Dialogic
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Dialogic® NaturalAccess™ Signaling Software Release 5.1.1

Release Notes

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1 RELEASE OVERVIEW

This revision history summarizes the changes made to the version of the Dialogic® NaturalAccess™ Signaling Software Release 5.1.1. This document may be subject to updates during the lifetime of the release.

Dialogic® NaturalAccess™ Signaling Software provides developers and OEMs with a highly productive API for call control combined with point code redundancy features for high-availability in demanding in-network applications. For complete details of the functions and features of this software, see An Introduction to Dialogic® NaturalAccess™ Signaling Software:
http://www.dialogic.com/products/docs/techbrief/11281-na-signaling-sw-tb.pdf

1.1 CONTENTS OF RELEASED IMAGE

Dialogic® NaturalAccess™ Signaling Software Release

Component	Version
TX Base	8.0.2
MTP2	6.0.2
MTP3	10.0.2
SIGTRAN	2.0.2
ISUP	9.0.2
SCCP	9.0.2
TCAP	7.0.2
TUP	9.0.2
Util	1.0.2
MTPCore	1.0.2

SUPPORTED HARDWARE AND REQUIREMENTS

2.1 SUPPORTED HARDWARE

High-performance range boards:

- Dialogic® TX 5500E PCI Express SS7 Network Interface Board
- Dialogic® TX 4000 PCI SS7 Network Interface Board
- Dialogic® TX 4000C CompactPCI SS7 Network Interface Board

Moderate-performance range boards:

- Dialogic® TX 5020E PCI Express SS7 Network Interface Board
- Dialogic® TX4000/20 PCI SS7 Network Interface Board
- Dialogic® TX 4000/20C CompactPCI SS7 Network Interface Board

2.2 BASIC SOFTWARE REQUIREMENTS

2.2.1 Supported Operating Systems

Windows
Windows® Server 2003, Standard and Enterprise, R2, SP2

Solaris Intel
Intel Solaris 10 (32)bit

SPARC Solaris
Solaris 10 SPARC (64-bit and compatibility mode)

Linux
Red Hat Enterprise Linux ES 4(Update 4)

2.2.2 Required Software

NaturalAccess Signaling Software Release 5.1.1 requires Dialogic® NaturalAccess™ Development Environment Release 8.0.

2.3 ADDITIONAL REQUIREMENTS

2.3.1 Flash Update Required on TX Hardware

You must update the flash memory of any TX boards with the TX Base kernel that ships with this software release. The software in this release is incompatible with versions of the TX Base kernel prior to Dialogic® NaturalAccess™ Signaling Software Release 5.1. The ss7load.[bat] file uses the txflash utility, specifying the txflash –s option, to automatically update the TX board's flash image with the correct kernel.

If you do not use ss7load.bat, see the instructions in the TX 4000, TX 4000C, and TX 5000E Series Installation Manual for information regarding updating the kernel using the txflash utility.

3 NEW FEATURES AND PROBLEMS CORRECTED

3.1 ALL OPERATING SYSTEMS

TX Base

TX 5000 Kernel: Ethernet route leaves task(s) holding, Priority boost, HSL unused trunk handling, Secondary clock master

Ethernet route leaves task(s) holding:

In a redundant configuration (TDM based), the first link that is routed over TX board -to- TX board Ethernet operates properly, but additional links that are routed over TX board -to- TX board Ethernet can be setup with a cyclic routing table entry. Once data is passed to a destination link that is involve with this cyclic route it is possible that the kernel task for maintaining communication with the host ($hcomm) will enter the HOLDING state. It is also possible for the kernel task responsible for maintaining IP communication ($ipeth) to end up in a HOLDING state. A problem was found in the TX board's IP packet routing algorithm. Release 5.1.1 corrects the issue.

Another Ethernet related issue was discovered in which received Ethernet packets may not be serviced as soon as these packets were received. Modifications were made to the TX 5000's Ethernet level-1 driver interface to maintain synchronization with the Ethernet co-processor.

Priority boost:

A scenario exists in which the TX operating system can have a higher priority task ready to execute but cannot execute that task due to a lock held by a lower priority task. Release 5.1.1 eliminates this situation. Anytime a high priority task is about to wait on a lower priority task the low-priority task is temporarily boosted to the higher task priority in order to release the lock as soon as possible.

HSL unused trunk handling:

The TX 5000 kernel provided with Release 5.1 included a restriction that required all 4 trunks to be configured if any High Speed Links (HSLs) were being used. Release 5.1.1 removes this restriction, allowing HSLs to operate properly without requiring configuration of unused trunks.

If an active HSL were connected to an unused trunk on a TX 5000 that had been configured to use HSLs over other trunks it was possible for a message received over an unused link to be reported as arriving over a used link. This would result in the MTP task issuing an internal error alarm. Release 5.1.1 corrects the issue.

Secondary clock master:

In Release 5.1, when a TX5000E board is configured as the secondary clock master and the primary clock source fails, the TX 5000 does switch to driving the secondary

clock; but almost immediately there is an alarm generated which indicates an additional clock failure which causes the TX 5000 to abandon acting as secondary clock master and to instead be clocked by the board's internal oscillator. A change was made to properly setup the TDM clocking control interface such that no false clock failure event would be reported. Release 5.1.1 corrects the issue.

TX 5000E host driver issues related to resetting or closing under heavy traffic load

In a Release 5.1, resetting TX 5000E when the controlling application has transmits outstanding can result in a number of transmit I/O's that never complete.

The TX 5000E host-side driver tracks each transmit that is in progress to the TX board. When the TX board is reset any In-progress transmits will never be acknowledged by the board. A problem was found related to locking of a mutex used to maintain the list of in-progress transmits. In Release 5.1 it was possible (based on specific traffic flow) for the driver to lose track of one or more of these never-to-complete transmits. Release 5.1.1 corrects the issue.

The TX 5000E host-side driver can report list corruption on txreset during heavy load.

Due to processing flow (especially in a multi-CPU environment) it was possible for a transmit complete indication to be processed which referred to an earlier transmit that should have been considered as dropped once the given TX board was reset. Release 5.1.1 corrects the issue.

TX 4000 kernel: Ethernet traffic stops on RNR indication, Ethernet route leaves task(s) holding, Priority boost

Ethernet traffic stops on RNR indication:

The Ethernet device used on the TX 4000 can report RNR (Receiver Not Ready) if the TX board is under heavy load when a large burst of additional Ethernet traffic is received. After RNR has been reported no further Ethernet traffic is received. The 4000 kernel was modified to re-initialize Ethernet receive handling whenever RNR is reported, allowing Ethernet receive traffic to resume.

Ethernet route leaves task(s) holding:

In a redundant configuration (TDM based), the first link that is routed over TX board -to- TX board Ethernet operates properly, but additional links that are routed over TX board -to- TX board Ethernet can be setup with a cyclic routing table entry. Once data is passed to a destination link that is involve with this cyclic route it is possible that the kernel task for maintaining communication with the host ($hbus) will enter the HOLDING state. It is also possible for the kernel task responsible for maintaining IP communication ($ipeth) to end up in a HOLDING state. A problem was found in the TX board's IP packet routing algorithm. Release 5.1.1 corrects the issue.

Priority boost:

A scenario exists in which the TX operating system can have a higher priority task ready to execute but cannot execute that task due to a lock held by a lower priority task. Release 5.1.1 corrects the issue. Anytime a high priority task is about to wait on a lower priority task the low-priority task is temporarily boosted to the higher task priority in order to release the lock as soon as possible.

Redundancy Issue: Loading primary may not result in backup becoming primary

Under certain timing conditions it is possible for a load of the primary board to not result in the backup board becoming primary. Release 5.1.1 increases the switchover timer timeout value, allowing the link timer ample time to expire first. This corrects the issue, resulting in the backup consistently becoming primary if the primary is ever loaded.

Upper layer SS7 message routed to non-existent destination could leak

The SS7 message routing code that is part of each SS7 TX-board-based communication layer can queue an outbound message (based on the ultimate destination of the message) to a non-existant entity. This message would never be delivered and therefore never deallocated. Release 5.1.1 corrects this potential issue in the MTP, ISUP, SCCP, TCAP and TUP tasks.

txinfo utility does not recognize a TX 5020E

The txinfo utility displays basic information for a given TX board. This utility is provided in both source and binary form. The version released as part of SS7 5.1 does not recognize the system ID used to identify a TX 5020E board. Release 5.1.1 corrects the issue.

Etsec on TX5000 ends up in no-transmit state

On TX 5000, there is a possibility that ethernet 1 or 2, sometimes, can end up in a state where it stops transmitting even though the state is reported as UP. Release 5.1.1 corrects this issue.

ISUP, MTP3 and SCCP services fail when using ctavers

The version of these three services released as part of SS7 5.1 would not execute as a service when running utilities such as ctavers sine the CPI library had not been listed as a dependent library to the service. The Release 5.1.1versions of these services were built with the required dependency identified and excute properly when triggered by ctavers

CTAERR_BAD_ARGUMENT in redundant SIGTRAN

HMI was not recognizing the NETWORK_UP/DOWN events which were generated by SIGTRAN. Instead of logging an error and returning, it was still eventing CTA with an uninitialized event. These events are now handled and CTA is evented correctly.

MTP123

MTP task should execute at priority 4 to avoid RX message loss under load

It is possible for a burst of messages from the host to control TX-based processing long enough that the MTP task is unable to service newly received messages (from TDM links). In this case these messages must be retransmitted. The TX board operating system processes messages from the host system at priority 5 in earlier releases. Release 5.1.1 provides load scripts that load the MTP task at priority 4 so that MTP traffic processing takes precedence over host message processing.

Any customer-specific load script / application used instead of the ss7load scripts should also be modified to load the MTP task at priority 4.

Chassis with TX 5000 series board installed can fail to warm boot

Certain types of chassis with certain riser card options create a situation where a cold boot with a TX 5000 series board installed boots normally but a warm boot can fail to boot. A modification was made to the TX operating system (or kernel) to inhibit the generation of interrupts to the host system until the host driver has indicated to the board that it is ready to receive interrupts.

PAUSE with no RESUME after congestion

When congestion reached level 3 a PAUSE would be generated but no subsequent RESUME would be generated when congestion abated. This has been corrected in this release.

MTP12

None

ISUP

Added CGB and CGU support for JNTT variant

Added support of CGB and CGU for JNTT variant. Edit the 'ss7load' file by adding -o 0x100 option at the cplot command line that loads the ISUP task to the board as shown below:

%TXUTIL%\cplot –c %BRD% -f %TXCP%\isup.%TASKTYPE% -n isup –o 0x100 –p 21 –a –s 40960

Perform an ss7load to operate using the new variant.

SCCP

SCCP – Class 1 messages not received by TCAP task

Class 1 messages received by the SCCP task are now passed up to the TCAP task or SCCP application.

SIGTRAN

Bundling and disable support in SIGTRAN

Implemented bundling support and the ability to disable associations initially.

Bundling is enabled when TMR_BUNDLE in the SCTP SAP is configured to be non-zero. Bundling can be disabled by setting TMR_BUNDLE to 0. When bundling is enabled, if there is already a transmit outstanding, chunks will be stored and packed into a single IP packet until one of these things occurs, at which point whatever is bundled will be sent:

1. The TMR_BUNDLE timer expires
2. The maximum transmission unit (mtu) is reached
3. A shutdown is received
4. The RTO timer expires
5. A SACK is received (potentially opening the transmit window)

Associations can be disabled initially by setting the new configuration parameter DISABLED to TRUE in the M3UA PSP configuration section. When disabled an association will not be automatically established by M3UA when configured as an ASP or IPSP with CLIENT_SIDE TRUE. Instead the association must be manually enabled through m3uamgr with the ASSOC EST <pspId> command.

M3UA requires all PSs active for resume - make default FALSE

The PS configuration parameter reqAvail is not configurable through M3UAcfg and its default is TRUE. Now that an issue has been corrected related to multiple route instances going out in an ASPAC, so that there is a separate ASPAC for each NSAP/route context, having reqAvail TRUE for all PS's means that upper layers won't get resumes until all have bound and ASPAC's get sent. For example if SCCP binds to M3UA (as it does immediately), but an ISUP app is not started (which will cause ISUP to bind to M3UA), SCCP will not get a RESUME until the ISUP app is started. Therefore the default and only value should be reqAvail = FALSE. Release 5.1.1 changes reqAvail to a value of FALSE, correcting the issue.

Need to differentiate COMM_LOST TermInd reasons

Multiple things can cause a COMM_LOST termination indication from SCTP to M3UA. It is helpful when diagnosing communication problems to know the underlying reason whenever communication is lost. Release 5.1.1 uses a SIGTRAN task that reports the reason for any loss in communication (via a new set of alarm messages).

SIGTRAN stack size has been increased

Increased SIGTRAN stack size to 256000 to avoid stack overflow when recovering from congestion.

3.2 APPLIES TO UNIX ONLY

TX BASE

Closing a channel to a TX 5000E series board under traffic load can panic the system.

The UNIX PCI Express driver was modified to manage channel closing such that a close would be suspended if there were active work items in progress on behalf of that channel. Only after all work related to the channel is complete will the close itself be allowed to complete.

Unix CPI library can receive -EAGAIN (instead of +EAGAIN) - must handle both

Testing communication with a TX 5000E series board on certain versions of the Solaris 10 operating system showed that the cpia_intr function could receive -EAGAIN as an indication that no further I/O is ready for processing. All previous Unix operating systems had provided +EAGAIN for this type of indication. The Unix CPI library now handles both positive and negative error codes to reads issued to any type of TX driver.

Linux CPI library

On Linux systems it is possible to receive the error code EINTR (operation was interrupted) when performing certain IO operations from within the CPI library. Certain versions of Linux can also report –EINTR to indicate the same condition. The CPI library code had been handling the positive EINTR but had not considered negative EINTR. The Linux version of the CPI library has been modified to handle both positive and negative EINTR whenever IO to the TX driver is performed.

Solaris CPI Library

When a CPI channel that was created as a synchronous channel [using cpi_open as opposed to cpia_open or cpix_open] is closed there is a helper thread that does not terminate until the calling application terminates. Higher layer SS7 management APIs use this synchronous type of CPI channel and so are prone to this issue. The SS7 5.1.1 release includes a change to the attributes of the helper thread such that the thread will now terminate as soon as the channel is closed [no longer requiring the calling application to first terminate].

NOTE: If using a release prior to SS7 5.1.1 the Solaris pstack command would show any helper threads that had been closed but did not fully terminate as Zombie threads.

3.3 APPLIES TO WINDOWS ONLY

None

4 INSTALLATION OVERVIEW, CONFIGURATION AND LICENSING

4.1 INSTALLATION OVERVIEW

The Dialogic® NaturalAccess™ Signaling Software Release 5.1.1 (Release 5.1.1) is binary-backward-compatible with the Dialogic(R) NaturalAccess(TM) Software Release 5.1 but is not binary-backward-compatible with earlier releases. To migrate from Release 5.0 or Release 4.3, applications must be recompiled. All structure packing from these releases has been replaced as needed with padding in order to achieve pure natural alignment of all structures. This means that NaturalAccess applications built against the Release 5.0 or Release 4.3 do not require any source code changes but do require a re-build of the software in order to adopt the new field offsets / structure sizes.

See the Dialogic website for software downloads, documentation, detailed installation and removal instructions at: http://www.dialogic.com/products/signalingip_ss7components/download/tx-software-5.1.1.htm "Installing Dialogic® NaturalAccess™ Signaling Software Release 5.1.1." and "Installing Dialogic® NaturalAccess™ SS7 Monitor Software 3.0"

4.2 CONFIGURATION

4.2.1 TX Series SS7 Board Configuration

See the Dialogic website to view the specific board installation manuals *"Dialogic® TX 5000E PCI Express SS7 Boards Installation Manual"or "Dialogic® TX 4000 PCI SS7 Network Interface Board Installation Manual"* for detailed instructions to:

- *Assign a CP number*
- *Add a board*
- *Change a CP number*
- *Move a board*
- *Remove a board*

4.2.2 Configuring Your System for Redundancy

See the Dialogic website to view the specific board installation manual *"Dialogic® TX Series SS7 Boards Health Management Developer's Reference Manual"* for detailed instructions to:

- Health Management
- Redundant Signaling subsystem architecture
- Failure detection and recovery
- Developing specific redundant applications
- Setting up a redundant system
- Information of specific demo programs

View the *"Dialogic® NaturalAccess™ Signaling Software Configuration Manual"* on the Dialogic website at: http://www.dialogic.com/products/signalingip_ss7components/download/tx-software-5.1.1.htm for complete instructions on configuring your TDM, IP or redundancy setup.

4.3 LICENSING

The TX 5500E and TX 5020 are available in models that support a range of link capacities and protocol operations. The capacities and options purchased are enabled at the time of manufacturing. The options available are:

- 4, 16, 32, 64 or 128 low speed links
- 0 or 4 high-speed links
- MTP or Full Stack(all protocols from MTP to TCAP plus SIGTRAN layers SCTP and M3UA)

Customers wishing to increase capacities or protocol options should contact their Dialogic sales representative to arrange for the purchase of additional capability which can be enabled via a Return Material Authorization(RMA).

5 PROGRAMMING LIBRARIES

Descriptions of the libraries can be found in the corresponding manuals located at the following Dialogic web location:

http://www.dialogic.com/products/signalingip_ss7components/download/tx-software-5.1.1.htm

6 DEMONSTRATION SOFTWARE

All Demo Software is described in the manuals of the corresponding layers at the following Dialogic web location:

http://www.dialogic.com/products/signalingip_ss7components/download/tx-software-5.1.1.htm

7 DOCUMENTATION

Dialogic® NaturalAccess™ Signaling and Dialogic® NaturalAccess™ SS7 Monitor Software and Documentation downloads can be found at the following website:

http://www.dialogic.com/products/signalingip_ss7components/download/tx-software-5.1.1.htm