Configure and Troubleshoot Posture State Synchronization

Contents

Introduction

This document describes the configuration and use of Posture State Synchronization introduced in the Cisco Identity Service Engine(ISE) 3.1 version.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Posture flow on Cisco ISE
- Configuration of posture components on Cisco ISE

It is supposed that you have a Posture configuration in place of any type.

To better understand the concepts described later, it is recommended to go through:

- Cisco Identity Services Engine Administrator Guide, Release 3.1
- Compare Earlier ISE Versions to ISE Posture Flow in ISE 2.2

- ISE Session Management and Posture

Components Used

The information in this document is based on these software and hardware versions:

- Cisco ISE version 3.1
- Cisco Secure Client 5.0.00556

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background information

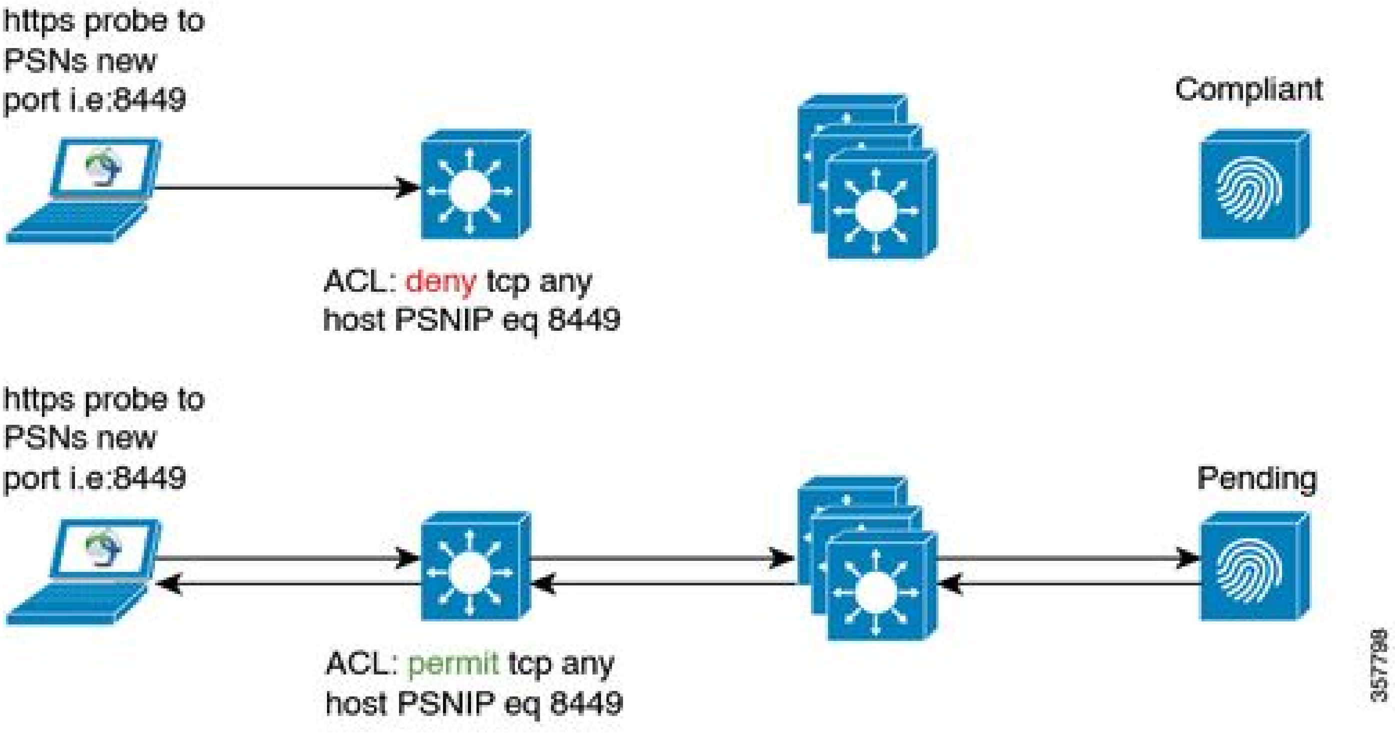
ISE Posture flow usually does not allow Posture status to be updated on the Client from the ISE. Cisco Secure Client Posture Module is used to evaluate the Posture status of the endpoint and keeps it until network change, Periodic Reassessment, or other client-side triggers. If the endpoint Posture status changes on ISE due to a session termination or other reasons, the Secure Client Posture Module could be unaware of that change, so the Endpoint stays in Posture Unknown state with limited network access until one of the client-side triggers happens.

This document is focused on a new feature - Posture Status Synchronisation, which was developed to address this kind of issue and allow ISE to provide feedback to the Secure Client Posture Module on the current Posture Status of the endpoint.

Configure

The Posture status probe port was introduced on each ISE PSN node when Posture State Synchronization is enabled - TCP 8449 by default. It is supposed to be reachable from the Endpoint if the Endpoint Posture status is Unknown or Pending and unreachable if the Endpoint status is Compliant.

Network Diagram


https probe to PSNs new port i.e:8449
ACL: deny tcp any host PSNIP eq 8449
Compliant
https probe to PSNs new port i.e:8449
ACL: permit tcp any host PSNIP eq 8449
Pending
357798

Configurations

Posture State Synchronisation feature configuration consists of two parts:

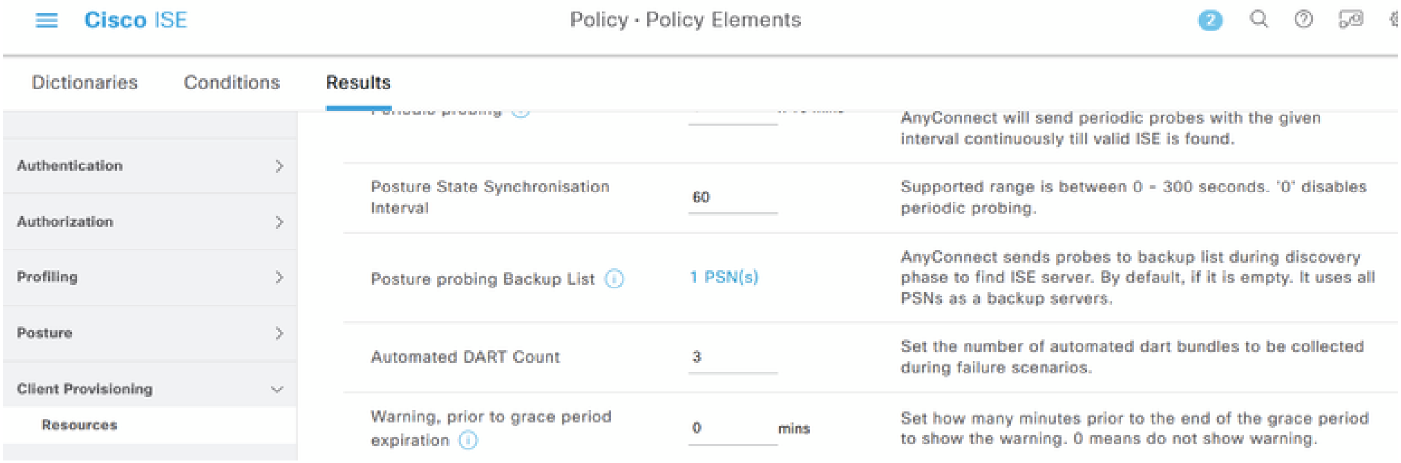
1. AnyConnect Posture Profile configuration

1.1 In the Cisco ISE GUI, navigate to **Policy** > **Policy Elements** > **Results** > **Client Provisioning** > **Resources**.

1.2 Select the AnyConnect Posture Profile you already use or create a new one.

1.3 In the Agent Behavior area, configure the Posture State Synchronisation Interval to any value between 1 and 300 seconds, 0 - disables Posture State Synchronisation

1.4 You can configure Posture Probing Backup List - Secure Client uses this list to check the Posture State on selected PSNs. If you do not choose any PSN, the connected PSN and any two backup servers are used as backups for posture state synchronization.



AnyConnect will send periodic probes with the given interval continuously till valid ISE is found.

Posture State Synchronisation Interval 60 — Supported range is between 0 - 300 seconds. '0' disables periodic probing.

Posture probing Backup List 1 PSN(s) — AnyConnect sends probes to backup list during discovery phase to find ISE server. By default, if it is empty. It uses all PSNs as a backup servers.

Automated DART Count 3 — Set the number of automated dart bundles to be collected during failure scenarios.

Warning, prior to grace period expiration 0 mins — Set how many minutes prior to the end of the grace period to show the warning. 0 means do not show warning.

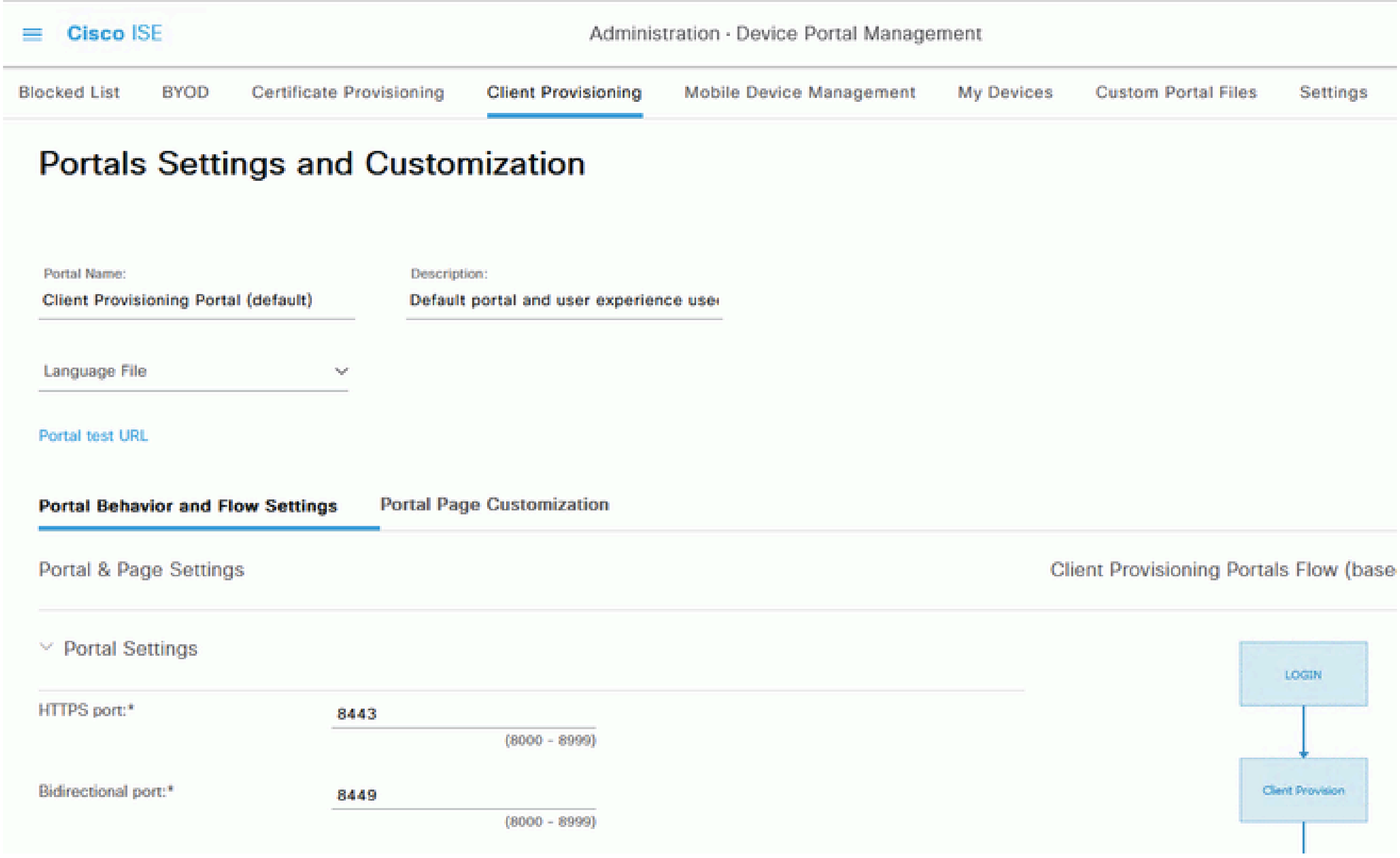
2. Configuration of a downloadable ACL(dACL) to block access to the Posture State Synchronization port on Cisco ISE when the client posture status is Compliant or Non Compliant. You need to add access control deny entry with the Posture State Synchronization port for every PSN at the top of ACLs used for Compliant endpoints to restrict access to the Posture State Synchronization port if the endpoint status is known, for example:

```
deny tcp any host PSN1-IP-ADDRESS eq 8449
deny tcp any host PSN2-IP-ADDRESS eq 8449
permit ip any any
```

permit ip any any is not mandatory, you can replace it with any set of rules according to your needs.

Note: If deny entry in dACL is not configured, the Posture Configuration Detection alarm is triggered on the Cisco ISE dashboard and Posture State Synchronization is disabled on the endpoint until Cisco Secure Client is restarted.

Posture State Synchronization port(Bidirectional port) can be changed on the Client Provisioning Portal configuration page. Navigate to **Administration > Device Portal Management > Client Provisioning > Select desired portal > Portal Behavior and Flow Settings** and open **Portal Settings**. The Posture State Synchronization port for the default Client Provisioning Portal cannot be changed.



Portals Settings and Customization

Portal Name:
Client Provisioning Portal (default)

Description:
Default portal and user experience use

Portal & Page Settings

Portal Settings

HTTPS port:* 8443 (8000 - 8999)

Bidirectional port:* 8449 (8000 - 8999)

Verify

From DART Bundle

Posture Status Synchronization can be verified from the Client side by looking into Cisco Secure Client Posture Module logs(AnyConnect_ISEPosture.txt) from DART Bundle:

1. Posture evaluation is finished, Posture status is Compliant.

```
2022/11/09 12:22:47 [Information] aciseagent Function: Authenticator::sendUIStatus Thread Id: 0xC60 Fil
```

2. Posture Status Synchronization probing is started.

```
2022/11/09 12:22:47 [Information] aciseagent Function: PeriodicProbe::ProcessMessage Thread Id: 0xC60 F
2022/11/09 12:22:47 [Information] aciseagent Function: PeriodicProbe::sessionSyncProbe Thread Id: 0x296
```

3. HTTPS connection to ISE PSN on the Posture State Synchronization port(8449) is initiated.

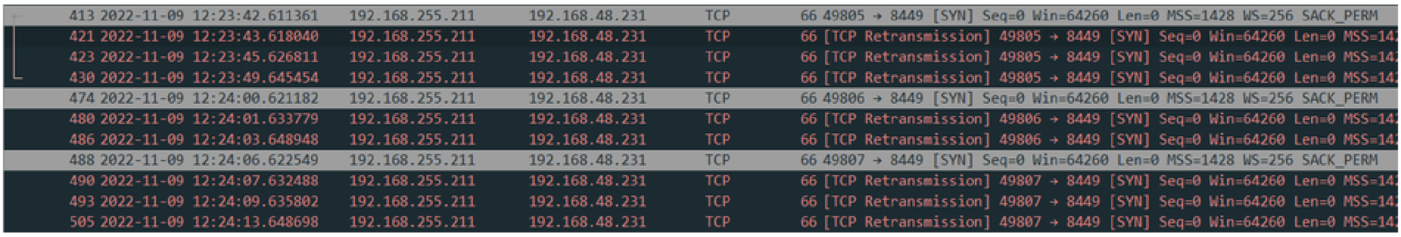
```
2022/11/09 12:22:47 [Information] aciseagent Function: PeriodicProbe::sessionSyncProbe Thread Id: 0x296
2022/11/09 12:22:47 [Information] aciseagent Function: HttpConnection::MakeRequest Thread Id: 0x296C Fi
```

4. Timeout for Posture Status Synchronization probing.

```
2022/11/09 12:22:54 [Information] aciseagent Function: hs_transport_winhttp_post Thread Id: 0x296C File
2022/11/09 12:22:54 [Information] aciseagent Function: hs_transport_post Thread Id: 0x296C File: hs_tra
2022/11/09 12:22:54 [Information] aciseagent Function: PeriodicProbe::sessionSyncProbe Thread Id: 0x296
```

From Packet Capture on the Client

Packet capture taken on the Client shows SYN packets sent towards the ISE PSN node on the Posture State Synchronization port(8449) without SYN-ACK response from ISE PSN:



```
413 2022-11-09 12:23:42.611361   192.168.255.211   192.168.48.231   TCP   66 49805 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=1428 WS=256 SACK_PERM
421 2022-11-09 12:23:43.618040   192.168.255.211   192.168.48.231   TCP   66 [TCP Retransmission] 49805 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=14
423 2022-11-09 12:23:45.626811   192.168.255.211   192.168.48.231   TCP   66 [TCP Retransmission] 49805 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=14
430 2022-11-09 12:23:49.645454   192.168.255.211   192.168.48.231   TCP   66 [TCP Retransmission] 49805 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=14
474 2022-11-09 12:24:00.621182   192.168.255.211   192.168.48.231   TCP   66 49806 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=1428 WS=256 SACK_PERM
480 2022-11-09 12:24:01.633779   192.168.255.211   192.168.48.231   TCP   66 [TCP Retransmission] 49806 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=14
486 2022-11-09 12:24:03.648948   192.168.255.211   192.168.48.231   TCP   66 [TCP Retransmission] 49806 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=14
488 2022-11-09 12:24:06.622549   192.168.255.211   192.168.48.231   TCP   66 49807 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=1428 WS=256 SACK_PERM
490 2022-11-09 12:24:07.632488   192.168.255.211   192.168.48.231   TCP   66 [TCP Retransmission] 49807 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=14
493 2022-11-09 12:24:09.635802   192.168.255.211   192.168.48.231   TCP   66 [TCP Retransmission] 49807 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=14
505 2022-11-09 12:24:13.648698   192.168.255.211   192.168.48.231   TCP   66 [TCP Retransmission] 49807 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=14
```

From ISE

Correct Posture Status Synchronization configuration cannot be verified from the ISE side as the connection on the Posture State Synchronization port(8449) is supposed to fail.

Posture Restart on Posture Status Change

1) Session state information has been received from ISE with Posture Status "Unknown" while Cisco Secure Client is in a "Compliant" state.

```
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
2022/11/09 12:26:24 [Information] aciseagent Function: dump_http_headers Thread Id: 0x296C File: hs_htt
```

2) Cisco Secure Client acknowledges the Posture status change and restarts the Posture Discovery:

```
2022/11/09 12:26:24 [Information] aciseagent Function: PeriodicProbe::sessionSyncProbe Thread Id: 0x296
2022/11/09 12:26:24 [Information] aciseagent Function: PeriodicProbe::sessionSyncProbe Thread Id: 0x296
2022/11/09 12:26:24 [Information] aciseagent Function: SwiftHttpRunner::restartDiscovery Thread Id: 0xC
```

3) Cisco Secure Client stops Posture Status Synchronization until Posture assessment is performed:

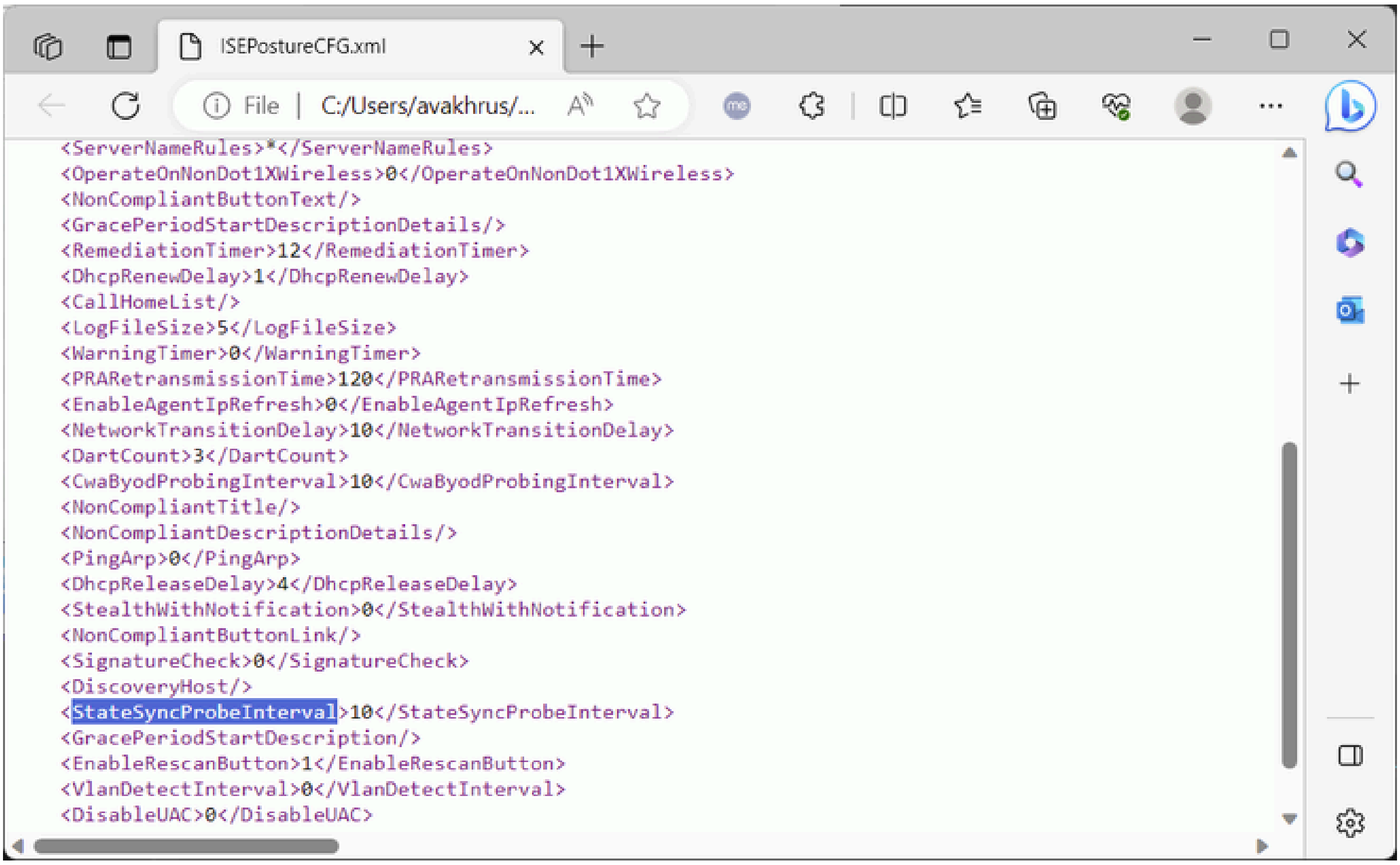
```
2022/11/09 12:26:24 [Information] aciseagent Function: SwiftHttpRunner::processMessage Thread Id: 0xC60
2022/11/09 12:26:24 [Information] aciseagent Function: SwiftHttpRunner::restartDiscovery Thread Id: 0xC
2022/11/09 12:26:24 [Information] aciseagent Function: SwiftHttpRunner::restartDiscovery Thread Id: 0xC
2022/11/09 12:26:24 [Information] aciseagent Function: hs_transport_free Thread Id: 0xC60 File: hs_tran
2022/11/09 12:26:24 [Information] aciseagent Function: PeriodicProbe::ProcessMessage Thread Id: 0xC60 F
2022/11/09 12:26:24 [Information] aciseagent Function: PeriodicProbe::ProcessMessage Thread Id: 0xC60 F
2022/11/09 12:26:24 [Information] aciseagent Function: PeriodicProbe::sessionSyncProbe Thread Id: 0x296
```

Troubleshoot

Posture Status Synchronization does not Start

If there is no indication of Posture Status Synchronization start in AnyConnect_ISEPosture.txt log file and the Client does not try to establish a connection with the ISE PSN node on Posture State Synchronization port(8449) check the Posture configuration file ISEPostureCFG.xml from DART bundle or directly on the Client machine: "%ProgramData%\Cisco\Cisco Secure Client\ISE Posture\" for a Windows PC.

The parameter responsible for Posture Status Synchronization is "StateSyncProbeInterval", it is supposed to be set with a value higher than 0:



```
    <ServerNameRules>*</ServerNameRules>
    <OperateOnNonDot1XWireless>0</OperateOnNonDot1XWireless>
    <NonCompliantButtonText/>
    <GracePeriodStartDescriptionDetails/>
    <RemediationTimer>12</RemediationTimer>
    <DhcpRenewDelay>1</DhcpRenewDelay>
    <CallHomeList/>
    <LogFileSize>5</LogFileSize>
    <WarningTimer>0</WarningTimer>
    <PRARetransmissionTime>120</PRARetransmissionTime>
    <EnableAgentIpRefresh>0</EnableAgentIpRefresh>
    <NetworkTransitionDelay>10</NetworkTransitionDelay>
    <DartCount>3</DartCount>
    <CwaByodProbingInterval>10</CwaByodProbingInterval>
    <NonCompliantTitle/>
    <NonCompliantDescriptionDetails/>
    <PingArp>0</PingArp>
    <DhcpReleaseDelay>4</DhcpReleaseDelay>
    <StealthWithNotification>0</StealthWithNotification>
    <NonCompliantButtonLink/>
    <SignatureCheck>0</SignatureCheck>
    <DiscoveryHost/>
    <StateSyncProbeInterval>10</StateSyncProbeInterval>
    <GracePeriodStartDescription/>
    <EnableRescanButton>1</EnableRescanButton>
    <VlanDetectInterval>0</VlanDetectInterval>
    <DisableUAC>0</DisableUAC>
```

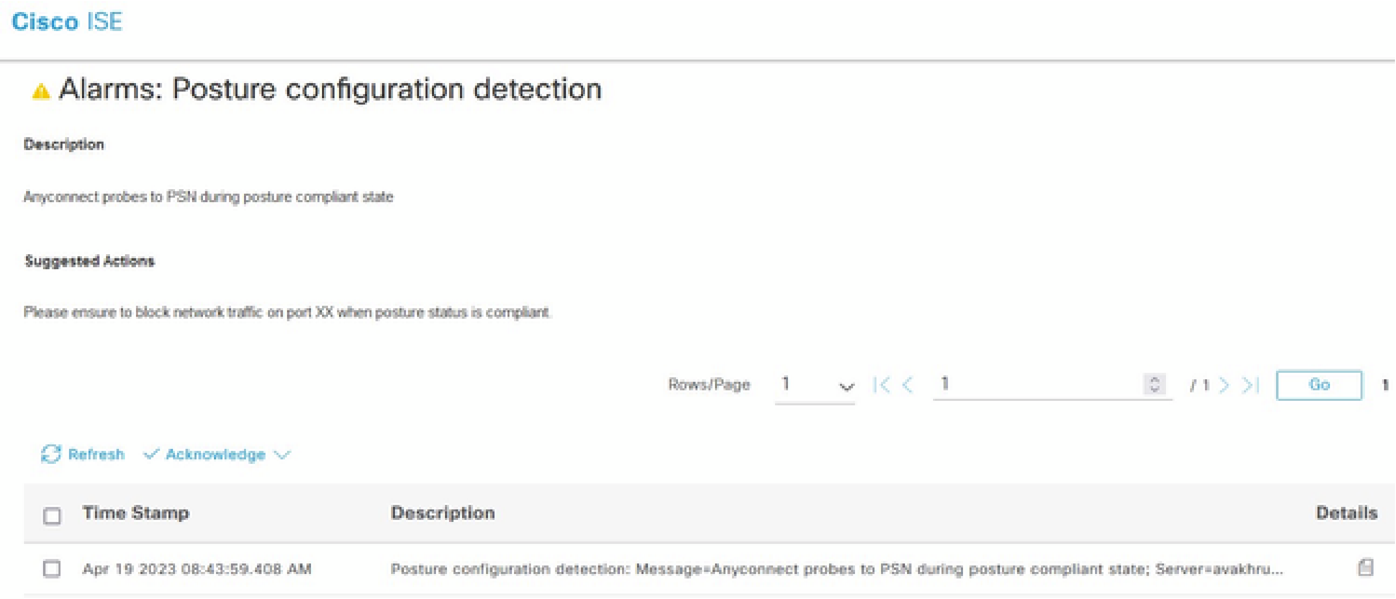
The absence of "StateSyncProbeInterval" or a value of "0" means that Posture Status Synchronization is disabled.

If "Posture State Synchronisation Interval" is set in Posture Profile on ISE but it is not reflected in a configuration file on the Client then Posture provisioning needs to be investigated.

Posture Status Synchronization Fails with Alarm on ISE Dashboard

If Posture State Synchronisation fails with alarm on ISE, it means that Cisco Secure Client was able to reach ISE on the Posture State Synchronization port(8449) and requested a status for the session with "Compliant" status.

- Alarm in ISE GUI:



Cisco ISE

⚠ Alarms: Posture configuration detection

Description

Anyconnect probes to PSN during posture compliant state

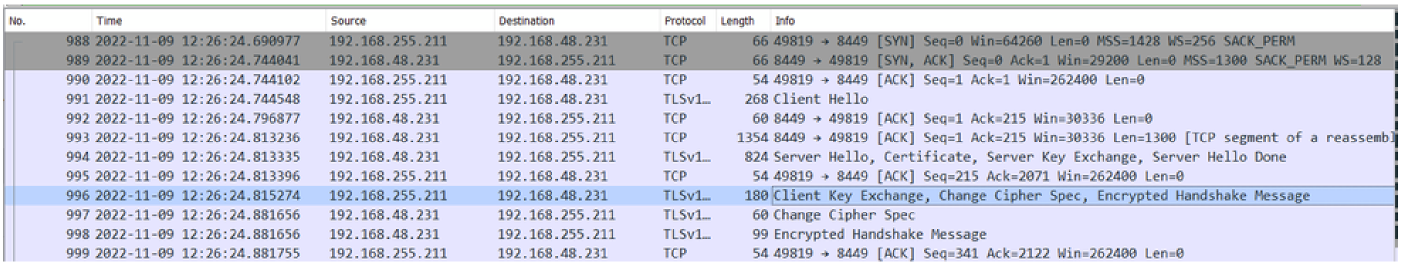
Suggested Actions

Please ensure to block network traffic on port XX when posture status is compliant.

□	Time Stamp	Description	Details
□	Apr 19 2023 08:43:59.408 AM	Posture configuration detection: Message=Anyconnect probes to PSN during posture compliant state; Server=avakhru...	

- Validate from packet capture

TCP connection on Posture State Synchronization port(8449) is established:



No.	Time	Source	Destination	Protocol	Length	Info
988	2022-11-09 12:26:24.690977	192.168.255.211	192.168.48.231	TCP	66	49819 → 8449 [SYN] Seq=0 Win=64260 Len=0 MSS=1428 WS=256 SACK_PERM
989	2022-11-09 12:26:24.744041	192.168.48.231	192.168.255.211	TCP	66	8449 → 49819 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1300 SACK_PERM WS=128
990	2022-11-09 12:26:24.744102	192.168.255.211	192.168.48.231	TCP	54	49819 → 8449 [ACK] Seq=1 Ack=1 Win=262400 Len=0
991	2022-11-09 12:26:24.744548	192.168.255.211	192.168.48.231	TLSv1…	268	Client Hello
992	2022-11-09 12:26:24.796877	192.168.48.231	192.168.255.211	TCP	60	8449 → 49819 [ACK] Seq=1 Ack=215 Win=30336 Len=0
993	2022-11-09 12:26:24.813236	192.168.48.231	192.168.255.211	TCP	1354	8449 → 49819 [ACK] Seq=1 Ack=215 Win=30336 Len=1300 [TCP segment of a reassemb]
994	2022-11-09 12:26:24.813335	192.168.48.231	192.168.255.211	TLSv1…	824	Server Hello, Certificate, Server Key Exchange, Server Hello Done
995	2022-11-09 12:26:24.813396	192.168.255.211	192.168.48.231	TCP	54	49819 → 8449 [ACK] Seq=215 Ack=2071 Win=262400 Len=0
996	2022-11-09 12:26:24.815274	192.168.255.211	192.168.48.231	TLSv1…	180	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
997	2022-11-09 12:26:24.881656	192.168.48.231	192.168.255.211	TLSv1…	60	Change Cipher Spec
998	2022-11-09 12:26:24.881656	192.168.48.231	192.168.255.211	TLSv1…	99	Encrypted Handshake Message
999	2022-11-09 12:26:24.881755	192.168.255.211	192.168.48.231	TCP	54	49819 → 8449 [ACK] Seq=341 Ack=2122 Win=262400 Len=0

- Validate from the Cisco Secure Client Posture Module log

Check AnyConnect_ISEPosture.txt from DART bundle:

1) HTTPS connection to ISE PSN on the Posture State Synchronization port(8449) is initiated.

```
2022/11/09 12:26:34 [Information] aciseagent Function: PeriodicProbe::sessionSyncProbe Thread Id: 0x275
```

2) Session state information has been received from ISE with Posture Status "Compliant".

```
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
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2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
```

```
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
2022/11/09 12:26:34 [Information] aciseagent Function: dump_http_headers Thread Id: 0x2750 File: hs_htt
```

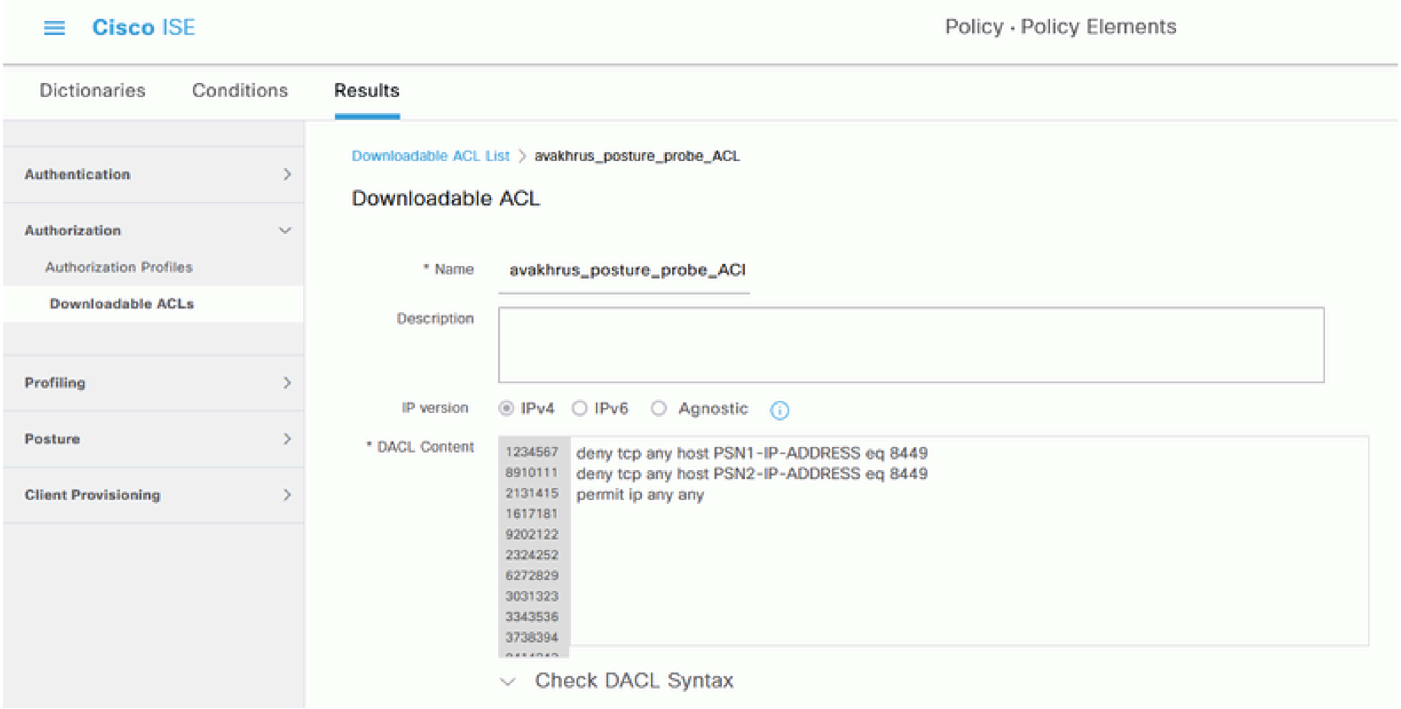
3) Posture State Synchronisation stops due to detection of an incorrect configuration:

```
2022/11/09 12:26:34 [Error] aciseagent Function: PeriodicProbe::sessionSyncProbe Thread Id: 0x2750 File
2022/11/09 12:26:34 [Information] aciseagent Function: PeriodicProbe::sessionSyncProbe Thread Id: 0x275
2022/11/09 12:26:34 [Information] aciseagent Function: PeriodicProbe::ProcessMessage Thread Id: 0xC60 F
2022/11/09 12:26:34 [Information] aciseagent Function: PeriodicProbe::ProcessMessage Thread Id: 0xC60 F
```

Posture State Synchronisation cannot be restarted from the Cisco Secure Client GUI by restarting the Posture assessment or a network change. Instead, the Cisco Secure Client needs to be restarted in order for Posture State Synchronisation to work again.

Verify dACL Configured for Posture "Compliant" authorization profile

1. Validate proper dACL is configured for Posture "Compliant" authorization profile:



Downloadable ACL

* Name: avakhrus_posture_probe_ACl

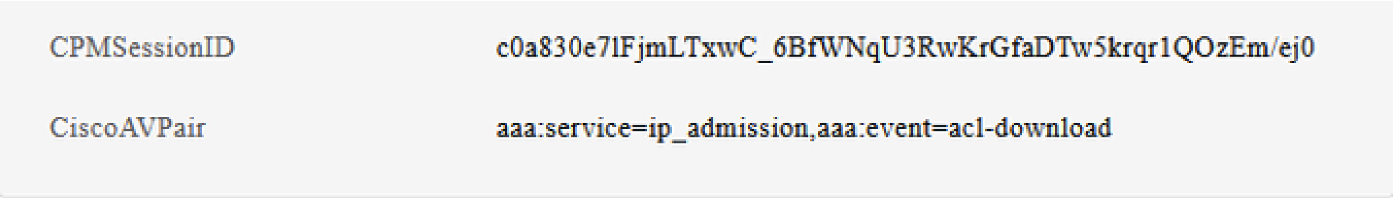
Description:

IP version: ● IPv4 ○ IPv6 ○ Agnostic

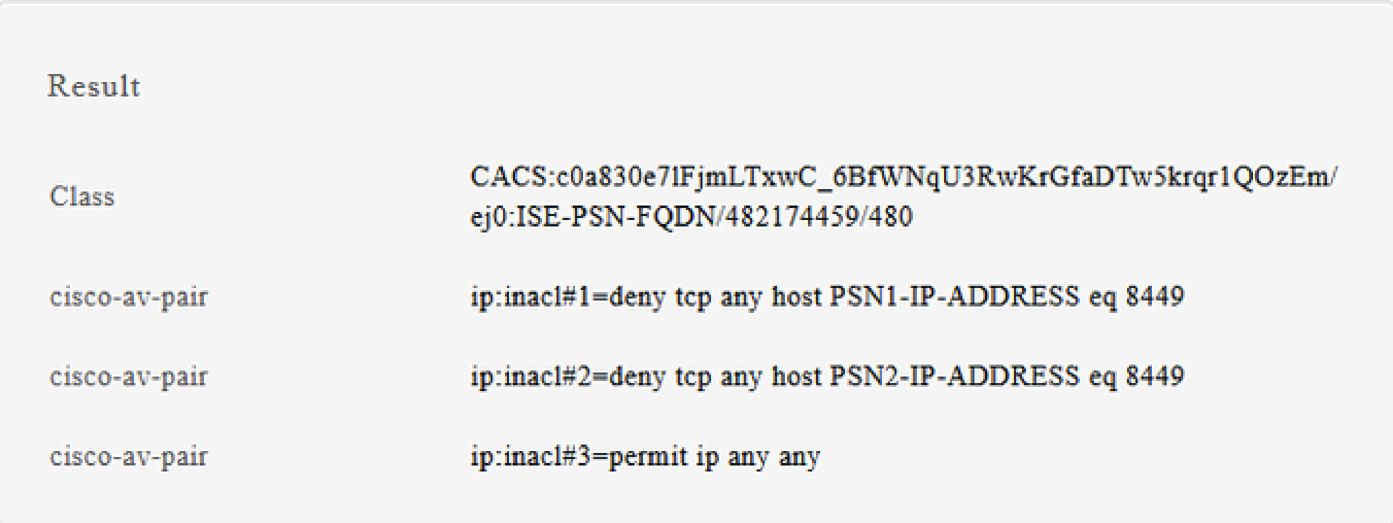
* DACL Content:

```
deny tcp any host PSN1-IP-ADDRESS eq 8449
deny tcp any host PSN2-IP-ADDRESS eq 8449
permit ip any any
```

2. Validate detailed authentication report dACL was sent correctly as a result of authentication of the "Compliant" endpoint.



CPMSessionID	c0a830e71FjmLTxwC_6BfWNqU3RwKrGfaDTw5krqr1QOzEm/ej0
CiscoAVPair	aaa:service=ip_admission,aaa:event=acl-download



Result

Class	CACS:c0a830e71FjmLTxwC_6BfWNqU3RwKrGfaDTw5krqr1QOzEm/ej0:ISE-PSN-FQDN/482174459/480
cisco-av-pair	ip:inacl#1=deny tcp any host PSN1-IP-ADDRESS eq 8449
cisco-av-pair	ip:inacl#2=deny tcp any host PSN2-IP-ADDRESS eq 8449
cisco-av-pair	ip:inacl#3=permit ip any any

3. Validate that dACL is correctly applied on a network access device:

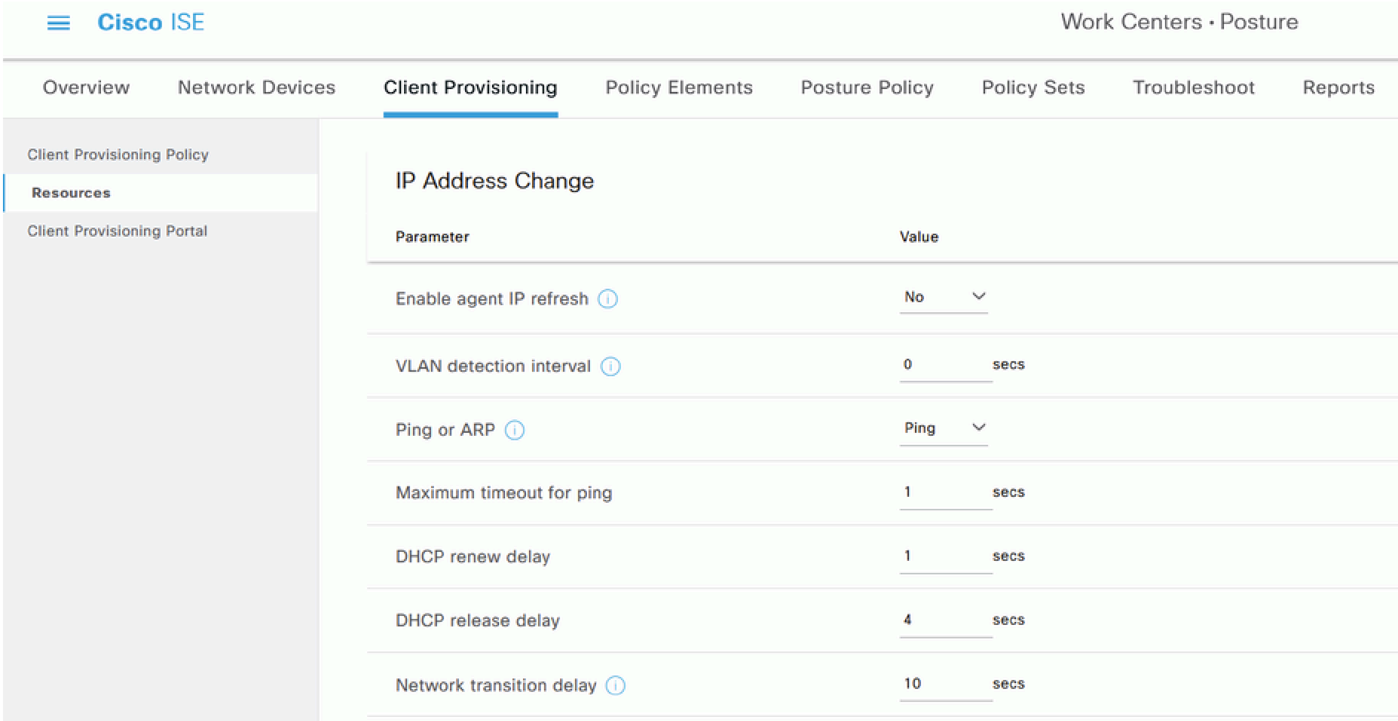
```
avakhrus_3560C#sh authe sess int fa0/12 det
            Interface:  FastEthernet0/12
          MAC Address:  0050.56a8.be02
         IPv6 Address:  Unknown
         IPv4 Address:  192.168.255.193
            User-Name:  TRAINING\bob
               Status:  Authorized
               Domain:  DATA
       Oper host mode:  multi-auth
     Oper control dir:  both
      Session timeout:  N/A
      Restart timeout:  N/A
Periodic Acct timeout:  172800s (local), Remaining: 92111s
       Session Uptime:  1515s
    Common Session ID:  C0A8FF0C00000012679EAF14
      Acct Session ID:  0x00000012
               Handle:  0x5D000005
       Current Policy:  POLICY_Fa0/12

Local Policies:
        Service Template: DEFAULT_LINKSEC_POLICY_SHOULD_SECURE (priority 150)

Server Policies:
              ACS ACL:  xACSACLx-IP-avakhrus_posture_probe_ACL-636b75ac

Method status list:
       Method           State

       mab              Stopped
       dot1x            Authc Success

avakhrus_3560C#sh access-lists | s  xACSACLx-IP-avakhrus_posture_probe_ACL-636b75ac
Extended IP access list xACSACLx-IP-avakhrus_posture_probe_ACL-636b75ac (per-user)
```

```
deny tcp any host PSN1-IP-ADDRESS eq 8449
deny tcp any host PSN2-IP-ADDRESS eq 8449
permit ip any any
```

Known Issues

Posture State Synchronisation Fails with Alarm on ISE

Posture State Synchronisation can fail with alarm on ISE even if proper dACL is applied on a network access device to the Client endpoint. It happens if Posture State Synchronisation Probe is performed faster than dACL is applied or if the Posture State Synchronisation Probe is already in progress when dACL is being applied. The issue was investigated in Cisco bug ID CSCwd58316
. As a workaround, you need to set "Network transition delay" to 10 seconds in the Anyconnect Posture profile(ISE Posture Agent Profile Settings).



IP Address Change

Parameter	Value
Enable agent IP refresh	No
VLAN detection interval	0 secs
Ping or ARP	Ping
Maximum timeout for ping	1 secs
DHCP renew delay	1 secs
DHCP release delay	4 secs
Network transition delay	10 secs