



# SIP Transparency & Normalization

## Examples



# Why SIP Transparency & Normalization?

- SIP is a complex, evolving, flexible protocol
  - Differing interpretations and degrees of compliance
  - Backward compatibility not always supported
  - Proprietary extensions are often necessary
  - Many different ways to accomplish goals
- SIP interoperability problems are very common
- SIP Transparency and Normalization
  - Provides powerful capabilities for UCM/SME to address interoperability problems
  - Usable by system administrators and supporting engineers with programming expertise and SIP knowledge
  - No need to wait for software updates for UCM/SME or other SIP systems

# SIP Transparency and Normalization

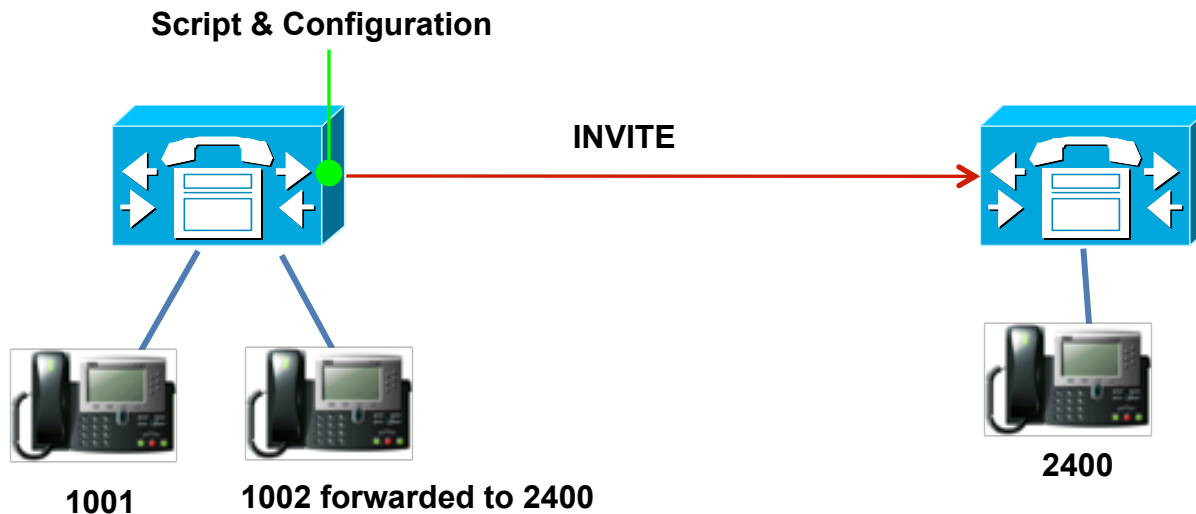
- Transparency
  - Ability to pass through known and unknown message components from one SIP trunk to another
  - For example, pass a proprietary header from incoming trunk to outgoing trunk
- Normalization
  - Transformations on inbound and outbound SIP messages and content bodies
    - get and modify request/response line
    - get, add, modify, and remove parameters
    - get, add, modify, and remove headers
    - get, add, and remove content bodies
    - specific APIs for manipulating SDP

# Diversion Mask – Problem Statement

Calling and called numbers can be transformed using a variety of configuration options as they traverse Cisco UCM. However, there is limited flexibility for redirecting numbers. With scripting, it is simple to apply a number mask to the redirecting number carried in the Diversion header. The final destination may screen calls based on the value of the redirecting number.

Scenario:

- 1002 call forwards all calls to 2400
- 1001 (calling number) calls 1002 (redirecting number or original called number)
- Call is forwarded across the trunk to 2400 (called number)



# Diversion Mask

## Configuration:

Note that in this example, there is configuration on the trunk to transform the calling number using the CallerId DN field. The script also requires configuration of a script specific parameter called Diversion-Mask.

- CallerId DN: 000180XXXX
- Script Parameters: Diversion-Mask=000180XXXX

## Script:

```
M = {}

local mask = scriptParameters.getValue("Diversion-Mask")

function M.outbound_INVITE(message)
    if mask
    then
        message:applyNumberMask("Diversion", mask)
    end
end

return M
```

# Diversion Mask – Script Configuration

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### SIP Normalization Script Configuration

Save Delete Reset Apply Config Add New Import File

**Status**  
Status: Ready

**SIP Normalization Script Info**

Name\*

Description

Content\* 

```
M = {}  
local mask = scriptParameters.getValue("Diversion-Mask")  
function M.outbound_INVITE(message)  
  if mask  
  then  
    message.applyNumberMask("Diversion", mask)  
  end  
end  
return M
```

Script Execution Error Recovery Action\*

System Resource Error Recovery Action\*


Memory Threshold\*  kilobytes

Lua Instruction Threshold\*  instructions

Save Delete Reset Apply Config Add New Import File





**i** \*- indicates required item.

# Diversion Mask – Trunk Configuration

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### Trunk Configuration

 Save  Delete  Reset  Add New

Connected Party Transformation CSS

Use Device Pool Connected Party Transformation CSS

---

#### Outbound Calls

Called Party Transformation CSS

Use Device Pool Called Party Transformation CSS

Calling Party Transformation CSS

Use Device Pool Calling Party Transformation CSS

Calling Party Selection\*

Calling Line ID Presentation\*

Calling Name Presentation\*

Caller ID DN

Caller Name

Redirecting Diversion Header Delivery - Outbound

---

#### Normalization Script

Name

Parameters

Enable Trace

# Diversion Mask – Results

Below, only the headers that are germane to this discussion are shown.

## Without Transparency and Normalization

```
INVITE sip:2400@172.18.195.96:5060 SIP/2.0
From: <sip:0001801001@172.18.195.38>;tag=8d70e7ad-1982-4dd2-872f-6944059d09c8-26221945
To: <sip:2400@172.18.195.96>
Contact: <sip:0001801001@172.18.195.38:5060;transport=tcp>
Diversion: <sip:1002@172.18.195.38>;reason=unconditional;privacy=off;screen=yes
P-Asserted-Identity: <sip:0001801001@172.18.195.38>
Remote-Party-ID: <sip:0001801001@172.18.195.38>;party=calling;screen=yes;privacy=off
```

---

## With Transparency and Normalization

```
INVITE sip:2400@172.18.195.96:5060 SIP/2.0
From: <sip:0001801001@172.18.195.38>;tag=8d70e7ad-1982-4dd2-872f-6944059d09c8-26221945
To: <sip:2400@172.18.195.96>
Contact: <sip:100018001@172.18.195.38:5060;transport=tcp>
Diversion: <sip:0001801002@172.18.195.38>;reason=unconditional;privacy=off;screen=yes
P-Asserted-Identity: <sip:0001801001@172.18.195.38>
Remote-Party-ID: <sip:0001801001@172.18.195.38>;party=calling;screen=yes;privacy=off
```



# 181 Transparency – Problem Statement

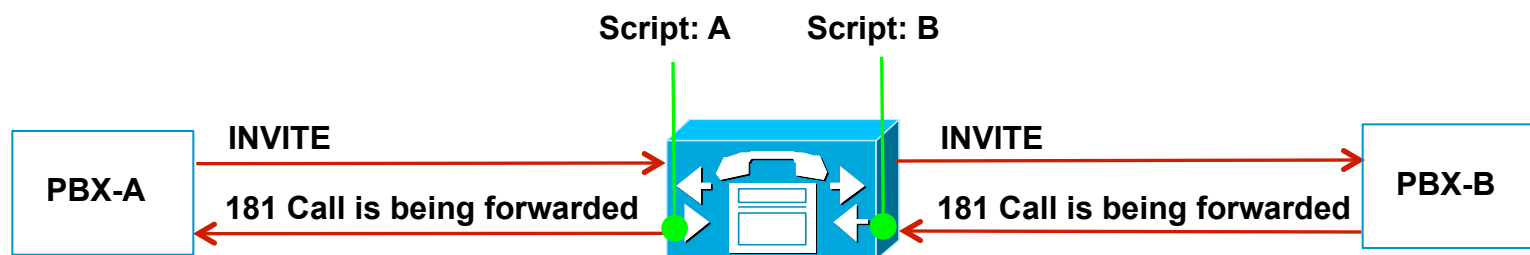
Some vendor's equipment can make use of 181 when the call is forwarded. Other equipment may not support 181. CUCM's default behavior is to convert 181 to 180. However, with this feature it is possible to transparently pass through the 181.

Note that in this example, A and B are named relative to the call direction. A is calling B. The B side responds with a 181. The B side script passes through enough information for the A side script to convert the would be 180 into a 181 with the appropriate Reason header.

Without Transparency and Normalization



With Transparency and Normalization



# 181 Transparency Script (B-Side)

Since the B side script runs first for a 181 response, let's consider it first. The B-side script provides an `inbound_181_INVITE` message handler. This is automatically invoked for the incoming 181. The handler, obtains the pass through object and the Reason header from the message. Then it adds an X-Reason header to the pass through object. CUCM will automatically merge the X-Reason header into the outbound message on the other side.


```
B = {}

function B.inbound_181_INVITE(msg)
    local pt = msg:getPassThrough()
    local reason = msg:getHeader("Reason")

    if pt and reason
    then
        pt:addHeader("X-Reason", reason)
    end
end







return B
```

# 181 Transparency – Script Configuration


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## SIP Normalization Script Configuration

 Save  Delete  Reset  Apply Config  Add New  Import File

**Status**

 Status: Ready

**SIP Normalization Script Info**

Name\*

Description

Content\* 


```
B = {}  
  
function B.inbound_181_INVITE(msg)  
  local pt = msg:getPassThrough()  
  local reason = msg:getHeader("Reason")  
  
  if pt and reason  
  then  
    pt:addHeader("X-Reason", reason)  
  end  
end  
  
return B
```

Script Execution Error Recovery Action\*  ▾


System Resource Error Recovery Action\*  ▾

Memory Threshold\*  kilobytes

Lua Instruction Threshold\*  instructions





 \*- indicates required item.

# 181 Transparency – Trunk Configuration

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## Trunk Configuration

 Save  Delete  Reset  Add New

Caller Name



Redirecting Diversion Header Delivery - Outbound

---

### SIP Information

#### Destination

Destination Address is an SRV

	Destination Address	Destination Address IPv6	Destination Port	
1*	<input type="text" value="172.18.195.96"/>	<input type="text"/>	<input type="text" value="5060"/>	 

MTP Preferred Originating Codec\*

Presence Group\*

SIP Trunk Security Profile\*

Rerouting Calling Search Space

Out-Of-Dialog Refer Calling Search Space

SUBSCRIBE Calling Search Space

SIP Profile\*

DTMF Signaling Method\*

#### Normalization Script

Name

Parameters

Enable Trace

# 181 Transparency Script (A-Side)

The A-side script provides an `outbound_180_INVITE` message handler. This is automatically invoked for the outgoing 180. The handler, obtains the X-Reason header from the message (it would have been auto merged if the message on the B-side triggered the 181 message handler). The A-side script then checks for the `cause=181` in the X-Reason header value. If that is present, it simply overwrites the response code and phrase with 181 Call is being forwarded, adds a Reason header, and removes the X-Reason that was passed across.

```
A = {}


function A.outbound_180_INVITE(msg)
    local reason = msg:getHeader("X-Reason")

    if reason
    then
        if string.find(reason, "cause=181")
        then
            msg:setResponseCode(181,"Call is being forwarded")
            msg:addHeader("Reason", reason)
        end

        msg:removeHeader("X-Reason")
    end
end







return A
```

# 181 Transparency – Script Configuration


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### SIP Normalization Script Configuration

 Save  Delete  Reset  Apply Config  Add New  Import File

**Status**

 Status: Ready

**SIP Normalization Script Info**

Name\*

Description

Content\* 


```
A = {}  
  
function A.outbound_180_INVITE(msg)  
  local reason = msg.getHeader("X-Reason")  
  
  if reason  
  then  
    if string.find(reason, "cause=181")  
    then  
      msg.setResponseCode(181, "Call is being forwarded")  
      msg.addHeader("Reason", reason)  
    end  
  
    msg.removeHeader("X-Reason")  
  end  
end
```

Script Execution Error Recovery Action\*


System Resource Error Recovery Action\*

Memory Threshold\*  kilobytes

Lua Instruction Threshold\*  instructions





 \*- indicates required item.

# 181 Transparency – Trunk Configuration

 **Cisco Unified CM Administration**  
For Cisco Unified Communications Solutions

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## Trunk Configuration

 Save  Delete  Reset  Add New

Caller Name

Redirecting Diversion Header Delivery - Outbound

---

### SIP Information

#### Destination

Destination Address is an SRV

	Destination Address	Destination Address IPv6	Destination Port	
1*	<input type="text" value="172.18.200.100"/>	<input type="text"/>	<input type="text" value="5066"/>	<input type="button" value="+"/> <input type="button" value="-"/>

MTP Preferred Originating Codec\*

Presence Group\*

SIP Trunk Security Profile\*

Rerouting Calling Search Space

Out-Of-Dialog Refer Calling Search Space

SUBSCRIBE Calling Search Space

SIP Profile\*

DTMF Signaling Method\*

---

#### Normalization Script

Name

Parameters

Enable Trace

# 181 Transparency – Results

Below, only the headers that are germane to this discussion are shown.

## Without Transparency and Normalization

```
SIP/2.0 180 Ringing
From: <sip:5555@172.18.200.100>;tag=siptclTrunk-1476969522
To: <sip:702401@172.18.195.38:5060>;tag=071d6b43-a5a4-4a9a-9d50-09bab443ffc2-29790174
Date: Mon, 17 May 2010 20:17:19 GMT
Call-ID: siptclTr-unk-5555--1476969526
Contact: <sip:702401@172.18.195.38:5060;transport=tcp>
P-Preferred-Identity: <sip:2401@172.18.195.38>
Remote-Party-ID: <sip:2401@172.18.195.38>;party=called;screen=no;privacy=off
```

---

## With Transparency and Normalization

```
SIP/2.0 181 Call is being forwarded
From: <sip:5555@172.18.200.100>;tag=siptclTrunk-1476969522
To: <sip:702401@172.18.195.38:5060>;tag=071d6b43-a5a4-4a9a-9d50-09bab443ffc2-29790174
Date: Mon, 17 May 2010 20:17:19 GMT
Call-ID: siptclTr-unk-5555--1476969526
Contact: <sip:702401@172.18.195.38:5060;transport=tcp>
P-Preferred-Identity: <sip:2401@172.18.195.38>
Remote-Party-ID: <sip:2401@172.18.195.38>;party=called;screen=no;privacy=off
Reason: SIP; cause=181; text="Call Forward Unconditional"
```





## Angel Fire

# SME-SIP Session Trace Overview and Demo



# Why SIP Session Trace?

- Session Management Edition delivers simplification including troubleshooting tools
  - Captures and archives call related SIP message activities to help troubleshoot and to understand the message flow.
- Trace SIP Messages between SME, SIP Trunks, UC Clients and TDM phones on 3<sup>rd</sup> party PBXs
- Search calls and draw SIP Ladder Diagram
  - Show both pre-translated and post-translated SIP messages
  - View raw SIP messages
  - Save Ladder Diagram and details

# Architecture Overview

