Configure Firepower Threat Defense Interfaces in Routed Mode

Contents

Introduction

This document describes the configuration, verification, and operation of an Inline Pair Interface on a Firepower Threat Defense (FTD) appliance.

Prerequisites

Requirements

There are not specific requirements for this document.

Components Used

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

- ASA5512-X - FTD code 6.1.0.x
- Firepower Management Center (FMC) - code 6.1.0.x

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.

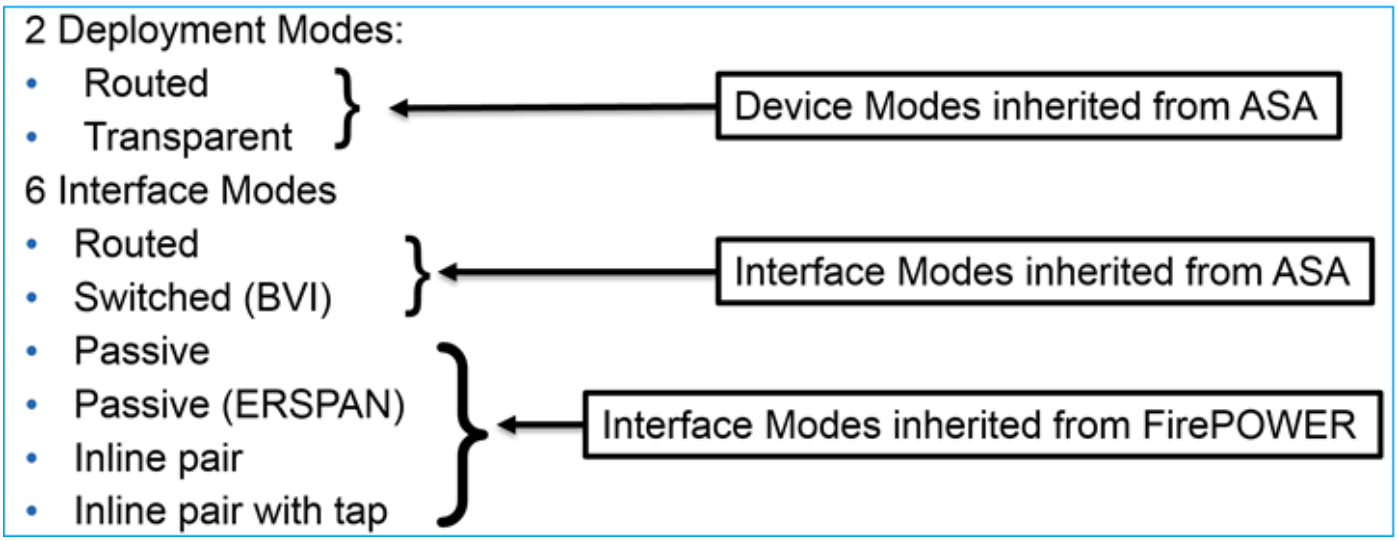
Related Products

This document can also be used with these hardware and software versions:

- ASA5506-X, ASA5506W-X, ASA5506H-X, ASA5508-X, ASA5516-X
- ASA5512-X, ASA5515-X, ASA5525-X, ASA5545-X, ASA5555-X
- FPR2100, FPR4100, FPR9300
- VMware (ESXi), Amazon Web Services (AWS), Kernel-based Virtual Machine (KVM)
- FTD software code 6.2.x and later

Background Information

The Firepower Threat Defense (FTD) provides two Deployment modes and six Interface modes as shown in this image:



Note: You can mix interface modes on a single FTD appliance.

High level overview of the various FTD deployment and interface modes:

FTD interface mode	FTD Deployment mode	Description	Traffic can be dropped
Routed	Routed	Full LINA engine and Snort-engine checks	Yes
Switched	Transparent	Full LINA engine and Snort-engine checks	Yes

Inline Pair	Routed or Transparent	Partial LINA engine and full Snort-engine checks	Yes
Inline Pair with Tap	Routed or Transparent	Partial LINA engine and full Snort-engine checks	No
Passive	Routed or Transparent	Partial LINA engine and full Snort-engine checks	No
Passive (ERSPAN)	Routed	Partial LINA engine and full Snort-engine checks	No

Configure

Network Diagram

Configure a Routed Interface and a Subinterface

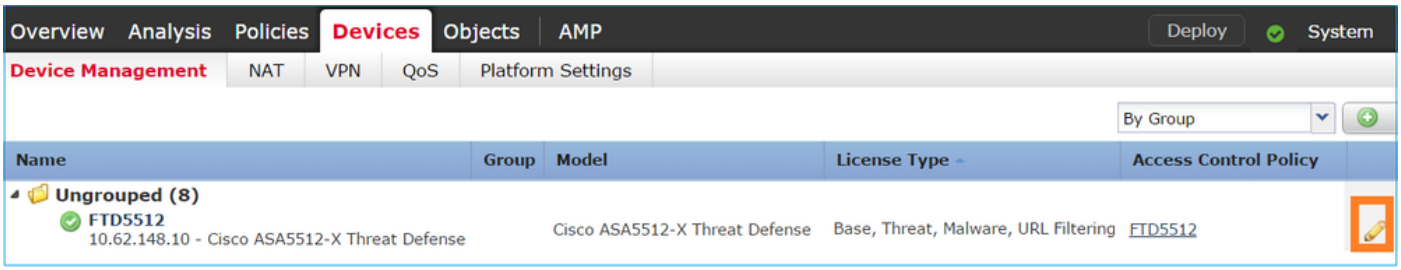
Configure subinterface G0/0.201 and interface G0/1 as per these requirements:

Interface	G0/0.201	G0/1
Name	INSIDE	OUTSIDE
Security Zone	INSIDE_ZONE	OUTSIDE_ZONE
Description	INTERNAL	EXTERNAL
Sub interface ID	201	-
VLAN ID	201	-
IPv4	192.168.201.1/24	192.168.202.1/24
Duplex/Speed	Auto	Auto

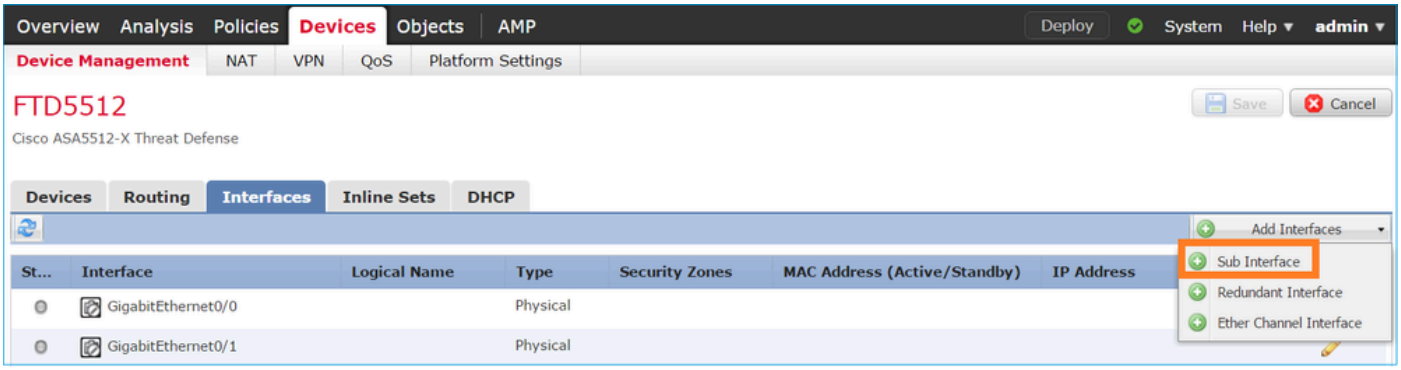
Solution

Step 1. Configure the Logical Interface

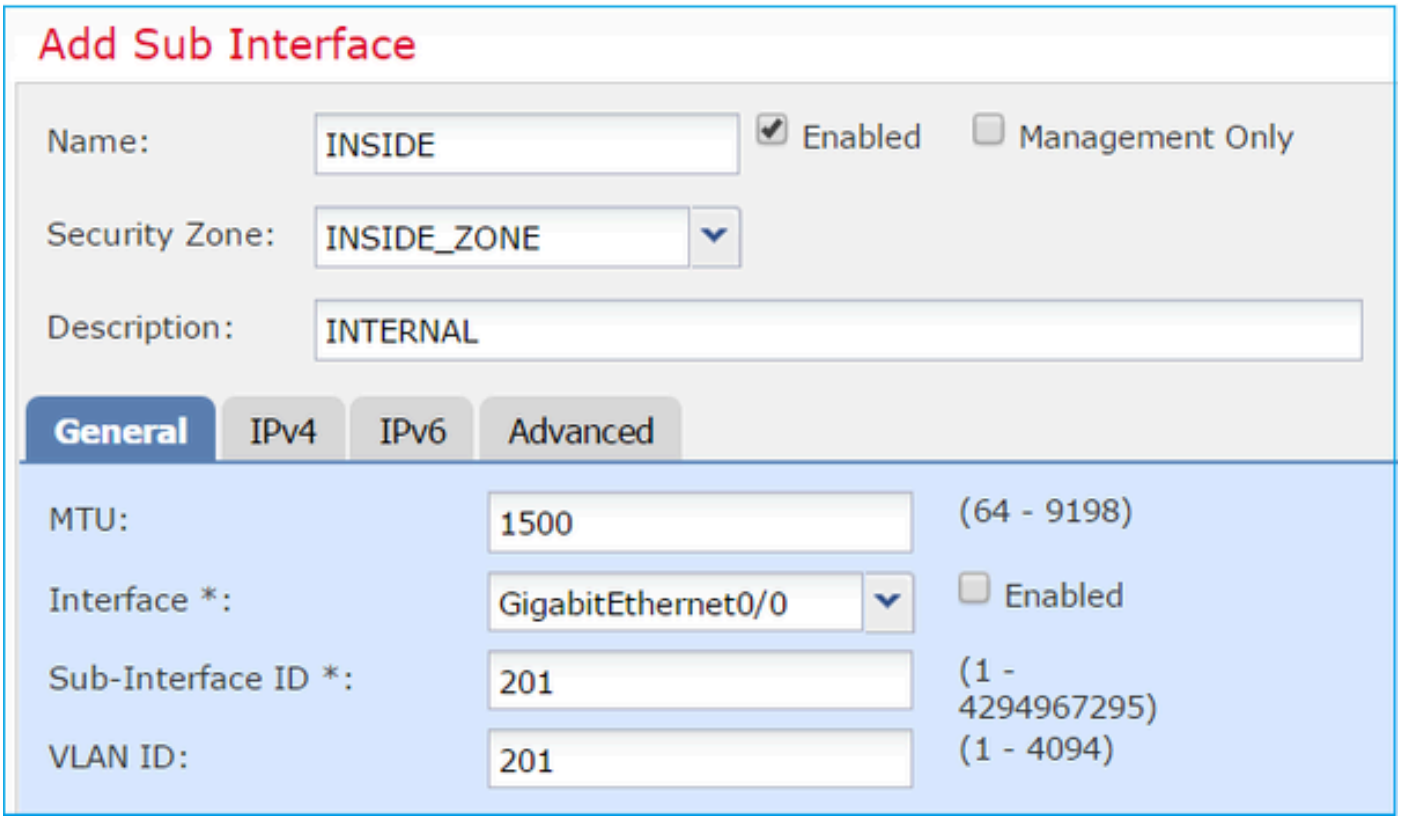
Navigate to **Devices > Device Management,** select the appropriate device and select the **Edit** icon:



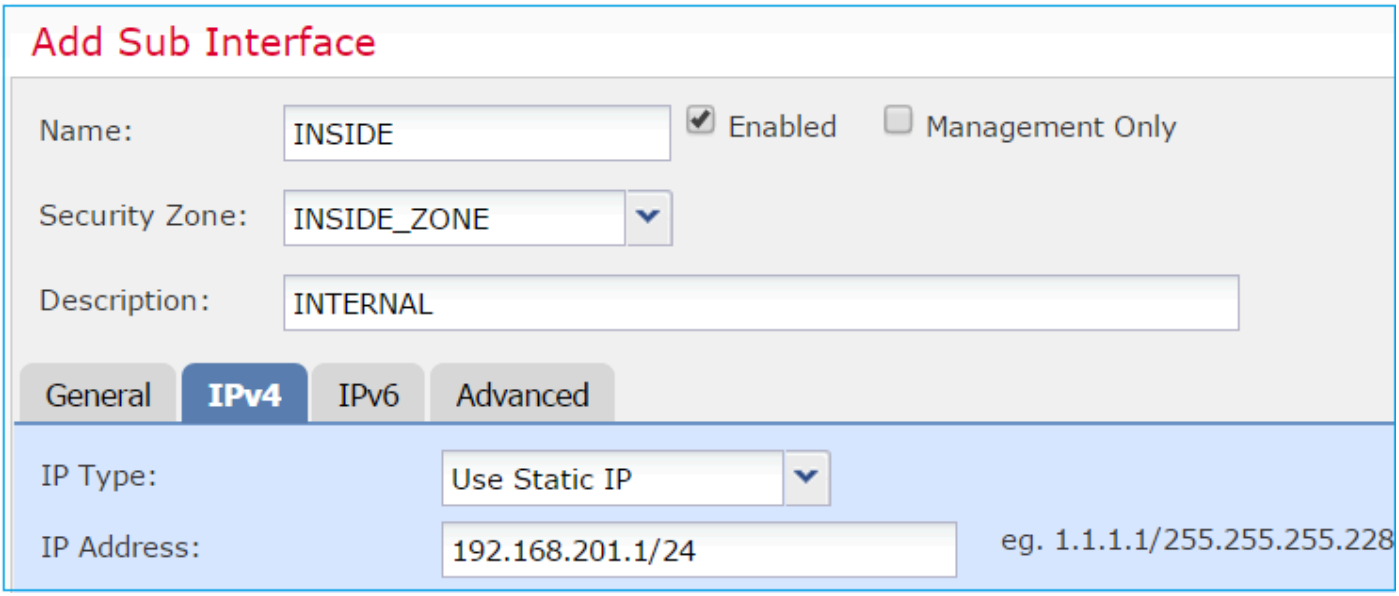
Select **Add Interfaces > Sub Interface**:



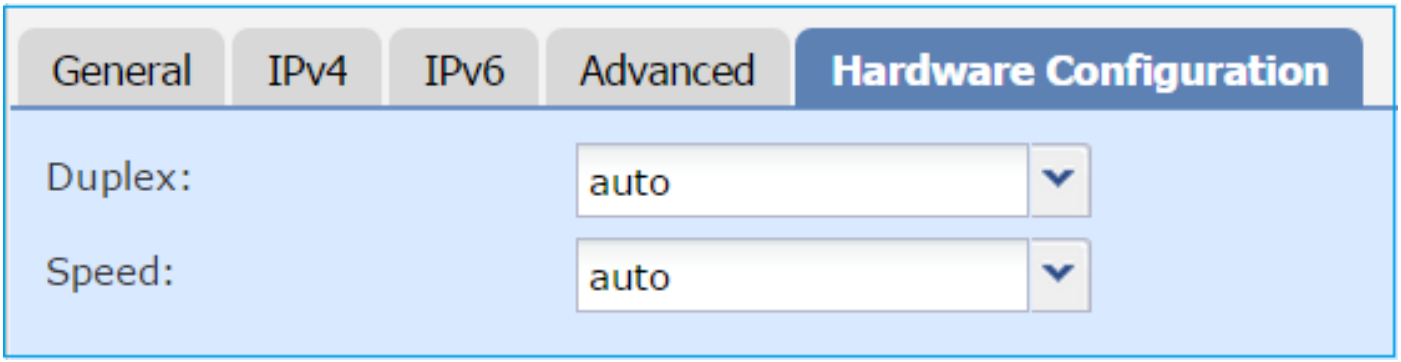
Configure the subinterface settings as per requirements:



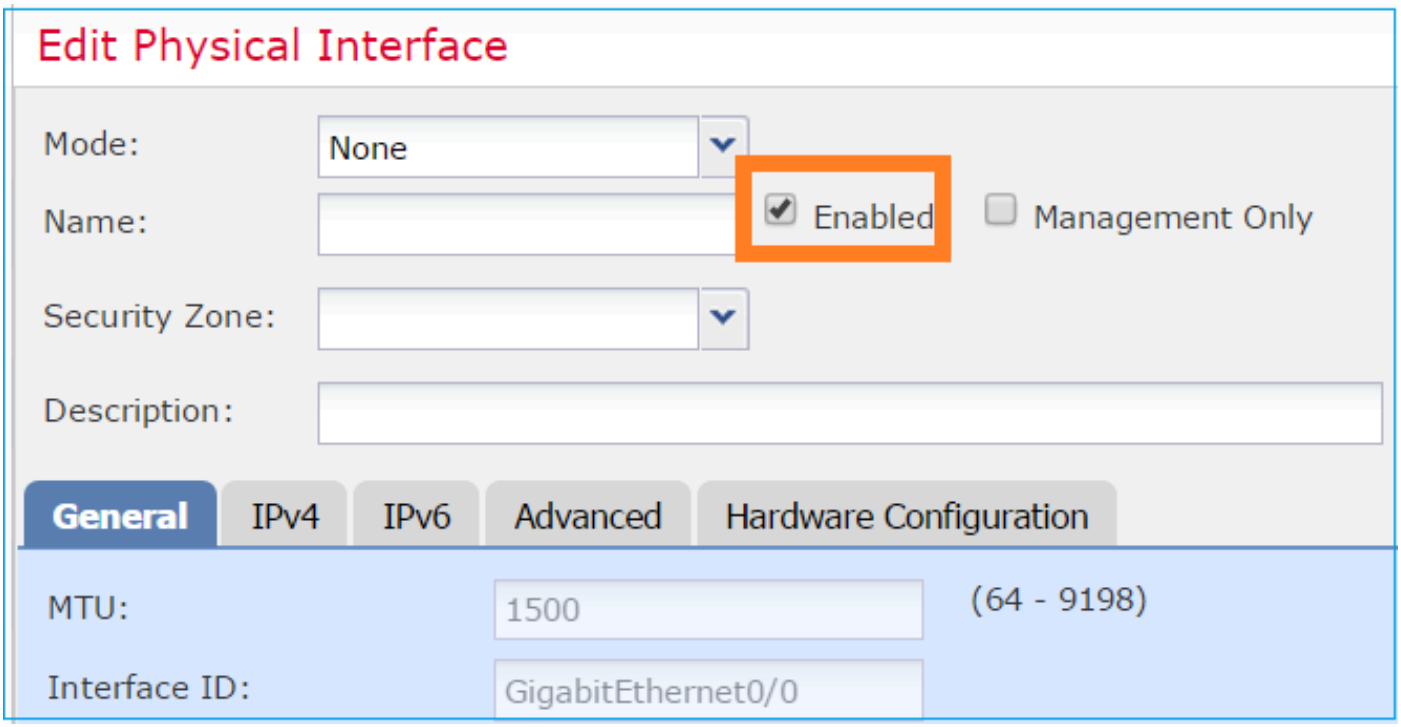
Interface IP settings:



Under the physical interface (GigabitEthernet0/0) specify the Duplex and Speed settings:

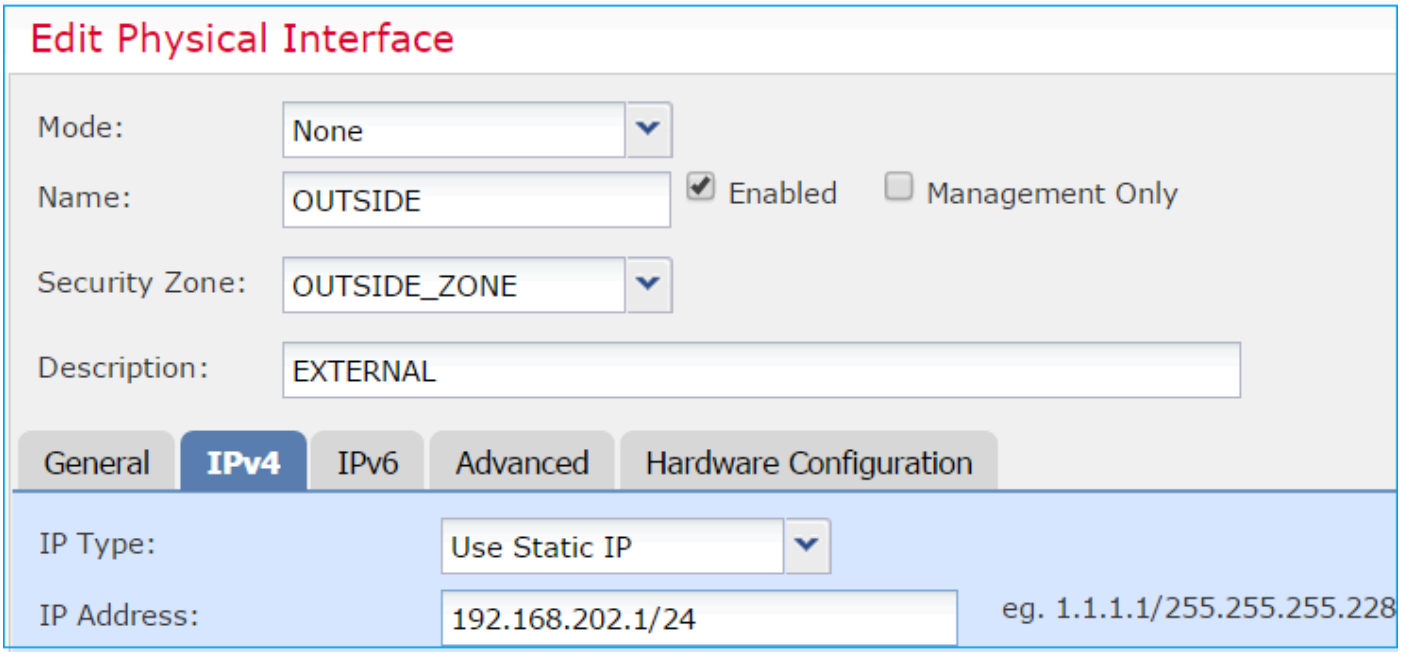


Enable the physical interface (G0/0 in this case):



Step 2. Configure the Physical Interface

Edit the GigabitEthernet0/1 physical interface as per requirements:

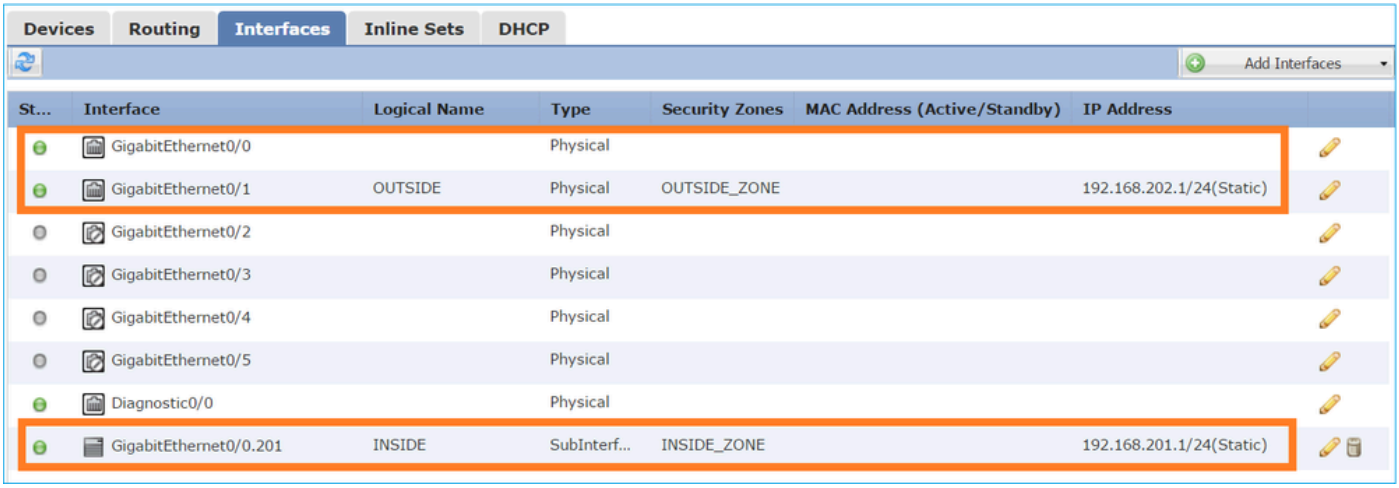


- For Routed interface the Mode is: **None**
- The Name is equivalent to the ASA interface **nameif**
- On FTD all interfaces have security level = 0
- **same-security-traffic** is not applicable on FTD. Traffic between FTD interfaces (inter) and (intra) is allowed by default

Select **Save** and **Deploy.**

Verification

From the FMC GUI:



From the FTD CLI:

<#root>

>

```
show interface ip brief

Interface                  IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0         unassigned      YES unset  up                    up

GigabitEthernet0/0.201     192.168.201.1   YES manual up                    up
GigabitEthernet0/1         192.168.202.1   YES manual up                    up

GigabitEthernet0/2         unassigned      YES unset  administratively down down
GigabitEthernet0/3         unassigned      YES unset  administratively down down
GigabitEthernet0/4         unassigned      YES unset  administratively down down
GigabitEthernet0/5         unassigned      YES unset  administratively down down
Internal-Control0/0        127.0.1.1       YES unset  up                    up
Internal-Data0/0           unassigned      YES unset  up                    up
Internal-Data0/1           unassigned      YES unset  up                    up
Internal-Data0/2           169.254.1.1     YES unset  up                    up
Management0/0              unassigned      YES unset  up                    up
```

<#root>

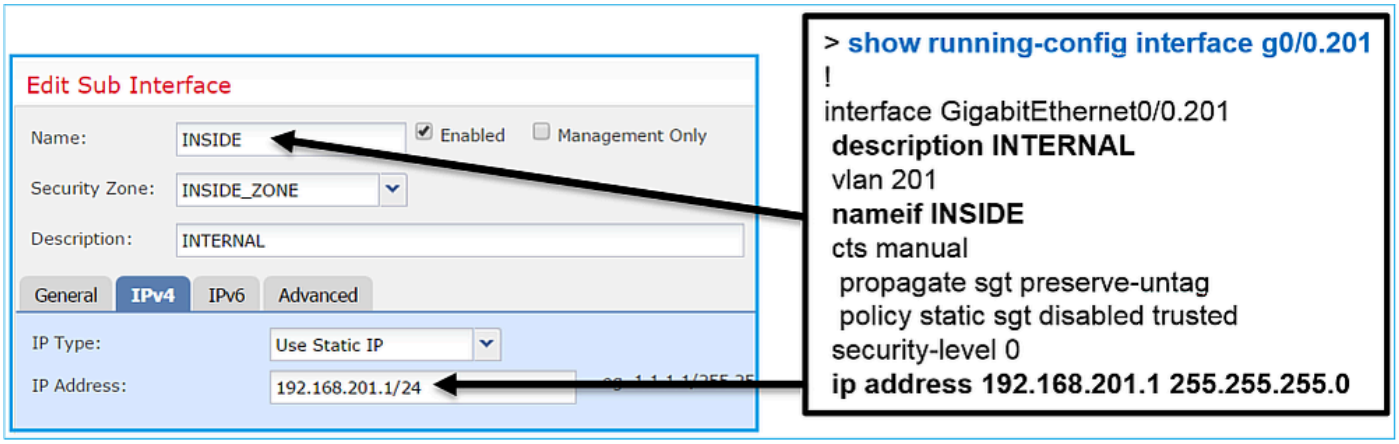
```
>

show ip

System IP Addresses:
Interface                  Name                  IP address      Subnet mask     Method
GigabitEthernet0/0.201     INSIDE                192.168.201.1   255.255.255.0   manual
GigabitEthernet0/1         OUTSIDE               192.168.202.1   255.255.255.0   manual
Current IP Addresses:
Interface                  Name                  IP address      Subnet mask     Method

GigabitEthernet0/0.201     INSIDE                192.168.201.1   255.255.255.0   manual
GigabitEthernet0/1         OUTSIDE               192.168.202.1   255.255.255.0   manual
```

FMC GUI and FTD CLI correlation:



<#root>

```
>

show interface g0/0.201

Interface GigabitEthernet0/0.201

 "
```

INSIDE

",

is up, line protocol is up

```
  Hardware is i82574L rev00, BW 1000 Mbps, DLY 10 usec
```

VLAN identifier 201

Description: INTERNAL

```
        MAC address a89d.21ce.fdea, MTU 1500
```

IP address 192.168.201.1, subnet mask 255.255.255.0

```
  Traffic Statistics for "INSIDE":
        1 packets input, 28 bytes
        1 packets output, 28 bytes
        0 packets dropped
>
```

show interface g0/1

Interface GigabitEthernet0/1 "OUTSIDE", is up, line protocol is up

```
  Hardware is i82574L rev00, BW 1000 Mbps, DLY 10 usec
```

Auto-Duplex(Full-duplex), Auto-Speed(1000 Mbps)

```
        Input flow control is unsupported, output flow control is off
```

Description: EXTERNAL

```
        MAC address a89d.21ce.fde7, MTU 1500
```

IP address 192.168.202.1, subnet mask 255.255.255.0

```
        0 packets input, 0 bytes, 0 no buffer
        Received 0 broadcasts, 0 runts, 0 giants
        0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
        0 pause input, 0 resume input
        0 L2 decode drops
        1 packets output, 64 bytes, 0 underruns
        0 pause output, 0 resume output
        0 output errors, 0 collisions, 12 interface resets
        0 late collisions, 0 deferred
        0 input reset drops, 0 output reset drops
        input queue (blocks free curr/low): hardware (511/511)
        output queue (blocks free curr/low): hardware (511/511)
  Traffic Statistics for "OUTSIDE":
        0 packets input, 0 bytes
        0 packets output, 0 bytes
        0 packets dropped
      1 minute input rate 0 pkts/sec,  0 bytes/sec
      1 minute output rate 0 pkts/sec,  0 bytes/sec
      1 minute drop rate, 0 pkts/sec
      5 minute input rate 0 pkts/sec,  0 bytes/sec
      5 minute output rate 0 pkts/sec,  0 bytes/sec
      5 minute drop rate, 0 pkts/sec
```

>

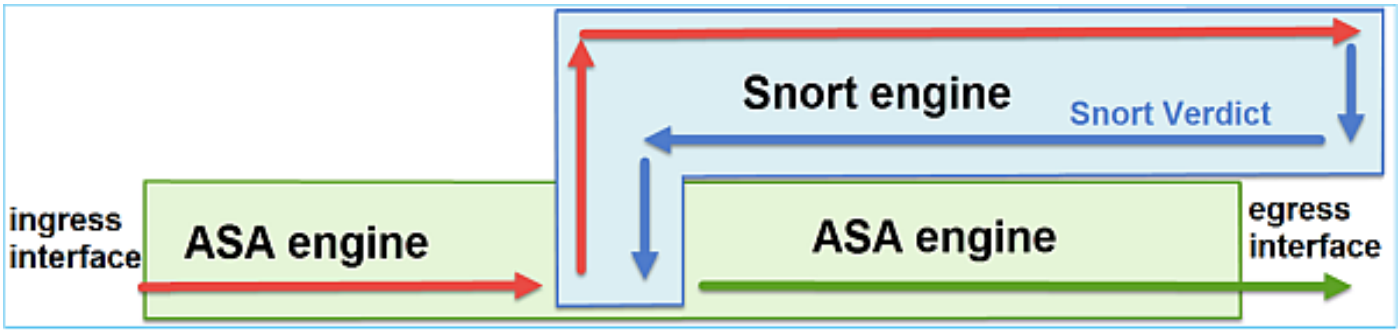
FTD Routed Interface Operation

Verify the FTD packet flow when Routed interfaces are in use.

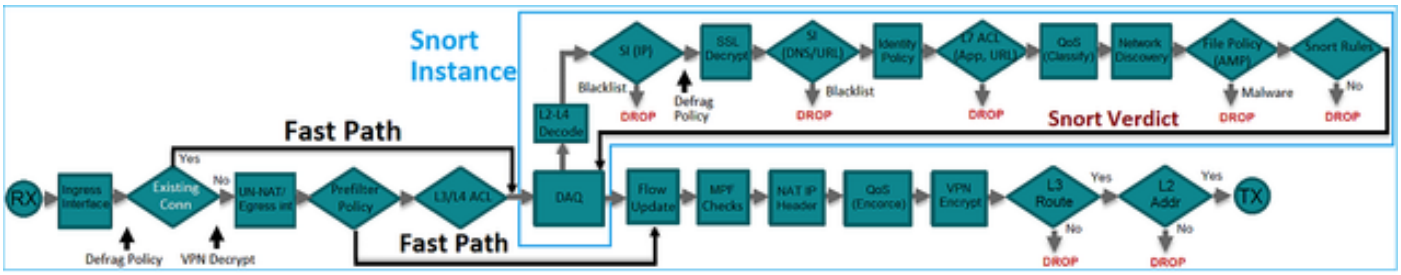
Solution

FTD Architectural overview

A high-level overview of the FTD data plane:



This picture shows some of the checks that occur within each engine:



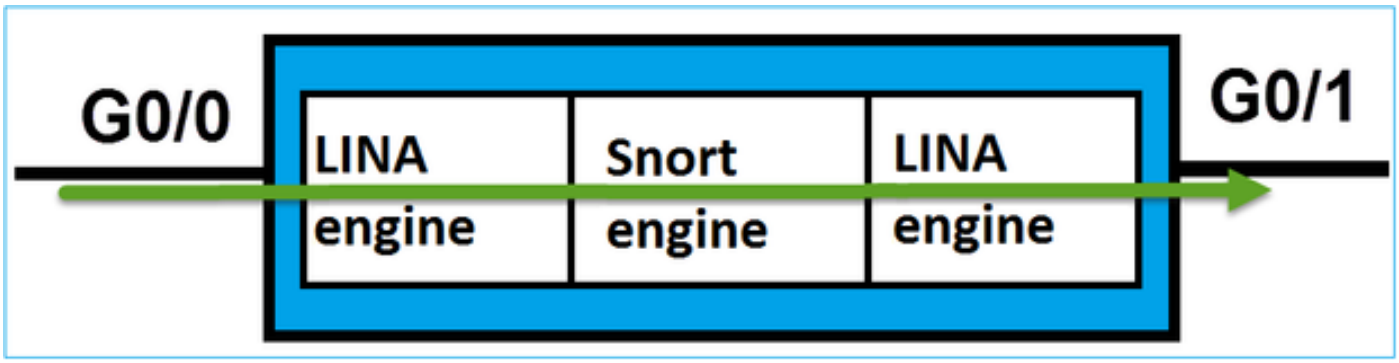
Key points

- The bottom checks correspond to the FTD LINA engine Data Path
- The checks inside the blue box correspond to the FTD Snort engine instance

FTD Routed Interface Overview

- Available only in **Routed** Deployment
- Traditional **L3 firewall deployment**
- One or more physical or logical (VLAN) routable interfaces
- Allows features like NAT or Dynamic Routing protocols to be configured
- Packets are forwarded based on **Route Lookup** and next hop is resolved based on **ARP Lookup**
- Actual traffic **can be dropped**
- **Full LINA engine** checks are applied along with **full Snort engine** checks

The last point can be visualized accordingly:



Verify

Trace a Packet on FTD Routed Interface

Network Diagram

Use packet-tracer with the these parameters to see the applied policies:

Input interface	INSIDE
Protocol/Service	TCP port 80
Source IP	192.168.201.100
Destination IP	192.168.202.100

Solution

When a routed interface is used the packet is processed in a similar way to a classic ASA Routed interface. Checks like Route Lookup, Modular Policy Framework (MPF), NAT, ARP lookup etc take place in the LINA engine Data Path. Additionally, if the Access Control Policy requires so, the packet is inspected by the Snort engine (one of the Snort instances) where a verdict is generated and returned back to the LINA engine:

<#root>

>

```
packet-tracer input INSIDE tcp 192.168.201.100 11111 192.168.202.100 80


Phase: 1


Type: ROUTE-LOOKUP


Subtype: Resolve Egress Interface
Result: ALLOW
Config:
Additional Information:

found next-hop 192.168.202.100 using egress ifc  OUTSIDE


Phase: 2


Type: ACCESS-LIST


Subtype: log
Result: ALLOW
Config:
access-group CSM_FW_ACL_ global
access-list CSM_FW_ACL_ advanced permit ip any any rule-id 268437505
access-list CSM_FW_ACL_ remark rule-id 268437505: ACCESS POLICY: FTD5512 - Default/1
access-list CSM_FW_ACL_ remark rule-id 268437505: L4 RULE: DEFAULT ACTION RULE

Additional Information:


 This packet will be sent to snort for additional processing where a verdict will be reached


Phase: 3


Type: CONN-SETTINGS


Subtype:
Result: ALLOW
Config:

class-map class-default


 match any


policy-map global_policy
```

```
 class class-default

  set connection advanced-options UM_STATIC_TCP_MAP

service-policy global_policy global

Additional Information:

Phase: 4

Type: NAT

Subtype: per-session
Result: ALLOW
Config:
Additional Information:

Phase: 5
Type: IP-OPTIONS
Subtype:
Result: ALLOW
Config:
Additional Information:

Phase: 6
Type: NAT
Subtype: per-session
Result: ALLOW
Config:
Additional Information:

Phase: 7
Type: IP-OPTIONS
Subtype:
Result: ALLOW
Config:
Additional Information:

Phase: 8
Type: FLOW-CREATION
Subtype:
Result: ALLOW
Config:
Additional Information:
New flow created with id 11336, packet dispatched to next module

Result:

input-interface: INSIDE

input-status: up
input-line-status: up
```

```
output-interface: OUTSIDE


output-status: up
output-line-status: up
Action: allow

>
```

> **Note**: In phase 4 the packet is checked against a TCP map called UM_STATIC_TCP_MAP. This is the default TCP Map on FTD.

<#root>

```
firepower#

show run all tcp-map

!
tcp-map UM_STATIC_TCP_MAP
  no check-retransmission
  no checksum-verification
  exceed-mss allow
  queue-limit 0 timeout 4
  reserved-bits allow
  syn-data allow
  synack-data drop
  invalid-ack drop
  seq-past-window drop
  tcp-options range 6 7 allow
  tcp-options range 9 18 allow
  tcp-options range 20 255 allow
  tcp-options selective-ack allow
  tcp-options timestamp allow
  tcp-options window-scale allow
  tcp-options mss allow
  tcp-options md5 clear
  ttl-evasion-protection
  urgent-flag allow
  window-variation allow-connection
!
>
```

Related Information

- Cisco Firepower Threat Defense Configuration Guide for Firepower Device Manager, Version 6.1
- Install and Upgrade Firepower Threat Defense on ASA 55xx-X devices
- Cisco Secure Firewall Threat Defense
- Cisco Technical Support & Downloads