Release Notes
For
Switch Software Development Kit

SDK 6.5.18

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Section 1: About This Document

This document provides a general description of the release and its new features. It also describes the chips supported by the release, BCM API additions or changes, resolved issues, and any relevant open issues. The reader should refer to prior release notes for 6.5.x, as only new features or issues are described in this version of the release notes.

Section 2: Product Documentation

The following documents are available through Broadcom's Customer Support Portal at https://csp.broadcom.com/group/customers/csp. They are the primary source of information and should be referenced when using this release:

Document	***Description***
Network Switching Software Development Kit, Release 6.5.18.html	This document describes the theory of operations of the API and all existing BCM APIs for this release.
SDK-PG822-R	*Network Switching Software Platform Guide* This guide describes the SDK source and Makefile structure, abstraction and porting layers, device specific interactions, and the platform/operating system specific features of the SDK. If this is your first time working with the SDK, start with this document. Available through SDS Software Request Portal and must be specifically requested.
56XX-PG-1001-R	*Network Switching SDK CINT Interface for Diagnostic Shell* This guide describes how to use the C interpreter (CINT) that runs under the diagnostic shell (Broadcom Shell utility). Available on docSAFE per request.
StrataXGS-AN300-R	*BCM Diagnostic Shell* This guide describes how to use the diagnostic shell, the primary CLI to the SDK. Available on docSAFE per request.
SDK-6.5.18-HSDK-TD4 -Getting-Started-Guide	This guide describes how to compile HSDK for BCM56880 device and run it with the BCM56880 XGSSIM, BCMSIM or Broadcom SVK

Additionally, please review the RN-SDK65xDNX-R document for DNX Release Notes for SDK 6.5.x. This is a companion guide describing only specific DNX family device changes in this SDK release. Common changes and resolved issues are described within this document which is packaged in the release deliverable itself.

Section 3: New Devices added to this release

For any given SDK release, support for certain devices may be provided in Preview or Supported status. Devices in “Supported Switch Devices” have completed the full QA process and are intended for use in production systems. It is expected that customers would integrate the version of the SDK which provides "Supported" status for their use on actual development or production systems. For the full list of Broadcom switch and PHY devices supported in the SDK, please reference the file `SDK-6.5.18-Device-Matrix.xlsx` in the RELDOCS directory in the release package.

Devices in “Preview Switch Devices” are provided to allow early integration of the customer's application with the SDK APIs that support that device. This software has not been fully tested on the physical target device and should not be expected to fully function.

Section 3.1: Newly Supported XGS Switch Devices in this release

Family	*Devices*	*Description*
BCM56670	BCM56670 C0	800 Gb/s Radio-over-Ethernet Switch
	BCM56672 C0	8x25G_CPRI + 8x25G Ethernet Switch
	BCM56675 C0	Terabit Ethernet Switch

Section 3.2: Preview XGS Switch Devices

Family	*Devices*	*Description*
BCM56070	BCM56070 A0	Centralized chassis line card switch with channelization support
	BCM56071 A0	25G connectivity switch
BCM56470	BCM56470 A0	1700Gb/s Centralized enterprise chassis with advanced telemetry
BCM56275	BCM56275 A0	48 Port Front Panel Ethernet Switch with 24 Multi Gigabit Lite Ports
	BCM56273 A0	24GE Front panel port Ethernet Switch with Broadscan
	BCM56274 A0	48GE or 24GE Optical Front panel Ethernet Switch with Broadscan
	BCM56276 A0	24GE Front panel port Ethernet Switch
	BCM56277 A0	48GE or 24GE Optical Front panel Ethernet Switch
	BCM56278 A0	48 Port Front Panel Ethernet Switch with 24 Multi-Gigabit Lite ports and 24 GE ports.
BCM56880	BCM56880 A0	50G PAM4 SerDes and 144 logical ports

Section 4: New Features per Device

Section 4.1: BCM56670 (MONTEREY) FAMILY GENERAL AVAILABILITY (GA) SUPPORT

The Broadcom® BCM56670 family is a class of high-performance, Radio-over-Ethernet (RoE) switches for advanced Mobile networking applications. The switch acts as a bridge between the traditional mobile networks and the ethernet infrastructure of modern cloud-based platform, using Common Public Radio Interface links.

In this release, GA support is provided for the BCM56670 C0 device. The following configurations are supported in this release for BCM56670 SKUs:

- 56670: 24x25G ETH/CPRI + 16x25G ETH + 24x10G ETH
- 56672: 8x25G_CPRI + 8x25G ETH, 6x10G_CPRI + 4 x 25G ETH
- 56675: 40x25G + 24x10G Switch

Section 4.1.1: SDK Features support.

Section 4.1.1.1: Legacy Feature support

The table below shows the status of legacy SDK features supported on BCM56670 C0 in this release. Legacy features have passed regression testing and are considered GA level in maturity.

Table 1. BCM56670 Legacy Features Maturity Level

Feature	***Maturity***
L2	GA
L3	GA
Switch control	GA
HW/SW linkscan	GA
8 byte IFG	GA
Packet TX/RX	GA
TR diags	GA
VLAN	GA
Mirror	GA
Ethernet CCM	GA
KNET	GA
LAG	GA
STG	GA
QoS	GA
IPMC	GA
Legacy Field Processor	GA
Legacy Stats	GA
MMU stats	GA
MCAST	GA
Tunnel	GA
Trunk	GA

Policer	GA
Meter	GA
Rate	GA
VxLAN	GA
DLB HiGiG	GA
Stack	GA
PIM Bi-Dir	GA
STAT	GA
SER	GA
Subport	GA
MPLS	GA
MIM	GA
Legacy MMU	GA
Warmboot	GA
PFC/SAFC	GA
ECMP	GA
RTAG7 Flex Hash	GA
Failover/Protection Switching	GA
VPLS	GA

Section 4.1.1.2: New Feature support

The table below shows the status of new BCM56670 C0 SDK features in this release.

Table 2. BCM56670 New Features Maturity Level

Feature	***Maturity***
MACSEC	GA
MMU - preemption	GA
Flexport	GA
SyncE	GA
CPRI Frame alignment	GA
eCPRI	GA
CPRI Rate Limiting	GA
External DPLL Support	GA
CPRI Structure agnostic mode	GA
CPRI tunnel mode	GA

Section 4.1.1.2.1: MACSEC support

MACSEC software is delivered in the package `xflow-macsec-1.0.9.tar.gz`.

To compile with the SDK:

1. untar `xflow-macsec-1.0.9.tar.gz` in any directory.
2. Add `XFLOW_MACSEC` to the FEATURE_LIST in `$SDK\make\Make.local` file.
3. set the environment variable `XFLOW_MACSEC_HOME` to point to the location of the xflow-macsec directory.

Section 4.1.1.3: Known Limitations

CPRI Rate negotiation feature will be supported in an upcoming release.

Section 4.2: BCM56880 (Trident4 X11) A0 Beta Support

The Broadcom® BCM56880 family is a class of high performance, non-blocking network switching devices supporting compiler-based programmability of forwarding and instrumentation functions. The device family features up to 256 lanes of 50G PAM4 SerDes and 144 logical ports. Port speeds of 10, 25, 40, 50, 100, 200, and 400GE can be simultaneously supported, without the need for external PHYs. The BCM56880 delivers high bandwidth, glueless network connectivity up to 12.8 Tb/s on a single chip.

In this release, Beta support is provided for the BCM56880 A0 device. The following configurations are supported in this release for BCM56880 SKUs:

- 56880: 128x50G + 16x400G, 32x400G, 64x200G, 128x100G

Section 4.2.1: SDK Features support

This release is based on DNA 4.4.13 flexcode. Features listed in below tables are supported in this release and most of them are in GA maturity. For features in Beta or Preview maturity, more tests are needed and will be GAed in next release. Customer can use this release for product development.

Please note as DNA evolves, new features will be added. SDK will evolve as well to support the new features as well as bug fixes.

Section 4.2.1.1: Legacy Feature support

The table below shows the status of legacy SDK features supported on BCM56880 A0 in this release.

Table 3 . BCM56880 Legacy Features Maturity Level

Feature	***Maturity***
Linkscan	Beta
L2 switching	GA
L3 routing	GA
ALPM	GA
Flex Flow (VxLAN)	GA
IP Tunnel	GA
Multicast	GA
IPMC	GA
QoS	GA
ECN	GA
Mirroring	GA
VLAN	GA
STG	GA
Port	GA
Flex Port	Beta
Trunk	GA
VPLAG	GA
ECMP	GA
DLB	GA

Cosq	GA
Rate	GA
Failover	GA
Hash output selection	GA
HIGIG3	Beta
Switch control	GA
MIB counter	GA
Packet I/O	GA
LED	GA
SER	GA
FP	GA
UDF	Beta
Policer	GA
ETRAP	GA
Time and SyncE	Preview
Warmboot & ISSU	Preview

Section 4.2.1.2: New Feature support

The table below shows the status of new BCM56880 A0 SDK features in this release.

Table 4. BCM56880 New Features Maturity Level

Feature	***Maturity***
Flex Digest	GA
Flex counter 2.0	GA
Flex State	Beta
Trace and drop event counter	GA
Packet trace and DOP	GA
Latency-based ECN	Preview
Mirror-on-drop	Beta
Event BST	Preview
Packet integrity check	GA
Packet protocol control	GA

Section 4.2.1.3: Features supported in future release

Below features are planned to be supported in future SDK release with new DNA release:

- AACL
- MPLS
- Access SVP/DVP
- VxLAN GBP
- Pipe-aware hash-LTs
- Overlay/underlay index table scale expansion
- IPMC Hit bit
- HW INT
- New UFT modes

Section 4.2.1.4: Known Issues or Limitations

- In order to support VLAN flooding by default, 2K L2MC entries are reserved. The number of reserved L2MC entries is user configurable. This means in default mode, customers can not create 4K vlans.
  To overcome it, customers can choose to use advanced mode in VLAN creation to manage L2MC resources as VLAN flooding domain by themselves.
- In port stress test with traffic which involves multiple iterations of port disable/enable/add/delete and other port operations, it may run into an issue where packets are stuck in internal buffer and port disable fails. It will be resolved in next release.

Section 4.3: BCM56275 (Trident3 X2) A0 Family Preview Support

The BCM56275 family is a class of higher performance line rate network switching devices supporting 24 and 48 port wiring closet switches. The products offer flexible port configuration that support 10 ME, 100 ME, 1 GE, 2.5 GE, 5 GE, 10 GE, 20 GE and 25 GE port speeds with the ability to run stacking or uplinks over 25G SerDes. They also offer backwards compatible stacking with previous generation wiring closet switches like BCM56160 and BCM56170. This release supports the following BCM56275 port configurations:

- 8x10G + 16x1G + 4x25G + 2xHGd[21]
- [32x1G+16x2.5G] + 4x25G + 2xHGd[21]
- 24x2.5G + 4x25G + 2xHGd[21]

- 8x10G + 16x1G + 2x25G + 2xHGd[21]
- [32x1G+16x2.5G] + 2x25G + 2xHGd[21]
- 24x2.5G + 2x25G + 2xHGd[21]

- 8x10G + 16x1G + 4x10G + 2xHGd[21]
- [32x1G+16x2.5G] + 4x10G + 2xHGd[21]
- 24x2.5G + 4x10G + 2xHGd[21]

BCM56275 A1 device support is available as part of this release. CANCUN Version 03.00.08 is packaged for BCM56275 in this release.

Section 4.3.1: SDK Features support

Section 4.3.1.1: Legacy Feature support

The table below shows the status of legacy SDK features supported on BCM56275 A0 in this release. Legacy features have passed regression testing and are considered GA level in maturity.

Table 5. BCM56275 Legacy Features Maturity Level

Feature	***Maturity***
L2	Preview
L3	Preview
Switch control	Preview
HW/SW linkscan	Preview
Packet TX/RX	Preview

TR diags	Preview
VLAN	Preview
Mirror	Preview
STG	Preview
QoS	Preview
IPMC	Preview
Legacy Field Processor	Preview
Legacy Stats	Preview
MMU stats	Preview
Tunnel	Preview
Trunk	Preview
Policer	Preview
Meter	Preview
Rate	Preview
VxLAN	Preview
Stack	Preview
SER	Preview
MIM	Preview
Legacy MMU	Preview
ECMP	Preview
RTAG7 Flex Hash	Preview
Failover/Protection Switching	Preview
riot	Preview
Port	Preview
Flexport	Preview
Warmboot	Preview

Section 4.3.1.2: New Feature support

The table below shows the status of new BCM56275 A0 SDK features in this release.

Table 6. BCM56275 New Features Maturity Level

Feature	***Maturity***
BroadScan 2.0	Preview
UTT	Preview
MACSEC	Preview

Section 4.3.1.2.1: MACSEC support

MACSEC software is delivered in the package `xflow-macsec-1.0.9.tar.gz`.

To compile with the SDK:

1. untar `xflow-macsec-1.0.9.tar.gz` in any directory.
2. Add `XFLOW_MACSEC` to the FEATURE_LIST in `$SDK\make\Make.local` file.
3. set the environment variable `XFLOW_MACSEC_HOME` to point to the location of the xflow-macsec directory.

Section 4.4: BCM56470 (Trident3 X4) A0 Family Preview support

The Broadcom BCM56470 family is a class of high-performance, non-blocking network switching devices supporting up to a maximum of 16x (4x25G Serdes core) and various combinations of the port configurations. The BCM56470 delivers high-bandwidth, glueless network connectivity for up to 1.6 Tb/s on a single chip. BCM56470 is an Enterprise Switch for Centralized Chassis and Pizza box Aggregation Device with application and network performance monitoring. This SDK release provides bringup only support for the BCM56470 device. Chassis testing between BCM56470 and BCM56070 is not covered as part of this release. CANCUN Ver: 03.00.03 is currently used for BCM56470.

The following BCM56470 A0 port configurations for Centralized Chassis use case are verified in this release:

- Supervisor Switch for 6-slot Centralized Chassis
  - 6x(2x1x100G)/12x1x100G (Backplane, Line Cards) + 4x25G (External device - FPGA/CPU) +2x1x100G (cascade) + 2x1x100G (uplink)
- Supervisor Switch for 8-slot Centralized Chassis, 50G (2x25G) Backplane Interfaces to Line Cards, and 2x1x100G Uplinks
  - 8x(3x50G) (Backplane, Line Cards) + 2x10G (External device - FPGA/CPU) + 2x1x100G (Cascade/Uplink) + 2x1x100G (Uplink)
- Supervisor Switch for 8-slot Centralized Chassis, 25G Backplane Interfaces to Line Cards, 2x25G for off-chip CPU for Analytics, and 4x1x100G Uplinks
  - 8x(6x25G) (Backplane, Line Cards) + 2x25G (External device - FPGA/CPU) + 2x1x100G (Cascade/Uplink) + 2x1x100G (Uplink)
- Supervisor Switch for 8-slot Centralized Chassis, 25G Backplane Interfaces to Line Cards, 2x10G for off-chip CPU for Analytics, and 4x1x100G Uplinks
  - 8x(6x25G) (Backplane, Line Cards) + 2x10G (External device - FPGA/CPU) + 2x1x100G (Cascade/Uplink) + 2x1x100G (Uplink)
- Supervisor Switch for 6-slot Centralized Chassis, 25G Backplane Interfaces to Line Cards, 4x25G for off-chip CPU for Analytics, and 4x1x100G Uplinks
  - 6x(8x25G) (Backplane, Line Cards) + 4x25G (External device - FPGA/CPU) + 2x1x100G (Cascade/Uplink) + 2x1x100G (Uplink)
- 25G Aggregation Switch
  - 48x25G (Downlink) + 4x25G (External device - FPGA/CPU) + 4x1x100G (Uplink).

Section 4.4.1: SDK Features support

Note this is not a GA version release for BCM56470 and it should not be used for BCM56470 production deployment. It is subject to change based on ongoing software improvements, regression tests, and bug fixes.

Section 4.4.1.1: Legacy Feature support

The table below shows the status of legacy SDK features supported on BCM56470 A0 in this release. The features listed in below table are completed from development perspective and have passed basic regression testing and some of them are considered Beta level in maturity.

Table 7. BCM56470 *Legacy Features Maturity Level*

Feature	***Maturity***
L2	Beta
VLAN	Beta
STG	Beta

PORT	Beta
PKT/TX/RX	Beta
STAT	Beta
MULTICAST	Beta
MIRROR	Beta
VXLAN	Beta
PROXY	Beta
RATE	Beta
QoS	Beta
SWITCH	Beta
TRUNK	Beta
STACK	Beta
NIV/PE	Beta
MIM	Beta
BROADSCAN 1.0 2.0	Beta
ECMP	Beta
FIELD	Beta
POLICER	Beta
L3/IPMC	Beta
RTAG7	Beta
SER	Beta
KNET	Beta
I2C	Beta
TR Diags	Beta

Section 4.4.1.2: New Feature support

The table below shows the status of new BCM56470 A0 SDK features in this release.

Table 8. BCM56470 *New Features Maturity Level*

Feature	***Maturity***
COE	Preview
Broadscan 3.0	Preview
Channelized HQoS	Preview
Channelized congestion management	Preview
UTT	Preview
AACL	Preview

Section 4.5: BCM56070 (Firelight) A0 Family Beta support

The Broadcom BCM56070 family is a class of high-performance, non-blocking network switching devices supporting up to a maximum of 3x (4x10Q Serdes core) and 4x (4x25G Serdes core), as well as various combinations of these port configurations. The BCM56070 family delivers high-bandwidth, glueless network connectivity for up to 420 Gb/s on a single chip. BCM56070 family can be used as a channelized adjunct line card port fan-out switch for BCM56470 in a Centralized Ethernet Switching system (CES), as an unchannelized uplink line card for BCM56470, and in a standalone mode. BCM56071 A0 support is available as part of this release.

Section 4.5.1: SDK Features support

Note this is not a GA version release for BCM56070 family and it should not be used for BCM56070 family production deployment. It is subject to change based on ongoing software improvements, regression tests and bug fixes. The table below shows the status of BCM56070 A0 family SDK features in this release.

Table 9. BCM56070 *New Features Maturity Level*

Feature	***Maturity***
COE tag Forwarding	Beta
Channelized Flow Control	Beta

Table 10. BCM56070 *Legacy Features Maturity Level*

Feature	***Maturity***
L2	Beta
VLAN	Beta
STG	Beta
PORT	Beta
PKT/TX/RX	Beta
STAT	Beta
MULTICAST	Beta
MIRROR	Beta
VXLAN	Beta
PROXY	Beta
RATE	Beta
QoS	Beta
SWITCH	Beta
TRUNK	Beta
STACK	Beta
NIV/PE	Beta
MIM LITE	Beta
Custom PKT HDR	Beta
OAM	Beta
ECMP	Beta
FIELD	Beta
POLICER	Beta
L3/IPMC	Beta
RTAG7	Beta
TSN	Beta
SER	Beta
KNET	Beta
I2C	Beta
TIME/TIMESYNC	Preview
M0 Firmware For LED and FW Linkscan	Beta

Section 4.5.2: MACSEC support

MACSEC software is delivered in the package `xflow-macsec-1.0.9.tar.gz`.

To compile with the SDK:

1. untar `xflow-macsec-1.0.9.tar.gz` in any directory.
2. Add `XFLOW_MACSEC` to the FEATURE_LIST in `$SDK\make\Make.local` file.
3. set the environment variable `XFLOW_MACSEC_HOME` to point to the location of the xflow-macsec directory.

Section 4.6: BCM56770 (Trident3 X5) Family Updates

The Broadcom® BCM56770 family is a class of high-performance, non-blocking network switching devices supporting up to a maximum of 20x100GbE, as well as various combinations of these port configurations. The device family features a maximum of 20 integrated high speed SerDes cores, each with four integrated 25G SerDes transceivers and associated PCS for native support of a multitude of 10G, 25G, 40G, 50G, and 100G standards without requiring external PHYs, and Broadcom's proprietary HiGig2. BCM56770 delivers high bandwidth, glueless network connectivity for up to 2.0 Tb/s.

Section 4.6.1: CANCUN Feature support

Please refer to Section 4.8 for further details on CANCUN features support.

Section 4.7: BCM56870 (Trident3 X7) Family Updates

The Broadcom® BCM56870 family is a class of high-performance, non-blocking network switching devices supporting up to a maximum of 128x 25GbE, 64x 50GbE, or 32x 100GbE, as well as various combinations of these port configurations. The BCM56870 delivers high-bandwidth, glueless network connectivity up to 3.2 Tbps on a single chip.

This SDK release package contains CANCUN 5.3.3. To upgrade to premium CANCUN, please use "cancun_dir" config variable to point to the binaries in the directory $SDK/rc/flex/bcm870_a0.

Section 4.7.1: ISSU

SDK 6.5.18 no longer supports ISSU for CANCUN 5.1.8 upgrading from earlier SDK releases. Default load in SDK 6.5.18 will be CANCUN 5.3.3. Customers using CANCUN 5.1.8 must upgrade to CANCUN 5.3.3 through cold boot. ISSU to future SDK releases using CANCUN 5.3.3 will be supported. To take advantage of CANCUN bug fixes in the future SDK releases, cold boot is required.

Section 4.7.2: CANCUN Feature support

Please refer to Section 4.8 for further details on CANCUN features support.

Section 4.8: BCM56370 (Trident3 X3) Family Updates

The Broadcom BCM56370 family is a class of high-performance, non-blocking network switching devices supporting up to a maximum of 3x (4x25G Serdes core), 5x (4x10G Serdes core) and 3x (4x10Q Serdescore), as well as various combinations of these port configurations. The BCM56370 delivers high-bandwidth, glueless network connectivity for up to 540 Gb/s on a single chip.

Section 4.8.1: CANCUN Feature support

Please refer to Section 4.8 for further details on CANCUN features support. No new features/bug fixes are part of this release.

Section 4.9: Trident3 Family CANCUN updates

Section 4.9.1: CANCUN support matrix

BCM56870, BCM56770, BCM56370 and BCM56470 are programmable devices released with flexible firmware. Below is the matrix of support between SDK version and Cancun load:

Table 11. Trident3 X7 (BCM56870) Support Matrix

Cancun firmware load	***Supported SDK release***
B870.5.0.7	6.5.12
B870.5.1.8	6.5.13
B870.5.1.8 B870.5.2.3	6.5.14
B870.5.1.8 B870.5.3.3	6.5.15
B870.5.1.8 B870.5.3.3	6.5.16
B870.5.1.8 B870.5.3.3	6.5.17
B870.5.3.3	6.5.18

Table 12. Trident3 X5 (BCM56770) Support Matrix

Cancun firmware load	***Supported SDK release***
B770.3.0.0	6.5.14
B770.3.1.2	6.5.15
B770.3.1.2	6.5.16
B770.3.1.2	6.5.17
B770.3.1.2	6.5.18

Table 12. Trident3 X3 (BCM56370) Support Matrix

Cancun firmware load	***Supported SDK release***
B370.3.0.5	6.5.15
B370.3.0.5	6.5.16
B370.3.0.5	6.5.17
B370.3.0.5	6.5.18

CANCUN versions B870.5.3.3, B770.3.1.2, B370.3.0.5 are updated with bug fixes in this release. Please request your field support team for the list of CANCUN bugs fixed in the updated versions.

Section 4.9.2: CANCUN release notes

Details on features supported for programmable devices can be referenced via the CANCUN feature list documentation posted on docSAFE.

Please refer to the resolved issues (Section 11) for the details of SDK features and bugs fixes that are part of 6.5.18 release.

Section 4.10: Embedded Applications Updates

Section 4.10.1: Broadsync and KNETSync

- Broadsync support is being introduced for BCM56670
- KNETSync support is being introduced for BCM56960, BCM56850

Please reach out to Broadcom business PoC for more info about the feature GA timelines

Section 5: Things to note

This section lists items that require special attention that are new to this release. Please see prior 6.5.x release notes for previously reported items that should also be noted.

Section 5.1: SDK releases out of active engineering support

The following releases are out of active engineering support:

- SDK 6.5.x releases: 6.5.10, 6.5.9, 6.5.8, 6.5.7, 6.5.6, 6.5.5, 6.5.4, 6.5.3, 6.5.2, 6.5.1, 6.5.0
- All SDK 6.4.x, 6.3.x, and older releases

Customers are recommended to use this release for new product development or sustaining releases. Per Broadcom policy, as older devices are discontinued due to end of life (EOL), their SW support is also deprecated in SDK releases beyond the device EOL date. All releases earlier than SDK 6.3.5 and SDK 5.x.x are EOL.

Section 5.3: Warmboot Notes and Considerations

This section is to give information about warmboot specific activity in this release. In this case, warmboot allows for quick reboot by reinitializing the necessary components and processes.
Please note that the warmboot scache size requirements for a device for a particular release can be found by running the `warmboot storage` command at the BCM prompt.

It is recommended that any customer perform their own warmboot testing for their specific environment and use these results and information as guidance only. Note: Warmboot downgrade is not supported.

Section 5.3.1: Validated Warmboot upgrades

Warmboot like-to-like testing and issue resolution is focused on a majority of recently supported devices and is performed with a limited set of test cases. Warmboot testing is not complete on devices which have not yet reached supported status. Warmboot testing is not performed with PHY devices attached.

In-service software upgrade (ISSU) allows upgrade of SDK software from one version to a different version without impacting packet forwarding. This type of SDK warmboot upgrade from 6.5.17 to 6.5.18 has been validated on specific silicon validation kits (SVKs) in this release.

Section 6: Summary of BCM API changes and enhancements

Complete BCM API documentation is available in the Network Switching Software Programmer's Guide number `Network Switching Software Development Kit, Release 6.5.18.html`. BCM API changes in this release are no longer found in this document. Please refer to Appendix B: Summary of BCM API changes and enhancements in this release for further details.

For the full list of API support by Broadcom device, please reference the file `SDK-6.5.x-Support-Matrix.xls` in the sdk/RELDOCS directory in the release package. The API support matrix is not maintained for DNX devices, thus DNX devices are excluded from `SDK-6.5.x-Support-Matrix.xls`.

Broadcom does not guarantee API default values set within the SDK and changes to default values may be made between releases. If an API default value is required for application software to work properly, it must be explicitly set.

Refer to "`Summary of BCM API changes and enhancements`" for the API changes specific to this release.

Section 7: Test Statistics

Section 7.1: How to read the data

In cases where tables are shown below, the tables represent a spread of data gathered per device, per suite, and per release. The percentages represent the aggregate rate of failure for that suite when run against all variants of the family of devices. This data does not include results from DNX device regressions.

The below data is not meant to be a precise indication of quality but instead serves as a guideline for improvements release-over-release. Additionally, although some cells show 0% failures, this does not necessarily mean the feature is supported in the device - tests are run to validate the appropriate SDK support even for unsupported features on older devices to ensure graceful handling of all APIs. Finally, some devices have fewer columns listed if they were introduced recently.

Section 7.2: Overview

Each suite listed below is indicative of a specific module. Golden refers to a suite of tests that takes representation across multiple modules and serves as a sanity regression. Each suite contains tests of various types, loosely categorized as follows:

Test Categories	***Description***
Configuration Tests	Tests that verify that each API functions appropriately and can configure the device as expected.
Functionality Tests	Tests that further validate each of the API through functional use often requiring traffic to be run through the system.
Semantic Tests	Tests that ensure that the proper error handling mechanisms are working and users cannot crash the device through the API.

Section 7.3: Total Tests

The data below represents the number of unique cases for each release. The goal is to increase test coverage release over release but there may be instances where tests are consolidated which may yield a net reduction from one version to the next. Note that although a particular test case will execute for each and every chip, it is only counted once.

	sdk-6.5.18	***sdk-6.5.17***	***sdk-6.5.16***	***sdk-6.5.15***
golden	153	153	153	153

warmboot	7408	7408	7042	6924
auth	17	17	17	17
bfd	123	123	123	123
bhh	159	159	159	159
chip	10	10	10	9
coe	711	668	667	667
cosq	838	838	838	837
custom	7	7	7	7
ea	108	108	108	108
eav	19	19	19	19
extender	61	61	61	61
fabric	7	7	7	7
failover	15	14	10	10
fcoe	37	37	37	37
field	1852	1852	1851	1851
higigproxy	129	129	129	129
infra	114	114	114	114
ipfix	17	17	17	17
ipmc	138	138	138	138
l2	487	487	387	387
l2gre	33	33	33	33
l3	660	656	624	624

l3.alpm	732	724	704	704
link	27	27	27	27
mim	61	61	61	61
mirror	400	362	362	361
misc	28	28	28	28
mpls	694	694	694	694
multicast	54	52	29	29
niv	84	84	84	84
oam	402	402	402	402
pkt	70	70	70	70
port	568	559	554	554
proxy	49	49	49	49
ptp	140	140	140	140
qos	99	99	65	65
rate	21	21	21	21
rtag7	92	92	87	87
rx	65	65	65	65
ser	297	296	296	296
stack	130	126	125	125
stat	677	602	494	494
stg	42	42	42	42
switch	291	286	227	227

time	35	35	35	33
tlvMsg	13	13	13	13
trill	51	51	51	51
trunk	283	267	265	265
tunnel	194	175	148	144
subport	31	31	31	31
vlan	310	301	264	264
vxlan	383	383	383	383
wlan	17	17	17	17
Test Suite Total	19443	19209	18384	18257

Section 7.4: API Test Results

In this release, all tested devices passed DVAPI regressions with over 99.8% passing rate.

Section 7.5: Security Vulnerability Test Results

These are scaling and semantic testing which verify that we properly handle errors and scaling to the limits. The table below shows the passing rate on the security suite.

	Total Tests	***% Pass***
minigolden	2	100%
warmboot	292	100%
cosq	270	100%
e2ecc	5	100%
ea	6	100%
eav	16	100%

fabric	4	100%
fcoe	3	100%
field	26	100%
fieldScale	2	100%
higigproxy	43	100%
l2	136	100%
l3	30	100%
l3.alpm	248	100%
linkphy	7	100%
mim	1	100%
mirror	38	100%
mpls	30	100%
multicast	2	100%
oam	1	100%
oobfc	12	100%
packing	2	100%
policier	13	100%
port	105	100%
proxy	7	100%
ptp	77	100%
qos	6	100%
riot	49	100%

rtag7	2	100%
rx	27	100%
sat	29	100%
stat	53	100%
stg	13	100%
switch	20	100%
time	15	100%
trill	3	100%
trunk	65	100%
tunnel	17	100%
subport	7	100%
udf	6	100%
vlan	116	100%
vxlan	100	100%
Security Totals	1906 tests	100% pass rate

Section 7.6: Static Code Analysis

NOTE: Starting with SDK 6.5.17, the “pass by value” alert threshold was changed from 128 bytes to 160 bytes. This was required in order to accommodate the greater number of ports available in new Broadcom devices. Customers running their own version of Static Code Analysis need to make adjustments in their environment accordingly in order to avoid false positives.

The table below shows the SDK static analysis backlog for this release:

Section 7.6.1: Unresolved Static Code Analysis Issues

Area	*Open Issues SDK 6.5.18*	*Open Issues SDK 6.5.17*	*Open Issues SDK 6.5.16*	*Open Issues SDK 6.5.15*	*Open Issues SDK 6.5.14*	*Open Issues SDK 6.5.13*	*Open Issues SDK 6.5.12*	*Open Issues SDK 6.5.11*	*Open Issues SDK 6.5.10*	*Open Issues SDK 6.5.9*	*Open Issues SDK 6.5.8*	*Open Issues SDK 6.5.7*
DNX	2	57	12	5	3	11	1	0	7	8	11	47
XGS	6	31	9	14	8	13	1	2	12	6	25	10
SerDes	4	14	3	5	3	4	5	6	6	10	12	10
Common	5	11	5	9	2	10	3	3	4	8	3	4
Total	17	116	29	33	16	38	10	11	29	32	51	71

Section 8: Service Impacting Defects

A Service Impacting Defect (SID) is any defect (internal or external) that has high potential to severely disrupt network operations in a deployed system. The following table lists SIDs identified since our last SDK release.

Reference	*Chips*	*Affected Versions*	*Errata Synopsis*	*Details*
SDK-192668	56850_A0, 56850_A1, 56850_A2,	6.5.16	The system will hang, and customer's insert/lookup/delete operation for ALPM tables and SER correction will no longer work.	The system will hang, and customer's insert/lookup/delete operation for ALPM tables and SER correction will no longer work.
SDK-192589	56980_A0	6.5.16	segmentation fault was observed when invoking bcm_l2_addr_unregister while traffic was running.	When invoking bcm_esw_l2_addr_register, we will set _bcm_l2_cbs to _bcm_l2_addr_callback which is invoked by _bcm_l2_register_callback in L2MOD thread. When we do bcm_esw_l2_addr_unregister, we set _bcm_l2_cbs to NULL, which may still be used in L2MOD thread, so the segmentation fault occurs.
SDK-192126	56370_A0, 56770_A0,	6.5.17,	SDK Asserts in ALPM when Updating IPv4	In mix UC and MC routes in same VRF, propagation when change a

	56870_A0, 56870_B0	6.5.14, 6.5.15, 6.5.16	Default Route on a VRF which has Multicast Routes	default route shouldn't apply to MC routes (direct routes). Otherwise bkt_info->bnk_fmt[] will be all 0s (invalid) and thus assertion fails.
SDK-190534	56970_A0	6.5.16	segmentation fault was observed when invoking bcm_l2_addr_unregister while traffic was running.	When invoking bcm_esw_l2_addr_register, we will set _bcm_l2_cbs to _bcm_l2_addr_callback which is invoked by _bcm_l2_register_callback in L2MOD thread. When we do bcm_esw_l2_addr_unregister, we set _bcm_l2_cbs to NULL, which may still be used in L2MOD thread, so the segmentation fault occurs.
SDK-185879	56960_A0	6.5.17	_soc_sram_scan_thread - missing if condition causing EPERM assert failure	The memories L3_DEFIP_ALPM_ECCm and L3_DEFIP_ALPM_RAWm are missed in ALPM_UNLOCK path.

Section 9: Potential Security Vulnerabilities

Broadcom treats security vulnerability issues reported by customer Product Security Incident Response Teams (PSIRT) with very high importance and urgency. Please ensure that any such issues reported and filed by your organization through the Broadcom customer support portal specifically use the acronym “PSIRT” in the CSP case summary and/or description. This will allow the Broadcom engineering teams to track, analyze, and address these issues as quickly as possible.

Table 14: Security Vulnerabilities

Reference	*Chips*	*Affected Versions*	*Errata Synopsis*	*Details*
None identified in this release				

Section 10: GNU tools versions

Broadcom uses GNU tools, specifically “gmake”, “gcc”, several Linux distributions and Linux kernel versions for SDK build and validation in-house. The following table summarizes the tools used in this release

Table 15: GNU tools versions

CPU	*gmake*	*gcc*	*Operating System*	*Linux Kernel*
SLK	4.1	4.9.2	Broadcom LDK 4.1.10	3.14.65
iProc	4.1	6.3.0	Broadcom XLDK 5.1.1	4.14.48
XLR	4.1	5.4.0	Broadcom XLDK	4.19.1
GTS	4.1	5.4.0	Broadcom XLDK	4.19.1
sim	4.1	7.1.0	Native	
iProc64	4.1	6.3.0	Broadcom XLDK 5.1.1	4.14.48

In this release we performed code optimizations to support a more recent version of gcc. This version of SDK compiled cleanly with gcc 7.1.0 for the systems/sim target.

If there are any issues with running or compiling SDK with GCC versions higher than what is listed above, such issues should be reported via Broadcom Customer Support for evaluation. If the issue is caused by SDK coding or logic error, it will be resolved in a subsequent SDK release.

However, if the issue is caused by the nature of how new versions of GCC handle compilation and is not directly related to SDK coding or logic errors, it will be fixed on best-effort basis.

Section 11: Resolved and Unresolved Issues for 6.5.18

Section 11.1: Resolved Issues and Improvements

For the full resolved list, please reference the file `SDK-6.5.18-Resolved-Issues-Improvements.xlsx` in the RELDOCS directory in the release package.

Section 11.2: Unresolved Issues

The following open Urgent priority issues remain unresolved in SDK 6.5.18. These are in process of being evaluated for inclusion in a future SDK release:

Number	*CSP*	*Chips*	*Errata For 6.5.18*
SDK-194296	CS9150968	56670_C0	_soc_monterey_ser_process_pm_ecc: [bcmDPC] CPRI Decap AxC Data Memory[] single-bit ECC error on port 1
SDK-196010	CS9266297	56980_A0	Fail to set TH3's interface type to 100GAUI-2(C2C)
SDK-193024	CS9105911	56850_A0, 56850_A1, 56850_A2	Broadcom Knet module needs linux network namespace support
SDK-197392	CS9317037	56860_A0, 56860_A1, 56870_A0, 56870_B0, AllChips	Add MMU configuration settings IngressPortPGResetOffsetBytes and IngressPortPGGlobalHeadroomEnable on TD2+ and TD3.

Section 12: Compatibility

Section 12.1: Broadcom Embedded Applications Firmware Compatibility Matrix

The following table shows new feature support added in Firmware releases for switch devices compatible with the corresponding SDK release. Please refer to the appropriate Network Switching SDK Firmware release notes publication (56XX0_88XX0_FW-RNxxx-R) for the indicated version below for full details. 1588/PTP feature support is being enabled on SDK 6.5.17. There may be few SDK patches to be applied to work with 4.3.11 Monterey 1588/PTP firmware release. Please get in touch with Broadcom marketing on the availability of 4.3.11 Monterey 1588/PTP firmware GA release

	SDK-6.5.18	SDK-6.5.17	SDK-6.5.16	SDK-6.5.15	SDK-6.5.14	SDK-6.5.13	SDK-6.5.12
4.3.12 (planned)	BCM56670 BCM56960 BCM56850						
4.3.11		BCM56670 BCM56770 BCM56980 BCM56970					
4.3.10			BCM56980 BCM88690				
4.3.9				BCM88470 BCM88270 BCM56870 BCM56980 BCM56970			
4.3.8					BCM88375		
4.3.7						BCM56870 BCM56970	
4.3.6							BCM56870

							BCM53570
4.3.5							
4.3.4							
4.3.3							

Section 12.2: BMACSEC SDK Compatibility Matrix

Switch SDK Release	*BMACSEC Release*
6.5.7	4.16
6.5.8	4.16
6.5.9	4.16
6.5.10	4.16
6.5.11	4.17
6.5.12	4.17
6.5.13	4.17
6.5.14	4.18
6.5.15	4.19
6.5.16	4.20
6.5.17	4.20
6.5.18	4.20

Section 12.3: iMACSEC SDK Compatibility Matrix

This software is specifically for use with the BCM54190 integrated PHY driver.

Switch SDK Release	*iMACSEC Release*
6.5.7	1.0
6.5.8	1.1
6.5.9	1.1
6.5.10	1.2
6.5.11	1.2
6.5.12	1.2
6.5.13	1.3
6.5.14	1.3
6.5.15	1.3
6.5.16	1.3
6.5.17	1.3
6.5.18	1.3

Section 12.4: PHY Firmware Compatibility Matrix

The following table identifies changes in PHY firmware for newer PHY devices and for the serdes core. For a view of supported switch and PHY combinations, please review the `SDK-6.5.x-Device-Support.xls` spreadsheet.

PHY Core	**6.5.11 Firmware Versions**	**6.5.12 Firmware Versions**	**6.5.13 Firmware Versions**	**6.5.14 Firmware Versions**	**6.5.15 Firmware Versions**	**6.5.16 Firmware Versions**	**6.5.17 Firmware Versions**	**6.5.18 Firmware Versions**

BCM84888	A0: 1.00.09 B0: 2.00.09	A0: 1.00.09 B0: 2.00.09	A0: 1.01.06 B0: 2.01.06	A0: 1.01.07 B0: 2.02.07	A0: 1.01.07 B0: 2.02.07	A0: 1.01.07 B0: 2.02.07	A0: 1.01.07 B0: 2.02.07	A0: 1.01.07 B0: 2.02.07
BCM84858	01.03.04	01.03.04	01.03.04	01.03.04	01.03.04	01.03.04	01.03.04	01.03.04
BCM84856	01.03.04	01.03.04	01.03.04	01.03.04	01.03.04	01.03.04	01.03.04	01.03.04
Falcon	D10B_14	D10B_14	D10B_14	D10B_14	D10B_1F	D10B_1F	D10B_1F	D10B_1F
Falcon dual PLL	N/A	D10B_19	D10B_1C	D10B_1C	D10B_1C	D10B_1C	D10B_1C	D10B_1C
Falcon16	D102_03	D103_04	D103_04	D103_0A	D103_0D	D103_0D	D103_11	D103_13
Eagle	D10F_13	D10F_13	D10F_13	D10F_13	D10F_13	D10F_13	D10F_13	D10F_13
Eagle dual PLL	D10F_13	D10F_13	D10F_17	D10F_17	D10F_17	D10F_17	D10F_17	D10F_17
Merlin16	D101_0C	D101_0C	D101_0C	D102_09	D102_09	D102_09	D102_09	
Blackhawk	N/A	N/A	D02_007	A0: D003_06 B0: D004_00	A0: D003_06 B0: D100_02	A0: D003_06 B0: D100_04	A0: D003_0A B0: D100_06	A0: D003_0C B0: D100_0A

Section 12.5: SDK and BCM88060 FW Compatibility Matrix

The firmware binary is part of the SDK release. Below table shows the firmware version compatible with which SDK release.

Switch SDK Release	***88060 FW version***
6.5.10	1.0.10
6.5.11	1.0.11
6.5.12	1.0.12

6.5.13	1.0.13
6.5.14	1.0.14
6.5.15	1.0.15
6.5.16	1.0.16
6.5.17	1.0.17
6.5.18	1.0.18

Section 13: SDK Externally Licensed Software Components

The SDK contains a number of third-party externally licensed software components. This appendix contains information regarding these components, the license for each of these components, and where these components are used in SDK.

Component	*Origin*	*Location in Source Tree*
EDITLINE	/afs/athena.mit.edu/contrib/sipb/src/ editline	src/sal/appl/editline
LIBXML2	http://xmlsoft.org/downloads.html	src/shared/libxml
ED Editor	USENET comp.sources.misc Volume 9, Issue 36	src/appl/diag/edline.c
BITMAP	USENET comp.sources.misc Volume 9, Issue 36	src/appl/diag/edline.c
CINT	http://www.gnu.org/software/bison/	src/appl/cint/cint_parser.[ch]
BIGDIGITS	David Ireland, copyright (c) 2001-11 by D.I. Management Services Pty Limited <www.di-mgt.com.au>	src/soc/dpp/SAND/Utils/sand_u64.c
APIMODE	http://www.gnu.org/software/bison/	src/appl/diag/api/api_grammar.tab.[ch]
SFlow	http://www.inmon.com/technology/sflowlicense.txt	N/A - see Section 13.8

Section 13.1: EDITLINE License terms and conditions

```
--------------------------------------------------------------------------------

This package was obtained in 1999 and modified to fit the Broadcom
SDK. In 2015 is was modified further to perform terminal I/O through
call-backs, and several unused FSF compatibility functions were
removed. For SDK purposes, the library can still be replaced by the
FSF readline library.

The original library is maintained at GitHub:
https://github.com/troglobit/editline

--------------------------------------------------------------------------------

ORIGINAL DESCRIPTION

This is a line-editing library.  It can be linked into almost any
program to provide command-line editing and recall.

It is call-compatible with the FSF readline library, but it is a
fraction of the size (and offers fewer features).  It does not use
standard I/O.  It is distributed under a "C News-like" copyright.

--------------------------------------------------------------------------------

ORIGINAL COPYRIGHT
```

```
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   software, no matter how awful, even if they arise from flaws in it.
2. The origin of this software must not be misrepresented, either by
   explicit claim or by omission.  Since few users ever read sources,
   credits must appear in the documentation.
3. Altered versions must be plainly marked as such, and must not be
   misrepresented as being the original software.  Since few users
   ever read sources, credits must appear in the documentation.
4. This notice may not be removed or altered.
```

Section 13.2: LIBXML2 - XML C parser terms and conditions

Package was obtained from http://xmlsoft.org/ and is used by diagnostics tool for miscellaneous input/output tasks

This README is part of SDK under src/shared/libxml and is as follows:

```
/*
 * $Id$
 *
 * $Copyright: (c) 2011 Broadcom Corporation
 * All Rights Reserved.$
```

```
 */

This package was obtained from http://xmlsoft.org/downloads.html
(ftp://xmlsoft.org/libxml2/libxml2-2.7.2.tar.gz)
and was modified for purposes of inclusion into the SOC diagnostics shell.

Only certain portion of package was included in SDK in 2 places:
    Under srs/shared/libxml
        chvalid.c, config.h, dict.c, encoding.c, entities.c, error.c
        globals.c, hash.c, libxml.h, list.c, Makefile, parser.c
        parserInternals.c, SAX2.c, threads.c, tree.c, uri.c, valid.c
        xmlIO.c, xmlmemory.c, xmlsave.c, xmlstring.c, xmlunicode.c
    Under include/shared/libxml
        catalog.h, chvalid.h, debugXML.h, dict.h, DOCBparser.h
        encoding.h, entities.h, globals.h, hash.h, HTMLparser.h
        HTMLtree.h, list.h, parser.h, parserInternals.h, pattern.h
        relaxng, SAX2.h, threads.h, tree.h, uri.h, valid.h, xinclude.h
        xlink.h, xmlautomata.h, xmlerror.h, xmlexports.h, xmlIO.h
        xmlmemory.h, xmlmodule.h, xmlregexp.h, xmlsave.h, xmlstring.h
        xmlunicode.h, xmlversion.h, xpath.h, xpathInternals.h, xpointer.h

No functionality was changed, but there were modifications to match SDK
requirements

Copyright

Except where otherwise noted in the source code (e.g. the files hash.c,
list.c and the trio files, which are covered by a similar licence but
with different Copyright notices) all the files are:
```

Section 13.3: CINT parser license terms and conditions

The C code for the CINT parser was generated by using GNU Bison parser generator from the file cint_grammar.y CINT is an optional diagnostic tool that can be included in your system by adding CINT to the FEATURE_LIST in SDK compilation flags.

Removed files:
None

Added files:
None

Changed functionality:
None

```
------------------------------------------------------------------------------
/* A Bison parser, made by GNU Bison 2.4.1.  */

/* Skeleton implementation for Bison's Yacc-like parsers in C

      Copyright (C) 1984, 1989, 1990, 2000, 2001, 2002, 2003, 2004, 2005, 2006
   Free Software Foundation, Inc.

   This program is free software: you can redistribute it and/or modify
   it under the terms of the GNU General Public License as published by
   the Free Software Foundation, either version 3 of the License, or
   (at your option) any later version.

   This program is distributed in the hope that it will be useful,
   but WITHOUT ANY WARRANTY; without even the implied warranty of
   MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
   GNU General Public License for more details.

   You should have received a copy of the GNU General Public License
   along with this program.  If not, see <http://www.gnu.org/licenses/>.  */

/* As a special exception, you may create a larger work that contains
   part or all of the Bison parser skeleton and distribute that work
   under terms of your choice, so long as that work isn't itself a
   parser generator using the skeleton or a modified version thereof
   as a parser skeleton.  Alternatively, if you modify or redistribute
   the parser skeleton itself, you may (at your option) remove this
   special exception, which will cause the skeleton and the resulting
   Bison output files to be licensed under the GNU General Public
   License without this special exception.

   This special exception was added by the Free Software Foundation in
   version 2.2 of Bison.  */

/* C LALR(1) parser skeleton written by Richard Stallman, by
   simplifying the original so-called "semantic" parser.  */
```

Section 13.4: BIGDIGITS license terms and conditions

```
Contains BIGDIGITS multiple-precision arithmetic code originally
written by David Ireland, copyright (c) 2001-11 by D.I. Management
```

```
Services Pty Limited <www.di-mgt.com.au>, and is used with
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paid us for the software, namely nothing. By using the software you
expressly agree to such a waiver. If you do not agree to the terms, do
not use the software.
```

Section 13.5: APIMODE parser license terms and conditions

The C code for the APIMODE parser was generated by using GNU Bison parser generator from the file api_grammar. APIMODE is an optional diagnostics shell interface that can be included in your system by adding APIMODE to the FEATURE_LIST in SDK compilation flags.

See “CINT parser license terms and conditions” for the Bison licence.

Section 13.6: SFlow license terms and conditions

Broadcom provides several API modules that refer to SFlow by name, specifically Field, Mirror, Port, and Switch. All are implemented as per IETF RFC-3176. Please review the separate sflowlicense.txt file for terms of the agreement used by Broadcom in our implementation.