

mml> prov-add:pritariff:tariffid=5,drecchrg=1,currency="dollars",amount=1,amtmult=3,
timelen=60,timescale=2,granularity=1,granularityscale=2,billingid=0,chargingunits=60,
duration=60000,ratetype=0,initialtariff=" "

mml> prov-add:pritariff:tariffid=6,drecchrg=1,currency="dollars",amount=1,amtmult=3,
timelen=120,timescale=2,granularity=1,granularityscale=2,billingid=0,chargingunits=40,
duration=120000,ratetype=0,initialtariff=" "

mml> prov-add:pritariff:tariffid=7,drecchrg=1,currency="dollars",amount=1,amtmult=3,
timelen=60,timescale=2,granularity=1,granularityscale=2,billingid=0,chargingunits=60,
duration=60000,ratetype=1,initialtariff=" "

mml> prov-add:pritariff:tariffid=8,drecchrg=1,currency="dollars",amount=1,amtmult=3,
timelen=60,timescale=2,granularity=1,granularityscale=2,billingid=0,chargingunits=50,
duration=60000,ratetype=0,initialtariff=" "

```

## AOC-D Use Case Examples

The following use case examples are based on the AOC-D provisioning examples. A call flow diagram is also provided for each use case.

### Use Case 1

Scenario: Use 3 flat rate and then an ongoing rate.

#### Call Information

Charge Origin: Default

Charge Destination: 1

Day: Monday

Time of Day: 080000 (HHMMSS)

Call Duration: 5 minutes and 10 seconds

```

|<----- SETUP -----|
|----- SETUP ACK ----->|
|----- CALL PROC ----->|
|----- ALERTING ----->|
|----- CONNECT ----->|
|----- FAC w/ AOC-D (CU = 0) ----->|
080000 |<----- CONNECT ACK -----|
080000 |----- FAC w/ AOC-D (CU = 50) ----->| Tariff Applied = ID 8
080100 |----- FAC w/ AOC-D (CU = 110) ----->| Tariff Applied = ID 5
080200 |----- FAC w/ AOC-D (CU = 150) ----->| Tariff Applied = ID 6
080400 |----- FAC w/ AOC-D (CU = 150) ----->| Tariff Applied = ID 1
080500 |----- FAC w/ AOC-D (CU = 200) ----->|
080510 |<----- DISCONNECT -----|
|----- RELEASE w/ AOC-E (CU = 208) ---->|
|<----- RELEASE COMPLETE -----|

```

### Use Case 2

Scenario: Call hung up during initial flat rate.

**Call Information**

Charge Origin: Default

Charge Destination: 1

Day: Monday

Time of Day: 080000 (HHMMSS)

Call Duration: 0 minutes and 10 seconds

```

|<----- SETUP -----|
|----- SETUP ACK ----->|
|----- CALL PROC ----->|
|----- ALERTING ----->|
|----- CONNECT ----->|
|----- FAC w/ AOC-D (CU = 0) ----->|
080000 |<----- CONNECT ACK -----|
080000 |----- FAC w/ AOC-D (CU = 50) ----->| Tariff Applied = ID 8
080010 |<----- DISCONNECT -----|
|----- RELEASE w/ AOC-E (CU = 50) ---->|
|<----- RELEASE COMPLETE -----|

```

**Use Case 3**

Scenario: Call starts during a continuous flat rate period, then rolls into ongoing duration based rate.

**Call Information**

Charge Origin: Default

Charge Destination: 1

Day: Monday

Time of Day: 235930 (HHMMSS)

Call Duration: 3 minutes and 10 seconds

```

|<----- SETUP -----|
|----- SETUP ACK ----->|
|----- CALL PROC ----->|
|----- ALERTING ----->|
|----- CONNECT ----->|
|----- FAC w/ AOC-D (CU = 0) ----->|
235930 |<----- CONNECT ACK -----|
235930 |----- FAC w/ AOC-D (CU = 40) ----->| Tariff Applied = ID 4
|
240000 | ** Switchover based on DoW, but
|         not applied, flat rate ongoing
|
000130 |----- FAC w/ AOC-D (CU = 40) ----->| Tariff Applied = ID 1
000230 |----- FAC w/ AOC-D (CU = 90) ----->|
000240 |<----- DISCONNECT -----|
|----- RELEASE w/ AOC-E (CU = 98) ---->|
|<----- RELEASE COMPLETE -----|

```

**Use Case 4**

Scenario: Call starts during continuous flat rate period.

**Call Information**

Charge Origin: Default

Charge Destination: 1

Day: Monday

Time of Day: 230000 (HHMMSS)

Call Duration: 3 minutes and 10 seconds

```

|<----- SETUP -----|
|----- SETUP ACK ----->|
|----- CALL PROC ----->|
|----- ALERTING ----->|
|----- CONNECT ----->|
|----- FAC w/ AOC-D (CU = 0) ----->|
230000 |<----- CONNECT ACK -----|
230000 |----- FAC w/ AOC-D (CU = 40) ----->| Tariff Applied = ID 4
230200 |----- FAC w/ AOC-D (CU = 80) ----->| Tariff Applied = ID 4
230310 |<----- DISCONNECT -----|
|----- RELEASE w/ AOC-E (CU = 80) ---->|
|<----- RELEASE COMPLETE -----|

```

**Use Case 5**

Scenario: Call starts during tariff 3 and then switches over into tariff 4.

**Call Information**

Charge Origin: Default

Charge Destination: 1

Day: Monday

Time of Day:195730 (HHMMSS)

Call Duration: 5 minutes and 10 seconds

```

|<----- SETUP -----|
|----- SETUP ACK ----->|
|----- CALL PROC ----->|
|----- ALERTING ----->|
|----- CONNECT ----->|
|----- FAC w/ AOC-D (CU = 0) ----->|
195730 |<----- CONNECT ACK -----|
195730 |----- FAC w/ AOC-D (CU = 60) ----->| Tariff Applied = ID 5
195830 |----- FAC w/ AOC-D (CU = 60) ----->| Tariff Applied = ID 7
195930 |----- FAC w/ AOC-D (CU = 120) ----->| Tariff Applied = ID 3
200000 |----- FAC w/ AOC-D (CU = 190) ----->| Tariff Applied = ID 4 (Time of day
switchover)
200200 |----- FAC w/ AOC-D (CU = 230) ----->| Tariff Applied = ID 4
200240 |<----- DISCONNECT -----|
|----- RELEASE w/ AOC-E (CU = 230) ---->|
|<----- RELEASE COMPLETE -----|

```

## Troubleshooting Tips

In the event of errors, verify that all of the required properties and tables are configured properly.

For more information on troubleshooting the rest of the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Operations, Maintenance, and Troubleshooting Guide*.

## Monitoring and Maintaining

For more information on operational tasks for the rest of the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Operations, Maintenance, and Troubleshooting Guide*.

“Daily Tasks” section on page 33 contains the procedures required for proper monitoring and maintenance of this feature.

For more information on operational tasks for the rest of the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Operations, Maintenance, and Troubleshooting Guide*.

## Daily Tasks

The following sections describe procedures performed on a daily basis on the Cisco MGC. These procedures call for Man-Machine Language (MML) and UNIX commands. You can also perform these procedures using the optional Cisco MGC Node Manager (MNM) application. For more information on using the Cisco MNM to operate the Cisco MGC, refer to the *Cisco Media Gateway Controller Node Manager User's Guide*.

The tasks you should perform on a daily basis are found in the following sections:

- [Starting a Provisioning Session, page 22](#)
- [Verifying the Platform State of the Cisco MGC Hosts, page 33](#)
- [Verifying That Processes Are Running, page 34](#)

## Verifying the Platform State of the Cisco MGC Hosts

You can determine which of your Cisco MGC hosts is the active Cisco MGC and which is the standby Cisco MGC. If your system uses a Cisco MGC in a simplex configuration, the single Cisco MGC host is always active. To verify the MGC host state, complete the following steps:

**Step 1** Log in to one of the Cisco MGCs, start an MML session, and enter the following command to determine the platform state:

```
mml> rtrv-ne
```

The system should return a message, similar to the following, if it is currently the active Cisco MGC:

```
Media Gateway Controller 2004-07-17 14:15:22
M RTRV
  "Type:"MGC" "
  "Hardware platform:sun4u sparcsUNW,Ultra-5_10"
  "Vendor:"Cisco Systems, Inc." "
  "Location:Media Gateway Controller"
  "Version:"9.5(2) " "
  "Platform State:ACTIVE"
```

The valid values for the Platform State field are ACTIVE, STANDBY, and OOS.

- Step 2** Log in to the other Cisco MGC, start an MML session, and enter the following command to determine the platform state:

```
mml> rtrv-ne
```

The system should return a message that indicates that it is in either the active or standby platform state.

If the Cisco MGC hosts have changed their platform states, determine why the switchover occurred by searching the contents of the active system log file.

Under normal operations, one Cisco MGC host is active and the other Cisco MGC host is standby.

If the platform state of either Cisco MGC host is out of service (OOS), check the alarms and take the actions necessary to correct the condition that caused the associated alarm(s). The alarms that require you to take corrective action and their associated actions can be found in the *Cisco Media Gateway Controller Software Release 9 Messages Reference Guide*.

If the platform state of both Cisco MGC hosts is active, proceed to [Step 4](#).

- Step 3** Verify that the active configuration has not changed by entering the following UNIX commands:

```
cd /opt/CiscoMGC/etc
ls -l
```

The system returns a response similar to the following:

```
total 35350
-rw-r--r--  1 mgcusr mgcgrp   38240 May  8 10:46 02.trigger
-rw-rw-r--  1 mgcusr  mgcgrp   20488 May 10  2004 64eisup.bat
lrwxrwxrwx  1 mgcusr  mgcgrp    43 Aug  1 18:55 active_link ->
/opt/CiscoMGC/etc/CONFIG_LIB/CFG_pol-addipl
-rw-rw-rw-  1 mgcusr  mgcgrp   30907 Jul 24 15:29 alarmCats.dat
-rw-rw-rw-  1 mgcusr  mgcgrp   2064 Jun  4 10:57 alarmTable.dat
-rw-rw-rw-  1 mgcusr  mgcgrp    0 Jun  4 10:57 auxSigPath.dat
```

Identify the active\_link file. The previous listing indicates which configuration is currently active. The active configuration in the example is CFG\_pol-addipl.

If everything is normal, this procedure is complete. However, if the configuration has changed, you might want to compare the active configuration to the previous configuration and proceed to [Step 4](#).

- Step 4** Contact the Cisco Technical Assistance Center (TAC) for assistance. Refer to the [“Obtaining Technical Assistance” section on page 59](#) for more information on contacting the Cisco TAC.

## Verifying That Processes Are Running

To verify that the processes on your Cisco MGC are running, perform the following steps:

- Step 1** Log in to the active Cisco MGC, start an MML session, and enter the following command:

```
mml> rtrv-softw:all
```

The system returns a response similar to the following:

```
Media Gateway Controller - MGC-04 2004-07-17 08:06:03
M RTRV
"CFM-01:RUNNING ACTIVE"
"ALM-01:RUNNING ACTIVE"
"MM-01:RUNNING ACTIVE"
```

```

"AMDMPR-01:RUNNING ACTIVE"
"CDRDMPR-01:RUNNING ACTIVE"
"DSKM-01:RUNNING IN N/A STATE"
"MMDB-01:RUNNING IN N/A STATE"
"POM-01:RUNNING ACTIVE"
"MEASAGT:RUNNING ACTIVE"
"OPERSAGT:RUNNING ACTIVE"
"PROVSAGT:RUNNING ACTIVE"
"MGCP-1:RUNNING IN N/A STATE"
"Replic-01:RUNNING ACTIVE"
"ENG-01:RUNNING ACTIVE"
"IOCM-01:RUNNING ACTIVE"
"TCAP-01:RUNNING IN N/A STATE"
"FOD-01:RUNNING IN N/A STATE"
"EISUP-1:RUNNING IN N/A STATE"
"SS7-A-1:RUNNING IN N/A STATE"

```



**Note** If this MML command is entered on the standby Cisco MGC, the state of the processes is either RUNNING STANDBY or RUNNING IN N/A STATE.

**Step 2** If any process is initializing, wait a few moments and repeat [Step 1](#). If that process is still initializing, contact the Cisco TAC for assistance. Refer to the [“Obtaining Documentation” section on page 56](#) for more information on contacting the Cisco TAC.

If any of the processes are stopped, contact the Cisco TAC for assistance. Refer to the [“Obtaining Documentation” section on page 56](#) for more information on contacting the Cisco TAC.

## Understanding Processes

The Cisco MGC software contains processes and process groups that perform various functions. These functions include managing the I/O channels; generating alarms, call detail records (CDRs), and logs; and performing signal conversion. All of these processes are managed by the process manager of the Cisco MGC software.

Three different monitoring levels are offered:

- Active process—Controlled and monitored directly by the process manager.
- Passive process—Does not communicate with the process manager.
- Monitoring process—Periodically runs an executable or script and sets or clears an alarm based on the return code. This type of process can monitor other processes or tasks that can be checked programmatically. Some examples are the amount of available disk space, system daemon existence, and established process dependency.

[Table 8](#) shows the system processes and process groups controlled by the process manager.

**Table 8** *Processes Controlled by the Process Manager*

| Group   | Process   | Description                                                                                                      |
|---------|-----------|------------------------------------------------------------------------------------------------------------------|
| ENGG-01 |           | Engine Group                                                                                                     |
|         | Replic-01 | Replicator controller. It is an active process. If it should go down, it causes a critical out-of-service alarm. |

**Table 8** *Processes Controlled by the Process Manager (continued)*

| <b>Group</b>    | <b>Process</b>                     | <b>Description</b>                                                                                                                                                                                                                                        |
|-----------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 | ENG-01                             | Call engine. It is an active process. If it should go down, the system cannot process calls. Its failure causes a critical out-of-service alarm.                                                                                                          |
| <b>IOSG-01</b>  | <b>I/O Subsystem Group</b>         |                                                                                                                                                                                                                                                           |
|                 | IOCC-01                            | I/O channel controller. It is a passive process. If it should go down, it causes a critical out-of-service alarm.                                                                                                                                         |
|                 | IOCC-02                            | I/O channel controller. It is a passive process. If it should go down, it causes a critical out-of-service alarm.                                                                                                                                         |
|                 | IOCM-01                            | I/O channel manager. It is a passive process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                               |
|                 | TCAP-01                            | TCAP and SCCP protocol handler. It is a passive process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                    |
| <b>XEG-01</b>   | <b>Execution Environment Group</b> |                                                                                                                                                                                                                                                           |
|                 | CFM-01                             | Configuration manager. It is an active process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                             |
|                 | ALM-01                             | Alarm manager. It is an active process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                                     |
|                 | AMDMPR-01                          | Alarm and measurement dumper. It is an active process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                      |
|                 | MM-01                              | Measurement manager. It is an active process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                               |
|                 | CDRDMPR-01                         | CDR dumper. It is an active process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                                        |
|                 | MMDB-01                            | TimesTen database. It is a passive process. If it should go down, it causes a minor out-of-service alarm.                                                                                                                                                 |
|                 | POM-01                             | Provisioning object manager. It is an active process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                       |
| <b>FTG-01</b>   | <b>Failover Group</b>              |                                                                                                                                                                                                                                                           |
|                 | FOD-01                             | Failover controller. It is a monitoring process. If it should go down, it causes a minor out-of-service alarm.                                                                                                                                            |
| <b>PFMG-01</b>  | <b>Platform Monitoring Group</b>   |                                                                                                                                                                                                                                                           |
|                 | DSKM-01                            | Disk space monitor. This shell script monitors disk space and trims back older files in case the current amount of free space is below a specified threshold. This is a monitoring process. If it should go down, it causes a minor out-of-service alarm. |
| <b>SNMPG-01</b> | <b>SNMP Group</b>                  |                                                                                                                                                                                                                                                           |
|                 | MEASAGT                            | Measurements SNMP agent. This is an active process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                         |
|                 | OPERSAGT                           | Operational SNMP Agent. This is an active process. If it should go down, it causes a major out-of-service alarm.                                                                                                                                          |

## AOC Supplementary Operations

The following are AOC supplementary services:

- AOC-S—Enables a user to receive information about the charging rates at call setup and also to receive further information during the call if there is a change of charging rates.
- AOC-D—Enables a user to receive information on the recorded charges for a call during the active phase of the call.
- AOC-E—Enables a user to receive information on the recorded charges for a call when the call is terminated.

The MGC acts as the charge determination point, gets the tariff rate, and generates AOC-S or AOC-D, depending on the state of the call. The AOC-S or AOC-D are sent out to the ingress side in a Facility message. The AOC-E, which is sent at the call termination, is generated in either a Disconnect or a Release message that is sent out to the ingress side. The MGC also processes the appropriate response.

### Invoking AOC Supplementary Services

The MGC is required to act as a charge determination point for ETSI PRI calls. The AOC supplementary services are invoked as determined by the AOC\_INVOKE\_TYPE trunk group property setting. The AOC supplementary services are either invoked on receipt of the subscription (per call basis) or generally available (for all calls). AOC services will be made available for any call based on the configured (AOC\_ENABLED) value.

Upon receiving the call origination, Generic Analysis obtains the Charge Origin and Charge Destination information from the dial plan, based on the number analysis. The charge information is stored in the Call Context and the AOC supplementary services are invoked.

If AOC\_INVOKE\_TYPE is configured for all calls, then the default tariff value is retrieved from the PRI Tariff table and AOC supplementary services are invoked. The AOC type invoked depends on the default configured value. For example, if the MGC receives the AOC invoke component, the MGC overrides the AOC component and invokes the charges as it would for per calls.

If AOC\_INVOKE\_TYPE is configured for per call, then the AOC supplementary services are not invoked until the AOC invoke component is received from the user.

On receipt of the invoke component, the PRI retrieves the tariff value from the PRI Tariff table, based on the stored Charge Origin and Charge Destination information, and the AOC supplementary services are invoked. The type of AOC invoked depends on the invoke component received from the user.

If the user invokes the AOC supplementary services (for example, AOC-S) and no AOC information is provided with the AOC invocation, the attempt to invoke the AOC service is rejected, and the user is informed of the reason for the rejection.

If the user invokes the supplementary AOC services and the information related to the call is not available or is incomplete, the attempt to invoke the services is rejected and the reason is made known to the subscribed user.

If a proper all calls configuration does not exist for the call requesting an activation, and the MGC cannot activate the requested AOC supplementary service, the MGC sends a Facility Information element. The element includes the requested type of AOC supplementary service (AOCSCurrency, AOCDCchargingUnit, AOCEChargingUnit, and so on), the invoke component indicating that “chargeNotAvailable” or another error from the General Error list to the subscriber or user.

If the MGC receives a request to activate the AOC supplementary service in any call control message other than a SETUP message, the MGC sends a ChargingRequest return error component indicating “invalidCallState” to the subscriber or user.

Tariff information is determined, based on a combination of:

- Customer group
- Destination
- Time of day/day of week

or

- Customer group
- Call Origin
- Destination
- Time of day/day of week

When there is a change in the charging rate during the call, due either to the configured tariff rate (split tariff) or the change in date, the MGC sends information about the new charging rate to be applied for the call to the requesting user.

If the MGC determines the charge is free-call, then free-of-charge information is sent once to the subscribing user.

## Populating Table Data for AOC Supplementary Services

Two tables, PRI Charge table and PRI AOC Tariff table, have been added. These tables are in a flat-file format and are loaded at startup. These tables must be reloaded in the event of craft update.

Access to the charge table is gained by using a combination of three keys: charge origin, charge destination, and the day of the week (DOW). The charge origin and charge destination values are retrieved by the analysis function while it is reading the dial plan data and are passed on to the charging function. The holiday table is used to get the DOW and corresponding holiday. The charge table provides the charge descriptor that is applied for the call in progress.

The resultant tariff descriptor is used to set up the different AOC charging mechanisms. The tariff descriptor consists of the tariff identifier and the time of day when the tariff identifier is applied to a call. The tariff identifier is used to get the charging rate information for the invoked AOC supplementary services. The values obtained from the PRI Tariff table and PRI Charge table complete the data required for generating the required AOC.

The format for the PRI AOC Tariff table is shown in [Table 2](#). [Table 2](#) indicates which data is mandatory and which is optional for the different AOC supplementary services.

## Invoking AOC-S Charging

The AOC-S supplementary services are invoked at call establishment. If the invoke component is received after call establishment, the call attempt is discarded and the reason is made available to the subscribing user.

On successful charge establishment due to user invocation or the MGC configuration, the charging information is sent to the subscribing user at call establishment or at the latest by call connection. Additional information is sent to the user whenever there is a change in the charging rate.

## Invoking AOC-D Charging

The AOC-D supplementary services are invoked at call establishment. If the invoke component is received after call establishment, the call attempt is discarded, and the reason is made available to the subscribing user.

On successful charge establishment due to user invocation or the MGC configuration, the charging information is sent to the subscribing user during the active phase of the call. For AOC-D, the total charge is recorded until the charging information is sent to the user.

On call release, the total charge is sent to the subscribing user in a call control message that clears the call. The total accumulated charge is sent to the user at regular 15-minute intervals. On call release, the total charge accumulated is sent to the subscribing user in a backward call control message clearing the call.

## Invoking AOC-E Charging

The AOC-E supplementary services are invoked at call establishment. If the invoke component is received after call establishment, the attempt is discarded and the reason is made available to the subscribing user.

On successful charge establishment due to user invocation or by the MGC configuration, the total charge is sent to the subscribing user in a call control message that clears the call.

## Provisioning Example

### Step 1 (Optional)—Create Charge Holiday Data.

```
mm1> prov-add:holiday:date="04.07.04",hday="hol1"
mm1> prov-add:holiday:date="04.12.25",hday="hol2"
mm1> prov-add:holiday:date="04.05.01",hday="hol3"
```

### Step 2 (Optional)—Define Charge Origins.

The following example assigns charge origins from the newly introduced CLI charge origin table:

```
mm1> numan-add:achorigin:custgrpId="pstn"
mm1> numan-add:achorigin:custgrpId="pstn",cli="91234567",corigin=1
mm1> numan-add:achorigin:custgrpId="pstn",cli="501234567",corigin=2
```

### Step 3 (Mandatory)—Create PRI Charge data.

```
mm1> prov-add:charge:chorig=1,chdest=1,stariffdesc="3 0700 4 1800 3",
dtariffdesc="3 0700 5 1800 3",etariffdesc="3 0700 6 1800 4"
mm1> prov-add:charge:chorig=1,chdest=1,dow=saturday,stariffdesc="4",
dtariffdesc="3",etariffdesc="4"
mm1> prov-add:charge:chorig=1,chdest=1,dow=sunday,stariffdesc="2",
dtariffdesc="2",etariffdesc="2"
mm1> prov-add:charge:chorig=1,chdest=1,dow=hol1,stariffdesc="3 0700 4 1800
3",dtariffdesc="3",etariffdesc="4"
mm1> prov-add:charge:chorig=1,chdest=1,dow=hol2,stariffdesc="3",dtariffdesc="3",
etariffdesc="3"
mm1> prov-add:charge:chdest=1,stariffdesc="1",dtariffdesc="1",etariffdesc="1"
```

In the preceding PRI Charge table example, calls from charge origin 1 to charge destination 1 on Monday to Friday use a tariff ID of 3 from 0000 to 0700, a tariff ID of 4 from 0700 to 1800, and then a tariff ID of 3 again from 1800 to 2400, if AOC-S supplementary service is activated. The MGC uses tariff ID 3

from 0000 to 0700, tariff ID 5 from 0700 to 1800, and tariff ID 3 again from 1800 to 2400, if AOC-D supplementary service is activated. The MGC uses tariff ID 3 from 0000 to 0700, tariff ID 6 from 0700 to 1800, and then uses tariff ID 3 again from 1800 to 2400, if AOC-E supplementary service is activated.

Calls from charge origin 1 to charge destination 1 on Saturday use tariff ID 4 from 0000 to 2400, if AOC-S supplementary service is activated. Calls use tariff ID 3 from 0000 to 2400, if AOC-D supplementary service is activated. The MGC uses tariff ID 4 from 0000 to 2400, if AOC-E supplementary service is activated.

Calls from charge origin 1 to charge destination 1 on Sunday use tariff ID 2 from 0000 to 2400, if AOC-S supplementary service is activated. The MGC uses tariff ID 2 from 0000 to 2400, if AOC-D supplementary service is activated. The MGC uses tariff ID 2 from 0000 to 2400, if AOC-E supplementary service is activated.

Calls from charge origin 1 to charge destination 1 on HOL1 use tariff ID of 3 from 0000 to 0700 and tariff ID 4 from 0700 to 1800, and then uses tariff ID 3 again from 1800 to 2400, if AOC-S supplementary service is activated. The MGC uses tariff ID 3 from 0000 to 2400, if AOC-D supplementary service is activated. The MGC uses tariff ID 4 from 0000 to 2400, if AOC-E supplementary service is activated.

All other calls to charge destination 1 (charge origin <> 1) on any day use a tariff ID of 1 from 0000 to 2400, if AOC-S supplementary service is activated. It uses tariff ID 1 (flat rate) from 0000 to 2400, if AOC-D supplementary service is activated. It uses tariff ID 1 (flat rate) from 0000 to 2400, if AOC-E supplementary service is activated.

**Step 4** (Mandatory) Create PRI Tariff table.

```
mml> prov-add:pritariff:tariffid=1,schargeditem=1,sca=1,srecchrg=1,drecchrg=1,erecchrg=1,
currency=USD,amount=1,amtmult=3,timelen=600,timescale=1,granularity=1,granularityscale=2,
vol=1,scu=1,billingid=1
```

```
mml> prov-add:pritariff:tariffid=2,schargeditem=1,sca=1,srecchrg=1,drecchrg=1,erecchrg=1,
currency=USD,amount=1,amtmult=3,timelen=30,timescale=2,granularity=1,granularityscale=2,
vol=1,scu=1,billingid=1
```

**Step 5** (Mandatory) Create CHARGE result type.

```
mml> numan-add:resulttable:customergrp="pri",name="aoccharge1",resulttype="charge",
dw1="10",dw2="10",dw3="2",setname="privoipcall"
```

**Step 6** (Mandatory) Set AOCInvokeType against the trunk groups.

```
mml> prov-add:trnkgrpprop:name="pri",custgrp="aoccharge1",aocinvoketype=1
```

**Step 7** (Optional) Set AOCDefaultTariffId against the trunk groups.

```
mml> prov-add:trnkgrpprop:name="pri",custgrp="aoccharge1",aocdefaulttariffid=1
```

**Step 8** (Optional) Set AOCMinPeriodicTimerDuration against the trunk groups.

```
mml> prov-add:sigsvccprop:name="pri",aocminperiodictimerduration="30"
```

**Step 9** (Mandatory) Set AOCEnabled against the trunk groups.

```
mml> prov-add:trnkgrpprop:name="2000",aocenabled="1"
```

## Adding, Editing, Retrieving, and Deleting AOC Properties

The following MML provisioning commands are examples of adding, editing, retrieving, and deleting AOC properties.

## AOCEnabled Provisioning

```

mml> prov-add:trnkgrpprop:name="2000",aocenabled="1"
MGC-01 - Media Gateway Controller 2004-07-17 15:30:22.471 EDT
M  COMPLD
   "trnkgrpprop"
   ;

mml> prov-ed:trnkgrpprop:name="2000",aocenabled="0"
MGC-01 - Media Gateway Controller 2004-07-17 15:30:46.350 EDT
M  COMPLD
   "trnkgrpprop"
   ;

mml> prov-rtrv:trnkgrpprop:name="2000"
MGC-01 - Media Gateway Controller 2004-07-17 15:30:58.869 EDT
M  RTRV
   "session=test:trnkgrpprop"
   /*
AOCEnabled = 0

```

## AOCDefaultTariffId Provisioning

```

mml> prov-add:trnkgrpprop:name="2000",aocdefaulttariffid="1"
MGC-01 - Media Gateway Controller 2004-07-17 15:33:43.610 EDT
M  COMPLD
   "trnkgrpprop"
   ;

mml> prov-ed:trnkgrpprop:name="2000",aocdefaulttariffid="2"
MGC-01 - Media Gateway Controller 2004-07-17 15:33:54.267 EDT
M  COMPLD
   "trnkgrpprop"
   ;

mml> prov-rtrv:trnkgrpprop:name="2000",aocdefaulttariffid="2"
MGC-01 - Media Gateway Controller 2004-07-17 15:34:00.556 EDT
M  RTRV
   "session=test:trnkgrpprop"
   /*
AOCDefaultTariffId = 2

```

## AOCInvokeType Provisioning

```

mml> prov-add:trnkgrpprop:name="2000",aocinvoke="1"
MGC-01 - Media Gateway Controller 2004-07-17 15:34:42.169 EDT
M  COMPLD
   "trnkgrpprop"
   ;

mml> prov-ed:trnkgrpprop:name="2000",aocinvoke="2"
MGC-01 - Media Gateway Controller 2004-07-17 15:35:32.943 EDT
M  COMPLD
   "trnkgrpprop"
   ;

mml> prov-rtrv:trnkgrpprop:name="2000",aocinvoke="2"
MGC-01 - Media Gateway Controller 2004-07-17 15:35:41.888 EDT
M  RTRV
   "session=test:trnkgrpprop"
   /*
AOCInvokeType = 2

```

## AOCAdminPeriodicTimerDuration Provisioning

```

mml> prov-add:sigsvcpop:name="bh2055ess",aocadminperiodictimerduration="30"
MGC-01 - Media Gateway Controller 2004-07-17 15:36:53.374 EDT

```

```

M  COMPLD
   "sigsvccprop"
   ;
mml> prov-ed:sigsvccprop:name="bh2055ess",aocadminperiodictimerduration="25"
MGC-01 - Media Gateway Controller 2004-07-17 15:37:04.904 EDT
M  COMPLD
   "sigsvccprop"
   ;
mml> prov-rtrv:sigsvccprop:name="bh2055ess",aocadminperiodictimerduration="25"
MGC-01 - Media Gateway Controller 2004-07-17 15:37:09.327 EDT
M  RTRV
   "session=test:sigsvccprop"
   /*
AOCAdminPeriodicTimerDuration = 25

```

## Command Reference

This section documents Man-Machine Language (MML) commands added to support the AOC Generation for PRI feature. All other commands are documented in the *Cisco Media Gateway Controller Software Release 9 MML Command Reference Guide*.

### New MML Commands

This section contains the MML commands added for the AOC Generation for PRI feature.

The following MML commands were added to support the PRI Charge table and the PRI Tariff table for the AOC Generation for PRI feature:

- prov-add:pricharge
- prov-ed:pricharge
- prov-dlt:pricharge
- prov-rtrv:pricharge
- prov-add:pritariff
- prov-ed:pritariff
- prov-dlt:pritariff
- prov-rtrv:pritariff

The following MML commands were added to support the AOCInvokeType and the AOCDefaultTariffId trunkgroup properties for the AOC Generation for PRI feature.

- prov-add:trunkgroupprop
- prov-ed:trunkgroupprop
- prov-dlt:trunkgroupprop
- prov-rtrv:trunkgroupprop

## PROV-ADD—Add a Provisioning Component

**Purpose:** This MML command adds a component to the Cisco MGC configuration.

**Syntax:** Example:

```
mml->prov-add:<comp>:name="<MML name>",<param name>=<param value>,...
```

**Input** Where:

**Description:**

- *comp*—MML component type name for the type of configuration you are creating. The component type must match one of the component types listed in the *Cisco Media Gateway Controller Software Release 9 Provisioning Guide*.
- *name*—MML component name for the new object you are creating (as many as ten characters).
- *custgrpid*—Customer group ID. The ID of the customer associated with this trunk group. Value range: 0 (if not defined) or any 4-character alphanumeric string.

**Example:**

```
mml> prov-add:trnkgrpprop:name="1111",custgrpid="1234",OCInvokeType=2
Media Gateway Controller - MGC-01 2004-07-17 15:19:51
M COMPLD
;
```

**Comments:**

## PROV-ADD:PRICHARGE—Adds an Entry to the PRI Charge Table

**Purpose:** This MML command adds an entry into the PRI Charge table for PRI AOC supplementary services.

**Syntax:** Example:

```
mml> prov-add:pricharge:chorig=<1-9999>,
chdest=<1-9999>,dow="<monday-sunday, hol1, hol2,
hol3>",<stariffdesc>="<tariff 1 timeChange 1 - tariff n timeChange
n>",<dtariffdesc>="<tariff 1 timeChange 1 - tariff n timeChange
n>",<etariffdesc>="<tariff 1 timeChange 1 - tariff n timeChange n>"
```

**Note** The “chorig” and “dow” properties are optional. Their default value is 0 in the PRI Charge table if no value is specified.

- Input Description: Where:
- *chorig*—The charge origin. Indicates the numeric designation for the charge origin of the call. Value range: 1 through 9999.
- Note** If no value is entered for *chorig*, then the charge origin is assumed to be 0 for any origin that has the same destination and no other charge origin specified.
- *chdest*—The charge destination. Indicates the numeric designation for the charge destination of the call. Value range: 1 through 9999.
  - *dow*—The day of week. Indicates the day of week for which the charge applies. Value range: Default, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, HOL1, HOL2, or HOL3.
- Note** If no value is entered for *dow*, then the charge is assumed to be 0 for any day of the week where no other indication is given.
- *stariffdesc*—The AOC-S tariff description. The tariff description indicates to the calling private branch exchange (PBX) or end office of the charge for the call through the network, from the start of the call.
  - *dtariffdesc*—The AOC-D tariff description. The tariff description indicates to the calling PBX or end office of the charge for the call through the network, during the call.
  - *etariffdesc*—The AOC-E tariff description. The tariff description indicates to the calling PBX or end office of the charge for the call through the network, at the end of the call.
- Note** The tariffs to be applied are from the Tariff table with their associated durations. Up to five tariff changes can be specified per day. The format for the time change field is HHMM, where MM must be divisible by 15 (that is, 15-minute increments; for example, 2015). The time change value must be 2400 if the last field is a time change value.
- Example: 

```
mml> prov-add:pricharge:chorig=2,chdest=2,dow="HOL1",stariffdesc="1 1815 3
2100 2"
Media Gateway Controller - MGC-01 2004-07-17 15:19:55
M COMPLD
;
```
- Comments: The Charge table entry format for the preceding MML command is:
- ```
2 2 8 "1 1815 3 2100 2"
```
- This indicates that the Charge Origin is 2; the Charge Destination is 2; the Day of week is HOL1, Tariff ID 1 is applicable until 1815; Tariff ID 3 is applicable until 2100; and Tariff ID 2 is applicable until the end of the day. A time change does not have to be entered as the last change value, but if it is entered, it must be 2400.

## PROV-ADD:PRITARIFF—Adds an Entry to the PRI Tariff Table

**Purpose:** This MML command adds an entry to the PRI Charge table for PRI AOC supplementary services.

**Syntax:** Example:

```
mml->prov-add:pritariff:tariffid=<range 1-9999>,  
schargeditem=<AocSChargedItemRange>,dcallstate=<AocDCallStateRange>,ecallsta  
te=<AocECallStateRange>,sca=<1-10>,srecchrg=<AocSRecordedChrgRange>,drecchrg  
=<AocDRecordedChrgRange>,erecchrg=<AocERecordedChrgRange>,  
currency=<IA51-10>,amount=<0-16777215>,amtmult=<AmountMultiplierRange>,  
timelen=<0-16777215>,timescale=<TimeScaleRange>,granularity=<0-16777215>,  
granularityscale=<GranularityTimeScaleRange>,vol=<VolumeRange>,scu=<1-32767>  
,billingid=<BillingIdRange>,chargingunits=<0-16777215>,duration=<0-16777215>  
,ratetype=<0-1>,initialtariff=<up to 3 tariffs>
```

Input Description:	<p>Where:</p> <ul style="list-style-type: none"> <li>• <i>tariffid</i>—The tariff ID. This is the tariff identifier configured as part of the tariff descriptor. Value range: 1 through 9999.</li> <li>• <i>schargeditem</i>—The AOC-S charged item. Indicates the function for which the caller is billed. Value range: 0 through 4. Where 0 = Basic Communication; 1 = Call Attempt; 2 = Call Setup; 3 = User-to-user information; 4 = Operation of Supplemental Services.</li> <li>• <i>sca</i>—Special Charging Agreement. Indicates the AOC-S special charging arrangement. Value range: 1 through 10. Where the user defines each value.</li> <li>• <i>srecchrg</i>—The AOC-S recorded charge. Indicates the AOC-S charge recording configuration. Value range: 1 through 6. Where 1 = Duration rate; 2 = Flat Rate; 3 = Volume Rate; 4 = Free Of Charge; 5 = Info Not Available; 6 = Special.</li> <li>• <i>drecchrg</i>—The AOC-D recorded charge. Indicates the AOC-D charge recording configuration. Values: 1 through 3. Where: 1 = Charging Unit; 2 = Currency Unit, and 3 = Free Of Charge.</li> <li>• <i>erecchrg</i>—The AOC-E recorded charge. Indicates the AOC-E charge recording configuration. Values: 1 through 3. Where: 1 = Charging Unit; 2 = Currency Unit, and 3 = Free Of Charge.</li> <li>• <i>currency</i>—The currency used for billing. Indicates the currency name used for billing the call. Value range: 1 through 10 alphabetical characters.</li> <li>• <i>amount</i>—The amount of currency billed. Indicates the amount of the charge in the selected currency. Value range: 0 through 16777215.</li> <li>• <i>amtmult</i>—The amount multiplier. The currency amount multiplier for billing. Value range: 0 through 6. Where: 0 = 0.001; 1 = 0.01; 2 = 0.1; 3 = 1; 4 = 10; 5 = 100; 6 = 1000.</li> <li>• <i>timelen</i>—The time length. The time length is the time duration for the call charge. The scale representing this time length is determined by the timescale field. Value range: 0 through 16,777,215.</li> <li>• <i>timescale</i>—The time scale. Indicates the time units used for billing the call. Value range: 0 through 6. Where: 0 = 0.01 second; 1 = 0.1 second; 2 = 1 second; 3 = 10 seconds; 4 = 1 minute; 5 = 1 hour; 6 = 24 hours.</li> <li>• <i>granularity</i>—The granularity length. Indicates the number of time units (in granularity time scale) for the call duration. Value range: 0 through 16777215.</li> <li>• <i>granularityscale</i>—The granularity time scale. Indicates the time scale granularity used to measure the call duration. Value range: 0 through 6. Value range: 0 = 0.01 second; 1 = 0.1 second; 2 = 1 second; 3 = 10 seconds; 4 = 1 minute; 5 = 1 hour; 6 = 24 hours.</li> <li>• <i>vol</i>—The volume unit. Indicates the unit used for measuring the call. Where: 0 = Octet; 1 = Segment; 2 = Message.</li> <li>• <i>scu</i>—The special charging unit. The special charging unit indicates the charging association. Value range: 0 through 32767.</li> <li>• <i>billingid</i>—The ID of the billing type being used. Value range: 0 through 7. Where 0 = Normal; 1 = Reverse; 2 = Credit Card; 3 = Call Forwarding Unconditional; 4 = Call Forwarding Busy; 5 = Call Forwarding No Response; 6 = Call Deflection; 7 = Call Transfer.</li> </ul>
-----------------------	--

- *chargingunits*—The charging units. The number of charging units for the defined time length. Value range: 1 through 16777215.
- *duration*—The duration. Time period, in milliseconds, this tariff remains in effect. A 0 value indicates an ongoing tariff (the tariff does not expire after a fixed duration). Value range: 0 through 16777215.
- *ratetype*—The rate type. The rate type is either a flat rate (0), or a duration-based rate (1).
- *initialtariff*—The initial tariff. A list of up to 3 tariffs that are applied before this tariff is applied.

Example: `mm1> prov-add:pritariff:tariffid=99,schargeditem=2,sca=1,srecchrg=2,4zzzdrecchrg=<1-3>,erecchrg=<1-3>,currency=<IA51-10>,amount=<0-16777215>,amtmult=<0-6>,timelen=<0-16777215>,timescale=<0-6>,granularity=<0-16777215>,granularityscale=<GranularityTimeScaleRange>,vol=<0-2>,scu=<0-32767>,billingid=<0-7>,chargingunits=<0-16777215>,duration=<0-16777215>,ratetype=<0-1>,initialtariff=<up to 3 tariffs>`

Comments:

## Reference Information

The following sections contain reference material related to this feature:

- [Alarms, page 47](#)
- [Billing Interface, page 48](#)
- [Components, page 52](#)
- [Properties, page 54](#)
- [Provisioning Worksheets, page 55](#)

## Alarms

This section lists the alarms that were added to support this feature.

### PRI Tariff Table Load Failure

Description	This alarm is raised in case of failure to load the PRI Tariff table.
Severity	Major.
Cause	Table access failed.
Type	2 (Service affecting).
Action	No action required.

### PRI Charge Table Load Failure

Description	This alarm is raised in case of failure to load the PRI Charge table.
Severity	Major.
Cause	Table access failed.

## Reference Information

Type	2 (Service affecting).
Action	No action required.

**PRI Tariff Charging Unit Table Load Failure**

Description	This alarm is raised in case of failure to load the PRI Tariff Charging Unit table.
Severity	Major.
Cause	Table access failed.
Type	2 (Service affecting).
Action	No action required.

For information on the other alarms for the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Messages Reference Guide*.

**Billing Interface**

The tags shown in [Table 9](#) through [Table 14](#) have been added to support the AOC Generation for PRI feature.

**PRI AOC Service Activation (Tag: 4221)****Table 9 PRI AOC Service Activation Description Form**

<b>Name:</b> PRI AOC Service Activation	<b>Tag:</b> 4221	<b>Source:</b> MDL						
<b>Description/Purpose:</b> Service Activation allows the user to determine which supplementary services have been invoked by the user or by the MGC.								
<b>Format:</b> BE	<b>Length in Octets:</b> 1							
<b>Data Value:</b>								
PRI Service Activation information is 1 octet in length, and is defined as follows:								
AOC-S: 1								
AOC-D: 2								
AOC-E: 3								
AOC-S and AOC-D: 4								
AOC-S and AOC-E: 5								
AOC-D and AOC-E: 6								
AOC-S and AOC-D and AOC-E: 7								
<b>ANSI/ITU Variations:</b> None.								
<b>Extended Data Value:</b> No extended value.								
<b>General Information:</b>								
<b>MGC Release:</b> Release 9.5 and later.								
Answered (1010)	Deselected (1020)	Aborted (1030)	Release (1040)	Interrupted (1050)	Ongoing (1060)	Maintenance (1070)	External DB (1080)	End of Call (1110)
N	N	Y	Y	N	N	N	N	Y

## PRI AOC Invoke Type (Tag: 4222)

**Table 10** PRI AOC Invoke Type Description Form

<b>Name:</b> PRI AOC Invoke Type				<b>Tag:</b> 4222			<b>Source:</b> MDL		
<b>Description/Purpose:</b> PRI AOC Invoke Type allows the user to determine if the supplementary service was invoked due to receipt of the invoke component from the user (that is, per call), or was configured for all PRI calls (that is, all calls).									
<b>Format:</b> BE				<b>Length in Octets:</b> 1					
<b>Data Value:</b>									
PRI AOC Invoke Type information is 1 octet and is defined as follows:									
PER CALL: 1									
ALL CALL: 2									
<b>ANSI/ITU Variations:</b> None.									
<b>Extended Data Value:</b> No extended value.									
<b>General Information:</b>									
<b>MGC Release:</b> Release 9.5 and later.									
Answered (1010)	Deselected (1020)	Aborted (1030)	Release (1040)	Interrupted (1050)	Ongoing (1060)	Maintenance (1070)	External DB (1080)	End of Call (1110)	
N	N	Y	Y	N	N	N	N	Y	

## PRI AOC—S-Charge Information (Tag: 4223)

**Table 11** PRI AOC–S Charge Information Description Form

<b>Name:</b> PRI AOC–S Charge Information				<b>Tag:</b> 4223			<b>Source:</b> MDL		
<b>Description/Purpose:</b> Contains charging tariff information that has been set up for AOC–S supplementary services. It comprises the following data items:									
<ul style="list-style-type: none"> <li>tariff id and timestamp (from octets 1–6) can be repeated (up to 11 occurrences). The repetition depends on the number of different tariffs applied for a given call. The maximum number of tariffs allowed per day is 11.</li> </ul>									
<b>Format:</b> BE				<b>Length in Octets:</b> 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, or 66					
<b>Data Value:</b>									
Octets 1–2: integer value range 0–9999 (tariff id)									
Octets 3–6: Time in UNIX format (timestamp associated with tariff id in octets 1–2)									
<b>Extended Data Value:</b> No extended value.									
<b>General Information:</b> Octets 1–6 can be repeated up to 11 times to allow for up to 11 tariff changes during the call. Timestamps in octets 3–6 are in UNIX format (as CDB Timepoint tag 4001).									
<b>MGC Release:</b> Release 9.5(2) and later.									
Answered (1010)	Deselected (1020)	Aborted (1030)	Release (1040)	Interrupted (1050)	Ongoing (1060)	Maintenance (1070)	External DB (1080)	End of Call (1110)	
N	N	Y	Y	N	N	N	N	Y	

## PRI AOC—D-Charge Information (Tag: 4224)

**Table 12** PRI AOC–D Charge Information Description Form

<b>Name:</b> PRI AOC–D Charge Information		<b>Tag:</b> 4224			<b>Source:</b> MDL			
<b>Description/Purpose:</b> Contains charging tariff information that has been set up for AOC–D supplementary services. It comprises the following data items:								
<ul style="list-style-type: none"> <li>tariff id and timestamp (from octets 5–10) can be repeated (up to 11 occurrences). The repetition depends on the number of different tariffs applied for a given call. The maximum number of tariffs allowed per day is 11.</li> </ul>								
<b>Format:</b> BE			<b>Length in Octets:</b> 10, 16, 22, 28, 34, 40, 46, 52, 58, 64, or 70					
<b>Data Value:</b>								
Octets 1–4: Total Charge (integer value)								
Octets 5–6: integer value range 0–9999 (tariff id)								
Octets 7–10: Time in UNIX format (timestamp associated with tariff id in octets 5–6)								
<b>Extended Data Value:</b> No extended value.								
<b>General Information:</b> Octets 5–10 can be repeated up to 11 times to allow for up to 11 tariff changes during the call. Timestamps in octets 7–10 are in UNIX format (as CDB Timepoint tag 4001).								
<b>MGC Release:</b> Release 9.5(2) and later.								
Answered (1010)	Deselected (1020)	Aborted (1030)	Release (1040)	Interrupted (1050)	Ongoing (1060)	Maintenance (1070)	External DB (1080)	End of Call (1110)
N	N	Y	Y	N	N	N	N	Y

## PRI AOC—E-Charge Information (Tag: 4225)

**Table 13** PRI AOC–E Charge Information Description Form

<b>Name:</b> PRI AOC–E Charge Information		<b>Tag:</b> 4225			<b>Source:</b> MDL			
<b>Description/Purpose:</b> Contains Charging Tariff Information that has been setup for AOC–E supplementary services. It comprises the following data items:								
<ul style="list-style-type: none"> <li>tariff type sent</li> <li>tariff type received</li> <li>tariff id and timestamp (from octets 5–10) can be repeated (up to 11 occurrences). The repetition depends on the number of different tariffs applied for a given call. The maximum number of tariffs allowed per day is 11.</li> </ul>								
<b>Format:</b> BE			<b>Length in Octets:</b> 10, 16, 22, 28, 34, 40, 46, 52, 58, 64, or 70					
<b>Data Value:</b>								
Octets 1–4: Total Charge (integer value)								
Octets 5–6: integer value range 0–9999 (tariff id)								
Octets 7–10: Time in UNIX format (timestamp associated with tariff id in octets 5–6)								
<b>Extended Data Value:</b> No extended value.								
<b>General Information:</b> Octets 5–10 can be repeated up to 11 times to allow for up to 11 tariff changes during the call. Timestamps in octets 7–10 are in UNIX format (as CDB Timepoint tag 4001).								
<b>MGC Release:</b> Release 9.5(2) and later.								
Answered (1010)	Deselected (1020)	Aborted (1030)	Release (1040)	Interrupted (1050)	Ongoing (1060)	Maintenance (1070)	External DB (1080)	End of Call (1110)
N	N	Y	Y	N	N	N	N	Y

## PRI AOC Invoke Failure (Tag: 4226)

**Table 14** PRI AOC Invoke Failure Description Form

<b>Name:</b> PRI AOC Invoke Failure		<b>Tag:</b> 4226			<b>Source:</b> MDL			
<b>Description/Purpose:</b> PRI AOC invoke failure information is sent to the PRI user in case of failure to set up the charge; the same information is recorded in this tag for each AOC supplementary service.								
<b>Format:</b> BE			<b>Length in Octets:</b> 3					
<b>Data Value:</b>								
PRI AOC Invoke Failure Type information is 3 octets and is defined as follows:								
Octet 1: AOC-S failure type								
Octet 2: AOC-D failure type								
Octet 3: AOC-E failure type								
Each octet can have the following value:								
Invalid Call State: 1								
Not Subscribed: 2								
Charge Not Available: 3								
<b>ANSI/ITU Variations:</b> None.								

**Table 14** PRI AOC Invoke Failure Description Form (continued)

**Extended Data Value:** No extended value.

**General Information:**

**MGC Release:** Release 9.5 and later.

Answered (1010)	Deselected (1020)	Aborted (1030)	Release (1040)	Interrupted (1050)	Ongoing (1060)	Maintenance (1070)	External DB (1080)	End of Call (1110)
N	N	Y	Y	N	N	N	N	Y

For billing interface information for the rest of the Cisco MGC software, refer to the *Cisco Media Gateway Controller Software Release 9 Billing Interface Guide*.

## Components

The components described in the following sections are added for this feature.

### PRICHARGE

The PRI charge component is used to create entries in the PRI Charge table. The PRICHARGE component MML name is as follows:

- MML Name—PRICHARGE

The structure of this component is shown in [Table 15](#).

**Table 15** PRI Charge Component Structure

Parameter MML Name	Parameter Description	Parameter Values (Default)
CHORIG	Charge origin	Value range: 1–9999. Default: 0.
CHDEST	Charge destination	Value range: 1–9999. Default: 0.
DOW	Day of week	Value range: 1–10. Where: Monday = 1 through Sunday = 7; HOL1 = 8; HOL2 = 9; HOL3 = 10. Default: Default.
STARIFFDESC	AOC-S tariff description	Value range: 1–11 and 0000–2400. Default: N/A.
DTARIFFDESC	AOC-D tariff description	Value range: 1–11 and 0000–2400. Default: N/A.
ETARIFFDESC	AOC-E tariff description	Value range: 1–11 and 0000–2400. Default: N/A.

### PRITARIFF

The PRI Tariff component is used to create entries in the PRI Tariff table. The PRITARIFF component MML name is as follows:

- MML Name—PRITARIFF

The structure of this component is shown in [Table 16](#).

**Table 16 PRI Tariff Component Structure**

<b>Parameter MML Name</b>	<b>Parameter Description</b>	<b>Parameter Values (Default)</b>
TARIFFID	Tariff ID	Value range: 1–9999. Default: N/A.
SCHARGEDITEM	AOC-S charged item	Value range: 0–4. Where 0 = Basic Communication; 1 = Call Attempt; 2 = Call Setup; 3 = User-to-user information; and 4 = Operation of Supplemental Services. Default: 255.
SCA	Special Charging Arrangement	Value range: 1–10. Values are assigned by the user. Default: 255.
SRECCHRG	AOC-S Recorded Charge	Value range: 0–6. Where 1 = Duration rate; 2 = Flat Rate; 3 = Volume Rate; 4 = Free Of Charge; 5 = Info Not Available; and 6 = Special. Default: 255.
DRECCHRG	AOC-D Recorded Charge	Value range: 1–3. Where 1 = Charging Unit; 2 = Currency Unit; and 3 = Free of charge. Default: 255.
ERECCHRG	AOC-E Recorded Charge	Value range: 1–3. Where 1 = Charging Unit; 2 = Currency Unit; and 3 = Free of charge. Default: 255.
CURRENCY	Currency (monetary description used for billing)	Value range: 1–10 alphabetical characters. Default: “ ”(an empty string).
AMOUNT	Amount (of currency)	Value range: 0–16777215. Default:16777216.
AMTMULT	Amount Multiplier	Value range: 0–6. Where 0 = 0.001; 1 = 0.01; 2 = 0.1; 3 = 1; 4 = 10; 5 = 100; and 6 = 1000. Default: 255.
TIMELEN	Time Length	Value range: 0–16777215. Default: 16777216.
TIMESCALE	Time Scale	Value range: 0–6. Where 0 = 0.01 second; 1 = 0.1 second; 2 = 1 second; 3 = 10 seconds; 4 = 1 minute; 5 = 1 hour; and 6 = 24 hours. Default: 255.
GRANULARITY	Granularity Length	Value range: 0 through 16777215. Default: 16777216.
GRANULARITYSCALE	Granularity Time Scale	Value range: 0–6. Where 0 = 0.01 second; 1 = 0.1 second; 2 = 1 second; 3 = 10 seconds; 4 = 1 minute; 5 = 1 hour; and 6 = 24 hours. Default: 255.
VOL	Volume Unit	Value range: 0–2. Where 0 = Octet; 1 = Segment; and 2 = Message. Default: 255.
SCU	Special Charging Unit	Value range: 0–32767. Default: 32768.
BILLINGID	Billing identification of the billing type	Value range: 0–7. Where 0 = Normal; 1 = Reverse; 2 = Credit Card; 3 = Call Forwarding Unconditional; 4 = Call Forwarding Busy; 5 = Call Forwarding No Response; 6 = Call Deflection; 7 = Call Transfer. Default: 255.

**Table 16** PRI Tariff Component Structure (continued)

Parameter MML Name	Parameter Description	Parameter Values (Default)
CHARGING UNITS	The number of charging units for the defined time length	Value range: 1–1677725. Default: 1.
DURATION	Time period this tariff remains in effect (in milliseconds).	Value range: 0 through 1677725. A 0 indicates an ongoing tariff. (The tariff does not expire after a fixed duration.) Default: 0.
RATETYPE	Flat rate (0), or Duration-based rate (1)	Values: 0 or 1. Default: 1.
INITIALTARIFF	A list of up to 3 tariffs that are applied before this tariff	A string of up to 3 space separated tariff IDs Default: ""(an empty string).

## Properties

The trunk group properties added for the AOC Generation for PRI feature are listed in [Table 17](#) through [Table 19](#).

**Table 17** Trunk Group Property Descriptions

MML Parameter Name	Voice Services Provisioning Tool Parameter Name	Description
AOCInvokeType	Name	Allows configuration that indicates if the AOC supplementary services are applicable on a per call basis or for all calls. Values: 1 (on a per call basis, the default) or 2 (for all calls).
AOCDefaultTariff Id	Source service	Allows configuration of the default tariff ID to be applied when AOCInvokeType is configured for all calls (that is, AOCInvokeType = 2). Value range: 1 (default) through 9999.

**Table 18** Provisionable Properties

Property	Modified Value Takes Effect Without Restart
AOCInvokeType	Yes
AOCDefaultTariffId	Yes





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From this site, you can perform these tasks:

- Report security vulnerabilities in Cisco products.
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An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- Nonemergencies—[psirt@cisco.com](mailto:psirt@cisco.com)

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- 1 877 228-7302
- 1 408 525-6532



**Tip**

We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.x through 8.x.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

[http://www.cisco.com/en/US/products/products\\_security\\_vulnerability\\_policy.htm](http://www.cisco.com/en/US/products/products_security_vulnerability_policy.htm)

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### Note

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## Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

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For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

## Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

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Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

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## Glossary

Table 22 contains definitions of acronyms used in this feature module.

**Table 22 Acronyms and Definitions**

Acronym	Definition
AOC	Advice of Charge
AOC-D	Advice of Charge, charging information during the call
AOC-E	Advice of Charge, charging information at the end of the call
AOC-S	Advice of Charge, charging information at call setup time
DOW	Day of week
MGC	Cisco Media Gateway Controller
MML	Man-Machine Language
OOS	out of service
PBX	Private Branch Exchange
PGW	PSTN Gateway, also called the MGC
PRI	Primary Rate Interface
SC	Signaling Controller
SCA	Special Charging Arrangement
SCU	Special Charging Unit
VSC	Virtual Switch Controller



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