SQA Test Plan

Layer 2 Forwarding Enhancements

SONiC 2.0 Release

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# Test Strategy Plan Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Rev | Date | Author | Change Description |
| 1.00 | 14/5/2019 | Sneha Ann Mathew | 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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# Glossary

|  |  |
| --- | --- |
| Term | Meaning |
| FDB | Forwarding Databse |
|  |  |
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# Functional Project Overview

# Requirements Source and Test Traceability

This document covers test cases designed to verify basic L2 forwarding enhancements implemented in SONiC 2.0 release.

Below is the link to Functional Specification of the feature which provides the high level design of Layer 2 Forwarding Enhancements feature:

<http://gerrit-lvn-07.lvn.broadcom.net:8083/c/sonic/documents/+/6769>

# Functional Requirements

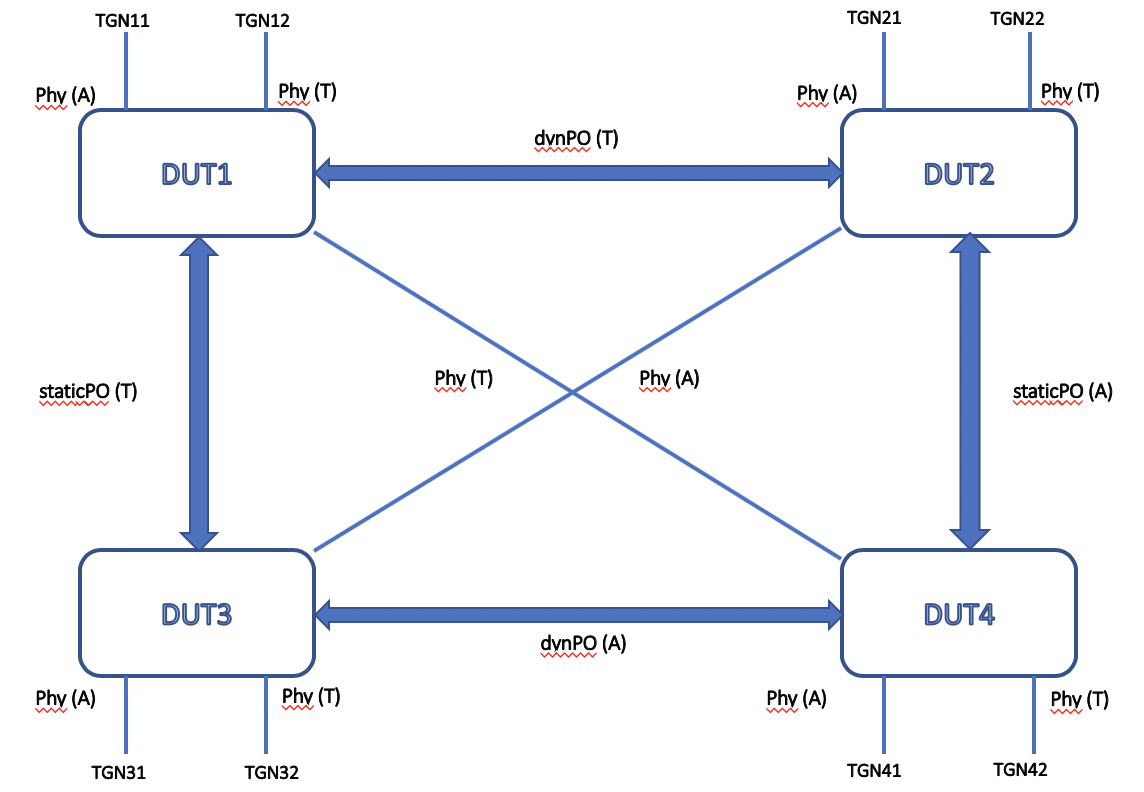
|  |  |
| --- | --- |
| **Requirement ID** | **Requirement** |
| SONiC2.0\_L2FWD\_001 | FDB Flush Support |
| SONiC2.0\_L2FWD\_002 | Handle MAC move event generated by hardware |
| SONiC2.0\_L2FWD\_003 | Configuration CLI for FDB aging time |
| SONiC2.0\_L2FWD\_004 | Configuration CLI for static FDB entry |
| SONiC2.0\_L2FWD\_005 | Should have per Port and per VLAN FDB clear options in CLI command "sonic-clear fdb" |
| SONiC2.0\_L2FWD\_006 | VLAN range CLI support |
| SONiC2.0\_L2FWD\_007 | New CLI to display current FDB aging time. |
| SONiC2.0\_L2FWD\_008 | Up to 4094 VLAN will be supported |
| SONiC2.0\_L2FWD\_009 | VLAN range commands are invalidated for VLANs that fall outside the range 1 through 4094 |
| SONiC2.0\_L2FWD\_010 | New CLI to display total mac count |

# Test Focus Areas

Objective of this test plan is to verify basic L2 forwarding in SONiC covering below feature areas. It will also focus on the new L2 forwarding enhancements done in 2.0 release.

* MAC learning, aging, clearing and MAC move on access and trunk ports
* Static MAC on regular and LAG ports
* Traffic forwarding on access, trunk, physical ports and dynamic LAG
* Native vlan support
* Different type of traffic streams like known unicast, unknown\_unicast, multicast and broadcast

### Network Test Topology



### Topology Design Details

Above topology will be used as basic configuration so that access,trunk physical ports and static, dynamic LAG cases will be covered simultaneously for all TCs. If the platform under test supports multiple towers/core, make sure to have links from each of the tower/core so that As per the TC objective required changes will be done for this logical topology.

# Basic Configuration

Below explained is the basic configuration used in most of the TCs.

1. Configure access port on all first TGN ports of each DUT.
2. Configure trunk port on all second TGN ports of each DUT.
3. Configure static LAG between Dut1-Dut3 and Dut2-Dut4.
4. Configure dynamic LAG between Dut1-Dut2 and Dut3-Dut4.
5. Configure a set of vlans using the vlan range command and add part of the physical ports and LAGs making sure there is no L2 loop.

# Basic Validations

Below set of basic validations will be done for each test case.

1. Verify mac-address table.
2. Verify vlan table.
3. Verify PO summary
4. Verify interface counters.
5. Verify CPU/Memory
6. Verify traffic rate received on all the TGN ports.

### Limitations and Exceptions

Maximum number of LAGs and maximum number of member-ports in a LAG will be tested based on number of physical ports available between a pair of DUTs.

# Test Case and Objectives

## CLI Validation

### Verify cli for configuring a range of vlans

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify cli for configuring a range of vlans |
| Test Case Id | FtSwL2FwdCli001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | CLI |
| New in Release | 2.0 |
| Platform Dependent | No |
| Syntax:  root@sonic:/# config vlan range add  root@sonic:/# config vlan range del  root@sonic:/# config vlan member range add <interface\_id>  root@sonic:/# config vlan member range del <interface\_id>  Validations:   1. Verify the syntax. 2. Verify the configuration reflects in running config 3. Unconfigure the CLI and verify it is removed from running config 4. Do snmp operations GET/WALK for the new cli and verify. 5. Do REST operations POST,PUT,PATCH,GET and DELETE and verify. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify CLI for configuring FDB aging time

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify cli for configuring FDB aging time |
| Test Case Id | FtSwL2FwdCli002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | CLI |
| New in Release | 2.0 |
| Platform Dependent | No |
| Syntax:   root@sonic:/# config mac aging-time  Validations:   1. Verify the syntax. 2. Verify the configuration reflects in running config 3. Unconfigure the CLI and verify it is removed from running config 4. Do snmp operations GET/WALK for the new cli and verify. 5. Do REST operations POST,PUT,PATCH,GET and DELETE and verify. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify CLI for configuring static MAC

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify cli for configuring static MAC |
| Test Case Id | FtSwL2FwdCli003 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | CLI |
| New in Release | 2.0 |
| Platform Dependent | No |
| Syntax:  root@sonic:/# config mac add 00:10:3a:2b:05:67 100 Ethernet2  root@sonic:/# config mac del 00:10:3a:2b:05:67 100  Validations:   1. Verify the syntax. 2. Verify the configuration reflects in running config. 3. Unconfigure the CLI and verify it is removed from running config. 4. Do snmp operations GET/WALK for the new cli and verify. 5. Do REST operations POST,PUT,PATCH,GET and DELETE and verify. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify CLI for displaying current configured FDB aging time

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify cli for displaying current configured FDB aging time |
| Test Case Id | FtSwL2FwdCli004 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | CLI |
| New in Release | 2.0 |
| Platform Dependent | No |
| Syntax:  root@sonic:/# show mac aging-time  Validations:   1. Verify the syntax. 2. Verify the configuration reflects in running config. 3. Unconfigure the CLI and verify it is removed from running config 4. Do snmp operations GET/WALK for the new cli and verify. 5. Do REST operations POST,PUT,PATCH,GET and DELETE and verify. | |
| Pass/Fail Criteria | Above verifications should pass. |

## Functional Test Cases

### Configure range of vlans and verify L2 forwarding with unknown DA mac

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Configure range of vlans and verify L2 forwarding with unknown DA mac |
| Test Case Id | FtSwL2FwdFn001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send unidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify that ingress traffic is flooding onto all member ports in the vlans. 5. Do the set of basic validations. 6. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Configure range of vlans and verify L2 forwarding with known DA mac

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Configure range of vlans and verify L2 forwarding with known DA mac |
| Test Case Id | FtSwL2FwdFn002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Do the set of basic validations. 6. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Modify vlan on an Access port and verify macs are learnt on new vlan.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Modify vlan on an Access port and verify macs are learnt on new vlan |
| Test Case Id | FtSwL2FwdFn003 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Modify the vlan configured on an untagged port (physical and LAG) to a different value. 3. Modify the vlan configured on an tagged port (physical and LAG) to a different value. 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify that SA mac learned on the untagged ports are learned in new vlan. 6. Verify for untagged ports, traffic is forwarded to the DA learned ports and no flooding seen. 7. Verify that for tagged ports MAC is removed for initial vlans and traffic is dropped. 8. Do the set of basic validations. 9. Revert the vlan on untagged and tagged ports to initial value. 10. Verify that SA mac learned on the untagged ports are learned in initial vlan. 11. Verify that SA mac learned on the tagged ports are learned in initial vlan and traffic is accepted. 12. Verify traffic is forwarded to the DA learned ports and no flooding seen. 13. Do the set of basic validations. 14. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Delete vlan and reconfigure vlans and ports and verify mac are re-learnt

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Delete vlan and reconfigure vlans and ports and verify mac are re-learnt |
| Test Case Id | FtSwL2FwdFn004 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Delete few vlans each from access/trunk ports and physical/LAG. 3. Verify that MACs for the deleted vlans are removed from MAC table. 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify that ingress traffic is dropped on the ports for the vlans which is deleted. 6. Verify accepted traffic is forwarded to the DA learned ports and no flooding seen. 7. Do the set of basic validations. 8. Add back the deleted vlans and verify MACs are re-learned on the vlans and traffic forwarding is fine. 9. Do the set of basic validations. 10. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Add new vlans to existing port and verify mac learning on new vlans.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Add new vlans to existing port and verify mac learning on new vlans |
| Test Case Id | FtSwL2FwdFn005 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Add new vlans to tagged physical port and LAG. 3. Send bidirectional traffic streams from each of the TGN port. 4. Send additional bidirectional traffic streams for newly added vlans. 5. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 6. Verify MAC is learned for new vlans. 7. Verify traffic is forwarded to the DA learned ports and no flooding seen. 8. Do the set of basic validations. 9. Remove the newly added vlans. 10. Verify macs are removed for the deleted vlans and no forwarding seen. 11. Remove the additional traffic streams added in step 4. 12. Do the set of basic validations. 13. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Modify Access mode to Trunk mode and vice versa and verify with traffic.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Modify Access mode to Trunk mode and vice versa and verify with traffic |
| Test Case Id | FtSwL2FwdFn006 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Modify untagged port/LAG to tagged and tagged port/LAG to untagged. 3. Send bidirectional traffic streams from each of the TGN port. 4. Verify untagged traffic ingress on tagged ports and tagged traffic ingress on untagged ports is dropped and no MAC learning seen. 5. Change the tagging in traffic streams as per changed port configurations. 6. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 7. Verify traffic is forwarded to the DA learned ports and no flooding seen. 8. Do the set of basic validations. 9. Revert the tagged and untagged configurations as in basic configuration. 10. Revert traffic stream tagging. 11. Do the set of basic validations. 12. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

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### Verify MAC aging after stopping traffic.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify MAC aging after stopping traffic |
| Test Case Id | FtSwL2FwdFn007 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Stop the traffic streams. 6. Verify MACs doesn’t age out as default aging-time is 0 7. Do the set of basic validations. 8. Flap the interfaces physical/LAG and repeat basic validations. 9. Restart all traffic streams. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Configure non default mac aging and verify MAC aging after stopping traffic.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Configure non default mac aging and verify MAC aging after stopping traffic |
| Test Case Id | FtSwL2FwdFn008 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure a non-default mac aging-time. 3. Configure few static mac entries. 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 6. Verify traffic is forwarded to the DA learned ports and no flooding seen. 7. Stop the traffic streams. 8. Verify MACs age out after configured aging-time. [wait time will be upto 2\* mac-aging time] 9. Start unidirectional streams for previously learned MACs and verify that traffic is flooding after mac age out. 10. Verify static MACs configured doesn’t age out and those streams forward to right port. 11. Do the set of basic validations. 12. Restart all traffic streams and Reload the DUT. 13. Stop all traffic. 14. Verify MACs age out after configured aging-time. 15. Start unidirectional streams for previously learned MACs and verify that traffic is flooding after mac age out. 16. Verify static MACs configured doesn’t age out and those streams forward to right port. 17. Verify unidirectional streams are still flooding. 18. Do the set of basic validations. 19. Unconfig the mac aging-time. 20. Restart all traffic. 21. Verify MACs configured doesn’t age out when we stop traffic streams. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify mac does not age out with mac-aging configured as 0.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify mac does not age out with mac-aging configured as 0 |
| Test Case Id | FtSwL2FwdFn009 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure a mac aging-time as 0. 3. Send bidirectional traffic streams from each of the TGN port. 4. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 5. Verify traffic is forwarded to the DA learned ports and no flooding seen. 6. Stop the traffic streams. 7. Verify MACs are not aging out. 8. Send uni-directional streams and verify no flooding is seen. 9. Do the set of basic validations. 10. Restart all traffic streams. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Clear mac table and verify MACs are relearnt and traffic is forwarded properly.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Clear mac table and verify MACs are relearnt and traffic is forwarded properly |
| Test Case Id | FtSwL2FwdFn010 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Stop all traffic. 6. Clear mac-address-table. 7. Verify all macs are removed from mac table. 8. Restart traffic. 9. Verify all macs are relearned and traffic forwards to right port. 10. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Clear MACs learned on a physical port and LAG.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Clear MACs learned on a physical port and LAG |
| Test Case Id | FtSwL2FwdFn011 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Stop all traffic. 6. Clear mac entries learned on a physical port/LAG. 7. Verify all macs learned on that port/LAG are removed from mac table. 8. Restart traffic. 9. Verify all macs are relearned and traffic forwards to right port. 10. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Clear MACs learned on vlan.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Clear MACs learned on vlan |
| Test Case Id | FtSwL2FwdFn012 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Stop all traffic. 6. Clear mac entries learned on a vlan. 7. Verify all macs learned on that port/LAG are removed from mac table. 8. Restart traffic. 9. Verify all macs are relearned and traffic forwards to right port. 10. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify MAC move between different type of interfaces in the topology.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify MAC move between different type of interfaces in the topology. |
| Test Case Id | FtSwL2FwdFn013 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Swap the SA/DA macs in traffic streams to simulate MAC move. 6. Verify the mac table that ports are updated for the MACs as per new traffic streams. 7. Do the set of basic validations. 8. Revert the traffic. 9. Verify all macs are relearned and traffic forwards to right port. 10. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify MAC aging after MAC move

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify MAC aging after MAC move. |
| Test Case Id | FtSwL2FwdFn014 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Swap the SA/DA macs in traffic streams to simulate MAC move. 6. Verify the mac table that ports are updated for the MACs as per new traffic streams. 7. Do the set of basic validations. 8. Configure non-default aging time. 9. Stop traffic 10. Verify all MACs are aged-out. 11. Revert the traffic. 12. Verify all macs are relearned and traffic forwards to right port. 13. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Static MAC over a physical port and LAG.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Static MAC over a physical port and LAG |
| Test Case Id | FtSwL2FwdFn015 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure static MACs with ports as access/trunk/physical port/static, dynamic LAGs 3. Send bidirectional traffic streams from each of the TGN port. 4. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 5. Verify traffic is forwarded to the DA learned ports and no flooding seen. 6. Configure traffic streams corresponding to the static Macs. 7. Send unidirectional streams and verify that traffic forwards to intended port and no flooding seen. 8. Send bidirectional traffic for the static mac. 9. Do the set of basic validations. 10. Flap the interfaces physical/LAG and repeat basic validations. 11. Reload the DUT and verify static macs are intact in software and hardware. 12. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Send traffic with configured static MAC as SA and verify.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Static MAC over a physical port and LAG |
| Test Case Id | FtSwL2FwdFn016 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure static MACs with ports as access/trunk/physical port/static, dynamic LAGs 3. Send bidirectional traffic streams from each of the TGN port. 4. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 5. Verify traffic is forwarded to the DA learned ports and no flooding seen. 6. Send traffic streams corresponding to the static Macs. 7. Configure and send few streams with SA as static mac configured. 8. Verify that traffic is dropped, if traffic received with configured SA. 9. Do the set of basic validations. 10. Flap the interfaces physical/LAG and repeat basic validations. 11. Revert the streams configured in step 7. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Remove static mac and learn mac dynamically and verify.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Remove static mac and learn mac dynamically and verify |
| Test Case Id | FtSwL2FwdFn017 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure static MACs with ports as access/trunk/physical port/static, dynamic LAGs 3. Send bidirectional traffic streams from each of the TGN port. 4. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 5. Verify traffic is forwarded to the DA learned ports and no flooding seen. 6. Configure traffic streams corresponding to the static Macs. 7. Send bidirectional traffic for the static mac and verify traffic forwarding. 8. Remove the configured static mac and verify the static mac streams SA is learned dynamically now. 9. Do the set of basic validations. 10. Reconfigure the static macs. 11. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Clear mac table and verify static MACs are not deleted.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Clear mac table and verify static MACs are not deleted |
| Test Case Id | FtSwL2FwdFn018 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure static MACs with ports as access/trunk/physical port/static, dynamic LAGs 3. Send bidirectional traffic streams from each of the TGN port. 4. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 5. Verify traffic is forwarded to the DA learned ports and no flooding seen. 6. Configure traffic streams corresponding to the static Macs. 7. Send bidirectional traffic for the static mac. 8. Clear mac table all and verify static MACs are not cleared. 9. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify mac learning for Multicast and broadcast traffic.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify mac learning for Multicast and broadcast traffic |
| Test Case Id | FtSwL2FwdFn019 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Send L2 multicast stream with DA mac as a multicast MAC. 6. Verify mac learning and traffic forwards to the right ports. 7. Verify interface statistics to see multicast stream count is updated. 8. Send L2 broadcast stream with DA mac as broadcast MAC. 9. Verify mac learning and traffic forwards to the right ports. 10. Verify interface statistics to see broadcast stream count is updated. 11. Do the set of basic validations. 12. Flap the interfaces physical/LAG and repeat basic validations. 13. Stop the L2 multicast and broadcast streams. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify traffic with variable frame sizes.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify traffic with variable frame sizes |
| Test Case Id | FtSwL2FwdFn020 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port with different frame size in range 64-9100(default MTU) from each of the 8 TGN interfaces. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify clear-mac, mac ageing for jumbo frames. 5. Verify traffic is forwarded to the DA learned ports and no flooding seen. 6. Do the set of basic validations. 7. Flap the interfaces physical/LAG and repeat basic validations. 8. Revert frame size of traffic streams from each TGN to single standard value. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify traffic with vlan tag 0.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify traffic with vlan tag 0 |
| Test Case Id | FtSwL2FwdFn021 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Send few streams with vlan tag 0 ingress on one access/trunk port each. 6. Verify that on access port vlan tag 0 stream is accepted as priority tagged packet and SA learning happens. 7. Verify that on trunk port vlan tag 0 stream is dropped and no SA learning seen. 8. Do the set of basic validations. 9. Flap the interfaces physical/LAG and repeat basic validations. 10. Stop the vlan tag 0 streams. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify mac learning with different types of traffic streams.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify mac learning with different types of traffic streams |
| Test Case Id | FtSwL2FwdFn022 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port in burst mode. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Send few streams with different headers like ARP, IPv4, IPv6 6. Verify that SA learning happens for different ethertype streams. 7. Verify PO load balancing is in place. [For PO load balancing, if IP(v4/v6) header is present in the packet, the hashing will be based on that; so load-balancing depends on header-type (stream-type) and not on forwarding-type, Send pure L2 stream and verify load balancing for variation in MAC] 8. Do the set of basic validations. 9. Send an FCoE stream 10. Verify MAC learning and traffic forwarding is fine. 11. Flap the interfaces physical/LAG and repeat basic validations. 12. Stop all other ethertype traffic other than the ones in basic stream. Change from burst mode to continuous mode traffic. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Warm reboot and verify traffic forwarding.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Warm reboot and verify traffic forwarding |
| Test Case Id | FtSwL2FwdFn023 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Perform warm reboot. 4. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 5. Verify traffic is forwarded to the DA learned ports and no flooding seen. 6. Do the set of basic validations. 7. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify L2 forwarding on physical ports/LAG in both untag and tag mode

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify L2 forwarding on physical ports/LAG in both untag and tag mode |
| Test Case I | FtSwL2FwdFn024 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Add a set of tagged vlans to untag port/LAG. 3. Add 2 untag vlans to tag port/LAG. (2nd one should fail) 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 6. Verify traffic is forwarded to the DA learned ports and no flooding seen. 7. Send traffic streams for the newly added vlans. 8. Verify mac learning and traffic forwarding works fine for the newly added tagged vlans. 9. Verify mac learning and traffic forwarding works fine for the untagged vlan added first and fails for the second one. 10. Do the set of basic validations. 11. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Toggle member ports in LAG and verify traffic forwarding.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Toggle member ports in LAG and verify traffic forwarding |
| Test Case Id | FtSwL2FwdFn025 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Shut/no-shut few of the member ports of the static and dynamic LAG and verify there is no traffic drop. 6. Verify LAG load balancing for different set of streams 7. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Delete and re-add member ports of the LAG and verify traffic forwarding

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Delete and re-add member ports of the LAG and verify traffic forwarding |
| Test Case Id | FtSwL2FwdFn026 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Remove and add back the member ports of the static and dynamic LAG and verify traffic forwarding. 6. Verify LAG load balancing for different set of streams 7. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Delete the port-channel and reconfigure and verify forwarding.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Delete the port-channel and reconfigure and verify forwarding |
| Test Case Id | FtSwL2FwdFn027 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Remove the static and dynamic LAG configurations and reconfigure 6. Verify mac learning and traffic forwarding. 7. Verify LAG load balancing for different set of streams 8. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Modify LAG mode from dynamic to static and vice versa.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Modify LAG mode from dynamic to static and vice versa |
| Test Case Id | FtSwL2FwdFn028 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | Static LAG not supported in SONiC |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Modify static LAG to dynamic LAG and vice versa. 6. Verify mac learning and traffic forwarding. 7. Verify LAG load balancing for different set of streams 8. Do the set of basic validations. 9. Revert the LAG configurations as in base config. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify L2 Forwarding when a LAG member port moved from one LAG to another.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify L2 Forwarding when a LAG member port moved from one LAG to another |
| Test Case Id | FtSwL2FwdFn029 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Between each pair of DUTs with LAG in the topology, create 2 LAGs and add different vlans to them. 6. Send traffic streams corresponding to both vlans. 7. Remove member port from one to another. 8. Verify mac learning and traffic forwarding. 9. Do the set of basic validations. 10. Revert the LAG configurations as in base config | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify L2 forwarding when LAG is down if min-links are not up.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify L2 forwarding when LAG is down if min-links are not up |
| Test Case Id | FtSwL2FwdFn030 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. With default LAG configuration in place shut the member ports of the static and dynamic LAG so that minimum links are not up. 6. Verify LAG goes down, MACs are removed and traffic drops. 7. Do the set of basic validations. 8. Enable back the LAG member ports. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify L2 forwarding with non-default min-links.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify L2 forwarding with non-default min-links |
| Test Case Id | FtSwL2FwdFn031 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Configure a non-default min-links value, shut the member ports of the static and dynamic LAG so that minimum links are not up. 6. Verify LAG goes down, MACs are removed and traffic drops. 7. Enable back few member ports so that minimum links are met. 8. Verify LAG is up and verify traffic forwarding. 9. Do the set of basic validations. 10. Revert the min-link configuration. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify LACP fallback feature

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify LACP fallback feature |
| Test Case Id | FtSwL2FwdFn032 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | Already automated in 1.0 release, Dropping this testcase |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Configure LACP fallback mode on dynamic LAG. Disable LACP on the peer. 6. Verify LAG is up with single member port only. 7. Verify MAC learning,ageing and clear mac 8. Do the set of basic validations. 9. Enable LACP on peer node and verify LACP is up with all member ports active. 10. Verify MAC learning,ageing and clear mac 11. Do the set of basic validations. 12. Revert the LACP fallback mode. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Jumbo frames without MTU configuration are forwarded on member ports.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Jumbo frames without MTU configuration are forwarded on member ports |
| Test Case Id | FtSwL2FwdFn033 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | MTU config not supported in SONiC, Dropping |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Send traffic streams with frame size in jumbo range 1500-9000. 6. Verify those streams are accepted and SA mac learning happens. 7. Do the set of basic validations. 8. Flap the interfaces physical/LAG and repeat validations. 9. Do clear mac table and repeat validations. 10. Reload the DUT and repeat validations. 11. Stop the jumbo streams. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Jumbo frames with lower MTU configuration are dropped .

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Jumbo frames with lower MTU configuration are dropped |
| Test Case Id | FtSwL2FwdFn034 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | MTU config not supported in SONiC, Dropping |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 4. Verify traffic is forwarded to the DA learned ports and no flooding seen. 5. Configure non-default MTU value (lower MTUs) in global and interface levels. 6. Send traffic streams with frame size in jumbo range 1500-9000. 7. Verify those streams are now dropped and MACs age out. 8. Do the set of basic validations. 9. Flap the interfaces physical/LAG and repeat validations. 10. Do clear mac table and repeat validations. 11. Reload the DUT and repeat validations. 12. Revert the MTU configs and verify Jumbo frames are forwarded. 13. Stop the jumbo streams. | |
| Pass/Fail Criteria | Above verifications should pass. |

## Integration Test Cases

### Configure IPv4 and IPv6 address under vlan and verify ping

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Configure IPv4 and IPv6 address under vlan and verify ping |
| Test Case Id | FtSwL2FwdIt001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Assign IPv4 and IPv6 address under vlan/port/LAG. 4. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 5. Verify traffic is forwarded to the DA learned ports and no flooding seen. 6. Do the set of basic validations. 7. Verify ping between the configured IPs over access and trunk port/LAG. 8. Send L3 stream and verify forwarding. 9. Flap the interfaces physical/LAG and verify ping and traffic. 10. Do clear ARP/ND and verify ping and traffic. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify L2/L3 forwarding with different order of configuration of vlan, IP and LAG

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify L2 forwarding with different order of configuration of vlan, IP and LAG |
| Test Case Id | FtSwL2FwdIt002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send bidirectional traffic streams from each of the TGN port. 3. Assign IPv4 and IPv6 address under vlan/port/LAG. 4. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 5. Verify traffic is forwarded to the DA learned ports and no flooding seen. 6. Do the set of basic validations. 7. Verify ping between the configured IPs over access and trunk port/LAG. 8. Send L3 stream and verify forwarding. 9. Delete the vlan configured with IP and reconfigure it. 10. Verify ping and traffic forwarding. 11. Delete vlan from a port, add it as member port of LAG 12. Verify SA learning, ping and traffic forwarding. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Change IP configured port/LAG to L2 mode and verify forwarding.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Change IP configured port/LAG to L2 mode and verify forwarding |
| Test Case Id | FtSwL2FwdIt003 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Assign IPv4 and IPv6 address under vlan/port/LAG. 2. Send L3 stream and verify forwarding. 3. Switch the L3 port/LAG to tagged mode L2 port/LAG. 4. Switch another L3 port/LAG to untagged mode L2 port/LAG. 5. Send bidirectional traffic streams from each of the TGN port 6. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 7. Verify traffic is forwarded to the DA learned ports and no flooding seen. 8. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Enable xSTP and verify mac learning and traffic forwarding.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Enable xSTP and verify mac learning and traffic forwarding |
| Test Case Id | FtSwL2FwdIt004 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Add more port-vlan assosciation so that there is loop in the topology. 3. Enable STP protocol so as to break the loop 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify the STP converged and we have a loop-free topology. 6. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 7. Verify traffic is forwarded to the DA learned ports and no flooding seen. 8. Verify there is no MAC learning on STP disabled ports. 9. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Shutdown interfaces and verify mac learning and traffic forwarding after STP reconvergence.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Shutdown interfaces and verify mac learning and traffic forwarding after STP reconvergence |
| Test Case Id | FtSwL2FwdIt005 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Add more port-vlan assosciation so that there is loop in the topology. 3. Enable STP protocol so as to break the loop. 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 6. Verify traffic is forwarded to the DA learned ports and no flooding seen. 7. Verify the STP converged and there is no MAC learning on STP disabled ports. 8. Shutdown few of the forwarding interfaces physical/LAG and verify STP reconverged. 9. Verify that mac table reflects the port in reconverged topology. 10. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Shut/no shut on STP enabled LAG member ports and verify L2 forwarding.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Shut/no shut on STP enabled LAG member ports and verify L2 forwarding |
| Test Case Id | FtSwL2FwdIt006 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Add more port-vlan assosciation so that there is loop in the topology. 3. Enable STP protocol so as to break the loop. 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 6. Verify traffic is forwarded to the DA learned ports and no flooding seen. 7. Verify the STP converged and there is no MAC learning on STP disabled ports. 8. Shut/no-shut member ports of the static and dynamic LAG and verify no STP reconvergence. 9. Verify that mac table is intact. 10. Do the set of basic validations. 11. Warm reboot and verify MAC table and traffic is not affected ?? 12. Do the set of basic validations. 13. Reload one DUT and verify mac learning and traffic forwarding after STP reconvergence 14. Do the set of basic validations. 15. Revert the port-vlan associations added to create the L2 loop. 16. Unconfigure STP. 17. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

## Negative Test Cases

### Send tagged traffic on access port.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Send tagged traffic on access port. |
| Test Case Id | FtSwL2FwdNe001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send tagged traffic to an access physical port/LAG. 3. Verify no MACs are learned and traffic is dropped. 4. Do the set of basic validations. 5. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Create/break a loop with L2 traffic.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Create/break a loop with L2 traffic |
| Test Case Id | FtSwL2FwdNe002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Add more port-vlan associations so that there is L2 loop. 3. Start bidirectional traffic streams. 4. Verify traffic is flooding. 5. Break the loop by disabling the interfaces 6. Verify flooding stops, CPU state and MACs age out. 7. Enable back the interfaces and break the loop by modifying port-vlan configurations. 8. Verify flooding stops, CPU state and MACs age out. 9. Do the set of basic validations. 10. Revert the port-vlan configs added to create loop. 11. Verify there is no flooding and macs are proper. 12. Verify CPU usage is minimal 13. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify streams with SA mac as broadcast/multicast

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify streams with SA mac as broadcast/multicast |
| Test Case Id | FtSwL2FwdNe003 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send few streams with SA mac as a multicast MAC ingressing to access/trunk ports. 3. Verify no MACs are learned and traffic is dropped. 4. Do the set of basic validations. 5. Flap the interfaces physical/LAG and repeat basic validations. 6. Send few streams with SA mac as broadcast MAC ingressing to access/trunk ports. 7. Verify no MACs are learned and traffic is dropped. 8. Do the set of basic validations. 9. Flap the interfaces physical/LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Send MACs more than max supported.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Send MAC more than max supported. |
| Test Case Id | FtSwL2FwdNe004 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send traffic streams with max supported MACs and verify all MACs are learned 3. Do the set of basic validations. 4. Increase the MAC count in incoming streams. 5. Verify the switch is stable and maximum supported MACs are in mac table and no flooding for those streams. 6. Do the set of basic validations. 7. Flap the interfaces physical/LAG and repeat basic validations. 8. Perform warm reboot and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

## Performance and Scale Tests

### Verify max MACs learned

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify max MACs learned. |
| Test Case Id | FtSwL2FwdSc001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Send traffic streams with max supported MACs and verify all MACs are learned 3. Do the set of basic validations. 4. Flap the interfaces physical/LAG and repeat basic validations. 5. Perform warm reboot and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Verify MAC learning on max vlans

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Verify MAC learning on max vlans |
| Test Case Id | FtSwL2FwdSc002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure 4094 vlans in each DUT. 3. Send traffic streams in all 4094 vlans. 4. Verify all MACs are learned in all the 4094 vlans and traffic forwarding is fine. 5. Do the set of basic validations. 6. Flap the interfaces physical/LAG and repeat basic validations. 7. Perform warm reboot and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Scale static macs and verify with traffic.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Scale static macs and verify with traffic |
| Test Case Id | FtSwL2FwdSc003 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure maximum supported macs as static MACs. 3. Send traffic streams for all the static MACs configured. 4. Verify all MACs present in mac-table and traffic forwarding is proper. 5. Do the set of basic validations. 6. Flap the interfaces physical/LAG and repeat validations. 7. Perform warm reboot and repeat validations. 8. Reload the DUT and repeat validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Configure max LAGs.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Configure max LAGs. |
| Test Case Id | FtSwL2FwdSc004 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Modify the LAG configurations so as to create maximum LAGs between each pair of DUTs with 1 member port each. 3. Add each of the LAGs in different vlans to avoid loop. 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 6. Verify traffic is forwarded to the DA learned ports and no flooding seen. 7. Create and send traffic streams corresponding to newly added LAGs. 8. Verify mac learning and traffic forwarding in all the LAGs. 9. Do the set of basic validations. 10. Flap the interfaces in the static and dynamic LAG and repeat basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Config replay with L2 configurations

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Config replay with L2 configurations |
| Test Case Id | FtSwL2FwdPe001 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure set of static MACs in each DUT. 3. Create L2 loop by adding more port-vlan associations and enable STP. 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 6. Verify traffic is forwarded to the DA learned ports and no flooding seen. 7. Do the set of basic validations. 8. Save the configs to a file. 9. Cleanup and reload the DUT. 10. Copy the configurations from file to the DUT. 11. Verify mac learning and traffic forwarding. 12. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Image Upgrade Downgrade

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Image Upgrade Downgrade |
| Test Case Id | FtSwL2FwdPe002 |
| Test Setup | Section 2.1 |
| Test Type | Automation |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure set of static MACs in each DUT. 3. Create L2 loop by adding more port-vlan associations and enable STP. 4. Send bidirectional traffic streams from each of the TGN port. 5. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 6. Verify traffic is forwarded to the DA learned ports and no flooding seen. 7. Do the set of basic validations. 8. Save the configs to startup file. 9. Do image upgrade/downgrade. 10. Verify the configurations are intact. 11. Verify mac learning and traffic forwarding. 12. Do the set of basic validations. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Measure time taken to re-learn max MACs after DUT reload

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Measure time taken to re-learn max MACs after DUT reload |
| Test Case Id | FtSwL2FwdPe003 |
| Test Setup | Section 2.1 |
| Test Type | Manual |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure set of static MACs in each DUT. 3. Create L2 loop by adding more port-vlan associations and enable STP. 4. Send bidirectional traffic streams from each of the TGN port. 5. With L2 scale and multi-d configurations, reload the DUT. 6. Measure time taken to learn max supported MACs. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Measure time taken to re-learn max MACs after STP re-convergence.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Measure time taken to re-learn max MACs after STP re-convergence |
| Test Case Id | FtSwL2FwdPe004 |
| Test Setup | Section 2.1 |
| Test Type | Manual |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure set of static MACs in each DUT. 3. Create L2 loop by adding more port-vlan associations and enable STP. 4. Send bidirectional traffic streams from each of the TGN port. 5. With L2 scale and multi-d configurations, shut few forwarding ports. 6. Measure time taken to learn max supported MACs after STP reconvergence.. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Measure time taken to re-learn max MACs after clear mac table

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Measure time taken to re-learn max MACs after clear mac table |
| Test Case Id | FtSwL2FwdPe005 |
| Test Setup | Section 2.1 |
| Test Type | Manual |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure set of static MACs in each DUT. 3. Create L2 loop by adding more port-vlan associations and enable STP. 4. Send bidirectional traffic streams from each of the TGN port. 5. With L2 scale and multi-d configurations, do clear mac. 6. Measure time taken to re-learn max supported MACs. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Measure time taken to re-learn max MACs after link toggle.

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Measure time taken to re-learn max MACs after link toggle |
| Test Case Id | FtSwL2FwdPe006 |
| Test Setup | Section 2.1 |
| Test Type | Manual |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure set of static MACs in each DUT. 3. Create L2 loop by adding more port-vlan associations and enable STP. 4. Send bidirectional traffic streams from each of the TGN port. 5. With L2 scale and multi-d configurations, shut/no-shut few ports/LAG. 6. Measure time taken to learn max supported MACs after link toggle. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Re-convergence Time on LAG for multiple failures

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Re-convergence Time on LAG for multiple failures |
| Test Case Id | FtSwL2FwdPe007 |
| Test Setup | Section 2.1 |
| Test Type | Manual |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure set of static MACs in each DUT. 3. Create L2 loop by adding more port-vlan associations and enable STP. 4. Send bidirectional traffic streams from each of the TGN port. 5. With L2 scale and multi-d configurations, do different LAG triggers.   Measure time taken for re-convergence of LAG. | |
| Pass/Fail Criteria | Above verifications should pass. |

### Memory and CPU usage Test -Soak test

|  |  |
| --- | --- |
| Test Case Details | |
| Title / Test Name | Memory and CPU usage Test -Soak test |
| Test Case Id | FtSwL2FwdPe008 |
| Test Setup | Section 2.1 |
| Test Type | Manual |
| Basic feature Sanity | Functional |
| New in Release | 2.0 |
| Platform Dependent | No |
| Steps:   1. Do the basic configurations. 2. Configure a non-deafult ageing time on each DUT. 3. Configure set of static MACs in each DUT. 4. Create L2 loop by adding more port-vlan associations and enable STP. 5. Send bidirectional traffic streams from each of the TGN port. 6. Assign IP address to vlans/port/LAG and send L3 traffic 7. Verify that SA mac is learned on all 4 duts for each traffic ingress port. 8. Verify traffic is forwarded to the DA learned ports and no flooding seen. 9. With L2 scale and multi-d configurations, send traffic and leave system for 2 days. 10. Do some triggers like port/LAG flaps, port-vlan modifications, STP triggers in between. 11. Monitor CPU and memory usage in between and verify it is within threshold. | |
| Pass/Fail Criteria | Above verifications should pass. |

## References

FS:

<http://gerrit-lvn-07.lvn.broadcom.net:8083/c/sonic/documents/+/6769>

SONiC Wiki Links:

<https://github.com/Azure/SONiC/wiki/Architecture>

<https://github.com/Azure/SONiC/wiki/L2-Switch-mode>

<https://github.com/Azure/SONiC/wiki/Command-Reference>