# 在ISE 2.2上配置TrustSec多個矩陣

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## 簡介

本檔案介紹在思科身分識別服務引擎(ISE)2.2中使用多個TrustSec矩陣和DefCon矩陣。這是在ISE 2.2中引入的新TrustSec功能，可改善網路中的粒度。

## 必要條件

### 需求

思科建議您瞭解以下主題：

- Cisco TrustSec(CTS)元件的基礎知識
- Catalyst交換機CLI配置基礎知識
- 身分識別服務引擎(ISE)配置體驗

## 採用元件

本文中的資訊係根據以下軟體和硬體版本：

- 身分識別服務引擎2.2
- Cisco Catalyst交換機3850 03.07.03.E
- Cisco Catalyst交換器3750X 15.2(4)E1
- Windows 7電腦

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路正在作用，請確保您已瞭解任何指令可能造成的影響。

# 背景資訊

在ISE 2.0中，所有網路裝置可能僅使用一個生產TrustSec矩陣。ISE 2.1新增了稱為暫存矩陣的功能，可用於測試和實施。在暫存矩陣中建立的策略僅應用於用於測試的網路裝置。其餘裝置仍使用生產矩陣。一旦確認暫存矩陣工作正常，所有其它裝置都可以移到該暫存矩陣中，它便成為新的生產矩陣。

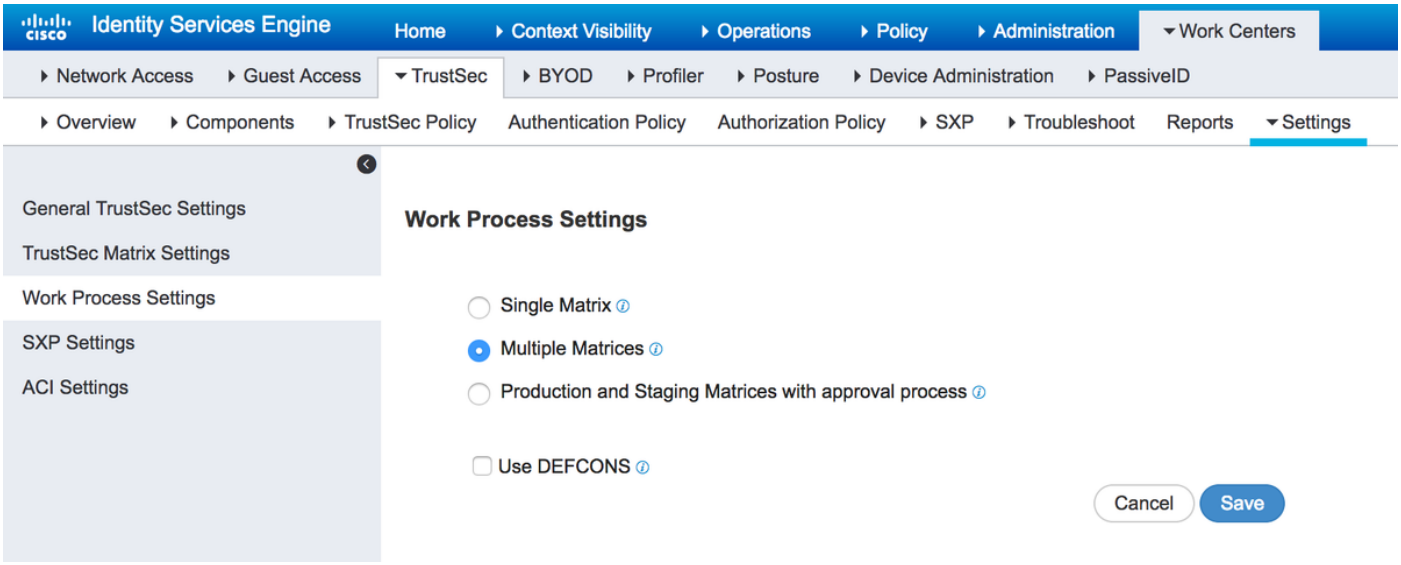
ISE 2.2具有兩項新的TrustSec功能：

1. 多個矩陣 — 能夠將不同的矩陣分配給網路裝置
2. DefCon matrix — 此矩陣在特殊情況下推送到所有網路裝置，由管理員觸發

可以在ISE 2.2中使用單個矩陣功能或生產和分期矩陣功能。

## 多矩陣

若要使用多個矩陣，必須在**工作中心> TrustSec >設定>工作進程設定**下啟用此選項，如下圖所示：



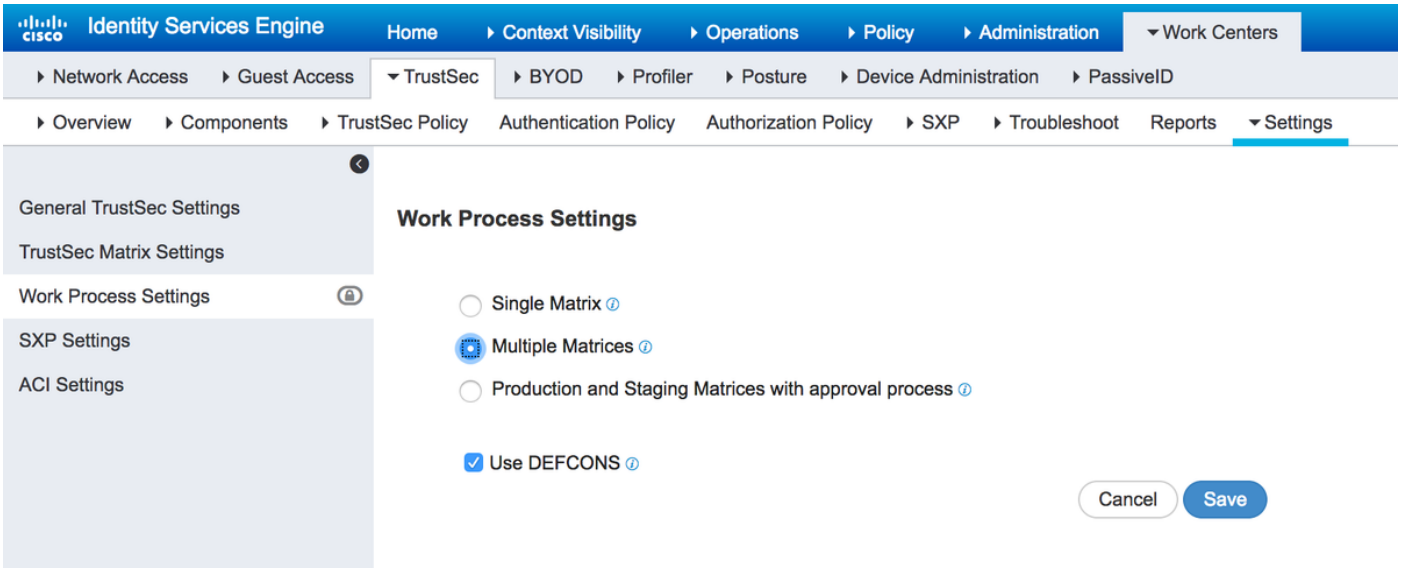

啟用該功能後，您可以建立新矩陣，稍後將網路裝置分配到特定矩陣。

## DefCon矩陣

DefCon矩陣是特殊矩陣，隨時可以部署。部署時，所有網路裝置都會自動分配給此矩陣。ISE仍會記住所有網路裝置的最後一個生產矩陣，因此此更改可以在停用DefCon的任何時刻恢復。最多可以定義四個不同的DefCon矩陣：

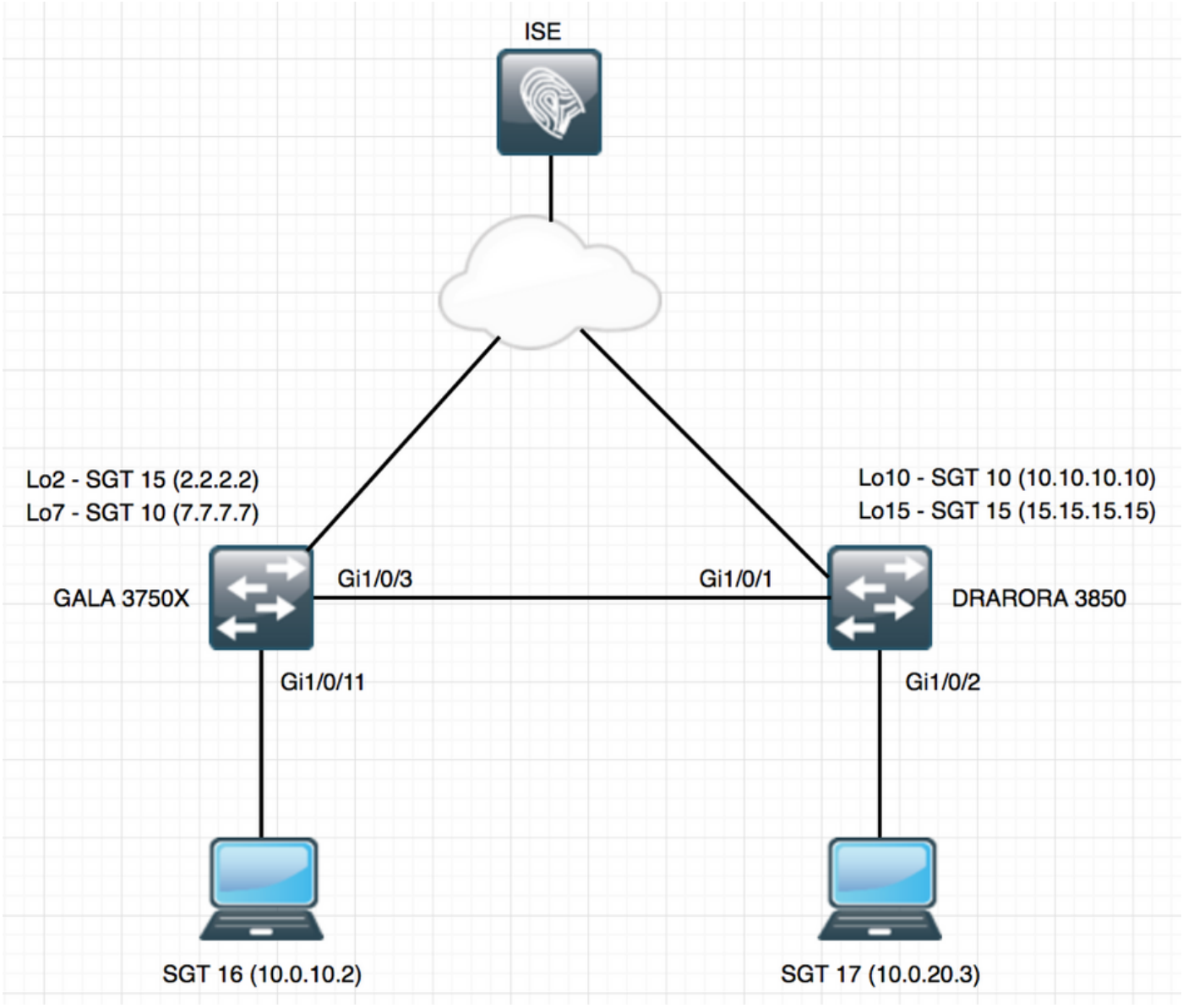
1. DefCon1 — 嚴重
2. DefCon2 — 嚴重
3. DefCon3 — 實質性
4. DefCon4 — 中等

DefCon矩陣可與所有三個工作流程選項結合使用：




# 設定

## 網路圖表




## 組態

要使用多個矩陣，必須在「工作進程設定」下啟用它。在此示例中，還啟用DefCon矩陣。

### 1. RADIUS/CTS的基本交換機配置

```
radius server ISE
 address ipv4 10.48.17.161 auth-port 1812 acct-port 1813
 pac key cisco

aaa group server radius ISE
 server name ISE
 ip radius source-interface FastEthernet0

ip radius source-interface FastEthernet0

aaa server radius dynamic-author
 client 10.48.17.161 server-key cisco

aaa new-model aaa authentication dot1x default group ISE aaa accounting dot1x default start-stop
group ISE
```

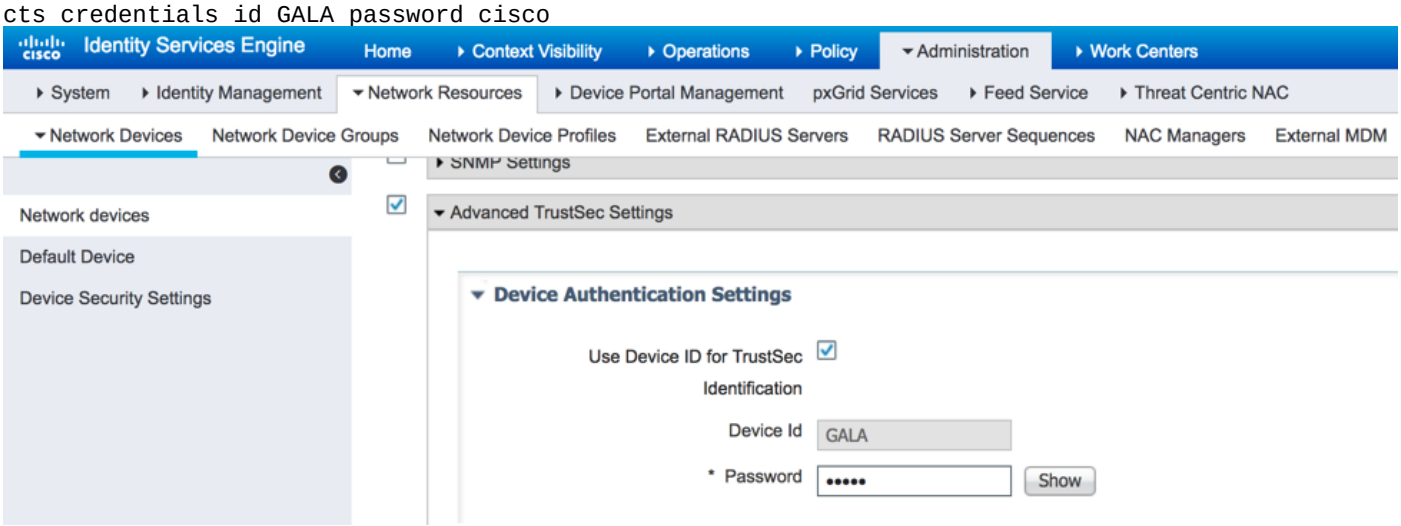
為了獲取CTS資訊，您必須建立CTS授權清單：

```
cts authorization list LIST
aaa authorization network LIST group ISE
```

## 2. CTS PAC

要從ISE接收CTS PAC（保護訪問憑證），必須在交換機和ISE上為網路裝置配置高級TrustSec配置下的相同憑證：

```
cts credentials id GALA password cisco
```




配置此配置後，交換機即可下載CTS PAC。在每個RADIUS請求中，PAC-Opaque的一部分作為AV對傳送到ISE，因此ISE可以驗證此網路裝置的PAC是否仍然有效：

```
GALA#show cts pacs
  AID: E6796CD7BBF2FA4111AD9FB4FEFB5A50
  PAC-Info:
    PAC-type = Cisco Trustsec
    AID: E6796CD7BBF2FA4111AD9FB4FEFB5A50
    I-ID: GALA
    A-ID-Info: Identity Services Engine
    Credential Lifetime: 17:05:50 CEST Apr 5 2017
  PAC-Opaque:
000200B000030001000400010E6796CD7BBF2FA4111AD9FB4FEFB5A5000060094000301001 2FABE10F3DCBCB152C54FA5
BFE124CB00000013586BB31500093A809E11A93189C7BE6EBDFB8FDD15B9B7252EB741ADCA3B2ACC5FD923AEB7BDFE48
A3A771338926A1F48141AF091469EE4AFC8C3E92A510BA214A407A33F469282A780E8F50F17A271E92D1FEE1A29ED427
B985F9A0E00D6CDC934087716F4DEAF84AC11AA05F7587E898CA908463BDA9EC7E65D827
  Refresh timer is set for 11y13w
```

## 3.交換機上的CTS配置。

下載PAC後，交換機可以請求其他CTS資訊（環境資料和策略）：

```
GALA#cts refresh environment-data

GALA#show cts environment-data
CTS Environment Data
====================
Current state = COMPLETE
Last status = Successful
Local Device SGT:
  SGT tag = 0-06:Unknown
```

```
Server List Info:
Installed list: CTSServerList1-0001, 1 server(s):
 *Server: 10.48.17.161, port 1812, A-ID E6796CD7BBF2FA4111AD9FB4FEFB5A50
          Status = ALIVE
          auto-test = TRUE, keywrap-enable = FALSE, idle-time = 60 mins, deadtime = 20 secs
Multicast Group SGT Table:
Security Group Name Table:
    0-ce:Unknown
    2-ce:TrustSec_Devices
    3-ce:Network_Services
    4-ce:Employees
    5-ce:Contractors
    6-ce:Guests
    7-ce:Production_Users
    8-ce:Developers
    9-ce:Auditors
    10-ce:Point_of_Sale_Systems
    11-ce:Production_Servers
    12-ce:Development_Servers
    13-ce:Test_Servers
    14-ce:PCI_Servers
    15-ce:BYOD
    255-ce:Quarantined_Systems
Environment Data Lifetime = 86400 secs
Last update time = 07:48:41 CET Mon Jan 2 2006
Env-data expires in   0:23:56:02 (dd:hr:mm:sec)
Env-data refreshes in 0:23:56:02 (dd:hr:mm:sec)
Cache data applied           = NONE
State Machine is running

GALA#cts refresh policy

GALA#show cts role-based permissions
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE
```

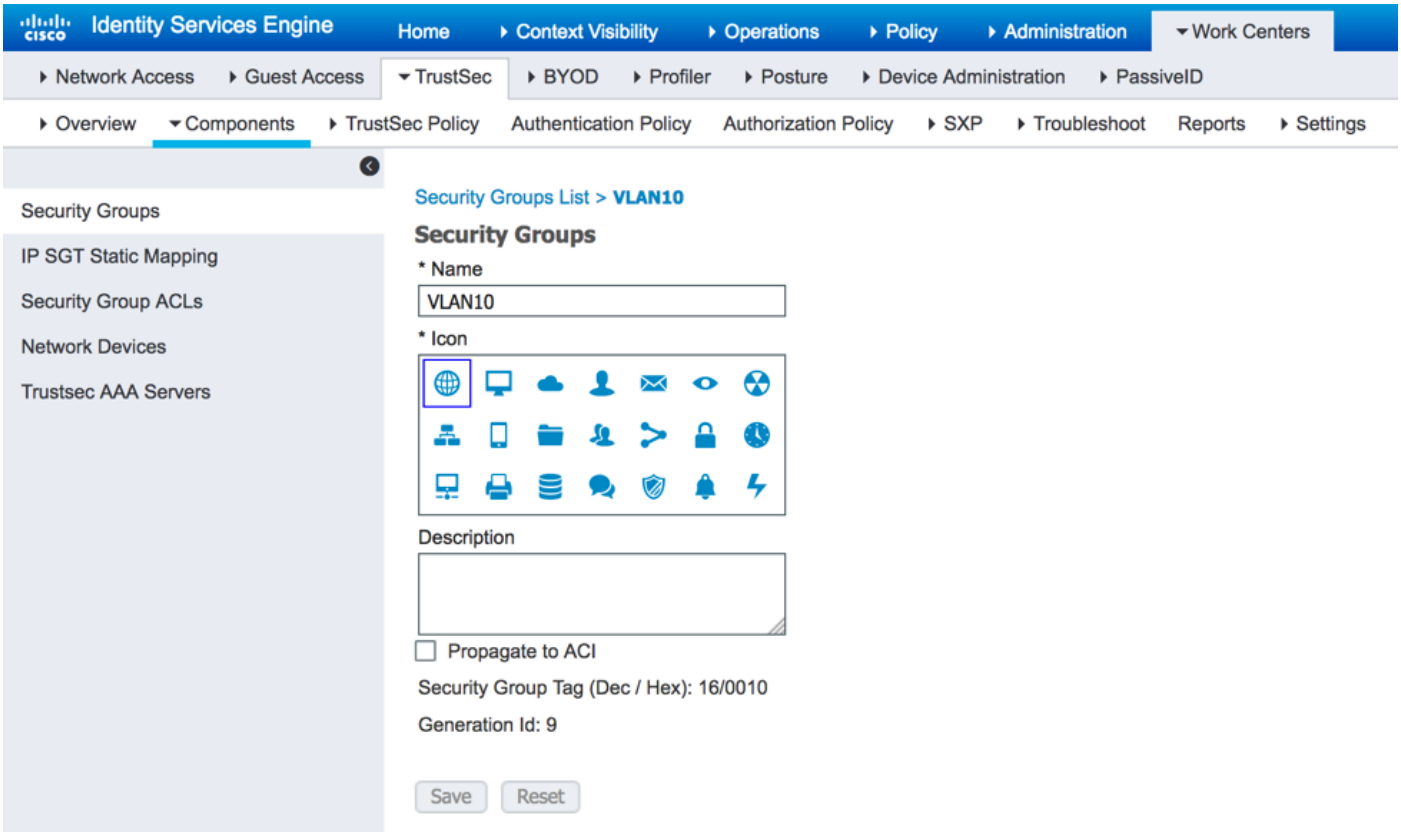
您可能會看到沒有從ISE下載策略，原因是交換機上未啟用CTS實施：

```
cts role-based enforcement
cts role-based enforcement vlan-list 1-4094

GALA#show cts role-based permissions
IPv4 Role-based permissions default:
Permit IP-00
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE
```

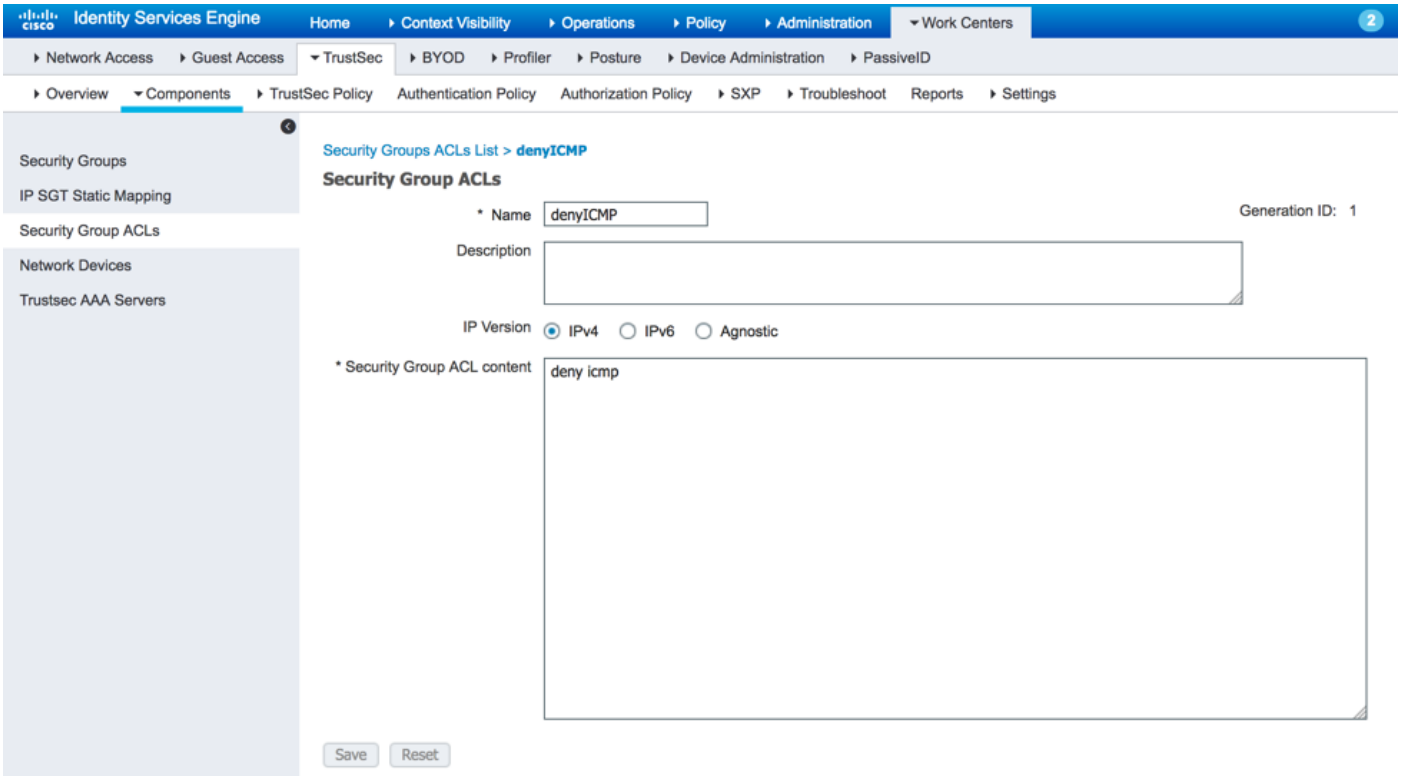
在這兩個輸出中，您都可以看到預設值 — 預設建立的SGT(0、2-15、255)和預設的**允許IP**策略。

### 4. ISE上的基本CTS配置。

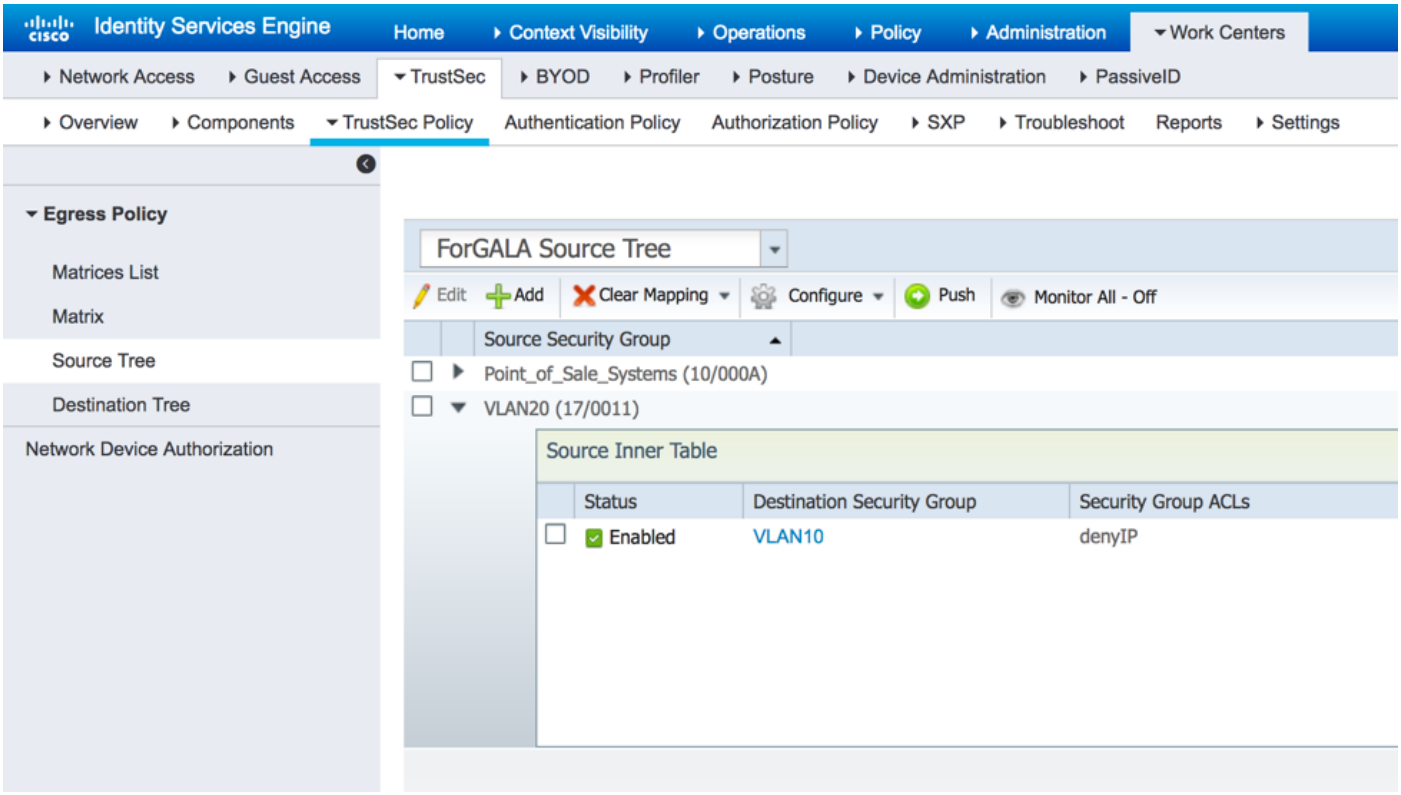
在ISE上建立新的安全組標籤(SGT)和少量策略，以便以後使用。導航到**工作中心(Work Centers)> TrustSec >元件(Components)>安全組(Security Groups)**，按一下**Add**以建立新的SGT:




要建立安全組訪問控制清單(SGACL)以進行流量過濾，請選擇**Security Group ACL**，如下圖所示：

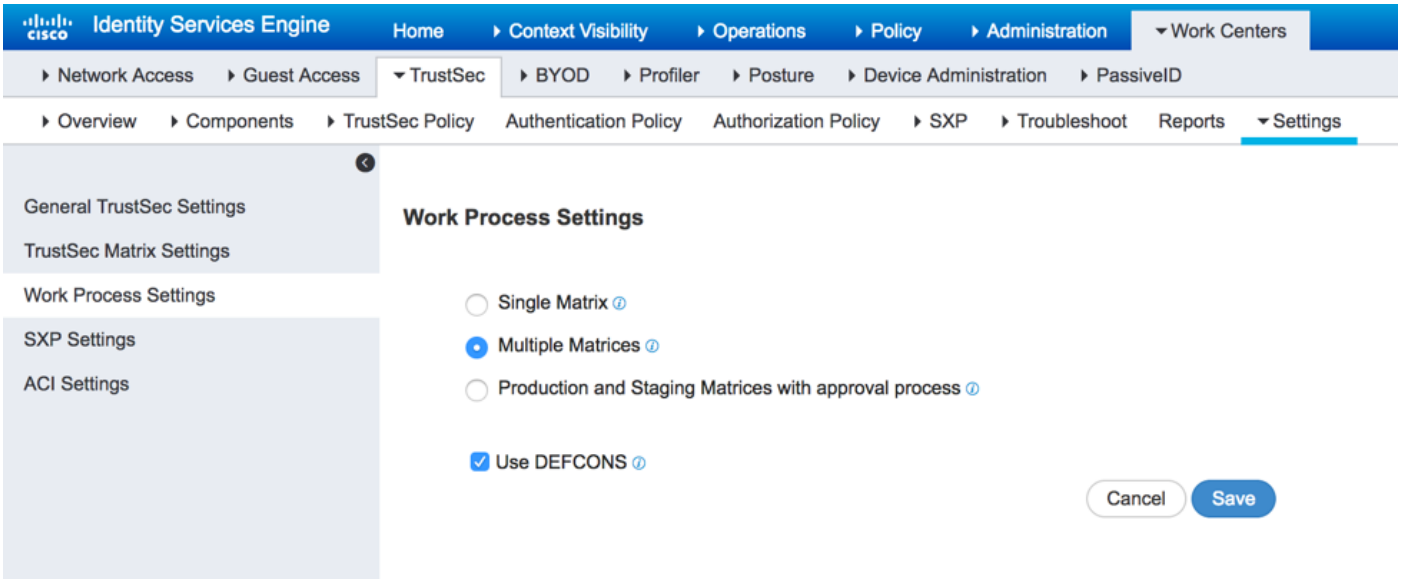



同樣，您可以建立其他SGT和SGACL。建立SGT和SGACL後，您可以在CTS策略中將它們連線在一起，為此，請導航到**Work Centers > TrustSec Policy > Egress Policy > Source Tree**，如下圖所示：



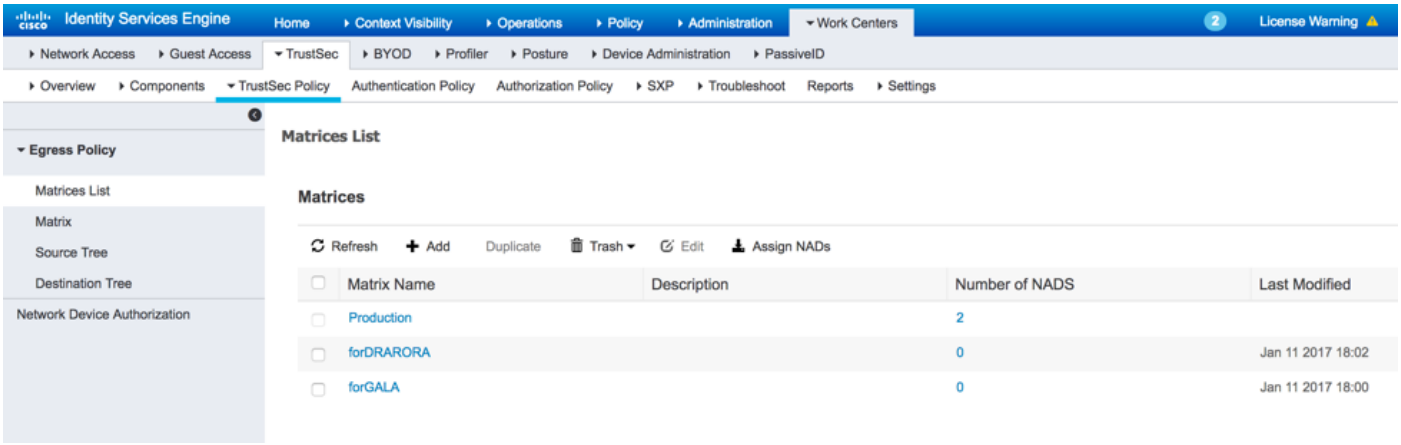

## 5. ISE上的多個矩陣和DefCon配置。

在本示例中，您已為矩陣ForGALA配置**策略**。要在矩陣之間切換，您可以使用下拉選單。要啟用多個矩陣，請導航到**工作中心> TrustSec >設定>工作進程設定**，然後啟用多個矩陣和DefCon矩陣，如下圖所示：

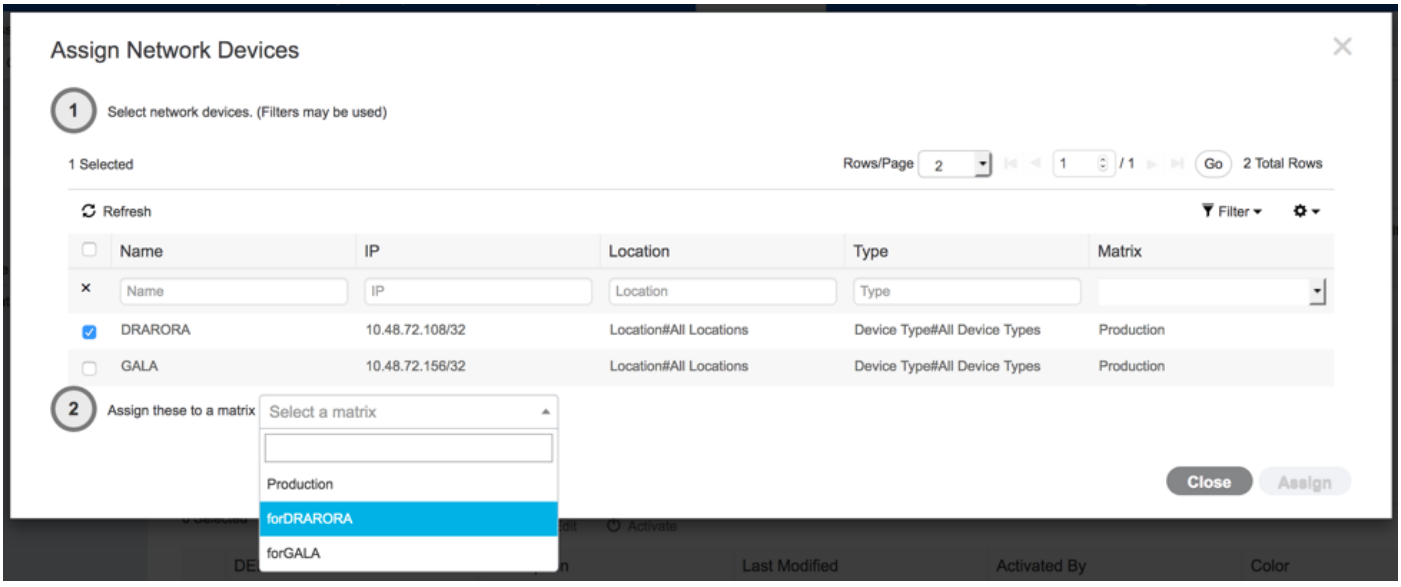



啟用此選項後，預設的生產矩陣將可用，但您可以建立其他矩陣。導航到**工作中心(Work Centers)> TrustSec > TrustSec Policy > Egress Policy > Matrices List**，然後點選Add:

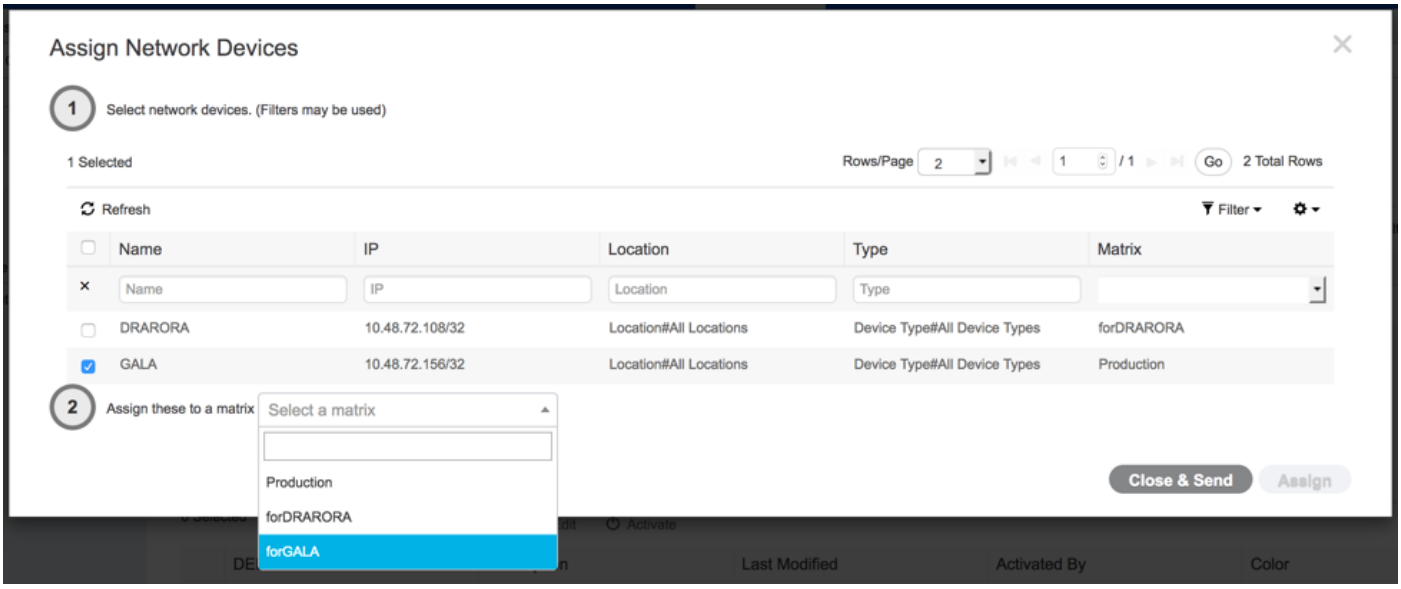

可以選擇從現有矩陣複製應成為新矩陣一部分的策略。建立兩個矩陣 — 一個用於3750X交換機，另一個用於3850交換機。建立矩陣後，您必須將網路裝置分配給這些矩陣，因為預設情況下所有啟用TrustSec的網路訪問裝置都將分配給Production矩陣。



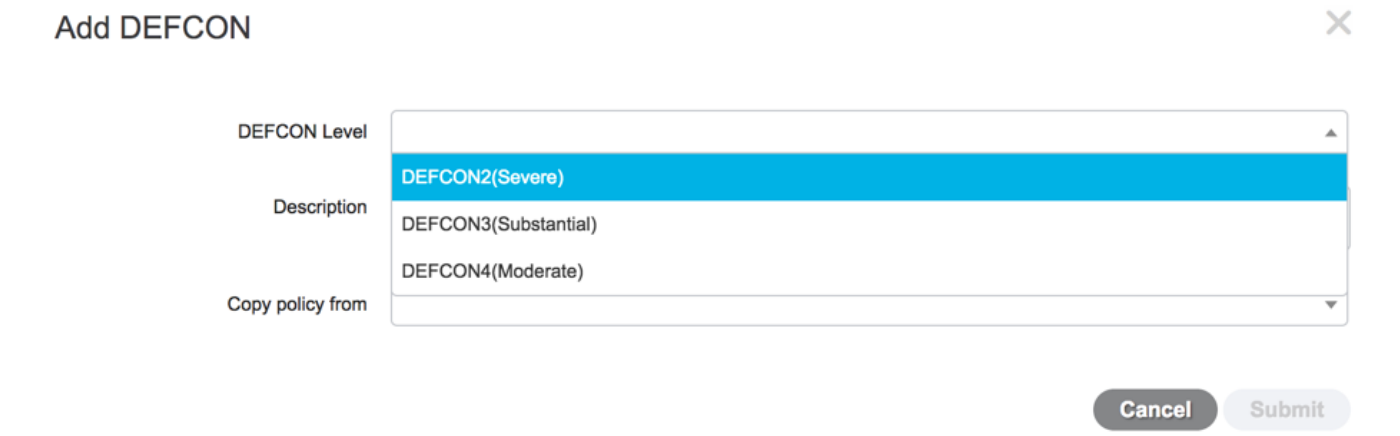

要分配NAD，請點選Matrices List下的**Assign NADs**選項，選中要分配矩陣的裝置，然後從下拉選單中選擇建立的矩陣，然後點選**Assign**，如下圖所示：



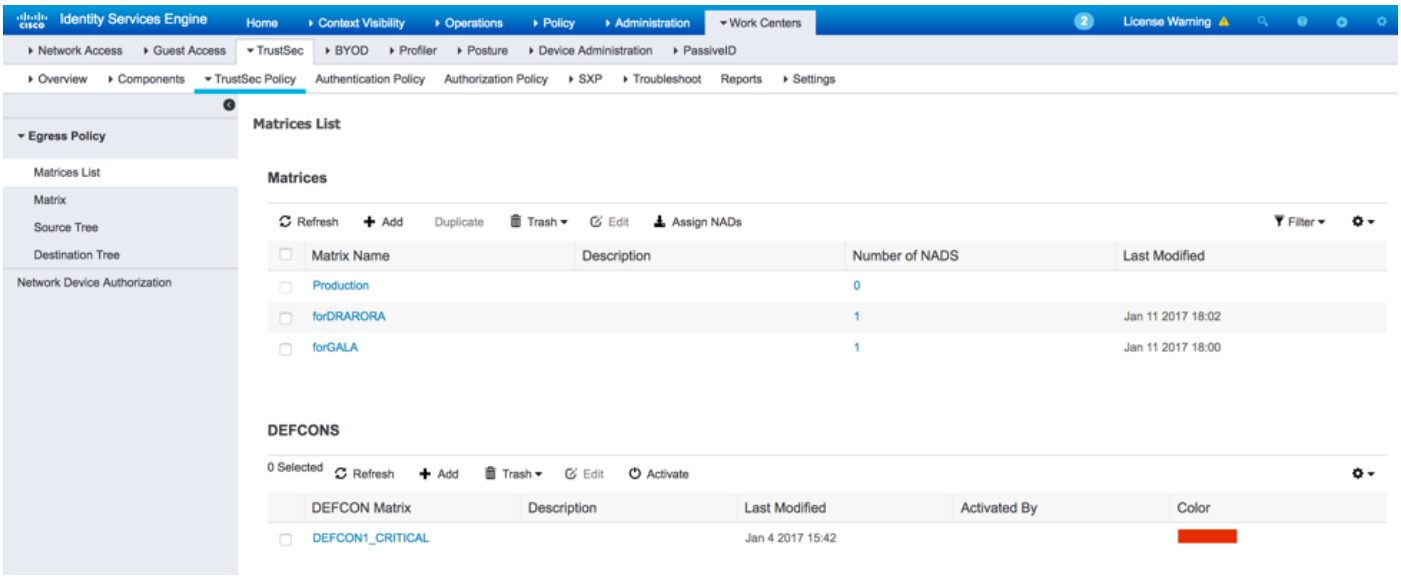

您可以對其它裝置執行相同的操作，然後按一下**Assign**按鈕：




執行完所有更改後，按一下**Close&Send**，該操作會將所有更新傳送到裝置，以執行CTS策略的刷新以下載新策略。同樣，建立DefCon矩陣，您可以從現有矩陣複製：




最終策略如下：

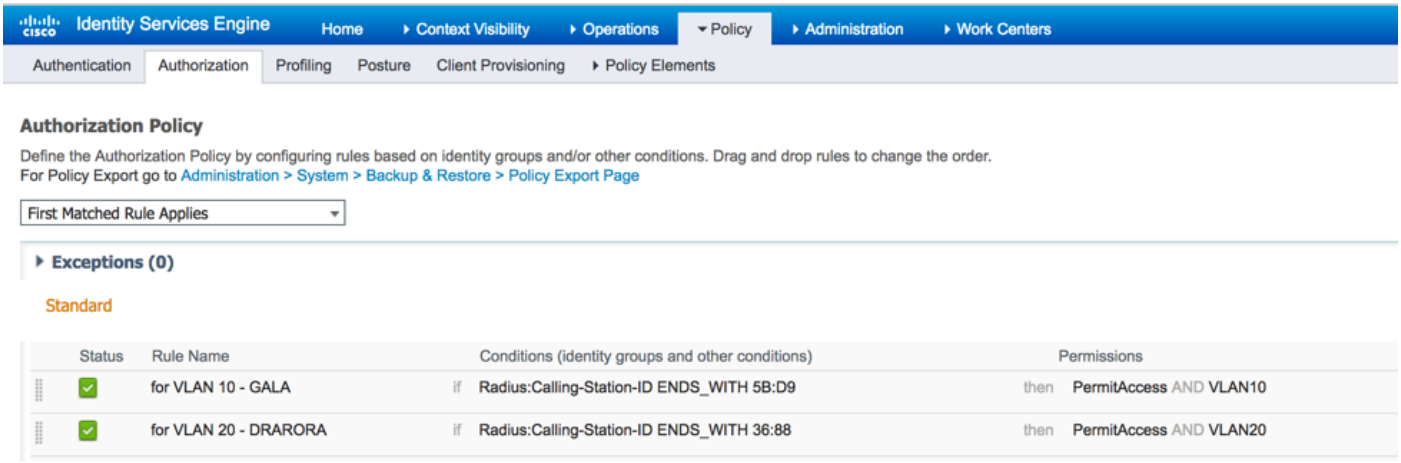



## 6. SGT分類

標籤到客戶端分配有兩種選項（建立IP-SGT對映）：

- *static* - with **cts role-based sgt-map *IP_address* sgt *tag***
- *dynamic* — 通過dot1x驗證（成功驗證後指定標籤）

此處使用這兩個選項，兩台Windows電腦通過dot1x身份驗證獲得SGT標籤，環回介面使用靜態SGT標籤。要部署動態對映，請為終端客戶端建立授權策略：




要建立靜態IP-SGT對映，請使用命令（例如GALA交換機）：

```
interface Loopback7
 ip address 7.7.7.7 255.255.255.0

interface Loopback2
 ip address 2.2.2.2 255.255.255.0

cts role-based sgt-map 2.2.2.2 sgt 15
cts role-based sgt-map 7.7.7.7 sgt 10
```

身份驗證成功後，客戶端將訪問具有特定SGT標籤的授權策略，結果為：

```
GALA#show authentication sessions interface Gi1/0/11 details
            Interface:  GigabitEthernet1/0/11
          MAC Address:  0050.5699.5bd9
         IPv6 Address:  Unknown
         IPv4 Address:  10.0.10.2
            User-Name:  00-50-56-99-5B-D9
               Status:  Authorized
               Domain:  DATA
       Oper host mode:  single-host
     Oper control dir:  both
      Session timeout:  N/A
      Restart timeout:  N/A
    Common Session ID:  0A30489C000000120002330D
      Acct Session ID:  0x00000008
               Handle:  0xCE000001
       Current Policy:  POLICY_Gi1/0/11

Local Policies:
Service Template: DEFAULT_LINKSEC_POLICY_SHOULD_SECURE (priority 150)
      Security Policy:  Should Secure
      Security Status:  Link Unsecure

Server Policies:
            SGT Value:  16
```

```
Method status list:
       Method           State

       mab              Authc Success
```

您可以使用命令**show cts role-based sgt-map all**檢查所有IP-SGT對映，其中顯示每個對映的源（LOCAL — 通過dot1x身份驗證、CLI — 靜態分配）：

```
GALA#show cts role-based sgt-map all
Active IPv4-SGT Bindings Information

IP Address              SGT     Source
============================================
2.2.2.2                 15      CLI
7.7.7.7                 10      CLI
10.0.10.2               16      LOCAL

IP-SGT Active Bindings Summary
============================================
Total number of CLI      bindings = 2
Total number of LOCAL    bindings = 1
Total number of active   bindings = 3
```

## 7. CTS策略下載

一旦交換機下載了CTS PAC和環境資料，就可以請求CTS策略。交換機不會下載所有策略，但只下載所需的策略（即針對發往已知SGT標籤的流量的策略），在進行GALA交換機時，它會從ISE請求這些策略：

- 到SGT 15的流量的策略
- 到SGT 10的流量的策略
- 到SGT 16的流量的策略

GALA交換機的所有策略輸出：

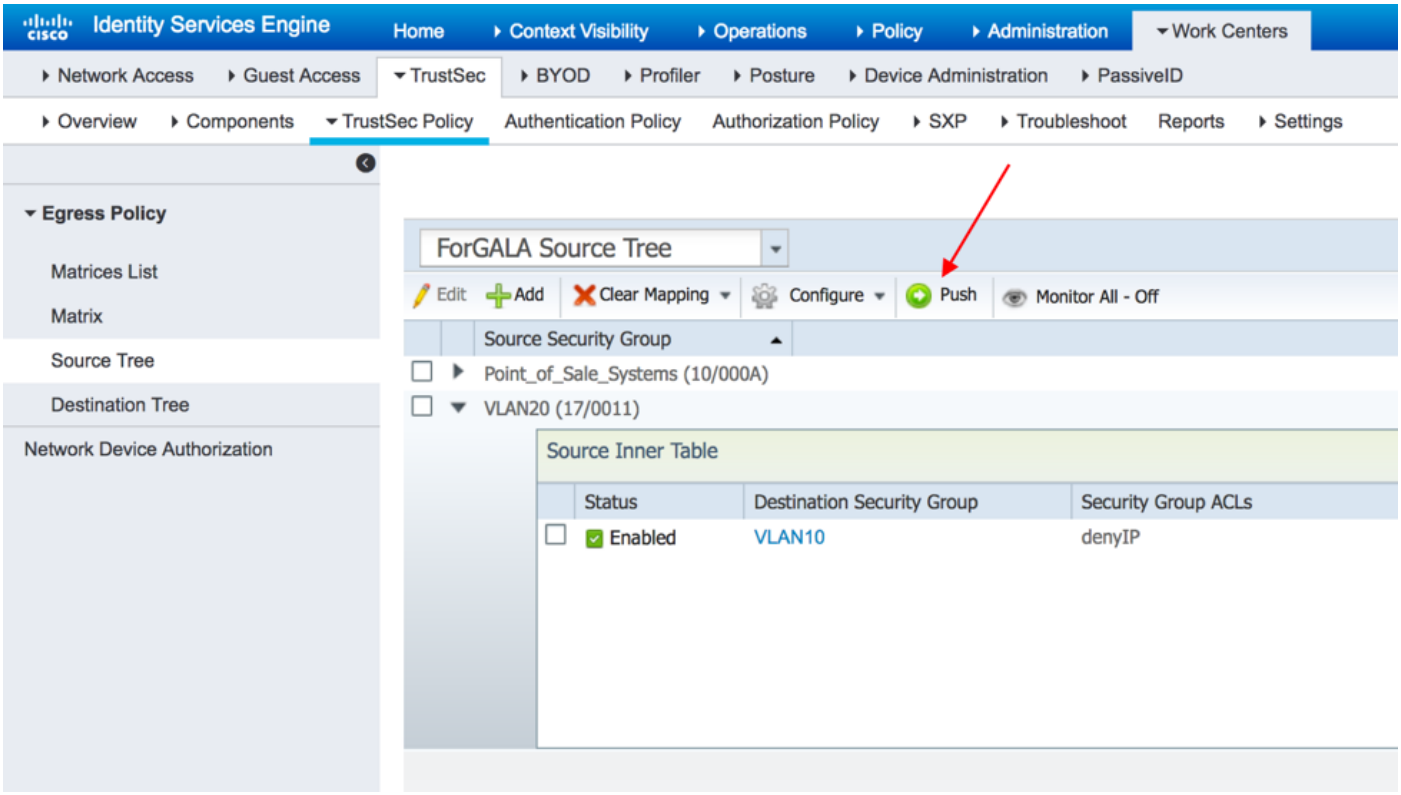
```
GALA#show cts role-based permissions
IPv4 Role-based permissions default:
Permit IP-00
IPv4 Role-based permissions from group 10:Point_of_Sale_Systems to group 15:BYOD:
denyIP-20
IPv4 Role-based permissions from group 17:VLAN20 to group 16:VLAN10:
denyIP-20
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE
```

交換機通過兩種方式獲取策略：

- 從交換器本身刷新CTS:

```
GALA#cts refresh policy
```

- 從ISE手動推送：




# 驗證

## 多矩陣

對於此示例，兩台交換機上的最終SGT-IP對映和CTS策略：

### GALA交換機：

```
GALA#show cts role-based sgt-map all
Active IPv4-SGT Bindings Information

IP Address              SGT     Source
============================================
2.2.2.2                 15      CLI
7.7.7.7                 10      CLI
10.0.10.2               16      LOCAL

IP-SGT Active Bindings Summary
============================================
Total number of CLI      bindings = 2
Total number of LOCAL    bindings = 1
Total number of active   bindings = 3

GALA#show cts role-based permissions
IPv4 Role-based permissions default:
   Permit IP-00
IPv4 Role-based permissions from group 10:Point_of_Sale_Systems to group 15:BYOD:
   denyIP-20
IPv4 Role-based permissions from group 17:VLAN20 to group 15:BYOD:
   permitIP-20
IPv4 Role-based permissions from group 17:VLAN20 to group 16:VLAN10:
   permitIP-20
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE
```

```
GALA#show cts rbacl | s permitIP
 name   = permitIP-20
   permit ip

GALA#show cts rbacl | s deny
 name   = denyIP-20
   deny ip
```

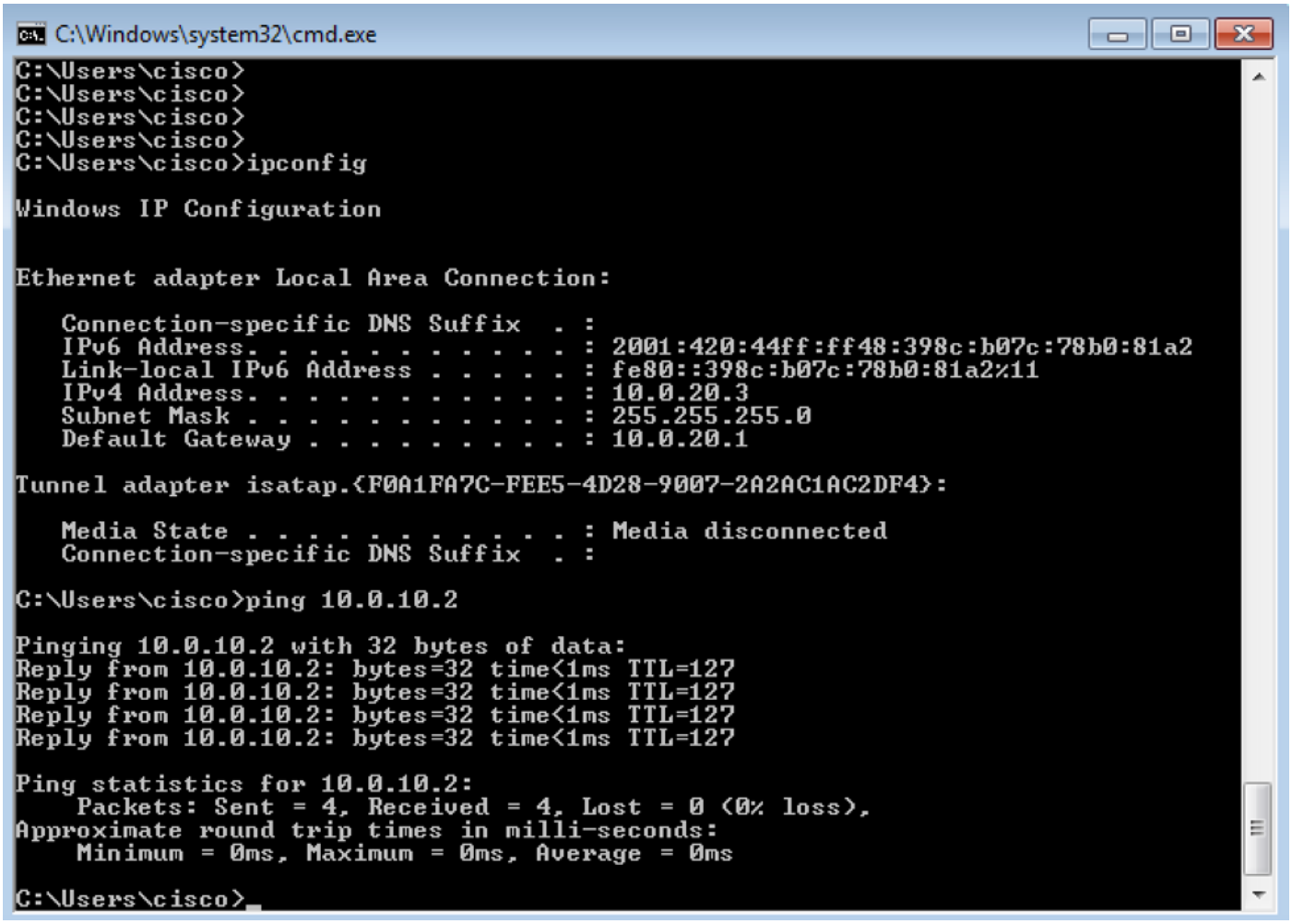
DRARORA交換機：

```
DRARORA#show cts role-based sgt-map all
Active IPv4-SGT Bindings Information

IP Address              SGT     Source
============================================
10.0.20.3               17      LOCAL
10.10.10.10             10      CLI
15.15.15.15             15      CLI

IP-SGT Active Bindings Summary
============================================
Total number of CLI      bindings = 2
Total number of LOCAL    bindings = 1
Total number of active   bindings = 3

DRARORA#show cts role-based permissions
IPv4 Role-based permissions default:
   Permit IP-00
IPv4 Role-based permissions from group 17:VLAN20 to group 10:Point_of_Sale_Systems:
   permitIP-20
IPv4 Role-based permissions from group 10:Point_of_Sale_Systems to group 15:BYOD:
   permitIP-20
IPv4 Role-based permissions from group 17:VLAN20 to group 15:BYOD:
   permitIP-20
IPv4 Role-based permissions from group 10:Point_of_Sale_Systems to group 17:VLAN20:
   denyIP-20
IPv4 Role-based permissions from group 16:VLAN10 to group 17:VLAN20:
   permitIP-20
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE
```

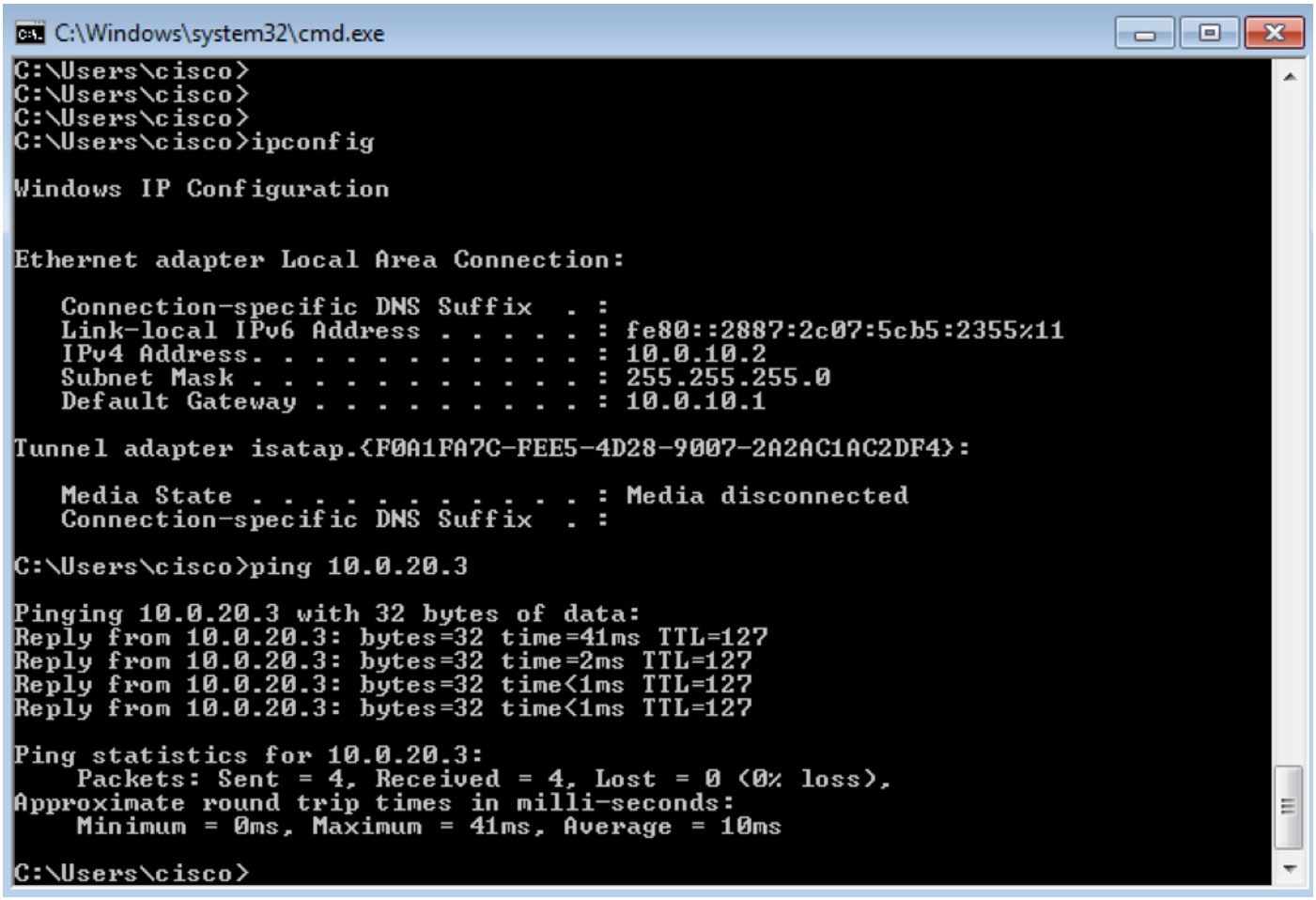
觀察到兩台交換機的策略不同（即使在10到15之間的同一策略對於GALA和DRARORA交換機也是不同的）。 這意味著從SGT 10到15的流量在DRARORA上被允許，但在GALA上被阻止：

```
DRARORA#ping 15.15.15.15 source Loopback 10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 15.15.15.15, timeout is 2 seconds:
Packet sent with a source address of 10.10.10.10
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms

GALA#ping 2.2.2.2 source Loopback 7
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
Packet sent with a source address of 7.7.7.7
U.U.U
Success rate is 0 percent (0/5)
```

同樣地，您可以從一個視窗訪問另一個視窗(SGT 17 -> SGT 16):




另一種方法(SGT 16 -> SGT 17):



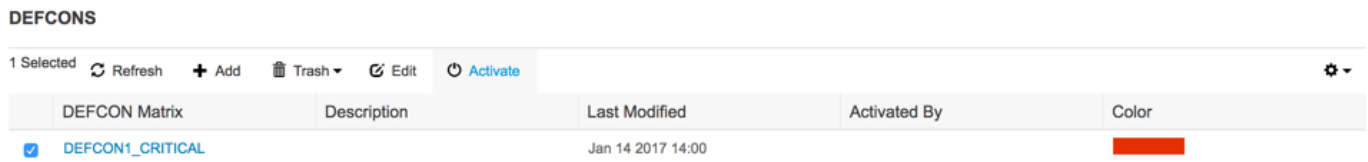
要確認應用了正確的CTS策略，請檢查**show cts role-based counters** 輸出：

```
GALA#sh cts role-based counters
Role-based IPv4 counters
# '-' in hardware counters field indicates sharing among cells with identical policies
From    To      SW-Denied       HW-Denied       SW-Permitted    HW-Permitted

17      16      0               0               0               8
17      15      0               -               0               -

10      15      4               0               0               0

*       *       0               0               127             26
```

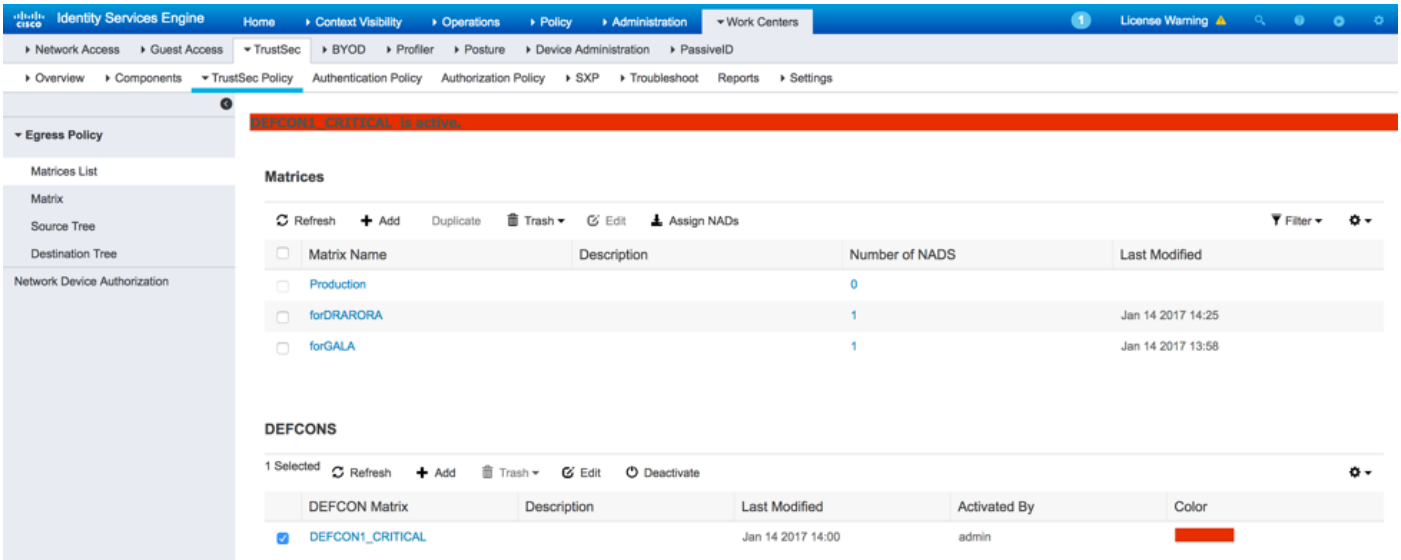
GALA有8個允許的資料包（4個來自ping 17->16,4個來自ping 16->17）。

## DefCon部署

如果需要，在**Work Centers > TrustSec > TrustSec Policy > Egress Policy > Matrices List**下部署DefCon矩陣，檢查您要啟用的DefCon矩陣，然後按一下**Activate**:




啟用DefCon後，ISE上的選單如下所示：




和交換機上的策略：

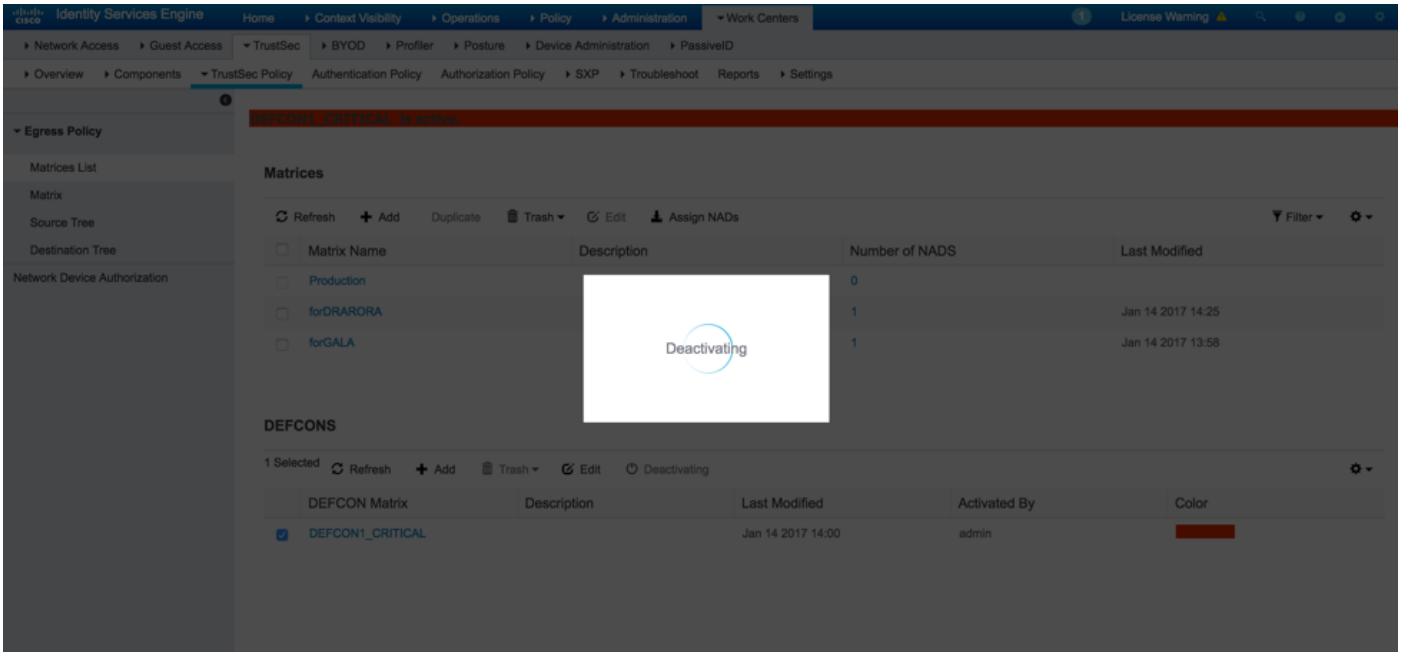
```
GALA#show cts role-based permissions
IPv4 Role-based permissions default:
Permit IP-00
IPv4 Role-based permissions from group 15:BYOD to group 10:Point_of_Sale_Systems:
denyIP-20
IPv4 Role-based permissions from group 15:BYOD to group 16:VLAN10:
denyIP-20
IPv4 Role-based permissions from group 17:VLAN20 to group 16:VLAN10:
```

```
denyIP-20
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE

DRARORA#show cts role-based permissions
IPv4 Role-based permissions default:
Permit IP-00
IPv4 Role-based permissions from group 15:BYOD to group 10:Point_of_Sale_Systems:
denyIP-20
IPv4 Role-based permissions from group 10:Point_of_Sale_Systems to group 17:VLAN20:
permitIP-20
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE
```

兩台交換器都不允許從SGT 15到SGT 10的流量：

```
DRARORA#ping 10.10.10.10 source Loopback 15
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.10.10.10, timeout is 2 seconds:
Packet sent with a source address of 15.15.15.15
U.U.U
Success rate is 0 percent (0/5)

GALA#ping 7.7.7.7 source Loopback 2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 7.7.7.7, timeout is 2 seconds:
Packet sent with a source address of 2.2.2.2
U.U.U
Success rate is 0 percent (0/5)
```

部署再次穩定後，可以停用DefCon和交換機請求舊策略。要停用DefCon，請導航到**工作中心(Work Centers)> TrustSec > TrustSec Policy > Egress Policy > Matrices List**，檢查活動的DefCon矩陣，然後按一下**Deactivate**:




兩台交換機都立即請求舊策略：

```
DRARORA#show cts role-based permissions
IPv4 Role-based permissions default:
Permit IP-00
```

```
IPv4 Role-based permissions from group 17:VLAN20 to group 10:Point_of_Sale_Systems:
permitIP-20
IPv4 Role-based permissions from group 10:Point_of_Sale_Systems to group 15:BYOD:
permitIP-20
IPv4 Role-based permissions from group 17:VLAN20 to group 15:BYOD:
permitIP-20
IPv4 Role-based permissions from group 10:Point_of_Sale_Systems to group 17:VLAN20:
denyIP-20
IPv4 Role-based permissions from group 16:VLAN10 to group 17:VLAN20:
permitIP-20
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE

GALA#show cts role-based permissions
IPv4 Role-based permissions default:
Permit IP-00
IPv4 Role-based permissions from group 10:Point_of_Sale_Systems to group 15:BYOD:
denyIP-20
IPv4 Role-based permissions from group 17:VLAN20 to group 15:BYOD:
permitIP-20
IPv4 Role-based permissions from group 17:VLAN20 to group 16:VLAN10:
permitIP-20
RBACL Monitor All for Dynamic Policies : FALSE
RBACL Monitor All for Configured Policies : FALSE
```

# 疑難排解

## PAC調配

這是成功的PAC調配的一部分：

```
GALA#debug cts provisioning packets
GALA#debug cts provisioning events

*Jan  2 04:39:05.707: %SYS-5-CONFIG_I: Configured from console by console
*Jan  2 04:39:05.707: CTS-provisioning: Starting new control block for server 10.48.17.161:
*Jan  2 04:39:05.707: CTS-provisioning: cts_provi_init_socket: Checking for any vrf associated
with 10.48.17.161
*Jan  2 04:39:05.707: CTS-provisioning: New session socket: src=10.48.72.156:65242
dst=10.48.17.161:1812
*Jan  2 04:39:05.716: CTS-provisioning: cts_provi_init_socket: Checking for any vrf associated
with 10.48.17.161
*Jan  2 04:39:05.716: CTS-provisioning: cts_provi_init_socket: Adding vrf-tableid: 0 to socket
*Jan  2 04:39:05.716: CTS-provisioning: New session socket: src=10.48.72.156:65242
dst=10.48.17.161:1812
*Jan  2 04:39:05.716: CTS-provisioning: Sending EAP Response/Identity to 10.48.17.161
*Jan  2 04:39:05.716: CTS-provisioning: OUTGOING RADIUS msg to 10.48.17.161:
1E010EE0:          01010090 64BCBC01 7BEF347B
1E010EF0: 1E32C02E 8402A83D 010C4354 5320636C
1E010F00: 69656E74 04060A30 489C3D06 00000000
1E010F10: 06060000 00021F0E 30303037 37643862
1E010F20: 64663830 1A2D0000 00090127 4141413A
1E010F30: 73657276 6963652D 74797065 3D637473
1E010F40: 2D706163 2D70726F 76697369 6F6E696E
1E010F50: 674F1102 00000F01 43545320 636C6965
1E010F60: 6E745012 73EBE7F5 CDA0CF73 BFE4AFB6
1E010F70: 40D723B6 00
*Jan  2 04:39:06.035: CTS-provisioning: INCOMING RADIUS msg from 10.48.17.161:
1EC68460:          0B0100B5 E4C3C3C1 ED472766
```

```
1EC68470: 183F41A9 026453ED 18733634 43504D53
1EC68480: 65737369 6F6E4944 3D306133 30313161
1EC68490: 314C3767 78484956 62414976 37316D59
1EC684A0: 525F4D56 34517741 4C362F69 73517A72
1EC684B0: 7A586132 51566852 79635638 3B343353
1EC684C0: 65737369 6F6E4944 3D766368 72656E65
1EC684D0: 6B2D6973 6532322D 3432332F 32373238
1EC684E0: 32373637 362F3137 37343B4F 1C017400
1EC684F0: 1A2B2100 040010E6 796CD7BB F2FA4111
1EC68500: AD9FB4FE FB5A5050 124B76A2 E7D34684
1EC68510: DD8A1583 175C2627 9F00
*Jan  2 04:39:06.035: CTS-provisioning: Received RADIUS challenge from 10.48.17.161.
*Jan  2 04:39:06.035: CTS-provisioning: A-ID for server 10.48.17.161 is
"e6796cd7bbf2fa4111ad9fb4fefb5a50"
*Jan  2 04:39:06.043: CTS-provisioning: Received TX_PKT from EAP method
*Jan  2 04:39:06.043: CTS-provisioning: Sending EAPFAST response to 10.48.17.161
*Jan  2 04:39:06.043: CTS-provisioning: OUTGOING RADIUS msg to 10.48.17.161:
<...>
*Jan  2 04:39:09.549: CTS-provisioning: INCOMING RADIUS msg from 10.48.17.161:
1EC66C50:          0309002C 1A370BBB 58B828C3
1EC66C60: 3F0D490A 4469E8BB 4F06047B 00045012
1EC66C70: 7ECF8177 E3F4B9CB 8B0280BD 78A14CAA
1EC66C80: 4D
*Jan  2 04:39:09.549: CTS-provisioning: Received RADIUS reject from 10.48.17.161.
*Jan  2 04:39:09.549: CTS-provisioning: Successfully obtained PAC for A-ID
e6796cd7bbf2fa4111ad9fb4fefb5a50
```

由於PAC設定已成功完成，因此應該出現RADIUS拒絕。

## 環境資料下載

以下顯示從交換器成功下載環境資料：

```
GALA#debug cts environment-data

GALA#
*Jan  2 04:33:24.702: CTS env-data: Force environment-data refresh
*Jan  2 04:33:24.702: CTS env-data: download transport-type = CTS_TRANSPORT_IP_UDP
*Jan  2 04:33:24.702:     cts_env_data START: during state env_data_complete, got event
0(env_data_request)

*Jan  2 04:33:24.702: cts_aaa_attr_add: AAA req(0x5F417F8)
*Jan  2 04:33:24.702:   username = #CTSREQUEST#
*Jan  2 04:33:24.702: cts_aaa_context_add_attr: (CTS env-data SM)attr(GALA)
*Jan  2 04:33:24.702:   cts-environment-data = GALA
*Jan  2 04:33:24.702: cts_aaa_attr_add: AAA req(0x5F417F8)
*Jan  2 04:33:24.702: cts_aaa_context_add_attr: (CTS env-data SM)attr(env-data-fragment)
*Jan  2 04:33:24.702:   cts-device-capability = env-data-fragment
*Jan  2 04:33:24.702: cts_aaa_req_send: AAA req(0x5F417F8) successfully sent to AAA.
*Jan  2 04:33:25.474: cts_aaa_callback: (CTS env-data SM)AAA req(0x5F417F8) response success
*Jan  2 04:33:25.474: cts_aaa_context_fragment_cleanup: (CTS env-data SM)attr(GALA)
*Jan  2 04:33:25.474: cts_aaa_context_fragment_cleanup: (CTS env-data SM)attr(env-data-fragment)

*Jan  2 04:33:25.474:   AAA attr: Unknown type (450).
*Jan  2 04:33:25.474:   AAA attr: Unknown type (274).
*Jan  2 04:33:25.474:   AAA attr: server-list = CTSServerList1-0001.
*Jan  2 04:33:25.482:   AAA attr: security-group-tag = 0000-10.
*Jan  2 04:33:25.482:   AAA attr: environment-data-expiry = 86400.
*Jan  2 04:33:25.482:   AAA attr: security-group-table = 0001-19.
*Jan  2 04:33:25.482: CTS env-data: Receiving AAA attributes
  CTS_AAA_SLIST
    slist name(CTSServerList1) received in 1st Access-Accept
```

```
    slist name(CTSServerList1) created
  CTS_AAA_SECURITY_GROUP_TAG - SGT = 0-10:unicast-unknown
  CTS_AAA_ENVIRONMENT_DATA_EXPIRY = 86400.
  CTS_AAA_SGT_NAME_LIST
    table(0001) received in 1st Access-Accept
    need a 2nd request for the SGT to SG NAME entries
    new name(0001), gen(19)
  CTS_AAA_DATA_END

*Jan  2 04:33:25.784: cts_aaa_callback: (CTS env-data SM)AAA req(0x8853E60) response success
*Jan  2 04:33:25.784: cts_aaa_context_fragment_cleanup: (CTS env-data SM)attr(0001)
*Jan  2 04:33:25.784:   AAA attr: Unknown type (450).
*Jan  2 04:33:25.784:   AAA attr: Unknown type (274).
*Jan  2 04:33:25.784:   AAA attr: security-group-table = 0001-19.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = 0-10-00-Unknown.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = ffff-13-00-ANY.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = 9-10-00-Auditors.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = f-32-00-BYOD.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = 5-10-00-Contractors.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = 8-10-00-Developers.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = c-10-00-Development_Servers.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = 4-10-00-Employees.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = 6-10-00-Guests.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = 3-10-00-Network_Services.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = e-10-00-PCI_Servers.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = a-23-00-Point_of_Sale_Systems.
*Jan  2 04:33:25.784:   AAA attr: security-group-info = b-10-00-Production_Servers.
*Jan  2 04:33:25.793:   AAA attr: security-group-info = 7-10-00-Production_Users.
*Jan  2 04:33:25.793:   AAA attr: security-group-info = ff-10-00-Quarantined_Systems.
*Jan  2 04:33:25.793:   AAA attr: security-group-info = d-10-00-Test_Servers.
*Jan  2 04:33:25.793:   AAA attr: security-group-info = 2-10-00-TrustSec_Devices.
*Jan  2 04:33:25.793:   AAA attr: security-group-info = 10-24-00-VLAN10.
*Jan  2 04:33:25.793:   AAA attr: security-group-info = 11-22-00-VLAN20.
*Jan  2 04:33:25.793:  CTS env-data: Receiving AAA attributes
  CTS_AAA_SGT_NAME_LIST
    table(0001) received in 2nd Access-Accept
    old name(0001), gen(19)
    new name(0001), gen(19)
  CTS_AAA_SGT_NAME_INBOUND - SGT = 0-68:unicast-unknown
   flag (128) sname (Unknown) added
   name (0001), request (1), receive (1)
cts_env_data_aaa_sgt_sgname, name = 0001, req = 1, rcv = 1
   Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
  CTS_AAA_SGT_NAME_INBOUND - SGT = 65535-68:unicast-default
   flag (128) sname (ANY) added
   name (0001), request (1), receive (1)
cts_env_data_aaa_sgt_sgname, name = 0001, req = 1, rcv = 1
   Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
  CTS_AAA_SGT_NAME_INBOUND - SGT = 9-68
   flag (128) sname (Auditors) added
   name (0001), request (1), receive (1)
cts_env_data_aaa_sgt_sgname, name = 0001, req = 1, rcv = 1
   Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
  CTS_AAA_SGT_NAME_INBOUND - SGT = 15-68
   flag (128) sname (BYOD) added
   name (0001), request (1), receive (1)
cts_env_data_aaa_sgt_sgname, name = 0001, req = 1, rcv = 1
   Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
  CTS_AAA_SGT_NAME_INBOUND - SGT = 5-68
   flag (128) sname (Contractors) added
   name (0001), request (1), receive (1)
cts_env_data_aaa_sgt_sgname, name = 0001, req = 1, rcv = 1
   Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
  CTS_AAA_SGT_NAME_INBOUND - SGT = 8-68
```

```
   flag (128) sgname (Developers) added
   name (0001), request (1), receive (1)
cts_env_data_aaa_sgt_sgname, name = 0001, req = 1, rcv = 1
   Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
  CTS_AAA_SGT_NAME_INBOUND - SGT = 12-68
   flag (128) sgname (Development_Servers) added
   name (0001), request (1), receive (1)
cts_env_data_aaa_sgt_sgname, name = 0001, req = 1, rcv = 1
   Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
  CTS_AAA_SGT_NAME_INBOUND - SGT = 4-68
   flag (128) sgname (Employees) added
   name (0001), request (1), receive (1)
cts_env_data_aaa_sgt_sgname, na
*Jan  2 04:33:25.793:     cts_env_data WAITING_RESPONSE: during state env_data_waiting_rsp, got
event 1(env_data_received)
*Jan  2 04:33:25.793: @@@ cts_env_data WAITING_RESPONSE: env_data_waiting_rsp ->
env_data_assessing
*Jan  2 04:33:25.793: env_data_assessing_enter: state = ASSESSING
*Jan  2 04:33:25.793: cts_aaa_is_fragmented: (CTS env-data SM)NOT-FRAG attr_q(0)
*Jan  2 04:33:25.793: env_data_assessing_action: state = ASSESSING
*Jan  2 04:33:25.793: cts_env_data_is_complete: FALSE, req(x1085), rec(x1487)
*Jan  2 04:33:25.793: cts_env_data_is_complete: TRUE, req(x1085), rec(x1487), expect(x81),
complete1(x85), complete2(xB5), complete3(x1485)
*Jan  2 04:33:25.793:     cts_env_data ASSESSING: during state env_data_assessing, got event
4(env_data_complete)
*Jan  2 04:33:25.793: @@@ cts_env_data ASSESSING: env_data_assessing -> env_data_complete
*Jan  2 04:33:25.793: env_data_complete_enter: state = COMPLETE
*Jan  2 04:33:25.793: env_data_install_action: state = COMPLETE
```

## CTS策略

CTS策略作為RADIUS消息的一部分被推送，因此**runtime-AAA**日誌記錄元件在ISE上設定為調試(**Administration > Logging > Debug Log Configuration**)，並且在交換機上的調試下應足以解決與CTS相關的任何問題：

```
debug cts coa
debug radius
```

此外，檢查交換機上匹配的策略 — 3750X:

```
GALA#show cts role-based counters
Role-based IPv4 counters
# '-' in hardware counters field indicates sharing among cells with identical policies
From    To      SW-Denied       HW-Denied       SW-Permitted    HW-Permitted

10      15      5               0               0               0

*       *       0               0               815             31

17      15      0               0               0               0
17      16      0               -               0               -
```

由於CiscobugID CSCuu32958，您無法在3850上使用相同的命令。