CUSP 컨피그레이션 예

목차

소개 <u>사전 요구 사항</u> <u>요구 사항</u> <u>사용되는 구성 요소</u> <u>구성</u> 시나리오 1 시나리오 2 시나리오 3 시나리오 4 <u>4가지 시나리오 모두 구성</u> 다음을 확인합니다. <u>문제 해결</u> <u>관련 정보</u>

소개

이 문서에서는 4가지 서로 다른 통화 라우팅 시나리오와 일치하는 디버그가 포함된 Cisco Unified SIP Proxy(CUSP)의 샘플 CLI 및 GUI 컨피그레이션에 대해 설명합니다.

사전 요구 사항

요구 사항

Cisco에서는 이러한 주제에 대한 기본적인 지식을 얻을 것을 권장합니다.

- SIP(Session Initiation Protocol)
- Cisco Unified SIP Proxy(CUSP)

사용되는 구성 요소

이 문서의 정보는 CUSP를 기반으로 합니다.

이 문서의 정보는 특정 랩 환경의 디바이스를 토대로 작성되었습니다.이 문서에 사용된 모든 디바 이스는 초기화된(기본) 컨피그레이션으로 시작되었습니다.현재 네트워크가 작동 중인 경우, 모든 명령어의 잠재적인 영향을 미리 숙지하시기 바랍니다.

구성

이 섹션에서는 네 가지 통화 라우팅 시나리오의 컨피그레이션에 대해 설명합니다.

참고:이 <u>섹션</u>에 사용된 명령에 대한 자세한 내용을 보려면<u>Command Lookup Tool(등록된</u> 고 객만 해당)을 사용합니다.

시나리오 1

통화 흐름: IP Phone 1 --- CME --- SIP --- CUSP --- SIP --- CUCM --- IP Phone 2

CUSP를 통해 Cisco CUCM(Unified Communications Manager)에 등록된 IP Phone 2에 연결하려 면 CME(CallManager Express)에 등록된 IP Phone 1에서 408 2 202 2 2102로 전화를 겁니다.

CME는 이 시나리오에서 PSTN(Public Switched Telephone Network)의 역할을 합니다.

1. CME에서 SIP INVITE가 CUSP로 전송됩니다.

```
[DsTransportListener-2] DEBUG 2013.02.27 19:15:59:245 DsSipLlApi.Wire -
Received UDP packet on 14.128.100.169:5060 ,source 14.128.100.150:57878
INVITE sip:4082022102@14.128.100.169:5060 SIP/2.0
Via: SIP/2.0/UDP 14.128.100.150:5060;branch=z9hG4bK21F2555
Remote-Party-ID: "4082025555" <sip:4082025555@14.128.100.150>;
party=calling;screen=yes;privacy=off
From: "4082025555" <sip:4082025555014.128.100.150>;tag=81D7430C-1D2
To: <sip:4082022102@14.128.100.169>
Date: Wed, 27 Feb 2013 19:15:59 GMT
Call-ID: F3E5F396-804811E2-9818EC62-1B7185EE@14.128.100.150
Supported: 100rel, timer, resource-priority, replaces, sdp-anat
Min-SE: 1800
Cisco-Guid: 4091813662-2152206818-2551376994-0460424686
User-Agent: Cisco-SIPGateway/IOS-12.x
Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER,
SUBSCRIBE, NOTIFY, INFO, REGISTER
CSeq: 101 INVITE
Timestamp: 1361992559
Contact: <sip:4082025555@14.128.100.150:5060>
Expires: 180
Allow-Events: telephone-event
Max-Forwards: 69
Content-Type: application/sdp
Content-Disposition: session; handling=required
Content-Length: 410
v=0
o=CiscoSystemsSIP-GW-UserAgent 1007 629 IN IP4 14.128.100.150
s=SIP Call
c=IN IP4 14.128.100.150
t=0 0
m=audio 16930 RTP/AVP 18 101
c=IN IP4 14.128.100.150
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-16
m=video 17954 RTP/AVP 97
```

c=IN IP4 14.128.100.150 b=TIAS:1000000 a=rtpmap:97 H264/90000 a=fmtp:97 profile-level-id=42801E;packetization-mode=0

--- end of packet ---

2. 일치하는 네트워크(Net-PSTN) 구성에 통화가 수락됩니다.

CLI

```
sip listen Net-PSTN udp 14.128.100.169 5060
!
sip network Net-PSTN standard
no non-invite-provisional
allow-connections
retransmit-count invite-client-transaction 3
retransmit-count invite-server-transaction 5
retransmit-count non-invite-client-transaction 3
retransmit-timer T1 500
retransmit-timer T2 4000
retransmit-timer T4 5000
retransmit-timer TU1 5000
retransmit-timer TU2 32000
retransmit-timer clientTn 64000
retransmit-timer serverTn 64000
tcp connection-setup-timeout 1000
udp max-datagram-size 1500
end network
!
```

GUI



디버그

[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition - inNetwork='Net-PSTN' [REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition - IN_NETWORK: Net-PSTN

3. 정규화 전 시퀀스가 실행됩니다.

CLI

trigger pre-normalization sequence 1 policy CUCM-Prefix-408 condition TC-from-CUCM $\ensuremath{\mathsf{TC}}$

GUI



디버그

[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 util.Normalization -Entering Normalization(moduleRequest:pre-normalize) [REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition inNetwork='Net-PSTN' [REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition -IN_NETWORK: Net-PSTN [REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.AbstractRegexCondition pattern(^\QNet-CUCM\E\$), toMatch(Net-PSTN) returning false [REQUESTI.12] INFO 2013.02.27 19:15:59:250 util.Normalization skipping pre-normalize, due to either no trigger is configured or triggers did not evaluate to true or is configured to by-pass

4. 트리거 조건(TC-from-PSTN)이 일치합니다.

CLI

```
!
trigger condition TC-from-PSTN
sequence 1
in-network ^\QNet-PSTN\E$
end sequence
end trigger condition
!
```

GUI



디버그

[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition inNetwork='Net-PSTN' [REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition -IN_NETWORK: Net-PSTN [REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.AbstractRegexCondition pattern(^\QNet-PSTN\E\$), toMatch(Net-PSTN) returning true

5. Routing Trigger 컨피그레이션은 Trigger Condition(TC-from-PSTN)에 따라 일치하는 Route Policy(Policy-to-CUCM)를 찾기 위해 선택됩니다.

trigger routing sequence 1 policy Policy-to-CUCM condition TC-from-PSTN



[REQUESTI.12] DEBUG 2013.02.27 19:15:59:251 triggers.ModuleTrigger -ModuleTrigger.eval() action<Policy-to-CUCM> actionParameter<> [REQUESTI.12] DEBUG 2013.02.27 19:15:59:251 triggers.ModuleTrigger -ModuleTrigger.eval() got the policy, executing it ...

 일치하는 Route Table(RT-CUCM)을 찾기 위해 Route Policy(Policy-to-CUCM) 컨피그레이션 이 선택됩니다.

CLI

```
!
policy lookup Policy-to-CUCM
sequence 100 RT-CUCM request-uri uri-component user
modify-key 4082022102 1111
rule exact
end sequence
end policy
!
```

GUI





```
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:251 nrs.XCLPrefix -
Entering getKeyValue()
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:251 nrs.FieldSelector -
getUriPart: URI - sip:4082022102@14.128.100.169:5060 part 6
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:251 nrs.FieldSelector -
Requested field 45
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:251 nrs.FieldSelector -
Returning key 4082022102
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:251 nrs.FieldSelector -
Retrieved Modifier RegexModifier: match= 4082022102, replace=
1111, ignore case= false
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:251 nrs.FieldSelector -
Input field: 4082022102
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:251 nrs.FieldSelector -
Modified field: 1111
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 nrs.XCLPrefix -
Leaving getKeyValue()
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 modules.XCLLookup -
table=RT-CUCM, key=1111
[REQUESTI.12] INFO 2013.02.27 19:15:59:252 modules.XCLLookup -
table is RT-CUCM
```

7. 대상(SG-CUCM.ajeet.com)을 찾기 위해 Route Table(RT-CUCM) 컨피그레이션이 선택됩니다

CLI

```
!
route table RT-CUCM
key 1111 target-destination SG-CUCM.ajeet.com Net-CUCM
end route table
!
```

GUI



디버그

[REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 routingtables.RoutingTable -Entering lookup() [REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 routingtables.RoutingTable -Looking up 1111 in table RT-CUCM with rule exact and modifiers=none [REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 routingtables.RoutingTable -Entering applyModifiers() [REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 routingtables.RoutingTable -Leaving applyModifiers(), returning 1111 [REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 routingtables.RoutingTable -Leaving lookup() [REQUESTI.12] INFO 2013.02.27 19:15:59:252 nrs.XCLPrefix -NRS Routing decision is: RouteTable:RT-CUCM, RouteKey:1111, TargetDestination:SG-CUCM.ajeet.com, Network:Net-CUCM [REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 loadbalancer.LBFactory -Entering createLoadBalancer() [REQUESTI.12] INFO 2013.02.27 19:15:59:252 loadbalancer.LBFactory lbtype is 3(call-id) [REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 loadbalancer.LBFactory -Leaving createLoadBalancer() [REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 nrs.XCLPrefix -Stored NRSAlgResult=isFound=true, isFailure=false, Response=-1, Routes=[Ruri: SG-CUCM.ajeet.com, Route: null, Network: Net-CUCM, q-value=1.0radvance=[502, 503]], PolicyAdvance=null [REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 nrs.NRSAlgResult set policyAdvance as specified in route=RouteTable:RT-CUCM, RouteKey:1111, TargetDestination:SG-CUCM.ajeet.com, Network:Net-CUCM [REQUESTI.12] DEBUG 2013.02.27 19:15:59:252 nrs.NRSAlgResult no policyAdvance specified in route [REQUESTI.12] DEBUG 2013.02.27 19:15:59:253 nrs.NRSAlgResult set policyAdvance as specified in algorithm={lookupkeymodifier= [RegexModifier: match= 4082022102, replace= 1111, ignore case= false], lookuprule=0, lookupfield=45, lookuplenght=-1, lookuptable=RT-CUCM, sequence=100, algorithm=1} [REQUESTI.12] DEBUG 2013.02.27 19:15:59:253 nrs.NRSAlgResult no policyAdvance specified in algorithm

8. 표준화 후 시퀀스가 실행됩니다.

참고:이 시나리오에서는 사후 정규화를 사용하지 않으므로 디버그에서 사후 표준화를 건너뜁 니다.

CLI

trigger post-normalization sequence 1 policy UC520-Four-to-Full condition TC-UC520-to-PSTN

GUI



디버그

[REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 util.Normalization -Entering Normalization(moduleRequest:post-normalize) [REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 conditions.RegexCondition inNetwork='Net-PSTN' [REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 conditions.RegexCondition -IN_NETWORK: Net-PSTN [REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 conditions.AbstractRegexCondition pattern(^\QNet-From-UC520\E\$), toMatch(Net-PSTN) returning false [REQUESTI.12] INFO 2013.02.27 19:15:59:254 util.Normalization skipping post-normalize, due to either no trigger is configured or triggers did not evaluate to true or is configured to by-pass

요소 IP 주소를 찾기 위해 서버 그룹 컨피그레이션이 선택되고 Q-값 및 가중치 컨피그레이션
 을 기반으로 가능한 최상의 경로로 통화가 라우팅됩니다.

CLI

```
!
server-group sip group SG-CUCM.ajeet.com Net-CUCM
element ip-address 14.128.64.191 5060 udp q-value 1 weight 50
element ip-address 14.128.64.192 5060 udp q-value 1.0 weight 100
failover-resp-codes 503
lbtype global
ping
end server-group
!
```

GUI



디버그

[REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 loadbalancer.LBFactory -Entering createLoadBalancer() [REQUESTI.12] INFO 2013.02.27 19:15:59:254 loadbalancer.LBFactory lbtype is 0(global) [REQUESTI.12] INFO 2013.02.27 19:15:59:254 loadbalancer.LBFactory -Default lbtype is 3(call-id) [REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 loadbalancer.LBFactory -Leaving createLoadBalancer() [REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 loadbalancer.LBBase -Entering getServer() [REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 loadbalancer.LBBase -Entering initializeDomains() [REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 servergroups. ServerGlobalStateWrapper - Net-CUCM:14.128.64.191:5060:1 numTries=2--->isServerAvailable(): true [REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 servergroups. ServerGlobalStateWrapper - Net-CUCM:14.128.64.192:5060:1 numTries=2--->isServerAvailable(): true

```
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:255 servergroups.AbstractNextHop -
Entering compareDomainNames()
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:255 servergroups.AbstractNextHop -
Leaving compareDomainNames()
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:255 loadbalancer.LBBase -
Leaving initializeDomains()
[REQUESTI.12] INFO 2013.02.27 19:15:59:255 loadbalancer.LBHashBased -
list of elements in order on which load balancing is done :
{reSgElementWeight=50, reSgElementSgName=SG-CUCM.ajeet.com,
reSgElementTransport=UDP, reSgElementQValue=1.0, reSgElementPort=5060,
reSgElementHost=14.128.64.191}, {reSgElementWeight=100, reSgElementSgName=
SG-CUCM.ajeet.com, reSgElementTransport=UDP, reSgElementQValue=1.0,
reSgElementPort=5060, reSgElementHost=14.128.64.192},
[REQUESTI.12] INFO 2013.02.27 19:15:59:255 loadbalancer.LBHashBased -
Hashing on F3E5F396-804811E2-9818EC62-1B7185EE@14.128.100.150
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:255 loadbalancer.DsHashAlgorithm -
Entering selectIndex()
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:255 loadbalancer.DsHashAlgorithm -
Leaving selectIndex()
[REQUESTI.12] INFO 2013.02.27 19:15:59:255 loadbalancer.LBHashBased -
Index selected 0
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:255 servergroups.AbstractNextHop -
Entering compareDomainNames()
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:255 servergroups.AbstractNextHop -
Leaving compareDomainNames()
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:255 loadbalancer.LBBase -
Server group SG-CUCM.ajeet.com selected {reSgElementWeight=50,
reSgElementSgName=SG-CUCM.ajeet.com, reSgElementTransport=UDP,
reSgElementQValue=1.0, reSgElementPort=5060, reSgElementHost=14.128.64.191}
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:255 loadbalancer.LBBase -
Leaving getServer()
```

10. SIP INVITE가 선택한 요소로 전송됩니다.

```
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:256 DsSipLlApi.Wire -
Sending UDP packet on 14.128.100.169:32771, destination 14.128.64.191:5060
INVITE sip:4082022102@SG-CUCM.ajeet.com SIP/2.0
Via: SIP/2.0/UDP 14.128.100.169:5061;branch=z9hG4bK.ToYJFeKMyfZGySv.gcLjg~~231
Via: SIP/2.0/UDP 14.128.100.150:5060;branch=z9hG4bK21F2555
Max-Forwards: 68
To: <sip:4082022102@14.128.100.169>
From: "4082025555" <sip:4082025555@14.128.100.150>;tag=81D7430C-1D2
Contact: <sip:4082025555@14.128.100.150:5060>
Expires: 180
Remote-Party-ID: "4082025555" <sip:4082025555@14.128.100.150
>;party=calling;screen=yes;privacy=off
Call-ID: F3E5F396-804811E2-9818EC62-1B7185EE@14.128.100.150
CSeq: 101 INVITE
Content-Length: 410
Date: Wed, 27 Feb 2013 19:15:59 GMT
Supported: 100rel, timer, resource-priority, replaces, sdp-anat
Min-SE: 1800
Cisco-Guid: 4091813662-2152206818-2551376994-0460424686
User-Agent: Cisco-SIPGateway/IOS-12.x
Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER,
SUBSCRIBE, NOTIFY, INFO, REGISTER
Timestamp: 1361992559
Allow-Events: telephone-event
Content-Type: application/sdp
Content-Disposition: session; handling=required
v=0
```

o=CiscoSystemsSIP-GW-UserAgent 1007 629 IN IP4 14.128.100.150

s=SIP Call

```
c=IN IP4 14.128.100.150
t=0 0
m=audio 16930 RTP/AVP 18 101
c=IN IP4 14.128.100.150
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-16
m=video 17954 RTP/AVP 97
c=IN IP4 14.128.100.150
b=TIAS:1000000
a=rtpmap:97 H264/90000
a=fmtp:97 profile-level-id=42801E;packetization-mode=0
```

참고:CUCM과 같은 일부 디바이스는 요청을 처리하기 전에 요청의 URI(Uniform Resource Identifier)를 검증합니다. 즉, 이 작업을 허용하려면 최종 디바이스가 FQDN(Fully Qualified Domain Name)으로 구성해야 합니다.

CUCM의 경우 CUCM > System > Enterprise Parameter > Clusterwide Domain Configuration > Cluster Fully Qualified Domain Name은 서버 그룹 이름과 같아야 합니다.

Clusterwide Domain Configuration				
Organization Top Level Domain				
Cluster Fully Qualified Domain Name	SG-CUCM.ajeet.com			

시나리오 2

통화 흐름:IP Phone 1 --- CUCM --- SIP --- CUSP --- SIP --- CME --- IP Phone 2

IP Phone 1에 연결하려면 IP Phone 2에서 Dial 202 2222를 먼저 사용해야 합니다. 408은 사전 정규 화 접두사로 사용해야 합니다.

CME는 이 시나리오에서 PSTN으로 작동합니다.

1. CUCM에서 SIP INVITE가 CUSP에 옵니다.

```
[DsTransportListener-0] DEBUG 2013.02.28 00:34:03:370 DsSipLlApi.Wire -
Received UDP packet on 14.128.100.169:5061 , source 14.128.64.192:5060
INVITE sip:2022222@14.128.100.169:5061 SIP/2.0
Via: SIP/2.0/UDP 14.128.64.192:5060;branch=z9hG4bK18012ae333f
From: "SJ Phone 1" <sip:2001@14.128.64.192>;
tag=534264~c1b77ee1-4af9-4a41-aed3-3846cd699427-49616146
To: <sip:2022222@14.128.100.169>
Date: Thu, 28 Feb 2013 00:34:03 GMT
Call-ID: 8be55500-12e1a5fb-ab-c040800e@14.128.64.192
Supported: timer, resource-priority, replaces
Min-SE: 1800
User-Agent: Cisco-CUCM8.6
Allow: INVITE, OPTIONS, INFO, BYE, CANCEL, ACK, PRACK, UPDATE,
REFER, SUBSCRIBE, NOTIFY
CSeq: 101 INVITE
Expires: 180
Allow-Events: presence, kpml
Supported: X-cisco-srtp-fallback, X-cisco-original-called
Call-Info: <sip:14.128.64.192:5060>
;method="NOTIFY;Event=telephone-event;Duration=500"
Cisco-Guid: 2347062528-0000065536-000000107-3225452558
```

```
Session-Expires: 1800
P-Asserted-Identity: "SJ Phone 1" <sip:2001@14.128.64.192>
Remote-Party-ID: "SJ Phone 1" <sip:2001@14.128.64.192>
;party=calling;screen=yes;privacy=off
Contact: <sip:2001@14.128.64.192:5060>
Max-Forwards: 70
Content-Length: 0
```

--- end of packet ---

2. 일치하는 네트워크(Net-CUCM) 컨피그레이션에서 통화가 수락됩니다.

CLI

ip network Net-CUCM standard
o non-invite-provisional
llow-connections
etransmit-count invite-client-transaction 3
etransmit-count invite-server-transaction 5
etransmit-count non-invite-client-transaction 3
etransmit-timer T1 500
etransmit-timer T2 4000
etransmit-timer T4 5000
etransmit-timer TU1 5000
etransmit-timer TU2 32000
etransmit-timer clientTn 64000
etransmit-timer serverTn 64000
cp connection-setup-timeout 1000
dp max-datagram-size 1500
nd network

sip listen Net-CUCM udp 14.128.100.169 5061

GUI



디버그

[REQUESTI.12] DEBUG 2013.02.28 00:34:03:373 conditions.RegexCondition inNetwork='Net-CUCM' [REQUESTI.12] DEBUG 2013.02.28 00:34:03:373 conditions.RegexCondition -IN_NETWORK: Net-CUCM

3. 정규화 전 시퀀스가 실행됩니다.

CLI

trigger pre-normalization sequence 1 policy CUCM-Prefix-408 condition TC-from-CUCM

! policy normalization CUCM-Prefix-408 uri-component update request-uri user 2022222 4082022222

GUI



디버그

[REQUESTI.12] DEBUG 2013.02.28 00:34:03:373 util.Normalization -Entering Normalization(moduleRequest:pre-normalize)[REQUESTI.12] DEBUG 2013.02.28 00:34:03:373 conditions.RegexCondition inNetwork='Net-CUCM' [REQUESTI.12] DEBUG 2013.02.28 00:34:03:373 conditions.RegexCondition -IN_NETWORK: Net-CUCM [REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.AbstractRegexCondition pattern(^\QNet-CUCM\E\$), toMatch(Net-CUCM) returning true [REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 triggers.ModuleTrigger -ModuleTrigger.eval() action<CUCM-Prefix-408> actionParameter<> [REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 triggers.ModuleTrigger -ModuleTrigger.eval() got the policy, executing it ... [REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 normalization. URIComponentNormalizationAlgorithm - normalizing request-uri [REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 normalization. URIComponentNormalizationAlgorithm updating user/phone of the sip:2022222@14.128.100.169:5061 to 4082022222 [REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 util.Normalization -Leaving Normalization.normalize()

4. 트리거 조건(TC-from-CUCM)이 일치합니다.

```
CLI
```

```
sequence 1
in-network ^\QNet-CUCM\E$
end sequence
end trigger condition
!
```

GUI

cisco Cisco Unified	SIP Proxy	Dashboard ejeet Log Out
Configure SIP Stack	Trigger 'TC-from-CUCM' Rules	
- General Settings		
TLS Trusted Peers	Trigger Rules	
Networks	Lagic Condition	
Server Groups	1 Inband Heterkin each Net-SLEM	
General Settings	Remove A Bresto Y	
SIP Ping Call Admission Control Route Groups	Add Cascel	

디버그

[REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.RegexCondition inNetwork='Net-CUCM' [REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.RegexCondition -IN_NETWORK: Net-CUCM [REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.AbstractRegexCondition pattern(^\QNet-CUCM\E\$), toMatch(Net-CUCM) returning true

5. Trigger Condition(TC-from-CUCM)에 따라 일치하는 Route Policy(Policy-to-PSTN)를 검색하 기 위해 Routing Trigger 컨피그레이션이 선택됩니다.

CLI

trigger routing sequence 2 policy Policy-to-PSTN condition TC-from-CUCM

GUI cisco Cisco Unified	I SIP Proxy		Dashkoand agent Lug Out About
Configure SIP Stark	Routing Triggers		
- General Settings - Alias FODNis	Routing Triggers		
TLS Trusted Peers	Route Policy Name	Trapper	
Triggers	1 Estevis-CUCM	TC-from-PSTN	
 Senier Groups 	2 Eakoda-PSIN	TO-from-CUOM	
- General Settings	3 Ballor-UC520	TC-P97N4o-UC520	
- SIP Ping	4 D Palor-UC529-ta-PSTN	TC-UC\$294o-PSTN	
Call Admission Control	Add Eat Remove A Nevelo. Y		
Route Groups Doute Tables			
Route Policies			
Normalization Policies			
Time Policies Hauting Triggers • Normalization Triggers			

디버그

[REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.RegexCondition inNetwork='Net-CUCM'
[REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.RegexCondition IN_NETWORK: Net-CUCM
[REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.AbstractRegexCondition pattern(^\QNet-CUCM\E\$), toMatch(Net-CUCM) returning true
[REQUESTI.12] DEBUG 2013.02.28 00:34:03:375 triggers.ModuleTrigger ModuleTrigger.eval() action<Policy-to-PSTN> actionParameter<>
[REQUESTI.12] DEBUG 2013.02.28 00:34:03:375 triggers.ModuleTrigger ModuleTrigger.eval() got the policy, executing it ...

6. 일치하는 Route Table(RT-PSTN)을 찾기 위해 Route Policy(Policy-to-PSTN) 컨피그레이션을 확인합니다.

```
!
route table RT-PSTN
key 4082022222 target-destination SG-PSTN Net-PSTN
end route table
!
```

CLI

 [REQUESTI.12] DEBUG 2013.02.28 00:34:03:375 nrs.XCLPrefix

 Entering getKeyValue()

 [REQUESTI.12] DEBUG 2013.02.28 00:34:03:375 nrs.FieldSelector

 getUriPart: URI - sip:4082022222@14.128.100.169:5061 part 6

 [REQUESTI.12] DEBUG 2013.02.28 00:34:03:375 nrs.FieldSelector

 Requested field 45

 [REQUESTI.12] DEBUG 2013.02.28 00:34:03:375 nrs.FieldSelector

 Returning key 408202222

 [REQUESTI.12] DEBUG 2013.02.28 00:34:03:375 nrs.XCLPrefix

 Leaving getKeyValue()

 [REQUESTI.12] DEBUG 2013.02.28 00:34:03:375 modules.XCLLookup

 table=RT-PSTN, key=408202222

 [REQUESTI.12] INFO 2013.02.28 00:34:03:376 modules.XCLLookup

 table is RT-PSTN

 7. 대상(SG-PSTN)을 찾기 위해 Route Table(RT-PSTN) 컨피그레이션이 선택되어 있습니다.

디버그

GUI

cisco Cisco Unified SIP Prox

 SIP Stack 	····· · · · · · · · · · · · · · · · ·			
- General Settings				
TI S Trusted Pages	Route Policy Steps			
Networks	State	Key	Lookup Rale	Route Table
Triggers	1 Active	RequestUR: User	Eastly	RTPSTN
 General Settings 	AD Remove Revert A Nov	10 Y		
Groups SIP Ping Call Admission Centrol Route Groups Route Tables Route Panado Normalization Policies	Note: New : New record, will be added to addive Modified : Medified record, will become addive Deleted : Deleted record, will be removed the Active : Addive record, addive configuration.	configuration when committed, configuration when committed, m active configuration when committed.		
cisco Cisco Unified	d SIP Proxy			Deshboard ejeet Log
Configure	Route Policy Step			
General Settings				
Allas FODNs	House habite	Activa linkus	Carolidada Usbas	
- TLS Trusted Peers Networks	Hame	ALLER VOIDE	DT.P.TTU W	
Trippers		No. and	Terrain and the second s	
 Server Groups 	Lookup Key Matches:	Exactly	Eadly	
- General Settings - Groups	Case Sensitive:	Disabled		
- SIP Ping Call Admission Centrol	Route Table Lookup Key			
Raute Groups Route Tables	Lookup Key:	Request URI: User	Request URI v User v	
Normalization Policies	Lookup Key Modifiers			
Time Policies	Regular Expression Match:			
 Normalization Trippers 	Regular Expression Replace:			
Pre-Normalization	Remove leading 's' symbol:	Disabled		
Post-Normalization	Benave separator characters	Disabled		
Call Admission Control				
Users	Update Cancel			

! policy lookup Policy-to-PSTN sequence 100 RT-PSTN request-uri uri-component user rule exact end sequence end policy !

Route Policy 'Policy-to-PSTN' St

GUI

cisco Cisco Unified	I SIP Proxy						Dashbiari ajeet	Log Dut About Hell
· Configure	Route Table 'RT-PSTN' Route	5						
 SIP Stack General Settings 								
- Allas FODNIS	Routes						Showing 1-1 of 1 12	v perpage Go
TLS Trusted Peers	State Key	Route Group 1	Target Destination	Next Hop	Response	Lookup Route Policy	Detault SIP Route	Network
Tricovers	Active 400202222		SG-PSTN					Net-PSTN
 Server Groups 	Add Remove Revet Import	Export Active Routes					H K Page	10111
General Bellings								
- SP Prig	Note:							
Call Admission Control	New : New record; will be added to active of	configuration when committed.						
Route Groups	Deleted : Electric record; will be removed from	configuration when committed. In active configuration when con-	mmled.					
Route Policies	Active : Active record; active configuration.							
Normalization Policies								
cisco Cisco Unifier	d SIP Proxy							Log Cat. About. H
+ Certigure	Route Table 'RT-PSTN' Route							
 SIP Stack 								
- General Settings - Alias FODNs	Adive Velue							
TLS Trusted Peers	Key 408202222							
Networks	Roule Type destination							
 Server Groups 	Port							
- General Settings	Transport Type:							
- Groups	Network: Net-PSTN							
Call Admission Central								
Route Groups	Candidate Value							
Houle Tablics Double Collinian	6 Key 409202222							
Normalization Pations	G Route Type destination w							
Time Policies								
 Normalization Trippers 	Target Destination 💿 Next Hop 🔘	Both O						
- Pre-Normalization	Torget Destination							
Post-Normalization	 Host / Server Group: SG-PSTN 							
Call Admission Control	Pot							
Users	Transport Type: none 💌							
User Detaults Groups								
Privileges	d Network: Net-PSTN w							
+ AAA	1							
Authentication Authorization	Update Cancel							
+ Solan								
- Healty	 Required fields 							

```
디버그
```

[REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 routingtables.RoutingTable -Entering lookup() [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 routingtables.RoutingTable -Looking up 4082022222 in table RT-PSTN with rule exact and modifiers=none [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 routingtables.RoutingTable -Entering applyModifiers() [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 routingtables.RoutingTable -Leaving applyModifiers(), returning 4082022222 [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 routingtables.RoutingTable -Leaving lookup() [REQUESTI.12] INFO 2013.02.28 00:34:03:376 nrs.XCLPrefix -NRS Routing decision is: RouteTable:RT-PSTN, RouteKey:4082022222, TargetDestination:SG-PSTN, Network:Net-PSTN [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 loadbalancer.LBFactory -Entering createLoadBalancer() [REQUESTI.12] INFO 2013.02.28 00:34:03:376 loadbalancer.LBFactory lbtype is 3(call-id) [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 loadbalancer.LBFactory -Leaving createLoadBalancer() [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 nrs.XCLPrefix -Stored NRSAlgResult=isFound=true, isFailure=false, Response=-1, Routes=[Ruri: SG-PSTN, Route: null, Network: Net-PSTN, q-value=1. Oradvance=[502, 503]], PolicyAdvance=null [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 nrs.NRSAlgResult set policyAdvance as specified in route=RouteTable:RT-PSTN, RouteKey:4082022222, TargetDestination:SG-PSTN, Network:Net-PSTN [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 nrs.NRSAlgResult no policyAdvance specified in route [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 nrs.NRSAlgResult set policyAdvance as specified in algorithm={lookuprule=0, lookupfield=45, lookuplenght=-1, lookuptable=RT-PSTN, sequence=100, algorithm=1} [REQUESTI.12] DEBUG 2013.02.28 00:34:03:376 nrs.NRSAlgResult no policyAdvance specified in algorithm

8. 표준화 후 시퀀스가 실행됩니다.

CLI

```
trigger post-normalization sequence 1 policy UC520-Four-to-Full
condition TC-UC520-to-PSTN
!
```

GUI

cisco Cisco Unified	SIP Proxy	Beakboard ejeet
Configure SIP Stack	Post-Normalization Triggers	
General Settings Alias FGDNs	Post-Romalization Triggers	
TLS Trusted Peers	Normalization Policy Name	Trigger Condition Name
Trippers	1 UC520-FourHo-Fut	TC-JC5204a-PSTN
 Server Groups 	Add. Edit Remove A Move to. Y	
General Settings Groups		
- SIP Ping		
Call Admission Control		
Route Tables		
Route Policies		
Normalization Policies Time Policies		
Routing Triggers		
Normalization Triggers Pre-Normalization Post-Normalization		

디버그

[REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 util.Normalization -Entering Normalization(moduleRequest:post-normalize) [REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 conditions.RegexCondition inNetwork='Net-CUCM' [REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 conditions.RegexCondition -IN_NETWORK: Net-CUCM [REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 conditions.AbstractRegexCondition pattern(^\QNet-From-UC520\E\$), toMatch(Net-CUCM) returning false [REQUESTI.12] INFO 2013.02.28 00:34:03:378 util.Normalization skipping post-normalize, due to either no trigger is configured or triggers did not evaluate to true or is configured to by-pass

9. 요소 IP 주소를 찾기 위해 서버 그룹(SG-PSTN) 컨피그레이션이 확인되고 Q-value 및 Weight 컨피그레이션을 기반으로 가능한 최상의 경로로 통화가 라우팅됩니다.

CLI

```
!
server-group sip group SG-PSTN Net-PSTN
element ip-address 14.128.100.150 5060 udp q-value 1.0 weight 0
failover-resp-codes 503
lbtype global
ping
end server-group
!
```

GUI							Pertine	and to det
cisco Cisco Unifie	d SIP	Proxy					Canada	ajeet Ligidat
Configure SIP Stack	Sen	ver Group 'SG-	PSTN'					
- General Sottings - Alias FODNs - TJ 5 Touried Page	Group	Settings Demont	•					
Networks	Serve	er Group Elements	B 1111-11			North & France Press	0.000	Walada
Triggers • Server Groups	B	Active	14.128.100.150	5090	udp	·	10	0
General Settings Grissos	Add	Remove Re	wrt .					
디버그								

[REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 loadbalancer.LBFactory -Entering createLoadBalancer() [REQUESTI.12] INFO 2013.02.28 00:34:03:378 loadbalancer.LBFactory lbtype is 0(global) [REQUESTI.12] INFO 2013.02.28 00:34:03:378 loadbalancer.LBFactory -Default lbtype is 3(call-id) [REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 loadbalancer.LBFactory -Leaving createLoadBalancer() [REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 loadbalancer.LBBase -Entering getServer() [REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 loadbalancer.LBBase -Entering initializeDomains() [REOUESTI.12] DEBUG 2013.02.28 00:34:03:378 servergroups. ServerGlobalStateWrapper - Net-PSTN:14.128.100.150:5060:1 numTries= 2--->isServerAvailable(): true [REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 loadbalancer.LBBase -Leaving initializeDomains() [REQUESTI.12] INFO 2013.02.28 00:34:03:378 loadbalancer.LBHashBased list of elements in order on which load balancing is done : {reSgElementWeight=0, reSgElementSgName=SG-PSTN, reSgElementTransport=UDP, reSgElementQValue=1.0, reSgElementPort=5060, reSgElementHost=14.128.100.150} , [REQUESTI.12] DEBUG 2013.02.28 00:34:03:378 servergroups.AbstractNextHop -Entering compareDomainNames() [REQUESTI.12] DEBUG 2013.02.28 00:34:03:379 servergroups.AbstractNextHop -Leaving compareDomainNames() [REQUESTI.12] DEBUG 2013.02.28 00:34:03:379 loadbalancer.LBBase -Server group SG-PSTN selected {reSgElementWeight=0, reSgElementSgName=SG-PSTN, reSgElementTransport=UDP, reSgElementQValue=1.0, reSgElementPort=5060, reSgElementHost=14.128.100.150} [REQUESTI.12] DEBUG 2013.02.28 00:34:03:379 loadbalancer.LBBase -Leaving getServer()

10. SIP INVITE가 선택한 요소로 전송됩니다.

[CT_CALLBACK.13] DEBUG 2013.02.28 00:34:06:260 DsSipLlApi.Wire -Sending UDP packet on 14.128.100.169:32772, destination 14.128.64.192: 5060SIP/2.0 200 OK Via: SIP/2.0/UDP 14.128.64.192:5060;branch=z9hG4bK18012ae333f To: <sip:2022222@14.128.100.169>;tag=82FA7450-F53 From: "SJ Phone 1" <sip:2001@14.128.64.192> ;tag=534264~c1b77ee1-4af9-4a41-aed3-3846cd699427-49616146 Contact: <sip:4082022222@14.128.100.150:5060> Require: timer Remote-Party-ID: <sip:4082022222@14.128.100.150> ;party=called;screen=no;privacy=off Call-ID: 8be55500-12e1a5fb-ab-c040800e@14.128.64.192 CSeq: 101 INVITE Content-Length: 276 Date: Thu, 28 Feb 2013 00:34:03 GMT Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER, SUBSCRIBE, NOTIFY, INFO, REGISTER Allow-Events: telephone-event Supported: replaces Supported: sdp-anat Supported: timer Server: Cisco-SIPGateway/IOS-12.x Session-Expires: 1800;refresher=uac Content-Type: application/sdp Content-Disposition: session; handling=required

v=0 o=CiscoSystemsSIP-GW-UserAgent 6810 2753 IN IP4 14.128.100.150 s=SIP Call

```
c=IN IP4 14.128.100.150
t=0 0
m=audio 16862 RTP/AVP 18 101
c=IN IP4 14.128.100.150
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-16
a=ptime:20
```

시나리오 3

통화 흐름:IP Phone 1 — CME 1 — SIP — CUSP — SIP — CME 2 — IP Phone 2

IP Phone 2에서 내선 번호로 연결하려면 IP Phone 1에서 4001 또는 4002로 전화를 겁니다.

CME 2는 이 시나리오에서 UC520이며 CME 1은 PSTN 역할을 합니다.

1. SIP INVITE는 CME 1(PSTN)에서 CUSP로 전송됩니다.

[DsTransportListener-3] DEBUG 2013.02.28 05:28:57:360 DsSipLlApi.Wire -Received UDP packet on 14.128.100.169:5062 ,source 14.128.100.150:56578 INVITE sip:4002@14.128.100.169:5062 SIP/2.0 Via: SIP/2.0/UDP 14.128.100.150:5060;branch=z9hG4bK2292567 Remote-Party-ID: <sip:85224044444014.128.100.150> ;party=calling;screen=no;privacy=off From: <sip:85224044444@14.128.100.150>;tag=84086F7C-10B8 To: <sip:4002@14.128.100.169> Date: Thu, 28 Feb 2013 05:28:57 GMT Call-ID: 9559E957-809E11E2-9856EC62-1B7185EE@14.128.100.150 Supported: 100rel, timer, resource-priority, replaces, sdp-anat Min-SE: 1800 Cisco-Guid: 2446255913-2157842914-2555505762-0460424686 User-Agent: Cisco-SIPGateway/IOS-12.x Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER, SUBSCRIBE, NOTIFY, INFO, REGISTER CSeq: 101 INVITE Max-Forwards: 70 Timestamp: 1362029337 Contact: <sip:85224044444@14.128.100.150:5060> Expires: 180 Allow-Events: telephone-event Content-Type: application/sdp Content-Disposition: session; handling=required Content-Length: 276 v=0o=CiscoSystemsSIP-GW-UserAgent 3653 4016 IN IP4 14.128.100.150 s=SIP Call c=IN IP4 14.128.100.150 t=0 0 m=audio 19202 RTP/AVP 18 101 c=IN IP4 14.128.100.150 a=rtpmap:18 G729/8000 a=fmtp:18 annexb=no a=rtpmap:101 telephone-event/8000 a=fmtp:101 0-16 a=ptime:20 --- end of packet ---

2. 일치하는 네트워크(Net-UC520) 구성에서 통화가 수락됩니다.

CLI

```
sip listen Net-UC520 udp 14.128.100.169 5062
!
sip network Net-From-UC520 standard
no non-invite-provisional
allow-connections
retransmit-count invite-client-transaction 3
retransmit-count invite-server-transaction 5
retransmit-count non-invite-client-transaction 3
retransmit-timer T1 500
retransmit-timer T2 4000
retransmit-timer T4 5000
retransmit-timer TU1 5000
retransmit-timer TU2 32000
retransmit-timer clientTn 64000
retransmit-timer serverTn 64000
tcp connection-setup-timeout 1000
udp max-datagram-size 1500
end network
!
```

GUI

cisco Cisco Unified	I SIP Proxy			Daanboard ajeet Log Out
Configure SiP Stack	Network: 'Net-UC520'			
- General Settings Alias FODNs	Ceneral Settings BIP Retransmissions SIP Listen Points BIP Record Route			
TLS Trusted Peers Networks	SIP Listen Points			Showing t-t of t 10 💌 per
Triggers	P Address	Port	Transport	
Server Groups General Settings	14.128.100.199	5062	udp	
- Groups - SIP Ping	Add Remove			H H Page 1 d

디버그

[REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 conditions.RegexCondition inNetwork='Net-UC520' [REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 conditions.RegexCondition -

IN_NETWORK: Net-UC520

3. 정규화 전 시퀀스가 실행됩니다.

CLI

trigger pre-normalization sequence 1 policy CUCM-Prefix-408 condition TC-from-CUCM

GUI

cisco Cisco Unified	I SIP Proxy		Deshboard	ajeet Lo
Configure SIP Stack	Pre-Normalization Triggers			
- General Settings - Alias FODNs	Pre-Normalization Triggers			
- TLS Trusted Peers	Normalization Policy Name	Trigger Condition Name		
Triggers	1 CUCM-Prefix-408	TC-from-CUCM		
* Server Groups	Add Edit Remove A Noveto Y			
- General Settings				
- Groups - SIP Pino				
- Call Admission Centrol				
Route Groups				
Route Tables Route Palicies				
Normalization Policies				
Time Policies				
Routing Trippers				
Pre-Normalization Post-Normalization				
디버그				

[REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 util.Normalization -Entering Normalization(moduleRequest:pre-normalize) [REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 conditions.RegexCondition inNetwork='Net-UC520' [REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 conditions.RegexCondition -IN_NETWORK: Net-UC520 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 conditions.AbstractRegexCondition pattern(^\QNet-CUCM\E\$), toMatch(Net-UC520) returning false [REQUESTI.10] INFO 2013.02.28 05:28:57:362 util.Normalization skipping pre-normalize, due to either no trigger is configured or triggers did not evaluate to true or is configured to by-pass 4. 트리거 조건(TC-PSTN-to-UC520)이 일치합니다.

CLI

```
!
trigger condition TC-PSTN-to-UC520
sequence 1
in-network ^\QNet-UC520\E$
end sequence
end trigger condition
!
```

GUI

cisco Cisco Unified	SIP Proxy	Destationant ager	et Log
Configure SIP Stack	Trigger 'TC-PSTN-to-UC520' Rules		
General Settings Alas FGDNs TLS Trusted Peers Networks Thosens * Server Groups	Trigger Rales		
	Logic Condition Imbound Network is eractly Net-UC520*		
General Settings Groups SP Floor	Renze A Noeto Y		
Call Admission Control	Add Canol		

디버그

[REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 conditions.RegexCondition inNetwork='Net-UC520' [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 conditions.RegexCondition -IN_NETWORK: Net-UC520 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 conditions.AbstractRegexCondition pattern(^\QNet-UC520\E\$), toMatch(Net-UC520) returning true

5. 트리거 조건(TC-PSTN-to-UC520)에 따라 일치하는 경로 정책(Policy-UC520)을 찾기 위해 라 우팅 트리거 컨피그레이션을 확인합니다.

CLI

trigger routing sequence 3 policy Policy-UC520 condition TC-PSTN-to-UC520

GUI			
cisco Cisco Unified	SIP Proxy		Dealthoand agreet Lug Out About
+ Centgure	Routing Triggers		
General Settings Alias FQDNis	Routing Triggers		
- TLS Trusted Peers	Route Policy Name	Tripper	
Triggers.	1 Delete-CUCM	TC-ton-P5TN	
* Senier Groups	2 Delicite-PSTN	T0-from-CUOM	
- General Settings	3 Eslici-UC520	TC-PSTN4o-UC520	
- SIP Pino	4 E Palici-UC520-ta-PSTN	TC-UC520-to-PSTN	
Call Admission Control	Add Eat Remove A Neveto M		
Route Groups			
Route Tables Route Policies			
Normalization Policies			
Time Policies Hauting Tropors * Normalization Triggers			

디버그

```
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 triggers.ModuleTrigger -
ModuleTrigger.eval() action<Policy-UC520> actionParameter<>
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 triggers.ModuleTrigger -
ModuleTrigger.eval() got the policy, executing it ...
```

경로 정책(Policy-UC520) 컨피그레이션은 일치하는 경로 테이블(RT-UC520)을 찾기 위해 선 택됩니다.

CLI

```
!
policy lookup Policy-UC520
sequence 100 RT-UC520 request-uri uri-component user
modify-key 400[12] 2222
rule exact
end sequence
end policy
!
```

GUI



디버그

[REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 nrs.XCLPrefix -Entering getKeyValue() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 nrs.FieldSelector getUriPart: URI - sip:4002@14.128.100.169:5062 part 6 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 nrs.FieldSelector -Requested field 45 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 nrs.FieldSelector -Returning key 4002 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 nrs.FieldSelector -Retrieved Modifier RegexModifier: match= 400[12], replace= 2222, ignore case= false [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 nrs.FieldSelector -Input field: 4002 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 nrs.FieldSelector -Modified field: 2222 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 nrs.XCLPrefix -Leaving getKeyValue() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 modules.XCLLookup table=RT-UC520, key=2222 [REQUESTI.10] INFO 2013.02.28 05:28:57:364 modules.XCLLookup table is RT-UC520

7. 대상(RG-UC520)을 찾기 위해 경로 테이블(RT-UC520) 컨피그레이션이 점검됩니다.

CLI

! route table RT-UC520 key 2222 group RG-UC520 end route table

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디버그

[REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 routingtables.RoutingTable -Entering lookup() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 routingtables.RoutingTable -Looking up 2222 in table RT-UC520 with rule exact and modifiers=none [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 routingtables.RoutingTable -Entering applyModifiers() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 routingtables.RoutingTable -Leaving applyModifiers(), returning 2222 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 routingtables.RoutingTable -Leaving lookup() [REQUESTI.10] INFO 2013.02.28 05:28:57:364 nrs.XCLPrefix -NRS Routing decision is: RouteTable:RT-UC520, RouteKey:2222, RouteGroup:RG-UC520 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 loadbalancer.LBFactory -Entering createLoadBalancer() [REQUESTI.10] INFO 2013.02.28 05:28:57:364 loadbalancer.LBFactory lbtype is 3(call-id) [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 loadbalancer.LBFactory -Leaving createLoadBalancer() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 nrs.XCLPrefix -Stored NRSAlgResult=isFound=true, isFailure=false, Response=-1, Routes=[Ruri: SG-UC520, Route: null, Network: Net-UC520, q-value=1.

0radvance=[502, 503]], PolicyAdvance=null [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 nrs.NRSAlgResult set policyAdvance as specified in route=RouteTable:RT-UC520, RouteKey:2222, RouteGroup:RG-UC520 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 nrs.NRSAlgResult no policyAdvance specified in route [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 nrs.NRSAlgResult set policyAdvance as specified in algorithm={lookupkeymodifier= [RegexModifier: match= 400[12], replace= 2222, ignore case= false], lookuprule=0, lookupfield=45, lookuplenght=-1, lookuptable=RT-UC520, sequence=100, algorithm=1} [REQUESTI.10] DEBUG 2013.02.28 05:28:57:364 nrs.NRSAlgResult no policyAdvance specified in algorithm

8. 표준화 후 시퀀스가 실행됩니다.

CLI

trigger post-normalization sequence 1 policy UC520-Four-to-Full condition TC-UC520-to-PSTN



디버그

[REQUESTI.10] DEBUG 2013.02.28 05:28:57:365 util.Normalization -Entering Normalization(moduleRequest:post-normalize) [REQUESTI.10] DEBUG 2013.02.28 05:28:57:365 conditions.RegexCondition inNetwork='Net-UC520' [REQUESTI.10] DEBUG 2013.02.28 05:28:57:365 conditions.RegexCondition -IN_NETWORK: Net-UC520 [REQUESTI.10] DEBUG 2013.02.28 05:28:57:365 conditions.AbstractRegexCondition pattern(^\QNet-From-UC520\E\$), toMatch(Net-UC520) returning false [REQUESTI.10] INFO 2013.02.28 05:28:57:365 util.Normalization skipping post-normalize, due to either no trigger is configured or triggers did not evaluate to true or is configured to by-pass

9. 요소 IP 주소를 찾기 위해 Route Group(경로 그룹) 컨피그레이션이 선택되고 Q-값 및 가중치 설정에 따라 가능한 최상의 경로로 통화가 라우팅됩니다.

CLI

```
!
route group RG-UC520
element target-destination SG-UC520 Net-UC520 q-value 1.0
failover-codes 502 - 503
weight 0
end element
end route
!
```

```
!
server-group sip group SG-UC520 Net-UC520
element ip-address 14.128.100.161 5060 udp q-value 1.0 weight 0
failover-resp-codes 503
lbtype global
ping
end server-group
!
```

GUI



디버그

[REQUESTI.10] DEBUG 2013.02.28 05:28:57:365 loadbalancer.LBFactory -Entering createLoadBalancer() [REQUESTI.10] INFO 2013.02.28 05:28:57:365 loadbalancer.LBFactory lbtype is 0(global) [REQUESTI.10] INFO 2013.02.28 05:28:57:365 loadbalancer.LBFactory -Default lbtype is 3(call-id) [REQUESTI.10] DEBUG 2013.02.28 05:28:57:365 loadbalancer.LBFactory -Leaving createLoadBalancer() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:365 loadbalancer.LBBase -Entering getServer() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:365 loadbalancer.LBBase -Entering initializeDomains() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:365 servergroups. ServerGlobalStateWrapper - Net-UC520:14.128.100.161:5060:1 numTries= 2--->isServerAvailable(): true [REQUESTI.10] DEBUG 2013.02.28 05:28:57:366 loadbalancer.LBBase -Leaving initializeDomains() [REQUESTI.10] INFO 2013.02.28 05:28:57:366 loadbalancer.LBHashBased list of elements in order on which load balancing is done :

{reSgElementWeight=0, reSgElementSgName=SG-UC520, reSgElementTransport=UDP, reSgElementQValue=1.0, reSgElementPort=5060, reSgElementHost=14.128.100.161}, [REQUESTI.10] DEBUG 2013.02.28 05:28:57:366 servergroups.AbstractNextHop -Entering compareDomainNames() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:366 servergroups.AbstractNextHop -Leaving compareDomainNames() [REQUESTI.10] DEBUG 2013.02.28 05:28:57:366 loadbalancer.LBBase -Server group SG-UC520 selected {reSgElementWeight=0, reSgElementSgName=SG-UC520, reSgElementTransport=UDP, reSgElementQValue=1.0, reSgElementPort=5060, reSgElementHost=14.128.100.161} [REQUESTI.10] DEBUG 2013.02.28 05:28:57:366 loadbalancer.LBBase -Leaving getServer()

10. SIP INVITE가 선택한 요소로 전송됩니다.

[REQUESTI.10] DEBUG 2013.02.28 05:28:57:367 DsSipLlApi.Wire -Sending UDP packet on 14.128.100.169:32773, destination 14.128.100.161:5060 INVITE sip:4002@SG-UC520 SIP/2.0 Via: SIP/2.0/UDP 14.128.100.169:5062; branch=z9hG4bK.ToYJFeKMyfZGySv.gcLjg~~237 Via: SIP/2.0/UDP 14.128.100.150:5060;branch=z9hG4bK2292567 Max-Forwards: 69 To: <sip:4002@14.128.100.169> From: <sip:85224044444@14.128.100.150>;tag=84086F7C-10B8 Contact: <sip:85224044444014.128.100.150:5060> Expires: 180 Remote-Party-ID: <sip:85224044444@14.128.100.150> ;party=calling;screen=no;privacy=off Call-ID: 9559E957-809E11E2-9856EC62-1B7185EE@14.128.100.150 CSeq: 101 INVITE Content-Length: 276 Date: Thu, 28 Feb 2013 05:28:57 GMT Supported: 100rel, timer, resource-priority, replaces, sdp-anat Min-SE: 1800 Cisco-Guid: 2446255913-2157842914-2555505762-0460424686 User-Agent: Cisco-SIPGateway/IOS-12.x Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER, SUBSCRIBE, NOTIFY, INFO, REGISTER Timestamp: 1362029337 Allow-Events: telephone-event Content-Type: application/sdp Content-Disposition: session; handling=required v=0

o=CiscoSystemsSIP-GW-UserAgent 3653 4016 IN IP4 14.128.100.150 s=SIP Call c=IN IP4 14.128.100.150 t=0 0 m=audio 19202 RTP/AVP 18 101 c=IN IP4 14.128.100.150 a=rtpmap:18 G729/8000 a=fmtp:18 annexb=no a=rtpmap:101 telephone-event/8000 a=fmtp:101 0-16 a=ptime:20

시나리오 4

통화 흐름: IP Phone 1 — CME 1 — SIP — CUSP — SIP — CME 2 — IP Phone 2

IP Phone 1에 연결하려면 IP Phone 2에서 4444로 전화를 겁니다. 이 번호는 415 240 444로 변경되고 IP Phone 1에 연결되면 정상화가 이루어집니다.

CME 2는 이 시나리오에서 UC520이며 CME 1은 PSTN 역할을 합니다.

1. SIP INVITE는 CME 2(UC520)에서 CUSP로 전송됩니다.

```
[DsTransportListener-1] DEBUG 2013.02.28 07:06:57:220 DsSipLlApi.Wire -
  Received UDP packet on 14.128.100.169:5063 ,source 14.128.100.161:59404
  INVITE sip:4444014.128.100.169:5063 SIP/2.0
  Date: Thu, 28 Feb 2013 07:09:20 GMT
  Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER,
  SUBSCRIBE, NOTIFY, INFO, REGISTER
  From: <sip:4001@14.128.100.161>;tag=256D566C-22AC
  Allow-Events: telephone-event
  Supported: 100rel, timer, resource-priority, replaces, sdp-anat
  Min-SE: 1800
  Remote-Party-ID: <sip:4001@14.128.100.161>
  ;party=calling;screen=no;privacy=off
  Cisco-Guid: 2598740490-2158760418-2150671243-2598404062
  Timestamp: 1362035360
  Content-Length: 543
  User-Agent: Cisco-SIPGateway/IOS-12.x
  To: <sip:4444@14.128.100.169>
  Contact: <sip:4001@14.128.100.161:5060>
  Expires: 180
  Content-Type: multipart/mixed; boundary=uniqueBoundary
  Call-ID: 9B62C157-80AC11E2-8035A38B-9AE07FDE@14.128.100.161
  Via: SIP/2.0/UDP 14.128.100.161:5060;branch=z9hG4bK21E82
  CSeq: 101 INVITE
  Max-Forwards: 70
  Mime-Version: 1.0
  --uniqueBoundary
  Content-Type: application/sdp
  Content-Disposition: session; handling=required
  v=0
  o=CiscoSystemsSIP-GW-UserAgent 3418 2914 IN IP4 14.128.100.161
  s=SIP Call
  c=IN IP4 14.128.100.161
  t=0 0
  m=audio 17618 RTP/AVP 18 101
  c=IN IP4 14.128.100.161
  a=rtpmap:18 G729/8000
  a=fmtp:18 annexb=no
  a=rtpmap:101 telephone-event/8000
  a=fmtp:101 0-16
  a=ptime:20
  --uniqueBoundary
  Content-Type: application/gtd
  Content-Disposition: signal; handling=optional
  IAM,
  GCI,9ae5a20a80ac11e28030a38b9ae07fde
  --- end of packet ---
2. 일치하는 네트워크(Net-From-UC520) 구성에서 통화가 수락됩니다.
```

CLI

```
sip listen Net-From-UC520 udp 14.128.100.169 5063 !
```

```
sip network Net-From-UC520 standard
no non-invite-provisional
allow-connections
retransmit-count invite-client-transaction 3
retransmit-count invite-server-transaction 5
retransmit-count non-invite-client-transaction 3
retransmit-timer T1 500
retransmit-timer T2 4000
retransmit-timer T4 5000
retransmit-timer TU1 5000
retransmit-timer TU2 32000
retransmit-timer clientTn 64000
retransmit-timer serverTn 64000
tcp connection-setup-timeout 1000
udp max-datagram-size 1500
end network
1
```

GUI



디버그

[REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition inNetwork='Net-From-UC520' [REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition -IN_NETWORK: Net-From-UC520

3. 정규화 전 시퀀스가 실행됩니다.

CLI

trigger pre-normalization sequence 1 policy CUCM-Prefix-408 condition TC-from-CUCM



디버그

[REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 util.Normalization -Entering Normalization(moduleRequest:pre-normalize) [REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition inNetwork='Net-From-UC520' [REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition -IN_NETWORK: Net-From-UC520 [REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.AbstractRegexCondition -

```
pattern(^\QNet-CUCM\E$), toMatch(Net-From-UC520) returning false
[REQUESTI.5] INFO 2013.02.28 07:06:57:229 util.Normalization -
skipping pre-normalize, due to either no trigger is configured or triggers
did not evaluate to true or is configured to by-pass
```

4. 트리거 조건(TC-UC520-to-PSTN)이 일치합니다.

CLI

```
!
trigger condition TC-UC520-to-PSTN
sequence 1
in-network ^\QNet-From-UC520\E$
end sequence
end trigger condition
!
```

GUI

cisco Cisco Unified	I SIP Proxy	Deshboard ejeet LogO
Configure DE Davis	Trigger 'TC-UC520-to-PSTN' Rules	
General Settings		
Add Protects TLS Transked Preva Heterartis Expert General Settings General Settings General Settings General Settings General Settings General Settings General Settings	Trigger Rules	
	Logic Canditor	
	1 Description and a seath Teleform ACS22	
	Merena A Mosts V	
	Add Conce	

디버그

[REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition inNetwork='Net-From-UC520' [REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition -IN_NETWORK: Net-From-UC520 [REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 conditions.AbstractRegexCondition pattern(^\QNet-From-UC520\E\$), toMatch(Net-From-UC520) returning true

5. 트리거 조건(TC-UC520-to-PSTN)에 따라 일치하는 경로 정책(Policy-UC520-to-PSTN)을 찾기 위해 라우팅 트리거 컨피그레이션이 선택됩니다.

CLI

trigger routing sequence 4 policy Policy-UC520-to-PSTN condition TC-UC520-to-PSTN



디버그

[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 triggers.ModuleTrigger -ModuleTrigger.eval() action<Policy-UC520-to-PSTN> actionParameter<> [REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 triggers.ModuleTrigger -ModuleTrigger.eval() got the policy, executing it ... 6. 경로 정책(Policy-UC520-to-PSTN) 컨피그레이션은 일치하는 경로 테이블(RT-UC520-PSTN)을 찾기 위해 선택됩니다.

```
CLI
```

```
!
policy lookup Policy-UC520-to-PSTN
sequence 100 RT-UC520-PSTN request-uri uri-component user
modify-key 4444 3333
rule exact
end sequence
end policy
!
```

GUI

cisco Cisco Unified	I SIP Proxy			Daubberi geri t		
Configure SP Stack	Route Policy 'Policy-UC520-to-PSTN' Steps					
General Settings						
TLS Trusted Peers	Route Paticy Steps					
Networks	5/4/4	Kay	Lookup Rule	Route Table		
Server Groups	1 Active	Repaid URL User	Exists	RT-UCS20-PSTN		
General Settings Groups	Add Remove Revert A U	with. Y				
cisco Cisco Unified	I SIP Proxy			Deskhowst mjørt La		
Configure SIP Stack	Route Policy Step					
- General Settings - Alas PODNs	Route Table					
TLS Trusted Peers		Active Velue	Candidate Value			
Triggers	rearing	RIGGEPHAIN	Resources a			
Server Groups	Lookup Key Matches:	Exactly	Eady			
- Groups	Cate Sensitive:	Disabled				
- SIP Ping	Route Table Lookup Key					
Route Groups	Lookes Mar	Para anti Di Linar	Descent Biller Lines In			
Route Tables	Coorden way.	Hequesi oni. Osei	Network and the			
Normalization Policies	Lonius Key Modifiers					
Time Policies	Receiler Frenzission Matrix	4444	4444			
 Normalization Triggers 	Regular Expression Replace:	2222	2222			
 Pre-Normalization 	Remove leading ** symbol	Disabled				
Performance Control	Remove separator characters:	Disabled	ō			
Call Admission Control Users	Update Cancel					

디버그

```
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 nrs.XCLPrefix -
Entering getKeyValue()
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 nrs.FieldSelector -
getUriPart: URI - sip:4444@14.128.100.169:5063 part 6
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 nrs.FieldSelector -
Requested field 45
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 nrs.FieldSelector -
Returning key 4444
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 nrs.FieldSelector -
Retrieved Modifier RegexModifier: match= 4444, replace= 3333,
ignore case= false
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 nrs.FieldSelector -
Input field: 4444
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 nrs.FieldSelector -
Modified field: 3333
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 nrs.XCLPrefix -
Leaving getKeyValue()
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 modules.XCLLookup -
table=RT-UC520-PSTN, key=3333
[REQUESTI.5] INFO 2013.02.28 07:06:57:230 modules.XCLLookup -
table is RT-UC520-PSTN
```

```
7. 대상(RG-UC520)을 찾기 위해 경로 테이블(RT-UC520-PSTN) 컨피그레이션을 확인합니다.
```

```
CLI
```

```
route table RT-UC520-PSTN
key 3333 group RG-UC520-to-PSTN
end route table
!
```

. _

I.

```
GUI
 cisco Cisco Unified SIP Proxy
                                        Route Table 'RT-UC520-PSTN' Routes
 - Configure
     SIP Stad
              val Settings
       Alles FOONS
TUS Trusted Peers
                                                                                                                                                                                                                                                                    Sheeing 1-1 of 1 10 v
                                         State
                                                                Key
                                                                              Route Group
                                                                                                                          Target Destination
                                                                                                                                                                                     Response
                                                                                                                                                                                                              Lookup Route Policy
                                                                                                                                                                                                                                                        Default SIP Route
   Networks
Triggers
Server Groups
                                          Active
                                                                3333
                                                                                RG-UC520-te-PSTM
                                                                                                                                                                                                                                                                         H + Page
                                                                        Import Export Active Routes
                                        Add
       - General Settings
- Groups
- SIP Ping
       ute Groupe
                                                 Modified record, will become active configuration when com
: Deleted record; will be removed from active configuration wi
 cisco Cisco Unifi
   Canfigure
                                       Route Table 'RT-UC520-PSTN' Route
    SIP Stack
General Settings
Allos FODNs
TLS Trusted Peers
                                         Active Value
                                         Key 2223
Route Type route-group
Route Group
   Triggers
Server Groups
       General Settings
Groups
SIP Ping
Call Admission C
                                         Candidate Value
                                            Key 3333
                    ion Ces
      sulle Groups
                                            Route Type I route-proup 💌
                                             Route Group RG-UC52340-PSTN V
    Route Policies
          sization Policies
    Time Policies
      Juding Trippers
                                        Update Cancel
```

```
디버그
```

[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 routingtables.RoutingTable -Entering lookup() [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 routingtables.RoutingTable -Looking up 3333 in table RT-UC520-PSTN with rule exact and modifiers=none [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 routingtables.RoutingTable -Entering applyModifiers() [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 routingtables.RoutingTable -Leaving applyModifiers(), returning 3333 [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 routingtables.RoutingTable -Leaving lookup() [REQUESTI.5] INFO 2013.02.28 07:06:57:231 nrs.XCLPrefix -NRS Routing decision is: RouteTable:RT-UC520-PSTN, RouteKey:3333, RouteGroup:RG-UC520-to-PSTN [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 loadbalancer.LBFactory -Entering createLoadBalancer() [REQUESTI.5] INFO 2013.02.28 07:06:57:231 loadbalancer.LBFactory lbtype is 3(call-id) [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 loadbalancer.LBFactory -Leaving createLoadBalancer() [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 nrs.XCLPrefix -Stored NRSAlgResult=isFound=true, isFailure=false, Response=-1, Routes=[Ruri: 14.128.100.150, Route: null, Network: Net-From-UC520, q-value=1.0radvance=[502, 503]], PolicyAdvance=null [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 nrs.NRSAlgResult set policyAdvance as specified in route=RouteTable:RT-UC520-PSTN, RouteKey:3333, RouteGroup:RG-UC520-to-PSTN [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 nrs.NRSAlgResult no policyAdvance specified in route [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 nrs.NRSAlgResult set policyAdvance as specified in algorithm={lookupkeymodifier= [RegexModifier: match= 4444, replace= 3333, ignore case= false], lookuprule=0, lookupfield=45, lookuplenght=-1, lookuptable=RT-UC520-PSTN, sequence=100, algorithm=1}

[REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 nrs.NRSAlgResult - no policyAdvance specified in algorithm

8. 표준화 후 시퀀스가 실행됩니다.

CLI

```
trigger post-normalization sequence 1 policy UC520-Four-to-Full
condition TC-UC520-to-PSTN
!
policy normalization UC520-Four-to-Full
uri-component update request-uri user 4444 85224044444
end policy
```

```
!
```

GUI

cisco Cisco Unific	d SIP Proxy	Gashboard	aject	
Configure SIP Stack General Settings	Post-Normalization Triggers			
Anas - CORA TLS Tructed Peers Networks Trigpers • Sener Groups • General Settings • Grups • G	Partnersection images Trigger Condition Name 1 UCSD/FaceFacht TC-UCSD/FaceFacht 40 Ext Remove N			
cisco Cisco Unified	SIP Proxy	Coshboard	-	
Configure SP Stack Genewal Settings Alias FODNs TLS Thushol Peers Naturata Tingges Server Groups General Settings Groups SP Prog Call Admission Control Road Groups	Normalization Policy "UC\$20-Four-to-Full" Propert UR Component UR Connenton UR Component UR Connenton UR Component UR Connenton UR Connenton UR Connection Connectio			

디버그

```
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 util.Normalization -
Entering Normalization(moduleRequest:post-normalize)
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 conditions.RegexCondition -
inNetwork='Net-From-UC520'
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 conditions.RegexCondition -
IN_NETWORK: Net-From-UC520
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 conditions.AbstractRegexCondition -
pattern(^\QNet-From-UC520\E$), toMatch(Net-From-UC520) returning true
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 triggers.ModuleTrigger -
ModuleTrigger.eval() action<UC520-Four-to-Full> actionParameter<>
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 triggers.ModuleTrigger -
ModuleTrigger.eval() got the policy, executing it ...
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 normalization.URIComponentNormalizationAlgorithm
normalizing request-uri
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 normalization.URIComponentNormalizationAlgorithm
updating user/phone of the sip:4444@14.128.100.150 to 85224044444
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 util.Normalization -
Leaving Normalization.normalize()
```

9. 요소 IP 주소를 찾기 위해 Route Group(경로 그룹) 컨피그레이션이 선택되고 Q-값 및 가중치 설정에 따라 가능한 최상의 경로로 통화가 라우팅됩니다.

```
!
route group RG-UC520-to-PSTN
element target-destination 14.128.100.150 Net-From-UC520 q-value 1.0
failover-codes 502 - 503
weight 0
end element
end route
```

GUI



디버그

[REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 loadbalancer.LBBase -Entering getServer() [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 loadbalancer.LBBase -Entering initializeDomains() [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 nrs.NRSRoutes routes before applying time policies: [Ruri: 14.128.100.150, Route: null, Network: Net-From-UC520, q-value=1.0radvance=[502, 503]] [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 nrs.NRSRoutes routes after applying time policies: [Ruri: 14.128.100.150, Route: null, Network: Net-From-UC520, q-value=1.0radvance=[502, 503]] [REQUESTI.5] DEBUG 2013.02.28 07:06:57:231 loadbalancer.LBBase -Leaving initializeDomains() [REQUESTI.5] INFO 2013.02.28 07:06:57:231 loadbalancer.LBHashBased list of elements in order on which load balancing is done : Ruri: 14.128.100.150, Route: null, Network: Net-From-UC520, q-value= 1.0radvance=[502, 503], [REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 loadbalancer.LBBase -Server group route-sg selected Ruri: 14.128.100.150, Route: null, Network: Net-From-UC520, g-value=1.0radvance=[502, 503] [REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 loadbalancer.LBBase -Leaving getServer()

10. SIP INVITE가 선택한 요소로 전송됩니다.

[REQUESTI.5] DEBUG 2013.02.28 07:06:57:233 DsSipLlApi.Wire -Sending UDP packet on 14.128.100.169:32770, destination 14.128.100.150:5060

CLI

INVITE sip:85224044444@14.128.100.150 SIP/2.0 Via: SIP/2.0/UDP 14.128.100.169:5063;branch=z9hG4bK.ToYJFeKMyfZGySv.gcLjg~~238 Via: SIP/2.0/UDP 14.128.100.161:5060;branch=z9hG4bK21E82 Max-Forwards: 69 To: <sip:4444@14.128.100.169> From: <sip:4001@14.128.100.161>;tag=256D566C-22AC Contact: <sip:4001@14.128.100.161:5060> Expires: 180 Remote-Party-ID: <sip:4001@14.128.100.161> ;party=calling;screen=no;privacy=off Call-ID: 9B62C157-80AC11E2-8035A38B-9AE07FDE@14.128.100.161 CSeq: 101 INVITE Content-Length: 543 Date: Thu, 28 Feb 2013 07:09:20 GMT Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER, SUBSCRIBE, NOTIFY, INFO, REGISTER Allow-Events: telephone-event Supported: 100rel, timer, resource-priority, replaces, sdp-anat Min-SE: 1800 Cisco-Guid: 2598740490-2158760418-2150671243-2598404062 Timestamp: 1362035360 User-Agent: Cisco-SIPGateway/IOS-12.x Content-Type: multipart/mixed; boundary=uniqueBoundary MIME-Version: 1.0 --uniqueBoundary Content-Type: application/sdp Content-Disposition: session; handling=required v=0o=CiscoSystemsSIP-GW-UserAgent 3418 2914 IN IP4 14.128.100.161 s=SIP Call c=IN IP4 14.128.100.161 t = 0 0m=audio 17618 RTP/AVP 18 101 c=IN IP4 14.128.100.161 a=rtpmap:18 G729/8000 a=fmtp:18 annexb=no a=rtpmap:101 telephone-event/8000 a=fmtp:101 0-16 a=ptime:20 --uniqueBoundary Content-Type: application/gtd Content-Disposition: signal; handling=optional IAM,

GCI,9ae5a20a80ac11e28030a38b9ae07fde

4가지 시나리오 모두 구성

이 문서에 설명된 네 가지 통화 시나리오에 대한 전체 CUSP 컨피그레이션은 다음과 같습니다.

```
ajeesing-cusp-8.5.3(cusp)# show configuration active verbose
Building CUSP configuration...
!
server-group sip global-load-balance call-id
server-group sip retry-after 0
server-group sip element-retries udp 2
server-group sip element-retries tls 1
```

server-group sip element-retries tcp 1 sip dns-srv enable no naptr end dns 1 no sip header-compaction Ţ sip logging sip max-forwards 70 sip network Net-CUCM standard no non-invite-provisional allow-connections retransmit-count invite-client-transaction 3 retransmit-count invite-server-transaction 5 retransmit-count non-invite-client-transaction 3 retransmit-timer T1 500 retransmit-timer T2 4000 retransmit-timer T4 5000 retransmit-timer TU1 5000 retransmit-timer TU2 32000 retransmit-timer clientTn 64000 retransmit-timer serverTn 64000 tcp connection-setup-timeout 1000 udp max-datagram-size 1500 end network Ţ sip network Net-From-UC520 standard no non-invite-provisional allow-connections retransmit-count invite-client-transaction 3 retransmit-count invite-server-transaction 5 retransmit-count non-invite-client-transaction 3 retransmit-timer T1 500 retransmit-timer T2 4000 retransmit-timer T4 5000 retransmit-timer TU1 5000 retransmit-timer TU2 32000 retransmit-timer clientTn 64000 retransmit-timer serverTn 64000 tcp connection-setup-timeout 1000 udp max-datagram-size 1500 end network sip network Net-PSTN standard no non-invite-provisional allow-connections retransmit-count invite-client-transaction 3 retransmit-count invite-server-transaction 5 retransmit-count non-invite-client-transaction 3 retransmit-timer T1 500 retransmit-timer T2 4000 retransmit-timer T4 5000 retransmit-timer TU1 5000 retransmit-timer TU2 32000 retransmit-timer clientTn 64000 retransmit-timer serverTn 64000 tcp connection-setup-timeout 1000 udp max-datagram-size 1500 end network 1 sip network Net-UC520 standard no non-invite-provisional allow-connections

```
retransmit-count invite-client-transaction 3
retransmit-count invite-server-transaction 5
retransmit-count non-invite-client-transaction 3
retransmit-timer T1 500
retransmit-timer T2 4000
retransmit-timer T4 5000
retransmit-timer TU1 5000
retransmit-timer TU2 32000
retransmit-timer clientTn 64000
retransmit-timer serverTn 64000
tcp connection-setup-timeout 1000
udp max-datagram-size 1500
end network
1
sip overload reject retry-after 0
sip peg-counting 2 86400
sip privacy service
sip queue message
drop-policy head
low-threshold 80
size 2000
thread-count 20
end queue
!
sip queue radius
drop-policy head
low-threshold 80
size 2000
thread-count 20
end queue
1
sip queue request
drop-policy head
low-threshold 80
size 2000
thread-count 20
end queue
1
sip queue response
drop-policy head
low-threshold 80
size 2000
thread-count 20
end queue
1
sip queue st-callback
drop-policy head
low-threshold 80
size 2000
thread-count 10
end queue
!
sip queue timer
drop-policy none
low-threshold 80
size 2500
thread-count 8
end queue
!
sip queue xcl
drop-policy head
low-threshold 80
size 2000
thread-count 2
```

```
end queue
1
route recursion
1
sip tcp connection-timeout 30
sip tcp max-connections 256
!
no sip tls
1
trigger condition TC-PSTN-to-UC520
sequence 1
in-network ^\QNet-UC520\E$
end sequence
sequence 2
in-network ^\QNet-CUCM\E$
end sequence
end trigger condition
1
trigger condition TC-UC520-to-PSTN
sequence 1
in-network ^\QNet-From-UC520\E$
end sequence
end trigger condition
1
trigger condition TC-from-CUCM
sequence 1
in-network ^\QNet-CUCM\E$
end sequence
end trigger condition
1
trigger condition TC-from-PSTN
sequence 1
in-network ^\QNet-PSTN\E$
end sequence
sequence 2
in-network ^\QNet-CUCM\E$
message request
end sequence
end trigger condition
1
trigger condition mid-dialog
sequence 1
mid-dialog
end sequence
end trigger condition
1
accounting
no enable
no client-side
no server-side
end accounting
!
server-group sip group SG-CUCM.ajeet.com Net-CUCM
element ip-address 14.128.64.191 5060 udp q-value 1 weight 50
element ip-address 14.128.64.192 5060 udp q-value 1.0 weight 100
failover-resp-codes 503
lbtype global
ping
end server-group
1
server-group sip group SG-PSTN Net-PSTN
element ip-address 14.128.100.150 5060 udp q-value 1.0 weight 0
failover-resp-codes 503
lbtype global
```

```
ping
end server-group
1
server-group sip group SG-UC520 Net-UC520
element ip-address 14.128.100.161 5060 udp q-value 1.0 weight 0
failover-resp-codes 503
lbtype global
ping
end server-group
1
route group RG-UC520
element target-destination SG-UC520 Net-UC520 q-value 1.0
failover-codes 502 - 503
weight 0
end element
end route
1
route group RG-UC520-to-PSTN
element target-destination 14.128.100.150 Net-From-UC520 q-value 1.0
failover-codes 502 - 503
weight 0
end element
end route
1
route table RT-CUCM
key 1111 target-destination SG-CUCM.ajeet.com Net-CUCM
end route table
route table RT-PSTN
key 4082022222 target-destination SG-PSTN Net-PSTN
end route table
1
route table RT-UC520
key 2222 group RG-UC520
end route table
1
route table RT-UC520-PSTN
key 3333 group RG-UC520-to-PSTN
end route table
1
policy normalization CUCM-Prefix-408
uri-component update request-uri user 2022222 4082022222
end policy
policy normalization UC520-Four-to-Full
uri-component update request-uri user 4444 85224044444
end policy
1
policy lookup Policy-UC520
sequence 100 RT-UC520 request-uri uri-component user
modify-key 400[12] 2222
rule exact
end sequence
end policy
!
policy lookup Policy-UC520-to-PSTN
sequence 100 RT-UC520-PSTN request-uri uri-component user
modify-key 4444 3333
rule exact
end sequence
end policy
1
policy lookup Policy-to-CUCM
sequence 100 RT-CUCM request-uri uri-component user
```

```
modify-key 4082022102 1111
rule exact
end sequence
end policy
1
policy lookup Policy-to-PSTN
sequence 100 RT-PSTN request-uri uri-component user
rule exact
end sequence
end policy
1
trigger routing sequence 1 policy Policy-to-CUCM condition
TC-from-PSTN
trigger routing sequence 2 policy Policy-to-PSTN condition
TC-from-CUCM
trigger routing sequence 3 policy Policy-UC520 condition
TC-PSTN-to-UC520
trigger routing sequence 4 policy Policy-UC520-to-PSTN condition
TC-UC520-to-PSTN
trigger pre-normalization sequence 1 policy CUCM-Prefix-408
condition TC-from-CUCM
trigger post-normalization sequence 1 policy UC520-Four-to-Full
condition TC-UC520-to-PSTN
1
server-group sip ping-options Net-CUCM 14.128.100.169 4001
method OPTIONS
ping-type proactive 2500
timeout 2000
end ping
server-group sip global-ping
sip cac session-timeout 720
sip cac Net-CUCM 14.128.64.191 5060 udp limit -1
sip cac Net-CUCM 14.128.64.192 5060 udp limit -1
sip cac Net-PSTN 14.128.100.150 5060 udp limit -1
sip cac Net-UC520 14.128.100.161 5060 udp limit -1
!
no sip cac
1
sip listen Net-CUCM udp 14.128.100.169 5061
sip listen Net-From-UC520 udp 14.128.100.169 5063
sip listen Net-PSTN udp 14.128.100.169 5060
sip listen Net-UC520 udp 14.128.100.169 5062
call-rate-limit 200
1
end
ajeesing-cusp-8.5.3(cusp)#
```

다음을 확인합니다.

현재 이 구성에 대해 사용 가능한 확인 절차가 없습니다.

문제 해결

현재 이 컨피그레이션에 사용할 수 있는 특정 문제 해결 정보가 없습니다.

관련 정보

- <u>Cisco Unified SIP Proxy 릴리스 8.5용 CLI 컨피그레이션 가이드</u>
- <u>Cisco Unified SIP Proxy 릴리스 8.5용 GUI 관리 설명서</u>
- <u>CUSP 통화 처리</u>
- <u>기술 지원 및 문서 Cisco Systems</u>