# Layer 3 Support for ITU-T Y.1564 Service Activation Test

*Table 1: Feature History Table*

| Feature Name | Release Information | Feature Description |
|---|---|---|
| Layer 3 Support for ITU-T Y.1564 Service Activation Test | Release 24.3.1 | The ITU-T Y.1564 Ethernet Service Activation Test (SAT) is now supported on Layer 3 interfaces, enhancing the capability to conduct thorough testing and performance verification for IP-based network services. This capability ensures that the performance of Ethernet services can be validated with greater accuracy and reliability, guaranteeing that network services meet the required quality standards before deployment. |

The Y. 1564 Service Activation Test (SAT) provides a standardized method for validating Ethernet services, ensuring network services meet the required performance criteria before they are activated for end-users. You can now configure Y.1564 SAT on Layer 3 interfaces and subinterfaces to test the performance of IP-based networks.

The test traffic is originated on an L3 interface or subinterface of a node and is looped back by the L3 interface or subinterface of the peer node. Enable SAT on the node that generates the test traffic. Enable Ethernet Data Plane Loopback functionality (EDPL) on the peer node that loops back the test traffic.

### Key Components of Y.1564 Testing

1. **Service Configuration Test**
    - **Objective**: To verify that all configured services are properly provisioned and meet the specified bandwidth profiles.
    - **Process**: Each service is tested individually to ensure it conforms to the committed information rate (CIR), excess information rate (EIR), and other traffic parameters.

2. **Service Performance Test**
   - **Objective**: To validate the performance of the services under full load conditions.
   - **Process**: All services are tested simultaneously to ensure they meet the performance objectives, such as latency, jitter, frame loss, and availability.

### Benefits of Layer 3 Y.1564 SAT

- **Assurance of Service Quality**: Ensures IP services meet the required performance standards before activation, reducing the risk of service degradation.
- **Improved Customer Satisfaction**: By validating service performance, providers can deliver reliable, high-quality services, leading to higher customer satisfaction.
- **Reduced Troubleshooting Time**: Early detection of performance issues allows quicker resolution, minimizing downtime and service disruptions.

### Traffic Flow in Y.1564 SAT

The Y.1564 SAT can be configured to test the traffic flow in two directions:

- **Internal Direction**: The user-to-network interface (UNI) generates traffic and transmits it to the peer through the network-to-network interface (NNI). SAT in the internal direction measures delay, jitter, loss, and throughput at the UNI port.
- **External Direction**: The network-to-network interface (NNI) generates traffic on the side that connects to the physical network infrastructure and transmits it to the peer through the same interface. SAT in the external direction measures delay, jitter, loss, and throughput at the NNI port.

**Note** The Layer 3 interfaces support SAT only in the external direction.

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# Restrictions of Layer 3 Support for Y.1564 Service Activation Test

The Layer 3 traffic is supported only on SAT external direction over the following interfaces:

- Layer 3 physical interfaces and subinterfaces.
- Layer 3 bundle interfaces and subinterfaces.
- Layer 3 interface with IPv4 and IPv6 addresses configured.
- Layer 3 interface with MPLS configured.
- Nodes that are connected directly without any IGP.

# Configure Layer 3 Support for Y.1564 Service Activation Test

To enable L3 support for SAT, configure the following:

- Configure SAT on an interface with IPv4 or IPv6 or dual stack address.
- Configure EDPL on an interface with IPv4 or IPv6 or dual stack address on the peer node.
- On the node configured with SAT, create a profile with filters.
- On the peer node with EDPL, enable ethernet loopback on the L3 interface and trigger EDPL loopback command
- Enable SAT on the L3 interface and trigger SAT.

### Procedure

**Step 1** Configure the Layer 3 interface on a node for SAT.

```
Router(config)# interface TenGigE0/0/0/0
Router(config-if)# ipv4 address ipv4 address 10.1.1.1/24
Router(config-if)# no shut
Router(config-if)# commit
```

**Step 2** Configure the Layer 3 interface on the peer node for EDPL.

```
Router(config)# interface TenGigE0/0/0/0
Router(config-if)# ipv4 address ipv4 address 10.1.1.2/24
Router(config-if)# no shut
Router(config-if)# commit
```

**Step 3** Use the **ethernet service-activation-test profile** command to configure SAT with a profile.

```
Router(config)# ethernet service-activation-test profile prof1
Router(config-ethsat-prf)#duration 1 minutes
Router(config-ethsat-prf)#information-rate 100 mbps
Router(config-ethsat-prf)#packet-size 1024
Router(config-ethsat-prf)#commit
Router(config-ethsat-prf)#root
Router(config)#interface TenGigE0/0/0/0
Router(config-if)#ethernet service-activation-test permit external
Router(config-if-ethsat)#commit
```

**Step 4** Use the **ethernet loopback** command to configure EDPL on the peer node.

```
Router(config)#interface TenGigE0/0/0/0
Router(config-if)#ethernet loopback permit external
Router(config-if)#commit
```

**Step 5** Start an EDPL session on the loopback interface.

```
Router#ethernet loopback start local interface TenGigE 0/0/0/0 external destination
mac-address 0000.1111.2222 timeout none
```

**Step 6** Start the SAT on the node that generates the test traffic.

```
Router#ethernet service-activation-test start interface TenGigE 0/0/0/0 profile prof1
destination 0000.1111.2222 direction external
```

**Step 7** View the running configuration on the node configured with SAT using the following commands.

```
Router# show running-config ethernet service-activation-test
ethernet service-activation-test
  profile prof1
   duration 1 minutes
   information-rate 100 mbps
   packet-size 1024
  !


Router# show running-config interface TenGigE 0/0/0/0
interface TenGigE0/0/0/0
  ethernet service-activation-test
    permit external
  !
  ipv4 address 10.1.1.1 255.255.255.0
 !
```

**Step 8** View the running configuration on the peer node configured with EDPL using the following command.

```
Router# show running-config interface TenGigE 0/0/0/0
interface TenGigE0/0/0/0
 ipv4 address 10.10.10.2 255.255.255.0
 ethernet loopback
  permit external
!
!
```

**Step 9** Verify the loopback configuration.

```
Router# show ethernet loopback active
Local: TenGigE0/0/0/0.0, ID 1
=============================================
Direction:                          External
Time out:                               None
Time left:                                 -
Status:                                Active
Filters:
  Dot1Q:                                  Any
  Second-dot1Q:                           Any
  Source MAC Address:                     Any
  Destination MAC Address:    0000.1111.2222
  Class of Service:                       Any
```

**Step 10** Verify the SAT results.

```
Router# show ethernet service-activation-test interface TenGigE0/0/0/0
Interface TenGigE0/0/0/0
  Service activation tests permitted (external only)
  Test completed:
    Duration 1 minute(s)
    Information rate 100 Mbps
    Color-blind
    External, Two-way, Destination 00:00:11:11:22:22
    Packet size 1024, Pattern hex 0x00
    Packet format: SAT MEF-49
    CoS not set

  Results:
```

```
Step 1, Information Rate 100 Mbps
  CIR packets:
    Tx packets: 731435, bytes: 748989440
    Rx packets: 731435, bytes: 748989440
    FL: 0, FLR: 0%
    FD: Min 5.000us, Mean 5.991us, Max 7.900us
    IFDV: Not supported
    Out of order packets: 0 (0%)
    Error packets: 0 (0%)

  EIR packets:
    Tx packets: 0, bytes: 0
    Rx packets: 0, bytes: 0
    FL: 0, FLR: 0%
    FD: Min 0.000us, Mean 0.000us, Max 0.000us
    IFDV: Min 0.000us, Mean 0.000us, Max 0.000us
    Out of order packets: 0 (0%)
    Error packets: 0 (0%)
```