**SQA Test Plan  
L3 Scale and Performance**

**SONiC 2.0 Project and Arlo Release**

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# Test Strategy Plan Revision History

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| **Rev** | **Date** | **Author** | **Change Description** |
| 0.01 | 05/08/2019 | Chandra Sekhar Reddy V | Initial Draft |
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# List of Approvers

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| **Function** | **Name** | **Date Approved** |
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# List of Reviewers

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| **Function** | **Name** |
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# Functional Project Overview

TBD.

## Requirements Source and Test Traceability

### Source Document

L3 Scale and Performance FS for 7712(TH1) and 7816(TH2)

<https://docs.google.com/document/d/1LhhX43aDF72g6TwDv18WKCp5P08Q1PEufzxSiz4JuoE/edit>

### ALPM Overview

ALPM mode attempts to address scalability by implementing the longest prefix matching using a combination of SRAMs and TCAMs. Entries with common prefixes are grouped together. A TCAM is used to store a root prefix and a SRAM is used to store a list of prefixes associated with this root prefix.

The Algorithmic LPM (ALPM) processing is similar to the legacy TCAM lookup mode, but differs in that ALPM logic must perform a second-level compare to identify the longest prefix match from a list. The number of entries in this secondary list determine the total number of prefixes that can be supported.

The ALPM associated data requires a large database. To accommodate this, the associative data for the second level compare resides in the (L2/L3/ALPM) shared memory tables. The number of storable entries per node varies depending on the prefix key width and also on weather a lookup for both SIP and DIP are required

# Test Focus Areas

This test plan is focus on validation of the below route programming into SRAM table in ALPM mode.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Platform** | **VE Interface** | **L3 Next Hops** | **IPv4 Prefixes** | **IPv6 Prefixes(<=64)** | **IPv6 Prefixes(>64)** | **IPv4 Hosts** | **IPv6 Hosts** | **ECMP paths and Groups** |
| **7712(TH1)** | **1K** | **32K** | **128K** | **80K** | **20K** | **8K** | **4K** | **64/256** |
| **7816(TH2)** | **1K** | **32K** | **288K** | **48K** | **42K** | **8K** | **4K** | **64/256** |
| **7326(TD3)** | **1K** | **32K** | **172k** | **48K** | **42K** | **8K** | **4K** | **64/256** |

Functional Testing   
- All CLI and debug commands  
-Scaling with max supported of ipv4 routes and 32k ipv6 routes with different prefix sizes  
-Route scaling with all dynamic protocols + static routes  
-Test on default and user VRFs

Negative Testing

* Link flaps
* Reload/kill daemon
* Withdraw/advertise routes
* Clear bgp neighbors/clear ipv4/v6 route table/clear arp/clear mac
* Warm reboot
* Orchagt/Syncd restart and upgrade
* Fast reboot
* Config save and reload

### Network Topology Design

#### Topology1







TG1, TG2, TG3 and TG4 are Traffic Generator ports which are used to emulate the protocols BGP to pump the routes into TH1/TH2/TD3 Device and also simulate the traffic for the corresponding networks

TG1 and TG3 in Default VRF and TG2 and TG4 in User VRF name RED

#### Topology2



4links



4 links

Default-vrf  
 Red vrf

dutA – Belgrade(TH1)  
dutB – XGS/DNX  
Two spirent ports are connected to dutA, dutB

# Test Case and Objectives

## Functional Tests

### CLI Validation

#### Verify cli command for enabling/disabling ALPM mode

|  |  |
| --- | --- |
| **Test Case Details** | |
| **Title / Test Name** | Verify cli command for enabling/disabling ALPM mode |
| **Description** |  |
| **Test Setup** | Topology 1 |
| **Manual Execution** | Yes |
| **Automation Status** | No |
| **Automation Priority** | NA |
| **Interface Mode** | NA |
| **Basic feature Sanity** | Functional |
| **New in Release** |  |
| **Platform Dependent** | Yes |
| STEPS:   1. Verify help strings are displayed while enabling ALPM mode in cli mode 2. Enable/disable ALPM mode with below cli and check proper warning message displayed and verify running-config | |

### Functional Test Cases

#### Verify 1D Scale of Max ipv4 routes with different prefix ranges on default vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv4 routes with different prefix ranges on default vrf | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP on DUT1 3. Advertise 64k ipv4 routes from TG1 and 64K ipv4 routes from TG3 with /24 prefix length for TH1 4. Verify all 128K ipv4 routes are installed in hardware using “l3 defip show” command 5. Send bidirectional traffic for the advertised routes 6. Repeat above steps from 3 to 6 for different prefix lengths from /16 to /32 7. Repeat above steps from 3 to 7 for different prefixes 8. Perform the below triggers:   8.1 Deletion and addition of routes when BGP unconfig/config  8.2 Link flaps when traffic is going on  8.3 Clear bgp neighbors to check all routes and forwarding  8.4 Clear ipv4 route table and check all routes and forwarding  8.5 Clear arp table and check all routes and forwarding  8.6 Clear mac table and check all routes and forwarding  8.7 Test across warm reboot , Orchagt/Syncd restart and upgrade  8.8 Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 as per the scale metric 288K and 172K respectively | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv4 routes with different prefix ranges on user-vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv4 routes with different prefix ranges on user-vrf | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP on DUT1 3. Advertise 60k ipv4 routes from TG2 and 60K ipv4 routes from TG4 with /24 prefix length for TH1 4. Verify all 120K ipv4 routes are installed in hardware using “l3 defip show” command 5. Send bidirectional traffic for the advertised routes 6. Repeat above steps from 3 to 6 for different prefix lengths from /16 to /32 7. Repeat above steps from 3 to 7 for different prefixes 8. Perform the below triggers:   8.1 Deletion and addition of routes when BGP unconfig/config  8.2 Link flaps when traffic is going on  8.3 Clear bgp neighbors to check all routes and forwarding  8.4 Clear ipv4 route table and check all routes and forwarding  8.5 Clear arp table and check all routes and forwarding  8.6 Clear mac table and check all routes and forwarding  8.7 Test across warm reboot , Orchagt/Syncd restart and upgrade  8.8 Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 as per the scale metric 288K and 172K respectively | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv6 routes with prefix <=64 on default vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv6 routes with prefix <=64 on default vrf | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP+ on DUT1 3. Advertise 40k ipv6 routes from TG1 and 40K ipv6 routes from TG3 with /64 prefix length for TH1 4. Verify all 80K ipv6 routes are installed in hardware using “l3 defip show” command 5. Send bidirectional traffic for the advertised routes 6. Repeat above steps from 3 to 6 for different prefix lengths from /16 to /64 7. Repeat above steps from 3 to 7 for different prefixes 8. Perform the below triggers:   8.1 Deletion and addition of routes when BGP unconfig/config  8.2 Link flaps when traffic is going on  8.3 Clear bgpv6 neighbors to check all routes and forwarding  8.4 Clear ipv6 route table and check all routes and forwarding  8.5 Clear neighbor table and check all routes and forwarding  8.6 Clear mac table and check all routes and forwarding  8.7 Test across warm reboot , Orchagt/Syncd restart and upgrade  8.8 Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 as per the scale metric 48K and 48K respectively | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv6 routes with prefix <=64 on user vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv6 routes with prefix <=64 on user vrf | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP+ on DUT1 3. Advertise 40k ipv6 routes from TG2 and 40K ipv6 routes from TG4 with /64 prefix length for TH1 4. Verify all 80K ipv6 routes are installed in hardware using “l3 defip show” command 5. Send bidirectional traffic for the advertised routes 6. Repeat above steps from 3 to 6 for different prefix lengths from /16 to /64 7. Repeat above steps from 3 to 7 for different prefixes 8. Perform the below triggers:    1. Deletion and addition of routes when BGP unconfig/config   8.2 Link flaps when traffic is going on  8.3 Clear bgpv6 neighbors to check all routes and forwarding  8.4 Clear ipv6 route table and check all routes and forwarding  8.5 Clear neighbor table and check all routes and forwarding  8.6 Clear mac table and check all routes and forwarding  8.7 Test across warm reboot , Orchagt/Syncd restart and upgrade  8.8 Test across fast reboot and config save and reload  9. Perform the above test cases in TH2 and TD3 as per the scale metric 48K and 48K respectively | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv6 routes with prefix >64 on default vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv6 routes with prefix > 64 on default vrf | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP+ on DUT1 3. Advertise 10k ipv6 routes from TG1 and 10K ipv6 routes from TG3 with >/64 prefix length for TH1 4. Verify all 80K ipv6 routes are installed in hardware using “l3 defip show” command 5. Send bidirectional traffic for the advertised routes 6. Repeat above steps from 3 to 6 for different prefix lengths from /64 to /128 7. Repeat above steps from 3 to 7 for different prefixes 8. Perform the below triggers:   8.1 Deletion and addition of routes when BGP unconfig/config  8.2 Link flaps when traffic is going on  8.3 Clear bgpv6 neighbors to check all routes and forwarding  8.4 Clear ipv6 route table and check all routes and forwarding  8.5 Clear neighbor table and check all routes and forwarding  8.6 Clear mac table and check all routes and forwarding  8.7 Test across warm reboot , Orchagt/Syncd restart and upgrade  8.8 Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 as per the scale metric 42K and 42K respectively | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv6 routes with prefix >64 on user vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv6 routes with prefix > 64 on user vrf | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP+ on DUT1 3. Advertise 10k ipv6 routes from TG2 and 10K ipv6 routes from TG4 with >/64 prefix length for TH1 4. Verify all 80K ipv6 routes are installed in hardware using “l3 defip show” command 5. Send bidirectional traffic for the advertised routes 6. Repeat above steps from 3 to 6 for different prefix lengths from /64 to /128 7. Repeat above steps from 3 to 7 for different prefixes 8. Perform the below triggers:   8.1 Deletion and addition of routes when BGP unconfig/config  8.2 Link flaps when traffic is going on  8.3 Clear bgpv6 neighbors to check all routes and forwarding  8.4 Clear ipv6 route table and check all routes and forwarding  8.5 Clear neighbor table and check all routes and forwarding  8.6 Clear mac table and check all routes and forwarding  8.7 Test across warm reboot , Orchagt/Syncd restart and upgrade  8.8 Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 as per the scale metric 42K and 42K respectively | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv4+ipv6 routes with IPv6 prefix =<64 on default vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv4+ipv6 routes with IPv6 prefix =<64 on default vrf | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP and BGP+ on DUT1 3. Advertise 16k ipv4 routes from TG1 and 16K ipv4 routes from TG3 with /24 prefix length for TH1 4. Advertise 16k ipv6 routes from TG1 and 16K ipv6 routes from TG3 with /64 prefix length for TH1 5. Verify all IPv4 + ipv6 : 32K +32K routes are installed in hardware using “l3 defip show” command 6. Send bidirectional traffic for the advertised routes 7. Repeat above steps from 3 to 7 for different prefixes in v4 and v6 8. Perform the below triggers:   8.1 Deletion and addition of routes when BGP/BGp+ unconfig/config  8.2 Link flaps when traffic is going on  8.3 Clear bgp/bgpv6 neighbors to check all routes and forwarding  8.4 Clear ipv4/ipv6 route table and check all routes and forwarding  8.5 Clear neighbor table and check all routes and forwarding  8.6 Clear mac table and check all routes and forwarding  8.7 Test across warm reboot , Orchagt/Syncd restart and upgrade  8.8 Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 as per the scale metric 46K + 36K and 43K + 36K respectively | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv4+ipv6 routes with IPv6 prefix =<64 on user vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv4+ipv6 routes with IPv6 prefix =<64 on user vrf | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP and BGP+ on DUT1 3. Advertise 16k ipv4 routes from TG2 and 16K ipv4 routes from TG4 with /24 prefix length for TH1 4. Advertise 16k ipv6 routes from TG2 and 16K ipv6 routes from TG4 with /64 prefix length for TH1 5. Verify all IPv4 + ipv6 : 32K +32K routes are installed in hardware using “l3 defip show” command 6. Send bidirectional traffic for the advertised routes 7. Repeat above steps from 3 to 7 for different prefixes in v4 and v6 8. Perform the below triggers:   8.1 Deletion and addition of routes when BGP/BGp+ unconfig/config  8.2 Link flaps when traffic is going on  8.3 Clear bgp/bgpv6 neighbors to check all routes and forwarding  8.4 Clear ipv4/ipv6 route table and check all routes and forwarding  8.5 Clear neighbor table and check all routes and forwarding  8.6 Clear mac table and check all routes and forwarding  8.7 Test across warm reboot , Orchagt/Syncd restart and upgrade  8.8 Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 as per the scale metric 46K + 36K and 43K + 36K respectively | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv4 routes with 64 ECMP paths on default-vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv4 routes with 64 ECMP paths on default-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 2 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP on DUT1 and DUT2 having 64 links in between them. 3. Advertise 256 ipv4 routes from TG1 and 256 ipv4 routes from TG3 with /24 prefix length for TH1 4. Verify all 256 ipv4 routes are installed in hardware using “l3 defip show” command. Make sure 64 ECMP paths are seen for each prefix. 5. Send bidirectional traffic for the advertised routes. Make sure the traffic is forwarded across all the 64 paths. 6. Perform the below triggers:   a) Deletion and addition of ECMP path.  b) ECMP Link flaps when traffic is going on  c) Clear bgp neighbors to check all routes and forwarding  d) Clear ipv4 route table and check all routes and forwarding  e) Clear arp table and check all routes and forwarding  f) Clear mac table and check all routes and forwarding  g) Test across warm reboot , Orchagt/Syncd restart and upgrade  h) Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 with 64 paths | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv6 routes with 64 ECMP paths on default-vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv6 routes with 64 ECMP paths on default-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 2 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP on DUT1 and DUT2 having 64 links in between them. 3. Advertise 256 ipv6 routes from TG1 and 256 ipv6 routes from TG3 with /24 prefix length for TH1 4. Verify all 256 ipv6 routes are installed in hardware using “l3 defip show” command. Make sure 64 ECMP paths are seen for each prefix. 5. Send bidirectional traffic for the advertised routes. Make sure the traffic is forwarded across all the 64 paths. 6. Perform the below triggers:   a) Deletion and addition of ECMP path.  b) ECMP Link flaps when traffic is going on  c) Clear bgp neighbors to check all routes and forwarding  d) Clear ipv4 route table and check all routes and forwarding  e) Clear arp table and check all routes and forwarding  f) Clear mac table and check all routes and forwarding  g) Test across warm reboot , Orchagt/Syncd restart and upgrade  h) Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 with 64 paths | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv4 static routes with 64 ECMP paths on default-vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv4 static routes with 64 ECMP paths on default-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 2 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Configure 256 ipv4 static routes on DUT1 towards TG3 with 64 different nexthops. Configure 256 ipv4 static routes on DUT2 towards TG3 with 64 different nexthops. 3. Verify all 256 ipv4 routes are installed in hardware using “l3 defip show” command. Make sure 64 ECMP paths are seen for each prefix. 4. Send bidirectional traffic for the advertised routes. Make sure the traffic is forwarded across all the 64 paths. 5. Perform the below triggers:   a) Deletion and addition of ECMP path.  b) ECMP Link flaps when traffic is going on  c) Clear bgp neighbors to check all routes and forwarding  d) Clear ipv4 route table and check all routes and forwarding  e) Clear arp table and check all routes and forwarding  f) Clear mac table and check all routes and forwarding  g) Test across warm reboot , Orchagt/Syncd restart and upgrade  h) Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 with 64 paths | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv6 static routes with 64 ECMP paths on default-vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv6 static routes with 64 ECMP paths on default-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 2 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Configure 256 ipv6 static routes on DUT1 towards TG3 with 64 different nexthops. Configure 256 ipv6 static routes on DUT2 towards TG1 with 64 different nexthops. 3. Verify all 256 ipv6 routes are installed in hardware using “l3 defip show” command. Make sure 64 ECMP paths are seen for each prefix. 4. Send bidirectional traffic for the advertised routes. Make sure the traffic is forwarded across all the 64 paths. 5. Perform the below triggers:   a) Deletion and addition of ECMP path.  b) ECMP Link flaps when traffic is going on  c) Clear bgp neighbors to check all routes and forwarding  d) Clear ipv4 route table and check all routes and forwarding  e) Clear arp table and check all routes and forwarding  f) Clear mac table and check all routes and forwarding  g) Test across warm reboot , Orchagt/Syncd restart and upgrade  h) Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 with 64 paths | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv4 routes with 64 ECMP paths on user-vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv4 routes with 64 ECMP paths on user-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 2 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP on DUT1 and DUT2 having 64 links in between them. 3. Advertise 256 ipv4 routes from TG2 and 256 ipv4 routes from TG4 with /24 prefix length for TH1 4. Verify all 256 ipv4 routes are installed in hardware using “l3 defip show” command. Make sure 64 ECMP paths are seen for each prefix. 5. Send bidirectional traffic for the advertised routes. Make sure the traffic is forwarded across all the 64 paths. 6. Perform the below triggers:   a) Deletion and addition of ECMP path.  b) ECMP Link flaps when traffic is going on  c) Clear bgp neighbors to check all routes and forwarding  d) Clear ipv4 route table and check all routes and forwarding  e) Clear arp table and check all routes and forwarding  f) Clear mac table and check all routes and forwarding  g) Test across warm reboot , Orchagt/Syncd restart and upgrade  h) Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 with 64 paths | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv6 routes with 64 ECMP paths on user-vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv6 routes with 64 ECMP paths on user-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 2 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Enable BGP on DUT1 and DUT2 having 64 links in between them. 3. Advertise 256 ipv6 routes from TG2 and 256 ipv6 routes from TG4 with /24 prefix length for TH1 4. Verify all 256 ipv6 routes are installed in hardware using “l3 defip show” command. Make sure 64 ECMP paths are seen for each prefix. 5. Send bidirectional traffic for the advertised routes. Make sure the traffic is forwarded across all the 64 paths. 6. Perform the below triggers:   a) Deletion and addition of ECMP path.  b) ECMP Link flaps when traffic is going on  c) Clear bgp neighbors to check all routes and forwarding  d) Clear ipv4 route table and check all routes and forwarding  e) Clear arp table and check all routes and forwarding  f) Clear mac table and check all routes and forwarding  g) Test across warm reboot , Orchagt/Syncd restart and upgrade  h) Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 with 64 paths | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv4 static routes with 64 ECMP paths on user-vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv4 static routes with 64 ECMP paths on user-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 2 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Configure 256 ipv4 static routes on DUT1 towards TG3 with 64 different nexthops. Configure 256 ipv4 static routes on DUT2 towards TG3 with 64 different nexthops. 3. Verify all 256 ipv4 routes are installed in hardware using “l3 defip show” command. Make sure 64 ECMP paths are seen for each prefix. 4. Send bidirectional traffic for the advertised routes. Make sure the traffic is forwarded across all the 64 paths. 5. Perform the below triggers:   a) Deletion and addition of ECMP path.  b) ECMP Link flaps when traffic is going on  c) Clear bgp neighbors to check all routes and forwarding  d) Clear ipv4 route table and check all routes and forwarding  e) Clear arp table and check all routes and forwarding  f) Clear mac table and check all routes and forwarding  g) Test across warm reboot , Orchagt/Syncd restart and upgrade  h) Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 with 64 paths | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D Scale of Max ipv6 static routes with 64 ECMP paths on user-vrf

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D Scale of Max ipv6 static routes with 64 ECMP paths on user-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 2 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode 2. Configure 256 ipv6 static routes on DUT1 towards TG4 with 64 different nexthops. Configure 256 ipv6 static routes on DUT2 towards TG2 with 64 different nexthops. 3. Verify all 256 ipv6 routes are installed in hardware using “l3 defip show” command. Make sure 64 ECMP paths are seen for each prefix. 4. Send bidirectional traffic for the advertised routes. Make sure the traffic is forwarded across all the 64 paths. 5. Perform the below triggers:   a) Deletion and addition of ECMP path.  b) ECMP Link flaps when traffic is going on  c) Clear bgp neighbors to check all routes and forwarding  d) Clear ipv4 route table and check all routes and forwarding  e) Clear arp table and check all routes and forwarding  f) Clear mac table and check all routes and forwarding  g) Test across warm reboot , Orchagt/Syncd restart and upgrade  h) Test across fast reboot and config save and reload   1. Perform the above test cases in TH2 and TD3 with 64 paths | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D scale of ipv4 host routes in default-vrf.

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D scale of ipv4 host routes in default-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode. 2. Resolve arp for 8k ipv4 hosts from TG1. 3. Verify all arp entries are installed in hardware. 4. Send traffic to all hosts from TG3 and verify traffic. 5. Do “clear arp” and verify all entries are re-learnt. 6. ‘shut/no shut’ on the interface and verify all entries are learnt by pre-arp and traffic resumes. 7. Perform the above test cases in TH2 and TD3 with 8k entries. | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D scale of ipv6 host routes in default-vrf.

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D scale of ipv6 host routes in default-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode. 2. Resolve arp for 4k ipv6 hosts from TG1. 3. Verify all arp entries are installed in hardware. 4. Send traffic to all hosts from TG3 and verify traffic. 5. Do “clear arp” and verify all entries are re-learnt. 6. ‘shut/no shut’ on the interface and verify all entries are learnt by pre-arp and traffic resumes. 7. Perform the above test cases in TH2 and TD3 with 4k entries. | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D scale of ipv4 host routes in user-vrf.

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D scale of ipv4 host routes in user-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode. 2. Resolve arp for 8k ipv4 hosts from TG2. 3. Verify all arp entries are installed in hardware. 4. Send traffic to all hosts from TG4 and verify traffic. 5. Do “clear arp” and verify all entries are re-learnt. 6. ‘shut/no shut’ on the interface and verify all entries are learnt by pre-arp and traffic resumes. 7. Perform the above test cases in TH2 and TD3 with 8k entries. | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D scale of ipv6 host routes in user-vrf.

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D scale of ipv6 host routes in user-vrf. | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode. 2. Resolve arp for 4k ipv6 hosts from TG1. 3. Verify all arp entries are installed in hardware. 4. Send traffic to all hosts from TG3 and verify traffic. 5. Do “clear arp” and verify all entries are re-learnt. 6. ‘shut/no shut’ on the interface and verify all entries are learnt by pre-arp and traffic resumes. 7. Perform the above test cases in TH2 and TD3 with 4k entries. | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify 1D scale of L2 mac table

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify 1D scale of L2 mac table | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode. 2. Configure port to TG1 as L2 port on vlan 100. 3. Configure Ve-100 and attach to Vlan 100. 4. Configure 8k ipv4 hosts on spirent and resolve arp. 5. Verify all MAC entries are installed in “show mac-address“ table. 6. Send traffic to all hosts from TG3 and verify traffic. 7. Do “clear mac-address dynamic” and verify all MAC entries are re-learnt after arp resolution. 8. Perform the above test cases in TH2 and TD3 with 8k entries. | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify route scale with 1k VEs

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify route scale with 1k VEs | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode. 2. Configure max supported VEs (1K) and assign ipv4 and ipv6 addresses on each interface. 3. Configure port connected to TG1 as L2 allowing all the vlans. 4. Ping to all the respective hosts on TG1 (both ipv4 and ipv6). 5. Verify all the ARP/ND entries are resolved. 6. Perform the above test cases in TH2 and TD3 with 1k entries. | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

#### Verify Max VRFs

|  |  |  |
| --- | --- | --- |
| **Test Case Details** | | |
| **Title / Test Name** | Verify Max VRFs | |
| **Description** |  | |
| **Test Setup** | Topology 1 | |
| **Manual Execution** | Yes | |
| **Automation Status** | No | |
| **Automation Priority** | NA | |
| **Interface Mode** |  | |
| **Basic feature Sanity** | Functional | |
| **New in Release** |  | |
| **Platform Dependent** | Yes | |
| STEPS:   1. Configure ALPM mode. 2. Configure max supported VRFs. 3. Configure same number of Vlans/VEs. 4. Configure ipv4 and ipv6 addresses on each VE. 5. Assign each VE to each VRF. 6. Configure interface connected to TG1 to allow all the vlans. 7. Configure matching hosts on TG1. 8. Send the traffic to all the hosts. 9. Verify all the ARP & ND entries are resolved. 10. Perform the above test cases in TH2 and TD3 with its max value. | | |
| **Pass/Fail Criteria** | | Above verifications should PASS |

### Performance Table

All values below are to be met in Arlo.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl.No.** | **Testcases** | **TH1 (7712)** | **TH2 (7816)** | **TD3 (7326)** |
| 1 | ARP | 25s to learn 2475 | 35s to learn 2475 |  |
| 2 | ND | 25s to learn 2560 | 35s for 2560 |  |
| 3 | IPv4 prefix programming | 48s to learn 96k | 48s for 96k |  |
| 4 | IPv6 (<=/64) | 35s for 60k | 35s for 60k |  |
| 5 | IPv6 (>/64) | 8s for 10k | 7s for 10k |  |
| 6 | ‘show arp’ on phy | 2.2s for 2k | 12s for 2k |  |
| 7 | ‘show arp’ on vlan | 16s for 2k | 12s for 2k |  |
| 8 | ‘show ndp’ on phy | 2.1s for 2k | 17s for 2560 |  |
| 9 | ‘show ndp’ on vlan | 21s for 2k | 17s for 2560 |  |
| 10 | show ip interface | 11s for 1k | 8s for 1k vlans |  |
| 11 | Show ip route | 20s (? Entries) | 22s |  |
| 12 | Show ipv6 route (64b) | 18s (? Entries) | 20s |  |
| 13 | Show ipv6 route (128b) | 18s (? Entries) |  |  |

# References

<https://docs.google.com/document/d/1LhhX43aDF72g6TwDv18WKCp5P08Q1PEufzxSiz4JuoE/edit>