



Configuration Guide

Modifying SIP Headers on SIP Trunks in AOS Voice Products

This configuration guide describes the use and configuration of Session Initiation Protocol (SIP) headers for outbound SIP trunks on ADTRAN Operating System (AOS) voice products. SIP headers can be modified on SIP trunks using the command line interface (CLI). This guide provides an overview of adding and replacing SIP headers, a description of how SIP headers operate, and includes configuration descriptions and examples.

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Overview of SIP Headers in AOS

SIP headers, specifically the SIP Diversion and P-Asserted-Identity headers, can be used to avoid problems with redirecting numbers when an alternate identity header is needed by the softswitch to authenticate the origin of the call. Adding or replacing these headers on an outbound trunk is done in a manner similar to configuring enhanced automatic number identification (ANI) and dialed number identification service (DNIS) substitution.

SIP headers are added or replaced on the trunk by using templates and matching sources and targets to those templates. The basic premise of these templates, the matching of sources and targets, and the actions performed when matches occur is outlined in detail in the [Enhanced ANI/DNIS Substitution in AOS](#) (Knowledge Base article 2509).

Adding SIP headers does not function exactly like ANI substitution, but it works using the same principles and commands as outlined in the [Enhanced ANI/DNIS Substitution in AOS](#) configuration guide (Knowledge Base article 2509). When adding or replacing SIP headers, you must specify the match source, the match source template, the match target, the match target template, and the match action. Each of these parameters are defined on the trunk for each SIP header you want to add or replace. These parameters are detailed in [SIP Header Addition and Replacement Using the CLI](#) below.

Hardware and Software Requirements and Limitations

Adding SIP headers to a SIP trunk is available on AOS voice products running AOS firmware release A4.01 or later. Refer to the [Product Feature Matrix](#) (Knowledge Base article 2272) for more information.

Replacing SIP headers on a SIP trunk is available on AOS voice products running AOS firmware release A4.05 or later. Refer to the [Product Feature Matrix](#) (Knowledge Base article 2272) for more information. Only SIP Diversion headers are replaced with the **replace** parameter of the **match ani** command. You cannot replace P-Asserted-Identity headers.

SIP Header Addition and Replacement Using the CLI

SIP headers are added to SIP trunks using the **match ani <template> add [diversion <template> [<diversion reason> <screening type> <privacy setting>] | p-asserted-identity <template>]** command from the SIP trunk's configuration mode. This command contains the match source, the match source template, the match target, the match target template, and the match action. To add P-Asserted-Identity headers, you need only specify that the P-Asserted-Identity header is added, using the **p-asserted-identity** parameter. However, if you are adding a SIP Diversion header, you can use additional keywords to specify the reason for the diversion.

SIP headers are replaced on SIP trunks using the **match ani** *<template>* **replace diversion** *<template>* [*<diversion reason>* *<screening type>* *<privacy setting>*] command from the SIP trunk's configuration mode. SIP Diversion headers are replaced only if the SIP Diversion header is already present in the SIP message. This command, like the **add** command, also contains the match source, the match source template, the match target, the match target template, and the match action. When replacing a SIP Diversion header, you can also use additional keywords to specify the reason for the diversion. The difference in configuring the SIP headers is described in [Modifying SIP Headers Using the CLI on page 7](#).



The **match ani** command described in this guide is only part of the ANI/DNIS substitution functionality. The description in this guide is specific to using the **match** command for the addition and replacement of SIP headers. This command is also used for ANI/DNIS substitution and replacement. For more information on those features, refer to the [Enhanced ANI/DNIS Substitution in AOS](#) configuration guide (Knowledge Base article 2509).

Match Source

The match source is the parameter that is compared to the match source template to determine whether a match exists. If the match source and match source template comparison results in a match, the action specified by the command is executed. There are two available match sources: ANI and DNIS. ANI is the match source used to add or replace SIP headers on a SIP trunk. In the following example command, the match source is in **bold**:

```
match ani !2565558XXX add diversion 2565558000 unconditional yes full
```

Match Source Template

The match source template is the first template defined in the **match** command. Templates are defined in the same way as dial plan entries.

Wildcards available for use are as follows:

0-9 = Match exact digit only.

M = Any digit 1 to 8.

X = Any single digit (0 to 9).

N = Any digit 2 to 9.

\$ = Match 0 or more of any digit.

[123] = Any digit contained in the bracketed list.



Do not use exclamation points, commas, spaces, etc., inside the brackets. Commas are implied between numbers in the brackets.

The special characters (), -, and + are always ignored in the template. The following are example template entries using wildcards:

1. 555-81XX matches 555-8100 to 555-8199.
2. 555-812[012] matches 555-8120 to 555-8122.
3. NXX-XXXX matches 7 digits local.
4. 1-NXX-NXX-XXXX matches long distance calls in North America.

Additional wildcards (\$) can also be used. The CLI also contains helpful information regarding the construction of the template and can be viewed by entering the **match ani** command followed by a question mark. For example, entering the command as follows results in the template input specifications:

(config)#**match ani ?**

Examples and rules of use.

MATCH #	SUBST #	
1) NXX-XXXX	256-NXX-XXXX	(Format a call for 10 digit dialing)
2) 1-NXX-XXX-XXXX	NXX-XXX-XXXX	(Format LD call for 10 digit dialing)
3) 1-NXX-NXX-XXXX	10-10-220-NXX-NXX-XXXX	(Insert a LD call PIC code)
4) 411	256-555-1212	(Redirect 411 information calls)
5) \$	10\$	(Prepend a number)
6) XXXX\$	\$	(Strip leading digits)

SUBSTITUTE Number Rules -

- 1) All "," characters are ignored.
- 2) All "[" and "]" brackets must match, no nesting, no wildcards.
- 3) All "[" and "]" brackets may hold digits, commas [1239], [1,2,3,9].
- 4) All "[" and "]" brackets may contain a range [1-39], [1-3,9].
- 5) If using a "\$" wildcard, it must be at the end of the number.
- 6) "X" matches [0-9], "N" matches [2-9].
- 7) A preceding "!" will match the inverse of the template following the "!".
- 8) The "!" is only valid as the first character of a match source template.

In the following example command, the match source template is in **bold**:

match ani **!2565558XXX** add diversion 2565558000 unconditional yes full



In this example, the template includes a ! at the beginning. The ! indicates that the inverse of the template is matched. Inverse matching can only be used with the match source template and requires a static target template (the target template cannot contain wildcards).

Match Action

A match action is the action taken when the match source matches the match source template. The **add** keyword of the **match** command is the action taken for adding SIP headers to SIP trunks. The **replace** keyword of the **match** command is the action taken for replacing SIP Diversion headers on SIP trunks. In the following example command, the match action is in **bold**:

match ani **!2565558XXX** **add** diversion 2565558000 unconditional yes full

Match actions work based upon specific criteria. [Table 1](#) outlines the attributes for the supported match actions, indicating whether a target template is required, the source and target must match, the source and target must differ, a target can be created (where one did not previously exist), and whether a target can be altered.

Table 1. Match Action Attributes

Match Action	Requires Target Template	Source and Target Must Match	Source and Target Must Differ	Target Can Be Created	Target Can Be Altered
Add	Yes	No	Yes	Yes	No
Replace	Yes	No	Yes	No	Yes



Creating and altering the target simultaneously is not supported. You can either create a target, or alter a target, but not both.

Match Target

The match target is the target for the action indicated in the command. A match target could have one or more additional parameters that are necessary to successfully complete the specified action. The type and number of parameters vary according to the match target and include the match target template. If you are adding a SIP Diversion header, for example, in addition to specifying **diversion** as the match target, you can also specify the reason for the diversion by using the keywords **away**, **deflection**, **do-not-disturb**, **follow-me**, **no-answer**, **out-of-service**, **time-of-day**, **unavailable**, **unconditional**, **unknown**, or **user-busy**. See [Table 3 on page 7](#) for more information.

In the following example command, the match target is in **bold** and the match target parameters are in *italics*:

```
match ani !2565558XXX add diversion 2565558000 unconditional yes full
```

Match Target Template

The match target template is the second template defined in the **match** command and is defined the same way as the match source template, but it is used to specify the template used to execute the command action. In the following example command, the match target template is in **bold**:

```
match ani !2565558XXX add diversion 2565558000 unconditional yes full
```

Each matching source works with a specific group of match targets. [Table 2](#) outlines the match targets allowed for each matching source.

Table 2. Allowed Match Targets for Match Sources

Match Source	Allowed Match Target
ANI	ANI, Diversion, P-Asserted-Identity
DNIS	ANI, DNIS

Matching Rules

The entire process of matching sources in order to determine when to add or replace a specified header is completed by using specific logical rules. First, all matches are made to the original caller ID information. Second, when you are configuring the match templates, sources, targets, and actions, you must be mindful of the order in which you place the commands. The commands are arranged in the order in which they were entered, but they are grouped by the target type. The order of the groupings from first to last is: DNIS, ANI, Diversion, and P-Asserted-Identity. The one exception to this rule is the **match dnis replace ani** variant. These commands will always be processed before other ANI target commands, regardless of configuration order. For example, if you entered the match commands in this order:

1. **match ani 1000 sub 1234**

This command has an implicit target type of **ani**, a source template of **1000**, and is performing an ANI substitution action (**sub**) when the ANI information is matched.

2. **match ani 1000 add p-asserted-identity 4321**

This command has an explicit target type of **p-asserted-identity**, a source template of **1000**, and is adding the SIP P-Asserted-Identity header when the ANI information is matched.

3. **match dnis 2565551000 replace ani 1000**

This command has an explicit target type of **ani**, a DNIS source template of **2565551000**, and is replacing the ANI information with **1000** when the DNIS information is matched.

4. **match ani 1000 add diversion 7890**

This command has an explicit target type of **diversion**, a source template of **1000**, and is adding the SIP Diversion header when the ANI information is matched.

5. **match dnis 5558000 sub 5632**

This command has an implicit target type of **dnis**, a source template of **5558000**, and is performing a DNIS substitution action (**sub**) when the DNIS information is matched.

The commands are processed in this order:

1. **match dnis 5558000 sub 5632**

This command is first because the target is DNIS.

2. **match dnis 2565551000 replace ani 1000**

This command is second because it is the exceptional case. This command will be processed before other ANI target commands.

3. **match ani 1000 sub 1234**

This command is third because the target is ANI, and it was the first command entered with ANI as a target.

4. **match ani 1000 add diversion 7890**

This command is fourth because the target is SIP diversion.

5. **match ani 1000 add p-asserted-identity 4321**

This command is last because the target type is P-Asserted-Identity.

The first command that succeeds for a given target will discontinue all other match attempts for that target.

Modifying SIP Headers Using the CLI

Modifying SIP headers includes adding or replacing the SIP Diversion header, or adding a P-Asserted-Identity header to outgoing SIP trunk messages. Both the SIP Diversion header and the P-Asserted-Identity header can be added to the message, but only the SIP Diversion header can be replaced on a SIP trunk. The SIP Diversion header allows the SIP trunk to pass identification information to the SIP user agent in order to identify from whom the call is diverted and why the call is diverted. SIP user agents can use this information to decide how features and requests should be handled. The P-Asserted-Identity header carries the authenticated identity of a user sending a SIP message to other SIP agents within the trusted network. To add or replace a SIP Diversion header, or to add a P-Asserted-Identity header to outgoing SIP messages, follow the steps outlined in the sections below.

Adding or Replacing a SIP Diversion Header

To add a SIP Diversion header to outgoing SIP messages, enter the **match ani <template> add diversion <template> [<diversion reason> <screening type> <privacy setting>]** command from the SIP trunk's configuration mode. To replace a SIP Diversion header in outgoing SIP messages, enter the **match ani <template> replace diversion <template> [<diversion reason> <screening type> <privacy setting>]** command from the SIP trunk's configuration mode.

With these commands, you can optionally specify the reason for the diversion using the *<diversion reason>* parameter. If a diversion type is specified, you must specify whether the diversion is screened by the network, and whether diversion privacy is used. If no diversion type is specified, the default diversion values are used. [Table 3](#) below describes the available diversion types, [Table 4 on page 8](#) describes the screening types, and [Table 5 on page 8](#) describes the privacy settings.

Table 3. Optional Diversion Reason Parameters

Diversion Reason	Description
away	Specifies the message is diverted because the receiving SIP agent is away.
deflection	Specifies the message is diverted because the receiving SIP agent is deflecting calls.
do-not-disturb	Specifies the message is diverted because the receiving SIP agent has do-not-disturb enabled.

Table 3. Optional Diversion Reason Parameters (Continued)

Diversion Reason	Description
follow-me	Specifies the message is diverted because the receiving SIP agent has Find Me-Follow Me enabled.
no-answer	Specifies the message is diverted because the receiving SIP agent does not answer.
out-of-service	Specifies the message is diverted because the receiving SIP agent is out of service.
time-of-day	Specifies the message is diverted because the message is sent at a particular time of day.
unavailable	Specifies the message is diverted because the receiving SIP agent is unavailable.
unconditional	Specifies the message is diverted because of an unconditional forward.
unknown	Specifies the message is diverted for of an unknown reason.
user-busy	Specifies the message is diverted because the receiving SIP agent is busy.

Table 4. Available Screening Type Parameters

Screening Type	Description
no	Specifies that the diversion user is not screened by the network.
yes	Specifies that the diversion user is screened by the network.

Table 5. Available Privacy Setting Parameters

Privacy Setting	Description
full	Specifies that the diversion uses full privacy, which indicates that the integrated services digital network (ISDN) presentation status is set to prohibited .
off	Specifies that the diversion does not use privacy, which indicates that the ISDN presentation status is set to allowed .

By default, SIP diversions are specified as unconditional (**unconditional**), do not use network screening (**no**), and do not use privacy (**off**).



These commands can get very lengthy. To shorten the length of the command, you must elect to use all default values for the diversion options, or you must override all options.

To add a SIP Diversion header, enter the command from the SIP trunk's configuration mode as follows:

```
(config)#voice trunk t01  
(config-T01)#match ani !2565558XXX add diversion 2565558000 unconditional yes full  
(config-T01)#
```

In the previous example, the SIP trunk (**t01**) is configured so that when the ANI source template (**2565558XXX**) is matched, an unconditional SIP Diversion header with a target template of **2565558000**, network screening, and full privacy are added to the message.

To replace a SIP Diversion header, enter the command from the SIP trunk's configuration mode as follows:

```
(config)#voice trunk t01  
(config-T01)#match ani !2565558XXX replace diversion 2565558000 unconditional yes full  
(config-T01)#
```

In the previous example, the SIP trunk (**t01**) is configured so that when the ANI source template (**2565558XXX**) is matched, an unconditional SIP Diversion header with a target template of **2565558000**, network screening, full privacy replaces the original SIP Diversion header of the message.

Adding a P-Asserted-Identity Header

To add a P-Asserted-Identity header to an outgoing SIP message, enter the **match ani <template> add p-asserted-identity <template>** command from the SIP trunk's configuration mode. For example, to add a P-Asserted-Identity header with the target template of **2565558000** to a SIP message when the ANI source template of **2565558XXX** is matched, enter the command as follows:

```
(config)#voice trunk t01  
(config-T01)#match ani !2565558XXX add p-asserted-identity 2565558000  
(config-T01)#
```

SIP Header Configuration Examples

The following is a basic example of adding a SIP Diversion and P-Asserted-Identity header to an outgoing SIP trunk. In this example, three users (A, B, and C) are part of a network in which User B is connected to a private branch exchange (PBX) that does not support sending an ISDN redirecting number. Both Users A and C are connected to a softswitch, which communicates with User B using a SIP trunk to an AOS voice product and then an ISDN trunk to the PBX. This network is illustrated in [Figure 1](#).

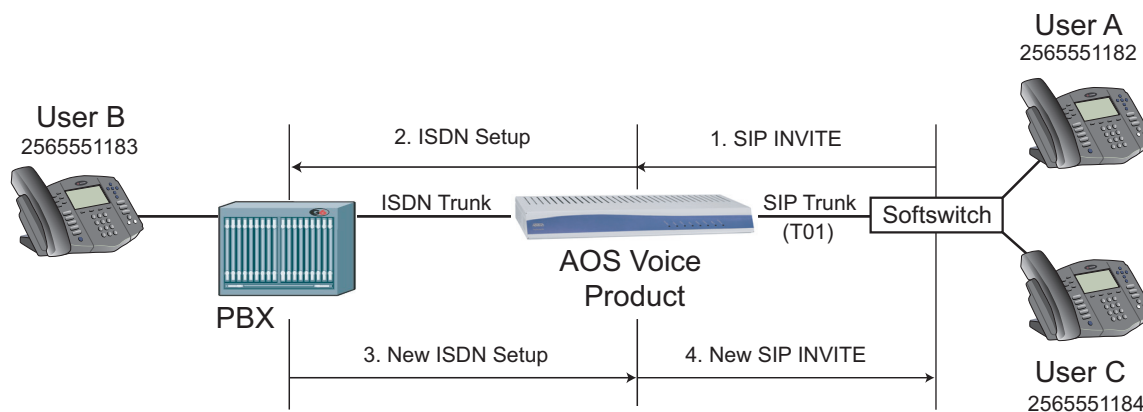


Figure 1. Small SIP Network Diagram

In this scenario, User A calls User B. The softswitch sends the AOS voice product a call with the SIP INVITE. The call is sent to the PBX for User B to answer the call. User B, however, has the phone forwarded to User C. Because the PBX does not support redirecting numbers, it sends a new SETUP message back to the AOS voice product. The AOS voice product sends the new call to the softswitch via a new SIP INVITE. The softswitch sees a call coming from the AOS voice product from User A, when it is aware that User A cannot be calling from the AOS voice product, so it would typically reject the call. If either a SIP Diversion or P-Asserted-Identity header were added to the call, the softswitch can accept the call because the presence of these headers tells the softswitch that User B is the reason for the call. The softswitch then accepts the call and User C receives a call from User A on the caller ID.

The following configuration shows the necessary configuration on the SIP trunk to add a SIP Diversion header to the call. In this configuration, the SIP trunk (**T01**) is configured to add the SIP header with a target template of **2565551183** (User B) when the source template (User A, **2565551182**) is matched. The SIP Diversion header is configured with the **deflection** parameter, and set to use network screening and full privacy.



Each of the parameters in this example are for illustration purposes only; specific parameters should be tailored to your purpose and usage. The following example does not contain all the necessary configurations for this network setup; it contains only the configuration pertinent to adding the necessary SIP headers. For more information about configuring SIP trunks, refer to the [NetVanta 7000 Series SIP Trunking](#) configuration guide (Knowledge Base article 2508).

!

voice trunk t01

match ani 2565551182 add diversion 2565551183 deflection yes full

!