

Release Notes For Switch Software Development Kit

SDK 6.5.15

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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
56XX-PG6515-R	<i>BCM API Reference Guide</i> This manual describes the theory of operations of the API and all existing BCM APIs for this release.
SDK-PG822-R	<i>Network Switching Software Platform Guide</i> 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 - must be requested.
56XX-PG-1001-R	<i>Network Switching SDK CINT Interface for Diagnostic Shell</i> 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	<i>BCM Diagnostic Shell</i> This guide describes how to use the diagnostic shell, the primary CLI to the SDK. Available on docSAFE per request.

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-6.5.15-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
BCM56370	BCM56370 A0	Stackable 48-Port Multigigabit-Ethernet Switch (1.8 MB)
	BCM56371 A0	48GbE Downlink Ports - No Broadscan
	BCM56372 A0	28GbE Downlink Ports - No Broadscan
	BCM56375 A0	48 Multigigabit/Multigigabit-Lite Ethernet Downlink Ports
	BCM56376 A0	48GbE Downlink Ports - With Broadscan
	BCM56377 A0	28GbE Downlink Ports - With Broadscan

Section 3.2: Preview XGS Switch Devices

Family	Devices	Description
BCM56670	BCM56670 A0	800 Gb/s Radio-over-Ethernet Switch
	BCM56675 A0	Terabit Ethernet Switch
BCM56980	BCM56982 A0	48 x 100 G + 8 x 400 G switch
	BCM56984 A0	64 x 100 G switch (25G-only, 256 x 25G)

Section 4: New Features per Device

Section 4.1: BCM56980 (Tomahawk3) Family Updates

The Broadcom® BCM56980 family is a class of high-performance, high-connectivity network switching devices supporting up to 32x 400GbE, 64x 200GbE, or 128x 100GbE switch ports. The device family features a maximum of 32 integrated Blackhawk Cores, each with eight integrated 50G PAM4 SerDes transceivers and associated PCS for native support of XFI, 10GBASE-KR/CR/SR/ER/LR, 40GBASE-KR4/CR4/SR4/ER4/LR4, 50 GbE, and 100GBASE-KR4/CR4/SR4/ER4/LR4. The BCM56980 delivers high-bandwidth, glueless network connectivity up to 12.8 Tb/s on a single chip.

Section 4.1.1: SDK Features support

Section 4.1.1.1: New Feature support

The table below shows the status of new features supported on the BCM56980 B0 device.

Table 1. New Features Maturity Level

Feature	Maturity
Reduced Lane Mode	GA
400G AN	Beta
INT	GA

INT-Turnaround	GA
Switch Utilization Monitor	GA
Time/SyncE API	GA

Section 4.1.1.2: Features not yet supported

- 1588/PTP

Section 4.1.1.3: Known Limitations

- Link training may take longer than 3 Seconds on some ports
- Diagnostic commands not supported in this release
 - phy control <port>
 - phy diag <port> pcs
- Flexport involving core re-initialization is not supported after warmboot initialization

Section 4.2: 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 4.2.1: SDK Features support

Section 4.2.1.1: New Feature support

The table below shows the status of new features supported on the BCM56770 and BCM56771 device.

Table 2. New Features Maturity Level

Feature	Maturity
25G, 50G mix on the same oversubscribed PM4x25	GA
UDF enhancements	GA

Section 4.2.1.2: Features not yet supported

- Flowtracker

Section 4.2.2: ISSU

SDK 6.5.15 is the first release that supports BCM56770 with CANCUN B770.3.1.2 in service software upgrade (ISSU). Customers running SDK 6.5.14 with CANCUN B770.3.0.0 cannot perform in service software upgrade (ISSU) to SDK 6.5.15 release. Customers who wish to upgrade to the latest CANCUN (B770.3.1.2) for the new features supported must cold boot (reset the switch device).

Section 4.2.3: CANCUN Feature support

Please refer to Section 4.6 for further details on CANCUN features support.

Section 4.2.4: UDF Support

New abstract types are added for UDF in this release. UDF in prior releases will allow extracting bytes from last parsed offset. In this release UDF module allows to extract bytes from offsets which are already parsed. This will provide higher flexibility to user.

Some containers are marked as not available for existing abstract types. The application must use alternate containers if it is using those containers.

Please refer to the API guide for details on new abstract types and API.

Section 4.3: 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 both CANCUN 5.1.8 and CANCUN 5.3.3 and by default 5.1.8 is loaded. To upgrade to CANCUN 5.3.3, please use “cancun_dir” config variable to point to the 5.3.3 binaries in the directory \$SDK/rc/flex/bcm870_a0.

Section 4.3.1: ISSU

SDK 6.5.15 supports ISSU for CANCUN 5.1.8 upgrading from earlier SDK releases and to future SDK releases with the same CANCUN 5.1.8. If new features are needed and available on a different CANCUN build, cold boot is needed.

SDK 6.5.15 also supports ISSU for CANCUN 5.3.3 to future SDK releases. If a new feature is needed in a future CANCUN, a cold boot to switch CANCUN version is needed.

Section 4.3.2: CANCUN Feature support

Please refer to Section 4.6 for further details on CANCUN features support.

Section 4.3.3: UDF Support

New abstract types are added for UDF in this release. UDF in prior releases will allow extracting bytes from last parsed offset. In this release UDF module allows to extract bytes from offsets which are already parsed. This will provide higher flexibility to user.

Some containers are marked as not available for existing abstract types. The application must use alternate containers if it is using those containers.

Please refer to the API guide for details on new abstract types and API.

Section 4.4: BCM56370 (TRIDENT3 X3) GENERAL AVAILABILITY (GA) SUPPORT

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 Serdes core), 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 4.4.1: SDK Features support

Section 4.4.1.1: Port Configurations

In this release the following port configurations have been validated:

- BCM56372 and BCM56377 SKUs
 - 28Gig + 2x2xHG[53] + 1x100G + 2x10G - Oversub
 - 28Gig + 2x2xHG[53] + 4x25G + 2x10G - Oversub
 - 28Gig + 2x2xHG[53] + 2x40G + 2x10G - Linerate
 - 28Gig + 2xHG[42] + 2x40G + 2x10G - Linerate
- BCM56371 and BCM56376 SKUs
 - 16MGL + 12xMG + 2x2xHG[53] + 1x100G + 2x10G - Oversub
 - 16MGL + 12xMG + 2x2xHG[53] + 4x25G + 2x10G - Oversub
 - 16MGL + 12xMG + 2x100G + 2x10G - Linerate
 - 16MGL + 12xMG + 2x2xHG[53] + 2x40G + 2x10G - Oversub
 - 48Gig + 2x2xHG[53] + 1x100G + 2x10G - Oversub
 - 48Gig + 2x2xHG[53] + 4x25G + 2x10G - Oversub
 - 48Gig + 2x2xHG[53] + 2x40G + 2x10G - Oversub
 - 48Gig + 2xHG[42] + 2x40G + 2x10G - Oversub
- BCM56370 and BCM56375 SKUs
 - 24xMG + 2x2xHG[53] + 1x100G + 2x10G - Oversub
 - 24xMG + 2x2xHG[53] + 4x25G + 2x10G - Oversub
 - 24xMG + 2x100G + 2x10G - Linerate
 - 24xMG + 2x2xHG[53] + 2x40G - Oversub
 - 48Gig + 3x100G + 2x10G - Linerate
 - 36MGL + 12xMG + 2x2xHG[53] + 1x100G + 2x10G - Oversub
 - 36MGL + 12xMG + 2x100G + 2x10G - Linerate
 - 36MGL + 12xMG + 2x2xHG[53] + 2x40G - Oversub
 - 40MGL + 8xMG + 2x2xHG[53] + 2x40G + 2x10G - Oversub
 - 24Gig + 16MGL + 8xMG + 2x2xHG[53] + 2x40G + 2x10G - Oversub
 - 32Gig + 16MGL + 2x2xHG[53] + 2x40G + 2x10G - Oversub

Section 4.4.1.1: Legacy Feature support

The table below shows the status of legacy SDK features supported on BCM56370 in this release. Legacy features have passed regression testing and are considered GA level in maturity. The below maturity level is for BCM56370 family SKUs.

Table 3. BCM56370 Legacy Features Maturity Level

Feature	Maturity
cosq/MMU	GA
extender	GA
failover	GA
field	GA
flexport	GA
flexpp	GA
flexriot	GA
GPE	GA
GENEVE	GA
UAT hash	GA
UFT hash	GA
higig-proxy	GA
INT	GA
ipmc	GA
knet	GA
l2	GA
l2gre	GA
L3	GA
alpm	GA
hecmp	GA
lpm	GA
linkscan	GA
mim	GA
mirror	GA
mpls	GA
multicast	GA
OAM (FP based)	GA
Tx	GA
Port	GA
proxy	GA
qos	GA
Rate	GA
Resilient hash	GA
riot	GA
rtag7	GA
Rx	GA
SER	GA
stack	GA
stat	GA
stg	GA
stream	GA
switch	GA
sFlow	GA
time/SyncE	GA
trunk	GA
tunnel	GA
UDF	GA
virtual	GA
vlan	GA

vxlan	GA
WRED	GA
Warmboot	GA

Section 4.4.1.2: New Feature support

The table below shows the status of new BCM56370 SKUs SDK features in this release.

Table 4. BCM56370 New Features Maturity Level

Feature	Maturity
Broadscan	GA
PMQ port macro (QSGMII/USXGMII mode)	GA
Mix of 1G, 10G, 25G on same PM4x25	GA
Mix of 1G, 2.5G, 10G on same PM4x10	GA
ERSPANv3/VxLAN mirror encap	GA
Group Based Policy (GBP)	GA
MMU HQoS wired and wireless queues	GA
UDF enhancements	GA
New FP qualifiers and actions	GA

Please refer to Section 4.6 for more details on CANCUN feature support.

Section 4.4.1.3: Serdes Features

- USXGMII (4X10M/100M/1G/2.5G per lane) support on QTCE core

Section 4.5: BCM56670 (Monterey) Beta 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, Beta support is provided for the BCM56670 A0 device. The following configurations are supported in this release for BCM56670:

- 16x25G_CPRI + 16x25GE
- 24x10G_CPRI + 10x40GE
- 24x10G_CPRI + 8x40GE + 2x100GE
- 12x12G_CPRI + 6x25G_CPRI + 6x10G_CPRI + 36x10GE + 1x1GE

Section 4.5.1: SDK Features support

Broadcom SDK support for these devices is still in the active development phase, therefore support will change in future releases. Improved passing rates and additional coverage will be reflected in future releases claiming device support maturity. The table below shows the status of SDK features in this interim release. For features listed at GA level, this means our regression passing rate is at least 99.5%. Beta indicates features still being debugged, and Preview indicates features that have only been unit tested.

Section 4.5.1.1: Legacy Feature support

The table below shows the status of legacy SDK features supported on BCM56670 A0 in this release. Legacy features have passed regression testing and are considered GA level in maturity.

Table 5. BCM56670 Legacy Features Maturity Level

Feature	Maturity
L2	GA
L3	GA
Switch control	GA
HW/SW linkscan	GA
Packet TX/RX	GA
TR diags	GA
VLAN	GA
Mirror	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
SER	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 4.5.1.2: New Feature support

The table below shows the status of new BCM56670_A0 SDK features in this release.

Table 6. BCM56670 New Features Maturity Level

Feature	Maturity
MACSEC	Beta
MMU - preemption	GA

FLEXPORT	Beta
CPRI	Beta

Section 4.5.1.2.1: CPRI support

This release added support for following features

- Tunnel Mode
- RSVD4 Agnostic mode
- eCPRI

Section 4.5.1.2.2: MACSEC support

MACSEC software is delivered in the package `xflow-macsec-1.0.3.tar.gz`.

To compile with the SDK:

1. `untar xflow-macsec-1.0.3.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 4.5.2: BCM56675 Bring Up Support

In this release, BU support is provided for the BCM56675 A0 device. The following configurations are supported in this release for BCM56675:

- 40x25G + 24x10G

Section 4.5.2.2: Status of BCM56675 A0 Bringup Support

Basic bring up of the SDK using the silicon validation kit has been completed. See below table for test results.

Table 7. TR Test Results

Description	Test	BCM56675 Status
Register reset defaults	TR 1	Pass
PCI Compliance	TR 2	Pass
Register read/write	TR 3	Pass
PCI S-Channel Buf	TR 4	Pass
CPU Loopback	TR 17	Pass
MAC Loopback	TR 18	Pass
PHY Loopback	TR 19	Pass
CPU Benchmarks	TR 21	Pass
CPU S/G, Reload	TR 22	Pass

CPU S/G, Simple	TR 23	Pass
CPU S/G, Random	TR 24	Pass
Counter widths	TR 30	Pass
Counter read/write	TR 31	Pass
XGS L2 Delete by Port	TR 35	Pass
XGS L2 Delete by VLAN	TR 36	Pass
New Snake Test	TR 39	Pass
BCM Packet Send	TR 40	Pass
BCM Packet Receive	TR 41	Pass
MAC Loopback - Mark 2	TR 48	Pass
PHY Loopback - Mark 2	TR 49	Pass
Memory Fill/Verify	TR 50	Pass
Memory Random Addr/Data	TR 51	Pass
Rand Mem Addr, write all	TR 52	Pass
Memory Hashing	TR 55	Pass
Memory Hashing Overflow Ins	TR 56	Pass
Linkscan MDIO	TR 60	Pass
Table DMA	TR 71	Pass
Traffic Test (MAC/PHY)	TR 72	Pass
SNMP MIB Object Test	TR 73	Pass
TX Reload Test	TR 90	Pass
RX Reload Test	TR 91	Pass
VLAN xlate Overflow Ins	TR 100	Pass
VLAN xlate Hashing	TR 101	Pass
Egr VLAN xlate Ovrflw Ins	TR 102	Pass
Egr VLAN xlate Hashing	TR 103	Pass
MPLS Overflow Ins	TR 104	Pass
MPLS Hashing	TR 105	Pass
Software BUS BUFFER Error Recovery	TR 143	Pass
Software Error Recovery	TR 144	Pass
ARM core	TR 146	Pass
Memory/Logic BIST	TR 147	Pass
Packet DMA SOC test	TR 500	Pass
Streaming test	TR 501	Pass

SBUS DMA	TR 502	Pass
SBUS DMA stress test	TR 506	Pass
CCM DMA test	TR 503	Pass
FIFO DMA test	TR 504	Pass
Latency test	TR 507	Pass
L2UC test	TR 510	Pass
L2MC test	TR 511	Pass
L3UC test	TR 512	Pass
IPMC test	TR 513	Pass
Flexport test	TR 514	Pass
MBIST	TR 515	Pass
SER In-House Test	TR 901	Pass
ECC Parity Test	TR 903	Pass

Section 4.6: Trident3 family CANCUN updates

Section 4.6.1: CANCUN support matrix

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

Table 8. Trident3 X7 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

Table 9. 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

Table 10. Trident3 X3 (BCM56370) Support Matrix

Cancun firmware load	Supported SDK release
B370.3.0.5	6.5.15

Section 4.6.2: 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 6.5.15 release.

Section 4.7: Embedded Applications Updates

Section 4.7.1: Telemetry embedded application package

A new flavor of Telemetry embedded application package is being introduced for BCM56870 (BCM56870_0_ims.srec) and BCM56970 (BCM56970_0_mod.srec) with below features

- BCM56870 : Core-0 : IFA Flow Learning + IFA FSP+ MOD + ST (Package Name : IMS 2.0)
- BCM56870 : Core-1 : IFA Header Insertion + IFA Report (Package Name : IFA 1.1)
- BCM56970 : Core-0 : MOD + ST (Package Name : MoD 1.0)

Above packages supports Inband-Flow Analyzer (IFA), Streaming Telemetry (ST) apps and introduces new features like Drop Monitoring (a.k.a MoD), First Seen packet (FSP) and flexible flow classification profiles for IFA and protobuf export. Config facility is provided to enable/disable any of the features/combinations as per customer requirements.

- First Seen packet (FSP):
This feature enables reporting of first packet received on a flow to an external collector by adding the IFA metadata. This ensures that at least one packet of even very short lived/mice flows can be monitored by IFA.
- Mirror on Drop (MoD):
This feature enables monitoring and reporting of packet drop reasons “along with a copy of packet” on a per-flow basis to an external collector

The new Above features are based on Cancun version 5.3.x. Please reach out to Broadcom business PoC for more info about the package GA timelines, features supported and roadmap.

Refer to the API guide for more information on the features.

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: 6.5.9, 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 5.2: External PHY updates

In this release, there have been no significant feature enhancements made for external PHY driver support. Please see the Resolved Issues section for any new improvements added to external PHY driver code.

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 6.5.14 to 6.5.15 has been validated on specific silicon validation kits (SVKs) in this release.

Section 5.3.2: Upgrade considerations

- On BCM56960 family devices upgrading from 6.4.x to 6.5.15, object validation may fail in `_bcm_esw_stat_validate_object` due to value change of `bcmIntStatObjectIngAgm` across different SDK versions. (SDK-162915)
- Customers using a single image on older SDK releases (e.g. 6.5.3) and upgrading to SDK-6.5.15 with BCM56980 may need to perform a two-step upgrade. For example, apply following upgrading sequence: 6.5.3 (with TD+, TD2, TH) to 6.5.15 (with TD+, TD2, TH), then to 6.5.15 (with TD+, TD2, TH, and TH3). (SDK-161852)
- BFD Session/endpoint ID = 0 is no longer supported on Trident3 (BCM56870) and Maverick2 (BCM56770) devices from SDK 6.5.15 onwards. Configuring session id = 0 as an argument to the action `bcmFieldActionBFDSessionIdNew` results in invalid bfd packet indication in the metadata. Hence session id = 0 is deprecated. The endpoint ID range will start from 1 and end at config

property `bfd_num_sessions` value. Previously the range was 0 to `bfd_num_sessions - 1`. This is applicable only when `bcm_bfd_init()` call is made after warm upgrade from "6.5.14 or below" to "6.5.15 or above". (SDK-161685)

- On BCM56870 family devices upgrading from 6.5.14 to this release, `bcmVlanTranslateEgressKeyPortGroupDouble(5)` is returned instead of `bcmVlanTranslateEgressKeyVlanPort(4)`

Section 5.4: Removal of SBX, Robo and EthernetAccess devices

Starting with SDK 6.5.7, SBX, Robo and EA device drivers, were deprecated 'in-place' in the SDK. Code was kept in the SDK but no longer supported.

From 6.5.15 release onwards, the driver code for SBX, Robo, and EA devices is completely removed from SDK Source code..

Because of the change the following devices shown below are impacted : (SDK-135847)

Robo devices: Northstar (BCM53010), Northstar (BCM53011), Northstar (BCM53012), Vulcan (BCM53115), Blackbird (BCM53118), BCM53020, BCM53101, BCM53115, BCM53118, Starfighter (BCM53125), Blackbird2 (BCM53128), BCM53134, Harrier (BCM53242), BCM53262, BCM53280, BCM53600, Testarossa (BCM5320), Dino8 (BCM5389), Falcon (BCM5395), Gripen (BCM5397), Polar (BCM89500)

SBX devices: Caladan (BCM88020), Caladan2 (BCM88025), Caladan3 (BCM88030), Polaris (BCM88130), Sirius (BCM88230), Sportster (BCM56930), FE2000, QE2000, BME3200, BM9600, BCM88030, BCM88034, BCM88039, BCM88020, BCM88025, BCM88130, BCM88230, BCM88231, BCM88235, BCM88236, BCM88239, BCM56613

EthernetAccess (EA) device: TK371x.

Starting from 6.5.15 release, from a SDK release packaging perspective, below are the changes :

"sdk-xgs-robo-X.Y.Z.tar.gz" will be renamed into "sdk-xgs-X.Y.Z.tar.gz" going forward.

In other words, the source code tar balls for SDK-6.5.15 will be named as follows:

sdk-all-6.5.15.tar.gz (contains only XGS and DNX, no SBX or Robo devices)

sdk-xgs-6.5.15.tar.gz (contains only XGS, no Robo)

The following tarball will NOT be posted: sdk-xgs-robo-6.5.15.tar.gz is now discontinued

Section 5.5: Removal of VxWorks and Linux Kernel Makefiles and BDE

The Linux Kernel mode BDE and VxWorks BDE was deprecated in place in SDK 6.5.6. Ref: Networking Software Platform Guide section 7. 1

Following the previous action in SDK 6.5.6, the reference code for VxWorks and Linux Kernel mode BDE and associated make-files will be removed from the SDK source tree release."

Section 5.6: CINT Scripts

Starting with this release sample CINT Scripts for BCM56980 devices are released as part of the SDK release package in src/examples/xgs/tomahawk3/

Section 6: Summary of BCM API changes and enhancements

This section summarizes BCM API changes in this release. Complete documentation will be available in the Network Switching Software Programmer's Guide number 56XX-PG6515-R. For the full list of API support by Broadcom device, please reference the file `SDK-6.5.x-Support-Matrix.xls` in the `sdk/RELDPCS` 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.

Complete documentation will be available in the Network Switching Software Programmer's Guide number 56XX-PG6515-R.

Please refer to Appendix B: Summary of BCM API changes and enhancements in 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.

	<i>sdk-6.5.15</i>	<i>sdk-6.5.14</i>	<i>sdk-6.5.13</i>
golden	153	153	153
warmboot	6924	6908	6528
auth	17	17	17
bfd	123	123	123
bhh	159	159	159
chip	9	9	9
coe	667	663	663
cosq	837	832	815
custom	7	7	7
ea	108	108	108
eav	19	19	19
extender	61	61	59
fabric	7	7	7
failover	10	10	10
fcoe	37	37	37

field	1851	1834	1810
higigproxy	129	129	129
infra	114	114	114
ipfix	17	17	17
ipmc	138	138	133
l2	387	384	375
l2gre	33	33	33
l3	624	624	584
l3.alpm	704	704	659
link	27	27	27
mim	61	61	60
mirror	361	361	306
misc	28	28	24
mpls	694	686	642
multicast	29	29	29
niv	84	84	84
oam	402	402	402
pkt	70	70	70
port	555	555	546
proxy	49	49	49
ptp	140	136	136

qos	65	64	64
rate	21	21	21
rtag7	87	87	87
rx	65	63	60
ser	296	295	275
stack	125	125	119
stat	494	493	466
stg	42	42	42
switch	227	227	227
time	33	33	33
tlvMsg	13	13	13
trill	51	51	50
trunk	265	264	253
tunnel	144	143	139
subport	31	31	31
vlan	264	261	259
vxlan	383	382	376
wlan	17	17	17
Test Suite Total	18258	18190	17475

Section 7.4: API Test Results

In this release, all tested devices passed our 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.

	<i>Total Tests</i>	<i>% Pass</i>
minigolden	2	100%
warmboot	232	100%
cosq	270	100%
e2ecc	5	100%
ea	6	100%
eav	16	100%
fabric	4	100%
fcoe	3	100%
field	78	100%
fieldScale	2	100%
higigproxy	43	100%
l2	134	100%
l3	30	100%
l3.alpm	244	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	1	100%
riot	49	100%
rtag7	2	100%
rx	27	100%
sat	29	100%
stat	53	100%
stg	13	100%
swtich	14	100%
time	13	100%
trill	3	100%
trunk	62	100%
tunnel	11	100%

subport	7	100%
udf	6	100%
vlan	108	100%
vxlan	100	100%
Security Totals	1862 tests	100% pass rate

Section 7.6: BCM88060 PHY Test Results

The table below represents specific results from switch and PHY interoperability and regression testing for the release for the BCM88060 device.

PHY 88060 Results

<i>Switch Device</i>	<i>Phy Config</i>	<i>Total Tests</i>	<i>% Fail</i>
56960_A0	phy88060	142	16.2%
56850_A2	phy88060	75	29.3%
56768_B1	phy88060	75	4.0%

Section 7.7: Static Code Analysis

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

Section 7.7.1: Unresolved Static Code Analysis Issues

<i>Area</i>	<i>Open Issues SDK 6.5.15</i>	<i>Open Issues SDK 6.5.14</i>	<i>Open Issues SDK 6.5.13</i>	<i>Open Issues SDK 6.5.12</i>	<i>Open Issues SDK 6.5.11</i>	<i>Open Issues SDK 6.5.10</i>	<i>Open Issues SDK 6.5.9</i>	<i>Open Issues SDK 6.5.8</i>	<i>Open Issues SDK 6.5.7</i>	<i>Open Issues SDK 6.5.6</i>
DNX	5	3	11	1	0	7	8	11	47	63
XGS	14	8	13	1	2	12	6	25	10	15
SerDes	5	3	4	5	6	6	10	12	10	38
Common	9	2	10	3	3	4	8	3	4	27
Total	33	16	38	10	11	29	32	51	71	143

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.

Table 11: Resolved Service Impacting Defects

Reference	Chips	Affected Versions	Errata Synopsis	Details
SDK-159749	56850_A0, 56850_A1, 56850_A2	6.5.10	ALPM ser inline correction is unable to correct parity error during insert/delete. This could cause customer's insert/lookup/delete op for ALPM tables fails when SER error exists on XOR bank3,4,5.	The SDK inline recovery of ALPM tables only covers XOR bank2(map to logical bank0). When the ser error is in XOR bank3,4,5(map to logical bank1,2,3), the error cannot be detected by sbus access due to ISS_MEMORY_CONTROL_84.FORCE_XOR_GENERATION is set to 1 not 0xf. Hence the error cannot be recovered.
SDK-157712	56762_B0, 56765_A0, 56765_B0	6.5.13, 6.5.14	If the traffic is 100%, there is no R_BLOCK_TYPE C received, it causes the link is wrongly set as down.	When line rate tagged traffic is sent on BCM56762_B0 device, the ports go down. When traffic is stopped, ports come up. Even with 99% rate traffic issue is not seen. Only at 100% rate and with tagged traffic issue is seen. For untagged traffic even with line rate no issue is seen.

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 12: 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 13: GNU tools versions

<i>CPU</i>	<i>CPU Arch</i>	<i>gmake</i>	<i>gcc</i>	<i>Operating System</i>	<i>Linux Kernel</i>
SLK	ARM(64)	4.1	4.9.2	Broadcom LDK 4.1.10	3.14.65
iProc	ARM	4.1	4.9.3	Broadcom XLDK 4.0.1	4.4.39
XLR	X86	4.1	4.9.2	Fedora Core 21	4.4.6
GTS	X86	4.1	4.9.2	Fedora Core 21	4.4.6
sim		4.1	7.1.0	Native	
iProc64	ARM(64)	4.1	6.3.0	Broadcom XLDK 5.0.3	4.14

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, with no guarantee for a specific ETA.

Section 11: Resolved and Unresolved Issues for 6.5.15

Section 11.1: Resolved Issues and Improvements

Starting with SDK 6.5.9, Broadcom provides a list of resolved improvements and defects in a sortable spreadsheet format rather than a static table in this document. For the full resolved list, please reference the file `SDK-6.5.15-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 6.5.15. These are in process of being evaluated for inclusion in a future SDK release:

Number	CSP	Chips	Errata For 6.5.15
PHY-2048	CS1640531	56960_A0	Request to disable CL72 while CL73 enabled on PHY82764 and PHY82381
PHY-2976	CS1113416	56860_A0, 56860_A1, 56960_A0, 56960_B1	improvement phymod_phy_rx_signal_detect_get() API to get signal status per lane/port for SESTO phy
PHY-2986	NA	56760_A0	The port speed was changed to 40G if change the encap from HigiG to Eth
PHY-3003	CS1139654	56846_A0, 56846_A1	LINK state issue with BCM84834
SDK-156329	CS5465230	56970_A0, 56970_B0, AllChips	New SDK api requirement to return number of entries currently used by each slice
SDK-157286	CS5792273	56565_A0, 56565_B0	Using TSCe5/6 & TSCf0/1 in config 6&7
SDK-161280	CS6324200	56850_A0, 56850_A1, 56850_A2	"TrunkMemberSourceModuleId" qualifier is NOT recovered in FP entry after WB
SDK-162096	NA	56980_A0, 56980_B0	TX taps configuration causing flex port conversion to fail
SDK-162592	CS6497979	56870_A0, 56870_B0	API for programming L3_TUNNEL.DEFAULT_VLAN_PROFILE_INDEX and L3_TUNNEL.DEFAULT_VLAN_PROFILE
SDK-163181	CS6323673	56640_A0, 56640_A1	BFD endpoint creation getting failed with BCM_E_EXISTS although endpoint entry is not present.
SDK-163339	CS6507746	56873_A0	L3 Host extended view Trunk support - soc_feature_extended_view_no_trunk_support returns true on BCM56873 whereas it returns false on BCM56870
SDK-163524	CS6657672	56870_A0	[TD3 SDK6514]Entry move in EGR_IP_TUNNEL_MPLS_DOUBLE_WIDE will cause problem
SDK-163760	CS6226264	AllChips	Need a sharable NH index via bcm_l3_egress_create API to use it for IPMC scenario/ L3 encap get & add
SDK-163970	CS6693578	AllChips	VLAN based my station entry fails when vfi based my station entry is added first with error code -8

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. Note there was no new device support added in SDK 6.5.8 and SDK 6.5.11.

	SDK-6.5.15	SDK-6.5.14	SDK-6.5.13	SDK-6.5.12	SDK-6.5.10	SDK-6.5.9	SDK-6.5.7
4.3.9	BCM88470 BCM88270						
4.3.8		BCM88375					
4.3.7			BCM56870 BCM56970				
4.3.6				BCM56870 BCM53570			
4.3.5					BCM88270 BCM56960 BCM56970		
4.3.4						BCM88270	
4.3.3							BCM56760 BCM56565

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

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

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	6.5.9 Firmware Versions	6.5.10 Firmware Versions	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

BCM84888	A0: 1.00.03 B0: 2.00.03	A0: 1.00.03 B0: 2.00.03	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
BCM84858	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
Falcon	D10B_14	D10B_14	D10B_14	D10B_14	D10B_14	D10B_14	D10B_1F
Falcon dual PLL	N/A	N/A	N/A	D10B_19	D10B_1C	D10B_1C	D10B_1C
Falcon16	D102_03	D102_03	D102_03	D103_04	D103_04	D103_0A	D103_0D
Eagle	D10F_13	D10F_13	D10F_13	D10F_13	D10F_13	D10F_13	D10F_13
Eagle dual PLL	D10F_13	D10F_13	D10F_13	D10F_13	D10F_17	D10F_17	D10F_17
Merlin16	D101_0C	D101_0C	D101_0C	D101_0C	D101_0C	D102_09	D102_09
Blackhawk	N/A	N/A	N/A	N/A	D02_007	A0: D003_06 B0: D004_00	A0: D003_06 B0: D100_02

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

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 it 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

Copyright 1992,1993 Simmule Turner and Rich Salz. All rights reserved.

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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, xmlregex.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

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ed - standard editor
^^

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TurboC mods and cleanup 8/17/88 RAMontante.

Further information (posting headers, etc.) at end of file.

Modification log:

25Aug92 (W.Metzenthen) Changed malloc() call to calloc() in makebitmap() to remove bugs under Linux. Changed a few '^' to the correct '~'. General tidying. Recognize Linux via the __linux__ symbol. Main change based upon suggestion by Wolfgang Thiel.

07Sep99 Changed large amounts of stuff to simplify --Curt McDowell

Section 13.4: BITMAP license terms and conditions

```

/*****
 * BITMAP.C -      makebitmap, setbit, testbit
 *
 *      bit-map manipulation routines.
 *
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 */

```

Section 13.5: 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

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```

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/* 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 13.6: BIGDIGITS license terms and conditions

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Section 13.7: 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.y`. 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 13.8: SFlow license terms and conditions

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