

## **Binary for Linux – M3UA**

### **Release Notes for Version 3.00**

#### **1. Overview**

This is the first release since V2.03 and is functionally equivalent to that release. This release is developed for use with the SS7 Development Package for Linux V5.00 or later. It cannot be used with earlier development packages.

Customers who wish to make use of the Long Message support offered in V5.00 of the development package should upgrade to this release of software (Long Message support is required for SCCP Segmentation). Other customers need not upgrade.

#### **2. Changes**

##### **2.1 Use of Linux shared object**

This release makes use of shared object version of the GCT library included in V5.00 of the development package. The module has not been changed to support Long Messages itself but it does permit the module to be used in an environment where Large Messages are being used.

Dialogic  
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## **Binary for Linux – M3UA**

### **Release Notes for Version 4.02**

#### **1. Introduction**

This release is the first to support IPSP connections between peer to peer ASP (host) M3UA systems and for generation of DAUD messages from ASPs to SGs. IPSP connections allow transport of SS7 signalling across all IP networks without need for MTP Signalling Links. This allows for investment in IP networks while maintaining existing proven SS7 technology.

This release also adds support for four new licenses supporting different combinations of associations and throughput allowances. This allows the customer to better match the needs of the protocol license used to the scale of the system. In addition, to aid customers in using the new licenses, the module supports Throughput Monitoring functionality.

This release has moved the definition of “M3UA\_TASK\_ID” from the “m3ua\_inc.h” file to the “ss7\_inc.h” file. New versions of both of these header files are available with this release.

This release is the first full release since V3.00 and is backwards compatible with that release.

#### **2. New Functionality**

##### **2.1 IPSP Connections (Peer to Peer ASP operation)**

Connections directly between ASPs are now supported allowing systems to communicate without the use of Signalling Gateways. These connections may be configured using the existing interface. This release of M3UA supports connection to a different remote ASP for each SCTP association used. Each remote ASP can support a different AS or an AS can be distributed over a number of associations.

The following information is necessary for configuring the M3UA host binary for IPSP operation:

- The DPC of the remote system.
- The M3UA Routing Context of the remote system.
- The logical id's of the SCTP associations connecting to the remote system.

For further information refer to the SIGTRAN Host Programmer's manual.

Routing between ASPs is based on DPC only.

## 2.2 Automatic Route Status Audit

An ASP connecting to a Signalling Gateway (SG) can now be made to automatically audit the SG when the SG becomes available and the ASP becomes UP. Auditing involves the generation of M3UA SNMM DAUD messages for each Route that the ASP is configured to use the SG for. Thereafter the ASP will send periodic DAUD messages to ensure the route states are synchronised.

This functionality can be enabled and disabled for each Signalling Gateway that the ASP connects to. To enable, set the M3UOP\_SERVER\_DAUD (0x0020) bit in the 'option' field of the M3U\_MSG\_CNF\_SERVER message. This option is not appropriate for IPSP operation.

## 2.3 New Licenses

Three new licenses SS7SBHSTM3UAS, SS7SBHSTM3UAR and SS7SBHSTM3UAL are now supported. These enable both IPSP and ASP operation. The existing SS7SBHSTM3UA license supports ASP operation only. The new licenses support a range of associations and throughput limits.

Licence	Assoc	Throughput		IPSP or ASP operation
		TDM Link Equivalents	(Kbps)	
SS7SBHSTM3UAU	4	4	312	ASP and IPSP
SS7SBHSTM3UAS	16	16	1232	ASP and IPSP
SS7SBHSTM3UAR	32	32	2464	ASP and IPSP
SS7SBHSTM3UAL	64	64	4920	ASP and IPSP
SS7SBHSTM3UA (Existing)	32	n/a	n/a	<b>ASP only</b>

## 2.4 Capability Licensing

This release introduces a new licensing scheme to allow use of the M3UA module for different size systems. Different licences have been made available to support up to a certain number of SCTP associations and a specified traffic throughput.

Throughput is calculated using the payload content of the API\_MSG\_TX\_REQ message (sent towards the network) and the payload content (ie. PROTOCOL\_Data – 4 octets) of the SCTP\_MSG\_RX\_IND message (received from the network).

For licensing purposes the sum of the TX and RX direction will be used. Other parameters or messages not listed above will not count towards the totals. For management and monitoring purposes individual sums of TX and RX will be maintained.

To support management of these new capabilities, new messages have been added as detailed in this section.

### 2.4.1 Configure M3UA Module

#### Synopsis:

Sent to the M3UA module to configure global parameters. When using s7\_mgt this message will be sent automatically.

#### Message Format:

MESSAGE HEADER		
FIELD NAME		MEANING
type		M3U_MSG_CONFIG (0x72c0)
id		0
src		Management Entity
dst		M3U Module
rsp_req		Used to request a confirmation
hclass		0
status		Non zero on error
err_info		0
len		15
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	mn_mod_id
1	1	trace_mod_id
2	1	maint_mod_id
3	2	max_assocs
5	2	max_servers
7	2	max_routes

9	2	max_throughput
11	4	options

### Description:

This message must be the first message sent to the module to configure the module wide settings.

### Parameters

#### **mn\_mod\_id**

Module ID for the Management Module.

#### **trace\_mod\_id**

Module ID for the Trace Module.

#### **maint\_mod\_id**

Module ID for the Maintenance Module.

#### **max\_assocs**

Maximum number of Associations the module will be required to handle.

#### **max\_servers**

Maximum number of Servers the module will be required to handle.

#### **max\_routes**

Maximum number of Routes the module will be required to handle.

#### **max\_throughput**

Maximum throughput required from the module in kB/s.

### Functionality options

This is a bit map specifying functionality that will be required by the module.

Bit	Functionality	Mnemonic
0	IPSP configurations	M3UA_FUNC_OPT_IPSP

*Note: For backwards compatibility if the old module configuration is submitted then the throughput will default to the maximum licensed. If IPSP is licensed then it will be permitted.*

## 2.4.2 Request Licensing State

### Synopsis:

Sent by Layer Management to request the current license state.

### Message Format:

MESSAGE HEADER		
FIELD NAME		MEANING
type		MGT_MSG_R_LIC_STATUS (0x6f22)
id		0
src		Layer Management
dst		M3U Module
rsp_req		Set appropriate response required bit
hclass		0
status		Set to 1 if module not enforcing licensing
err_info		0
len		56
PARAMETER AREA		
OFFSET	SIZE	NAME
0	4	Version
4	4	Licensed Protocol
8	4	Licensed Throughput Rate
12	4	Licensed Links
16	4	Licensed Sessions
20	4	Licensed Options
24	4	Configured Throughput Rate
28	4	Configured Maximum Links
32	4	Configured Maximum Sessions
36	4	Configured Options
40	4	Current Throughput Credit
44	4	Current Active Links
48	4	Current Active Sessions
52	4	Cong State

## **Parameters**

The version and Licensed protocol parameters should be set by the user. The rest of the parameters are set but the module in the reply.

### **Version**

Set to 0.

### **Licensed Protocol**

Identifies the protocol being licensed. For M3UA set to 0.

### **Licensed Throughput**

The throughput permitted by the installed license or licenses.

### **Licensed Links**

The number of links or associations permitted by the installed license or licenses

### **Licensed Sessions**

The number of simultaneous sessions or dialogs permitted by the installed license or licenses. Note: Not used by M3UA.

### **Licensed Options**

Bit mask of M3UA specific functionality enabled by current licenses. See the '**Functionality options**' parameter of the M3UA\_CONFIG message for definitions of individual bits.

### **Configured Throughput**

The maximum throughput requested in the M3UA\_CONFIG message.

### **Configured Maximum Links**

The maximum number of links permitted as requested in the M3UA\_CONFIG message.

### **Configured Maximum Sessions**

The maximum number of concurrent sessions permitted as requested in the M3UA\_CONFIG message. Note: Not used by M3UA.

### **Configured Options**

Bit mask of M3UA specific functionality enabled by current licenses. See the '**Functionality options**' parameter of the M3UA\_CONFIG message for definitions of individual bits.



### **Current Throughput Credit**

The number of bytes that can be sent to or received from the network by M3UA before enforcement mechanisms are triggered.

### **Current Active Links**

Number of links or associations currently configured.

### **Current Active Sessions**

Number of circuits or dialogs currently in use. Not used by M3UA.

### **Throughput Congestion State**

Value	State	Description
0	UNCONG	
1	CONG	

### 2.4.3 License Event Indication

#### Synopsis:

Sent to Layer Management to indicate a license related event. In the case of throughput it indicates throughput congestion onset, abatement or the beginning of enforcement.

#### Message Format:

MESSAGE HEADER		
FIELD NAME		MEANING
type		MGT_MSG_LIC_EVENT (0x0f23)
id		0
src		M3U Module
dst		Layer Management
rsp_req		0
hclass		0
status		0
err_info		0
len		8
PARAMETER AREA		
OFFSET	SIZE	NAME
	4	Protocol Type
	2	Event Type
	2	Event Indication

#### Parameters

##### Event Type

Event type	
0	Undefined
1	Throughput
2	Link/Associations
3	Session/Dialog

## Event Indications

### Throughput Event Indications

Throughput Event indication	
0	ABATE
1	CONGESTION
2	ENFORCEMENT

### Link/Associations

None currently defined

### Session/Dialog

None currently defined

## 2.5 Throughput Monitoring

In order to enable monitoring of the system throughput the M3UA module has been extended to offer additional statistics including:

- Data Received from the Network (RX Data)
- Data Received from the user module to be sent to the network (TX Data)
- Combined Rate
- Peak Rates (RX Data/TX Data and Combined)
- Enforcement state and congestion counts

These can be determined using the message MGT\_MSG\_R\_THR\_STATS (0x6f21) shown below.

## 2.5.1 Request Throughput Statistics

### Synopsis:

Sent by Layer Management to request the current throughput statistics.

### Message Format:

MESSAGE HEADER		
FIELD NAME		MEANING
type		MGT_MSG_R_THR_STATS (0x6f21)
id		0
src		Layer Management
dst		M3U Module
rsp_req		Set appropriate response required bit
hclass		0
status		Non zero to Reset
err_info		0
len		36
PARAMETER AREA		
OFFSET	SIZE	NAME
0	4	Version – Must be set to zero
4	4	Protocol
8	4	Time Period
12	4	RX Data
16	4	TX Data
20	4	RX_rate_peak
24	4	Tx rate_peak
28	4	Rate_peak
32	2	Congestion Count
34	2	Enforcement Count

## **Parameters**

The version and Licensed protocol parameters should be set by the user. The rest of the parameters are set by the module in the reply.

### **Licensed Protocol**

Identifies the protocol being licensed. For M3UA set to 0.

### **Time Period**

Updated by the module to show the time since start-up or the last statistics reset. Units of 100ms.

### **RX Data**

Amount of counted data, measured in Kbytes, received by the module from the network since the last statistics reset.

### **TX Data**

Amount of counted data, measured in Kbytes, sent by the User module since the last statistics reset.

### **RX rate peak**

The peak Rx data rate averaged over a rolling thirty second time window. Units of Bytes / Second.

### **TX rate peak**

The peak Tx data rate averaged over a rolling thirty second time window. Units of Bytes / Second.

### **Rate peak**

The peak data rate for both Tx and Rx data averaged over a rolling thirty second time window. Units of Bytes / Second.

### **Congestion Count**

Number of times the congestion state has been entered since the last statistics reset.

### **Enforcement Count**

Number of times the congestion state has been entered since the last statistics reset.

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## **Binary for Linux – M3UA**

### **Release Notes for Version 4.03**

#### **1. Overview**

This release adds support for multiple streams within an association (to reduce the possibility of head of line blocking) and enhances the load sharing functionality. In addition, this release corrects the reception of a DAUD message on a Signaling Gateway and now reports the temporary loss of a route as described below.

It is fully backwards compatible with the previous release.

#### **2. Changes**

##### **2.1 DAUD reception on a SGW**

The M3U\_MSG\_AUDIT\_DEST\_IND (0x02f3) message is used between M3UA and the NIF to indicate reception of a DAUD message from a peer. The NIF requires that the association id on which the DAUD was received is provided in the message while M3UA was providing the server id. This led to a failure to respond to a DAUD if the server id was different to the association id. M3UA now puts the association id in the header of the message.

##### **2.2 DAUD failure on short losses of association**

If an association was failing and recovering quickly such that an adjacent Signaling Gateway had been unavailable for less than a second then the DAUD mechanism was failing to work even though the route was unavailable.

##### **2.3 Traffic load-sharing for ASP operation**

The previous M3UA releases used the lowest bit of the SLS value to determine which Signaling Gateway to route traffic to. This causes traffic to each SG in a pair to be sent traffic with either all odd or even SLS values making onward routing more difficult.

This release uses the highest bit of the SLS instead, improving the traffic load-sharing.

##### **2.4 Support for multiple data streams**

The previous M3UA releases used only stream 1 for data traffic and stream 0 for management traffic.

This release now load-shares traffic across multiple streams in the association for data traffic. The use of multiple streams can aid the

performance of an association in systems experiencing high latency and message loss.

The data traffic is load-shared across the streams based on the SLS values. The streams used are those negotiated with the far end of the association. For example, if an association starts up with 9 streams then stream 0 is still reserved for management traffic but data traffic is distributed across streams 1 to 8.

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## **Binary for Linux – M3UA**

### **Release Notes for Version 4.04**

#### **1. Overview**

The main feature of this release is support for two new license models which offer increased capacity and throughput for users with high-end bandwidth intensive applications.

The release includes other minor changes and corrections as detailed below. It is fully backwards compatible with the previous release.

#### **2. New functionality**

##### **2.1 New licenses**

Two new run-time licenses SS7SBHSTM3UAK and SS7SBHSTM3UAJ are now available which support increased throughput. The full range of currently available M3UA licenses and the capability of each are detailed in the table below:

Dialogic Part Number	Description	Throughput	Max Associations	TDM Link Equivalents at 0.6 Erlang
G01-005-01	SS7SBHSTM3UAU	312kb/s	4	4
887-243-01	SS7SBHSTM3UAS	1,232kb/s	16	16
887-365-01	SS7SBHSTM3UAR	2,464kb/s	32	32
887-242-01	SS7SBHSTM3UAL	4,920kb/s	64	64
G15-005-01	SS7SBHSTM3UAK	9,832kb/s	128	128
G14-005-01	SS7SBHSTM3UAJ	19,664kb/s	256	256

#### **3. Changes**

##### **3.1 Error value in M3U\_MSG\_M3U\_ERROR message**

The previous M3UA releases used the same error value for “err\_val1” and “err\_val2” in message M3U\_MSG\_M3U\_ERROR (0x02ef). M3UA now uses two distinct values for parameters “err\_val1” and “err\_val2” as defined in the M3UA Programmer’s Manual.



### 3.2 Status Information in Notify message

The previous release only accepted values “1” (Insufficient ASP Resources Active in AS) and “2” (Alternate ASP Active) for the Status Information parameter contained in a NOTIFY Management message having a Status Type of “Other” (2). It now also accepts value “3” (ASP Failure).

### 3.3 “M3Ue\_xxx” and “M3Uv\_xxx” definitions in m3u\_inc.h

Type definitions “M3Ue\_xxx” and “M3Uv\_xxx” respectively used in M3U\_MSG\_M3U\_ERROR (0x02ef) and M3U\_MSG\_M3U\_EVENT (0x02ee) messages are now available in the external include file “m3u\_inc.h” and are listed here for reference.

Error types for M3U\_MSG\_M3U\_ERROR

Mnemonic	Value
M3Ue_BAD_STATE	0
M3Ue_CONFIG	1
M3Ue_RESOURCE	2
M3Ue_TIMER_TICK	3

Error types for M3U\_MSG\_M3U\_EVENT

Mnemonic	Value
M3Uv_PROTOCOL	0
M3Uv_M3UA_ERROR	1

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## **Binary for Linux – M3UA**

### **Release Notes for Version 4.05**

#### **1. Overview**

This release adds support for ANSI\_24 format Routing Labels with 8-bit SLS as well as support for SLS rotation. Activation of the SLS rotation feature requires use of s7\_mgt V3.11 or later which is part of the Dialogic® DSI Development Package for Linux V5.10 or later.

This release adds the ability to configure routes to adjacent Signalling Gateways to automatically become available without the reception of DAVA messages.

This release makes the configuration of the Routing Context parameter optional for Application Servers.

This release is fully backwards compatible with the previous release.

#### **2. New Functionality**

##### **2.1 ANSI\_24 routing label with 8-bit SLS**

The previous M3UA releases only supported 5-bit SLS values when using the ANSI\_24 routing label. This version now also supports ANSI\_24 routing label with 8-bit SLS. No specific configuration changes are required.

##### **2.2 SLS rotation**

SLS rotation is often necessary to help achieve even load distribution when routing messages via STPs. It can be enabled using the rotation parameter in the new config.txt command CNNCI. This command supports the following syntax:

```
CNNCI:ss7md=<variant>[,rotation=Y];
```

for example

```
CNNCI:SS7MD=ANSI,ROTATION=Y;
```

##### **2.3 Signalling Gateway Route Availability**

If a Route is configured to a point code hosted by an adjacent Signalling Gateway, it may be necessary for that route to become available once the SG becomes active without first receiving a DAVA message.

A new '**options**' field has been added to the config.txt SNRLI command to support this. The options field is a bit mask used to enable different options. This release supports a single option

Bit	Description
0	Presume Route available following SG becoming active.

The contents of the <options> parameter in the SNRLI command are passed at run-time by s7\_mgt to the M3UA module in a new Options field (offset 2, size 4) of the M3U\_MSG\_ADD\_ROUTE\_SERV (0x72c6) message.

Note: In order to use this new field it is essential to use s7\_mgt V3.11 or later.

The full syntax of the SNRLI command is as follows:

**SNRLI:SNRL=,SNRT=,SG=,[OPTIONS=];**

For example:

SNRLI:SNRL=1,SNRT=1,SG=1,OPTIONS=0x00000001;

## 2.4 Optional Routing Context Parameter

Previously the Routing Context parameter in config.txt **SNAPI** and **SNRAI** commands was mandatory but has now been made optional. The routing context parameter is only made mandatory by the specification if more than one Application Server operates over the same association.

The M3UA binary is configured with the Routing Context using the M3U\_MSG\_ADD\_SERV\_ASSOC message. This has been given a new options field to specify whether a routing context is present. The new message definition is shown below.

*Note: In typical configurations the user will not need to generate this message directly as it will be done by the S7\_MGT utility. S7\_MGT will set the message appropriate to the values specified in the **SNAPI** and **SNRAI** config.txt commands.*

## 2.4.1 Add Server to an Association

### Synopsis:

Declares an ASP or SGP that an AS or SG can run on.

### Message Format:

MESSAGE HEADER		
FIELD NAME		MEANING
type		M3U_MSG_ADD_SERV_ASSOC (0x72c5)
id		Association ID
src		Layer Management
dst		M3U Module
rsp_req		Used to request a confirmation
hclass		0
status		0
err_info		0
len		10
PARAMETER AREA		
OFFSET	SIZE	NAME
0	2	srv_id
2	4	route_ctxt
6	4	options

### Parameters

#### association ID

The logical ID of the Association used to communicate with the ASP or SGP.

#### srv\_id

The logical ID of the AS or SG that will run on the ASP or SGP.

#### route\_ctxt

M3UA Routing Context used by M3UA peers to identify a particular AS. If either M3UOP\_SERV\_ASSOC\_NO\_RC or M3UOP\_SERV\_ASSOC\_FORCE\_NO\_RC options are set then the value used here will have no effect on the system.

*Note: If no Routing Context is specified in this message then one may still be specified and used in the M3U\_MSG\_ASP\_ACT\_REQ message at run time.*

### **options**

<b>Mnemonic</b>	<b>Value</b>	<b>Description</b>
M3UOP_SERV_ASSOC_NO_RC	0x0001	No Routing Context is configured for use for this AS on this Association.
M3UOP_SERV_ASSOC_FORCE_NO_RC	0x0002	No Routing Context is configured for this AS on this Association and any Routing Context included in the ASP_ACT_REQ should be ignored.

## **3. Other Changes**

### **3.1 License Test Command Line Option**

The output from the license test command line option has been modified to provide a clearer indication of which licenses are present and valid.

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