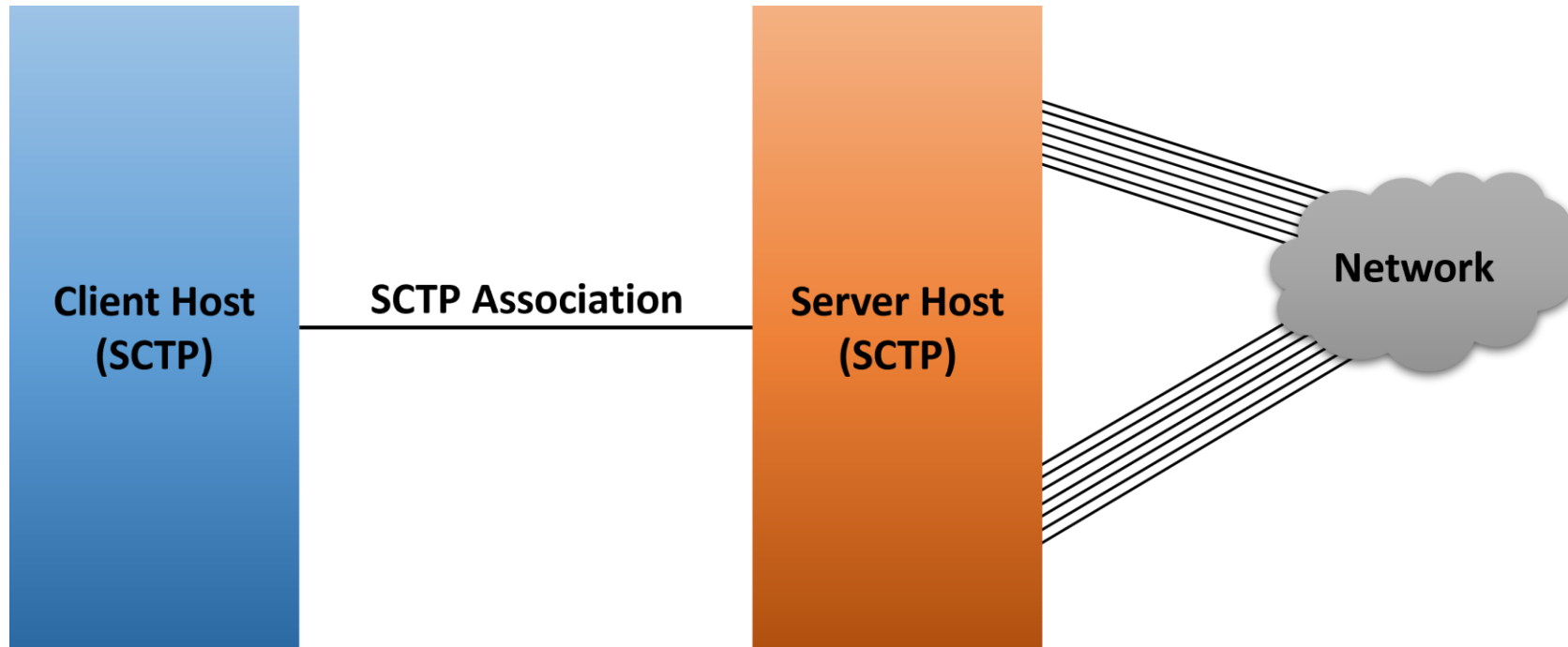

MAPS™ SCTP Conformance Emulator



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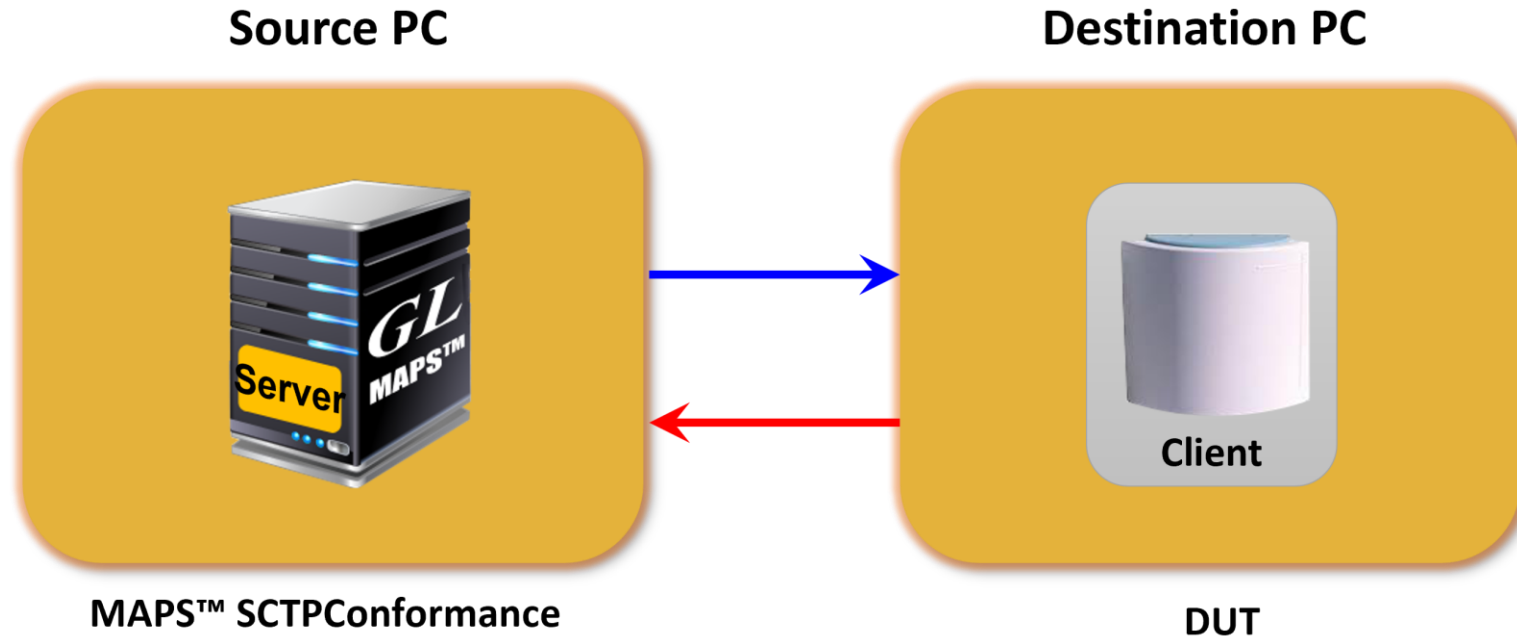
MAPS™ SCTP in SS7 Network



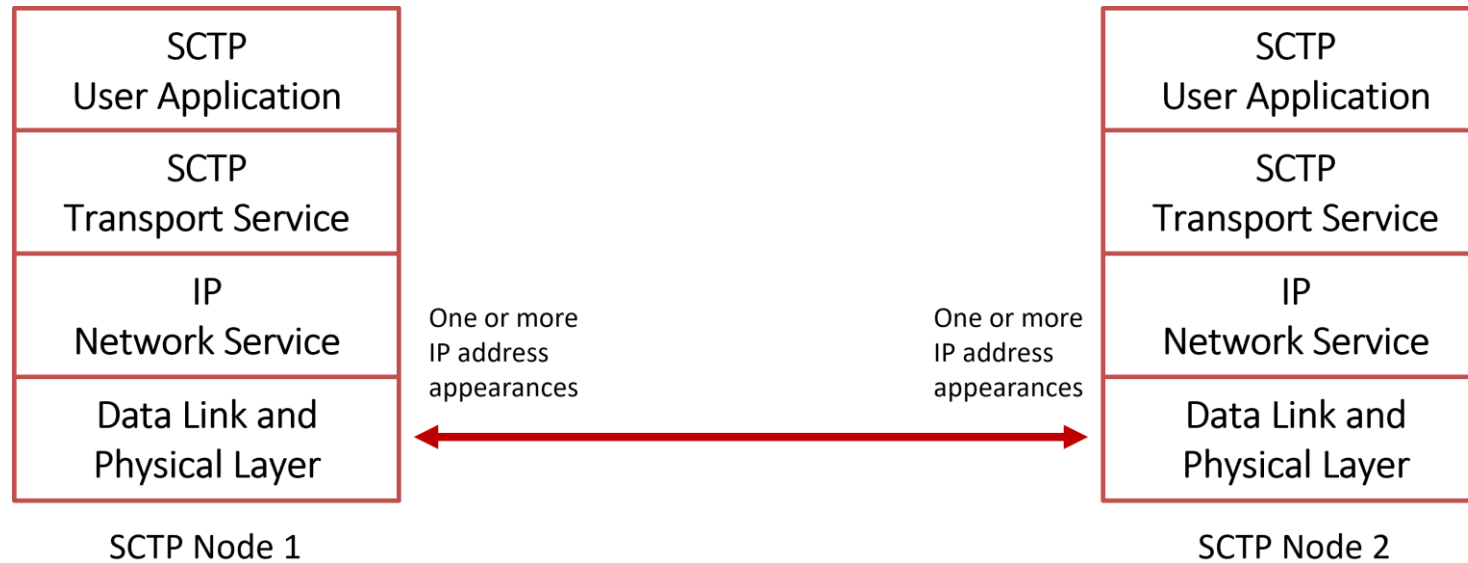
Main Features

- Emulate Server and Client nodes
- Generates and process SCTP (valid and invalid) messages
- Insertion of impairments to create invalid messages
- Supports customization of call flow and message templates using Script and Message Editor
- Ready-to-use scripts for quick testing
- Supports scripted call generation and automated call reception
- Provides Call Statistics and Events Status
- Automation, Remote access, and Schedulers to run tests 24/7

MAPS™ SCTP Conformance as SSP to test SSP (DUT)



Supported Protocol Stack and Standards



Supported Protocols	Standard / Specification Used
SCTP	RFC 9260
SCTP - Stream Control Transmission Protocol	RFC 4960
SCTP Reference	ETSI TS 102 144
SCTP Conformance Test Suite	ETSI TS 102 369 V1.1.1 (2004-11)

Testbed Configuration

The screenshot shows the MAPS (SCTPConformance) configuration window. The title bar reads "GL MAPS (SCTPConformance) - [Testbed Setup - TestBedDefault]". The menu bar includes "Configurations", "Emulator", "Reports", "Editor", "Debug Tools", "Windows", and "Help". The toolbar contains various icons for configuration, execution, and help. The main area displays a tree view of configuration options with a corresponding table of values and an "Enable" checkbox.

Config	Value	Enable
SCTP Configuration		<input checked="" type="checkbox"/>
SCTP Emulation Mode	Emulation Mode	
Conformance Profile Config	SCTP_Conformance	
SCTP Association Parameters for Emulation Mode		
SCTP Associations	1	
SCTP Associations 1		
Association Type	Client	
IP Address	192.168.12.35	
Source Port	10000	
InboundStreams	65535	
Outbound Streams	2	
Peer node Info		
Peer IP Address	192.168.12.43	
Peer Port	9000	

Buttons: Start, Edit

Initialisation Errors

Profile Configuration

MAPS (SCTPConformance) - [Profile Editor -SCTP_Conformance]

Configurations Emulator Reports Editor Debug Tools Windows Help

#	Profiles (Edit-F2)	Config	Value	Enable
1	SCTP_AS_V_1_1_1	SCTP_AS_V_1_1_1		<input checked="" type="checkbox"/>
2	SCTP_AS_V_1_1_2			
3	SCTP_AS_I_1_2_1			
4	SCTP_AS_I_1_2_2			
5	SCTP_AS_I_1_3_1			
6	SCTP_AS_I_1_3_2			
7	SCTP_AS_I_1_4			
8	SCTP_AS_V_1_5_1			
9	SCTP_AS_V_1_5_2			
10	SCTP_AS_V_1_6_1			
11	SCTP_AS_V_1_6_2			
12	SCTP_AS_V_1_7_1			
13	SCTP_AS_I_1_7_2			
14	SCTP_AS_V_1_7_3			
15	SCTP_AS_I_1_7_4			
16	SCTP_AS_V_1_7_5			
17	SCTP_AS_I_1_8_1			
18	SCTP_AS_I_1_8_2			
19	SCTP_AS_I_1_8_3			
20	SCTP_AS_I_1_8_4			
21	SCTP_AS_O_1_9_1			
22	SCTP_AS_O_1_9_2			
23	SCTP_AS_V_1_10_1			
24	SCTP_AS_V_1_10_2			
25	SCTP_AS_V_1_11_1			
26	SCTP_AS_V_1_11_2			
27	SCTP_AS_V_1_12_1			
28	SCTP_AS_I_1_12_2			

Test Case Name	Value
SCTP Association Parameters for Conformance Mode	
SCTP Association	
Association Type	Server
Source IP	192.168.12.43
Source Port	9000
Inbound Streams	65535
Outbound Streams	2
Peer Node Info	
Peer IP	192.168.12.35
Peer Port	10000
Invalid Verification Tag for IMH testcases	
Invalid Verification Tag	11
Data Fragmentation Parameters	
Message Template Name	FragmentData.hdl
Fragment Length	500
SourceIP for SCTPASO192	
Configure another IP from the NIC	192.168.12.63
HostName for SCTPASV1121 and SCTPASV1122	
Host Name	sctp.org.com
SCTPASV161 Parameters	
Supported Address Type	IPV4
IPv6 Address For SCTPASV161	fe80::bc63:642e:cfed:b2b1
Cookie Preservative	5000
SCTPASV162 IPv6 Address	
IPv6 Address For SCTPASV162	fe80::bc63:642e:cfed:b2b2
InvalidInboundStream for SCTPASV171	
Invalid Inbound Streams	1
InvalidInboundStream for SCTPASV173	
Invalid Inbound Streams	1
Invalid StreamID for SCTPEI63	
Invalid StreamID	3
SupportedAddressType for SCTPASV1131	
Supported Address Type	IPV4
Non Unicast Address for SCTPFHO535	
Non Unicast Address	192.168.1.252

Enable

Initialisation Errors
 Error Events
 Captured Errors

Global Configuration

Config	Value	Enable
Global Configuration		<input checked="" type="checkbox"/>
SCTP Specific Timers		
T1 Init Timer in msec	3000	
T3 Rtx Timer in msec	3000	
RTO Initial in msec	2000	
RTO Min in msec	500	
RTO Max in msec	30000	
SACK Timer in msec	40	
Cookie Timer in msec	3000	
Cookie Life in msec	20000	
Hearbeat Interval in msec	30000	
Heartbeat Timer in msec	3000	
T2 Shutdown Timer in msec	3000	
SCTP Counters		
Max Init Retransmits	5	
Association Max Retransmits	5	
Path Max Retransmits	5	
Export Message Sequence	Enable	
User Intervention	Enable	
User Intervention Timer in sec	40	
Waiting time for DUT to rcv DATA from UPL in sec	15	
Association Duration	120	

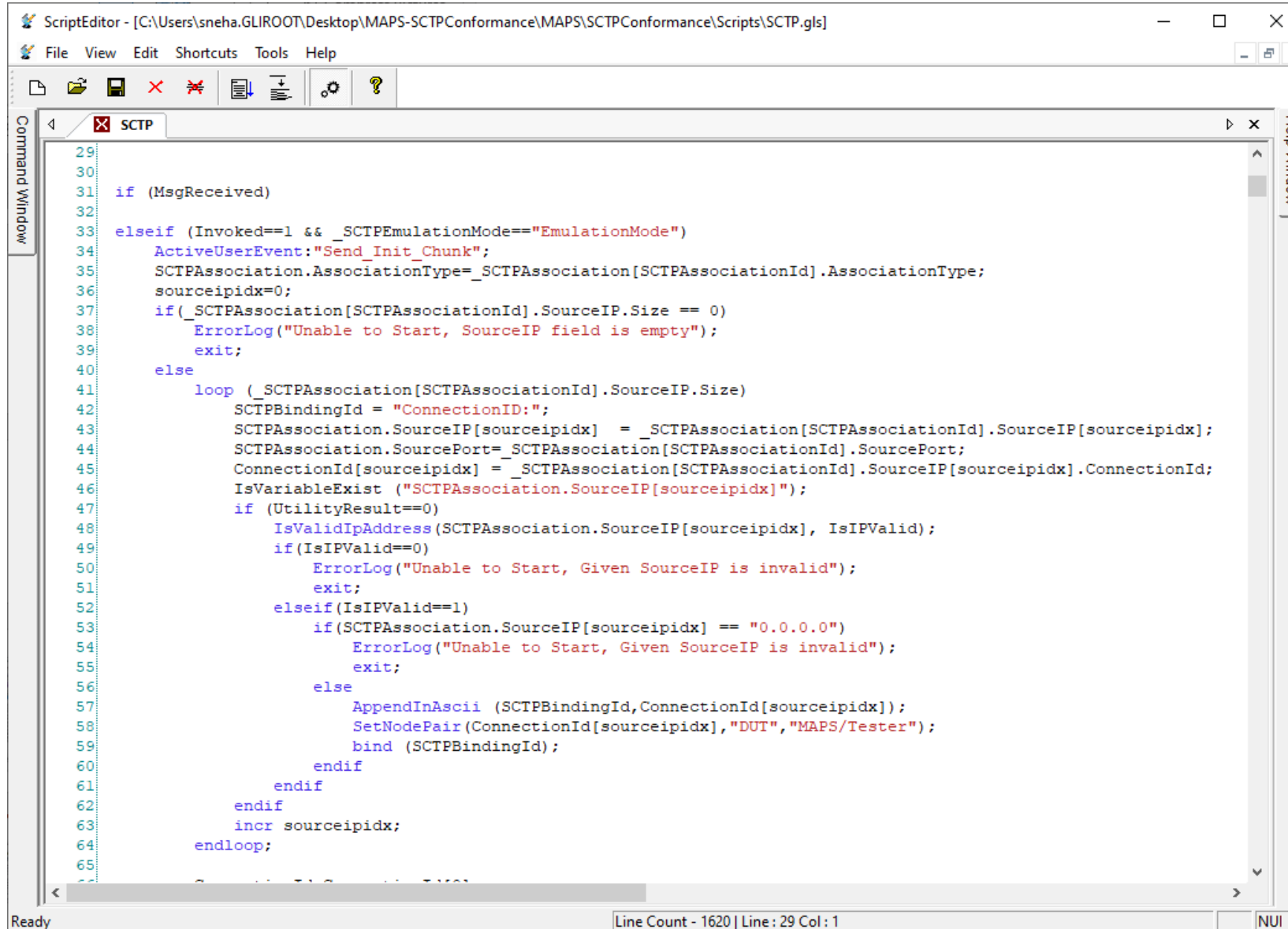
Incoming Call Handler Configuration

The screenshot displays the MAPS (SCTPConformance) application window titled "[Incoming Call Handlers Configuration - conformance]". The interface includes a menu bar with "Configurations", "Emulator", "Reports", "Editor", "Debug Tools", "Windows", and "Help". Below the menu is a toolbar with various icons for file operations and system functions. The main workspace is divided into several sections:

- Message Name / Script Name Table:** A table with two columns. The "Message Name" column lists various SCTP messages, and the "Script Name" column shows "Conformance.gls" for each.
- Scripts List:** A list box on the right containing "Conformance.gls".
- Execution Mode:** Radio buttons for "Sequence" (selected) and "Random".
- Navigation:** "Up" and "Down" buttons for moving items in the Scripts list.
- Management:** "Add" and "Delete" buttons for the Scripts list, and "Add" and "Delete" buttons for the Message Name / Script Name table.
- Actions:** "Apply Scripts" and "Clear Scripts" buttons at the bottom.
- Status:** "Initialisation Errors" and "Error" indicators at the bottom right.

Message Name	Script Name
DATA	Conformance.gls
INIT	Conformance.gls
INIT ACK	Conformance.gls
SACK	Conformance.gls
HEARTBEAT	Conformance.gls
HEARTBEAT ACK	Conformance.gls
ABORT	Conformance.gls
SHUTDOWN	Conformance.gls
SHUTDOWN ACK	Conformance.gls
ERROR	Conformance.gls
COOKIE ECHO	Conformance.gls
COOKIE ACK	Conformance.gls
SHUTDOWN COMPLETE	Conformance.gls

Customizations - Call Flow (Scripts)



```
ScriptEditor - [C:\Users\sneha.GLIROOT\Desktop\MAPS-SCTPConformance\MAPS\SCTPConformance\Scripts\SCTP.gls]
File View Edit Shortcuts Tools Help
SCTP
29
30
31 if (MsgReceived)
32
33 elseif (Invoked==1 && _SCTPEmulationMode=="EmulationMode")
34     ActiveUserEvent:"Send_Init_Chunk";
35     SCTPAssociation.AssociationType=_SCTPAssociation[SCTPAssociationId].AssociationType;
36     sourceipidx=0;
37     if(_SCTPAssociation[SCTPAssociationId].SourceIP.Size == 0)
38         ErrorLog("Unable to Start, SourceIP field is empty");
39         exit;
40     else
41         loop (_SCTPAssociation[SCTPAssociationId].SourceIP.Size)
42             SCTPBindingId = "ConnectionID:";
43             SCTPAssociation.SourceIP[sourceipidx] = _SCTPAssociation[SCTPAssociationId].SourceIP[sourceipidx];
44             SCTPAssociation.SourcePort=_SCTPAssociation[SCTPAssociationId].SourcePort;
45             ConnectionId[sourceipidx] = _SCTPAssociation[SCTPAssociationId].SourceIP[sourceipidx].ConnectionId;
46             IsValidVariableExist ("SCTPAssociation.SourceIP[sourceipidx]");
47             if (UtilityResult==0)
48                 IsValidIpAddress (SCTPAssociation.SourceIP[sourceipidx], IsIPValid);
49                 if (IsIPValid==0)
50                     ErrorLog("Unable to Start, Given SourceIP is invalid");
51                     exit;
52                 elseif (IsIPValid==1)
53                     if (SCTPAssociation.SourceIP[sourceipidx] == "0.0.0.0")
54                         ErrorLog("Unable to Start, Given SourceIP is invalid");
55                         exit;
56                     else
57                         AppendInAscii (SCTPBindingId,ConnectionId[sourceipidx]);
58                         SetNodePair (ConnectionId[sourceipidx],"DUT","MAPS/Tester");
59                         bind (SCTPBindingId);
60                     endif
61                 endif
62             endif
63             incr sourceipidx;
64         endloop;
65
```

Ready Line Count - 1620 | Line: 29 Col: 1 NUI

Customizations - Protocol Messages

The screenshot shows a software window titled "Message Editor - Untitled" with a menu bar (File, View, Direction, Tools, Help) and a toolbar. The main area is divided into two panes. The left pane shows a tree view of the SCTP protocol structure:

- SCTP
 - Source Port Number
 - Destination Port Number
 - Verification Tag
 - Checksum
 - InformationElements
 - Chunk
 - Chunk Type
 - Chunk Length
 - Cumulative TSN Ack
 - Advertised Receiver Window Credit (a_rwnd)
 - Number of Gap Ack Blocks (N)
 - Number of Duplicate TSNs (X)

The right pane displays the hex dump of the SCTP message:

```
===== SCTP Layer =====  
0000 Source Port Number          = 9082 (x237A)  
0002 Destination Port Number     = 9082 (x237A)  
0004 Verification Tag           = 2988032668 (xB219C29C)  
0008 Checksum                   = 2527227508 (x96A26E74)  
    Chunk                        =  
000C    Chunk Type               = 00000011 SACK  
000D    Chunk Flags              = 00000000 (0)  
000E    Chunk Length             = 16 (x0010)  
0010    Cumulative TSN Ack       = 0 (x00000000)  
0014    Advertised Receiver Window Credit (a_rwnd) = 1000000 (x000F4240)  
0018    Number of Gap Ack Blocks (N) = 0 (x0000)  
001A    Number of Duplicate TSNs (X) = 0 (x0000)
```

The status bar at the bottom shows "Ready" and "NUM SCRL" buttons.

SCTP Conformance Test Report

GL MAPS (SCTPConformance) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed It
1	SCTP_Conformance.gls	SCTP_AS_V_1_1_1		Start	Result Pending : User Intervention Timer Expi...	None	Pass	1	1
2	SCTP_Conformance.gls	SCTP_AS_I_1_2_2		Start		None	Unknown	1	0

Headers	Value
Date/Time	2023-05-30 18:20:32.843000
Test Purpose Num...	SCTP_AS_V_1_1_1
Status	Mandatory
Precondition	Association is not established between tester and SUT. Configure the IUT to send an INIT to the tester.
Reference	RFC 4960 [1]; sections 5.1 and 5.1.6.
Purpose	Ensure that the IUT makes complete association procedure.
Software Test Res...	Pass
Manual User Verif...	Result Pending : User Intervention Timer Expired
Failure Cause	N/A

Initialisation Errors
 Error Events
 Captured Errors
 Link Status U

Thank you