ASA 和 Catalyst 3750X 系列交换机 TrustSec 配置示例和故障排除指南

目录

简介 先决条件 要求 使用的组件 配置 网络图 流量传输 配置 <u>在3750X上使用ip device tracking</u>命令进行端口身份验证 身份验证、SGT和SGACL策略的ISE配置 ASA和3750X上的CTS配置 3750X(自动)和ASA上的PAC调配(手动) ASA和3750X上的环境更新 3750X上的端口身份验证验证和实施 3750X上的策略更新 SXP Exchange(将ASA用作侦听器,将3750X用作扬声器) 使用SGT ACL在ASA上过滤流量 使用从ISE下载的策略在3750X上进行流量过滤(RBACL) 验证 故障排除 PAC调配 环境更新 策略刷新 SXP交换 ASA上的SGACL 相关信息

简介

本文描述如何在思科安全自适应安全设备(ASA)和Cisco Catalyst 3750X系列交换机(3750X)上配置 Cisco TrustSec(CTS)。

为了了解安全组标记(SGT)和IP地址之间的映射,ASA使用SGT交换协议(SXP)。然后,使用基于 SGT的访问控制列表(ACL)来过滤流量。3750X从思科身份服务引擎(ISE)下载基于角色的访问控制 列表(RBACL)策略,并根据这些策略过滤流量。本文详细介绍数据包级别,以便描述通信运行方式 和预期调试。

先决条件

要求

Cisco 建议您具有以下主题的基础知识:

- CTS组件
- ASA和Cisco IOS®的CLI配置

使用的组件

本文档中的信息基于以下软件和硬件版本:

- Cisco ASA软件9.1版及更高版本
- Microsoft(MS)Windows 7和MS Windows XP
- Cisco 3750X软件,版本15.0及更高版本
- Cisco ISE软件1.1.4版及更高版本

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原 始(默认)配置。如果您使用的是真实网络,请确保您已经了解所有命令的潜在影响。

配置

网络图



流量传输

以下是流量:

- 3750X配置在G1/0/1和G1/0/2上,用于端口身份验证。
- ISE用作身份验证、授权和记帐(AAA)服务器。
- MAC地址绕行(MAB)用于MS Windows 7的身份验证。
- IEEE 802.1x用于MS Windows XP,以证明使用哪种身份验证方法无关紧要。

身份验证成功后,ISE返回SGT,3750X将该标记绑定到身份验证会话。交换机还使用**ip device tracking**命令获取两个站点的IP地址。然后,交换机使用SXP将SGT和IP地址之间的映射表发送到 ASA。两台MS Windows PC都有指向ASA的默认路由。

ASA收到来自映射到SGT的IP地址的流量后,能够根据SGT使用ACL。此外,当您使用3750X作为路由器(两个MS Windows工作站的默认网关)时,它能够根据从ISE下载的策略过滤流量。

以下是配置和验证步骤,在本文档后面的部分中会详细介绍其中的每个步骤:

- 在3750X上使用ip device tracking命令进行端口身份验证
- •身份验证、SGT和安全组访问控制列表(SGACL)策略的ISE配置
- •ASA和3750X上的CTS配置
- 3750X(自动)和ASA(手动)上的保护访问凭证(PAC)调配
- •ASA和3750X上的环境更新
- 3750X上的端口身份验证验证和实施
- 3750X上的策略更新
- •SXP交换(ASA作为侦听器,3750X作为扬声器)
- 使用SGT ACL在ASA上过滤流量
- 使用从ISE下载的策略在3750X上过滤流量

配置

在3750X上使用ip device tracking命令进行端口身份验证

这是802.1x或MAB的典型配置。只有当您使用来自ISE的活动通知时,才需要RADIUS授权更改 (CoA)。

aaa new-model aaa authentication dot1x default group radius aaa authorization network default group radius aaa authorization network ise group radius aaa accounting dot1x default start-stop group radius !Radius COA aaa server radius dynamic-author client 10.48.66.129 server-key cisco server-key cisco ip device tracking interface GigabitEthernet1/0/1 description windowsxp switchport mode access authentication order mab dot1x authentication port-control auto mab dot1x pae authenticator spanning-tree portfast ! interface GigabitEthernet1/0/2 description windows7 switchport mode access authentication order mab dot1x authentication port-control auto mab dot1x pae authenticator spanning-tree portfast radius-server host 10.48.66.129 pac key cisco radius-server host 10.48.66.129 auth-port 1812 radius-server vsa send accounting

radius-server vsa send authentication

身份验证、SGT和SGACL策略的ISE配置

ISE必须在Administration > Network Devices下配置两个网络设备:

CISCO Identity Services Engine		
🍐 Home Operations 🔻 Policy 🔻 Adm	inistration 🔻	
🔆 System 🛛 😤 Identity Management 🗌 🔛	Network Resources 🛛 🛃 Web Portal Management	
Network Devices Network Device Groups E	dernal RADIUS Servers RADIUS Server Sequences	SGA AAA Servers NAC Managers
Network Devices	Network Devices	
	/ Edit 🕂 Add 🕞 Duplicate 😭 Import	Export - OGenerate PAC
Ser Ser	Name A IP/Mask Location	Туре
Network Devices	3750X 10.48.66.10 All Locatio	ans All Device Types
Default Device	ASA 10.48.67.15 All Location	ns All Device Types

对于使用MAB身份验证的MS Windows 7,必须在**管理>身份管理>身份>终端**下创建终端身份 (MAC地址):



对于使用802.1x身份验证的MS Windows XP,您必须在Administration > Identity Management > Identities > Users下创建用户身份(用户名):

iliuliu cisco Identity Services Engine	
🐴 Home Operations 🔻 Policy 🔻 Admi	inistration 🔻
🔆 System 🛛 👰 Identity Management	Network Resources 🛛 🛃 Web Portal Management
Identities Groups External Identity Sources	Identity Source Sequences Settings
Identities	Network Access Users
	/ Edit 🕂 Add 🔞 Change Status 👻 🕼 Import
	Status Name 🔺 Description
	🗌 🗹 Enabled 🙎 cisco
Latest Network Scan Results	🗌 🗹 Enabled 🙎 guest

使用用户名**cisco**。使用这些凭证为MS Windows XP配置受可扩展身份验证协议保护的EAP(EAP-PEAP)。

在ISE上,使用默认身份验证策略(请勿更改)。第一个是MAB身份验证策略,第二个是802.1x:

CISCO Identity Services Engine		
🛕 Home Operations 🔻 Policy 🔻	Administration 👻	
Authentication SAuthorization	Profiling 😨 Posture 🔂 Client Provisioning	🔄 Security Group Access 🥏 🖧 Policy Elements
Authentication Policy		
Define the Authentication Policy by selecting the Policy Type O Simple Rule-Based	protocols that ISE should use to communicate with the netwo	vrk devices, and the identity sources that it should use for authentication.
MAB	: If Wired_MAB 💠 allow protocols Allow	red Protocol : Default Ne😋 and 🕨
DotlX	: If Wired_802.1X 💠 allow protocols Allow	red Protocol : Default Ne💟 and 🕨
Vireless MAB	: If Wireless_MAB 💠 allow protocols Allow	red Protocol : Default N📀 and 🕨
Custom Wireless	If Radius:NAS-Por 💠 allow protocols Allow	red Protocol : Default N😋 🛛 and 🕨
Default Rule (If no match)	: allow protocols Allowed Protocol : Default No	and use identity source : Internal Users 🔶

要配置授权策略,必须在**Policy > Results > Authorization > Authorization Profiles**下定义授权配置 文件。包含可下载ACL(DACL)的VLAN10-Profile允许所有流量,用于MS Windows 7配置文件:

cisco Identity Services Engine		
🍐 Home Operations 🔻 Policy 🔻 Adm	nistration 🔻	
🛃 Authentication 👩 Authorization 🔀 P	rofiling 👩 Posture 🕞 Client Provisioning 🚊 Security Group Access	🐥 Policy E
Dictionaries Conditions Results		
Results	Authorization Profiles > VLAN10-Profile Authorization Profile	
∲- ≡ 1 ∰	* Name VLAN10-Profile	
Authentication Authorization	Description	
Authorization Profiles Authorization Profiles Authorization Profiles	* Access Type ACCESS_ACCEPT V	
CWA	Common Tasks	
Cisco_IP_Phones	ACL Name PERMIT ALL TRAFFIC	
Q DenyAccess		
RermitAccess	VLAN Tag ID 1 Edit Tag ID/N	ame 10
VLAN10-Profile	Voice Domain Permission	
Q VLAN100-VoiceProfile		
😪 VLAN20-Profile	Web Authentication	
😪 Vlan2		
Downloadable ACLs	Auto Smart Port	
Inline Posture Node Profiles		

MS Windows XP使用类似的配置VLAN20-Profile,但VLAN编号(20)除外。

要在ISE上配置SGT组(标记),请导航至**策略>结果>安全组访问>安全组**。

注意:不能选择标签号;它由第一个空闲号码自动选择,但1除外。您只能配置SGT名称。

cisco Identity Services Engine					0	
🛕 Home Operations 🔻 Policy 🔻 Admi	inistrati	on 🔻				
🙎 Authentication 💿 Authorization 🔀 P	rofiling	💽 Posture	😡 Client Provi	sioning	🚊 Security G	roup Access
Dictionaries Conditions Results						
Results	Sec	curity Groups				
		Edit 🕂 Add	🔂 Import 🛛 🔂 E	xport -	🗙 Delete 👻	📀 Push
		Name 🔺	SGT (Dec / Hex)	Descripti	on	
Authentication		Unknown	0/0000	Unknown	n Security Gro	up
P Drofilion		VLAN10	2/0002	SGA For V	VLAN10 PC	
Proture		VLAN100	4/0004	Vlans For	Phone	
Glient Provisioning		VLAN20	3/0003	SGA For V	VLAN20 PC	
Security Group Access						
Security Group ACLs						
Security Groups						
Security Group Mappings	•					

要创建SGACL以允许Internet控制消息协议(ICMP)流量,请导航到**Policy > Results > Security** Group Access > Security Group ACLs:

cisco Identity Services Engine			V				
🛕 Home Operations 🔻 Policy 🔻 Adr	ninis	stration 🔻					
🙎 Authentication 💿 Authorization 🔀	Prof	filing 💽	Po	sture 👩 Client F	Provisionii	ng	👮 Security
Dictionaries Conditions Results							
Results]]	Security	Gr	oups ACLs			
		/ Edit	÷	Add Duplicate	🗙 Dele	ete 👻	😳 Push
		Name		Description		IP Ver	sion
Authentication		ICMP		Permit All Icmp Tr	raffic	IPv4	
Profiling							
Posture							
Client Provisioning							
▼ 🚞 Security Group Access							
Security Group ACLs							
Security Groups							
Security Group Mappings	0						

要创建策略,请导航到**Policy > Security Group Access > Egress Policy**。对于VLAN10与未知 VLAN或VLAN10或VLAN20之间的流量,使用ICMP ACL(**permit icmp**):

cisco Identity	Services Engine			
🛕 Home Operat	iona • Palky • Administration •			
Authentication	🖌 Authorization 🔄 Profiling 🕐 Posture	Chant Provisioning 🔄 Security Droup Access	Policy Elements	
Egress Polky Net	work Device Authorization			
Source Tree Des	tination Tree Matrix			
Egross Policy (?	Matrix View)			
/ Dia +AH	🗶 Clear Mapping * 🔅 Configure * 😜 Push 1	Senutor All Ormansion 531.3 *		Show All
Destination + Source +	Unknown (5 (6000)	VLAV10 (27.0002)	VLAN100 (470004)	VLAN20 (31 0003)
Usknown (5 / 0000)				
VLANII D (2 / 0002)	Enabled SGACLX ICMP	© Enabled © SGACLS, ICMP		GACLs: ICMP, Deny IP
VEAN/100 (4 / 0004)				
VLAN20 (3 (0003)				
Default 🗖 B	nabled SGACLs - Permit IP	Description - Default egress rule		

要设置授权规则,请导航到**Policy > Authorization**。对于MS Windows 7(特定MAC地址),使用 VLAN10-Profile,返回VLAN10和DACL,以及名为VLAN10的SGT的安全配置文件VLAN10。对于 MS Windows XP(特定用户名),使用VLAN20-Profile,返回VLAN 20和DACL,使用名为 VLAN20的SGT返回安全配置文件VLAN20。

cisco Id	entity Services Engine						
🛕 Home	Operations 🔻 Policy 🔻	Administration	•				
🛓 Authentic	ation S Authorization	K Profiling	Posture	Client Provisioning	Security Group Access	- 4	Policy Elements
Authorizati Define the Autho First Matched	on Policy rization Policy by configuring rul I Rule Applies	es based on ide	ntity groups and/	or other conditions. Drag and	drop rules to change the order		
 Exceptions 	(0)						
Standard							
Status	Rule Name		Conditions (ide	entity groups and other conditi	ons)		Permissions
	MAB-Win7-CTS	if	Radius:Calling-	Station-ID EQUALS 00-50-56-	99-4e-b2	then	VLAN10-Profile AND VLAN10
	MAB-WinXP-CTS	if	Radius:User-Na	ame EQUALS cisco		then	VLAN20-Profile AND VLAN20

完成交换机和ASA配置,以便它们接受SGT RADIUS属性。

ASA和3750X上的CTS配置

您必须配置基本CTS设置。在3750X上,必须指示应下载哪些服务器策略:

aaa authorization network ise group radius cts authorization list ise 在ASA上,仅需要AAA服务器以及指向该服务器的CTS:

aaa-server ISE protocol radius aaa-server ISE (mgmt) host 10.48.66.129 key ***** cts server-group ISE

> **注**:在3750X上,必须使用group radius命令明确指向ISE服务器。这是因为3750X使用自动 PAC调配。

3750X(自动)和ASA上的PAC调配(手动)

CTS云中的每台设备都必须通过身份验证服务器(ISE)进行身份验证,才能被其他设备信任。为此 ,它使用可扩展身份验证协议 — 通过安全协议的灵活身份验证(EAP-FAST)方法(RFC 4851)。此方 法要求您在带外提供PAC。此过程也称为**phase0**,它未在任何RFC中定义。EAP-FAST的PAC具有 类似于可扩展身份验证协议 — 传输层安全(EAP-TLS)的证书的角色。使用PAC建立安全隧道(第 1阶段),在第2阶段进行身份验证时需要该安全隧道。

3750X上的PAC调配

3750X支持自动PAC调配。在交换机和ISE上使用共享密码来下载PAC。必须在ISE上的 Administration > Network Resources > Network Devices下配置该密码和ID。选择交换机,然后展 开Advanced TrustSec Settings部分以配置:

 Device Authentication Settings 		
Use Device ID for SGA Identification	\checkmark	
Device Id	3750X	
* Password	Show	
 SGA Notifications and Updates 		
 SGA Notifications and Updates * Download environment 	ent data every 1	Days 🔻
 SGA Notifications and Updates * Download environme * Download peer authorization 	ent data every 1 on policy every 1	Days 🔻
 SGA Notifications and Updates * Download environme * Download peer authorization * Reauther 	ent data every 1 on policy every 1 ntication every 1	Days v Days v Days v
 SGA Notifications and Updates * Download environme * Download peer authorization * Reauther * Download SGA 	ent data every 1 on policy every 1 ntication every 1 ACL lists every 1	Days V Days V Days V Days V
 SGA Notifications and Updates * Download environme * Download peer authorization * Reauther * Download SGA Other SGA devices to true 	ent data every 1 on policy every 1 ntication every 1 ACL lists every 1 ust this device	Days • Days • Days • Days •

要让PAC使用这些凭证,请输入以下命令:

bsns-3750-5#cts credentials id 3750X password ciscocisco bsns-3750-5#**show cts pacs** AID: C40A15A339286CEAC28A50DBBAC59784 PAC-Info: PAC-type = Cisco Trustsec AID: C40A15A339286CEAC28A50DBBAC59784 I-ID: 3750X A-ID-Info: Identity Services Engine Credential Lifetime: 08:04:40 UTC Sep 25 2013 PAC-Opaque: 000200B00003000100040010C40A15A339286CEAC28A50DBBAC59784000600940003 010094F559DAE0C837D7847F2454CAD7E80B0000001351C8235900093A803D7D427BFB5C6F0FBBDF7EDF0818C58FECF97F8BDECF1B115FB0240260ADA8C96A46AA2A64C9EA2DB51E0E886768CA2D133D 2468D9D33339204BAA7E4CA2DE8E37FF1EB5BCB343408E9847998E301C26DDC6F91711F631A5B4C7 C2CB09EAB028630A3B22901FE3EF44F66FD019D09D2C46D92283 Refresh timer is set for 2y24w ASA上的PAC调配

ASA仅支持手动PAC调配。这意味着您必须在ISE上手动生成它(在网络设备/ASA中):

Generate PAC

The Identity field specifies the Device ID of an SGA network device and is provided an initiator id by the EAP-FAST protocol. If the Identity string entered here does not match that Device ID, authentication will fail.

* Identity	ASA ASA			
* Encryption Key	00000			
* PAC Time to Live	1	Years 💌		
Expiration Date	04 Jul 2014 13:31:35 GMT			
			Generate PAC	Cancel

然后必须安装文件(例如,使用FTP):

bsns-asa5510-17(config)# cts import-pac ftp://ftp:ftp@10.147.25.80/ASA.pac password ciscocisco !PAC Imported Successfully bsns-asa5510-17(config)# show cts pac PAC-Info: Valid until: Jul 04 2014 13:33:02 AID: c40a15a339286ceac28a50dbbac59784 ASA I-ID: A-ID-Info: Identity Services Engine PAC-type: Cisco Trustsec PAC-Opaque: 000200a80003000100040010c40a15a339286ceac28a50dbbac597840006008c000301 e667d7b908db7aeea3229e61462bdb70f46580bef9425011126bbf6c2f4212ccdacf08 c01ddbc7608c3a1ddeb996ba9bfbd1b207281e3edc9ff61b9e800f225dc3f82bd5f7947e0a86bee8a3d437af93f54e61858bac877c58d3fe0ec6be54b4c75fad23e1fd

ASA和3750X上的环境更新

在此阶段,两台设备都已正确安装PAC,并自动开始下载ISE环境数据。这些数据基本上是标记编 号和它们的名称。要触发ASA上的环境刷新,请输入以下命令:

bsns-asa5510-17# **cts refresh environment-data** 要在ASA上验证它(很遗憾,您看不到特定SGT标记/名称,但稍后会进行验证),请输入以下命令 :

bsns-asa5510-17(config)# show cts environment-data CTS Environment Data Status: Active Last download attempt: Successful Environment Data Lifetime: 86400 secs Last update time: 05:05:16 UTC Apr 14 2007 Env-data expires in: 0:23:56:15 (dd:hr:mm:sec) Env-data refreshes in: 0:23:46:15 (dd:hr:mm:sec) 要在3750X上验证它,请使用以下命令触发环境刷新:

要验证结果,请输入以下命令:

```
bsns-3750-5#show cts environment-data
CTS Environment Data
_____
Current state = COMPLETE
Last status = Successful
Local Device SGT:
SGT tag = 0-01:Unknown
Server List Info:
Installed list: CTSServerList1-0001, 1 server(s):
 *Server: 10.48.66.129, port 1812, A-ID C40A15A339286CEAC28A50DBBAC59784
        Status = ALIVE flag(0x11)
        auto-test = TRUE, keywrap-enable = FALSE, idle-time = 60 mins,
deadtime = 20 secs
Security Group Name Table:
0001-60 :
   0-47:Unknown
   2-47:VLAN10
   3-47:VLAN20
   4-47:VLAN100
Transport type = CTS_TRANSPORT_IP_UDP
Environment Data Lifetime = 86400 secs
Last update time = 05:33:49 UTC Thu Apr 7 2011
Env-data expires in 0:16:46:50 (dd:hr:mm:sec)
Env-data refreshes in 0:16:46:50 (dd:hr:mm:sec)
Cache data applied
                           = NONE
State Machine is running
这表示所有标记和相应的名称都已正确下载。
```

3750X上的端口身份验证验证和实施

在3750X具有环境数据后,必须验证SGT是否应用于经过身份验证的会话。

要验证MS Windows 7是否正确通过身份验证,请输入以下命令:

```
bsns-3750-5#show authentication sessions interface g1/0/2
          Interface: GigabitEthernet1/0/2
        MAC Address: 0050.5699.4eb2
         IP Address: 192.168.1.200
          User-Name: 00-50-56-99-4E-B2
             Status: Authz Success
             Domain: DATA
    Security Policy: Should Secure
    Security Status: Unsecure
     Oper host mode: single-host
   Oper control dir: both
      Authorized By: Authentication Server
        Vlan Policy: 10
            ACS ACL: xACSACLx-IP-PERMIT_ALL_TRAFFIC-51134bb2
                SGT: 0002-0
     Session timeout: N/A
       Idle timeout: N/A
   Common Session ID: COA80001000001002B67334C
    Acct Session ID: 0x00000179
             Handle: 0x94000101
```

Runnable methods list:

Method State

mabAuthc Successdot1xNot run

输出显示VLAN10与SGT 0002和DACL一起用于所有流量。

要验证MS Windows XP是否正确通过身份验证,请输入以下命令:

bsns-3750-5#sh authentication sessions interface g1/0/1 Interface: GigabitEthernet1/0/1 MAC Address: 0050.5699.4ea1 IP Address: 192.168.2.200 User-Name: cisco Status: Authz Success Domain: DATA Security Policy: Should Secure Security Status: Unsecure Oper host mode: multi-auth Oper control dir: both Authorized By: Authentication Server Vlan Policy: 20 ACS ACL: xACSACLx-IP-PERMIT_ALL_TRAFFIC-51134bb2 SGT: 0003-0 Session timeout: N/A Idle timeout: N/A Common Session ID: COA80001000000FE2B67334C Acct Session ID: 0x00000177 Handle: 0x540000FF Runnable methods list:

Method State dotlx Authc Success mab Not run

输出显示, VLAN 20与SGT 0003和DACL一起用于所有流量

使用ip device tracking功能检测IP地址。DHCP交换机应配置为dhcp snooping。然后,在监听 DHCP响应后,它会获取客户端的IP地址。对于静态配置的IP地址(如本例所示),使用arp snooping功能,并且PC必须发送任何数据包才能检测交换机的IP地址。

对于**设备跟踪**,可能需要隐藏命令才能在端口上激活它:

bsns-3750-5#ip device tracking interface g1/0/1 bsns-3750-5#ip device tracking interface g1/0/2 bsns-3750-5#show ip device tracking all IP Device Tracking = Enabled IP Device Tracking Probe Count = 3 IP Device Tracking Probe Interval = 30 IP Device Tracking Probe Delay Interval = 0 _____ MAC Address Vlan Interface IP Address STATE _____ 192.168.1.200 0050.5699.4eb2 10 GigabitEthernet1/0/2 ACTIVE 192.168.2.200 0050.5699.4ea1 20 GigabitEthernet1/0/1 ACTIVE

Total number interfaces enabled: 2 Enabled interfaces: Gi1/0/1, Gi1/0/2

3750X上的策略更新

3750X(与ASA不同)可以从ISE下载策略。在下载和实施策略之前,您必须使用以下命令启用策略 :

bsns-3750-5(config)#cts role-based enforcement bsns-3750-5(config)#cts role-based enforcement vlan-list 1-1005,1007-4094 如果未启用该策略,则下载该策略,但不会安装该策略,也不会将其用于实施。

要触发策略刷新,请输入以下命令:

bsns-3750-5#**cts refresh policy** Policy refresh in progress **要验证是否已从ISE下载策略,请输入以下命令**:

bsns-3750-5#show cts role-based permissions
IPv4 Role-based permissions default:
 Permit IP-00
IPv4 Role-based permissions from group 2:VLAN10 to group Unknown:
 ICMP-20
IPv4 Role-based permissions from group 2:VLAN10 to group 2:VLAN10:
 ICMP-20
IPv4 Role-based permissions from group 2:VLAN10 to group 3:VLAN20:
 ICMP-20
Deny IP-00

输出显示仅下载策略的必要部分。

在CTS云中,数据包包含源主机的SGT,并在目**标设备上进行实施**。这意味着数据包将从源设备转 发到最后一台设备,该设备直接连接到目的主机。该设备是实施点,因为它知道其直连主机的 SGT,并知道对于特定目标SGT是否应该允许或拒绝具有源SGT的传入数据包。

此决定基于从ISE下载的策略。

在此场景中,所有策略都将被下载。但是,如果清除MS Windows XP身份验证会话 (SGT=VLAN20),则交换机无需下载任何与VLAN20对应的策略(行),因为该SGT中没有更多设 备连接到交换机。

高级(故障排除)部分说明3750X如何通过检查数据包级别来决定应下载哪些策略。

SXP Exchange(将ASA用作侦听器,将3750X用作扬声器)

ASA不支持SGT。ASA会丢弃所有带有SGT的帧。因此,3750X无法向ASA发送SGT标记的帧。而 是使用SXP。该协议允许ASA从交换机接收有关IP地址与SGT之间映射的信息。借助该信息 ,ASA能够将IP地址映射到SGT并根据SGACL做出决策。

要将3750X配置为扬声器,请输入以下命令:

cts sxp enable cts sxp default source-ip 192.168.1.10 cts sxp default password cisco cts sxp connection peer 192.168.1.1 password default mode local 要将ASA配置为侦听程序,请输入以下命令:

cts sxp enable cts sxp default password ***** cts sxp default source-ip 192.168.1.1 cts sxp connection peer 192.168.1.10 password default mode local listener 要验证ASA是否已收到映射,请输入以下命令:

bsns-asa5510-17# **show cts sxp sgt-map ipv4 detail** Total number of IP-SGT mappings : 2 Total number of IP-SGT mappings shown: 2

SGT : 2:VLAN10 IPv4 : 192.168.1.200 Peer IP : 192.168.1.10 Ins Num : 1 : Active Status Seq Num : 49 : 3:VLAN20 SGT : 192.168.2.200 TPv4 Peer IP : 192.168.1.10 Ins Num : 1 : Active Status Seq Num : 39

现在,当ASA收到源IP地址为192.168.1.200的传入数据包时,它能够将其视为来自SGT=2的传入数据包。对于源IP地址192.168.200.2,它能够将其视为来自SGT=3。目的IP地址也是如此。

注:3750X必须知道关联主机的IP地址。这是通过IP设备跟踪完成的。对于终端主机上静态配置的IP地址,交换机必须在身份验证后接收任何数据包。这会触发IP设备跟踪以查找其IP地址 ,从而触发SXP更新。当只有SGT已知时,它不会通过SXP发送。

使用SGT ACL在ASA上过滤流量

以下是对ASA配置的检查:

```
interface Ethernet0/0
nameif outside
security-level 0
ip address 192.168.1.1 255.255.255.0
!
interface Ethernet0/1
nameif inside
security-level 100
ip address 192.168.2.1 255.255.255.0
创建一个ACL并将其应用于内部接口。它允许从SGT=3到SGT=2(称为VLAN10)的所有ICMP流量:
```

access-list inside extended permit icmp security-group tag 3 any security-group name VLAN10 any access-group inside in interface inside

注:您可以使用标记编号或标记名称。

如果从源IP地址为192.168.2.200(SGT=3)的MS Windows XP ping IP地址为 192.168.1.200(SGT=2)的MS Windows 7,则ASA会建立连接:

%ASA-6-302020: Built outbound ICMP connection for faddr 192.168.1.200/0 (2:VLAN10) gaddr 192.168.2.200/512 laddr 192.168.2.200/512(3:VLAN20) 当您尝试使用Telnet时,流量会被阻止:

Deny tcp src inside:192.168.2.200/2478(3:VLAN20) dst outside:192.168.1.200/23 (2:VLAN10) by access-group "inside"

ASA上有更多配置选项。源和目标都可以使用安全标记和IP地址。此规则允许从**SGT标记= 3**和IP地 址192.168.2.200到名为VLAN10的SGT标记和目标主机地址192.168.1.200的ICMP回应流量:

access-list inside extended permit icmp security-group tag 3 host 192.168.2.200 security-group name VLAN10 host 192.168.1.200 echo 对象组也可以实现此目的:

object-group security SGT-VLAN-10 security-group name VLAN10 object-group security SGT-VLAN-20 security-group tag 3 object-group network host1 network-object host 192.168.1.200 object-group network host2 network-object host 192.168.2.200 object-group service my-icmp-echo service-object icmp echo

access-list inside extended permit object-group my-icmp-echo object-group-security SGT-VLAN-20 object-group host2 object-group-security SGT-VLAN-10 object-group host1

使用从ISE下载的策略在3750X上进行流量过滤(RBACL)

也可以在交换机上定义本地策略。但是,此示例展示从ISE下载的策略。允许在ASA上定义的策略 在一个规则中使用IP地址和SGT(以及来自Active Directory的用户名)。在交换机上定义的策略 (本地和来自ISE)仅允许SGT。如果您需要在规则中使用IP地址,则建议在ASA上进行过滤。

测试MS Windows XP和MS Windows 7之间的ICMP流量。为此,您必须在MS Windows上将默认网 关从ASA更改为3750X。3750X具有路由接口,能够路由数据包:

interface Vlan10 ip address 192.168.1.10 255.255.255.0 ! interface Vlan20 ip address 192.168.2.10 255.255.255.0 已从ISE下载策略。要验证它们,请输入以下命令:

```
bsns-3750-5#show ip access-lists ICMP-20
Role-based IP access list ICMP-20 (downloaded)
10 permit icmp
要验证ACL,请输入以下命令:
```

name = ICMP-20

IP protocol version = IPV4 refcnt = 6 flag = 0x41000000 stale = FALSE RBACL ACES:

permit icmp

```
name = Permit IP-00
IP protocol version = IPV4
refcnt = 2
flag = 0x41000000
stale = FALSE
RBACL ACEs:
   permit ip
```

要验证SGT映射以确保来自两台主机的流量被正确标记,请输入以下命令:

bsns-3750-5**#show cts role-based sgt-map all** Active IP-SGT Bindings Information

IP Address	SGT	Source
192.168.1.200	2	LOCAL
192.168.2.200	3	LOCAL

IP-SGT Active Bindings Summary

从MS Windows 7(**SGT=2)**到MS Windows XP(**SGT=3)**的ICMP与ACL ICMP-20配合使用效果良好。 通过检查从2到3(15个允许的数据包)的流量计数器可以验证这一点:

bsns-37 Role-ba # '-' i policie	50-5# sho sed IPv4 n hardwa:	w cts role-based counters re counters field	counters d indicates shar:	ing among cells w	with identical
From	То	SW-Denied	HW-Denied	SW-Permitted	HW-Permitted
2 2	0 2	0 0	0 -	1695 0	224
*	*	0	0	133258	132921
² 在您尝	³ 试使用Te	。 elnet计数器后,ネ	。 波拒绝的数据包 2	₀ ≳增加(ICMP-20	15)ACL上不允许出现这种情况):

<pre>bsns-3750-5#show cts role-based counters Role-based IPv4 counters # '-' in hardware counters field indicates sharing among cells with identical policies</pre>						
From	То	SW-Denied	HW-Denied	SW-Permitted	HW-Permitted	
2 2	0 2	0 0	0 -	1695 0	224	
*	*	0	0	133281	132969	
2	3	0	2	0	15	

注意:输出中显示的星号(*)字符与所有未标记的流量相关(该列和行在ISE上的矩阵中称为 unknown,并使用标记号**为0**)。

当您拥有带有log关键字的ACL条目(在ISE上定义)时,相应的数据包详细信息和采取的操作会与 带有log关键字的任何ACL中记录相同。

验证

有关验证过程,请参阅各个配置部分。

故障排除

PAC调配

使用自动PAC调配时可能出现问题。请记住对RADIUS服务器使用pac关键字。3750X上的自动

PAC调配使用可扩展身份验证协议的EAP-FAST方法,内部方法使用Microsoft质询握手身份验证协 议(EAP-MSCHAPv2)身份验证。在调试时,您会看到多个RADIUS消息,它们是EAP-FAST协商的 一部分,用于构建安全隧道,该隧道使用具有已配置ID和密码的EAP-MSCHAPv2进行身份验证。

第一个RADIUS请求使用AAA service-type=cts-pac-provisioning以通知ISE这是一个PAC请求。

bsns-3750-5#debug cts provisioning events

bsns-3750-5#debug cts provisioning packets *Mar 1 09:55:11.997: CTS-provisioning: New session socket: src= 10.48.66.109:57516 dst=10.48.66.129:1645 *Mar 1 09:55:11.997: CTS-provisioning: Sending EAP Response/Identity to 10.48.66.129 *Mar 1 09:55:11.997: CTS-provisioning: OUTGOING RADIUS msg to 10.48.66.129: *Mar 1 09:55:11.997: CTS-provisioning: INCOMING RADIUS msg from 10.48.66.129: *Mar 1 09:55:11.997: CTS-provisioning: Received RADIUS challenge from 10.48.66.129. *Mar 1 09:55:12.006: CTS-provisioning: Received TX_PKT from EAP method *Mar 1 09:55:12.006: CTS-provisioning: Sending EAPFAST response to 10.48.66.129 *Mar 1 09:55:12.006: CTS-provisioning: OUTGOING RADIUS msg to 10.48.66.129: *Mar 1 09:55:12.106: CTS-provisioning: INCOMING RADIUS msg from 10.48.66.129: *Mar 1 09:55:12.115: CTS-provisioning: Received RADIUS challenge from 10.48.66.129. *Mar 1 09:55:12.744: CTS-provisioning: Received TX_PKT from EAP method *Mar 1 09:55:12.744: CTS-provisioning: Sending EAPFAST response to 10.48.66.129 *Mar 1 09:55:12.744: CTS-provisioning: OUTGOING RADIUS msg to 10.48.66.129: *Mar 1 09:55:12.844: CTS-provisioning: INCOMING RADIUS msg from 10.48.66.129: *Mar 1 09:55:12.844: CTS-provisioning: Received RADIUS challenge from 10.48.66.129. *Mar 1 09:55:12.853: CTS-provisioning: Received TX PKT from EAP method *Mar 1 09:55:12.853: CTS-provisioning: Sending EAPFAST response to 10.48.66.129 *Mar 1 09:55:12.853: CTS-provisioning: OUTGOING RADIUS msg to 10.48.66.129: 1 09:55:12.853: CTS-provisioning: INCOMING RADIUS msg from 10.48.66.129: 1 09:55:12.861: CTS-provisioning: Received RADIUS challenge from *Mar 10.48.66.129. *Mar 1 09:55:12.861: CTS-provisioning: Received TX_PKT from EAP method *Mar 1 09:55:12.861: CTS-provisioning: Sending EAPFAST response to 10.48.66.129 *Mar 1 09:55:12.861: CTS-provisioning: OUTGOING RADIUS msg to 10.48.66.129: *Mar 1 09:55:12.878: CTS-provisioning: INCOMING RADIUS msg from 10.48.66.129: *Mar 1 09:55:12.878: CTS-provisioning: Received RADIUS challenge from 10.48.66.129. *Mar 1 09:55:12.886: CTS-provisioning: Received TX_PKT from EAP method *Mar 1 09:55:12.886: CTS-provisioning: Sending EAPFAST response to 10.48.66.129 *Mar 1 09:55:12.886: CTS-provisioning: OUTGOING RADIUS msg to 10.48.66.129: *Mar 1 09:55:12.895: CTS-provisioning: INCOMING RADIUS msg from 10.48.66.129: *Mar 1 09:55:12.895: CTS-provisioning: Received RADIUS challenge from 10.48.66.129. *Mar 1 09:55:12.895: CTS-provisioning: Received TX_PKT from EAP method *Mar 1 09:55:12.895: CTS-provisioning: Sending EAPFAST response to 10.48.66.129 *Mar 1 09:55:12.903: CTS-provisioning: OUTGOING RADIUS msg to 10.48.66.129: *Mar 1 09:55:12.912: CTS-provisioning: INCOMING RADIUS msg from 10.48.66.129: *Mar 1 09:55:12.912: CTS-provisioning: Received RADIUS challenge from 10.48.66.129. *Mar 1 09:55:12.920: CTS-provisioning: Received TX_PKT from EAP method 1 09:55:12.920: CTS-provisioning: Sending EAPFAST response to 10.48.66.129 *Mar *Mar 1 09:55:12.920: CTS-provisioning: OUTGOING RADIUS msg to 10.48.66.129: *Mar 1 09:55:12.928: CTS-provisioning: INCOMING RADIUS msg from 10.48.66.129: *Mar 1 09:55:12.928: CTS-provisioning: Received RADIUS challenge from 10.48.66.129.

*Mar 1 09:55:12.970: CTS-pac-refresh: PAC C40A15A339286CEAC28A50DBBAC59784
refresh timer has been set for 20y30w
*Mar 1 09:55:12.970: CTS-provisioning: Ignoring key data.
*Mar 1 09:55:12.979: CTS-provisioning: Received TX_PKT from EAP method
*Mar 1 09:55:12.979: CTS-provisioning: Sending EAPFAST response to 10.48.66.129
*Mar 1 09:55:12.979: CTS-provisioning: OUTGOING RADIUS msg to 10.48.66.129:
*Mar 1 09:55:12.995: CTS-provisioning: INCOMING RADIUS msg from 10.48.66.129:
*Mar 1 09:55:12.995: CTS-provisioning: Successfully obtained PAC for A-ID
c40a15a39286ceac28a50dbbac59784
*Mar 1 09:55:12.995: CTS-provisioning: cts_provi_server_cleanup: 10.48.66.129
*Mar 1 09:55:12.995: CTS-provisioning: work complete, process terminating.

输出末尾的RADIUS reject是预期值,因为您已经收到PAC,并且没有执行进一步的身份验证过程。

请记住,与ISE的所有其他通信均需要PAC。但是,如果没有配置,交换机在配置时仍会尝试环境 或策略刷新。然后,它不会在RADIUS请求中附加**cts-opaqueue**(PAC),从而导致失败。

如果您的PAC密钥错误,此错误消息会显示在ISE上:

The Message-Authenticator RADIUS attribute is invalid

如果PAC密钥错误,您还会看到交换机上的调试(**debug cts provisioning + debug radius**)的以下输出 :

Apr 20 10:07:11.768: CTS-provisioning: Sending EAP Response/Identity t Apr 20 10:07:15.325: RADIUS(0000024B): Request timed out! Apr 20 10:07:15.325: RADIUS: No response from (10.62.84.224:1645,1646) for id 1645/37

如果使用现代radius server约定,则会显示:

radius server KRK-ISE
address ipv4 10.62.84.224 auth-port 1645 acct-port 1646
pac key CISCO

注意:您必须在ISE上使用您在设备身份验证设置中使用的密码。

PAC调配成功后,ISE上会显示以下内容:

Authentication Summary						
Logged At:	June 26,2013 1:36:32.676 PM					
RADIUS Status:	PAC provisioned					
NAS Failure:						
Username:	3750					
MAC/IP Address:	BC:16:65:25:A5:00					
Network Device:	<u>3750X</u> : <u>10.48.66.109</u> :					
Allowed Protocol:	NDAC_SGT_Service					
Identity Store:	Internal CTS Devices					
Authorization Profiles:						
SGA Security Group:						
Authentication Protocol	Authentication Protocol : EAP-FAST(EAP-MSCHAPv2)					

环境更新

环境刷新用于从ISE获取基本数据,包括SGT编号和名称。数据包级别显示它只有三个RADIUS请求 和具有属性的响应。

```
对于第一个请求,交换机收到CTSServerlist名称。对于第二个SGT,它会收到该列表的详细信息
,对于最后一个SGT,它会收到带有标记和名称的所有SGT:
```

No.	Source	Destination	Protocol	Length	Info
1	10.48.66.109	10.48.66.129	RADIUS	347	Access-Request(1) (id=166, l=319)
2	10.48.66.129	10.48.66.109	RADIUS	337	Access-Accept(2) (id=166, l=309)
3	10.48.66.109	10.48.66.129	RADIUS	351	<pre>Access-Request(1) (id=167, l=323)</pre>
4	10.48.66.129	10.48.66.109	RADIUS	288	Access-Accept(2) (id=167, l=260)
5	10.48.66.109	10.48.66.129	RADIUS	350	<pre>Access-Request(1) (id=168, l=322)</pre>
6	10.48.66.129	10.48.66.109	RADIUS	396	Access-Accept(2) (id=168, l=368)

```
Authenticator: b1b/2c429de059341/de4315ee0bd40c
 [This is a response to a request in frame 5]
 [Time from request: 0.008000000 seconds]
▼ Attribute Value Pairs
 v AVP: l=14 t=User-Name(1): #CTSREQUEST#
    User-Name: #CTSREQUEST#
 AVP: l=40 t=State(24): 52656175746853657373696f6e3a30613330343238313030...
 AVP: l=50 t=Class(25): 434143533a30613330343238313030303031343033353143...
 AVP: l=6 t=Termination-Action(29): RADIUS-Request(1)
 AVP: l=18 t=Message-Authenticator(80): ac8e7b6f0d59da776f0dbf1ffa04baf1
 v AVP: l=39 t=Vendor-Specific(26) v=Cisco(9)
   VSA: l=33 t=Cisco-AVPair(1): cts:security-group-table=0001-5
 v AVP: l=46 t=Vendor-Specific(26) v=Cisco(9)
   VSA: l=40 t=Cisco-AVPair(1): cts:security-group-info=0-0-00-Unknown
 v AVP: l=45 t=Vendor-Specific(26) v=Cisco(9)
   VSA: l=39 t=Cisco-AVPair(1): cts:security-group-info=ffff-0-00-ANY
 v AVP: l=45 t=Vendor-Specific(26) v=Cisco(9)
   VSA: l=39 t=Cisco-AVPair(1): cts:security-group-info=2-0-00-VLAN10
 v AVP: l=45 t=Vendor-Specific(26) v=Cisco(9)
   VSA: l=39 t=Cisco-AVPair(1): cts:security-group-info=3-0-00-VLAN20
```

此处可以看到默认SGT 0和 ffff,以及两个自定义:SGT标记2命名为VLAN10,SGT标记3命名为 VLAN20。

注意:由于PAC调配,所有RADIUS请求都包括cts-pac-opaque。

No.	Source	Destination	Protocol	Length	Info		
1	10.48.66.109	10.48.66.129	RADIUS	347	Access-Request(1) (id=166, l=319)		
2	10.48.66.129	10.48.66.109	RADIUS	337	Access-Accept(2) (id=166, l=309)		
3	10.48.66.109	10.48.66.129	RADIUS	351	Access-Request(1) (id=167, l=323)		
4	10.48.66.129	10.48.66.109	RADIUS	288	Access-Accept(2) (id=167, l=260)		
5	10.48.66.109	10.48.66.129	RADIUS	350	Access-Request(1) (id=168, l=322)		
6	10.48.66.129	10.48.66.109	RADIUS	396	Access-Accept(2) (id=168, l=368)		
▶ Rav	v packet data						
▶ In	ternet Protocol	Version 4, Sr	c: 10.48.	66.109	(10.48.66.109), Dst: 10.48.66.129		
▶ Use	er Datagram Pro	tocol, Src Por	t: sight]	line (10	545), Dst Port: sightline (1645)		
▼ Ra	dius Protocol						
0	Code: Access-Request (1)						
P	Packet identifier: 0xa6 (166)						
L	Length: 319						
A	Authenticator: 60a2c0dbab563d6a0f4b44910f646d9e						
L	[The response to this request is in frame 2]						
▼ A	▼ Attribute Value Pairs						
~	▼ AVP: l=203 t=Vendor-Specific(26) v=Cisco(9)						
	VSA: l=197 t=Cisco-AVPair(1): cts-pac-opaque=\000\002\000\260\000\003\000\0						
~	✓ AVP: l=14 t=User-Name(1): #CTSREQUEST#						
	User-Name: #CTSREQUEST#						
~	▼ AVP: l=34 t=Vendor-Specific(26) v=Cisco(9)						
	VSA: l=28 t=Cisco-AVPair(1): cts-environment-data=3750X						
Þ	AVP: l=18 t=User-Password(2): Encrypted						
Þ	AVP: l=6 t=Service-Type(6): Dialout-Framed-User(5)						
Þ	\land AVP: 1=6 t=NAS-TP-Address(4): 10.48.66.100						

- ▷ AVP: L=b T=NAS-IP-Address(4): 10.48.66.109
- AVP: l=18 t=Message-Authenticator(80): a16f5aea9af1cb47abb0d06d229eeec7

在3750X上,您应该看到所有三种RADIUS响应的调试,以及相应的列表、列表详细信息和特定 SGT内部列表:

bsns-3750-5#debug cts environment-data all *Mar 1 10:05:07.454: CTS env-data: cleanup mcast SGT table *Mar 1 10:05:18.057: CTS env-data: Force environment-data refresh *Mar 1 10:05:18.057: CTS env-data: download transport-type = CTS_TRANSPORT_IP_UDP *Mar 1 10:05:18.057: cts_env_data START: during state env_data_complete, got event 0(env_data_request) *Mar 1 10:05:18.057: @@@ cts_env_data START: env_data_complete -> env_data_waiting_rsp *Mar 1 10:05:18.057: env_data_waiting_rsp_enter: state = WAITING_RESPONSE *Mar 1 10:05:18.057: env_data_request_action: state = WAITING_RESPONSE *Mar 1 10:05:18.057: cts_env_data_is_complete: FALSE, req(x0), rec(x0), expect(x81), complete1(x85), complete2(xB5), complete3(x28B5) *Mar 1 10:05:18.057: cts_aaa_req_setup: (CTS env-data)Private group appears DEAD, attempt public group *Mar 1 10:05:18.057: cts_aaa_req_setup: (CTS env-data)CTS_TRANSPORT_IP_UDP *Mar 1 10:05:18.057: cts_aaa_req_setup: (CTS env-data)AAA req(x7C3DF10) *Mar 1 10:05:18.057: cts_aaa_attr_add: AAA req(0x7C3DF10) *Mar 1 10:05:18.057: username = #CTSREQUEST# *Mar 1 10:05:18.057: cts-environment-data = 3750X *Mar 1 10:05:18.057: cts_aaa_req_send: AAA req(0x7C3DF10) successfully sent to AAA. 1 10:05:18.083: cts_aaa_callback: (CTS env-data)AAA req(0x7C3DF10) *Mar response success

```
*Mar 1 10:05:18.083: AAA attr: Unknown type (447).
*Mar 1 10:05:18.083: AAA attr: Unknown type (220).
*Mar 1 10:05:18.083: AAA attr: Unknown type (275).
*Mar 1 10:05:18.083: AAA attr: server-list = CTSServerList1-0001.
*Mar 1 10:05:18.083: AAA attr: security-group-tag = 0000-00.
*Mar 1 10:05:18.083: AAA attr: environment-data-expiry = 86400.
*Mar 1 10:05:18.083: AAA attr: security-group-table = 0001-5.
*Mar 1 10:05:18.083: 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 = unicast-unknown-00
CTS_AAA_ENVIRONMENT_DATA_EXPIRY = 86400.
CTS_AAA_SGT_NAME_LIST
  table(0001) received in 1st Access-Accept
  old name(), gen()
  new name(0001), gen(50)
CTS_AAA_DATA_END
*Mar 1 10:05:18.083:
                        cts_env_data WAITING_RESPONSE: during state
env_data_waiting_rsp, got event 1(env_data_received)
*Mar 1 10:05:18.083: @@@ cts_env_data WAITING_RESPONSE: env_data_waiting_rsp ->
env_data_assessing
*Mar 1 10:05:18.083: env_data_assessing_enter: state = ASSESSING
*Mar 1 10:05:18.083: env_data_assessing_action: state = ASSESSING
*Mar 1 10:05:18.083: cts_env_data_is_complete: FALSE, req(x1089), rec(xC83),
expect(x28B5), complete1(x85), complete2(xB5), complete3(x28B5)
*Mar 1 10:05:18.083:
                        cts_env_data ASSESSING: during state env_data_assessing,
got event 3(env_data_incomplete)
*Mar 1 10:05:18.083: @@@ cts_env_data ASSESSING: env_data_assessing ->
env_data_waiting_rsp
*Mar 1 10:05:18.083: env_data_waiting_rsp_enter: state = WAITING_RESPONSE
*Mar 1 10:05:18.083: env_data_request_action: state = WAITING_RESPONSE
*Mar 1 10:05:18.083: cts_env_data_is_complete: FALSE, req(x1089), rec(xC83),
expect(x28B5), complete1(x85), complete2(xB5), complete3(x28B5)
*Mar 1 10:05:18.083: cts_aaa_req_setup: (CTS env-data)Private group appears DEAD,
attempt public group
*Mar 1 10:05:18.083: cts_aaa_req_setup: (CTS_env-data)CTS_TRANSPORT_IP_UDP
*Mar 1 10:05:18.083: cts_aaa_req_setup: (CTS env-data)AAA req(x792FFD0)
*Mar 1 10:05:18.083: cts_aaa_attr_add: AAA req(0x792FFD0)
*Mar 1 10:05:18.091: username = #CTSREQUEST#
*Mar 1 10:05:18.091: cts-server-list = CTSServerList1
*Mar 1 10:05:18.091: cts_aaa_req_send: AAA req(0x792FFD0) successfully sent to AAA.
*Mar 1 10:05:18.099: cts_aaa_callback: (CTS env-data)AAA req(0x792FFD0)
response success
*Mar 1 10:05:18.099: AAA attr: Unknown type (447).
*Mar 1 10:05:18.099: AAA attr: Unknown type (220).
*Mar 1 10:05:18.099: AAA attr: Unknown type (275).
*Mar 1 10:05:18.099: AAA attr: server-list = CTSServerList1-0001.
*Mar 1 10:05:18.099: AAA attr: server = c40a15a339286ceac28a50dbbac59784:
10.48.66.129:1812.
*Mar 1 10:05:18.099: CTS env-data: Receiving AAA attributes
CTS_AAA_SLIST
   2nd Access-Accept slist name(CTSServerList1), gen(0001)
CTS AAA SERVERS
  server (c40a15a339286ceac28a50dbbac59784:10.48.66.129:1812) added
CTS_AAA_DATA_END
*Mar 1 10:05:18.099:
                        cts_env_data WAITING_RESPONSE: during state
env_data_waiting_rsp, got event 1(env_data_received)
*Mar 1 10:05:18.099: @@@ cts_env_data WAITING_RESPONSE: env_data_waiting_rsp ->
env_data_assessing
*Mar 1 10:05:18.099: env_data_assessing_enter: state = ASSESSING
*Mar 1 10:05:18.099: env_data_assessing_action: state = ASSESSING
*Mar 1 10:05:18.099: cts_env_data_is_complete: FALSE, req(x108D), rec(xC87),
expect(x28B5), complete1(x85), complete2(xB5), complete3(x28B5)
```

```
*Mar 1 10:05:18.099:
                         cts_env_data ASSESSING: during state env_data_assessing,
got event 3(env_data_incomplete)
*Mar 1 10:05:18.099: @@@ cts_env_data ASSESSING: env_data_assessing ->
env_data_waiting_rsp
*Mar 1 10:05:18.099: env_data_waiting_rsp_enter: state = WAITING_RESPONSE
*Mar 1 10:05:18.099: env_data_request_action: state = WAITING_RESPONSE
*Mar 1 10:05:18.099: cts_env_data_is_complete: FALSE, req(x108D), rec(xC87),
expect(x28B5), complete1(x85), complete2(xB5), complete3(x28B5)
*Mar 1 10:05:18.099: cts_aaa_req_setup: (CTS env-data)Using private server group
*Mar 1 10:05:18.099: cts_aaa_req_setup: (CTS env-data)CTS_TRANSPORT_IP_UDP
*Mar 1 10:05:18.099: cts_aaa_req_setup: (CTS env-data)AAA req(x7A6C4AC)
*Mar 1 10:05:18.099: cts_aaa_attr_add: AAA req(0x7A6C4AC)
*Mar 1 10:05:18.099: username = #CTSREQUEST#
*Mar 1 10:05:18.099:
                      cts-security-group-table = 0001
*Mar
     1 10:05:18.099: cts_aaa_req_send: AAA req(0x7A6C4AC) successfully sent to AAA.
*Mar 1 10:05:18.108: cts_aaa_callback: (CTS env-data)AAA req(0x7A6C4AC)
response success
*Mar 1 10:05:18.108: AAA attr: Unknown type (447).
*Mar 1 10:05:18.108: AAA attr: Unknown type (220).
*Mar 1 10:05:18.108: AAA attr: Unknown type (275).
*Mar 1 10:05:18.108: AAA attr: security-group-table = 0001-5.
*Mar 1 10:05:18.108: AAA attr: security-group-info = 0-0-00-Unknown.
*Mar 1 10:05:18.108: AAA attr: security-group-info = ffff-0-00-ANY.
*Mar 1 10:05:18.108: AAA attr: security-group-info = 2-0-00-VLAN10.
*Mar 1 10:05:18.108: AAA attr: security-group-info = 3-0-00-VLAN20.
*Mar 1 10:05:18.108: CTS env-data: Receiving AAA attributes
CTS_AAA_SGT_NAME_LIST
   table(0001) received in 2nd Access-Accept
   old name(0001), gen(50)
  new name(0001), gen(50)
CTS_AAA_SGT_NAME_INBOUND - SGT = unicast-unknown-00
  flag (128) server name (Unknown) added
 name (0001), request (1), receive (1)
 Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
CTS_AAA_SGT_NAME_INBOUND - SGT = unicast-default-00
   flag (128) server name (ANY) added
 name (0001), request (1), receive (1)
 Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
CTS_AAA_SGT_NAME_INBOUND - SGT = 2-00
  flag (128) server name (VLAN10) added
 name (0001), request (1), receive (1)
 Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
CTS_AAA_SGT_NAME_INBOUND - SGT = 3-00
   flag (128) server name (VLAN20) added
 name (0001), request (1), receive (1)
 Setting SG Name receving bit CTS_ENV_DATA_SGT_NAME_ENTRY on
CTS_AAA_DATA_END
*Mar 1 10:05:18.108:
                        cts_env_data WAITING_RESPONSE: during state
env_data_waiting_rsp, got event 1(env_data_received)
*Mar 1 10:05:18.108: @@@ cts_env_data WAITING_RESPONSE: env_data_waiting_rsp ->
env_data_assessing
*Mar 1 10:05:18.108: env_data_assessing_enter: state = ASSESSING
*Mar 1 10:05:18.108: env_data_assessing_action: state = ASSESSING
*Mar 1 10:05:18.116: cts_env_data_is_complete: TRUE, req(x2085), rec(x2C87),
expect(x81), complete1(x85), complete2(xB5), complete3(x28B5)
                         cts_env_data ASSESSING: during state env_data_assessing,
*Mar 1 10:05:18.116:
got event 4(env_data_complete)
*Mar 1 10:05:18.116: @@@ cts_env_data ASSESSING: env_data_assessing ->
env_data_complete
*Mar 1 10:05:18.116: env_data_complete_enter: state = COMPLETE
*Mar 1 10:05:18.116: env_data_install_action: state = COMPLETE
```

策略刷新

只有交换机支持策略刷新。它类似于环境更新。这些只是RADIUS请求和接受。

交换机要求输入默认列表中的所有ACL。然后,对于每个不是最新(或不存在)的ACL,它会发送 另一个请求以获取详细信息。

以下是请求ICMP-20 ACL时的响应示例:

No.	Source		Destination	Protocol	Length	Info	
3	10.48.66.	109	10.48.66.129	RADIUS	375	Access-Request(1)	(id=31, l=347)
4	10.48.66.	129	10.48.66.109	RADIUS	235	Access-Accept(2)	(id=31, l=207)
5	10.48.66.	109	10.48.66.129	RADIUS	390	Access-Request(1)	(id=32, l=362)
4							
▶ Fr	ame 4: 235	5 byte	s on wire (188	0 bits),	235 by	tes captured (1880	bits)
▶ Ra	w packet d	lata					
⊳ In	ternet Pro	otocol	Version 4, Sr	c: 10.48	.66.129	(10.48.66.129), D	st: 10.48.66.109
⊳ Us	er Datagra	am Pro	tocol, Src Por	t: radiu	s (1812), Dst Port: sight	line (1645)
⊽ Ra	dius Proto	ocol					
0	Code: Acce	ss-Acc	ept (2)				
F	Packet ide	ntifie	er: 0x1f (31)				
I	ength: 20	7					
	Authenticator: 75c1a287476bb50b917480b941ee1d11						
	<u>This is a</u>	respo	inse to a reque	<u>est in fr</u>	<u>rame 31</u>		
	[Time from request: 0.008000000 seconds]						
▼ Attribute Value Pairs							
Þ	AVP: l=14 t=User-Name(1): #CTSREQUEST#						
Þ	▷ AVP: l=40 t=State(24): 52656175746853657373696f6e3a30613330343238313030						
▷ AVP: l=50 t=Class(25): 434143533a30613330343238313030303031343042353143							
AVP: l=6 t=Termination-Action(29): RADIUS-Request(1)							
AVP: l=18 t=Message-Authenticator(80): ebacc40303fc804ee71b587818c2f330							
~	✓ AVP: L=24 t=Vendor-Specific(26) v=Cisco(9)						
	▷ VSA: L=18 t=Cisco-AVPair(1): cts:rbacl=ICMP-2						
	▼ AVP: L=35 t=Vendor-Specific(26) v=Cisco(9)						
	₽ VSA: L=	:29 t=0	lisco-AVPair(1)): cts:n	bact-ace	e#1=permit icmp	

请记住,您必须配置cts role-based enforcement才能实施该ACL。

调试指示是否发生更改(基于gen ID)。如果需要,您可以卸载旧策略,并安装新策略。这包括 ASIC编程(硬件支持)。

bsns-3750-5#**debug cts all**

Mar 30 02:39:37.151: CTS authz entry: peer(Unknown-2) Receiving AAA attributes
 rcv rbacl list: flags: req(81)rcv(0)wait(80)prev(0)install(880)
 - SGT = 2-01:VLAN10
 - SGT = 2-01:VLAN10
 current arg_cnt=8, expected_num_args=11
 3rd Access-Accept rbacl received name(ICMP), gen(20)
 received_policyp->sgt(2-01:VLAN10)
 existing sgt_policy(73FFDB4) sgt(2-01:VLAN10)
 RBACL name(ICMP-20)flag(4000000) already exists
 acl_listp(740266C) old_acl_infop(0),exist_rbacl_type(0)
 CTS_AAA_AUTHORIZATION_EXPIRY = 86400.
 CTS_AAA_DATA_END

```
Mar 30 02:39:37.176: cts_authz_entry_complete_action: Policy download complete -
peer(Unknown-2) SGT(2-01:VLAN10) status(RBACL-POLICY SUCCEEDED)
Mar 30 02:39:37.176: cts_authz_rbacl_uninstall_cb:
Mar 30 02:39:37.176: uninstall cb_ctx:
Mar 30 02:39:37.176: session_hdl = F1000003
Mar 30 02:39:37.176: sgt_policyp = 73FFDB4, sgt=(2-01:VLAN10), magic(BABECABB)
Mar 30 02:39:37.176: ip_version = IPV6
Mar 30 02:39:37.176: src-or-dst = BOTH
Mar 30 02:39:37.176: wait_rbm_install_ip_ver(0)
Mar 30 02:39:37.176: wait_rbm_uninstall_ip_ver(C0000000)
Mar 30 02:39:37.176: cts_authz_rbacl_uninstall_cb:
Mar 30 02:39:37.176: uninstall cb_ctx:
Mar 30 02:39:37.176: session_hdl = F1000003
Mar 30 02:39:37.176: sgt_policyp = 73FFDB4, sgt=(2-01:VLAN10), magic(BABECABB)
                     ip_version = IPV4
Mar 30 02:39:37.176:
Mar 30 02:39:37.176: src-or-dst = BOTH
Mar 30 02:39:37.176: wait_rbm_install_ip_ver(0)
Mar 30 02:39:37.176: wait_rbm_uninstall_ip_ver(40000000)
Mar 30 02:39:37.210: install cb_ctx:
Mar 30 02:39:37.210: session_hdl = F1000003
Mar 30 02:39:37.210: sgt_policyp = 73FFDB4, sgt=(2-01:VLAN10), magic(BABECABB)
Mar 30 02:39:37.210: ip_version = IPV6
Mar 30 02:39:37.210: src-or-dst = SRC
Mar 30 02:39:37.210: wait_rbm_install_ip_ver(C0000000)
Mar 30 02:39:37.210: wait_rbm_uninstall_ip_ver(0)
Mar 30 02:39:37.210: cts_authz_rbacl_install_cb: Waiting for more RBM callback
for remaining IP version(40000000) RBACL policy(73FFDB4) for SGT(2-01:VLAN10)
flag(41400001)
Mar 30 02:39:37.210: cts_authz_rbacl_install_cb:
Mar 30 02:39:37.210: install cb_ctx:
Mar 30 02:39:37.210: session_hdl = F1000003
Mar 30 02:39:37.210: sgt_policyp = 73FFDB4, sgt=(2-01:VLAN10), magic(BABECABB)
Mar 30 02:39:37.210: ip_version = IPV4
Mar 30 02:39:37.210: src-or-dst = SRC
Mar 30 02:39:37.210: wait_rbm_install_ip_ver(40000000)
Mar 30 02:39:37.210: wait_rbm_uninstall_ip_ver(0)
Mar 30 02:39:37.210: cts_authz_rbacl_install_cb: Program RBACL policy(73FFDB4)
for SGT(2-01:VLAN10) flag(41400001) success
```

SXP交换

SXP更新由查找设备IP地址的IP设备跟踪代码触发。然后,使用短消息对等设备(SMPP)协议发送更 新。它使用**TCP选项19**进行身份验证,该选项与边界网关协议(BGP)相同。SMPP负载未加密。 Wireshark没有适用于SMPP负载的正确解码器,但很容易找到其中的数据:

No.	Source	Destination	Protocol Length	Info
1	192.168.1.10	192.168.1.1	TCP 78 5	58154 > 64999 [SYN] Seq=14/5381900 Win=4128 Len=0 MSS=1460
2	192.168.1.1	192.168.1.10	TCP 78 6	64999 > 58154 [SYN, ACK] Seq=2692737597 Ack=1475381901 Win=32768 Len=0 MSS=1380
3	192.168.1.10	192.168.1.1	TCP 74.5	58154 > 64999 [ACK] Seg=1475381901 Ack=2692737598 Win=4128 Len=0
4	192.168.1.10	192.168.1.1	5MPP 90 S	SNPP Bind receiver[Malformed Packet]
5	192.168.1.1	192.168.1.10	TCP 74 6	64999 > 58154 [ACK] Seg=2692737598 Ack=1475381917 Win=32768 Len=0
6	192.168.1.1	192.168.1.10	SMPP 90.5	SNPP Bind transmitter[Malformed Packet]
j	192.168.1.10	192.168.1.1	5MPP 148 S	SNPP Query sm
8	192.168.1.1	192.168.1.10	TCP 74 6	64999 > 58154 [ACK] Seq=2692737614 Ack=1475381991 Win=32768 Len=0
7 6 8	nerner rr, ars.,	1.15LU_2.3.0.3.4	(uc.iv.v	1.427, 051, 01500_30,10.32 (00.22.33,30,10.32)
⊵ 1n	ternet Protocol	Version 4, Sr	: 192.168.1.10	(192.168.1.10), Dst: 192.168.1.1 (192.168.1.1)
⊁ Tr	ansmission Cont	rol Protocol, S	Src Port: 58154	(58154), Dst Port: 64999 (64999), Seq: 1475381917, Ack: 2692737614, Len: 74
- Sh	ort Message Pee	r to Peer, Com	and: Query_sm,	Seq: 14, Len: 74
1	ength: 74			
1	Operation: Query	_sm (0x0000000	3)	
	Rominonen #+ 14	-	-	
0000	00 22 55 3c f	0 32 bc 16 65	25 a5 42 08 00	45 00 ."U>.2 c%.BE.
0010	00 86 ff 70 0	0 00 ff 06 38	a5 c0 a8 01 0a	εθ a8p 8
0020	01 01 e3 2a f	d e7 57 f0 8a	9d a0 7f ea 4e	a0 10*WN
0030	10 10 6f 9d 0	0 00 13 12 e8	d5 0c 81 78 2f	7e fe
0040	65 56 19 5e 5	5 cb e8 ce 00	00 00 00 00 4a	60 60 ev.~u
0050	00 03 00 00 D	0 01 00 00 00	0e c0 a8 01 c8	DD 00
0060	00 01 00 00 D	0 02 00 <mark>02</mark> 00	00 00 01 00 00	00 0e
0070	CB a8 G2 C8 D	0 00 00 01 00	00 00 07 00 03	PD 00
0086	90 01 00 00 D	<u>9 96 CG 48 9a</u>	95 66 66 60 61	
0090	00 02 00 04			

•第一个c0 a8 01 c8是192.168.1.200,并且带有标记2。

•第二个c0 a8 02 c8是192.168.2.200,带有标记3。

• 第三个c0 a8 0a 02是192.168.10.2,具有tag 4(此标记用于测试电话SGT=4) 在IP设备跟踪找到MS Windows 7的IP地址后,在3750X上进行了以下调试:

bsns-3750-5#debugctssxpmessagebsns-3750-5#debugctssxpinternalbsns-3750-5#debugctssxpconnbsns-3750-5#debugctssxpmdbbsns-3750-5#debugctssxperror

Apr7 00:39:06.874:CTS-SXP-CONN:sxp_process_message_event = CTS_SXPMSG_REQUESTApr7 00:39:06.874:CTS-SXP-CONN:sxp_process_requestCTS_SXPMSG_REQ_CONN_NVGENApr7 00:39:06.874:CTS-SXP-CONN:cts_get_next_sxpconn_cliApr7 00:39:06.874:CTS-SXP-CONN:cts_get_next_sxpconn_cliApr7 00:39:06.874:CTS-SXP-INTNL:sxp_process_request boolean setApr7 00:39:06.874:CTS-SXP-INTNL:sxp_send_request set boolean afterApr7 00:40:05.418:CTS-SXP-CONN:is_cts_sxp_rf_activeApr7 00:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr7 00:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr7 00:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr7 00:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr7 00:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr7 00:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr7 00:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr90:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr90:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr90:40:05.418:CTS-SXP-MDB:sxp_export_ipsgt_changeApr90:40:05.418:00:40:05.418:Apr90:40:05.418:00:40:05.418:Apr90:40:05.418:00:40:05.418:Apr90:40:05.418:90:40:05.418:Apr90:40:05.418:90:40:05.418:Apr90:40:05.418:90:40:05.418:Apr90:40:05.418:90:40:05.418:

bsns-asa5510-17# debug cts sxp all

%ASA-7-776018: CTS SXP: Binding 192.168.1.200->2:VLAN10 from peer 192.168.1.10
(instance 1) added in SXP database.

%ASA-7-776019: CTS SXP: Binding 192.168.1.200->2:VLAN10 added. Update binding manager.

%ASA-6-776251: CTS SGT-MAP: Binding 192.168.1.200->2:VLAN10 from SXP added to binding manager.

%ASA-7-776014: CTS SXP: SXP received binding forwarding request (add) binding 192.168.1.200->2:VLAN10.

为了查看ASA上的更多调试,您可以启用调试详细级别:

ASA上的SGACL

在ASA正确安装SXP收到的SGT映射后,安全组ACL应该可以正常工作。当映射遇到问题时,请输 入:

bsns-asa5510-17# **debug cts sgt-map** 带有security-group的ACL与IP地址或用户身份的ACL的工作方式完全相同。日志可揭示问题,以及 所命中的ACL的确切条目。

以下是从MS Windows XP到MS Windows 7的ping,表明Packet Tracer工作正常:

bsns-asa5510-17# packet-tracer input inside icmp 192.168.2.200 8 0 192.168.1.200 detailed <output ommitted> Phase: 2 Type: ACCESS-LIST Subtype: log Result: ALLOW Config: access-group inside in interface inside access-list inside extended permit icmp security-group tag 3 any security-group name VLAN10 any Additional Information: Forward Flow based lookup yields rule: in id=0xaaf2ae80, priority=13, domain=permit, deny=false hits=185, user_data=0xaa2f5040, cs_id=0x0, use_real_addr, flags=0x0, protocol=1 src ip/id=0.0.0.0, mask=0.0.0.0, icmp-type=0, tag=3:VLAN20 dst ip/id=0.0.0.0, mask=0.0.0.0, icmp-code=0, tag=2:VLAN10, dscp=0x0 input_ifc=inside, output_ifc=any

<output ommitted>

相关信息

- 适用于3750的Cisco TrustSec配置指南
- 适用于ASA 9.1的思科TrustSec配置指南
- Cisco TrustSec部署和路线图
- <u>技术支持和文档 Cisco Systems</u>

关于此翻译

思科采用人工翻译与机器翻译相结合的方式将此文档翻译成不同语言,希望全球的用户都能通过各 自的语言得到支持性的内容。

请注意:即使是最好的机器翻译,其准确度也不及专业翻译人员的水平。

Cisco Systems, Inc. 对于翻译的准确性不承担任何责任,并建议您总是参考英文原始文档(已提供 链接)。