

Configuratievoorbeeld van CUSP

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Inleiding

Dit document beschrijft de configuratie van de steekproef CLI en GUI van Cisco Unified SIP Proxy (CUSP) met debugs die vier verschillende routingscenario's overeenkomen.

Voorwaarden

Vereisten

Cisco raadt u aan basiskennis van deze onderwerpen te hebben:

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

Gebruikte componenten

De informatie in dit document is gebaseerd op CUSP.

De informatie in dit document is gebaseerd op de apparaten in een specifieke laboratoriumomgeving. Alle apparaten die in dit document worden beschreven, hadden een opgeschoonde (standaard)configuratie. Als uw netwerk live is, moet u de potentiële impact van elke opdracht begrijpen.

Configureren

In deze sectie worden de configuratie van vier routingscenario's beschreven.

Opmerking: Gebruik de [Command Lookup Tool \(alleen voor geregistreeerde gebruikers\) voor meer informatie over de opdrachten die in deze sectie worden gebruikt.](#)

Scenario 1

Call Flow: IP-telefoon 1 — CME — SIP — CUSP — SIP — CUCM — IP-telefoon 2

Bel 408 202 2102 van IP-telefoon 1 die is geregistreerd in CallManager Express (CME) om IP-telefoon 2 te bereiken die is geregistreerd in Cisco Unified Communications Manager (CUCM) via CUSP.

CME fungeert in dit scenario als een openbare telefoonnetwerk (PSTN).

1. SIP INVITE komt vanuit CME naar CUSP.

```
[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:4082025555@14.128.100.150>;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 ---

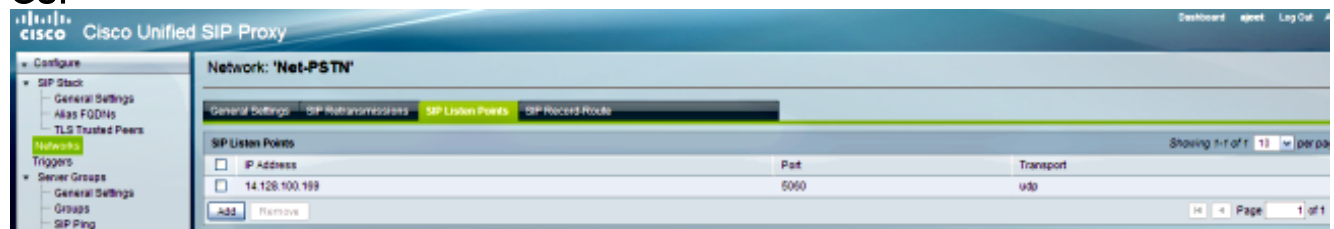
2. De oproep wordt ingewilligd voor de netwerkconfiguratie (Net-PSTN) die overeenkomt met de configuratie.

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



DEBUG

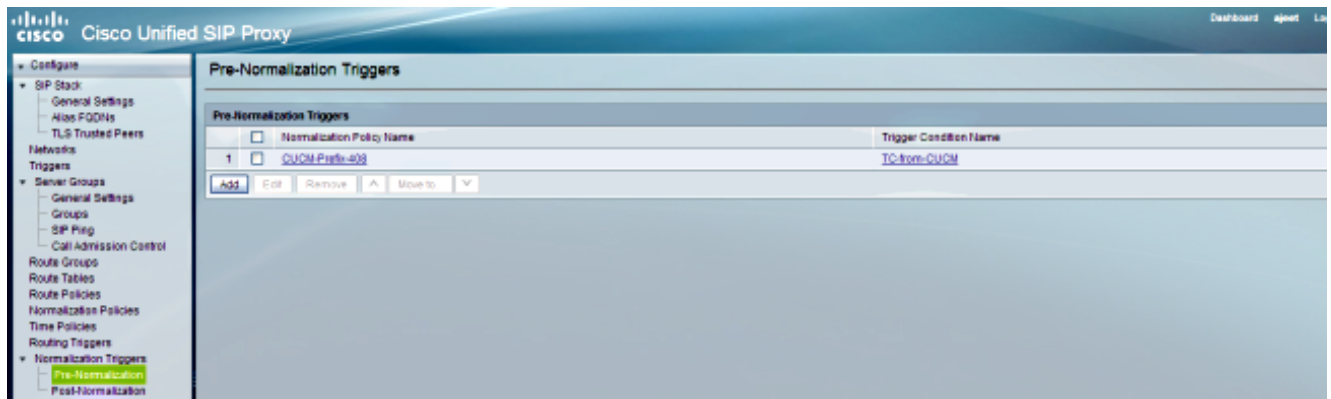
```
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250
conditions.RegexCondition - inNetwork='Net-PSTN'
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250
conditions.RegexCondition - IN_NETWORK: Net-PSTN
```

3. De pre-normalisatie volgorde wordt uitgevoerd.

CLI

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

GUI



DEBUG

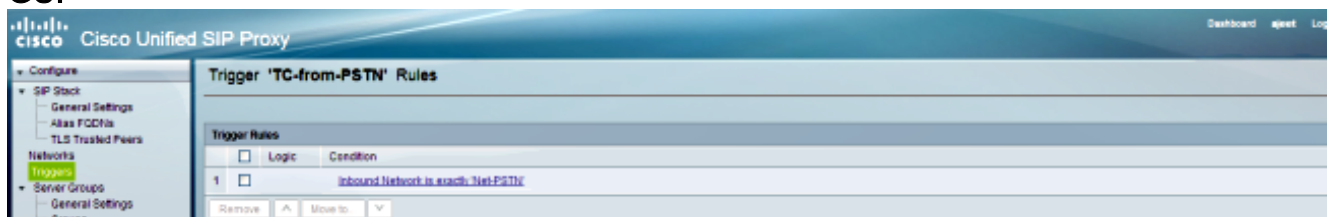
```
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 util.Normalization -
Entering Normalization(moduleRequest:pre-normalize)
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition -
inNetwork='Net-PSTN'
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition -
IN_NETWORK: Net-PSTN
[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. De Trigger Condition (TC-van-PSTN) wordt aangepast.

CLI

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

GUI



DEBUG

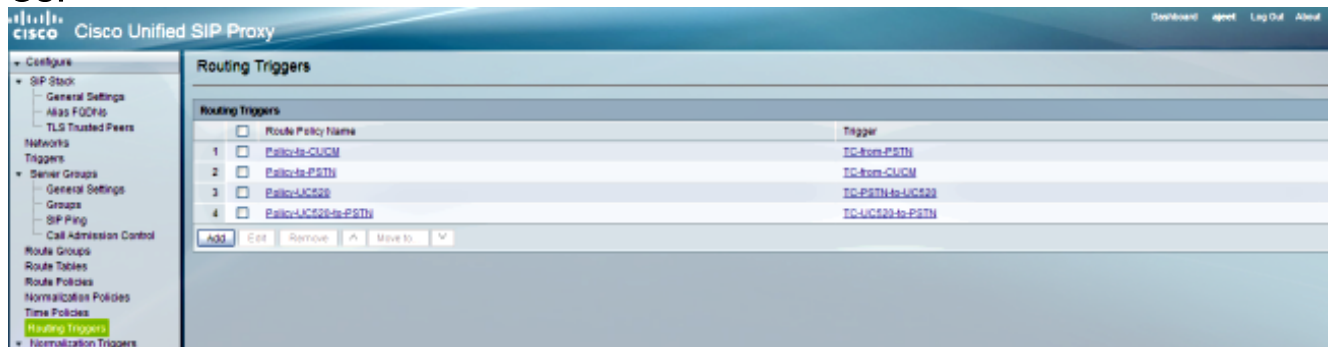
```
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition -
inNetwork='Net-PSTN'
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.RegexCondition -
IN_NETWORK: Net-PSTN
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:250 conditions.AbstractRegexCondition -
pattern(`\QNet-PSTN\E$), toMatch(Net-PSTN)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

5. De configuratie van de Studie van het Routing Station wordt gecontroleerd om het routebeleid (beleid-naar-CUCM) te vinden dat overeenkomt met de basis van de voorwaarden van de trigger (TC-van-PSTN).

CLI

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

GUI



DEBUG

```
[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 ...
```

6. De configuratie van het Route Policy (Policy-to-CUCM) wordt gecontroleerd om de routeswitch-tabel (RT-CUCM) te vinden die overeenkomt met de huidige overeenkomsten.

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



DEBUG

```
[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. De configuratie van de RT-CUCM (Route Table) wordt gecontroleerd om de doelbestemming te vinden (SG-CUCM.ajeet.com).

CLI

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

GUI

The top screenshot shows the 'Route Table 'RT-CUCM' Routes' configuration page. The table below is a representation of the data shown in the screenshot:

<input type="checkbox"/> State	Key	Route Group	Target Destination	Next Hop	Response	Lookup Route Policy	Default SIP Route	Network
<input type="checkbox"/> Active	1111	-	SG-CUCM.ajeet.com	-	-	-	-	Net-CUCM

The bottom screenshot shows the 'Route Table 'RT-CUCM' Route' configuration page. The form fields are as follows:

- Active Value:
- Key: 1111
- Route Type: destination
- Host / Server Group: SG-CUCM.ajeet.com
- Port:
- Transport Type: none
- Network: Net-CUCM

DEBUG

```
[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, lookuplength=-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
```

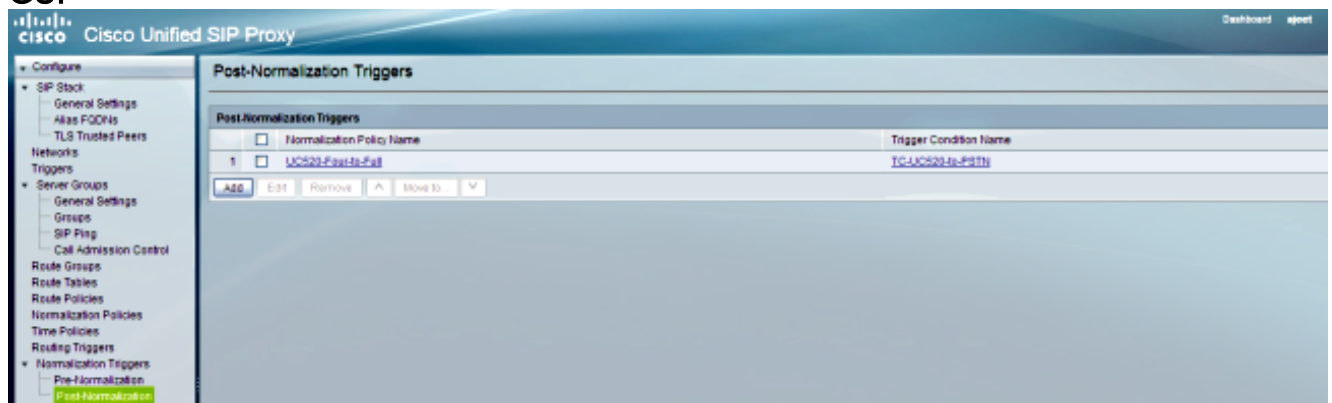
8. De Post-Normalisatie sequentie wordt uitgevoerd.

Opmerking: Dit scenario maakt geen gebruik van Post-Normalisatie, wat de reden is dat Post-Normalisatie in de deposito's is overgeslagen.

CLI

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

GUI



DEBUG

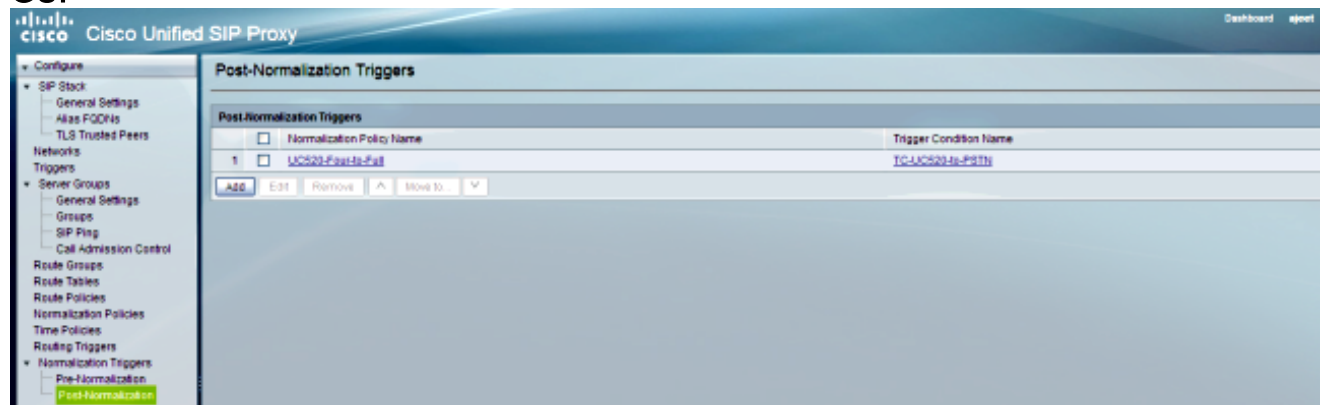
```
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 util.Normalization -  
Entering Normalization(moduleRequest:post-normalize)  
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 conditions.RegexCondition -  
inNetwork='Net-PSTN'  
[REQUESTI.12] DEBUG 2013.02.27 19:15:59:254 conditions.RegexCondition -  
IN_NETWORK: 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
```

9. De configuratie van de servergroep wordt gecontroleerd om het IP-adres van het element te vinden en de oproep wordt naar de best mogelijke route gestuurd op basis van de configuratie van de Q-waarde en het gewicht.

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



DEBUG

```
[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 INVITE wordt naar het geselecteerde element verzonden.

```
[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
```

Opmerking: Sommige apparaten, zoals CUCM, valideren de Uniform Resource Identifier (URI) van verzoeken voordat ze worden verwerkt, wat betekent dat het eindapparaat mogelijk moet worden geconfigureerd met de Full Qualified Domain Name (FQDN) om dit toe te staan.

In het geval van CUCM moet **CUCM > System > Enterprise Parameter > Cluster-breedband Domain Configuration > Cluster Full Qualified Domain Name** dezelfde zijn als de naam van de servergroep.

Clusterwide Domain Configuration	
Organization Top Level Domain	<input type="text"/>
Cluster Fully Qualified Domain Name	SG-CUCM.ajeet.com

Scenario 2

Call Flow: IP-telefoon 1 — CUCM — SIP — CUSP — SIP — CME — IP-telefoon 2

Bel 202 222 vanaf IP-telefoon 2.408 moet met pre-normalisatie worden uitgevoerd om IP-telefoon 1 te bereiken.

CME treedt in dit scenario op als PSTN.

1. SIP INVITE komt vanuit CUCM naar CUSP.

```
[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: 2347062528-0000065536-0000000107-3225452558
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 ---

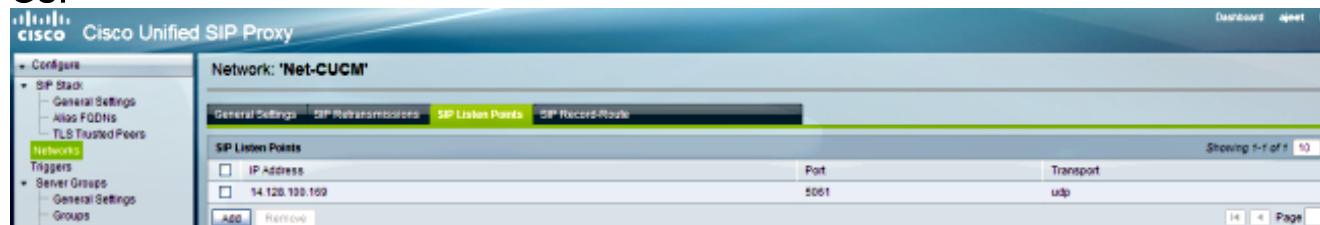
2. De oproep wordt ingewilligd op de netwerkconfiguratie (Net-CUCM) die overeenkomt met de inhoud.

CLI

```
sip listen Net-CUCM udp 14.128.100.169 5061

!
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
!
```

GUI



DEBUG

```
[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
```

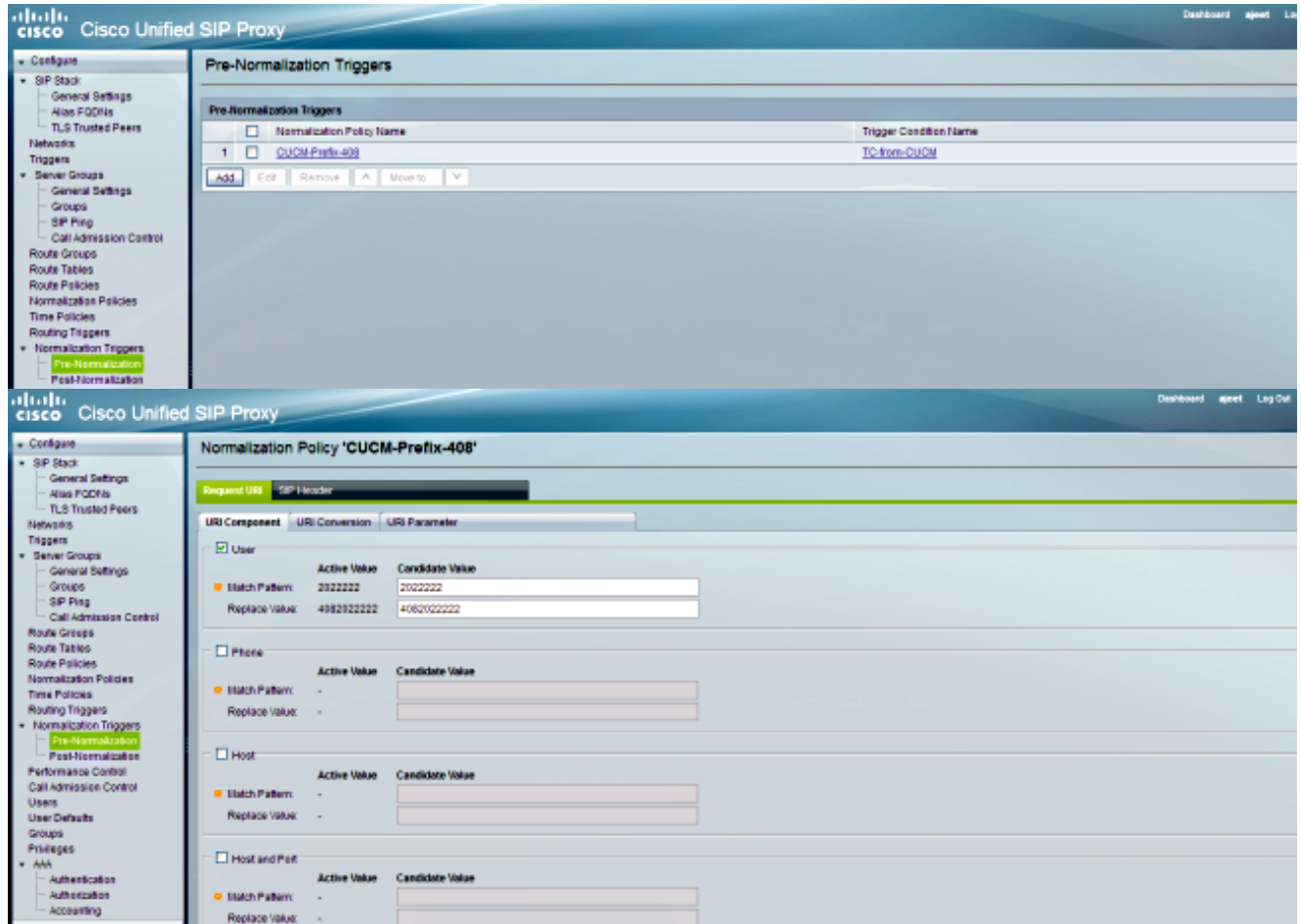
3. De pre-normalisatie volgorde wordt uitgevoerd.

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  
end policy  
!
```

GUI



DEBUG

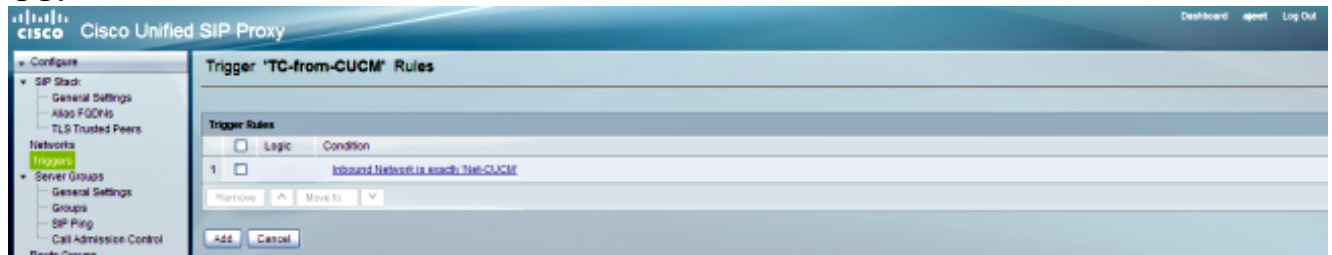
```
[REQUESTI.12] DEBUG 2013.02.28 00:34:03:373 util.Normalization -  
Entering Normalization(moduleRequest:pre-normalize  
) [REQUESTI.12] DEBUG 2013.02.28 00:34:03:373 conditions.RegexCondition -  
inNetwork='Net-CUCM'  
[REQUESTI.12] DEBUG 2013.02.28 00:34:03:373 conditions.RegexCondition -  
IN_NETWORK: 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. De Trigger Condition (TC-van-CUCM) is vergelijkbaar.

CLI

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

GUI



DEBUG

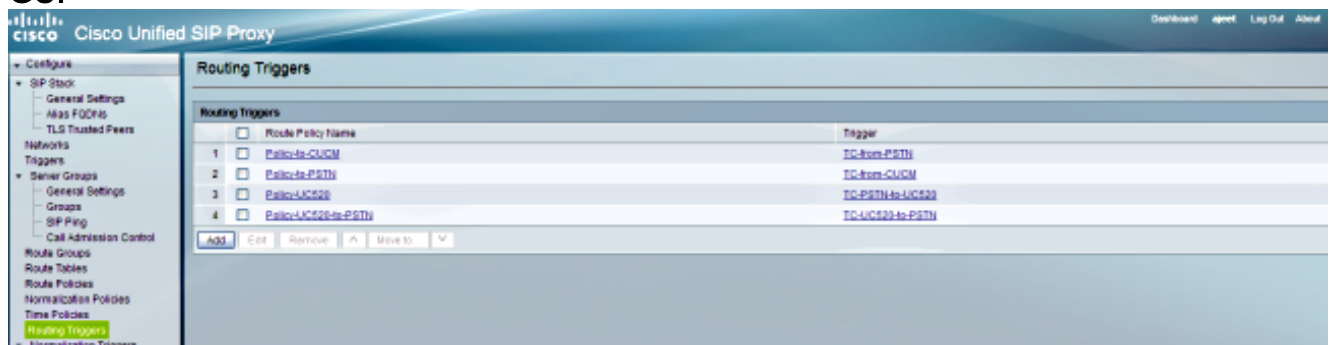
```
[REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.RegexCondition -  
inNetwork='Net-CUCM'  
[REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.RegexCondition -  
IN_NETWORK: Net-CUCM  
[REQUESTI.12] DEBUG 2013.02.28 00:34:03:374 conditions.AbstractRegexCondition -  
pattern(^\\QNet-CUCM\\E$),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

5. De configuratie van de Routing Trigger wordt gecontroleerd om het routebeleid (Policy-to-PSTN) te ontdekken dat overeenkomt met de basis van de Trigger-conditionie (TC-van-CUCM).

CLI

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

GUI



DEBUG

```
[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 ...
```

- De configuratie van het Routebeleid (Policy-to-PSTN) wordt gecontroleerd om de routekaart (RT-PSTN) te vinden die overeenkomt met de betreffende opties.

CLI

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

GUI

The top screenshot shows the 'Route Policy 'Policy-to-PSTN' Steps' configuration page. It features a table with columns for 'Step', 'State', 'Key', 'Lookup Rule', and 'Route Table'. A single step is listed with 'Step' 1, 'State' Active, 'Key' RequestURI User, 'Lookup Rule' Exactly, and 'Route Table' RT-PSTN. Below the table are buttons for 'ADD', 'Remove', 'Revert', and 'Move to'. A 'Notes' section provides details on record status changes.

The bottom screenshot shows the 'Route Policy Step' configuration page. It includes fields for 'Route Table' (Name: RT-PSTN), 'Active Value' (RT-PSTN), and 'Candidate Value' (RT-PSTN). The 'Lookup Key Matches' field is set to 'Exactly' and 'Case Sensitive' is disabled. The 'Route Table Lookup Key' section shows 'Request URI' and 'User' as the key components. The 'Lookup Key Modifiers' section includes options for 'Regular Expression Match', 'Regular Expression Replace', 'Remove leading '+' symbol', and 'Remove separator characters', all of which are currently disabled.

DEBUG

```
[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:408202222@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
```

- De configuratie van de RT-PSTN (Route Table) wordt gecontroleerd om de doelbestemming (SG-PSTN) te vinden.

CLI

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

GUI

The top screenshot shows the Cisco Unified SIP Proxy GUI configuration page for 'Route Table 'RT-PSTN' Routes'. It features a table with columns: State, Key, Route Group, Target Destination, Next Hop, Response, Lookup Route Policy, Default SIP Route, and Network. A single route is listed with Key '4082022222', Route Group '-', Target Destination 'SG-PSTN', and Network 'Net-PSTN'. Below the table are buttons for 'Add', 'Remove', 'Revert', 'Import', and 'Export Active Routes'. A 'Note' section provides instructions for new, modified, deleted, and active records.

The bottom screenshot shows the configuration page for a specific 'Route Table 'RT-PSTN' Route'. It displays 'Active Value' and 'Candidate Value' sections. The 'Active Value' shows Key '4082022222', Route Type 'destination', Host/Server Group 'SG-PSTN', Port, Transport Type, and Network 'Net-PSTN'. The 'Candidate Value' section includes a radio button for 'Route Type' set to 'destination', radio buttons for 'Target Destination' (selected), 'Next Hop', and 'Both', a text field for 'Host/Server Group' containing 'SG-PSTN', and a dropdown for 'Network' set to 'Net-PSTN'. 'Update' and 'Cancel' buttons are at the bottom.

DEBUG

```
[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.  
Oradvice=[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,
lookupplengt=-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. De Post-Normalisatie sequentie wordt uitgevoerd.

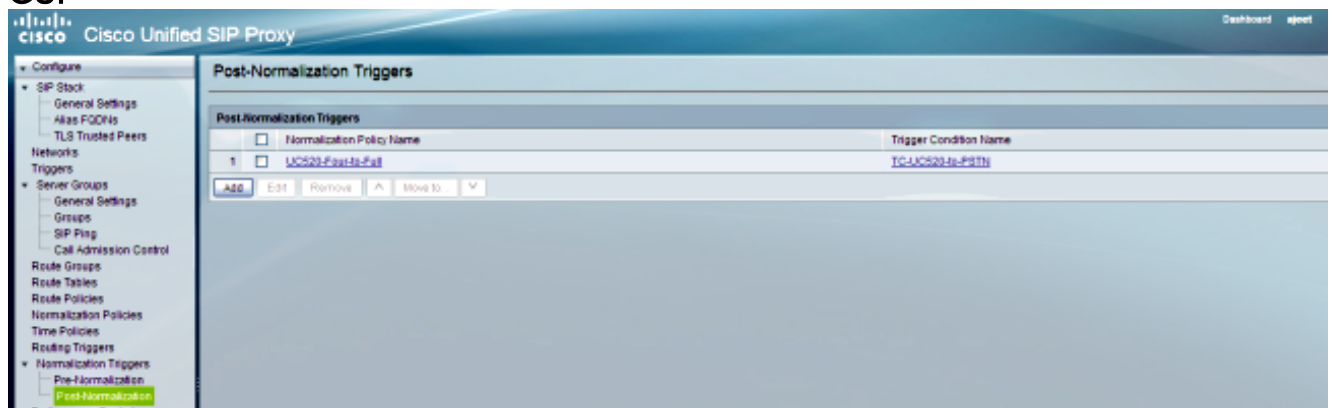
CLI

```

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

```

GUI



DEBUG

```

[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. De configuratie van de Server Group (SG-PSTN) wordt gecontroleerd om het IP-adres van het element te vinden en de vraag wordt naar de best mogelijke route routegebaseerd op de configuratie van de Q-waarde en het gewicht.

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



DEBUG

```
[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()
[REQUESTI.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 INVITE wordt naar het geselecteerde element verzonden.

```
[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~clb77ee1-4af9-4a41-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

Scenario 3

Call Flow: IP-telefoon 1 — CME 1 — SIP — CUSP — SIP — CME 2 — IP-telefoon 2

Bel 4001 of 4002 vanaf IP-telefoon 1 om een uitbreiding op IP-telefoon 2 te bereiken.

CME 2 is UC520 in dit scenario en CME 1 fungeert als PSTN.

1. SIP INVITE komt vanaf CUSP 1 (PSTN).

```
[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:85224044444@14.128.100.150>  
,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=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
```

--- end of packet ---

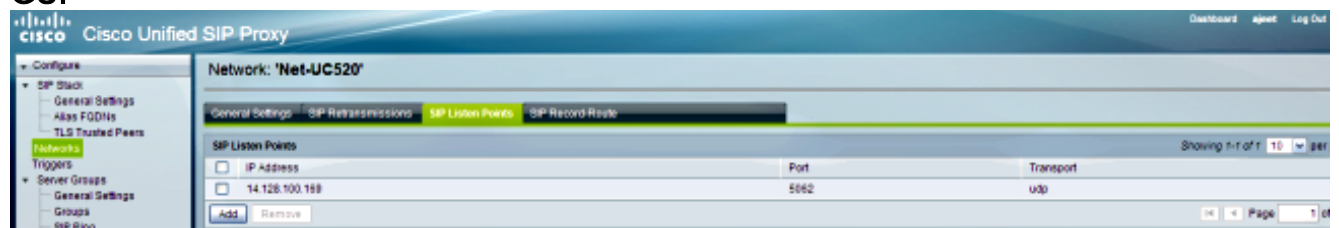
2. De oproep wordt geaccepteerd op de netwerkconfiguratie (Net-UC520) die aansluit.

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



DEBUG

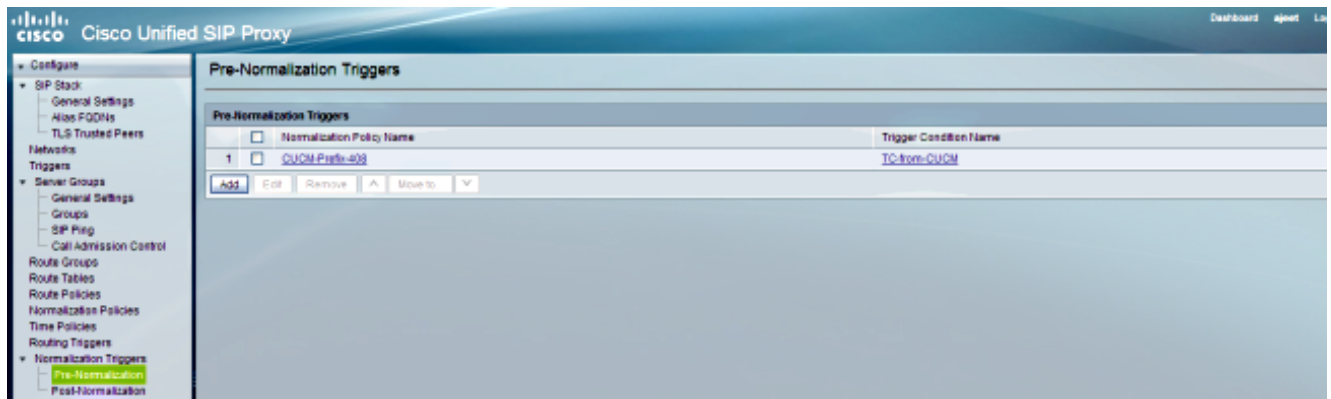
```
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 conditions.RegexCondition -
inNetwork='Net-UC520'
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 conditions.RegexCondition -
IN_NETWORK: Net-UC520
```

3. De pre-normalisatie volgorde wordt uitgevoerd.

CLI

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

GUI



DEBUG

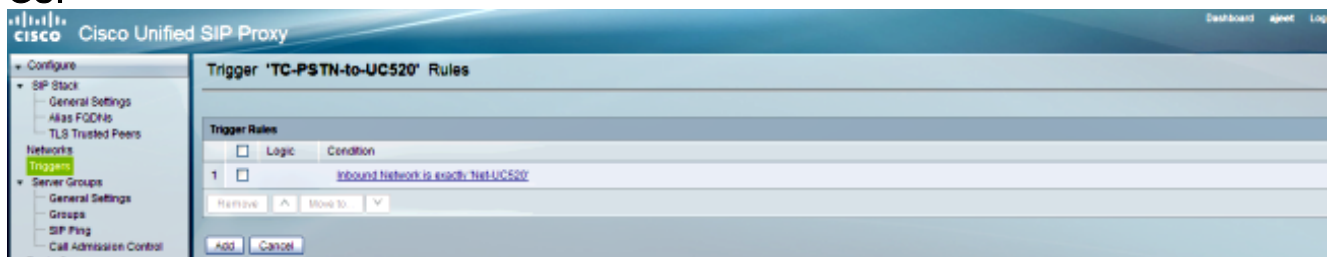
```
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 util.Normalization -
Entering Normalization(moduleRequest:pre-normalize)
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 conditions.RegexCondition -
inNetwork='Net-UC520'
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:362 conditions.RegexCondition -
IN_NETWORK: Net-UC520
[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. De triggerconditionering (TC-PSTN-to-UC520) is vergelijkbaar.

CLI

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

GUI



DEBUG

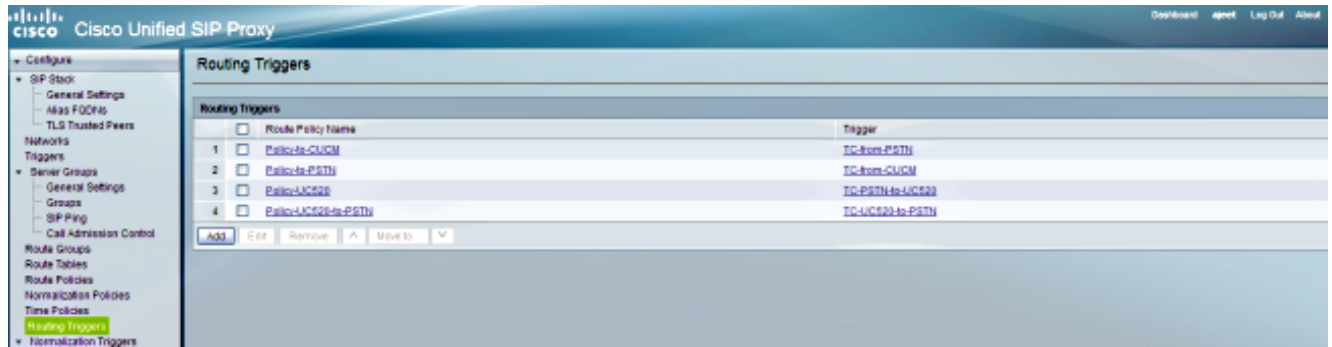
```
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 conditions.RegexCondition -
inNetwork='Net-UC520'
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 conditions.RegexCondition -
IN_NETWORK: Net-UC520
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 conditions.AbstractRegexCondition -
pattern(`\QNet-UC520\E$), toMatch(Net-UC520)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

5. De configuratie van de Routing Trigger wordt afgevinkt om het routebeleid (Policy-UC520) te vinden dat overeenkomt met de basis van de triggerconditionering (TC-PSTN-to-UC520).

CLI

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

GUI



DEBUG

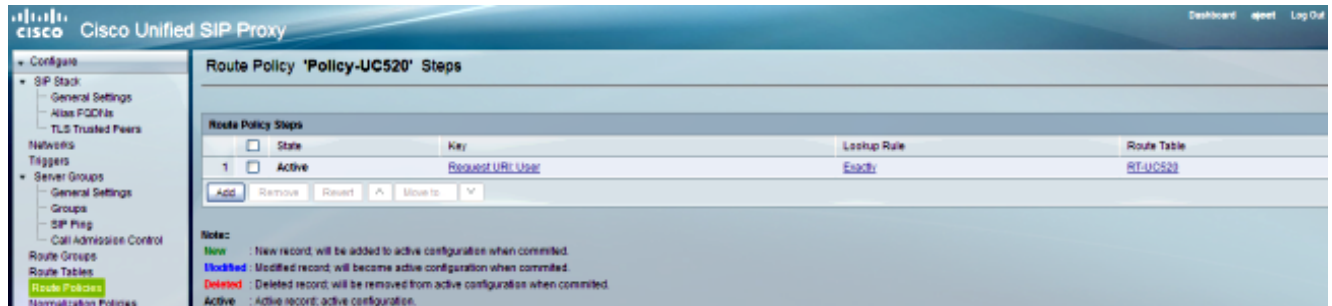
```
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 triggers.ModuleTrigger -  
ModuleTrigger.eval() action<Policy-UC520> actionParameter<>  
[REQUESTI.10] DEBUG 2013.02.28 05:28:57:363 triggers.ModuleTrigger -  
ModuleTrigger.eval() got the policy, executing it ...
```

6. De configuratie van het Routebeleid (Policy-UC520) wordt gecontroleerd om de routekaart (RT-UC520) te vinden die overeenkomt.

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



DEBUG

```

[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. De configuratie van de routetabel (RT-UC520) wordt gecontroleerd om de doelbestemming (RG-UC520) te vinden.

CLI

```

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

```

GUI

The top screenshot shows the 'Route Table 'RT-UC520' Routes' configuration page. It features a table with columns: State, Key, Route Group, Target Destination, Next Hop, Response, Lookup Route Policy, Default SIP Route, and Network. The table contains one active route with Key '2222' and Route Group 'RG-UC520'. Below the table are buttons for 'Add', 'Remove', 'Reset', 'Import', and 'Export Active Routes'. A note section explains the status of records: New (added to active), Modified (becomes active), Deleted (removed from active), and Active (active configuration).

The bottom screenshot shows the 'Route Table 'RT-UC520' Route' configuration page. It displays the configuration for a specific route with the following details: Active Value (Key: 2222, Route Type: route-group, Route Group: RG-UC520). The Candidate Value section shows: Key: 2222, Route Type: route-group, and Route Group: RG-UC520. There are 'Update' and 'Cancel' buttons at the bottom.

DEBUG

```

[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. De Post-Normalisatie sequentie wordt uitgevoerd.

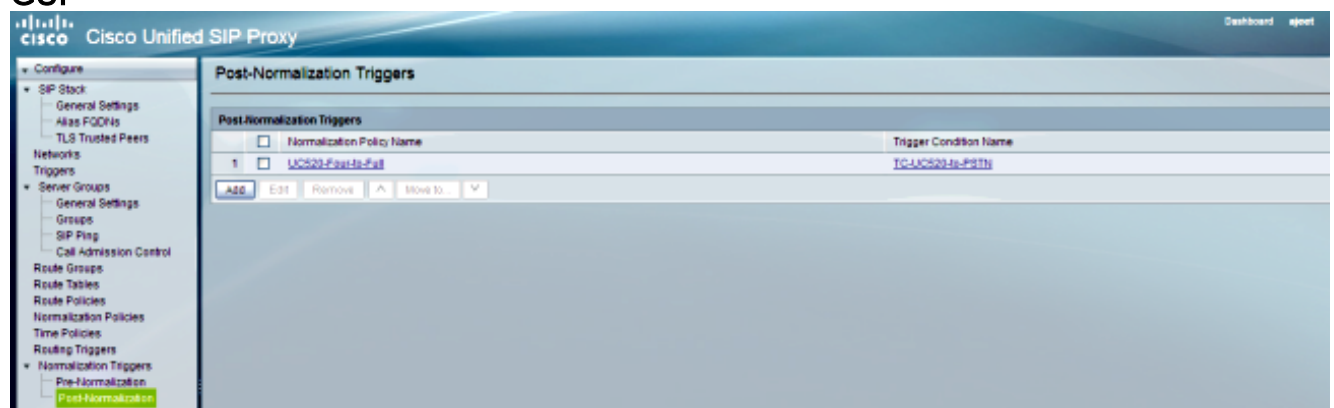
CLI

```

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

```

GUI



DEBUG

```

[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

```

- De configuratie van de Routegroep wordt gecontroleerd om het IP-adres van het element te vinden en de vraag wordt naar de best mogelijke route gestuurd op basis van de instelling Q-waarde en Gewicht.

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

The image displays three screenshots of the Cisco Unified SIP Proxy GUI, illustrating the configuration process for a Route Group and its associated Server Group.

Top Screenshot: Route Group 'RG-UC520'
 This screenshot shows the configuration page for the Route Group 'RG-UC520'. The 'Elements' tab is selected, displaying a table of Route Group Elements. The table has columns for State, Host / Server Group, Port, Transport, Next Hop, Network, Q-Value, Weight, Time Policy, and Failover Response Codes. One element is listed as Active, with Host / Server Group 'SG-UC520', Network 'Net-UC520', Q-Value '1.0', and Weight '0'. Below the table, there are 'Add', 'Remove', and 'Reset' buttons. A 'Notes' section provides information about record states: New (added to active), Modified (becomes active), Deleted (removed from active), and Active (active).

Middle Screenshot: Route Group 'RG-UC520' Element
 This screenshot shows the configuration page for a specific element within the Route Group 'RG-UC520'. The 'Target Destination' section includes fields for Host / Server Group (set to 'SG-UC520'), Port, and Transport Type (set to 'None (Default)'). The 'Options' section includes fields for Network (set to 'Net-UC520'), Q-Value (set to '1.0'), Weight (set to '0'), Time Policy (set to 'None'), and Failover Response Codes (set to '502-503'). There are 'Update' and 'Cancel' buttons at the bottom.

Bottom Screenshot: Server Group 'SG-UC520'
 This screenshot shows the configuration page for the Server Group 'SG-UC520'. The 'Elements' tab is selected, displaying a table of Server Group Elements. The table has columns for State, IP Address, Port, Transport, Nested Server Group, Q-Value, and Weight. One element is listed as Active, with IP Address '14.128.100.161', Port '5060', Transport 'udp', and Q-Value '1.0'. Below the table, there are 'Add', 'Remove', and 'Reset' buttons.

DEBUG

```

[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 INVITE wordt naar het geselecteerde element verzonden.

```

[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:85224044444@14.128.100.150:5060>
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
```

Scenario 4

Call Flow: IP-telefoon 1 — CME 1 — SIP — CUSP — SIP — CME 2 — IP-telefoon 2

Bel 4444 vanaf IP-telefoon 2, die wordt gewijzigd in 415 240 444 met Post-Normalisatie om IP-telefoon 1 te bereiken.

CME 2 is UC520 in dit scenario en CME 1 fungeert als PSTN.

1. SIP INVITE komt vanaf CUSP 2 (UC520).

```
[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:4444@14.128.100.169:5063 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. De oproep wordt geaccepteerd op de netwerkconfiguratie (Net-From-UC520) die overeenkomt met de netwerkconfiguratie.

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
!

```

GUI



DEBUG

```

[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. De pre-normalisatie volgorde wordt uitgevoerd.

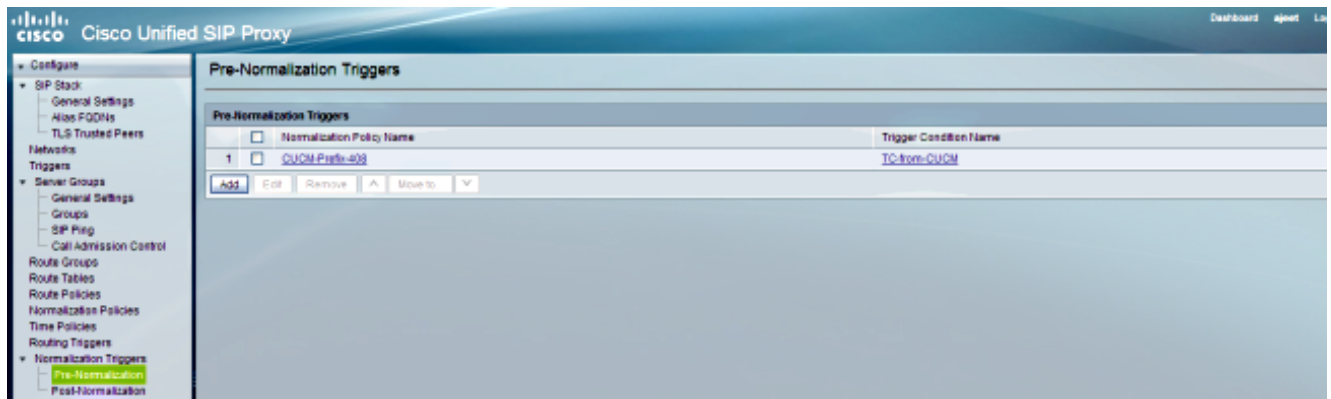
CLI

```

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

```

GUI



DEBUG

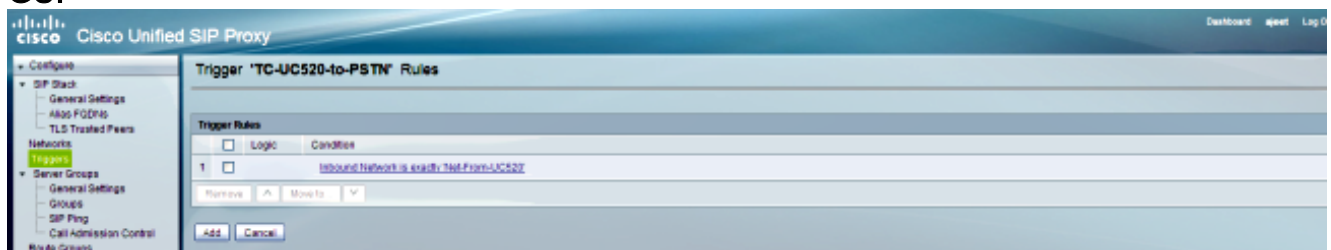
```
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 util.Normalization -
Entering Normalization(moduleRequest:pre-normalize)
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition -
inNetwork='Net-From-UC520'
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition -
IN_NETWORK: 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. De triggerconditionering (TC-UC520-to-PSTN) is vergelijkbaar.

CLI

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

GUI



DEBUG

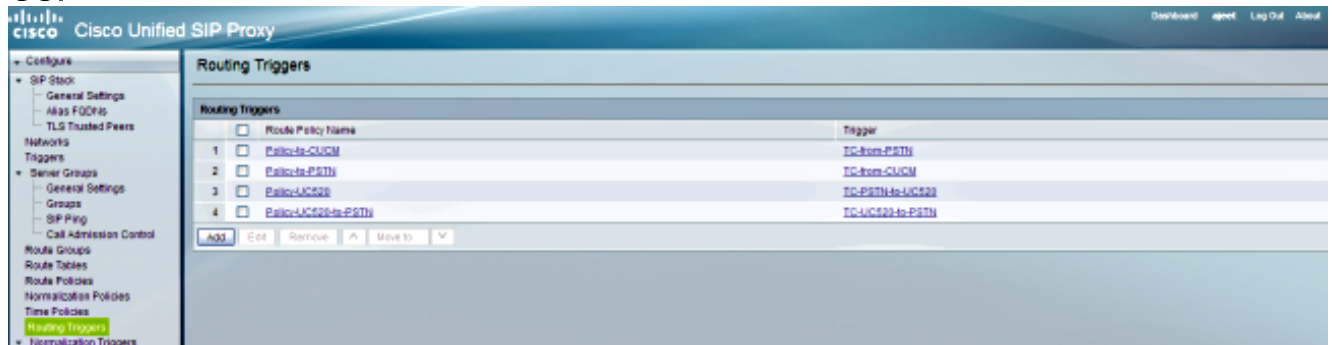
```
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition -
inNetwork='Net-From-UC520'
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:229 conditions.RegexCondition -
IN_NETWORK: Net-From-UC520
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:230 conditions.AbstractRegexCondition -
pattern(`\QNet-From-UC520\E$),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

5. De configuratie van de Routing Trigger wordt afgevinkt om het routebeleid (Policy-UC520-to-PSTN) te vinden dat overeenkomt met de basis van de triggerconditiontie (TC-UC520-to-PSTN).

CLI

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

GUI



DEBUG

```
[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. De configuratie van het Routebeleid (Policy-UC520-to-PSTN) wordt gecontroleerd om de routeswitch (RT-UC520-PSTN) te vinden die overeenkomt met de betreffende tabel.

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



DEBUG

```

[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. De configuratie van de routetabel (RT-UC520-PSTN) wordt gecontroleerd om de beoogde bestemming (RG-UC520) te vinden.

CLI

```

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

```

GUI

The top screenshot shows the 'Route Table 'RT-UC520-PSTN' Routes' configuration page. It features a table with columns: State, Key, Route Group, Target Destination, Next Hop, Response, Lookup Route Policy, and Default SIP Route. The table contains one entry with Key '3333' and Route Group 'RG-UC520-PSTN'. Below the table are buttons for 'Add', 'Remove', 'Reset', 'Import', and 'Export Active Routes'. A notice section indicates that new records will be added to active configuration when committed, modified records will become active, and deleted records will be removed.

The bottom screenshot shows the 'Route Table 'RT-UC520-PSTN' Route' configuration page. It displays the 'Active Value' section with fields for Key (3333), Route Type (route-group), and Route Group (RG-UC520-to-PSTN). The 'Candidate Value' section shows a dropdown for Key (3333), a dropdown for Route Type (route-group), and a dropdown for Route Group (RG-UC520-to-PSTN). There are 'Update' and 'Cancel' buttons at the bottom.

DEBUG

```

[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, lookuplength=-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. De Post-Normalisatie sequentie wordt uitgevoerd.

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

The top screenshot shows the 'Post-Normalization Triggers' configuration page in the Cisco Unified SIP Proxy GUI. The left sidebar shows the configuration tree with 'Post-Normalization' selected. The main area displays a table of triggers:

Post-Normalization Triggers	Trigger Condition Name
1 UC520-Four-to-Full	TC-UC520-to-PSTN

The bottom screenshot shows the 'Normalization Policy UC520-Four-to-Full' configuration page. The 'Request URI' is set to 'SIP Header'. Under 'URI Component', the 'User' component is selected. The 'Match Pattern' is '4444' and the 'Candidate Value' is '85224044444'.

DEBUG

```
[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. De configuratie van de Routegroep wordt gecontroleerd om het IP-adres van het element te vinden en de vraag wordt naar de best mogelijke route gestuurd op basis van de instelling Q-waarde en Gewicht.

CLI

```
!  
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

The top screenshot shows the Cisco Unified SIP Proxy GUI configuration page for the Route Group 'RG-UC520-to-PSTN'. The 'Route Group Elements' table is as follows:

State	Host/Server Group	Port	Transport	Next Hop	Network	Q-value	Weight	Time Policy	Fallover Response Codes
<input checked="" type="checkbox"/>	14.128.100.150	-	-	-	Net-From-UC520	1.0	0	-	{502, 503}

The bottom screenshot shows the configuration page for the 'Route Group 'RG-UC520-to-PSTN' Element'. The 'Target Destination' section has 'Host/Server Group' set to 14.128.100.150. The 'Options' section shows the following values:

Option	Active Value	Candidate Value
Network	Net-From-UC520	Net-From-UC520
Q-Value	1.0	1.0
Weight	0	0
Time Policy	None	None
Fallover Response Codes	502,503	502,503

DEBUG


```
[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, q-value=1.0radvance=[502, 503]
[REQUESTI.5] DEBUG 2013.02.28 07:06:57:232 loadbalancer.LBBase -
Leaving getServer()
```

10. SIP INVITE wordt naar het geselecteerde element verzonden.

```
[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
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=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
```

Configuratie voor alle vier scenario's

Hier is de volledige CUSP-configuratie voor alle vier de callscenario's die in dit document worden beschreven:

```
ajeesting-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
!
no sip header-compaction
!
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
!
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
!
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
!
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
!
sip queue request
drop-policy head
low-threshold 80
size 2000
thread-count 20
```

```
end queue
!
sip queue response
drop-policy head
low-threshold 80
size 2000
thread-count 20
end queue
!
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
!
route recursion
!
sip tcp connection-timeout 30
sip tcp max-connections 256
!
no sip tls
!
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
!
trigger condition TC-UC520-to-PSTN
sequence 1
in-network ^\QNet-From-UC520\E$
end sequence
end trigger condition
!
trigger condition TC-from-CUCM
sequence 1
in-network ^\QNet-CUCM\E$
end sequence
end trigger condition
!
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
!
trigger condition mid-dialog
sequence 1
mid-dialog
end sequence
end trigger condition
!
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
!
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
!
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
!
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
!
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
!
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
!
route table RT-UC520
key 2222 group RG-UC520
end route table
!
```

```
route table RT-UC520-PSTN
key 3333 group RG-UC520-to-PSTN
end route table
!
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
!
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
!
policy lookup Policy-to-CUCM
sequence 100 RT-CUCM request-uri uri-component user
modify-key 4082022102 1111
rule exact
end sequence
end policy
!
policy lookup Policy-to-PSTN
sequence 100 RT-PSTN request-uri uri-component user
rule exact
end sequence
end policy
!
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
!
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  
!  
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  
!  
end  
ajeeting-cusp-8.5.3(cusp)#
```

Verifiëren

Er is momenteel geen verificatieprocedure beschikbaar voor deze configuratie.

Problemen oplossen

Er is momenteel geen specifieke troubleshooting-informatie beschikbaar voor deze configuratie.

Gerelateerde informatie

- [CLI Configuration Guide voor Cisco Unified SIP Proxy release 8.5](#)
- [GUI-beheergids voor Cisco Unified SIP Proxy release 8.5](#)
- [CUSP-gespreksverwerking](#)
- [Technische ondersteuning en documentatie – Cisco Systems](#)