DDOS Prevention Configuration for SIP Access environments

Technical Application Note

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2 Intended Audience

This document is intended for use by Oracle Systems Engineers, third party Systems Integrators, Oracle Enterprise customers and partners and end users of the Oracle Enterprise Session Border Controller (SBC). It is assumed that the reader is familiar with basic operations of the Oracle Enterprise Session Border Controller.

3 Document Overview

This document is designed to provide a basic framework for DDoS configuration in SIP Access environments across all hardware. The scope of this document is limited to providing a minimum set of configuration settings to enable basic protection. The contents herein cannot be considered advanced or customer specific in any way. Where appropriate, limitations of this protection will be addressed throughout the course of this document. This document will not go into any detail pertaining to the underlying SIP configuration.

All base configurations used during testing were created according to Best Current Practices

4 General Approach

This document is designed to provide minimal DDoS settings for SIP access SBC environments across all hardware.
The software release used for the testing is R SCZ8.3.0. The SBC model used here is Policy Based Realm Bridging Model(PBRB).

4.1 Supported Platforms

Here is the list of supported platforms for DDoS configuration.

Platform	Flow Table Size	Memory
AP 6350	2000000	48G
AP6300	1000000	16G
AP4600	1000000	16G
AP6100	1000000	16G
VME720	720	4G
AP1100	720	4G
AP3900	16000	16G

4.2 Traffic Terminologies Used in SBC

1. Flow- An individual conversation between two endpoints (may or may not be policed) –finest layer
2. Queue - A bundle of flows coming from the same IP/port
3. Pipe -A bundle of queues that represent a class of traffic (Untrusted, trusted…)
4. Port - Port is located between the wire-speed fabric and the path to the CPU. The coarsest layer of the framework

4.3 Endpoints Promotion and Demotion

Endpoints, irrespective of whether or not they are defined as session-agents are promoted/demoted between hardware-enforced trusted, untrusted, and denied Access Control List traffic queues based on trust level configuration. Static ACLs are also configurable to further classify signaling traffic as being permanently assigned to the appropriate trust queue. Trust is assigned through several mechanisms including the access-control-trust-level parameter of the realm the session-agent or end point is a member of, trust-level of provisioned ACLs, and the allow-anonymous setting on the applicable sip-interface. The SBC will demote an endpoint if:

- It receives too many signaling messages within the configured time window (maximum-signal-threshold in the realm or static ACL)
- It receives too many invalid signaling messages within the configured time window (invalid-signal-threshold in the realm or static ACL)
- It receives too many signaling messages from an untrusted source within the configured time window (untrusted-signal-threshold in the realm or static ACL)

- A trusted endpoint exceeds the call admission controls and the cac-failurethreshold defined in an ACL (the call admission control limits are defined in media profiles)
- An untrusted endpoint exceeds call admission controls and the untrust-cac-failurethreshold defined in an ACL.

The SBC will promote an endpoint if:

- It received a 200 OK response to a registration
- The registration overload protection (reg-overload-protect) option has been set globally in the sip-config element (this is temporary, and only if a 401 or 407 response is received)
- The deny-period has expired.

4.3.1 Statistics

Each promotion and demotion event, between trusted, untrusted, and deny queues is counted and kept as an ACL statistic. These counts are maintained separately for signaling applications. Statistics for ACL status and operations can be seen using the ACLI commands show sipd acls.

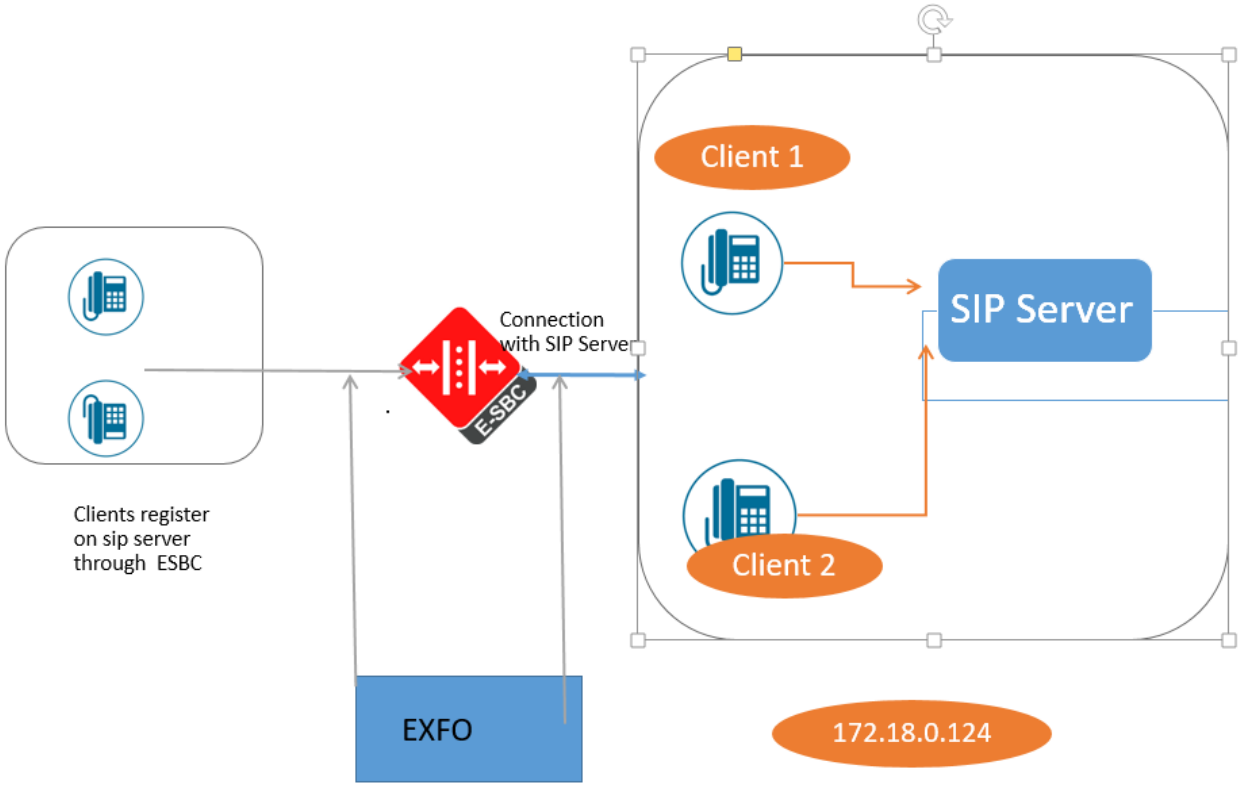
```
OraceSBC-# show sipd acls
22:20:15-102
SIP ACL Status              -- Period -- -------- Lifetime --------
                  Active    High   Total      Total  PerMax    High
Total Entries          1       1       0          2       1       2
Trusted                1       1       0          2       1       2
Blocked                0       0       0          0       0       0
Blocked NATs           0       0       0          0       0       0

ACL Operations                  ---- Lifetime ----
                       Recent       Total  PerMax
ACL Requests                0         174       2
Bad Messages                0           0       0
Promotions                  0         174       2
Demotions                   0           1       1
Trust->Untrust              0           1       1
Untrust->Deny               0           0       0
```

5 DDoS Prevention for Access Environments

5.1 Test Environment

The test network used for SIP Access with basic DDoS configuration is shown below. A third party SIP server operates as the registrar in the core network and requires authentication on all SIP Registrations.



5.2 Test Methodology

The chosen test methodology aims to determine the maximum signaling bandwidth required per platform to keep the CPU usage below 90%. Throughout the testing, parameters from the media-manager configuration object are modified to limit the amount of traffic entering the SD to a point where no more than 89% of CPU resources are consumed.

5.2.1 Maximum Signaling Bandwidth (max-signaling-bandwidth)

The maximum signaling bandwidth (max-signaling-bandwidth) is calculated per platform by sending SIP OPTIONS packets with the max-forwards header set to 0. The SD will process this packet and response with a 483 “Too Many Hops”.

max-signaling-bandwidth = OPTIONS/sec * Bytes/OPTIONS

Hardware platforms utilize bytes per second and VNF platforms utilize packets per second. VNF platforms (COTS,VM,1100) derive max-signaling from number of signaling cores. A value of 0 represents dynamic max-signaling applied which can be overwritten by customer.
Hardware platforms have a max signaling rate typically 40M for 6xxx and 10M for 4600.

5.2.2 Max and Min Untrusted Signaling Percentages (max-untrusted-signaling & min-untrusted-signaling)

With the max-signaling-bandwidth parameter set to the calculated value, the max-untrusted-signaling and min-untrusted-signaling parameters in the media-manager configuration are modified until the defined background traffic and applied DDoS attack consume approximately 89% of CPU resources. For purposes of this document CPU consumption under the threshold of 89% is considered to be within an acceptable range. The max-untrusted-signaling parameter is determined first by trial and error to find the maximum setting acceptable. Following this, various min-untrusted-signaling parameter settings are exercised to verify the CPU resources consumed remain under 89%.

5.2.3 Maximum Signaling Threshold (max-signaling-threshold)

The maximum-signaling-threshold value is defined as part of the realm-configuration object and governs the number of SIP signaling messages which can be received from a given source during the period of time defined in the tolerance-window (30 second default window). Once a trusted source exceeds this threshold it will be demoted to the untrusted queue. Provisioning this provides further protection to the Session Director by allowing it to remove a violating endpoint from the trusted queue, effectively preserving the integrity of that queue for non-violating trusted sources.

Due to the nature of this setting, it is recommended each network administrator define a value based on network usage. In absence of customized network analysis, it is recommended a value no less than 4000 be used along with a defined tolerance-window of 30 seconds. As defined, a value of 4,000 was chosen with the intention that it not affect those trusted users who are behaving properly or otherwise as expected under normal circumstances. In the event of either endpoint malfunction or malicious attack, this value will easily be exceeded resulting in demotion to the offending source

5.2.4 DDoS Attacks

The baseline of trusted traffic consists of SIP Registrations and calls and produces a total SD CPU Utilization of 55% for all tests. To create this traffic, the EXFO protocol simulation tool registers a group of access endpoints with unique IP addresses to the SD and another group of core endpoints directly to the Registrar in the core network. Calls are then initiated from the access endpoints to the core endpoints

DDoS attacks were generated from a PC running the Acme Packet tool GULP. GULP is located on the direct subnet of the SIP interface of the access realm. The DDoS attack applied for this testing is a SIP Register flood which creates a flood from approximately 1000 untrusted endpoints at line rate.

5.3 Observations/Limitations

The settings outlined in this appendix are beneficial when facing malicious or nonmalicious flood attacks, such as a REGISTER avalanche following a network outage. By limiting the amount of untrusted traffic to the SBC, the registration rate allowed will be throttled and the SBC will not be overrun by the high rate of registrations. However, there is an opportunity cost between the level of protection against a DDoS flood attack and the convergence time for this type of avalanche condition. For example, raising the percentage of untrusted bandwidth allowed will inevitably allow more untrusted traffic to traverse the SBC, and minimize the convergence time. The opportunity cost here is higher CPU usage during the flood, a result of higher demand on the processor due to the increased level of registrations it's required to process. Additionally, when set as an option in the sip-configuration, reg-overload-protect requires the SBC temporarily promote a registering endpoint upon receipt of a 401/407 response from the "real" registrar. This temporary promotion is in advance of the real and final promotion, which takes place following the 200 OK response to a REGISTER request containing authentication credentials. During a registration avalanche from untrusted sources, temporary promotion based on the initial REGISTER request sent from a specific source helps minimize the amount of time it will take to promote the collective untrusted sources, to trusted sources, effectively restoring service in the event of an outage as quickly as possible. This is also referred to as: minimizing the convergence time. The addition of any SIP option relevant to DDoS, including reg-overload-protect, would require additional testing. For customers with specific convergence requirements, additional research must be conducted to arrive at an appropriate DDoS configuration for deployment.

A limitation of the configuration parameters described in this appendix is the handling of SIP message spoofing. When a trusted user is "spoofed" by another user or a defective trusted user sends many SIP messages, the CPU utilization of the SBC may spike to 100%. One safe-guard implemented as part of this appendix is the establishment of a setting for maximum-signaling-threshold, defined in the realmconfiguration object. When set, this provides an entry level amount of protection by removing a violating source from the trusted queue once the defined threshold is exceeded. To further handle this scenario, there are additional advanced DDoS configurations that can be set. For example: if the desired outcome is to deny violating sources from the hardware level, the access-control-trust-level should be set to low in the realm-configuration object. This also requires the configuration of the untrustedsignal-threshold to properly demote offending untrusted users to the deny list. If one wishes to move an endpoint back into the untrusted queue the access-control-trustlevel of "medium" should be used. The DDoS configuration recommendations in this appendix are meant as a general baseline to help protect the SBC from DDoS. For more complete protection, DDoS configurations should be determined by the examining the applicable environment and customizing based on the environment driven traffic flows and load levels.

5.4 SBC configuration for Access Environment

The following parameters are configured in the SBC for DDOS Prevention in Access environment

- Realm Configuration
- Sip Interface
- Session Agent and Access-Control

5.4.1 Realm Configuration

To configure DDOS settings in SBC for a particular realm ,Go to configure terminal->media-manager->realm-config and select the realm.

```
OraceSBC# con t
OraceSBC(configure)# media-manager
OraceSBC(media-manager)# realm-config
OraceSBC(realm-config)# select
identifier:
 1: Peer  s0p3:0 0.0.0.0
 2: Core    s0p0:0 0.0.0.0
 3: Access s0p0:0 0.0.0.0
 4: Nice    s0p3:0.4 0.0.0.0
 5: public  s1p0:0.4 0.0.0.0

selection: 3

OraceSBC(realm-config)# access-control-trust-level low
OraceSBC(realm-config)# done
```

The following realm-config parameters are used in the basic DDoS configuration.

Parameter	Access Realm	Core Realm
access-control-trust-level	low	high
invalid-signal-threshold	1	0
average-rate-limit	0	0
maximum-signal-threshold	4000	0
untrusted-signal-threshold	1	0

The maximum-signal-threshold of 4000 is very high so as not to impact service. It should be reduced to a number close to the maximum number of signaling messages from one client within the tolerance-window on the realm, which by default is 30 seconds. Base the threshold on an actual trace to account for the extraneous messages that are normally not considered, and make sure to account for network loss and/or renegotiations.

5.4.2 SIP Interface

To configure DDOS settings in SBC for a particular sip-interface ,go to configure terminal ->session-router->sip-interface and select the SIP interface.

```
OraceSBC# con t
OraceSBC (configure)# session-router
```

```
OraceSBC(session-router)# sip-interface
OraceSBC(sip-interface)# select
<RealmID>:
 1: Peer  192.168.1.94:5060
 2: Core    172.18.0.129:5060
 3: Access 172.18.0.255:5060
 4: Nice    192.168.1.25:5060
 5: public  141.146.36.72:5080

selection: 1
OraceSBC(sip-interface)# sip-ports
OraceSBC(sip-port)# select
<address>:
1: 172.18.0.255:5060/UDP
2: 172.18.0.255:5060/TCP

selection: 1

OraceSBC(sip-port)# registered
OraceSBC(sip-port)# done
```

Parameter	Access Realm	Core Realm
allow-anonymous	registered	all

5.5 DDoS Configuration Settings per Platform in Access Environments

Below are the recommended parameters settings that are derived from the above test results for each platform in a SIP Access model. Changes under media-manager require system reboot to take effect. Be sure to follow precautions to reboot SBC(s) to unnecessary service outage during this execution.

5.5.1 Acme Packet 4600 1000000 Flow Table 16G memory - copper single GigE

Platform	AP4600
Flow Table	1000000
Memory	16GB
Software Release	SCZ 8.3.0

The following table lists the five parameters germane to DDoS Configuration Settings in Access Environments for the Acme Packet 4600 and their settings on the access realm based on whether endpoints can be denied or not.

Parameter	No Denied	Denied
access-control-trust-level	medium	low
invalid-signal-threshold	2	1
maximum-signal-threshold	25	25
untrusted-signal-threshold	10	2
Nat-trust-threshold	0	0
Deny-period	30	1800

The media-manager configuration should be set as suggested in the following table for the Acme Packet 4600 in PBRB Model.

Parameter	PBRB Model
max-signaling-bandwidth	2651610
max-untrustedsignaling	15
min-untrustedsignaling	12
app-signaling-bandwidth	0
tolerance-window	30

5.5.2 Acme Packet 6100 1000000 Flow Table 16G memory - copper single GigE

Platform	AP6100
Flow Table	1000000
Memory	16GB
Software Release	SCZ 8.3.0

The following table lists the five parameters germane to DDoS Configuration Settings in Access Environments for the Acme Packet 6100 and their settings on the core and access realms.

Parameter	Core realm-config	Access-realm-config
access-control-trust-level	high	low
average-rate-limit	0	0
invalid-signal-threshold	0	1
maximum-signal-threshold	0	4000
untrusted-signal-threshold	0	1

The media-manager configuration should be set as suggested in the following table for the Acme Packet 6100 in the PBRB model.

Parameter	PBRB Model
max-signaling-bandwidth	7070960
max-untrustedsignaling	1
min-untrustedsignaling	1
tolerance-window	30

5.5.3 Acme Packet 6350 2000000 Flow Table 48G memory - copper single GigE

Platform	AP6350
Flow Table	2000000
Memory	48GB
Software Release	SCZ 8.3.0

The following table lists the five parameters germane to DDoS Configuration Settings in Access Environments for the Acme Packet 6100 and their settings on the core and access realms.

Parameter	Core realm-config	Access-realm-config
access-control-trust-level	high	low
average-rate-limit	0	0
invalid-signal-threshold	0	1
maximum-signal-threshold	0	4000
untrusted-signal-threshold	0	2

The media-manager configuration should be set as suggested in the following table for the Acme Packet 6350 in the PBRB model.

Parameter	PBRB Model
max-signaling-bandwidth	7070960
max-untrustedsignaling	15
min-untrustedsignaling	14
tolerance-window	30

5.5.4 Acme Packet 6300 1000000 Flow Table 16G memory - copper single GigE

Platform	AP6300
Flow Table	1000000
Memory	16GB
Software Release	SCZ 8.3.0

The following table lists the five parameters germane to DDoS Configuration Settings in Access Environments for the Acme Packet 6300 and their settings on the core and access realms.

Parameter	Core realm-config	Access-realm-config
access-control-trust-level	high	low
average-rate-limit	0	0
invalid-signal-threshold	0	1
maximum-signal-threshold	0	4000
untrusted-signal-threshold	0	1

The media-manager configuration should be set as suggested in the following table for the Acme Packet 6100 in the PBRB model.

Parameter	PBRB Model
max-signaling-bandwidth	7070960
max-untrustedsignaling	1
min-untrustedsignaling	1
tolerance-window	30

5.5.5 Acme Packet 3900 1600000 Flow Table 16G memory - copper single GigE

Platform	AP3900
Flow Table	160000
Memory	16GB
Software Release	SCZ 8.3.0

The following table lists the five parameters germane to DDoS Configuration Settings in Access Environments for the Acme Packet 3900 and their settings on the access realm based on whether endpoints can be denied or not.

Parameter	No Denied	Denied
access-control-trust-level	medium	low
invalid-signal-threshold	2	1
maximum-signal-threshold	25	25
untrusted-signal-threshold	10	1
Nat-trust-threshold	0	0
Deny-period	30	1800

The media-manager configuration should be set as suggested in the following table for the Acme Packet 3900 in PBRB Model.

Parameter	PBRB Model
max-signaling-packets	40000
max-untrustedsignaling	7
min-untrustedsignaling	7
tolerance-window	30

5.5.6 Acme Packet 1100 720 Flow Table 4G memory - copper single GigE

Platform	AP3900
Flow Table	720
Memory	4GB
Software Release	SCZ 8.3.0

The following table lists the five parameters germane to DDoS Configuration Settings in Access Environments for the Acme Packet 1100 and their settings on the access realm based on whether endpoints can be denied or not.

Parameter	No Denied	Denied
access-control-trust-level	medium	low
invalid-signal-threshold	2	1
maximum-signal-threshold	25	25
untrusted-signal-threshold	10	1
Nat-trust-threshold	0	0
Deny-period	30	1800

The media-manager configuration should be set as suggested in the following table for the Acme Packet 1100 in PBRB Model.

Parameter	PBRB Model
max-signaling-packets	10000
max-untrustedsignaling	7
min-untrustedsignaling	4
tolerance-window	30

5.5.7 Acme Packet VME 720 Flow Table 4G memory - copper single GigE

Platform	VME
Flow Table	720
Memory	4GB
Software Release	SCZ 8.3.0

The following table lists the five parameters germane to DDoS Configuration Settings in Access Environments for the Acme Packet VME and their settings on the access realm based on whether endpoints can be denied or not.

Parameter	No Denied	Denied
access-control-trust-level	medium	low
invalid-signal-threshold	2	1
maximum-signal-threshold	25	25
untrusted-signal-threshold	10	1
Nat-trust-threshold	0	0
Deny-period	30	1800

The media-manager configuration should be set as suggested in the following table for the Acme Packet 1100 in PBRB Model.

Parameter	PBRB Model
max-signaling-packets	100000
max-untrustedsignaling	7
min-untrustedsignaling	4
tolerance-window	30

6 Appendix A

The following is a sample configuration from the lab environment in PBRB model.

```
OraceSBC#  sh con sh

capture-receiver
        state                                   enabled
        address                                 172.18.0.125
        network-interface                       s0p0:0

local-policy
        from-address                            *
        to-address                              *
        source-realm                            Peer
        policy-attribute
                next-hop                                172.18.0.124
                realm                                   Core
local-policy
        from-address                            *
        to-address                              *
        source-realm                            Core
        policy-attribute
                next-hop                                155.212.214.7
                realm                                   Peer
media-manager
        latching                                disabled
        max-signaling-bandwidth                 2651610
        max-untrusted-signaling                 15
        min-untrusted-signaling                 12
        tolerance-window                        30
network-interface
        name                                    s0p0
        ip-address                              172.18.0.129
        netmask                                 255.255.0.0
        gateway                                 172.18.0.1
        hip-ip-list                             172.18.0.129
        icmp-address                            172.18.0.129

network-interface
        name                                    s1p0
        ip-address                              155.212.214.7
        netmask                                 255.255.255.0
        gateway                                 155.212.214.1
        hip-ip-list                             155.212.214.7
        icmp-address                            155.212.214.7
phy-interface
        name                                    s0p0
        operation-type                          Media

phy-interface
        name                                    s1p0
        operation-type                          Media
        slot                                    1

realm-config
        identifier                              Core
        network-interfaces                      s0p0:0
        mm-in-realm                             enabled
```

```
        out-translationid                       change1
        access-control-trust-level              high
        refer-call-transfer                     enabled
        session-recording-server                NiceAir2
realm-config
        identifier                              Access
        network-interfaces                      s0p0:1
        mm-in-realm                             enabled
        out-translationid                       change1
        access-control-trust-level              medium
        refer-call-transfer                     enabled
        session-recording-server                NiceAir


session-agent
        hostname                                172.18.0.124
        ip-address                              172.18.0.124
        port                                    4080
        realm-id                                Core
        description                             Genesys Agent
        options                                 refer-reinvite
        refer-call-transfer                     enabled
        refer-notify-provisional                all
session-agent
        hostname                                172.18.0.133
        ip-address                              172.18.0.133
        port                                    8080
        realm-id                                Core

sip-config
        home-realm-id                           Core

        options                                 max-udp-length=0
        refer-src-routing                       enabled

sip-interface
        realm-id                                Core
        sip-port
                address                                 172.18.0.129
                allow-anonymous                         all
        sip-port
                address                                 172.18.0.129
                transport-protocol                      TCP
                allow-anonymous                         all
        out-manipulationid                      ACME_NAT_TO_FROM_IP

sip-interface
        realm-id                                Access
        sip-port
                address                                 172.18.0.255
                allow-anonymous                         registered
        sip-port
                address                                 172.18.0.255
                transport-protocol                      TCP
                allow-anonymous                         registered
        out-manipulationid                      ACME_NAT_TO_FROM_IP


steering-pool
        ip-address                              172.18.0.129
        start-port                              10000
        end-port                                10999
        realm-id                                Core
```

```
system-config
        comm-monitor
                state                                   enabled
                monitor-collector
                        address                                 10.232.50.200
        default-gateway                         10.138.194.129
```

7 Appendix B

7.1 DDoS-2 show commands

DDoS-2 is supported for platforms: Acme Packet 4600, Acme Packet 6100, Acme Packet 6300, Acme Packet 6350, and Acme Packet VNF platforms.
DDoS-2 increases the number of trusted endpoints to a maximum of 500K for Acme Packet 4600/6100/6300 and 750K for Acme Packet 6350. It also increases the number of denied endpoints to a maximum 96K for Acme Packet 6350 and 64K for Acme Packet 4600/6100/6300
The command show acl info provides information about present usage of the HASH table.

Static ALC's are stored in both TCAM and HASH table. The fully qualified flows are stored in HASH table and the non –fully qualified flows are stored in the TCAM table.

```
OraceSBC# show acl info

Access Control List Statistics:

                |   # of entries  |   % utilization   |   Reserved Entry Count
-------------------------------------------------------------------------
Denied          |          4                0.0%                 32768
Trusted         |          5                0.1%                  8192
Media           |          0                0.0%                 64000
Untrusted       |          7                0.2%                  4096
Dynamic Trusted |          2                0.0%                250000
-------------------------------------------------------------
Total table space used = 18 of 359056 (99.99% free)
-------------------------------------------------------------

Media Entries not allocated due to ACL constraints:      0
Trusted Entries not allocated due to ACL constraints:    0
Untrusted Entries not allocated due to ACL constraints:  0
Denied Entries not allocated due to ACL constraints:     0



OraceSBC# show acl all
DENIED entries:
intf:vlan Source-IP/mask                                port/mask Destination-
IP/m                                                                        ask
                  port/mask   prot type    index  recv    drop
0/0:0     0.0.0.0                                          172.18.0.255

   1-1023      tcp  static  113451
0/3:0     0.0.0.0                                          192.168.1.25

   1-1023      tcp  static  113452
0/3:0     0.0.0.0                                          192.168.1.94

   1-1023      tcp  static  113455
0/0:0     0.0.0.0                                          172.18.0.129

   1-1023      tcp  static  113456
TRUSTED entries:
intf:vlan Source-IP/mask                                port/mask Destination-
IP/m                                                                        ask
                  port/mask   prot type    index  recv    drop
```

```
0/0:0     0.0.0.0                                                172.18.0.129

               icmp static  105257 0       0
0/3:0     0.0.0.0                                                192.168.1.94

               icmp static  105258 0       0
0/2:0     0.0.0.0                                                141.146.36.106

               icmp static  105259 9195    0
0/0:0     0.0.0.0                                                172.18.0.129

               tcp  static  105261 0       0
0/0:0     0.0.0.0                                                172.18.0.129

   5060        udp  static  105262 219     0
UNTRUSTED entries:
intf:vlan Source-IP/mask                              port/mask Destination-
IP/m                                                                    ask
                 port/mask   prot type    index  recv    drop
0/3:0     0.0.0.0                                                192.168.1.94

               tcp  static  101162 0       0
0/3:0     0.0.0.0                                                192.168.1.94

   5060        udp  static  101163 0       0
0/0:0     0.0.0.0                                                172.18.0.255

               tcp  static  101165 3158    0
0/0:0     0.0.0.0                                                172.18.0.255

   5060        udp  static  101166 135     0
0/3:0     0.0.0.0                                                192.168.1.25

               tcp  static  101168 0       0
0/3:0     0.0.0.0                                                192.168.1.25

   5060        udp  static  101169 0       0
0/2:0     0.0.0.0                                                141.146.36.72

   5080        udp  static  101170 0       0
Total deny entries:        4  (0 dropped)
Total media entries:       0
Total trusted entries:     5  (0 dropped)
Total untrusted entries:   7  (0 dropped)
Media Entries not allocated due to ACL constraints:      0
Trusted Entries not allocated due to ACL constraints:    0
Untrusted Entries not allocated due to ACL constraints:  0
Denied Entries not allocated due to ACL constraints:     0
Trusted Endpoints not allocated due to ACL constraints:  0
```

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