
PacketScan™

Protocol Specific Presentation



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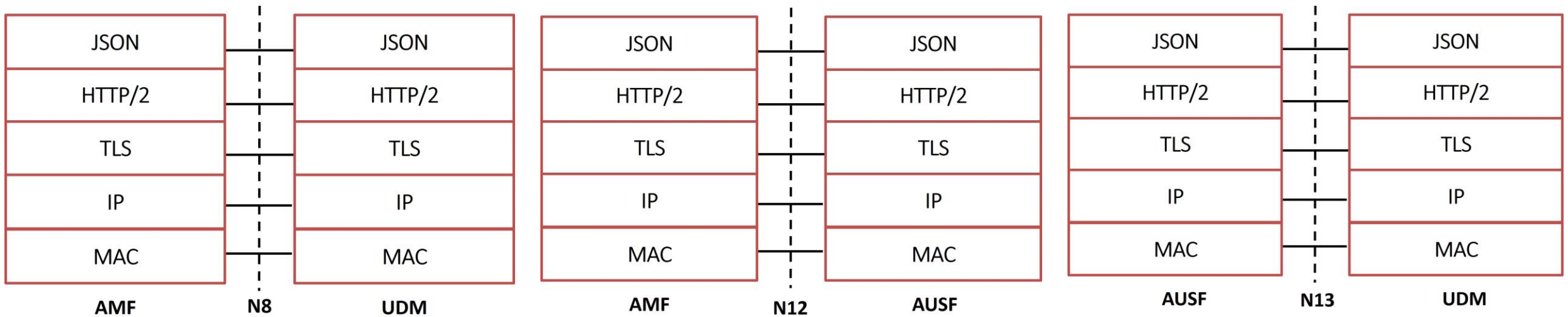
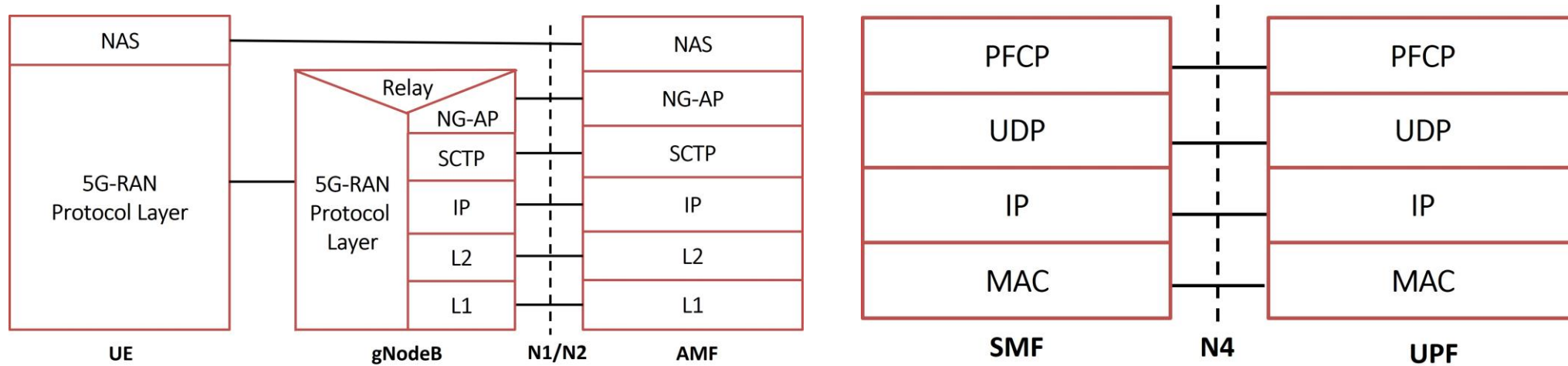
- 5G
- LTE
- SIP, MGCP, MEGACO, H.323
- UMTS over IP
- GSM A and Abis over IP
- GPRS over IP
- Diameter over IP

Supported Protocols

- 5G – N1N2, N4, N8, N12, N13
- SIP-3261
- Megaco3525
- Megaco3015
- MGCP
- H.323
- SIGTRAN (BICC, CAP, INAP, MAP, M3UA, M2UA, M2PA, MTP2, MTP3, SCCP, ISDN, ISUP)
- GSMA over IP
- GSM-R
- GPRS over IP
- UMTS over IP
- LTE, Diameter

5G

5G Protocol Stack



- Decode and analyze 5G protocol stack
- The protocols supported for decoding across all these interfaces are NAS, NGAP, PFCP, SCTP, UDP, TCP, and IP

Protocol Specifications

Supported Protocols	Standard / Specification Used
System Architecture for the 5G	3GPP TS 23.501
NG Application Protocol (NGAP)	3GPP TS 38.413
Non-Access-Stratum (NAS)	3GPP TS 24.501
GPRS Tunneling Protocol for User Plane (GTP-U)	3GPP TS 29.281
NR and NG-RAN Overall Description	3GPP TS 28.300
Packet Forwarding Control Protocol (PFCP)	3GPP TS 29.244
UDP	IETF RFC 768
IPv4	IETF RFC 791 [5]
IPv6	IETF RFC 2460 [6]
JavaScript Object Notation (JSON)	IETF RFC 8259
HTTP/2	IETF RFC 7231 IETF RFC 7540/RFC 7541
TLS	IETF RFC 8446
TCP	IETF RFC 793

Detail View – 5G NGAP Layer

PacketScan 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Device	Frame#	TIME (Relative)	Length (Bytes)	Error	Length/Protocol Type MAC	Packet Type MAC	Source IP Address IPv4	Destination IP Address IPv4
✓ 0	54	00:00:04.071183000	60		ARP			
✓ 0	55	00:00:04.078905000	60		ARP			
✓ 0	56	00:00:04.530010000	217		Internet IP(IPv4)		192.168.12.10	239.255.255.250
✓ 0	57	00:00:04.530250000	217		Internet IP(IPv4)		192.168.12.11	239.255.255.250
✓ 0	58	00:00:04.679183000	158		Internet IP(IPv4)		192.168.13.101	192.168.13.106
✓ 0	59	00:00:04.756884000	60		ARP			
✓ 0	60	00:00:04.769177000	130		Internet IP(IPv4)		192.168.13.106	192.168.13.101
✓ 0	61	00:00:04.779202000	126		Internet IP(IPv4)		192.168.13.101	192.168.13.106

```

0030 Length = 112 (x0070)
0032 TSN = 448 (x000001C0)
0036 Stream Identifier = 0 (x0000)
0038 Stream Sequence Number = 448 (x01C0)
003A Payload Protocol Identifier = x0000003C NGAP
===== NGAP Layer =====
NGAP-PDU = CHOICE
Extensibility Marker = 0
Choice Index = 0
InitiatingMessage = SEQUENCE
ProcedureCode = INTEGER
Contents = 15 id-InitialUEMessage
procedureCriticality = ENUMERATOR
Contents = 0 reject(0)
Value = Open Type
Length = 92
InitialUEMessage = SEQUENCE
Extensibility Marker = 0
ProtocolIE-Container = SEQUENCE OF
Iteration Count = 6
ProtocolIE-Container = Instance 0
ProtocolIE-Field = SEQUENCE
ProtocolIE-ID = INTEGER
Contents = 85 id-RAN-UE-NGAP-ID
procedureCriticality = ENUMERATOR
Contents = 0 reject(0)
Value = Open Type
Length = 2
RAN-UE-NGAP-ID = INTEGER
Length Determinant = 1
Contents = 36
ProtocolIE-Container = Instance 1
ProtocolIE-Field = SEQUENCE
ProtocolIE-ID = INTEGER
Contents = 38 id-NAS-PDU
procedureCriticality = ENUMERATOR
Contents = 0 reject(0)
Value = Open Type
Length = 44
NAS PDU = SEQUENCE
NAS-PDU = OCTET STRING
    
```

Capture Rate : 0.02 Mbps C:\Program Files\GL Communications Inc\Packe Captured 10 242 frames Missed Frames : 0

Detail View – 5G NAS Layer

PacketScan 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Device	Frame#	TIME (Relative)	Length (Bytes)	Error	Length/Protocol Type MAC	Packet Type MAC	Source IP Address IPv4	Destination IP Address IPv4
✓ 0	54	00:00:04.071183000	60		ARP			
✓ 0	55	00:00:04.078905000	60		ARP			
✓ 0	56	00:00:04.530010000	217		Internet IP(IPv4)		192.168.12.10	239.255.255.250
✓ 0	57	00:00:04.530250000	217		Internet IP(IPv4)		192.168.12.11	239.255.255.250
✓ 0	58	00:00:04.679183000	158		Internet IP(IPv4)		192.168.13.101	192.168.13.106
✓ 0	59	00:00:04.756884000	60		ARP			
✓ 0	60	00:00:04.769177000	130		Internet IP(IPv4)		192.168.13.106	192.168.13.101
✓ 0	61	00:00:04.779202000	126		Internet IP(IPv4)		192.168.13.101	192.168.13.106

```

Contents = 0 reject(0)
Value = Open Type
Length = 1
UEContextRequest = ENUMERATOR
Extensibility Marker = 0
Contents = 0 requested(0)
===== 5G NAS Layer =====
0050 Extended Protocol Discriminator = 01111110 5GS Mobility Management Messages
0051 Security Header Type = ....0000 Plain NAS message, not security protected
0052 Message Type = 01000001 Registration Request
      5GS Registration Type and NAS Key Set Identifier =
0053 Registration Type = ....0001 Initial Registration
0053 Follow-On Request = ....0... No follow-on Request Pending
0053 NAS Key Set Identifier = .111.... (7)
0053 Type of Security Context Flag (TSC) = 0..... Native security context (for KSIAMF)
      5GS Mobile Identity =
0054 Length = 13 (x000D)
0056 Type of Identity = ....0001 SUCI
0056 SUPI Format = .000.... IMSI
0057 MCC = 001
0058 MNC = 01
005A Routing Indicator Digit = 0000
005C Protection Scheme Identifier = ....0000 Null scheme
005D Home Network Public Key Identifier = 0 (x00)
      Scheme output = 3012041631
      5GMM Capability =
0063 Information Element Id = 00010000 5GMM Capability
0064 Length = 1 (x01)
0065 S1 Mode = .....0 Not Supported
0065 HO Attach = .....0. Handover request to transfer PDU session from N1 mode to S1 mode not supported
0065 LTE Positioning Protocol (LPP) Capability = .....0... LPP in N1 mode not supported
      UE Security Capability =
0066 Information Element Id = 00101110 UE Security Capability
0067 Length = 2 (x02)
0068 5GS Encryption Algorithm 5G-EA7 = .....0 Not Supported
0068 5GS Encryption Algorithm 5G-EA6 = .....0. Not Supported
0068 5GS Encryption Algorithm 5G-EA5 = .....0... Not Supported
0068 5GS Encryption Algorithm 5G-EA4 = .....0... Not Supported
0068 5GS Encryption Algorithm 128-5G-EA3 = .....0... Not Supported
0068 5GS Encryption Algorithm 128-5G-EA2 = .....0... Not Supported
0068 5GS Encryption Algorithm 128-5G-EA1 = .1..... Supported
  
```

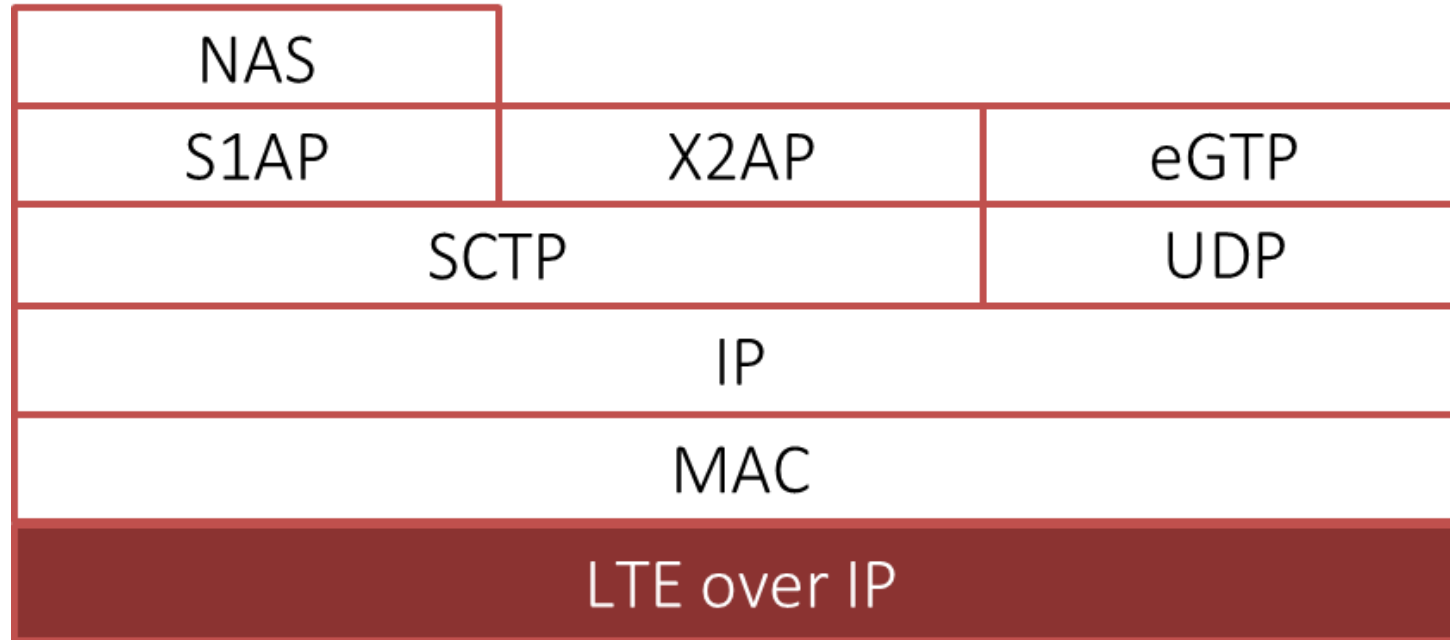
Capture Rate : 0.02 Mbps

C:\Program Files\GL Communications Inc\Packe Captured 11 586 frames

Missed Frames : 0

LTE

LTE Protocol Stack



- Decode and analyze full LTE protocol stack
- Test eNodeB or UE over S1, S3, S4, S5 (or S8), S6a, S10, S11, S13 and X2 interfaces of the LTE network
- The protocols supported for decoding across all these interfaces are NAS, S1AP, X2AP, eGTP, GTP-U, Diameter, SCTP, UDP, TCP, and IP

Supported Protocols

Supported Protocols	Standard / Specification Used
SCTP	RFC 2960
S1AP	3GPP TS 36.413 V9.0.0
X2AP	3GPP TS 36.423 V9.0.0
eGTP	3GPP TS 29.274 V8.0.0
NAS	3GPP TS 24.301 V9.0.0

Detail View – LTE Protocol

- The detail decode view of LTE call displays the following:

- MAC Layer
- IP Layer
- UDP Layer
- eGTP Layer
- S1AP Layer

```
000F Delay = ...0... Normal Delay
000F Throughput = ...0... Normal Throughput
000F Reliability = ...0... Normal Reliability
000F Reserved for Future Use = .....00 (0)
0010 Total Length = 67 (x0043)
0012 Identification = 35445 (x8A75)
0014 Reserved = 0..... (0)
0014 DF = .0..... May Fragment
0014 MF = ..0..... Last Fragment
0014 Fragment Offset = 0 (...00000 00000000)
0016 Time To Live = 128 (x80)
0017 Protocol = 00010001 User Datagram
0018 Header Check Sum = x2BEB
001A Source IP Address = 192.168.1.84 (xC0A80154)
001E Destination IP Address = 192.168.1.165 (xC0A801A5)
===== UDP Layer =====
0022 Source Port = 2124 (x084C)
0024 Destination Port = 2123 (x084B)
0026 Length (Header + Data) = 47 (x002F)
0028 Checksum = 9289 (x2449)
===== eGTP R8 Layer =====
002A TEID = ....1... TEID Present
002A Piggybacking (P) = ...0... No piggybacked message
002A Version = 010..... GTP-C
002B Message Type = 01000000 Modify Bearer Command
002C Length = 35 (x0023)
002E Tunnel Endpoint Identifier = 1 (x00000001)
0032 Sequence Number = 0 (x0000)
APN-Aggregate Maximum Bit Rate (APN-AMBR) =
0036 Information Element Id = 01001000 Aggregate Maximum Bit Rate (AMBR)
0037 Length = 8 (x0008)
0039 Instance = ...0000 (0)
0039 Comprehension Required (CR) = 000..... (0)
Aggregate Maximum Bit Rate-Down Link = 0 (x00)
Aggregate Maximum Bit Rate-Up Link = 0 (x00)
Aggregate Maximum Bit Rate-Down Link (Extended) = 0 (x00)
Aggregate Maximum Bit Rate-Up Link (Extended) = 0 (x00)
Aggregate Maximum Bit Rate-Down Link (Extended-2) = 0 (x00)
Aggregate Maximum Bit Rate-Up Link (Extended-2) = 0 (x00)
AMBR-Specific Data = x0000
```

Call Detail View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Dev	Frame#	TIME (Relative)	Len	Error	Protocols	Source IP Address	Destination IP Address	SCTP Chunk Type	SCTP Source Port	SCTP Destination Port
✓ 1	0	00:00:00.000000	82		Internet IP(IPv4)	192.168.1.84	192.168.1.165	INIT Chunk	36412	36412
✓ 1	1	00:00:02.137817	82		Internet IP(IPv4)	192.168.1.165	192.168.1.84	INIT Chunk	36412	36412
✓ 1	2	00:00:02.138900	198		Internet IP(IPv4)	192.168.1.84	192.168.1.165	INIT ACK Chunk	36412	36412
✓ 1	3	00:00:02.153674	178		Internet IP(IPv4)	192.168.1.165	192.168.1.84	COOKIE ECHO Chunk	36412	36412
✓ 1	4	00:00:02.153925	50		Internet IP(IPv4)	192.168.1.84	192.168.1.165	COOKIE ACK Chunk	36412	36412
✓ 1	5	00:00:11.130704	122		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	36412	36412
✓ 1	6	00:00:11.203394	102		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	36412	36412

Call ID	Call Status	Protocol	Call Originating (Nu...	Call Destination (Nu...	Call Start Date & Time	Call Duration	Protocol Specific
0	Completed	LTE	192.168.1.84	192.168.1.165	2012-04-23 15:35:52.581680	00:00:09.850198	<eNodeB S1AP Id> 1 <MME S1AP Id> 1 <Mobile Id> 9886915860 <S1 Release Cause> release-due-to
1	Completed	LTE	192.168.1.84	192.168.1.165	2012-04-23 15:36:06.657334	00:00:19.982239	<eNodeB S1AP Id> 2 <MME S1AP Id> 2 <Mobile Id> 9886915860 <S1 Release Cause> release-due-to
2	Completed	LTE	192.168.1.84	192.168.1.165	2012-04-23 15:36:32.347614	00:00:11.768413	<eNodeB S1AP Id> 3 <MME S1AP Id> 3 <Mobile Id> 9886915860 <S1 Release Cause> release-due-to

Off-line Viewing C:\Program Files (x86)\GL Communications Inc\Pack 107 Frames

Statistics View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Dev	Frame#	TIME (Relative)	Len	Error	eGTP v8 Messages	Protocols	Source IP Address	Destination IP Address
✓ 1	0	00:00:00.000000	211		Create Session Request	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	1	00:00:00.148442	120		Create Session Response	Internet IP(IPv4)	192.168.1.165	192.168.1.84
✓ 1	2	00:00:01.686761	92		Update User Plane Request	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	3	00:00:01.695531	93		Update User Plane Response	Internet IP(IPv4)	192.168.1.165	192.168.1.84
✓ 1	4	00:00:04.349182	81		Bearer Resource Command	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	5	00:00:04.358175	116		Create Bearer Request	Internet IP(IPv4)	192.168.1.165	192.168.1.84
✓ 1	6	00:00:04.406025	106		Create Bearer Response	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	7	00:00:05.582507	81		Bearer Resource Command	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	8	00:00:05.589399	92		Update Bearer Request	Internet IP(IPv4)	192.168.1.165	192.168.1.84
✓ 1	9	00:00:05.649283	80		Update Bearer Response	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	10	00:00:08.428547	87		Bearer Resource Command	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	11	00:00:08.435473	64		Delete Bearer Request	Internet IP(IPv4)	192.168.1.165	192.168.1.84
✓ 1	12	00:00:08.483746	70		Delete Bearer Response	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	13	00:00:10.539146	65		Modify Bearer Request	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	14	00:00:10.547424	65		Modify Bearer Response	Internet IP(IPv4)	192.168.1.165	192.168.1.84

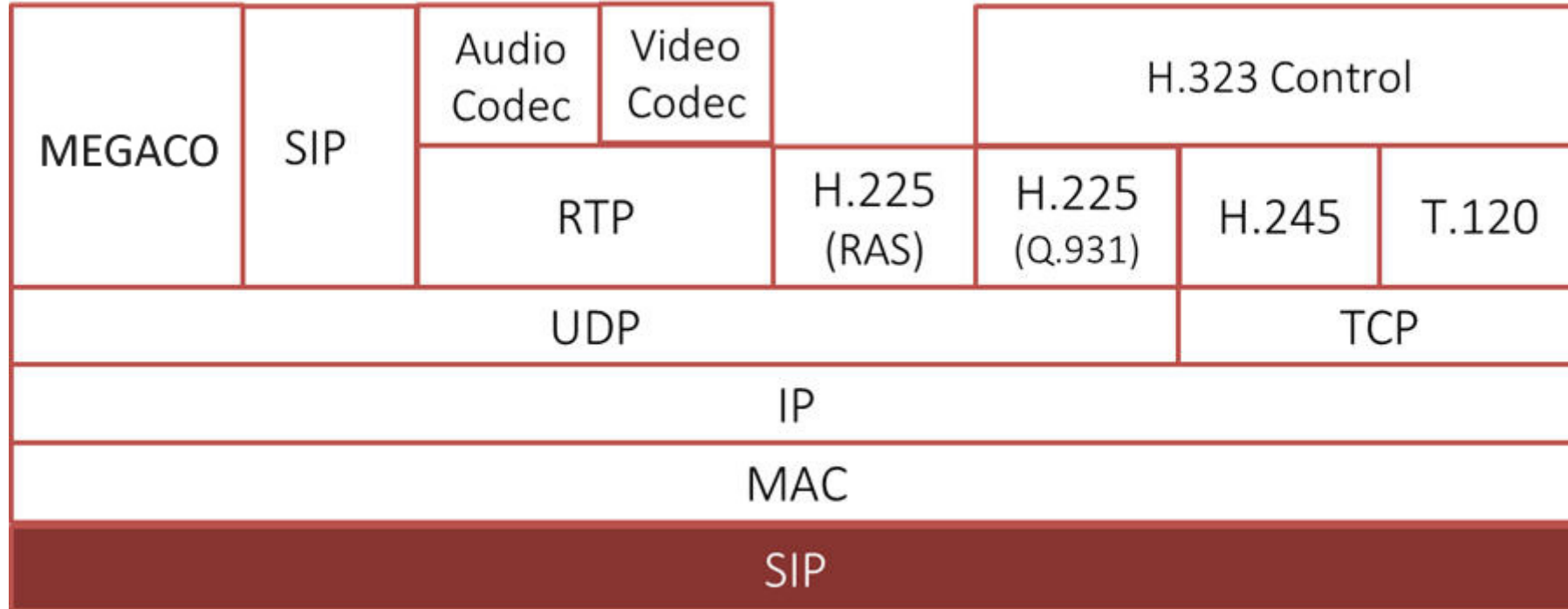
Message Type

- Create Session Request (32)
- Create Session Response (33)
- Update User Plane Request (34)
- Update User Plane Response (35)
- Modify Bearer Request (36)
- Modify Bearer Response (37)
- Bearer Resource Command (68)
- Create Bearer Request (95)
- Create Bearer Response (96)
- Update Bearer Request (97)
- Update Bearer Response (98)
- Delete Bearer Request (99)
- Delete Bearer Response (100)

C:\Program Files (x86)\GL Communic 15 Frames

SIP, MGCP, MEGACO, H.323

SIP, MGCP, MEGACO, H.323, Skinny



- Test IP phones, Gateways, IP Routers and Switches, and Proxies
- Detail Packet Data Analysis (PDA) and extensive graphical reports

Supported Protocols

Supported Protocols	Standard / Specification Used
MAC	IEEE 802.3
IP	RFC 791
TCP	RFC 793
UDP	RFC768
MEGACO	RFC 3525 and 3015
SIP	RFC 3261
SIP-I	Q.1912.5
SIP-T	IETF RFC 3372
RTP	RFC 3550
RTCP	RFC 3605
SCCP	Cisco proprietary

Detail View – MEGACO

- The detail decode view of MEGACO call displays the following:

- MAC layer
- IP Layer
- UDP Layer
- MEGACO Layer

```
PacketScan (VPA) Megaco3525
File View Capture Statistics Database Call Detail Records Configure Help
-----
Dev  Frame#  TIME (Relative)  Len  Error  Protocols  Source IP Address  Destination IP Address  IP Packet
-----
✓ 1      7      00:00:25.447443  84    Internet IP(IPv4)  192.168.1.167  192.168.1.105  MEGACO

Device1 Frame=7 at 00:00:25.447443 OK Len=84
Ethernet Frame Data
----- MAC Layer -----
Destination Address      = x0050BAC1A951
Source Address           = x0090BB15C66C
Length/Protocol Type     = x0800 Internet IP(IPv4)
----- IP Layer -----
Version                  = 0100.... (4)
Internet Header Length (In 32 bit words) = ....0101 (5)
Type of Service
Precedence               = 110.... Internetwork Control
Delay                    = ...0.... Normal Delay
Throughput               = ....0... Normal Throughput
Reliability              = .....0.. Normal Reliability
Reserved for Future Use  = .....00 (0)
Total Length             = 70 (x0046)
Identification          = 10 (x000A)
Reserved                 = 0..... (0)
DF                       = .0..... May Fragment
MF                       = ..0..... Last Fragment
Fragment Offset          = 0 (...000000 00000000)
Time To Live             = 128 (x80)
Protocol                 = 00010001 User Datagram
Header Check Sum         = xB57C
Source IP Address        = 192.168.1.167 (xC0A801A7)
Destination IP Address   = 192.168.1.105 (xC0A80169)
----- UDP Layer -----
Source Port              = 2944 (x0B80)
Destination Port        = 2944 (x0B80)
Length (Header + Data)  = 50 (x0032)
Checksum                = 61839 (xF18F)
----- Megaco Layer -----
MEGACO                  = MEGACO/1 [192.168.1.167]:2944 Pending=20{}
```

Detail View – MGCP

- The detail decode view of MGCP call displays the following: MAC layer

- MAC Layer
- IP Layer
- UDP Layer
- MGCP Layer

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

Dev	Frame#	TIME (Relative)	Len	Error	APN	ClientType	Protocols	IP Packet Type	NSAP Operation
✓ 0	21	00:01:50.691200	97				Internet IP(IPv4)	MGCP	
✓ 0	22	00:01:50.692394	53				Internet IP(IPv4)	MGCP	

Device0 Frame=21 at 00:01:50.691200 OK Len=97

Ethernet Frame Data

```
===== MAC Layer =====
0000 Destination Address      = x000F3DDEEBED
0006 Source Address          = x00908F33A6AC
000C Length/Protocol Type    = x0800 Internet IP(IPv4)
===== IP Layer =====
000E Version                  = 0100.... (4)
000E Internet Header Length (In 32 bit words) = ....0101 (5)
      Differentiated Services Field
000F Differentiated Services Codepoint      = 101000.. Class Selector 5
000F Explicit Congestion Notification      = .....00 Not-ECT (Not ECN-Capable Transport)
0010 Total Length                = 83 (x0053)
0012 Identification              = 19 (x0013)
0014 Reserved Bit                = 0..... Not Set
0014 Don't fragment              = .0..... Not Set
0014 More fragments              = ..0..... Not Set
0014 Fragment Offset             = 0 (...00000 00000000)
0016 Time To Live                = 64 (x40)
0017 Protocol                    = 00010001 User Datagram
0018 Header Check Sum            = xBC20
001A Source IP Address           = 192.168.30.106 (xC0A81E6A)
001E Destination IP Address      = 192.168.30.12 (xC0A81E0C)
===== UDP Layer =====
0022 Source Port                 = 2427 (x097B)
0024 Destination Port           = 2427 (x097B)
0026 Length (Header + Data)      = 63 (x003F)
0028 Checksum                    = 9056 (x2360)
===== MGCP Layer =====
MGCP                             = NTFY 2076 ACgw1@AudioCodes.com MGCP 1.0
MGCP                             = X: 58
MGCP                             = O: hu
```

Off-line Viewing C:\Program Files\GL Communications\25 Frames

Detail View – H.323

- The detail decode view of H.323 call displays the following:

- MAC Layer
- IP layer
- TCP Layer
- TPKT Header Layer
- H225 Q.931 Call Signaling Layer
- H225 Call Layer
- H245 Layer

```
Urgent Pointer = x0000
----- TPKT Header Layer -----
TPKT Hdr
  Version = 3 (x03)
  Reserved = 00000000 (0)
  Length = 326 (x0146)
----- H225 Q.931 Call Signaling Layer -----
Protocol Discriminator = 00001000 Q931/I.451 user-network call control
Call Reference Length = ...0010 (2)
Call Reference Value = 30357 (.1110110 10010101)
Call Reference Flag = 1..... TO side that originated callref
Message Type = 00000001 ALERTING
  IEI Display = 00101000 Display IE Identifier
  IE Length = 9 (x09)
  Display Information = x4E61676172616A7300
  IEI User User = 01111110 User User IE Identifier
  IE User User Length = 303 (x012F)
  Protocol Discriminator(H323) = 00000101 X.680 and X.690 coded user information
----- H225 Call Layer -----
H323-UserInformation = SEQUENCE
  Extensibility Marker = 0
  Preamble = 0
  h323-uu-pdu = SEQUENCE
  Extensibility Marker = 1
  Preamble = 0
  h323-message-body = CHOICE
  Extensibility Marker = 0
  Choice Index = 3
  alerting = SEQUENCE
  Extensibility Marker = 1
  Preamble = 0
  protocolIdentifier = OBJECTIDENTIFIER
  Length Determinant = 6
  Contents = 0.0.8.2250.0.4
  destinationInfo = SEQUENCE
  Extensibility Marker = 0
  Preamble = 010001
  vendor = SEQUENCE
  Extensibility Marker = 0
  Preamble = 11
  vendor = SEQUENCE
```

Call Detail View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

225 GoTo

Dev	Frame#	TIME (Relative)	Len	Error	Protocols	IP Packet Type	Source IP Address	Destination IP Address	UDP Source Port	UDP Destination Port
✓ 2	10	00:00:02.903378	354		Internet IP(IPv4)	SIP	192.168.1.103	192.168.1.200	54098	5060
✓ 2	11	00:00:02.905023	355		Internet IP(IPv4)	SIP	192.168.1.103	192.168.1.200	54098	5060
✓ 2	12	00:00:02.905180	820		Internet IP(IPv4)	SIP	192.168.1.103	192.168.1.200	54098	5060
✓ 2	4513	00:01:13.847419	258		Internet IP(IPv4)	MEGACO	192.168.1.167	192.168.1.105	2944	2944
✓ 2	4514	00:01:13.870981	60		ARP					
✓ 2	4515	00:01:13.913507	244		Internet IP(IPv4)	MEGACO	192.168.1.105	192.168.1.167	2944	2944
✓ 2	4516	00:01:14.037155	60		ARP					
✓ 2	4517	00:01:14.228370	157		Internet IP(IPv4)	MEGACO	192.168.1.167	192.168.1.105	2944	2944
✓ 2	4518	00:01:14.248422	152		Internet IP(IPv4)	MEGACO	192.168.1.105	192.168.1.167	2944	2944
✓ 2	4640	00:01:40.473039	188		Internet IP(IPv4)	H225	192.168.1.182	192.168.1.200		
✓ 2	4641	00:01:40.483019	385		Internet IP(IPv4)	H225	192.168.1.182	192.168.1.200		
✓ 2	4642	00:01:40.513937	85		Internet IP(IPv4)	H225	192.168.1.200	192.168.1.182		
✓ 2	4643	00:01:40.522101	260		Internet IP(IPv4)	H225	192.168.1.182	192.168.1.200		
✓ 2	4644	00:01:40.525157	92		Internet IP(IPv4)		192.168.1.66	192.168.1.255	137	137
✓ 2	4645	00:01:40.583990	82		Internet IP(IPv4)	H225	192.168.1.182	192.168.1.200		
✓ 2	4646	00:01:40.598697	82		Internet IP(IPv4)	H225	192.168.1.200	192.168.1.182		
✓ 2	4647	00:01:40.603843	294		Internet IP(IPv4)		192.168.1.182	192.168.1.200	5010	5004
✓ 2	4648	00:01:40.643512	92		Internet IP(IPv4)		192.168.1.160	192.168.1.255	137	137
✓ 2	4649	00:01:40.785617	60		ARP					

Call ID	Call Status	Protocol	Call Originating (Number / Address)	Call Destination (Number / Address)	Call Start Date & Time
0	Completed	SIP	0001@192.168.1.200	0001@192.168.1.103	2012-04-16 13:58:50.705427
1	Completed	H323	x0059006100640061006C006C0069		2012-04-16 14:00:28.275014
2	Completed	H323	x0059006100640061006C006C0069		2012-04-16 14:00:43.748387
3	Completed	SIP	4000@192.168.1.60	1000@192.168.1.60	2012-04-16 14:02:03.137242
4	Completed	SIP	test4@192.168.10.45	test3@192.168.10.14	2012-04-16 14:05:52.455292

Off-line Viewing C:\Program Files\GL Communications Inc\F 20 102 Frames

Statistics View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

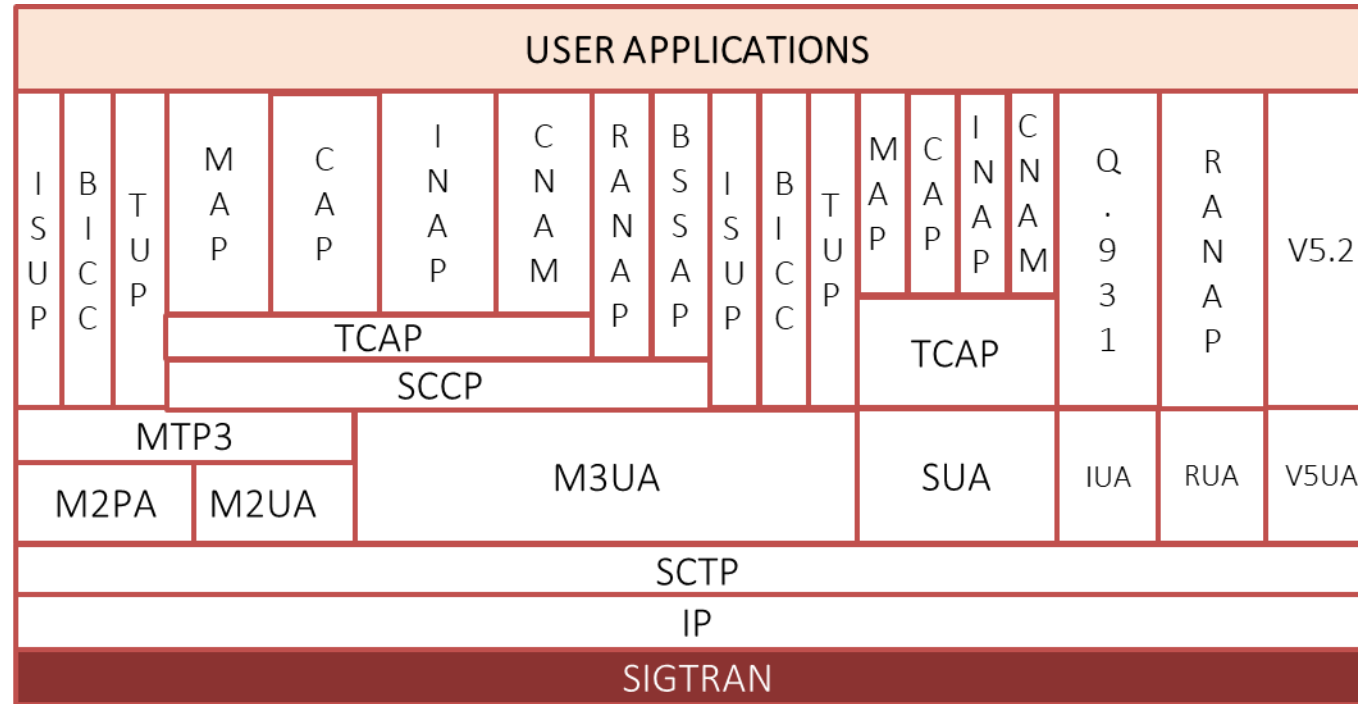
0 GoTo

Dev	Frame#	TIME (Relative)	Len	Error	Protocols	IP Pac...	Source IP Address	Destination IP A...	UDP Source ...	UDP Destination ...	SIP Method
✓ 2	6	00:00:03.253412	903		Internet IP(IPv4)	SIP	192.168.1.60	192.168.1.244	5060	5060	SIP/2.0 200 OK
✓ 2	7	00:00:03.268177	537		Internet IP(IPv4)	SIP	192.168.1.244	192.168.1.60	5060	5060	ACK
✓ 2	8	00:00:03.297312	214		Internet IP(IPv4)	RTP	192.168.1.244	192.168.1.60	5004	5004	
✓ 2	9	00:00:03.298763	214		Internet IP(IPv4)	RTP	192.168.1.60	192.168.1.244	5004	5004	
✓ 2	10	00:00:03.317288	214		Internet IP(IPv4)	RTP	192.168.1.244	192.168.1.60	5004	5004	
✓ 2	11	00:00:03.318628	214		Internet IP(IPv4)	RTP	192.168.1.60	192.168.1.244	5004	5004	
✓ 2	12	00:00:03.337275	214		Internet IP(IPv4)	RTP	192.168.1.244	192.168.1.60	5004	5004	
✓ 2	13	00:00:03.338604	214		Internet IP(IPv4)	RTP	192.168.1.60	192.168.1.244	5004	5004	
✓ 2	14	00:00:03.357271	214		Internet IP(IPv4)	RTP	192.168.1.244	192.168.1.60	5004	5004	

SIP CSeq	Frame Count(SIP CSeq)
20 ACK	1
total 20 ACK	1
20 INVITE	4
total 20 INVITE	4
21 ACK	1
total 21 ACK	1
21 INVITE	3
total 21 INVITE	3
22 BYE	2
total 22 BYE	2

C:\Program Files\GL Communications Inc\PacketScan 6 500 Frames

SIGTRAN Protocol Stack



- Decode and analyze SCTP, and user adaptation (UA) layers such as M2UA, M3UA, M2PA, SUA, IUA, ISUP and GSM MAP
- Permits testing and verification of Signaling Gateways

Supported Protocols

Supported Protocols	Standard / Specification Used
SCTP	RFC 2960
M2UA	RFC 3331
M2PA	RFC 4165
SUA ITU	RFC 3868
SUA ANSI	Internet Engineering Task Force: Draft 2026 (sec.10)
M3UA ITU	RFC 3332
M3UA ANSI	RFC 3332
MTP3 ITU	ITU-Y Q.701-Q.705 / ITU-T Q.782
MTP3 ANSI	T1.111.4-1996
IUA	RFC 4233 / RFC 5133
BICC	BICC pl-080r1, T-REC-Q.1902.2-07/2001, T-REC-Q.1902.3-07/2001
INAP CS1 ITU / ETSI	Q1218 and ETS 300 374 1, Sept, 1994
INAP CS2 ITU	INAP - Capability Set 2. (Q.1228)
INAP CS2 ETSI	INAP - Capability Set 2. (EN 301 140-1-v1.3.4-1999-06)

Supported Protocols (Contd.)

Supported Protocols	Standard / Specification Used
CAMEL V3	3GPP TS 29.078 V3.15.0
CAMEL V6	3GPP TS 29.078 6.3.0 (2004-09)
MAP R99	3GPP TS 09.02 V7.14.0 (2003-09)
MAP R4	3GPP TS 29.002 V4.18.0
TUP ITU	T-REC-Q.723-11/1988
TCAP ITU	ITU-T Q.771 - Q.775
TCAP ANSI IS-41	TIA/EIA, IS41.1-C, IS41.5
SCCP ITU	ITU-T Q.711-Q.714
SCCP ANSI	ANSI rec. T.112 (1996), T1.116.2 (1996)
SCCP ETSI	EN 300 009 -1 ,sept 1996, 3rd edition
ISUP ETSI	EN 300 356 -1 V3.2.2(1998-08)
ISUP ANSI	ANSI - T1.113.1 to T1.113.4
DPNSS	BTNR 190:June 1992
DASS2	ND1301:2001/03
Q.931	ITU-T Q.931 / Q.932(Facility IE) / Q.955.3 (MLPP Procedures)

Detail View – SS7 SIGTRAN

- The detail decode view of SS7 SIGTRAN call displays the following:
 - MAC Layer
 - IP Layer
 - SCTP Layer
 - MTP3 Layer
 - ISUP Layer

The screenshot shows the PacketScan (All-in-One) interface. The top window displays a table of captured packets:

Dev	Frame#	TIME (Relative)	Len	Error	Protocols	Source IP Address	Destination IP Address
✓ 1	0	00:00:00.000000	114		Internet IP(IPv4)	192.168.1.84	192.168.1.85
✓ 1	1	00:00:00.328550	94		Internet IP(IPv4)	192.168.1.85	192.168.1.84
✓ 1	2	00:00:04.355877	90		Internet IP(IPv4)	192.168.1.85	192.168.1.84
✓ 1	3	00:00:09.161943	94		Internet IP(IPv4)	192.168.1.84	192.168.1.85
✓ 1	4	00:00:09.217195	98		Internet IP(IPv4)	192.168.1.85	192.168.1.84

The bottom window shows the detailed decode view for the selected packet, specifically the ISUP Layer:

```
===== ISUP Layer =====  
0056 Circuit Identification Code = 00000001 ....0000 (1)  
0058 Message Type = 00000001 Initial address  
Mandatory Fixed Parameters =  
Nature Of Connection Indicators Parameter =  
0059 Satellite indicator = .....00 no satellite circuit in the connection  
0059 Continuity check indicator = .....00.. continuity check not required  
0059 Echo ctrl dev ind(Nat.Conn.Ind) = ...0.... outgoing echo control device not included  
Forward Call Indicators Parameter =  
005A National/international call ind = .....0 treated as a national call  
005A End-to-end method indicator = .....00.. No end-to-end method available  
005A Interworking Indicator = ...0.... no interworking encountered (No. 7 signalling all the way)  
005A End-to-end infor.ind(ForwardCall.Ind) = ...0.... not available  
005A ISDN User Part Indicator = ..0.... not used all the way  
005A ISDN User Part Preferences Indicators = 00..... preferred all the way (default)  
005B ISDN Access Ind(ForwardCall Ind) = .....0 Originating Access non-ISDN  
005B SCCP method indicator = .....00.. No Indication  
005B Ported number translation indicator = ...0.... Number not translated  
Calling Party Category Parameter =  
005C Calling Party's Category = 00000000 calling party's category unknown (default)  
Transmission Medium Requirement Parameter =  
005D Transmission Medium Requirement = 00000000 speech  
005E Pointer to Mandatory Parameter = Parm0 offset x02 (2)  
005F Pointer to optional parameters = x08 (8)  
Mandatory Variable Length Parameters =  
Called Party Number = mandatory parameter  
0060 Parameter length = 6  
0061 Nature of add.ind(CalledParty#) = .0000100 international number  
0061 Odd/even Indicator = 1..... odd number of digits  
0062 Spare = ....0000 (0)  
0062 Numbering Plan Indicator = .001.... ISDN (Telephony) numbering plan(Recommendation E.164)  
0062 Internal Network Number Indic = 0..... routing to internal network number allowed
```

Detail View – ISDN SIGTRAN

- The detail decode view of ISDN SIGTRAN call displays the following:
 - MAC Layer
 - IP Layer
 - SCTP Layer
 - ISDN Q.921 Layer
 - Q.93x-Layer 3

The screenshot shows the PacketScan (All-in-One) interface. The top menu includes File, View, Capture, Statistics, Database, Call Detail Records, Configure, and Help. Below the menu is a toolbar with various icons and a search box containing '0'. The main window is divided into two panes. The upper pane is a table with the following columns: Dev, Frame#, TIME (Relative), Len, Error, Protocols, Source IP Address, and Destination IP Address. The lower pane shows a detailed protocol decode for the selected packet (Frame 0).

Dev	Frame#	TIME (Relative)	Len	Error	Protocols	Source IP Address	Destination IP Address
✓ 1	0	-00:03:48.331315	134		Internet IP(IPv4)	192.168.1.84	192.168.1.85
✓ 1	1	-00:03:48.052508	102		Internet IP(IPv4)	192.168.1.85	192.168.1.84
✓ 1	2	-00:03:48.031304	98		Internet IP(IPv4)	192.168.1.85	192.168.1.84
✓ 1	3	-00:03:42.996826	98		Internet IP(IPv4)	192.168.1.85	192.168.1.84
✓ 1	4	-00:03:42.953161	98		Internet IP(IPv4)	192.168.1.84	192.168.1.85
✓ 1	5	-00:03:27.922000	102		Internet IP(IPv4)	192.168.1.84	192.168.1.85
✓ 1	6	-00:03:27.865631	102		Internet IP(IPv4)	192.168.1.85	192.168.1.84


```
0036 Stream Identifier = 10 (x000A)
0038 Stream Sequence Number = 0 (x0000)
003A Payload Protocol Identifier = x00000001 ISDN User Adaptation Layer(IUA)
===== ISDN Q.921-User Adaptation Layer Layer =====
003E Version = 00000001 Release 1.0
0040 Message Class = 00000101 Q.921/Q.931 Boundary Primitives Transport
0041 QPTM Message Type = 00000010 Data Indication Message
0042 Message Length = 69 (x00000045)
0046 Tag = 1 (x0001)
0048 Length = 8 (x0008)
004A Interface Identifier (integer) = 0 (x00000000)
004E Tag = 5 (x0005)
0050 Length = 8 (x0008)
0052 SAPI(Service Access Point Identifier) = 000000.. (0)
0053 TEI(Terminal Endpoint Identifier) = 0000001. (1)
Protocol Data =
0056 Tag = 14 (x000E)
0058 Length = 45 (x002D)
Higher Layer Data = x0802000105A104038090A31803A183816C0B218031313131
```

Call Detail View of SS7 SIGTRAN

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Dev	Frame#	TIME (Relative)	Len	Error	Protocols	Source IP Address	Destination IP Address	SCTP Chunk Type	SCTP Source Port	SCTP Destination
✓ 1	0	00:00:00.000000	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000	8000
✓ 1	1	00:00:00.000050	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000	8000
✓ 1	2	00:00:00.000080	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000	8000
✓ 1	3	00:00:00.000110	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000	8000
✓ 1	4	00:00:00.000139	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000	8000
✓ 1	5	00:00:00.000168	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000	8000
✓ 1	6	00:00:00.000196	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000	8000
✓ 1	7	00:00:00.000225	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000	8000
✓ 1	8	00:00:00.050775	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000	8000

Call ID	Call Status	Protocol	Call Originating (Number / Address)	Call Destination (Number / Address)	Call Start Date & Time	Call Duration	Protocol Specific Info
0	Completed	ISUP	1111111	9999991	2011-05-16 14:31:54.902003	00:00:10.930458	<CIC> 1 <Disposition> 1 <Release Com...
1	Completed	ISUP	1111112	9999992	2011-05-16 14:31:54.902053	00:00:10.930457	<CIC> 2 <Disposition> 1 <Release Com...
2	Completed	ISUP	1111113	9999993	2011-05-16 14:31:54.902083	00:00:10.930459	<CIC> 3 <Disposition> 1 <Release Com...
3	Completed	ISUP	1111114	9999994	2011-05-16 14:31:54.902113	00:00:10.930458	<CIC> 4 <Disposition> 1 <Release Com...
4	Completed	ISUP	1111115	9999995	2011-05-16 14:31:54.902142	00:00:10.930461	<CIC> 5 <Disposition> 1 <Release Com...
5	Completed	ISUP	1111116	9999996	2011-05-16 14:31:54.902171	00:00:10.930462	<CIC> 6 <Disposition> 1 <Release Com...
6	Completed	ISUP	1111117	9999997	2011-05-16 14:31:54.902199	00:00:10.930464	<CIC> 7 <Disposition> 1 <Release Com...

Off-line Viewing C:\Program Files (x86)\GL Communications Inc 95 Frames

Call Detail View of ISDN SIGTRAN

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Dev	Frame#	TIME (Relative)	Len	Error	Message Type	Protocols	Source IP Address	Destination IP Address	SCTP Chunk Type	SCTP Source Port	SCTP Destination Port
✓ 1	0	00:00:00.000000	134		SETUP	Internet IP(IPv4)	192.168.1.85	192.168.1.201	DATA Chunk	9900	9900
✓ 1	1	00:00:00.002111	102		CALL PROCEEDING	Internet IP(IPv4)	192.168.1.201	192.168.1.85	DATA Chunk	9900	9900
✓ 1	2	00:00:00.002319	98		ALERTING	Internet IP(IPv4)	192.168.1.201	192.168.1.85	DATA Chunk	9900	9900
✓ 1	3	00:00:00.061529	62			Internet IP(IPv4)	192.168.1.201	192.168.1.85	SACK Chunk	9900	9900
✓ 1	4	00:00:00.078435	62			Internet IP(IPv4)	192.168.1.85	192.168.1.201	SACK Chunk	9900	9900
✓ 1	5	00:00:05.021452	98		CONNECT	Internet IP(IPv4)	192.168.1.201	192.168.1.85	DATA Chunk	9900	9900
✓ 1	6	00:00:05.022907	98		CONNECT ACKNOWLEDGE	Internet IP(IPv4)	192.168.1.85	192.168.1.201	DATA Chunk	9900	9900
✓ 1	7	00:00:05.097595	62			Internet IP(IPv4)	192.168.1.85	192.168.1.201	SACK Chunk	9900	9900
✓ 1	8	00:00:05.101189	62			Internet IP(IPv4)	192.168.1.201	192.168.1.85	SACK Chunk	9900	9900

Call ID	Call Status	Protocol	Call Originating (Number / Address)	Call Destination (Number / Address)	Call Start Date & Time	Call Duration	Protocol Specific Info
0	Completed	ISDN	111111110	999999990	2012-04-23 16:00:56.444547	00:00:35.039220	<CRV>4 <Release Complete Cause> Normal call clearing

Off-line Viewing C:\Program Files (x86)\GL Communications Inc\Pa 18 Frames

Statistics View of SS7 SIGTRAN

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Dev	Frame#	TIME (Relative)	Len	Error	Protocols	Source IP Address	Destination IP Address	SCTP Chunk Type	SCTP Source Port
✓ 1	0	00:00:00.000000	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	1	00:00:00.000050	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	2	00:00:00.000080	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	3	00:00:00.000110	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	4	00:00:00.000139	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	5	00:00:00.000168	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	6	00:00:00.000196	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	7	00:00:00.000225	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	8	00:00:00.050775	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	9	00:00:00.050820	114		Internet IP(IPv4)	192.168.1.96	192.168.1.160	DATA Chunk	8000
✓ 1	10	00:00:00.175811	94		Internet IP(IPv4)	192.168.1.160	192.168.1.96	DATA Chunk	8000
✓ 1	11	00:00:00.175851	94		Internet IP(IPv4)	192.168.1.160	192.168.1.96	DATA Chunk	8000
✓ 1	12	00:00:00.175891	94		Internet IP(IPv4)	192.168.1.160	192.168.1.96	DATA Chunk	8000
✓ 1	13	00:00:00.175924	94		Internet IP(IPv4)	192.168.1.160	192.168.1.96	DATA Chunk	8000

Message Type	Frame Count(Message Type)
Initial address (1)	21
Address complete (6)	20
Answer (9)	20
Release (12)	20
Release Complete (16)	14

C:\Program Files (x86)\GL Communicati 95 Frames

Statistics View of ISDN SIGTRAN

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

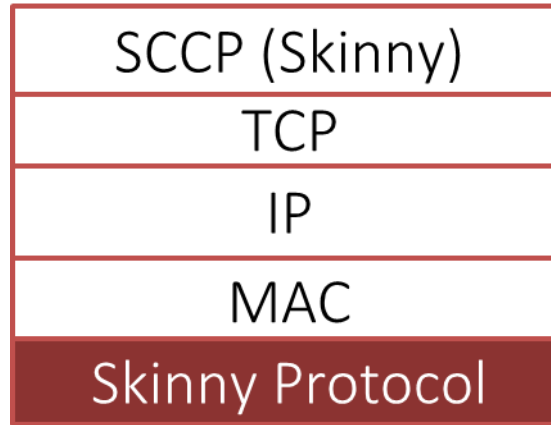
Dev	Frame#	TIME (Relative)	Len	Error	Message Type	Protocols	Source IP Address	Destination IP Address
✓ 1	0	00:00:00.000000	134		SETUP	Internet IP(IPv4)	192.168.1.85	192.168.1.201
✓ 1	1	00:00:00.002111	102		CALL PROCEEDING	Internet IP(IPv4)	192.168.1.201	192.168.1.85
✓ 1	2	00:00:00.002319	98		ALERTING	Internet IP(IPv4)	192.168.1.201	192.168.1.85
✓ 1	3	00:00:00.061529	62			Internet IP(IPv4)	192.168.1.201	192.168.1.85
✓ 1	4	00:00:00.078435	62			Internet IP(IPv4)	192.168.1.85	192.168.1.201
✓ 1	5	00:00:05.021452	98		CONNECT	Internet IP(IPv4)	192.168.1.201	192.168.1.85
✓ 1	6	00:00:05.022907	98		CONNECT ACKNOWLEDGE	Internet IP(IPv4)	192.168.1.85	192.168.1.201
✓ 1	7	00:00:05.097595	62			Internet IP(IPv4)	192.168.1.85	192.168.1.201
✓ 1	8	00:00:05.101189	62			Internet IP(IPv4)	192.168.1.201	192.168.1.85
✓ 1	9	00:00:35.036567	102		DISCONNECT	Internet IP(IPv4)	192.168.1.85	192.168.1.201
✓ 1	10	00:00:35.037847	102		RELEASE	Internet IP(IPv4)	192.168.1.201	192.168.1.85
✓ 1	11	00:00:35.039220	98		RELEASE COMPLETE	Internet IP(IPv4)	192.168.1.85	192.168.1.201
✓ 1	12	00:00:35.098979	62			Internet IP(IPv4)	192.168.1.201	192.168.1.85
✓ 1	13	00:00:35.115084	62			Internet IP(IPv4)	192.168.1.85	192.168.1.201
✓ 1	14	00:00:41.138564	102		RESTART	Internet IP(IPv4)	192.168.1.85	192.168.1.201

Message Type	Frame Count(Message Type)	Frame Count(QPTM Message Type)
ALERTING (1)	1	1
CALL PROCEEDING (2)	1	1
SETUP (5)	1	1
CONNECT (7)	1	1
CONNECT ACKNOWLEDGE (15)	1	1
DISCONNECT (69)	1	1
RESTART (70)	1	1
RELEASE (77)	1	1
RESTART ACKNOWLEDGE (78)	1	1
RELEASE COMPLETE (90)	1	1

C:\Program Files (x86)\GL Communicati 18 Frames

SCCP (Skinny) over IP

Protocol Stack



- Skinny Client Control Protocol (SCCP), also referred to as "Skinny", is a Cisco Systems proprietary signaling and control protocol used to communicate between IP devices and Cisco Unified Communications Manager
- Allows call establishment, teardown, and call control features in VoIP environments

Supported Protocols

Supported Protocols	Standard / Specification Used
MAC	IEEE 802.3
IP	RFC 791
TCP	RFC 793
SCCP	Cisco proprietary

Detail View – SCCP (Skinny)

- The detail decode view of SCCP call displays the following:
 - MAC Layer
 - IP Layer
 - TCP Layer
 - Skinny Client Control Protocol Layer

The screenshot shows the PacketScan (All-in-One) interface. The top menu includes File, View, Capture, Statistics, Database, Call Detail Records, Configure, and Help. Below the menu is a toolbar with various icons and a search box containing '0'. The main window displays a table of network traffic:

Dev	Frame#	TIME (Relative)	Len	Protocols	Source IP Address	Destination IP Address	TCP Source Port	TCP Destination Port
✓ 0	32	00:00:38.995845	82	Internet IP(IPv4)	192.168.20.75	192.168.1.167	2000	51918
✓ 0	33	00:00:38.996066	78	Internet IP(IPv4)	192.168.20.75	192.168.1.167	2000	51918
✓ 0	34	00:00:38.996295	78	Internet IP(IPv4)	192.168.20.75	192.168.1.167	2000	51918
✓ 0	35	00:00:38.996508	70	Internet IP(IPv4)	192.168.20.75	192.168.1.167	2000	51918
✓ 0	36	00:00:38.996692	66	Internet IP(IPv4)	192.168.20.75	192.168.1.167	2000	51918

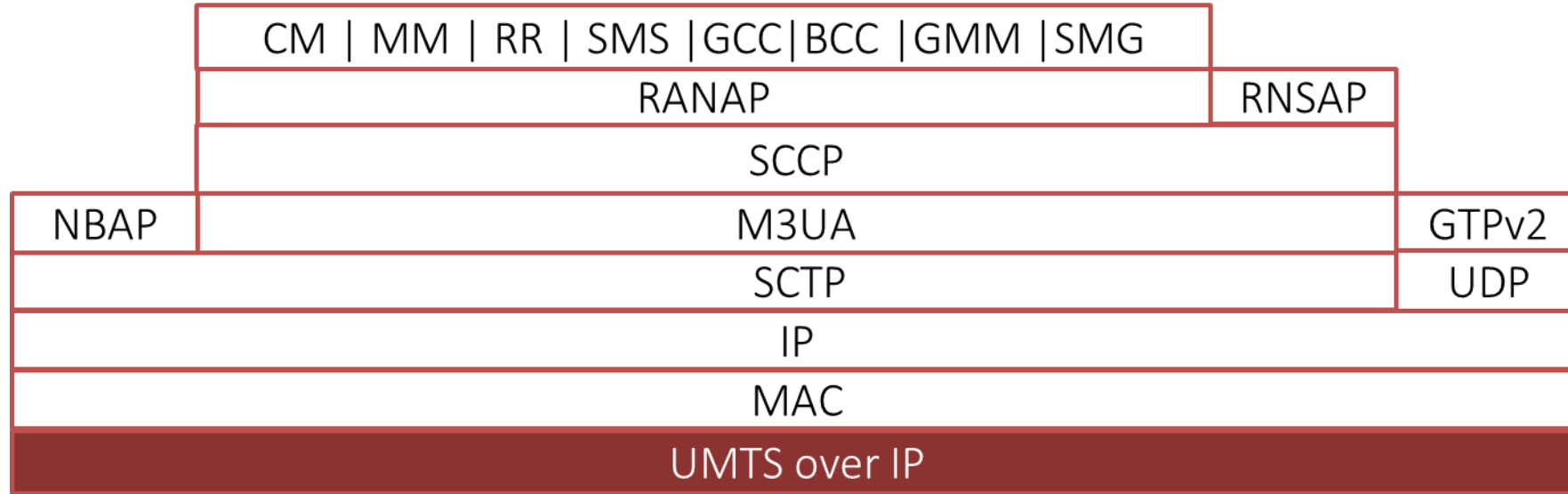
Below the table, the detailed decode view for the selected frame (Frame 36) is shown:

```
===== Skinny Client Control Protocol Layer =====  
Cisco Skinny  
0036 Length = 20 (x14000000)  
003A Header Version = 17 (x11000000) CM7 type B  
003E Message Type = 272 (x10010000) Select Soft Keys Message  
0042 Line Instance = 0 (x00000000)  
0046 Call Identifier = 0 (x00000000)  
004A Soft Key Set Description = 0 (x00000000) On Hook  
004E Soft Key 0 = .....1 Show  
004E Soft Key 1 = .....1. Show  
004E Soft Key 2 = .....1.. Show  
004E Soft Key 3 = .....1... Show  
004E Soft Key 4 = .....1.... Show  
004E Soft Key 5 = .....1..... Show  
004E Soft Key 6 = .....0..... Don't show  
004E Soft Key 7 = .....1..... Show  
004F Soft Key 8 = .....1.....1 Show  
004F Soft Key 9 = .....1..... Show  
004F Soft Key 10 = .....1..... Show  
004F Soft Key 11 = .....1..... Show  
004F Soft Key 12 = .....1..... Show  
004F Soft Key 13 = .....1..... Show  
004F Soft Key 14 = .....1..... Show  
004F Soft Key 15 = .....1..... Show
```

The status bar at the bottom indicates "Off-line Viewing" and the file path "E:\packetscan\Skinny_Test.hdl" with "161 Frames" loaded.

UMTS over IP

Protocol Stack



- Test RNC, MSC, Home NodeB (HnB) and Home NodeB Gateway (HN GW) entities
- Decode and analyze different control plane protocols i.e. NBAP, RNSAP, RANAP and more over IuCS, IuH, and IuPS interfaces

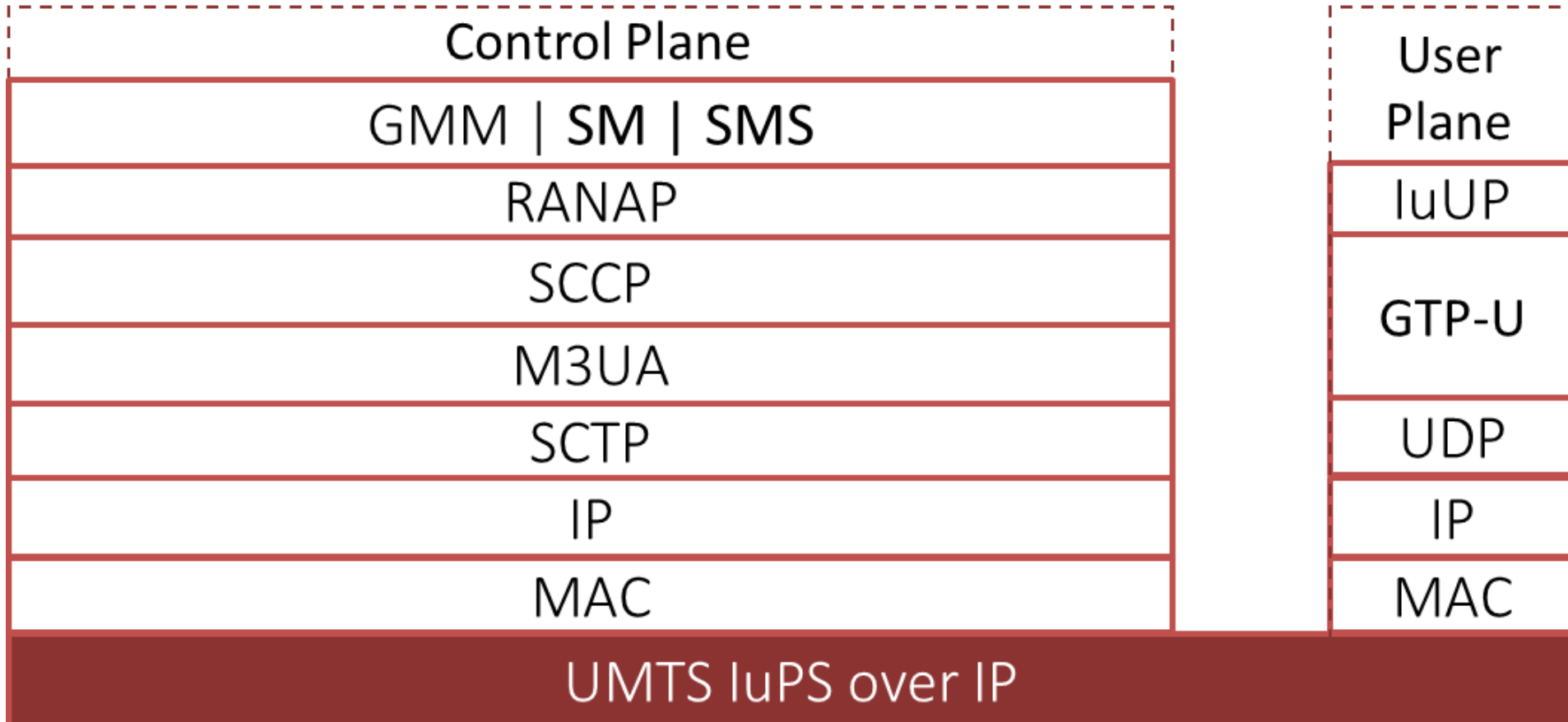
Supported Protocols

Supported Protocols	Standard / Specification Used
NBAP	3GPP TS 25.433 V6.3.0 (2004-09)
RANAP	3GPP TS 25.413 V6.3.0 (2004-09)
RNSAP	3GPP TS 25.423 V6.4.0 (2004-12)
SCCP ITU	ITU-T Q.711-Q.714
SCTP	RFC 2960
GMM (GPRS Mobility Management)	3GPP TS 24.008 V5.0.0
CC	3GPP TS 24.008 V5.0.0
MM	3GPP TS 24.008 V5.0.0
RR	3GPP TS 04.18 V8.13.0
GCC (Group Call Control)	3GPP TS 44.068 V9.0.0
BCC (Broadcast Call Control)	3GPP TS 44.069 V9.0.0
SMG (GPRS Session Management)	3GPP TS 24.008 V5.0.0
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0

UMTS over IP

- The detail decode view of UMTS over IP call displays the following:
 - UMTS over IP
 - MAC Layer
 - IP Layer
 - SCTP Layer
 - MTP3 Layer
 - SCCP Layer
 - RANAP Layer
 - GMM Layer
 - MM Layer
 - CC Layer

IuPS Protocol Stack



Detail View – luPS over IP

The screenshot shows the PacketScan (All-in-One) interface. The main window displays a table of captured packets. The selected packet (Frame 2) is shown in detail below the table. The detail view includes fields for Contents, Value, Length, SAPI, Extensibility Marker, and various GPRS Mobility Mgmt Layer parameters such as Protocol Discrim. Value, Skip indicator, Message Type, Type of algorithm, IMEISV request value, Force to standby value, AC reference No. Value, Authentication parameter RAND, IE Identifier(AP RAND), RAND value, GPRS ciphering key sequence No, IE Identifier(CKSNo), key sequence, Authentication parameterAUTN, IE Identifier(AP AUTN), Length, and RAND Value.

Device	Frame#	TIME (Relative)	Length (Bytes)	Error	Protocols	IP Packet Type
0	2	00:00:00.023977	150		Internet IP(IPv4)	
0	3	00:00:00.031938	118		Internet IP(IPv4)	

```
Contents = 1 ignore(1)
Value = Open Type
Length = 1
SAPI = ENUMERATOR
Extensibility Marker = 0
Contents = 0 sapi-0(0)
===== Gprs Mobility Mgmt Layer =====
0069 Protocol Discrim. Value = ....1000 GPRS MM mssgs
0069 Skip indicator = 0000.... (0)
006A Message Type = 00010010 AUTHENTICATION AND CIPHERING REQ
006B Type of algorithm = .....000 ciphering not used
006B IMEISV request value = .000.... IMEISV not requested
006C Force to standby value = .....000 Not indicated
006C AC reference No. Value = 0001.... (1)
Authentication parameter RAND =
006D IE Identifier(AP RAND) = 00100001 Authentication parameter RAND
006E RAND value = x00000000000000000000000000000000123
GPRS ciphering key sequence No =
007E IE Identifier(CKSNo) = 1000.... Reserved
007E key sequence = .....000 Sequence Number
Authentication parameterAUTN =
007F IE Identifier(AP AUTN) = 00101000 Authentication parameter AUTN
0080 Length = 16 (x10)
0081 RAND Value = x22222222222222222222222222222201
```

IuPS Call Detail View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

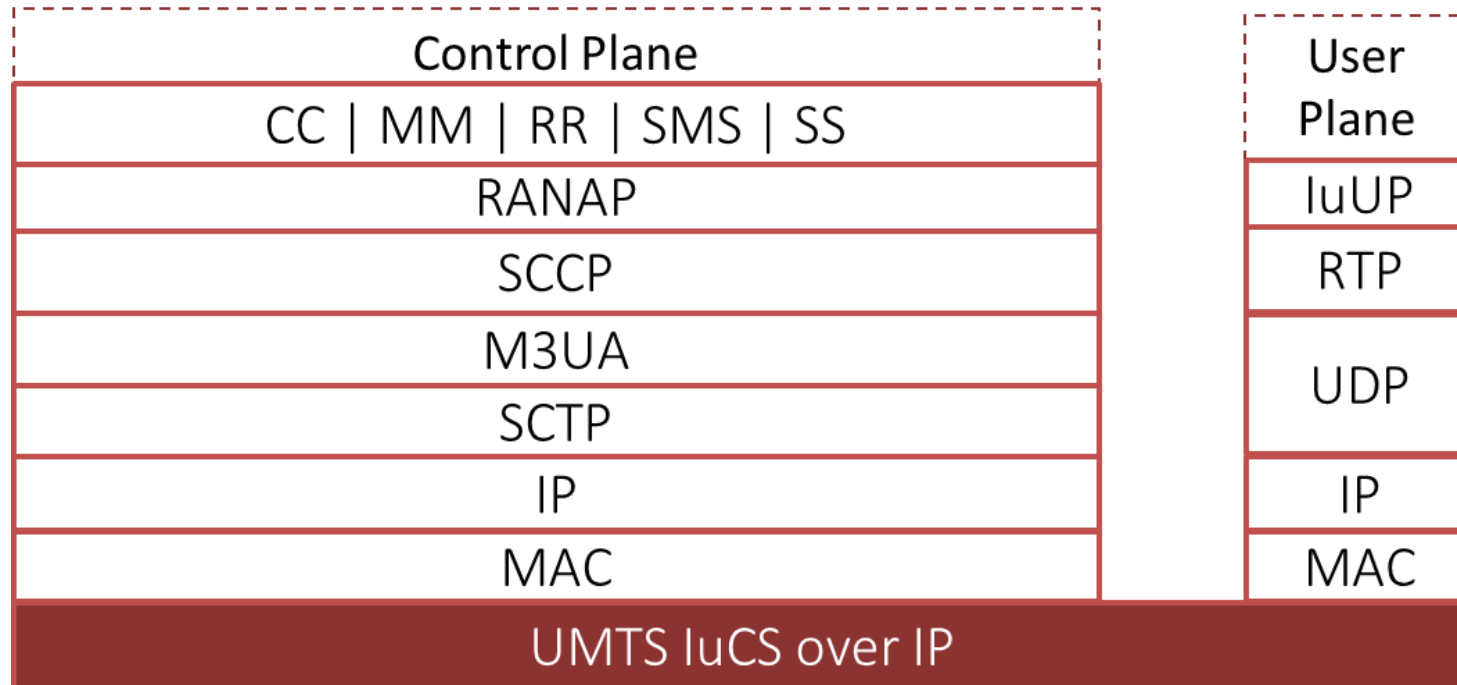
0 GoTo

Device	Frame#	TIME (Relative)	Length (Bytes)	Error	Protocols	IP Packet Type	Source IP Address
✓ 0	0	00:00:00.000000	138		Internet IP(IPv4)		192.168.1.84
✓ 0	1	00:00:00.022268	98		Internet IP(IPv4)		192.168.1.85
✓ 0	2	00:00:00.023977	150		Internet IP(IPv4)		192.168.1.85
✓ 0	3	00:00:00.031938	118		Internet IP(IPv4)		192.168.1.84
✓ 0	4	00:00:00.033635	130		Internet IP(IPv4)		192.168.1.85
✓ 0	5	00:00:00.035751	106		Internet IP(IPv4)		192.168.1.84
✓ 0	6	00:00:00.037156	114		Internet IP(IPv4)		192.168.1.85
✓ 0	7	00:00:00.042245	122		Internet IP(IPv4)		192.168.1.84

Call ID	Call Status	Protocol	Call Originating (Number / ...)	Call Destination (Numbe...	Call Start Date & Time	Call Duration	Protocol Specific Info
0	Completed	UMTS			2012-08-09 18:16:12.217955	00:00:04.134824	<SLR> 1 <DLR> 1633884 <Release Cause> SCCP user originated ...
1	Completed	UMTS			2012-08-09 18:16:36.911916	00:00:06.386558	<Call Type> PDP <SLR> 1 <DLR> 1633884 <Release Cause> SCC...
2	Completed	UMTS			2012-08-09 18:16:46.101349	00:00:15.149330	<Call Type> PDP <SLR> 1 <DLR> 1633884 <Release Cause> SCC...

C:\Program Files (x86)\GL Communications Inc\Pac 93 Frames

IuCS Protocol Stack



Detail View – luCS over IP

The screenshot shows the PacketScan (All-in-One) interface. The main window displays a table of captured packets. The first packet (Frame# 0) is selected, and its details are shown in the lower pane. The details pane shows the RANAP Layer structure, including fields like RANAP PDU, Extensibility Marker, Choice Index, InitiatingMessage, ProcedureCode, Contents, Criticality, Value, Length, InitialUE-Message, Preamble, ProtocolIE-Container, Iteration Count, and CN-DomainIndicator.

Device	Frame#	TIME (Relative)	Length (Bytes)	Error	Protocols	IP Packet Type
✓ 1	0	00:00:00.000000	182		Internet IP(IPv4)	
✓ 1	1	00:00:00.146258	102		Internet IP(IPv4)	

```
----- RANAP Layer -----  
RANAP PDU = CHOICE  
Extensibility Marker = 0  
Choice Index = 0  
InitiatingMessage = SEQUENCE  
  ProcedureCode = INTEGER  
  Contents = 19 id-InitialUE-Message  
  Criticality = ENUMERATOR  
  Contents = 1 ignore(1)  
  Value = Open Type  
  Length = 68  
  InitialUE-Message = SEQUENCE  
  Extensibility Marker = 0  
  Preamble = 0  
  ProtocolIE-Container = SEQUENCE OF  
  Iteration Count = 6  
  ProtocolIE-Container = Instance 0  
  ProtocolIE-Field = SEQUENCE  
  ProtocolIE-ID = INTEGER  
  Contents = 3 id-CN-DomainIndicator  
  Criticality = ENUMERATOR  
  Contents = 1 ignore(1)  
  Value = Open Type  
  Length = 1  
  CN-DomainIndicator = ENUMERATOR  
  Contents = 0 cs-domain(0)  
  ProtocolIE-Container = Instance 1  
  ProtocolIE-Field = SEQUENCE
```

LuCS Call Detail View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

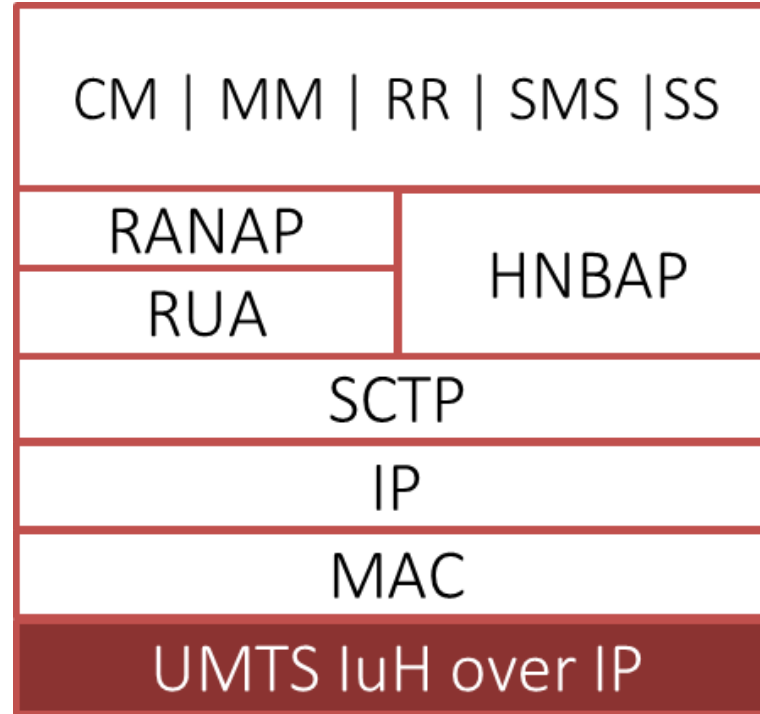
0 GoTo

Dev	Frame#	TIME (Relative)	Len	Protocols	Source IP Address	Destination IP Address	SCTP Chunk Type	SCTP Source Port	SCTP Destination Port
✓ 1	0	00:00:00.000000	182	Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	6500	6500
✓ 1	1	00:00:00.146258	102	Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	6500	6500
✓ 1	2	00:00:00.146660	130	Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	6500	6500
✓ 1	3	00:00:00.185583	118	Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	6500	6500
✓ 1	4	00:00:00.191194	130	Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	6500	6500
✓ 1	5	00:00:00.219637	106	Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	6500	6500
✓ 1	6	00:00:00.220611	114	Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	6500	6500
✓ 1	7	00:00:00.234606	122	Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	6500	6500
✓ 1	8	00:00:00.237914	130	Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	6500	6500
✓ 1	9	00:00:00.264252	114	Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	6500	6500
✓ 1	10	00:00:00.266203	114	Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	6500	6500
✓ 1	11	00:00:00.300149	138	Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	6500	6500

Call ID	Call Status	Protocol	Call Originating (Number / A...	Call Destination (Number / Address)	Call Start Date & Time	Call Duration	Protocol Specific Info
0	Completed	UMTS	405060000000000-IMSI	9845090005	2012-04-23 14:05:41.636164	00:00:06.873219	<Call Type> Call Setup <SLR> 5 <DLR> 15 <Releas...
1	Completed	UMTS	405060000000000-IMSI	8254268000	2012-04-23 14:05:54.725073	00:00:07.386582	<Call Type> Call Setup <SLR> 6 <DLR> 15 <Releas...
2	Completed	UMTS	405060000000000-IMSI		2012-04-23 14:06:08.931499	00:00:00.028857	<Call Type> Authentication <SLR> 7 <DLR> 15 <Rel...

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IuH Protocol Stack



Detail View – LuH over IP

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Device	Frame#	TIME (Relative)	Length (Bytes)	Error	Protocols	IP Packet Type	Source IP Address
✓ 1	0	00:00:00.000000	162		Internet IP(IPv4)		192.168.1.84
✓ 1	1	00:00:00.256235	122		Internet IP(IPv4)		192.168.1.165

```

===== RUA Layer =====
RUA PDU = CHOICE
Extensibility Marker = 0
InitiatingMessage = SEQUENCE
  Procedure Code = INTEGER
  Contents = 1 id-Connect
  Criticality = ENUMERATOR
  Contents = 1 ignore(1)
  Value = Open Type
  Length = 96
  Connect = SEQUENCE
  Extensibility Marker = 0
  Preamble = 0
  ProtocolIE-Container = SEQUENCE OF
    Iteration Count = 4
    ProtocolIE-Container = Instance 0
      ProtocolIE-Field = SEQUENCE
        ProtocolIE-ID = INTEGER
        Contents = 7 id-CN-DomainIndicator
        Criticality = ENUMERATOR
        Contents = 0 reject(0)
        Value = Open Type
        Length = 1
        CN-DomainIndicator = ENUMERATOR
        Contents = 0 cs-domain(0)
      ProtocolIE-Container = Instance 1
        ProtocolIE-Field = SEQUENCE
          ProtocolIE-ID = INTEGER
  
```

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Statistics View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

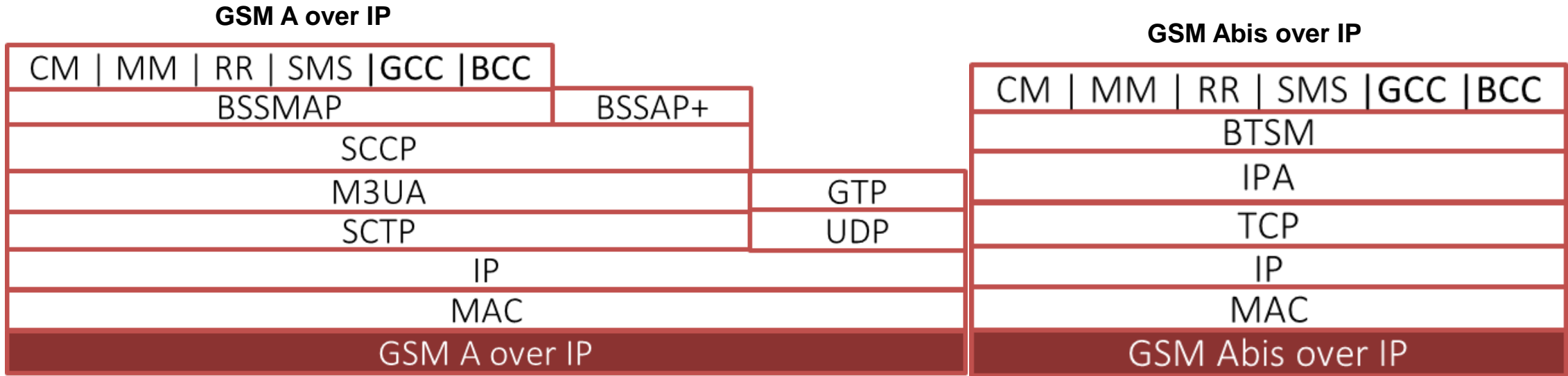
Dev	Frame#	TIME (Relative)	Len	Error	Message Type	Protocols	Source IP Address	Destination IP Address
✓ 1	0	00:00:00.000000	148		Create PDP Context Request	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	1	00:00:00.056241	146		Create PDP Context Respo...	Internet IP(IPv4)	192.168.1.165	192.168.1.84
✓ 1	2	00:00:03.251862	122		Update PDP Context Requ...	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	3	00:00:03.253027	98		Update PDP Context Resp...	Internet IP(IPv4)	192.168.1.165	192.168.1.84
✓ 1	4	00:00:08.666417	74		Initiate PDP Context Activa...	Internet IP(IPv4)	192.168.1.165	192.168.1.84
✓ 1	5	00:00:08.787484	52		Initiate PDP Context Activa...	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	6	00:00:08.838863	140		Create PDP Context Request	Internet IP(IPv4)	192.168.1.84	192.168.1.165
✓ 1	7	00:00:08.840232	146		Create PDP Context Respo...	Internet IP(IPv4)	192.168.1.165	192.168.1.84
✓ 1	8	00:00:10.897543	122		Update PDP Context Requ...	Internet IP(IPv4)	192.168.1.165	192.168.1.84

Message Type	Frame Count(Message Type)
Create PDP Context Request (16)	2
Create PDP Context Response (17)	2
Update PDP Context Request (18)	3
Update PDP Context Response (19)	3
Delete PDP Context Request (20)	2
Delete PDP Context Response (21)	2
Initiate PDP Context Activation Request (22)	1
Initiate PDP Context Activation Response (23)	1

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GSM A and Abis over IP

Protocol Stack



- Decode and analyze complete GSM protocol stack on A and Abis interface.
- Supports BSSAP, DTAP, BSSMAP , and GSM MAP protocols

Supported Protocols

Supported Protocols	Standard / Specification Used
MTP3	Q.704, ITU-T Blue Book / ANSI T1.111-1996
SCCP	Q.713, CCITT (ITU-T) Blue Book / ANSI T1.112-1996
BSSMAP / DTAP	3GPP TS 08.08 V8.9.0
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998
Test & Network Management Messages (ITU)	ITU-T Q.703, Q.704
Test & Network Management Messages (ANSI)	ANSI T1.111.4, ANSI T1.111.7
MM	3GPP TS 04.08 V7.17.0
CC	3GPP TS 04.08 V7.17.0
RR	3GPP TS 04.18 V8.13.0
BSSAP+	3GPP TS 29.018 V6.0.0
GCC (Group Call Control)	3GPP TS 44.068 V9.0.0
BCC (Broadcast Call Control)	3GPP TS 44.069 V9.0.0

Detail View – GSMA over IP

• The detail decode view of GSMA over IP call displays the following:

- GSMA over IP
- MAC Layer
- IP Layer
- SCTP Layer
- MTP3 Layer
- SCCP Layer
- GSM Phase 2 Layer
- MM Layer
- CC Layer

The screenshot shows the PacketScan (All-in-One) interface. The top part is a table of captured packets. The bottom part shows a detailed decode view of a packet, specifically the GSM Phase 2+ layer and MM layer.

Dev	Frame#	TIME (Relative)	Len	Error	MM-Message	CC-Message	Protocols
✓ 1	47	00:00:22.789690	102		IDENTITY REQUEST		Internet IP(IPv4)
✓ 1	48	00:00:22.791692	110		IDENTITY RESPONSE		Internet IP(IPv4)
✓ 1	49	00:00:22.792629	110		TMSI REALLOCATION COMMAND		Internet IP(IPv4)
✓ 1	50	00:00:22.800824	98		TMSI REALLOCATION COMPLETE		Internet IP(IPv4)
✓ 1	51	00:00:22.820008	110			SETUP	Internet IP(IPv4)
✓ 1	52	00:00:22.852043	102			CALL CONFIR...	Internet IP(IPv4)
✓ 1	53	00:00:22.853275	134				Internet IP(IPv4)
✓ 1	54	00:00:22.857411	134				Internet IP(IPv4)


```

===== GSM Phase2+ Layer =====
005D Discrimination bit D      = .....1 DTAP
005E SAPI                     = ....000 Signalling
005E Control channel identification = 00..... Not Specified
005F Message Length          = 3 (x03)
    DTAP Info                 = x051801
===== MM Layer =====
SECURITY MESSAGE
0060 Protocol Discriminator   = ....0101 Mobility management
0060 Skip Indicator           = 0000.... Valid MM Message
0061 Message Type             = ..011000 IDENTITY REQUEST
    Identity type              =
0062 Type of identity         = .....001 IMSI
    
```

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Call Detail View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Dev	Frame#	TIME (Relative)	Len	Error	Protocols	Source IP Address	Destination IP Address	SCTP Chunk Type	SCTP Source Port	SCTP Destination Port	SCCP DLR	M3UA Clas
✓ 1	0	00:00:00.000000	126		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905	2905		Transfer
✓ 1	1	00:00:00.119032	98		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905	2905	1	Transfer
✓ 1	2	00:00:00.127613	118		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905	2905	1	Transfer
✓ 1	3	00:00:00.151308	102		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905	2905	1	Transfer
✓ 1	4	00:00:00.160303	102		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905	2905	1	Transfer
✓ 1	5	00:00:00.208318	98		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905	2905	1	Transfer
✓ 1	6	00:00:00.219134	102		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905	2905	1	Transfer
✓ 1	7	00:00:00.241942	110		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905	2905	1	Transfer
✓ 1	8	00:00:00.257105	110		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905	2905	1	Transfer
✓ 1	9	00:00:00.282224	98		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905	2905	1	Transfer
✓ 1	10	00:00:00.294631	98		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905	2905	1	Transfer
✓ 1	11	00:00:00.318144	114		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905	2905	1	Transfer
✓ 1	12	00:00:00.325921	102		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905	2905	1	Transfer
✓ 1	13	00:00:00.332875	134		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905	2905	1	Transfer
✓ 1	14	00:00:00.444735	134		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905	2905	1	Transfer
✓ 1	15	00:00:00.454134	114		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905	2905	1	Transfer

Call ID	Call Status	Protocol	Call Originating (Number / A...	Call Destination (Number / A...	Call Start Date & Time	Call Duration	Protocol Specific Info
0	Completed	GSM-A	4041000000000001-IMSI	9341141001	2012-05-09 16:56:41.968085	00:00:11.889279	<OPC> 1.1.1 <DPC> 2.2.2 <Release Cause> End user originated
1	Completed	GSM-A	4041000000000000-IMSI		2012-05-09 16:56:57.870964	00:00:00.056659	<OPC> 1.1.1 <DPC> 2.2.2 <Release Cause> End user originated
2	Completed	GSM-A	4041000000000000-IMSI	9341141000	2012-05-09 16:57:04.747933	00:00:12.378388	<OPC> 1.1.1 <DPC> 2.2.2 <Release Cause> End user originated
3	Completed	GSM-A	542542	9341141001	2012-05-09 16:57:42.904785	00:00:00.123304	<OPC> 1.1.1 <DPC> 2.2.2 <Release Cause> End user originated
4	Completed	GSM-A	4041000000000000-IMSI		2012-05-09 16:57:53.557513	00:00:00.081434	<OPC> 1.1.1 <DPC> 2.2.2 <Release Cause> End user originated

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Statistics View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

Dev	Frame#	TIME (Relative)	Len	Error	Protocols	Source IP Address	Destination IP Address	SCTP Chunk Type	SCTP Source Port
✓ 1	18	00:00:11.591032	118		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905
✓ 1	19	00:00:11.709400	118		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905
✓ 1	20	00:00:11.729983	98		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905
✓ 1	21	00:00:11.780885	102		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905
✓ 1	22	00:00:11.806405	98		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905
✓ 1	23	00:00:11.852325	98		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905
✓ 1	24	00:00:11.889279	94		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905
✓ 1	25	00:00:15.902879	130		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905
✓ 1	26	00:00:15.921267	98		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905
✓ 1	27	00:00:15.921539	118		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905
✓ 1	28	00:00:15.924643	102		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905
✓ 1	29	00:00:15.925733	102		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905
✓ 1	30	00:00:15.927303	98		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905
✓ 1	31	00:00:15.928149	102		Internet IP(IPv4)	192.168.1.165	192.168.1.84	DATA Chunk	2905

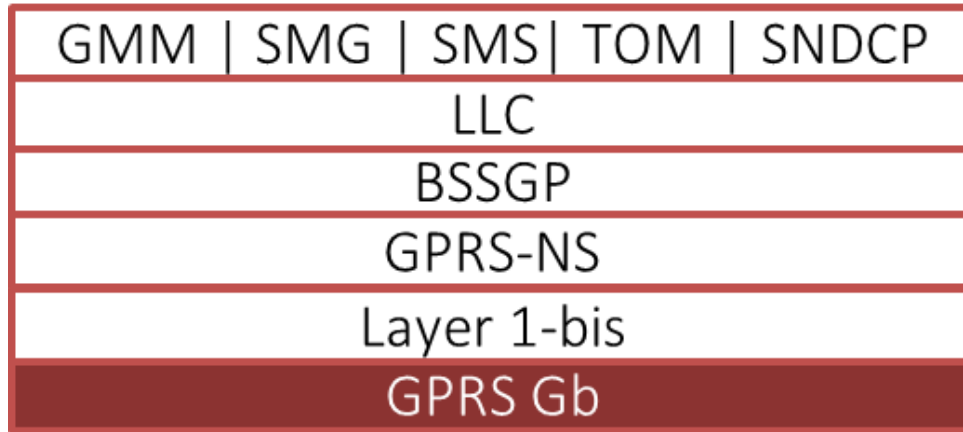
Message Type	Frame Count(Message Type)
LOCATION UPDATING ACCEPT (2)	1
LOCATION UPDATING REQUEST (8)	1
AUTHENTICATION REQUEST (18)	5
AUTHENTICATION RESPONSE (20)	5
IDENTITY REQUEST (24)	5
IDENTITY RESPONSE (25)	5
TMSI REALLOCATION COMMAND (26)	5
TMSI REALLOCATION COMPLETE (27)	5
CM SERVICE ACCEPT (33)	2
CM SERVICE REQUEST (36)	2

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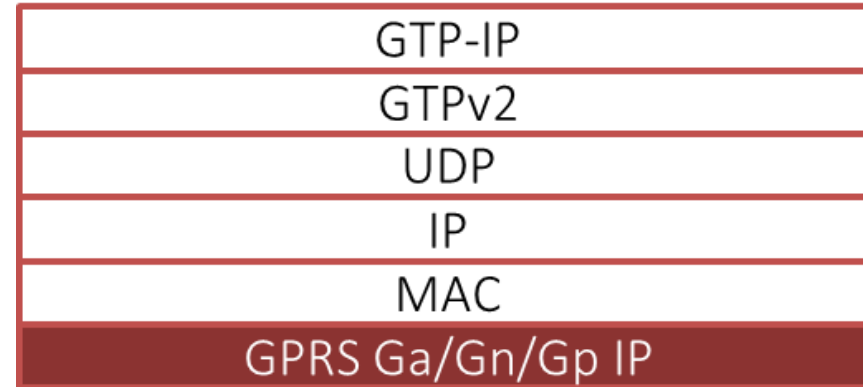
GPRS over IP

Protocol Stack

GPRS Gb Protocol Stack



GPRS Gn Protocol Stack



- Decode and analyze signaling and user data protocols over Gb and Ga/Gn interfaces
- Provides details about routing area update, PDP activation, and traffic patterns in the network

Supported Protocols

Supported Protocols	Standard / Specification Used
GPRS Gb Interface	
BSSGP	3GPP TS 08.18 V8.10.0
LLC	3GPP TS 04.64 V8.7.0
GMM	3GPP TS 04.08 V7.19.0
SMS	3GPP TS 03.40 V7.5.0 / GSM 03.38 version 7.2.0
TOM	3GPP TS 04.64 V8.7.0 (2001-12)-Annex B
SNDCP	3GPP TS 04.64 V8.7.0
SMG	3GPP TS 04.08 V7.19.0
NS (Network Service Frame Relay)	GSM 8.16 ETSI TS 101 299 V8.0.0
GPRS Gn Interface	
GTP / GTPv2 / GTP'	3GPP TS 09.60 V7.9.0 / 3GPP TS 29.060 V6.5.0 / 3GPP TS 32.005 V3.7.0 and 3GPP TS 32.015 V3.12.0

Detail View – GPRS over IP

- The detail decode view of GPRS over IP call displays the following:

- MAC Layer
- IP Layer
- UDP Layer
- GTP Layer
- GTP IP Layer
- GTP UDP Layer

The screenshot shows the PacketScan (All-in-One) application window. The packet list table at the top displays the following data:

Dev	Frame#	TIME (Relative)	Len	ICMP Type	Error	Message Type	Protocols
✓ 0	54	00:01:44.845729	119			G-PDU	Internet IP(IPv4)
✓ 0	55	00:02:22.716729	143				Internet IP(IPv4)
✓ 0	56	00:02:25.879729	110			G-PDU	Internet IP(IPv4)

The main decode view shows the following structure:

```
===== GTP/GTP Layer =====  
002A Version = 001..... GTP V1  
002A Protocol Type = ...1..... GTP V2  
GTP Layer Message =  
002A E = .....0... Not Present  
002A S = .....1. Present  
002A PN = .....1 Present  
002B Message Type = 11111111 G-PDU  
002C Length of GTP Message = 69 (x0045)  
002E Tunnel Endpoint Identifier = 8 (x00000008)  
0032 Sequence Number = 1482 (x05CA)  
No Extension Header = x00  
===== GTP IP Layer =====  
0036 Version = 0100.... (4)  
0036 Internet Header Length (In 32 bit words) = ...0101 (5)  
Type of Service =  
0037 Precedence = 000..... Routine  
0037 Delay = ...0.... Normal Delay  
0037 Throughput = ...0.... Normal Throughput  
0037 Reliability = .....0... Normal Reliability  
0037 Reserved for Future Use = .....00 (0)  
0038 Total Length = 65 (x0041)  
003A Identification = 26033 (x65B1)  
003C Reserved = 0..... (0)  
003C DF = .0..... May Fragment  
003C MF = ..0..... Last Fragment  
003C Fragment Offset = 0 (...00000 00000000)  
003E Time To Live = 255 (xFF)  
003F Protocol = 00010001 User Datagram  
0040 Header Check Sum = xE5F5  
0042 Source IP Address = 192.168.2.201 (xC0A802C9)  
0046 Destination IP Address = 125.22.47.125 (x7D162F7D)  
===== GTP UDP Layer =====  
004A Source Port = 58330 (xE3DA)  
004C Destination Port = 53 (x0035)  
004E Length (Header + Data) = 45 (x002D)  
0050 Checksum = 36783 (x8FAF)
```

Statistics View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

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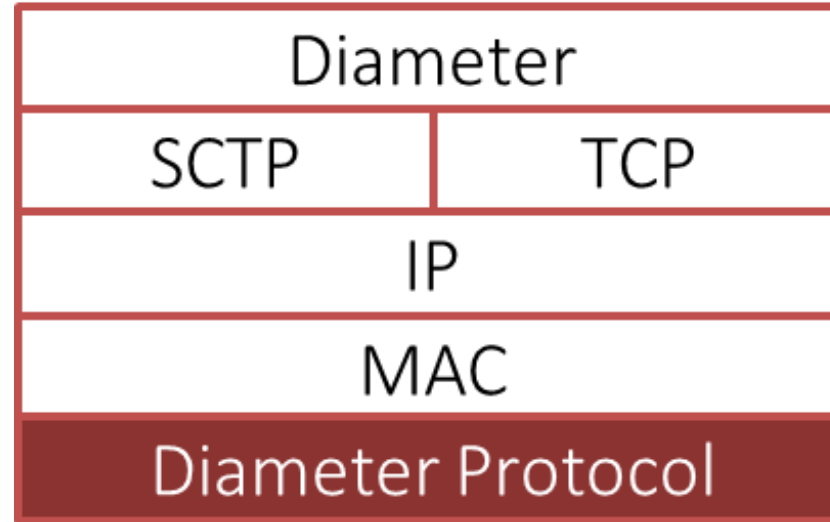
Dev	Frame#	TIME (Relative)	Len	Error	Message Type	Protocols	Source IP Address	Destination IP Address	GTP UDP Des...
✓ 0	44	00:00:31.181000	119		G-PDU	Internet IP(IPv4)	192.168.2.102	192.168.2.101	53
✓ 0	45	00:04:45.347459	213		G-PDU	Internet IP(IPv4)	192.168.2.101	192.168.2.102	64423
✓ 0	46	00:04:47.972459	234			Internet IP(IPv4)	192.168.2.102	192.168.2.150	
✓ 0	47	00:04:48.347459	209		G-PDU	Internet IP(IPv4)	192.168.2.101	192.168.2.102	58330
✓ 0	48	00:04:51.004459	230			Internet IP(IPv4)	192.168.2.102	192.168.2.150	
✓ 0	49	00:05:07.976459	143			Internet IP(IPv4)	192.168.2.150	192.168.2.102	
✓ 0	50	00:05:10.145459	118		G-PDU	Internet IP(IPv4)	192.168.2.102	192.168.2.101	53
✓ 0	51	00:04:46.365459	222		G-PDU	Internet IP(IPv4)	192.168.2.101	192.168.2.102	60826
✓ 0	52	00:04:49.026459	243			Internet IP(IPv4)	192.168.2.102	192.168.2.150	
✓ 0	53	00:01:41.919729	144			Internet IP(IPv4)	192.168.2.150	192.168.2.102	

Message Type	Frame Count(Message Type)
Create PDP Context Request (16)	2
Create PDP Context Response (17)	2
Delete PDP Context Request (20)	2
Delete PDP Context Response (21)	2
G-PDU (255)	1167

E:\BACKUP\Document_Images\Packet: 3 490 Frames

Diameter over IP

Protocol Stack



- Monitor thousands of Diameter sessions over S6a, S6d, Cx, Dx, Zn, Zh, Wx, Gq, Gy, Sh, Dh, Gx, Rf, Ro, Wg, Wm, Pr, Wa, Wd, Rx interfaces

Supported Protocols

Supported Protocols	Standard / Specification Used
Diameter	IETF RFC 3588
	S6a, S6d, S13 - 3GPP TS 29.272 V10.3.0
	Rx - 3GPP TS 29.214-b10
	Cx/Dx - 3GPP TS 29.228 & TS29.229
	Gx - 3GPP TS 29.212 & TS 23.203
	Zn/Zh – 3GPP TS 29.109 & TS 33.220
	Wx – 3GPP TS 29.234
	Gx – 3GPP TS 29.212 & TS 23.203
	Gy – 3GPP TS 32.29, TS 32.251 & RFC 4006
	Gq – 3GPP TS 29.209
	Sh/Dh – 3GPP TS 29.328 & TS 29.329
	Rf/RO – 3GPP TS 32.225, 3GPP TS 32.299 3GPP TS 29.061
	Wg/Wm/Wa/Wd/Pr – 3GPP TS 29.234
SCTP	RFC 4960
TCP	RFC 793

Detail View – Diameter

- The detail decode view of Diameter call displays the following:

- MAC Layer
- IP Layer
- SCTP Layer
- Diameter Protocol

The screenshot displays the PacketScan (All-in-One) application window. The main window is divided into several sections:

- Table:** A table showing captured packets. The selected packet (Frame 12) is highlighted. The table columns are: Dev, Frame#, Application Identifiers, Len, Error, Protocols, Source IP Address, and Destination IP Address.
- Decode View:** A detailed view of the selected packet, showing the following layers and fields:
 - SCTP Layer:**
 - 0022 Source Port Number = 3868 (x0F1C)
 - 0024 Destination Port Number = 3868 (x0F1C)
 - 0026 Verification Tag = 3888896536 (xE7CBDA18)
 - 002A Checksum = 3313050044 (xC57921BC)
 - 002E Chunk Type = 00000000 DATA Chunk
 - 002F U bit =0.. Ordered DATA chunk
 - 002F Beginning/Ending bits =11 Reserved
 - 0030 Length = 132 (x0084)
 - 0032 TSN = 1 (x00000001)
 - 0036 Stream Identifier = 0 (x0000)
 - 0038 Stream Sequence Number = 1 (x0001)
 - 003A Payload Protocol Identifier = x0000002F Undefined
 - Diameter Protocol Layer:**
 - 003E Version = 00000001 Diameter Version 1
 - 003F Length = 116 (x000074)
 - Command Flags:
 - 0042 Request (R) = 1..... Message is Request
 - 0042 Proxiable (P) = .0..... Message Locally Processed
 - 0042 Error (E) = ..0..... Message Doesn't Contain Protocol Error
 - 0042 Potentially Retransmitted Message (T) = ...1.... Possible Duplicate Due to Link Failure
 - 0043 Command Code = x00013E Authentication-Information Request/Answer
 - 0046 Application Identifiers = x01000023 Application-ID of the S6a/S6d interface application
 - 004A Hop By Hop Identifier = 0 (x00000000)
 - 004E End To End Identifier = 0 (x00000000)
 - User-Name = x00000001 User-Name
 - Vendor Specific Bit (V) = 0..... Vendor ID Field Not Present
 - Mandatory Bit (M) = .0..... Support Of AVP Not Required
 - Encryption For End To End Security (P) = ..0..... Not Needed
 - Reserved (r) = ...00000

The status bar at the bottom indicates "Off-line Viewing" and "C:\Program Files\GL Communications Inc\P\26 Frames".

Statistics View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

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Dev	Frame#	TIME (Relative)	Len	Application Identifiers	AVP Code	AVP Length	AVP Data
✓ 1	6	00:00:16.154128	122	Application-ID of the S6a/S6d interface application	Vendor-Id	x00000C	40401098869
✓ 1	7	00:00:16.234675	62				
✓ 1	8	00:00:16.394787	114	Application-ID of the S6a/S6d interface application	Result-Code	12	DIAMETER_SUCCESS
✓ 1	9	00:00:16.455333	62				
✓ 1	10	00:00:37.450454	178	Application-ID of the S6a/S6d interface application	Number-Of-Reques...	12	x00000001
✓ 1	11	00:00:37.513312	62				
✓ 1	12	00:00:49.960628	262	Application-ID of the S6a/S6d interface application	UE-SRVCC-Capabi...	12	UE-SRVCC-NOT-SUPPORTED
✓ 1	13	00:00:50.033034	62				
✓ 1	14	00:00:50.077594	166	Application-ID of the S6a/S6d interface application	Experimental-Result	20	x0000010A00000000C00001389
✓ 1	15	00:00:50.143471	62				
✓ 1	16	00:00:52.445251	250	Application-ID of the S6a/S6d interface application	NOR-Flags	12	34
✓ 1	17	00:00:52.512270	62				

Hop By Hop Identifier	AVP Data	Frame Count(AVP Data)
0	x00000001	1
1	40401098869	1
1	x0000010A00000000C00001389	1
2	x0000010A00000000C00001389	1
3	x00000001	1
4	x00000001	1
4	x657650	1

C:\Program Files (x86)\GL Communicatio 26 Frames

Thank you