PacketScan™
Protocol Specific Presentation

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Index

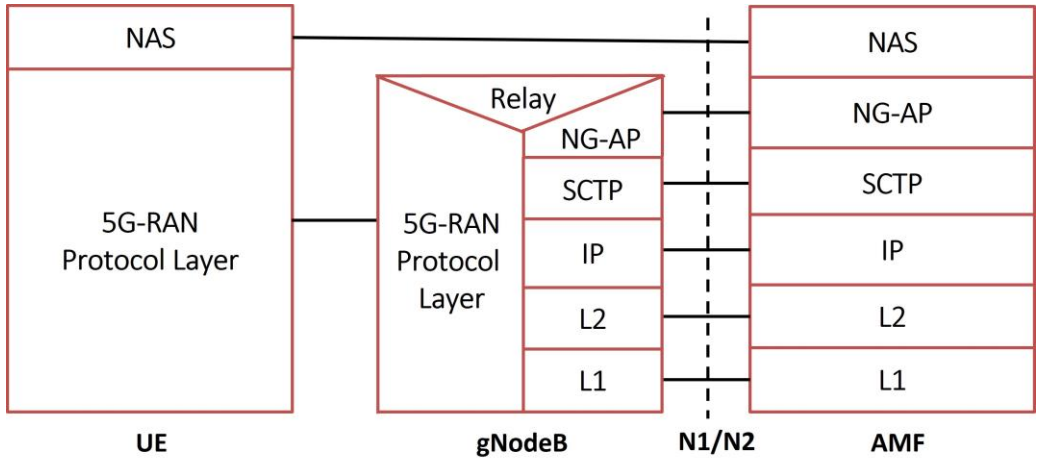
- 5G
- LTE
- SIP, MGCP, MEGACO, H.323
- UMTS over IP
- GSM A and Abis over IP
- GPRS over IP
- Diameter over IP

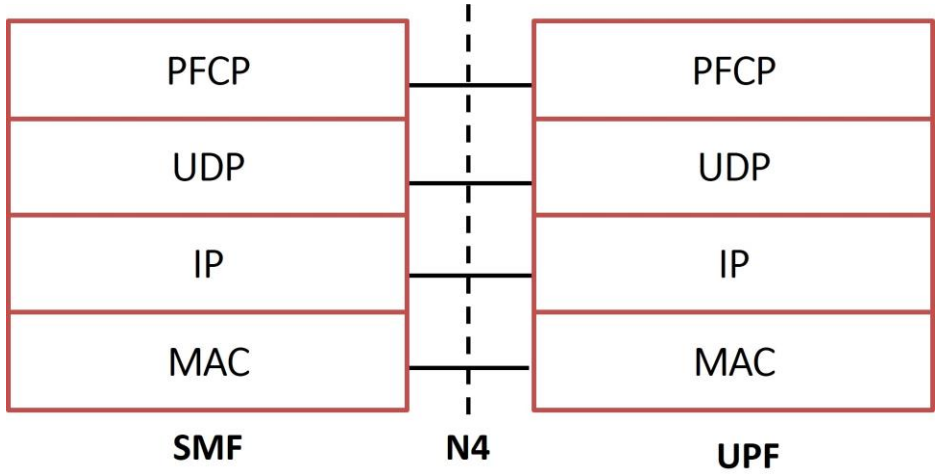
Supported Protocols

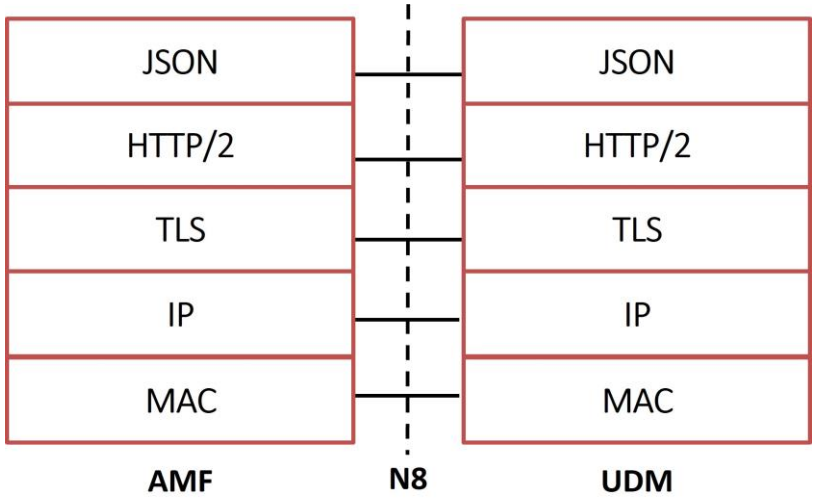
- 5G – N1N2, N4, N8, N12, N13
- SIP-3261
- Megaco3525
- Megaco3015
- MGCP
- H.323
- SIGTRAN (BICC, CAP, INAP, MAP, M3UA, M2UA, M2PA, MTP2, MTP3, SCCP, ISDN, ISUP)
- GSMA over IP
- GSM-R
- GPRS over IP
- UMTS over IP
- LTE, Diameter

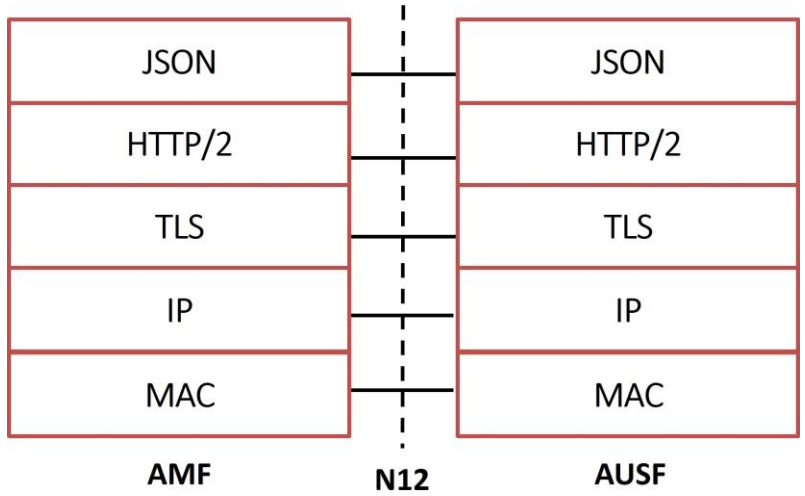
5G

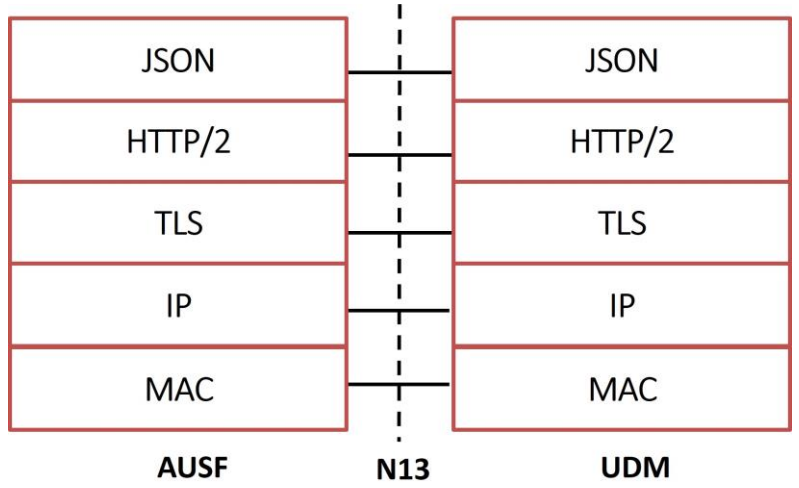
5G Protocol Stack











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

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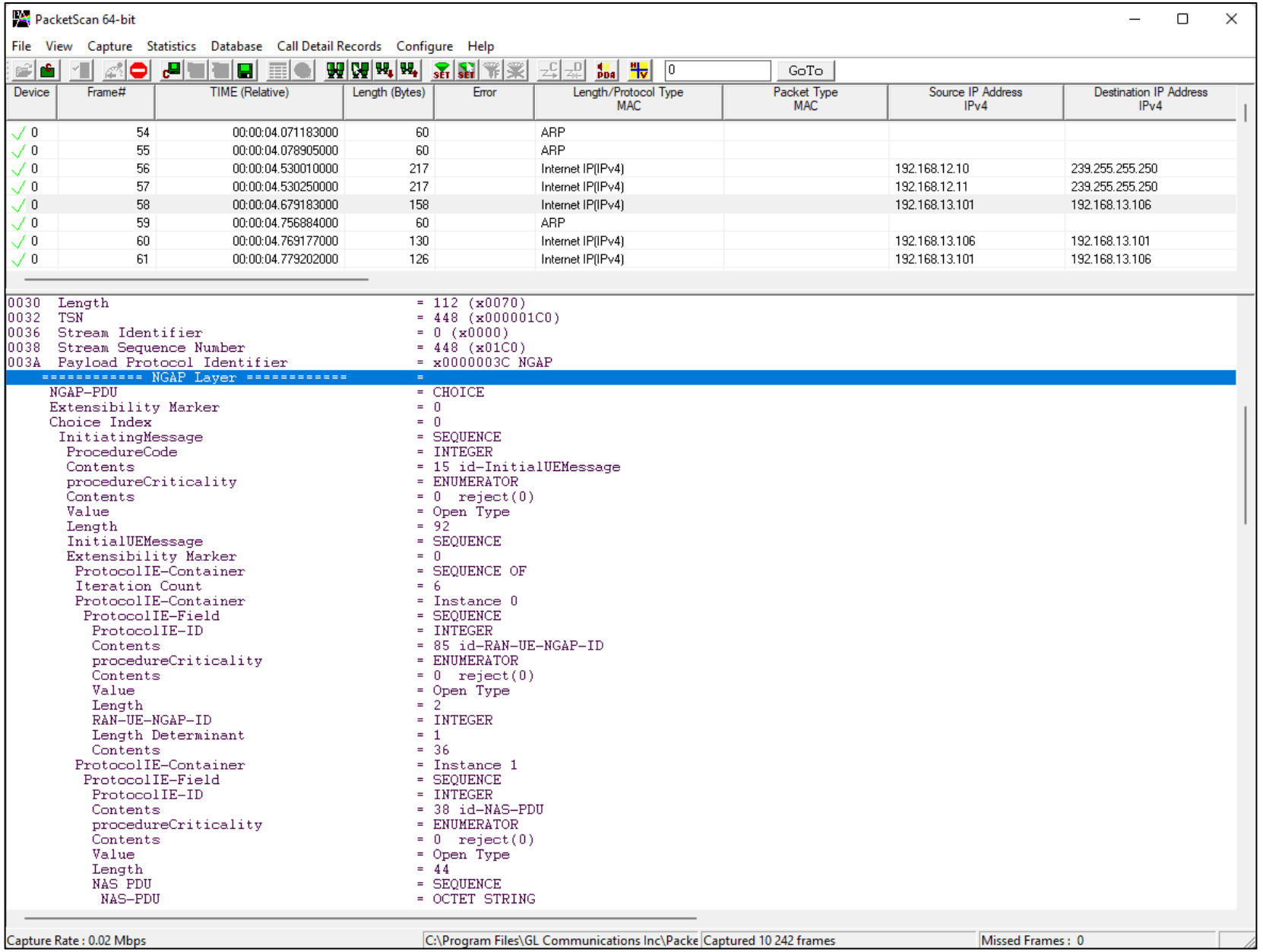
Protocol Specifications

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



Detail View – 5G NAS Layer

PacketScan 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

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                          = .....001 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                           = .....001 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

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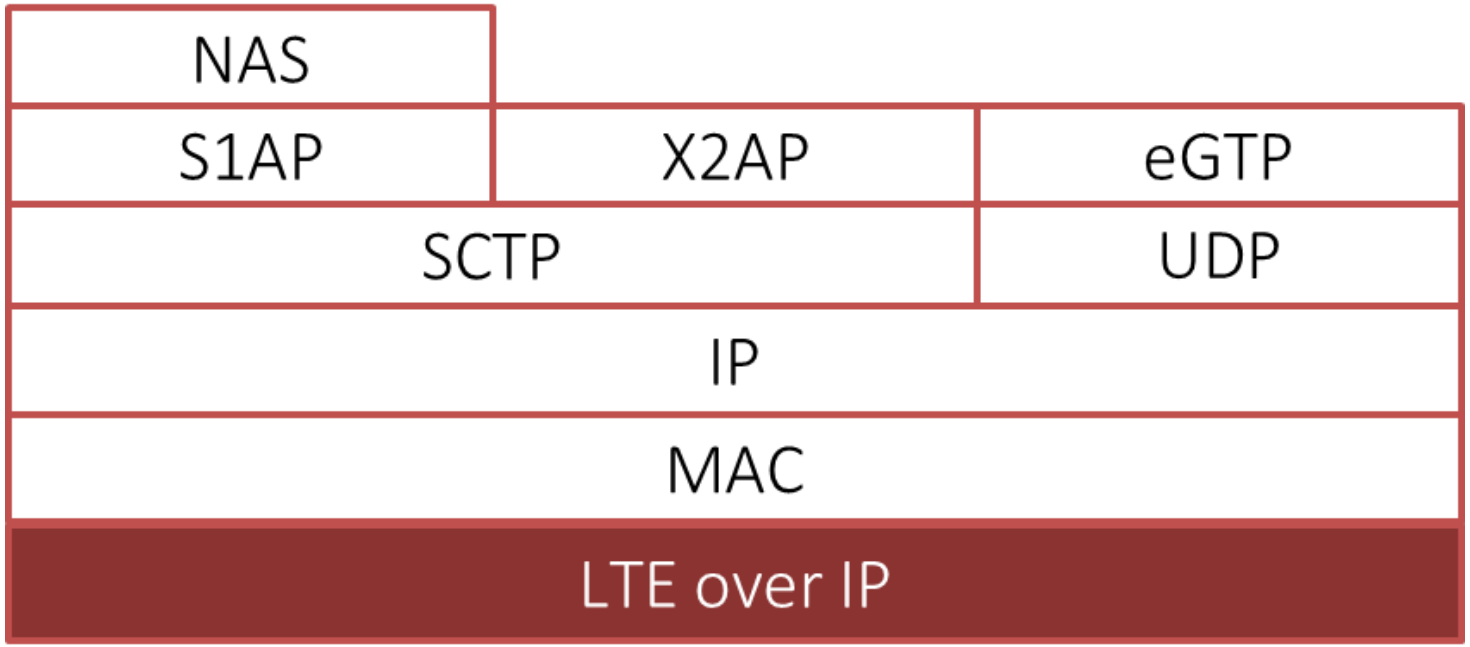
LTE

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
```

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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
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> 998869158860 <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> 998869158860 <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> 998869158860 <S1 Release Cause> release-due-to

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

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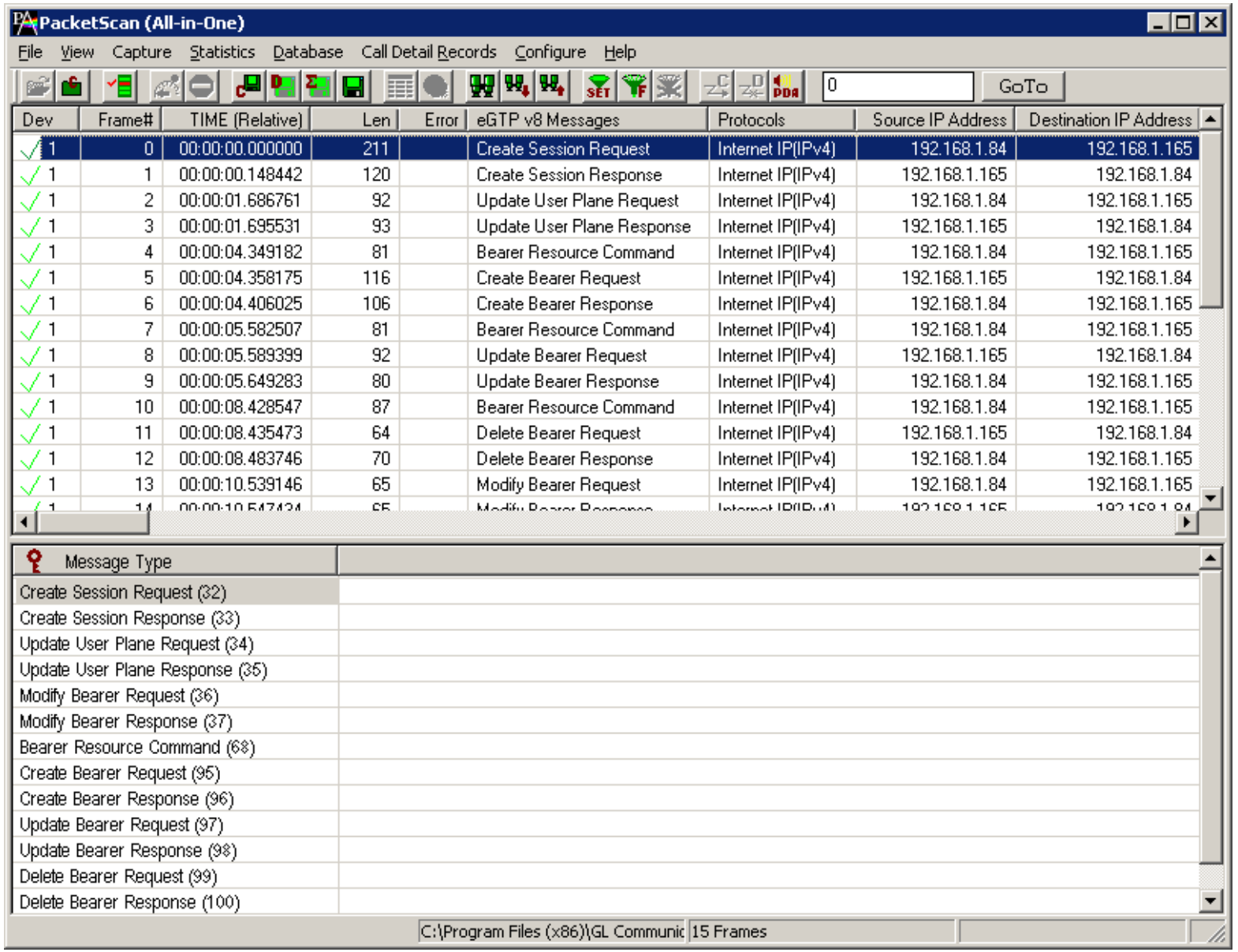
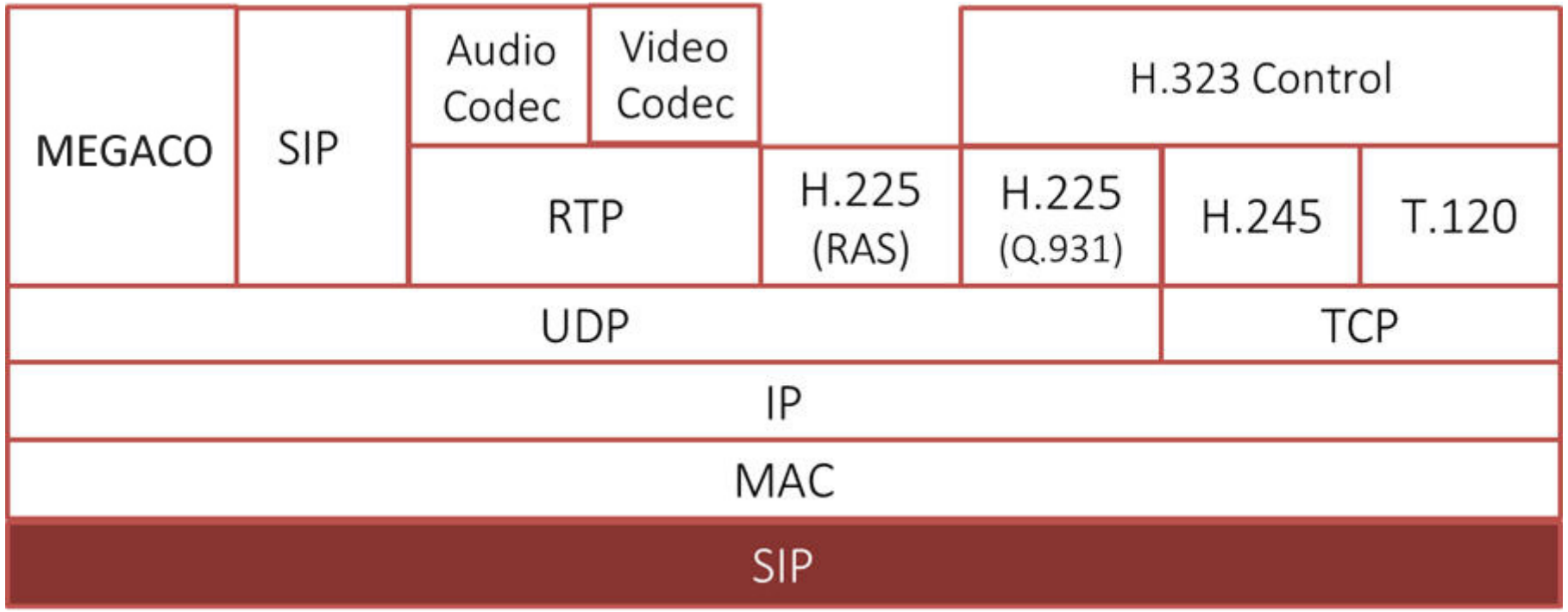
Statistics View



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

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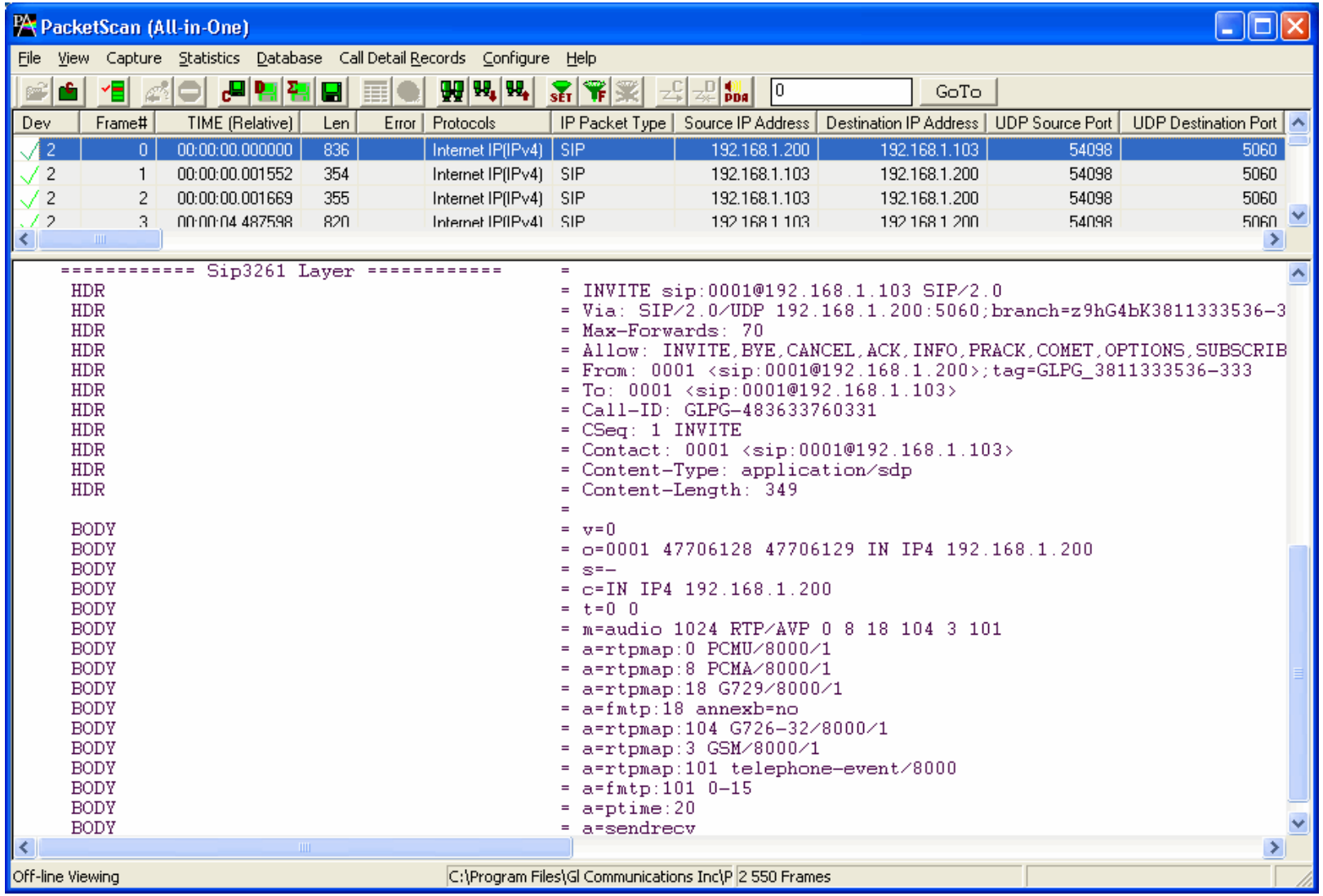
Supported Protocols

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

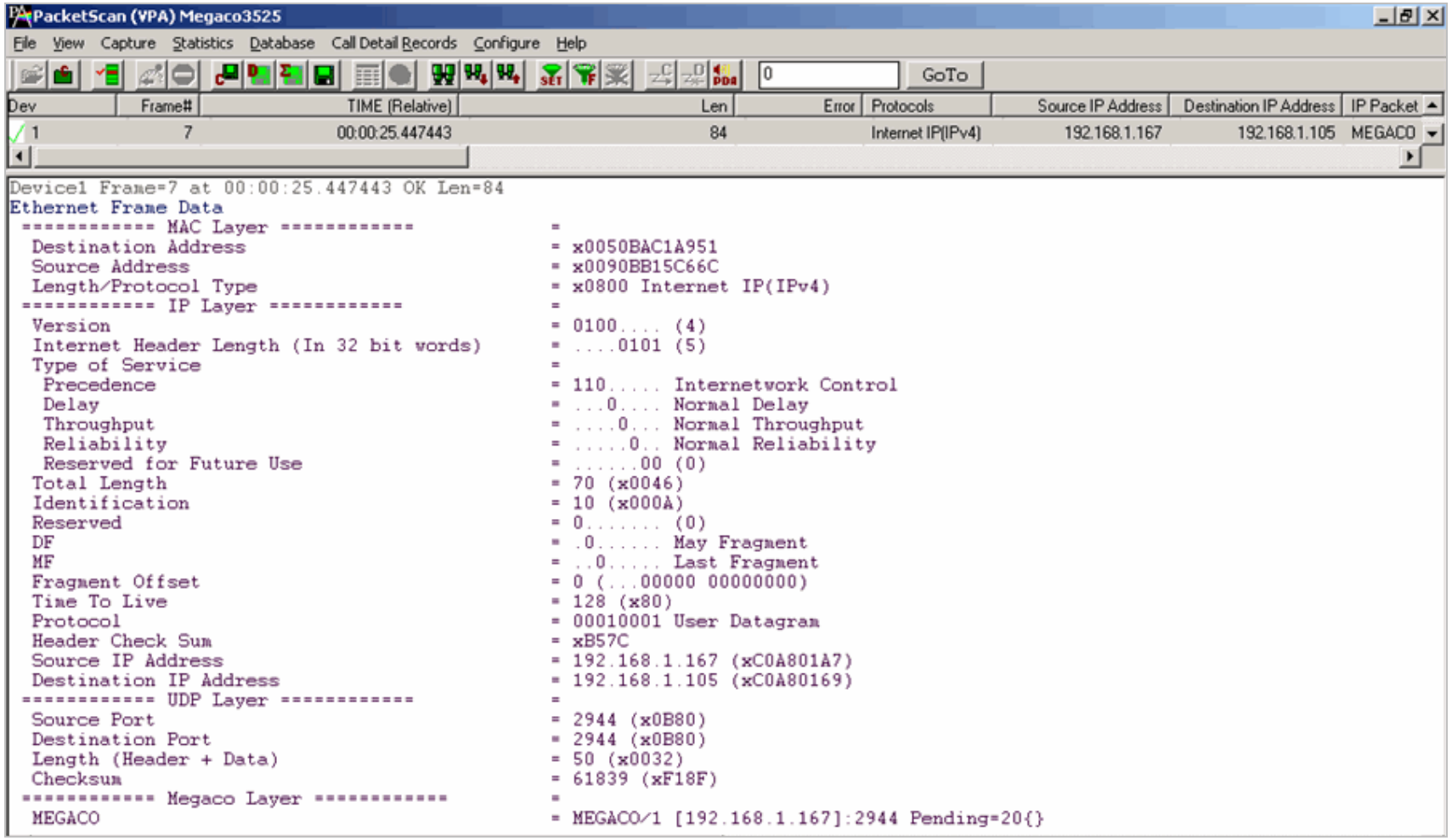
Detail View – SIP

- The detail decode view of SS7 SIGTRAN call displays the following:
  - MAC layer
  - IPV6 (or IPv4) Layer
  - UDP Layer
  - SIP 3261



Detail View – MEGACO

- The detail decode view of MEGACO call displays the following:
  - ➢ MAC layer
  - ➢ IP Layer
  - ➢ UDP Layer
  - ➢ MEGACO Layer



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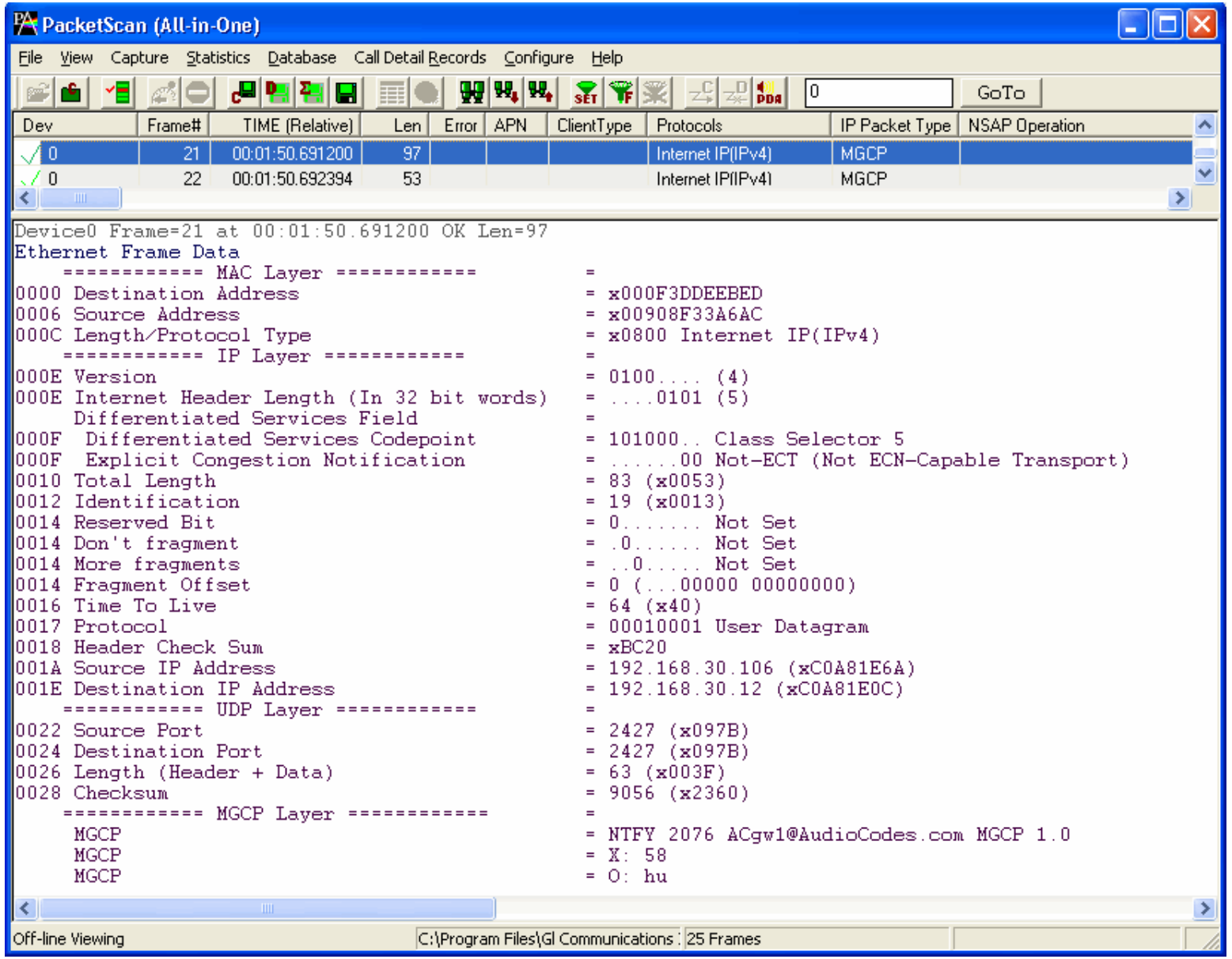
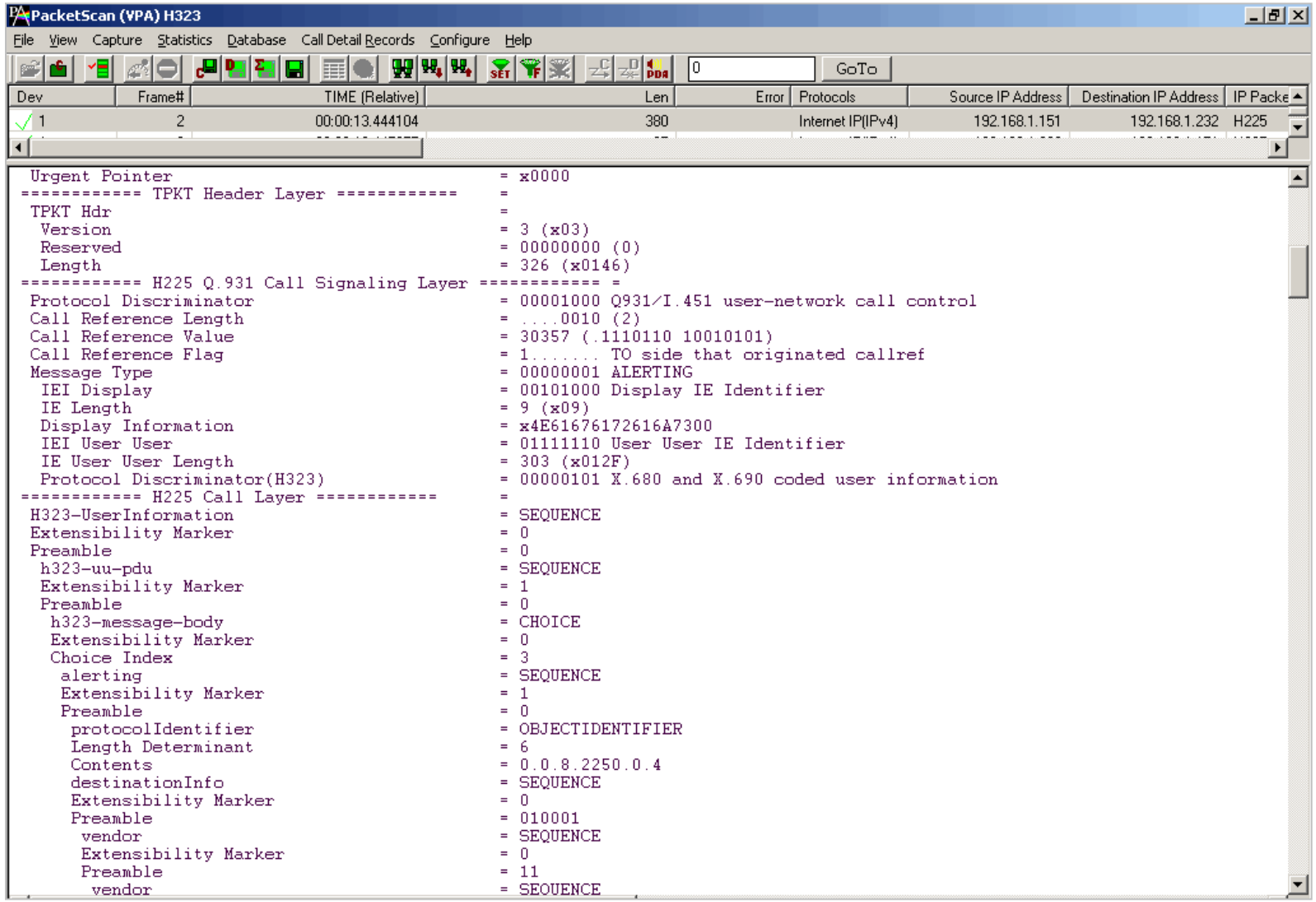
Detail View – MGCP

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

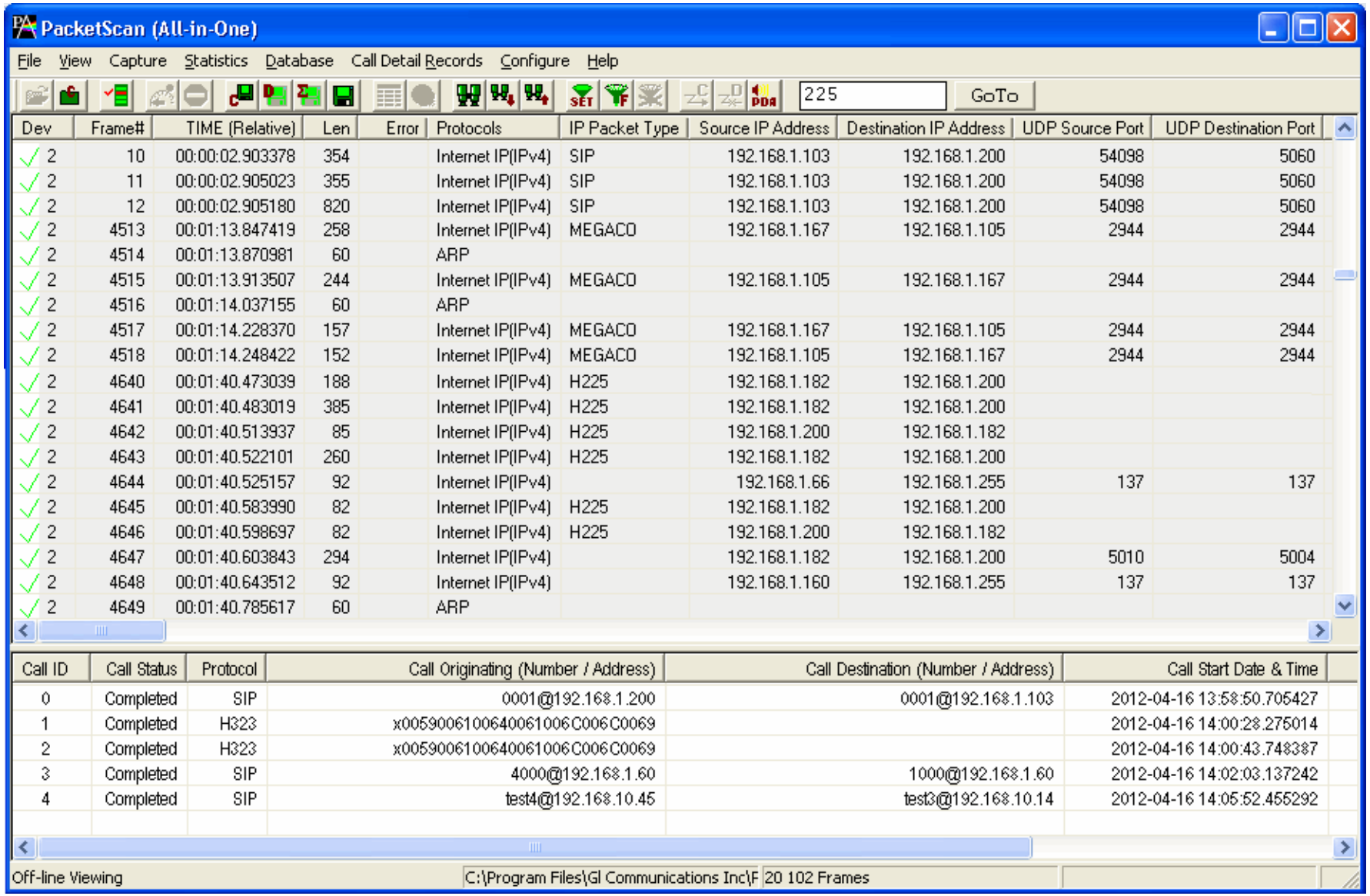


Detail View – H.323

- 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



Call Detail View



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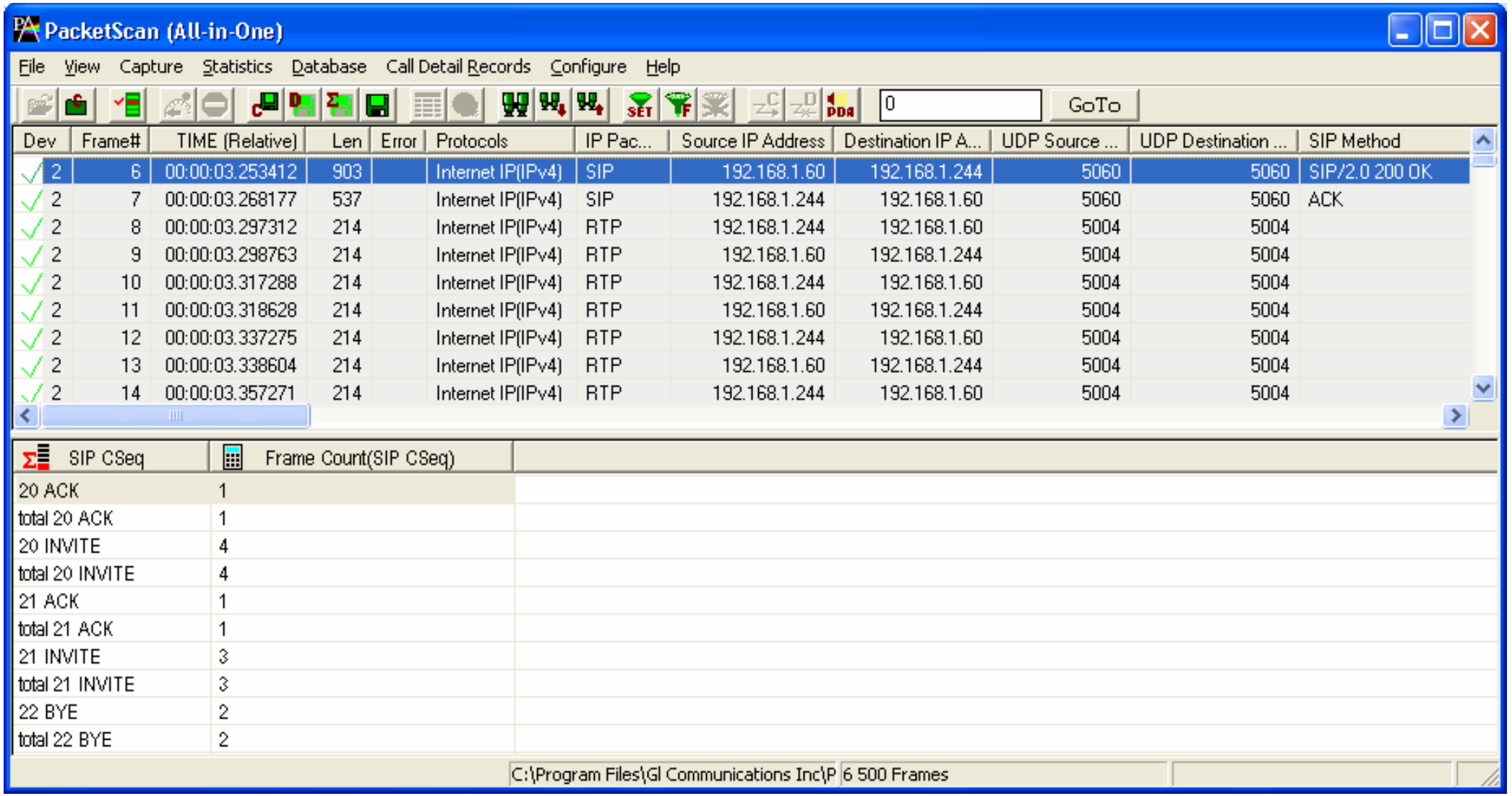
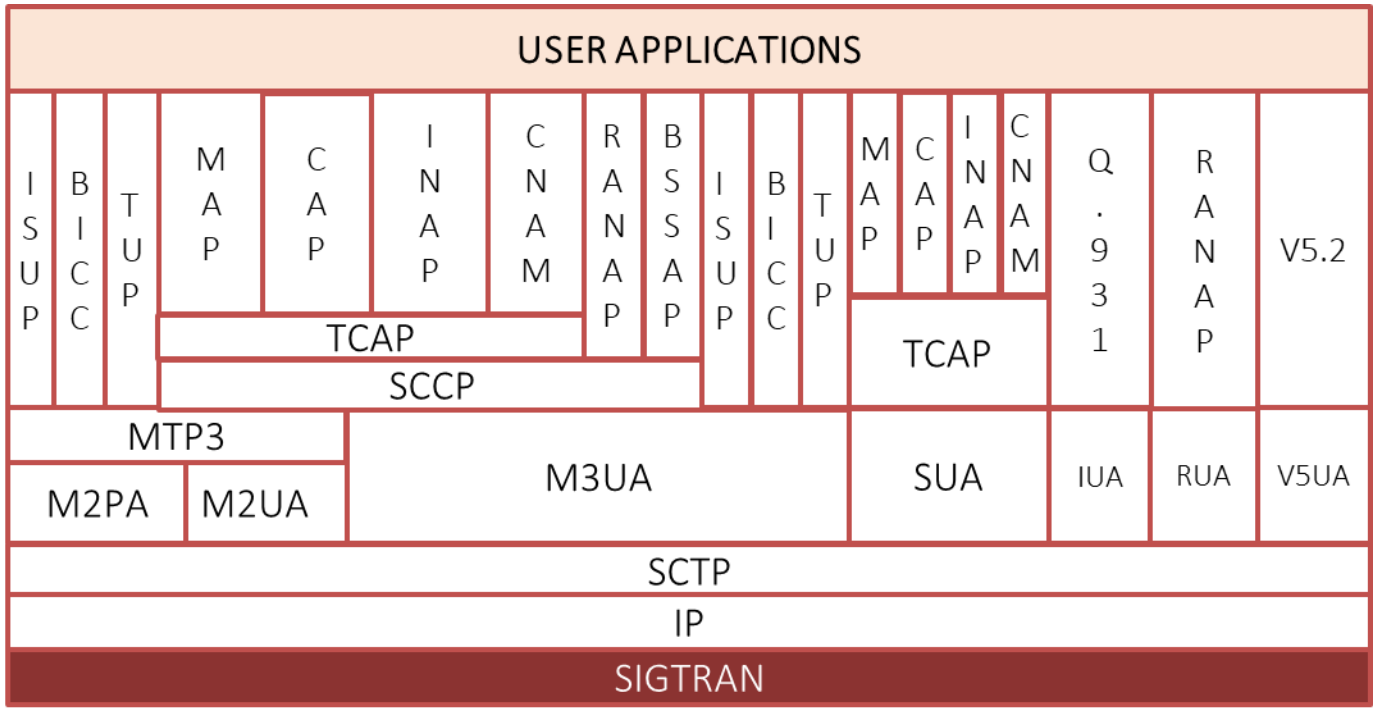
Statistics View



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

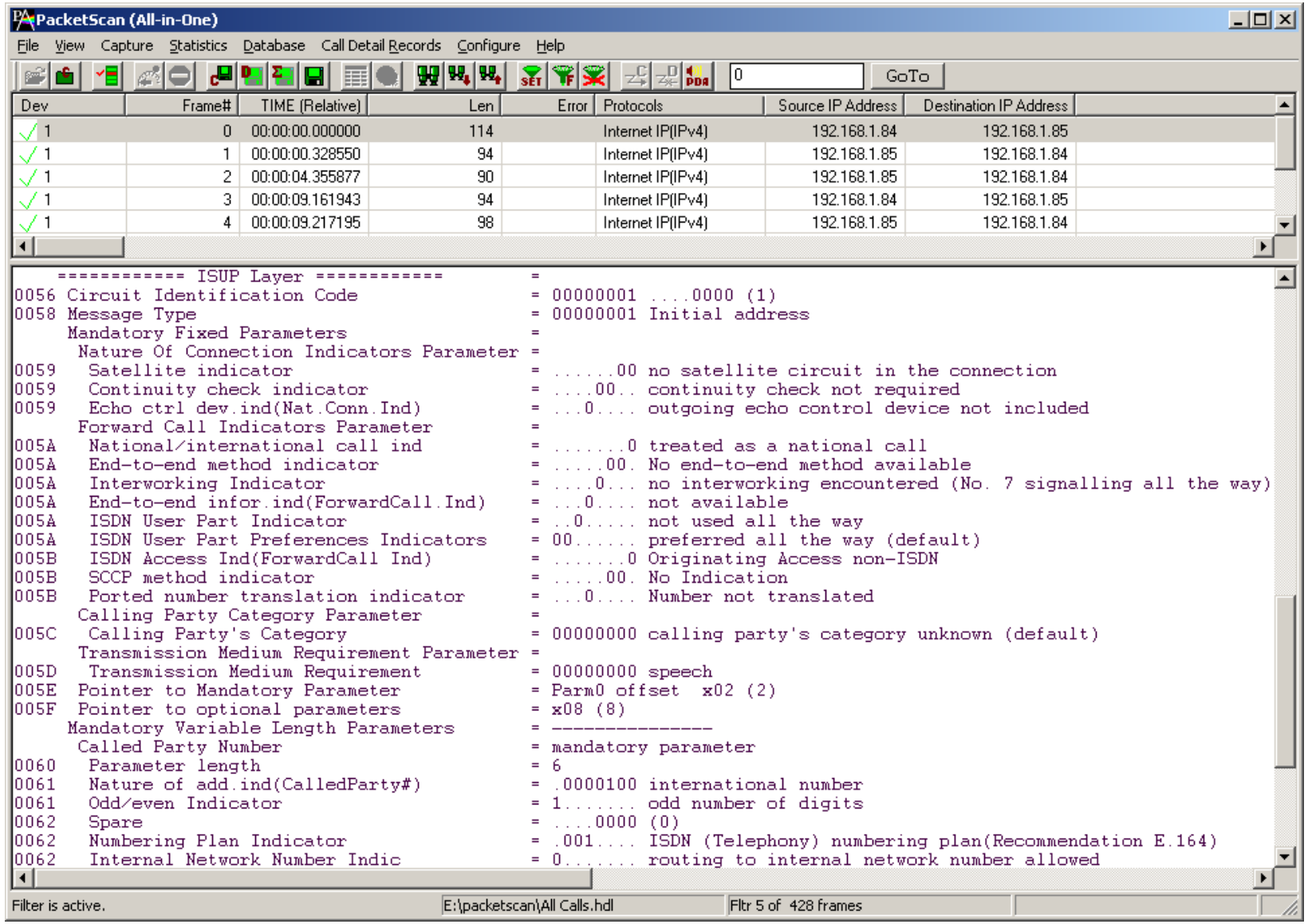
Supported Protocols	Standard / Specification Used
SCTP	RFC 2960
M2UA	RFC 3331
M2PA	RFC 4165
SUA ITU	RFC 3868
SUA ANSI	Internet Engineering Task Force: Draft 2026 (sec.10)
M3UA ITU	RFC 3332
M3UA ANSI	RFC 3332
MTP3 ITU	ITU-Y Q.701-Q.705 / ITU-T Q.782
MTP3 ANSI	T1.111.4-1996
IUA	RFC 4233 / RFC 5133
BICC	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)

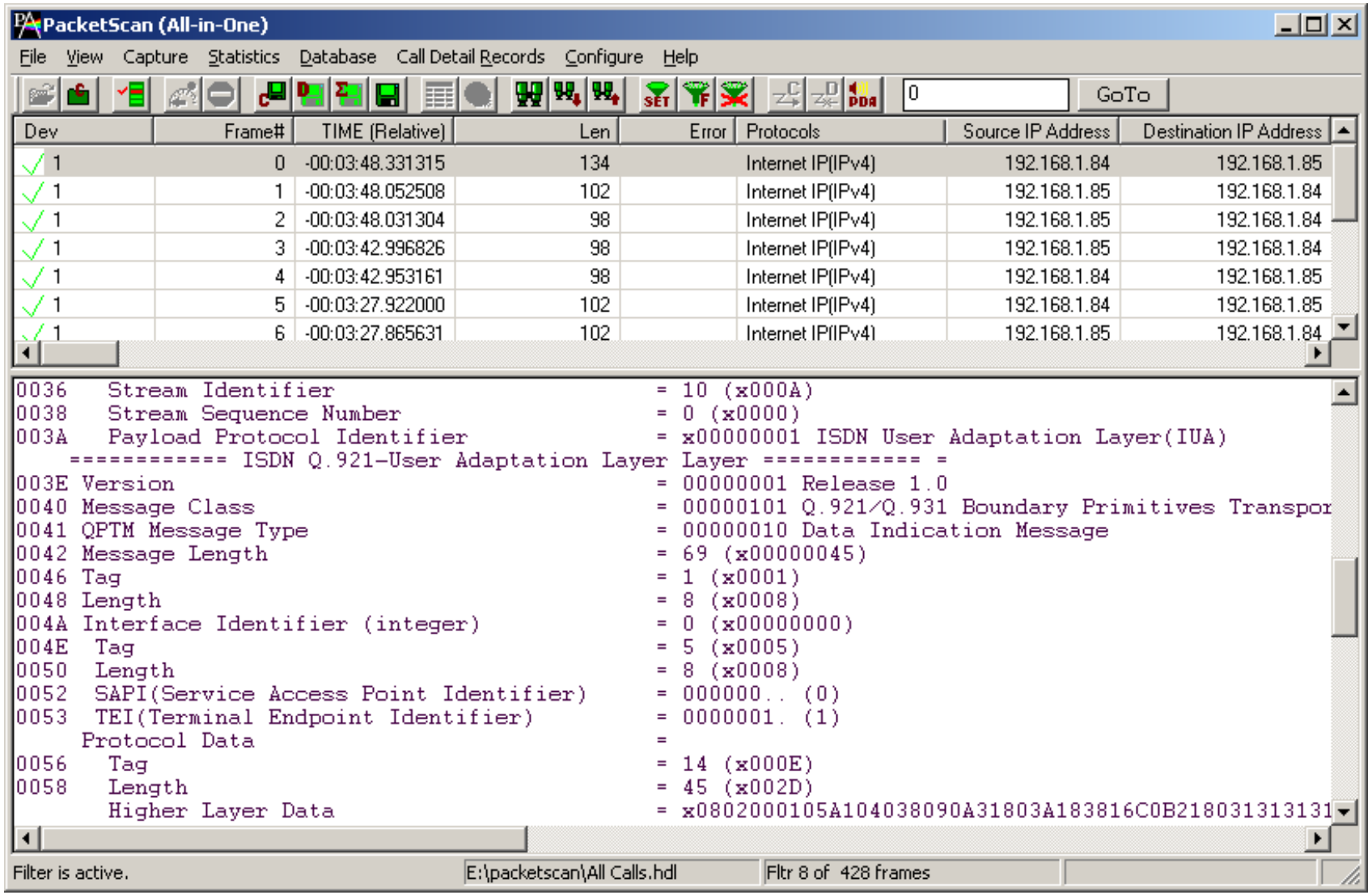
Detail View – SS7 SIGTRAN

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

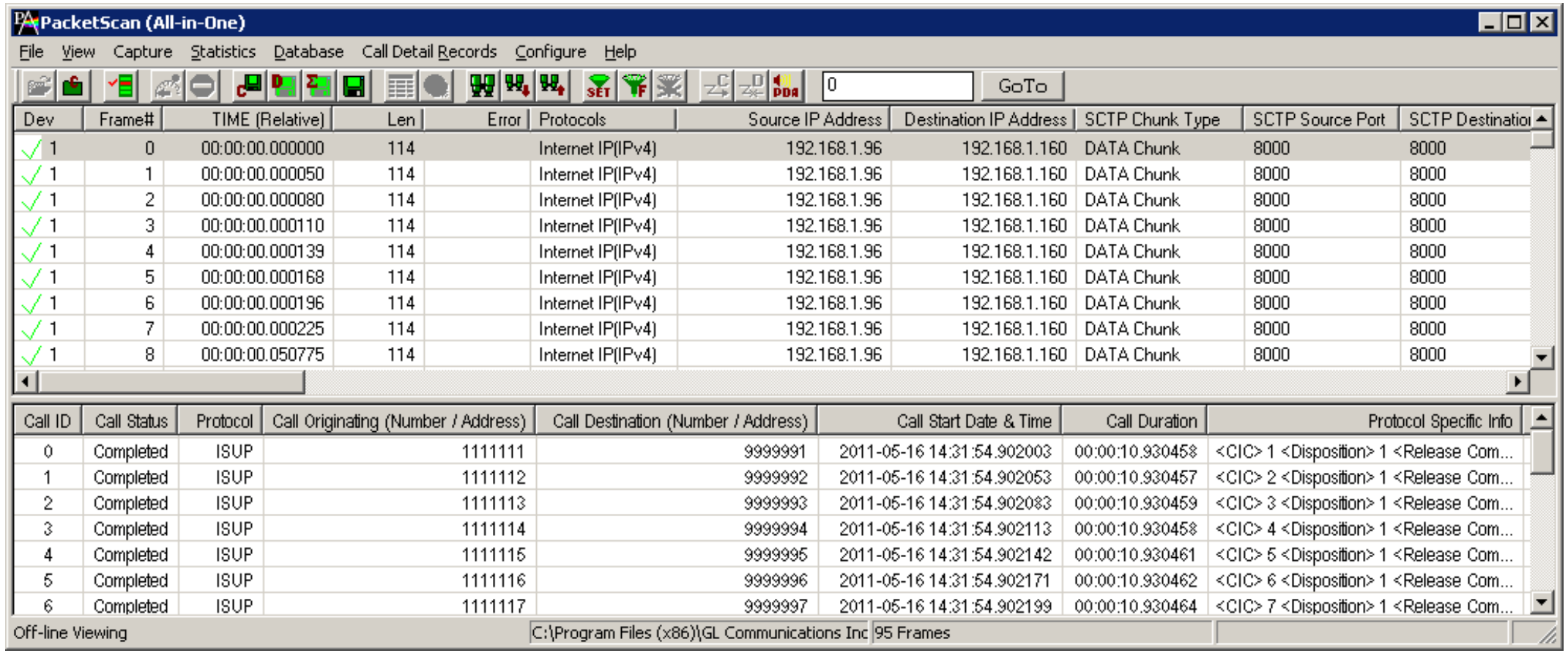


Detail View – ISDN SIGTRAN

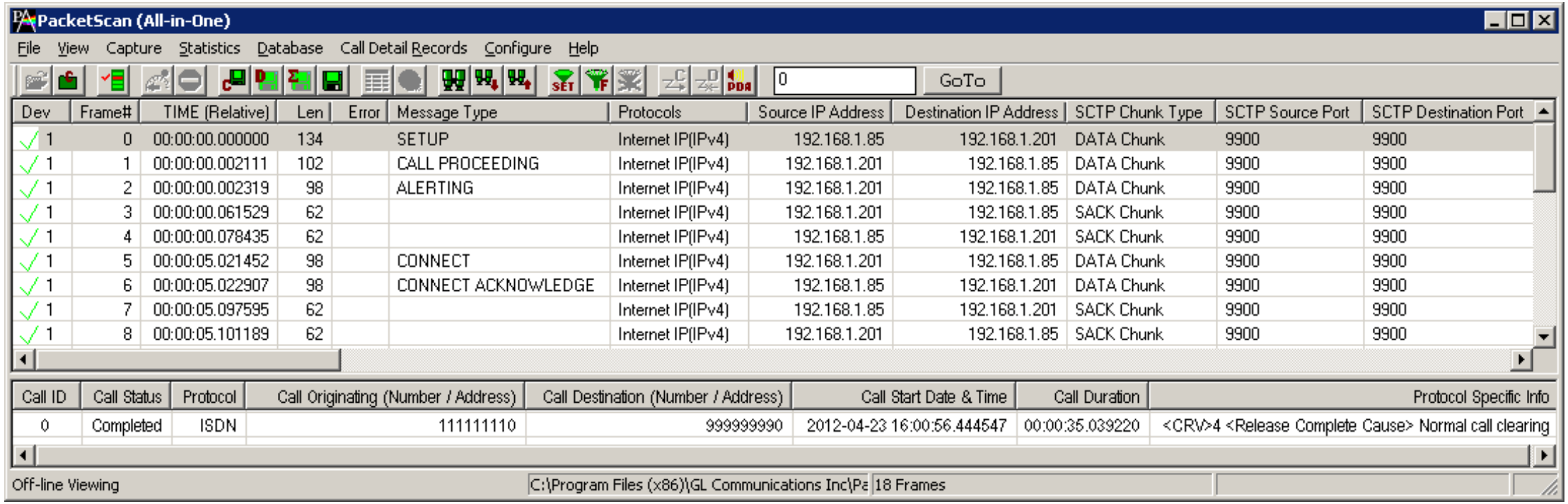
- The detail decode view of ISDN SIGTRAN call displays the following:
  - MAC Layer
  - IP Layer
  - SCTP Layer
  - ISDN Q.921 Layer
  - Q.93x-Layer 3



Call Detail View of SS7 SIGTRAN



Call Detail View of ISDN SIGTRAN



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

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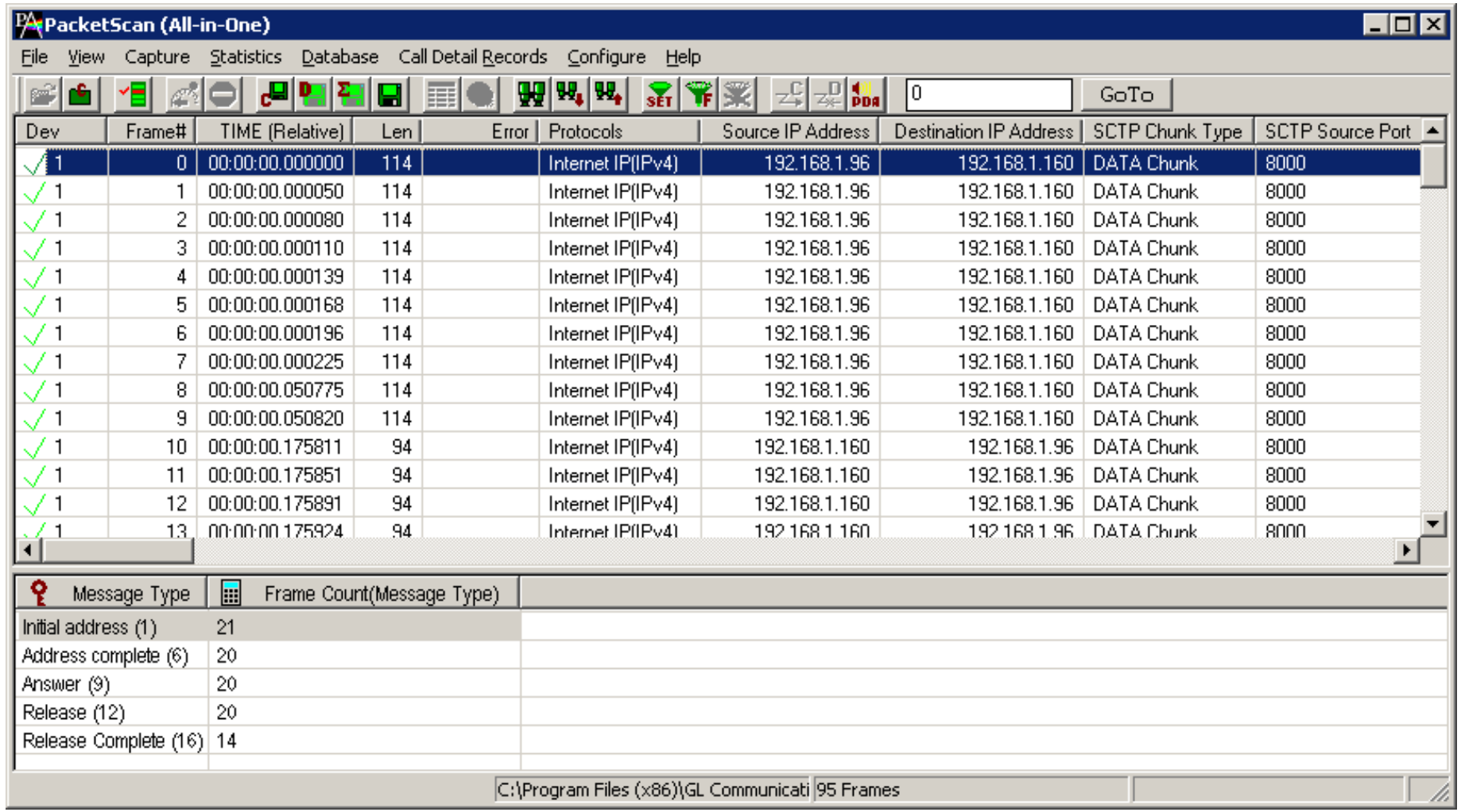
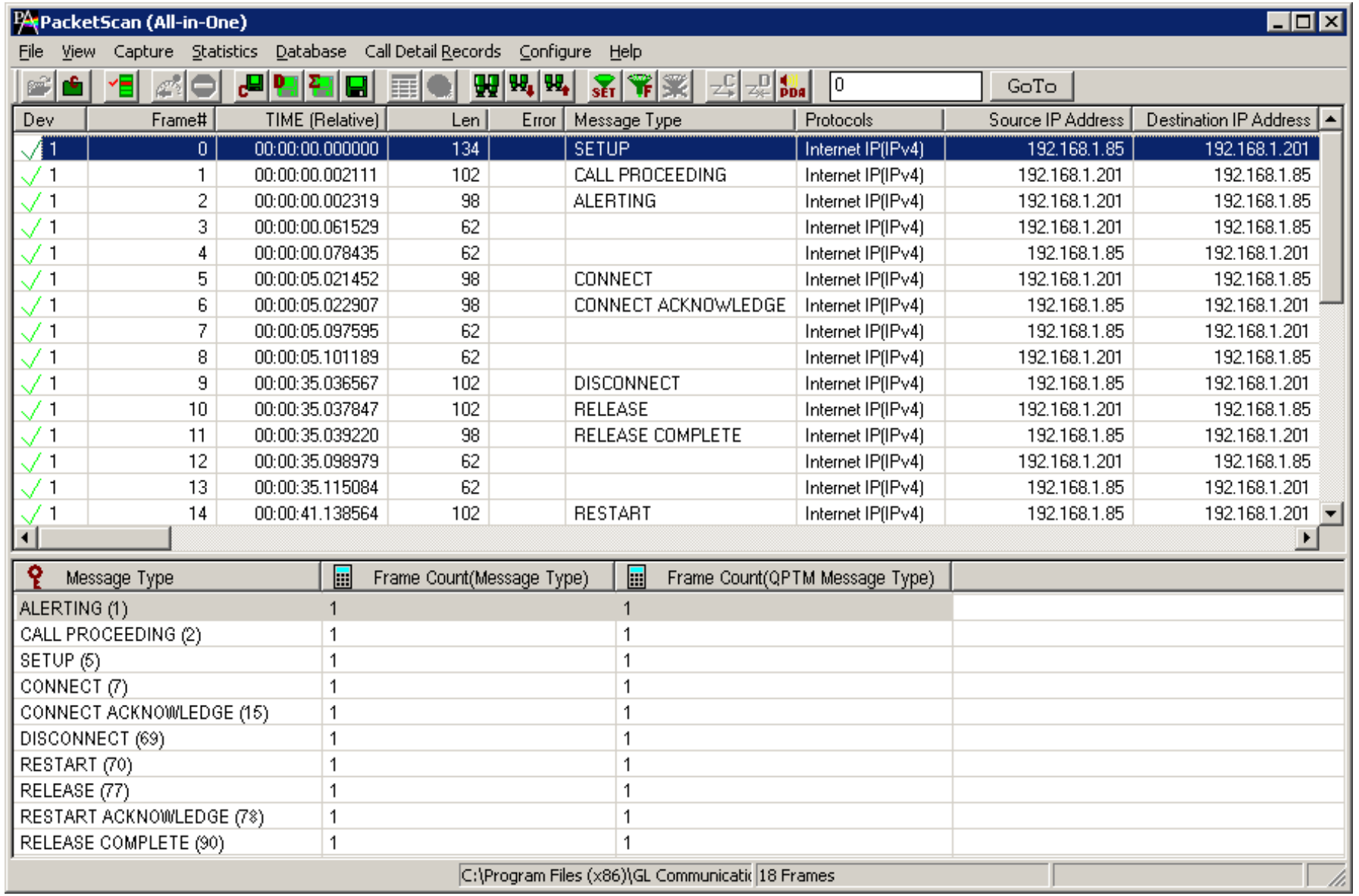
Statistics View of SS7 SIGTRAN



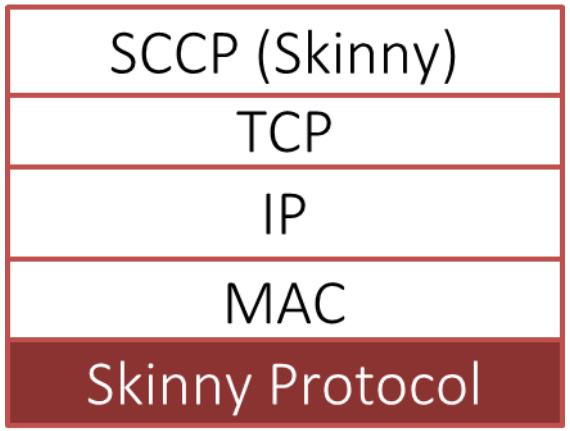
Statistics View of ISDN SIGTRAN



GL Communications

SCCP (Skinny) over IP

Protocol Stack



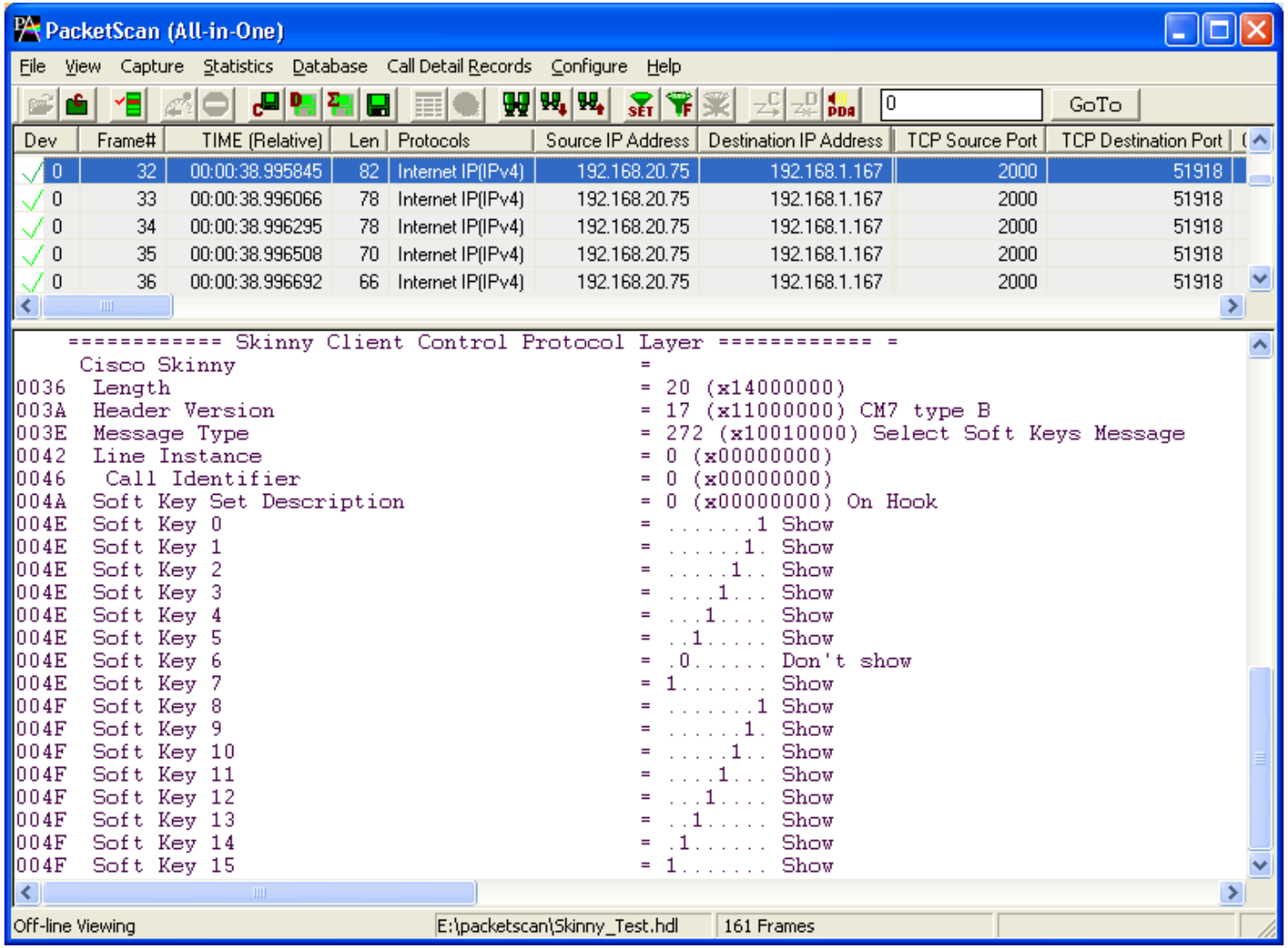
- Skinny Client Control Protocol (SCCP), also referred to as "Skinny", is a Cisco Systems proprietary signaling and control protocol used to communicate between IP devices and Cisco Unified Communications Manager
- Allows call establishment, teardown, and call control features in VoIP environments

Supported Protocols

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

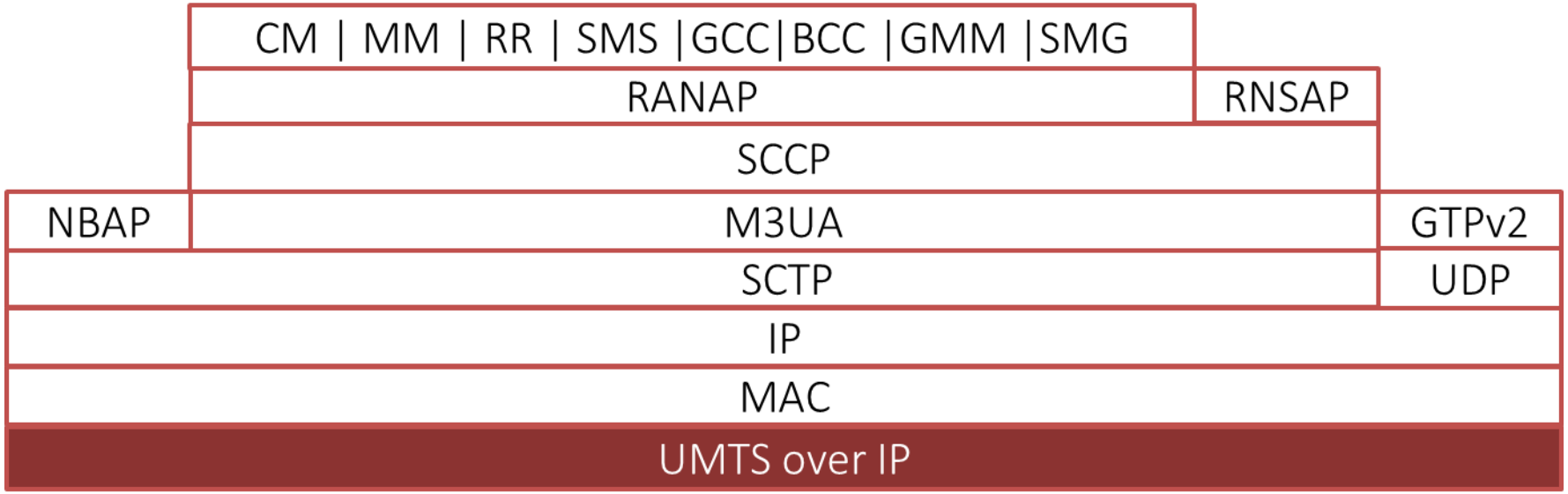
Detail View – SCCP (Skinny)

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



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

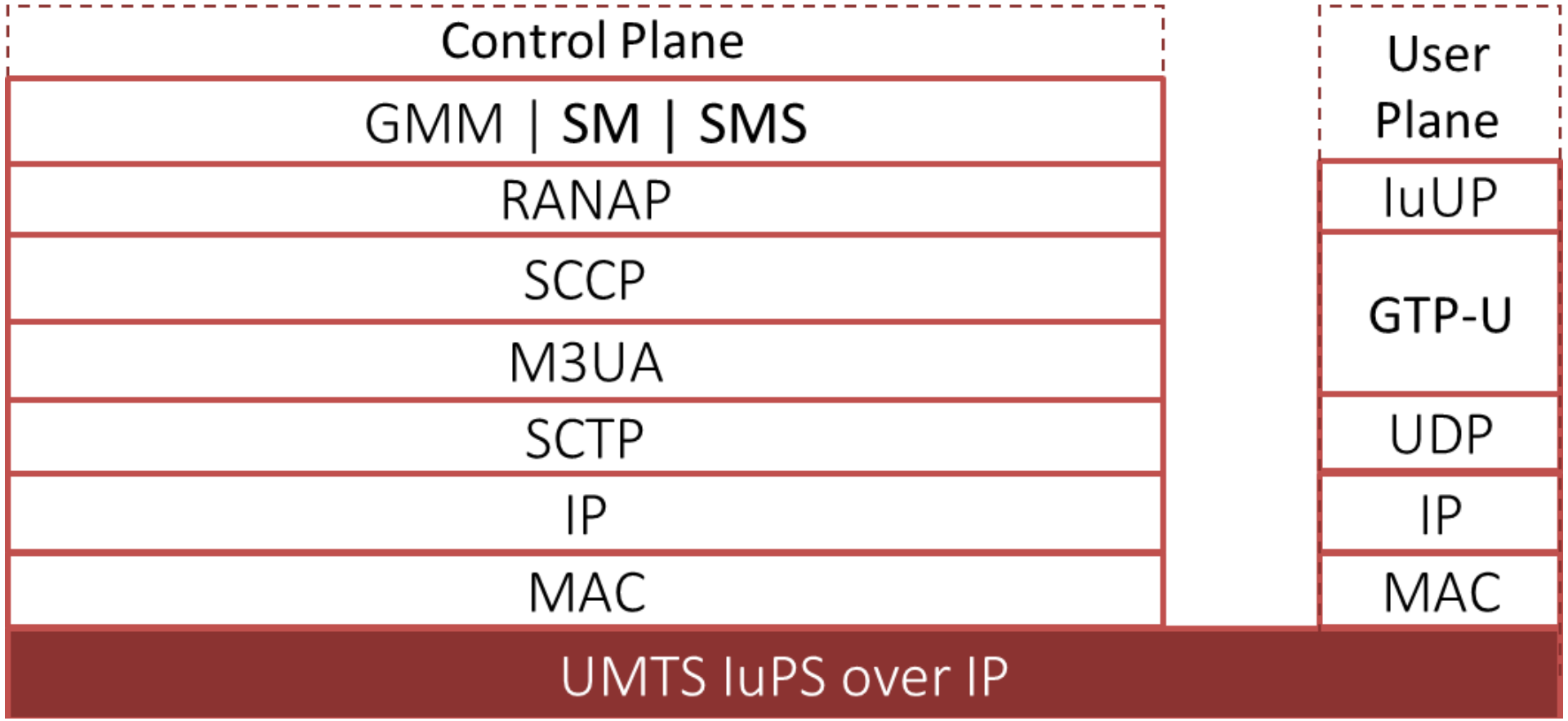
Supported Protocols

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

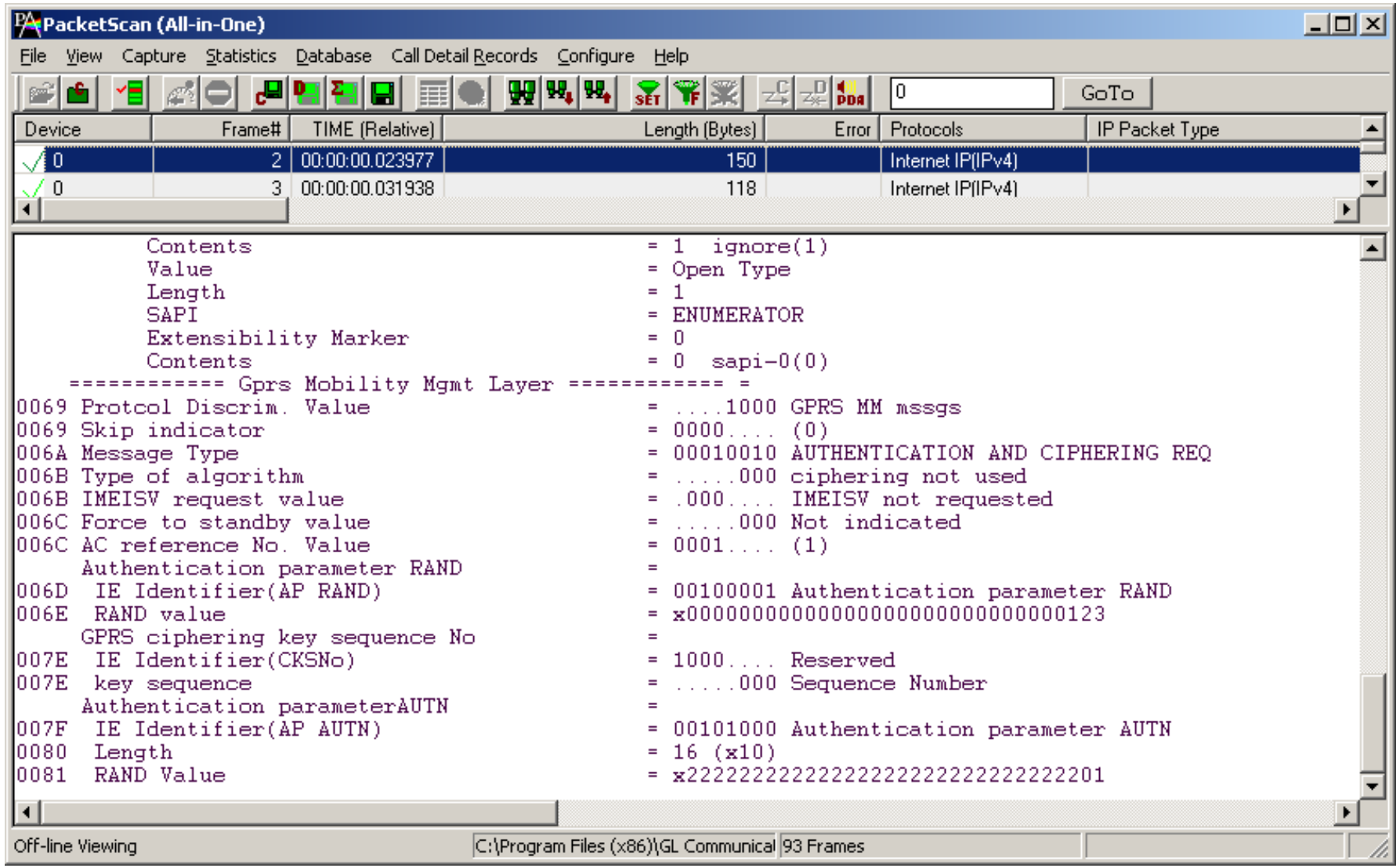
UMTS over IP

- 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

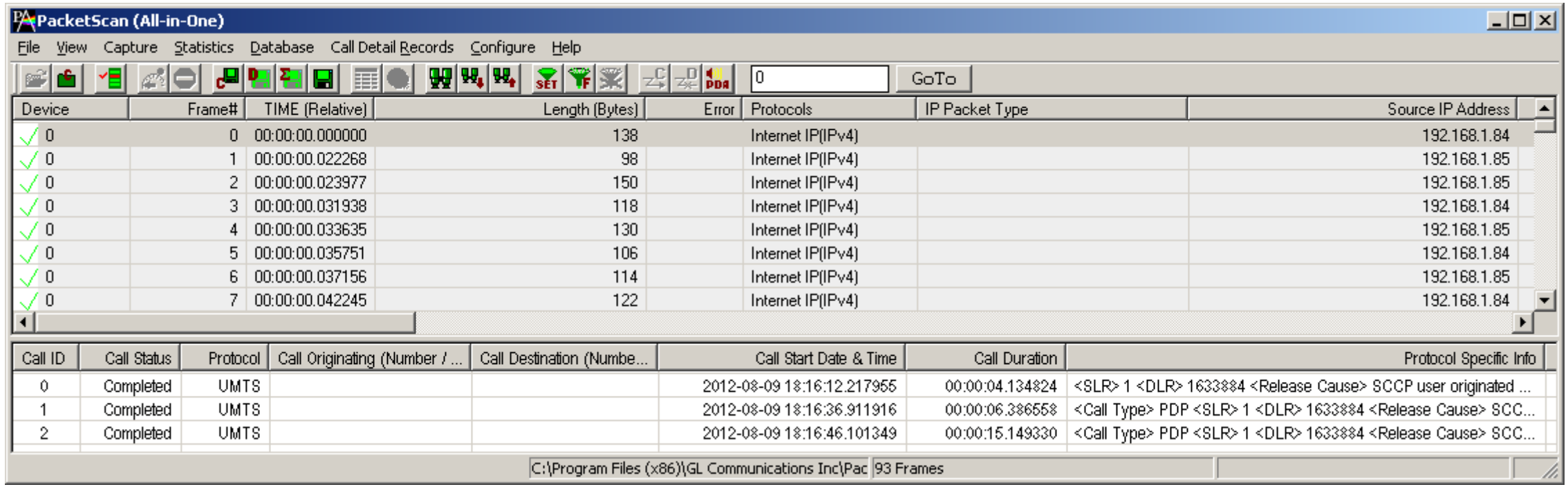
IuPS Protocol Stack



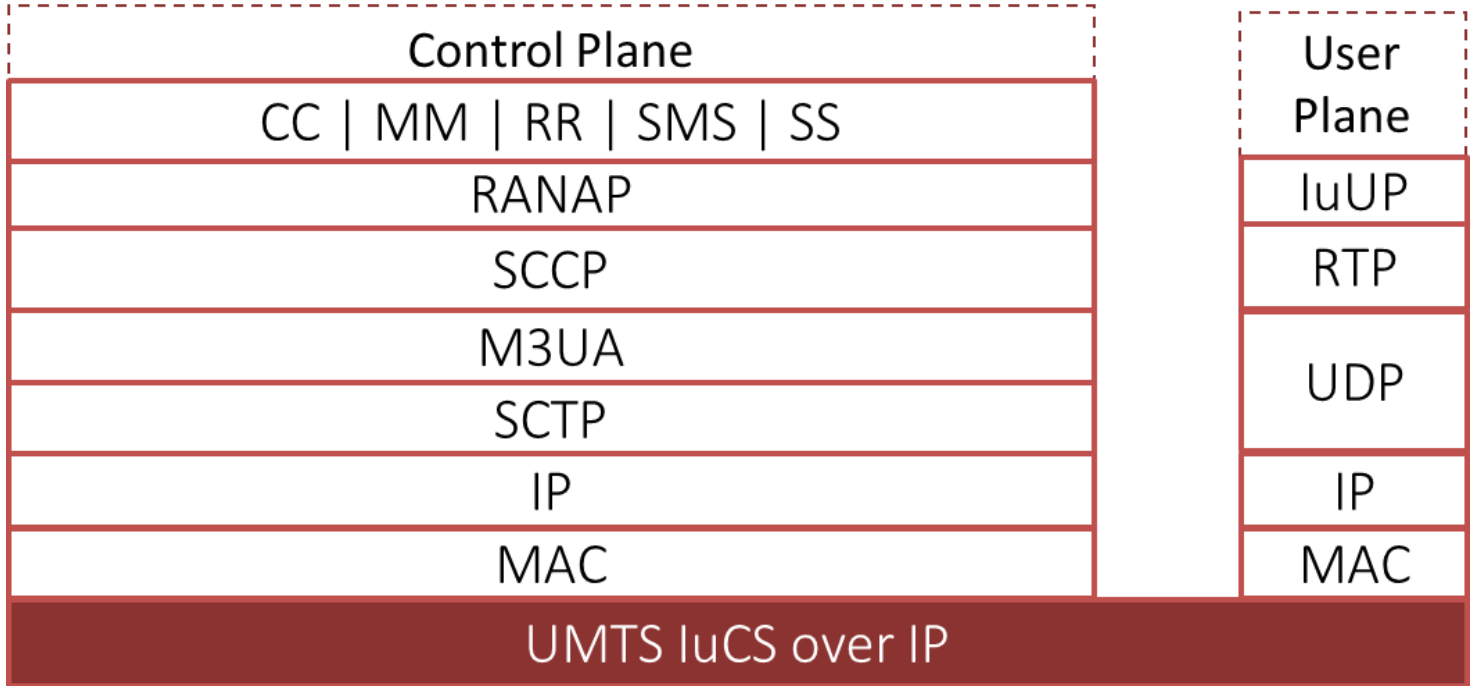
Detail View – IuPS over IP



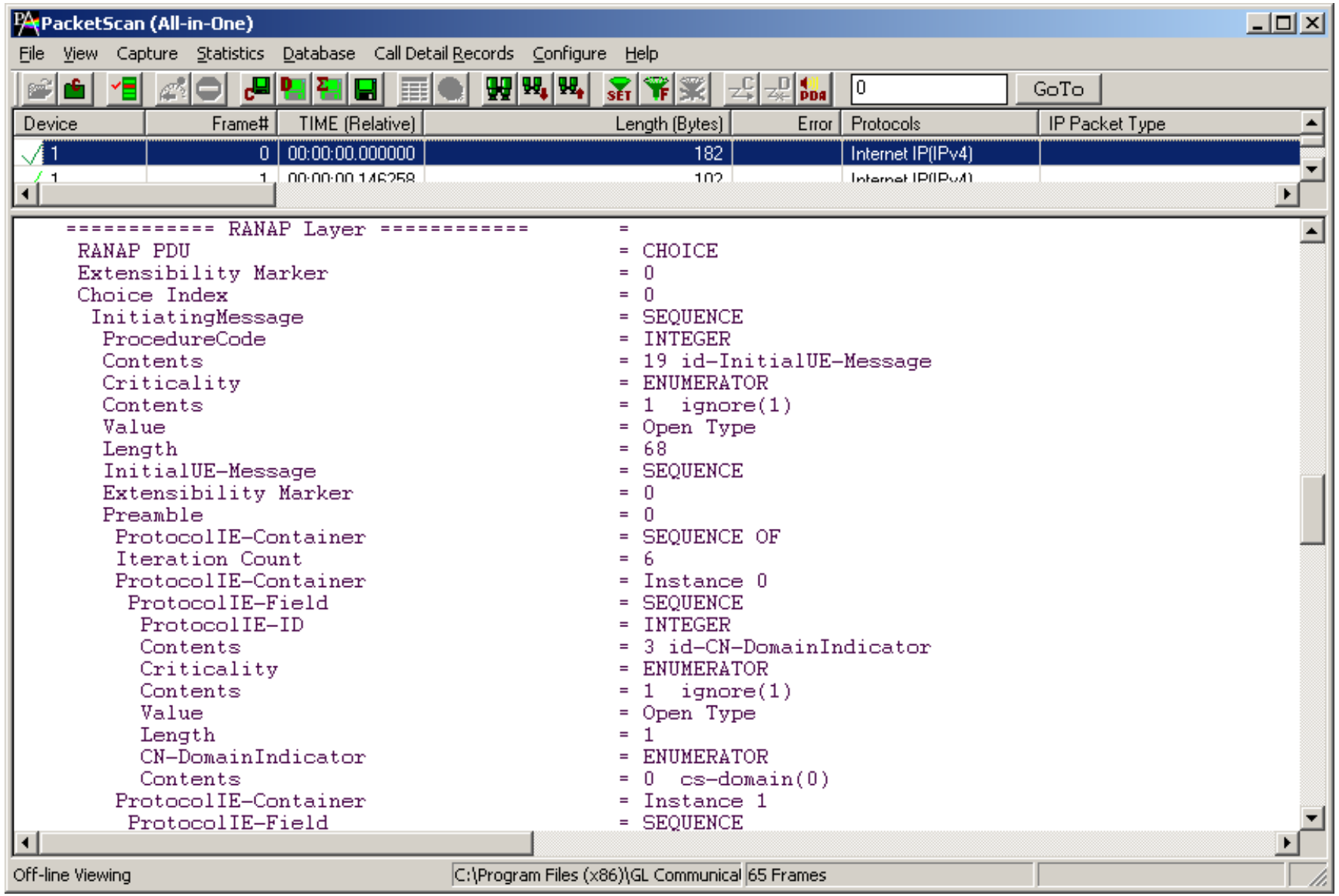
IuPS Call Detail View



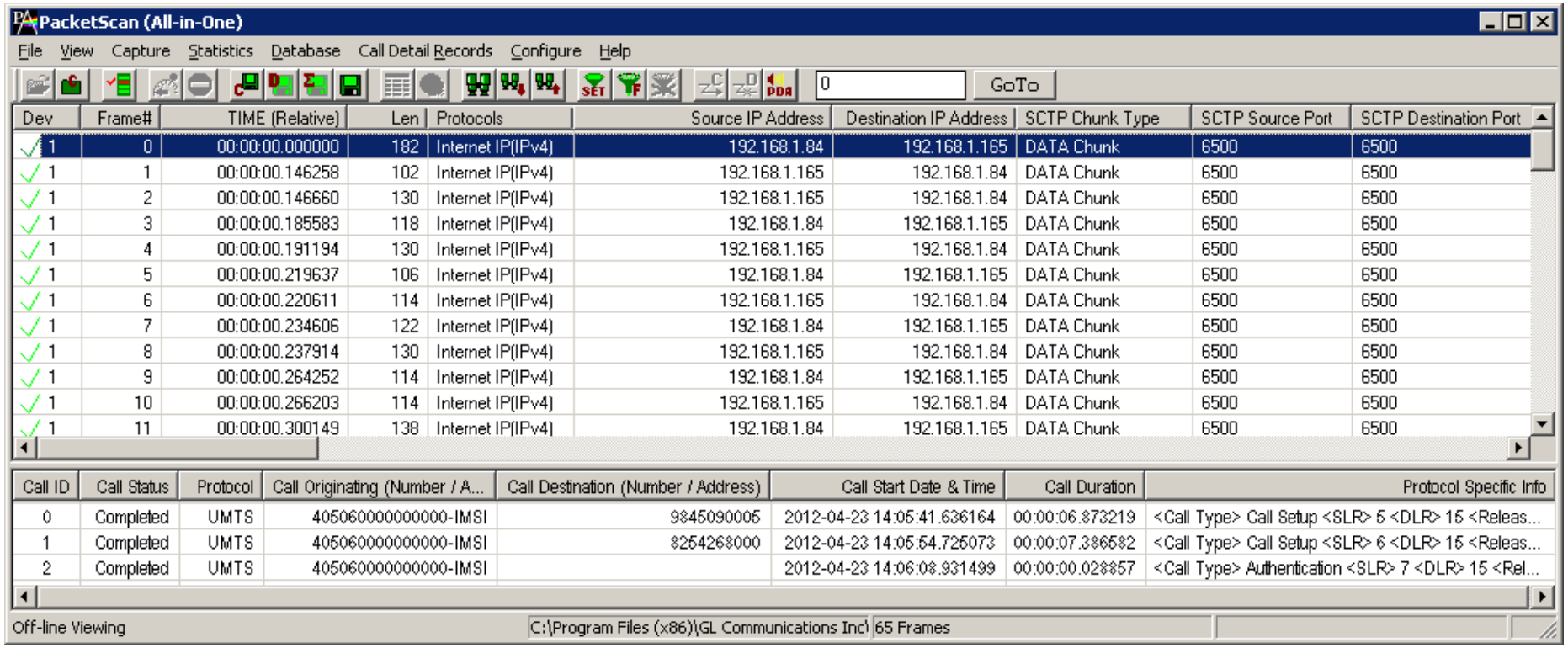
IuCS Protocol Stack



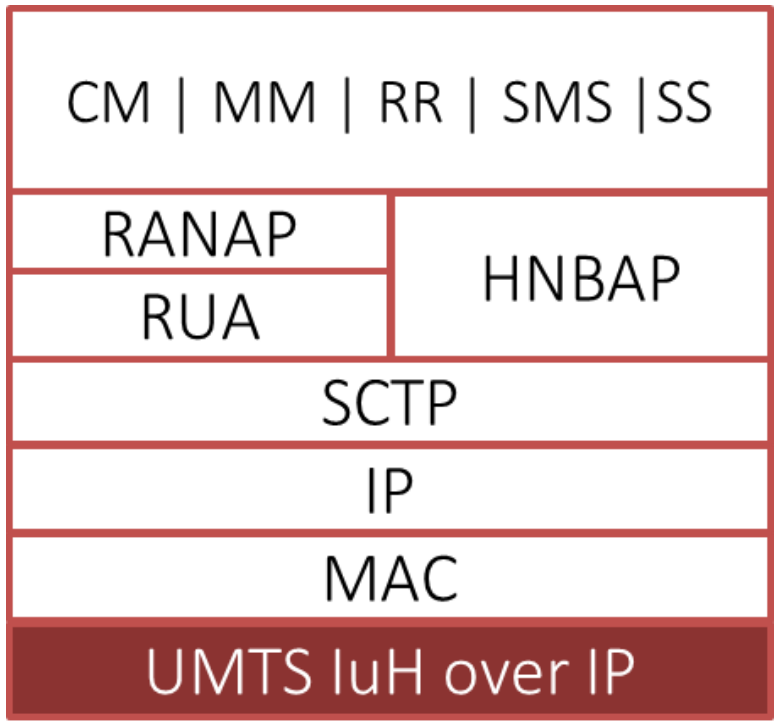
Detail View – IuCS over IP



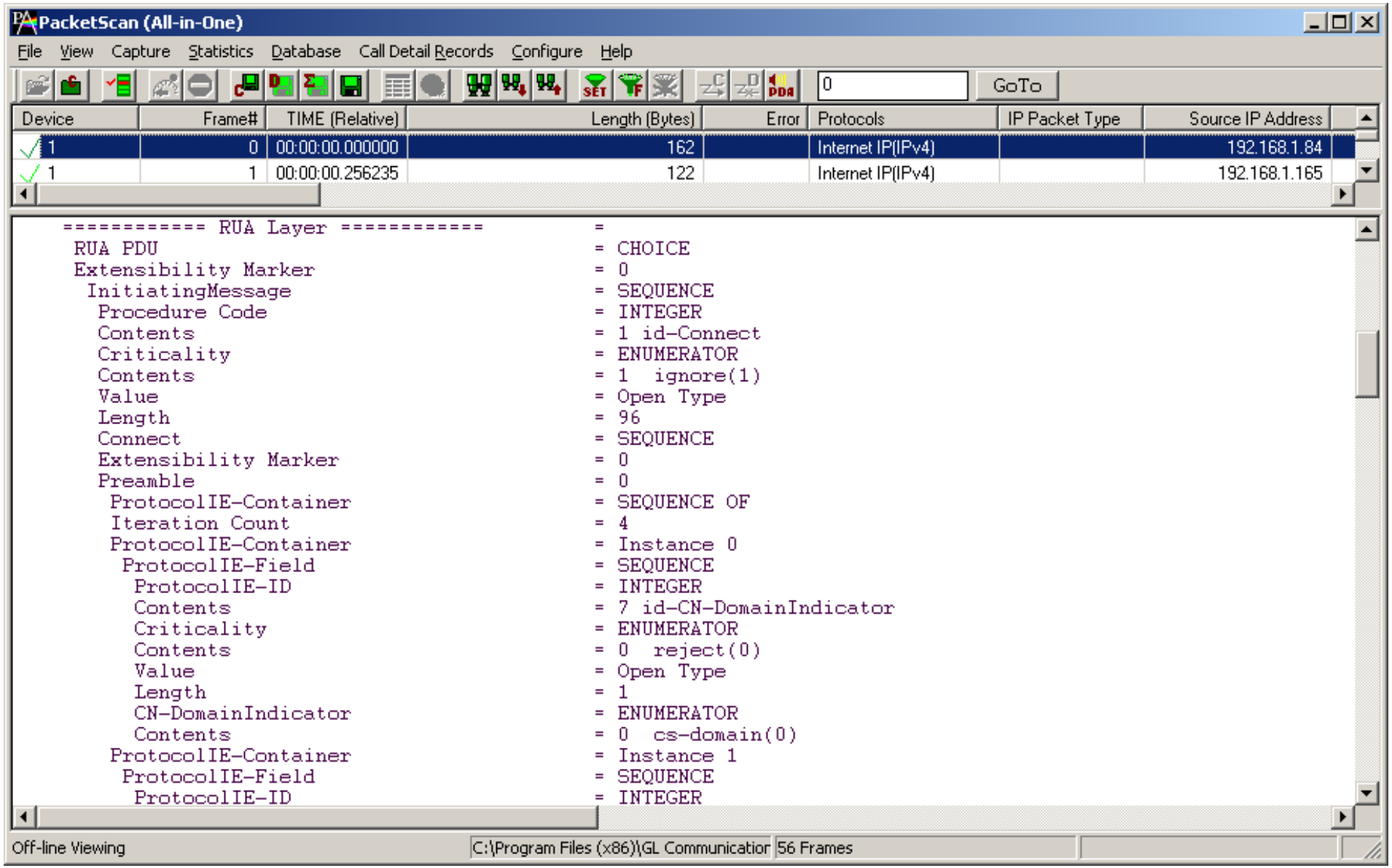
IuCS Call Detail View



IuH Protocol Stack

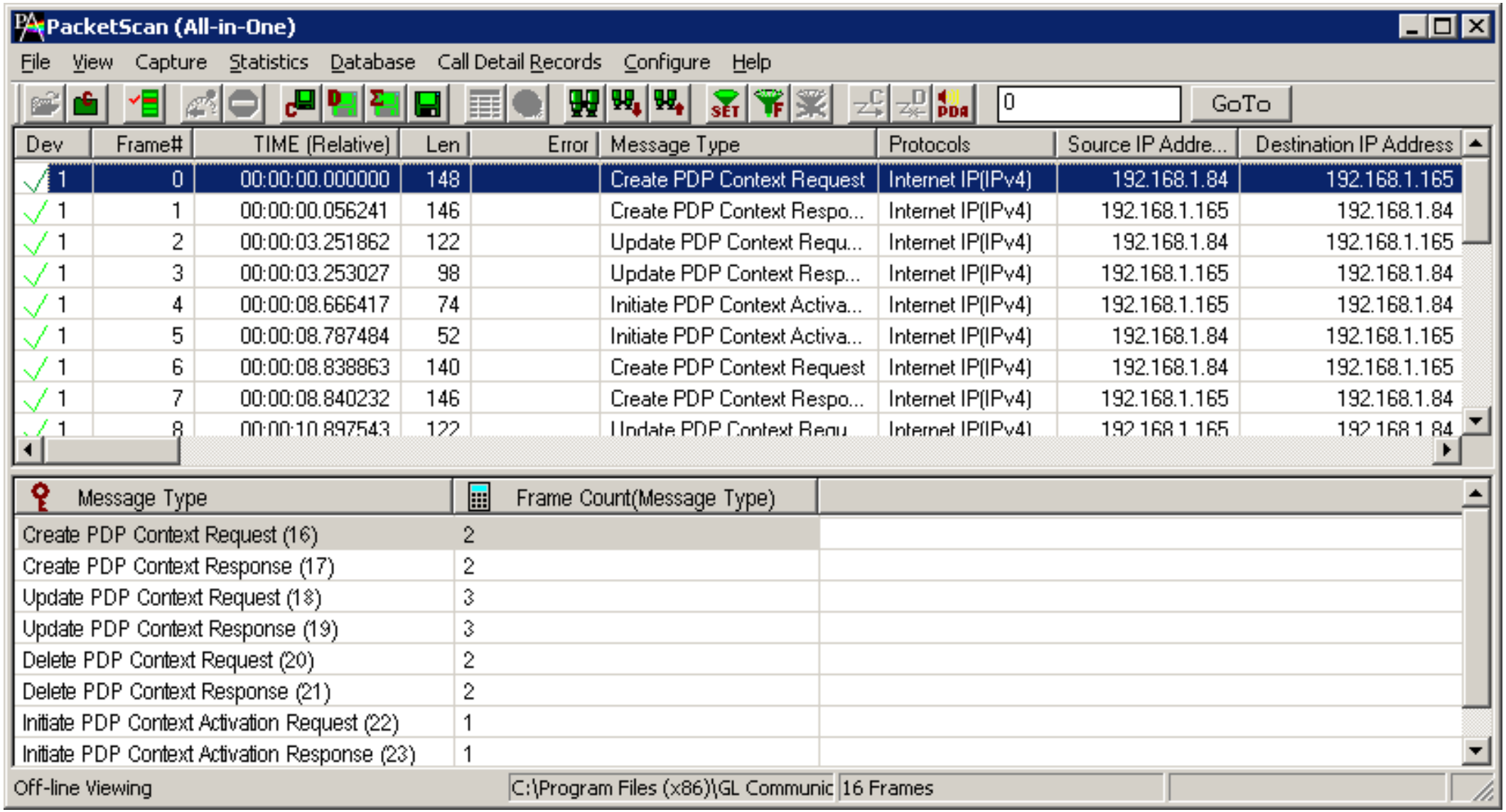


Detail View – IuH over IP



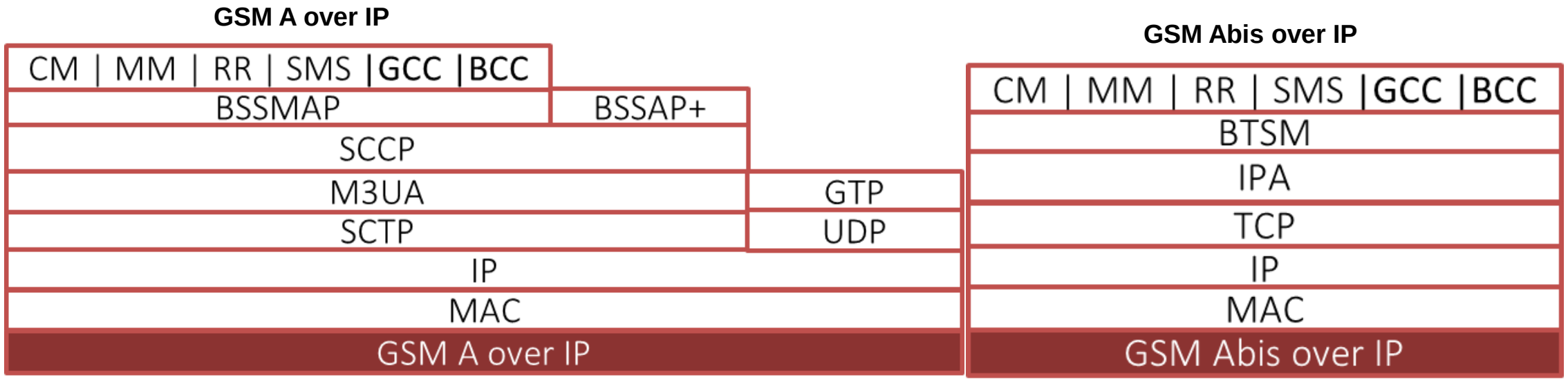
GL Communications

Statistics View



GSM A and Abis over IP

Protocol Stack



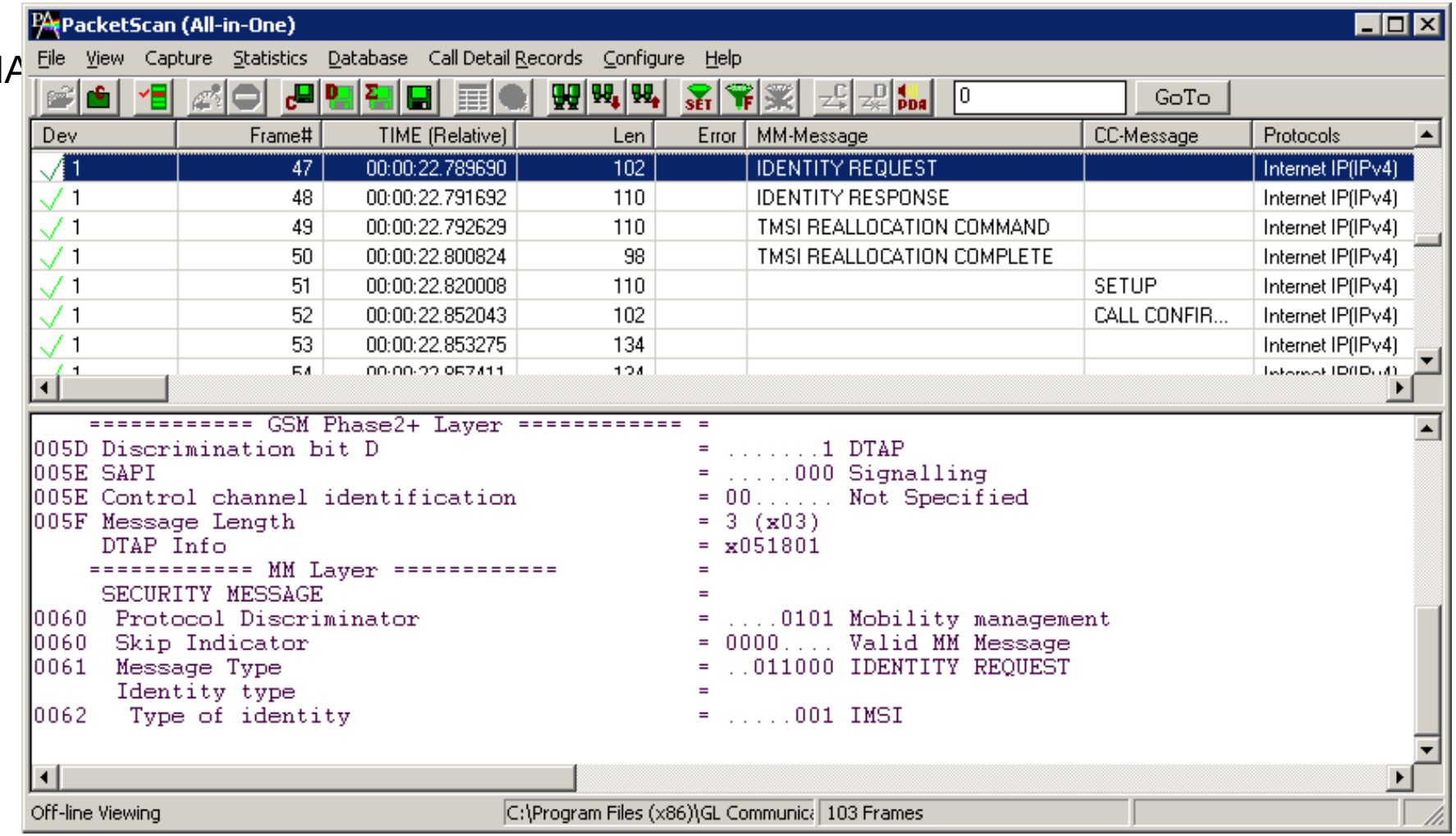
- Decode and analyze complete GSM protocol stack on A and Abis interface.
- Supports BSSAP, DTAP, BSSMAP , and GSM MAP protocols

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



Call Detail View

PacketScan (All-in-One)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

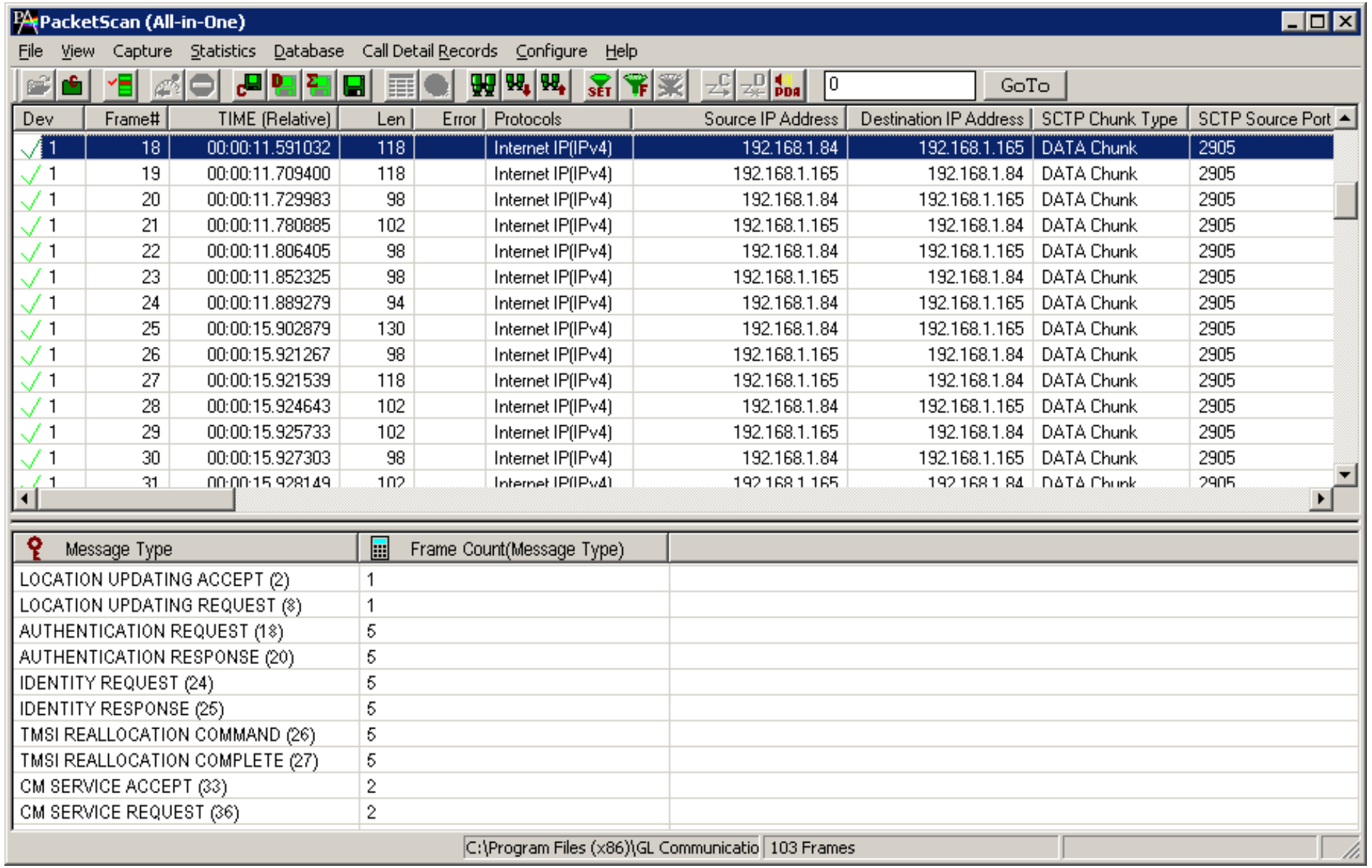
Dev	Frame#	TIME (Relative)	Len	Error	Protocols	Source IP Address	Destination IP Address	SCTP Chunk Type	SCTP Source Port	SCTP Destination Port	SCCP DLR	M3UA Cla
1	0	00:00:00.000000	126		Internet IP(IPv4)	192.168.1.84	192.168.1.165	DATA Chunk	2905	2905		Transfer
1	1	00:00:00.119032	98		Internet IP(IPv4)	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	404100000000001-IMSI	9341141001	2012-05-09 16:56:41.963085	00:00:11.889279	<OPC> 1.1.1 <DPC> 2.2.2 <Release Cause> End user originated
1	Completed	GSM-A	404100000000000-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	404100000000000-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	404100000000000-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

Off-line Viewing C:\Program Files (x86)\GL Communications Inc\F 103 Frames

GL Communications

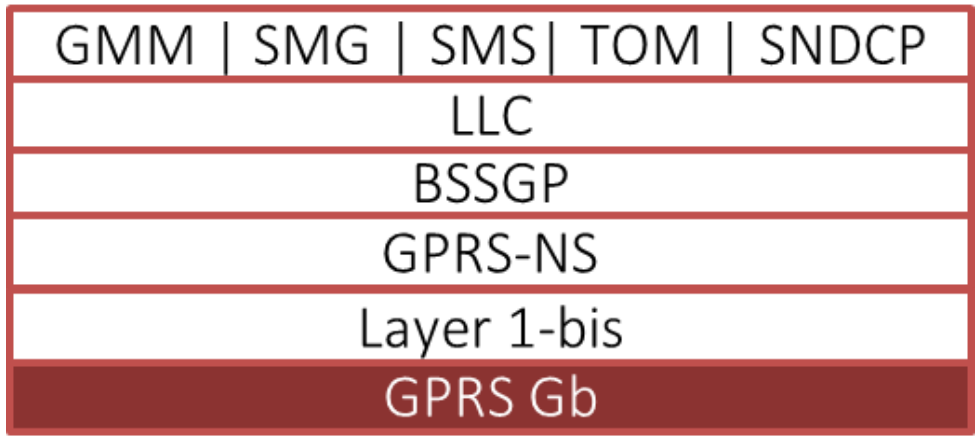
Statistics View



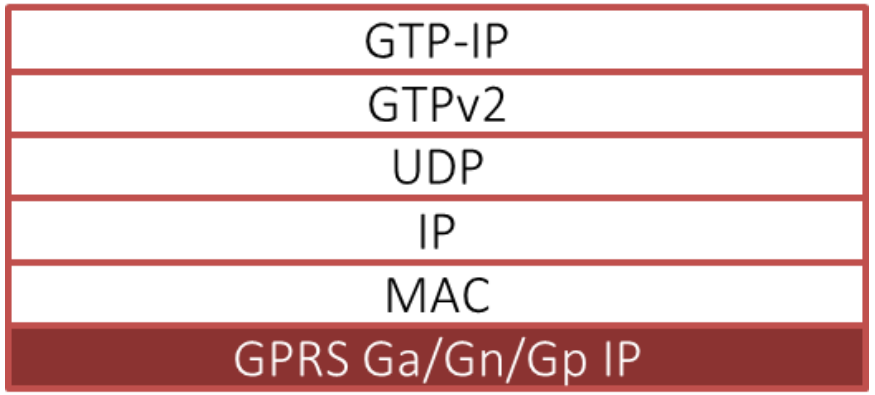
GPRS over IP

Protocol Stack

GPRS Gb Protocol Stack



GPRS Gn Protocol Stack



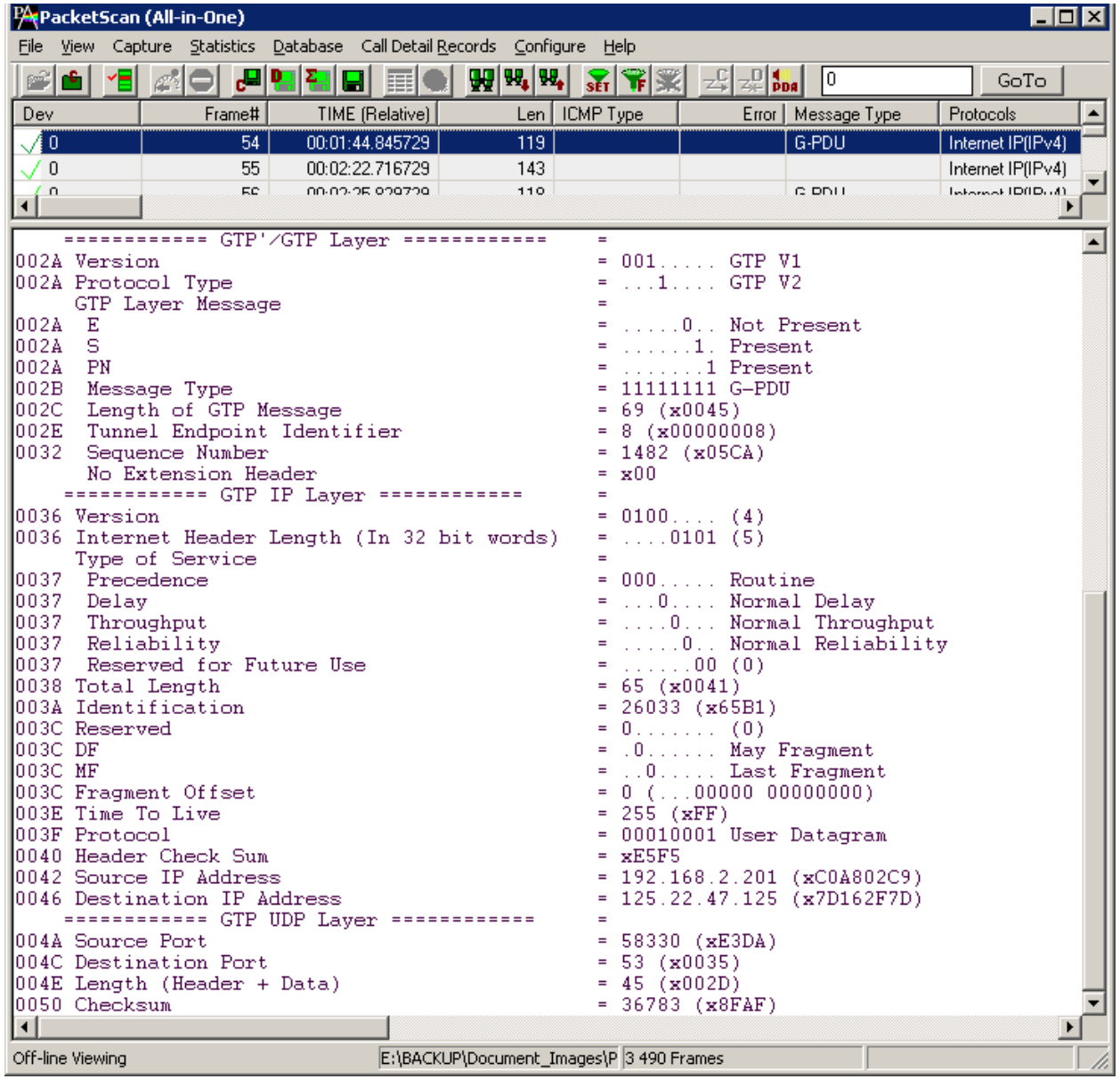
- Decode and analyze signaling and user data protocols over Gb and Ga/Gn interfaces
- Provides details about routing area update, PDP activation, and traffic patterns in the network

Supported Protocols

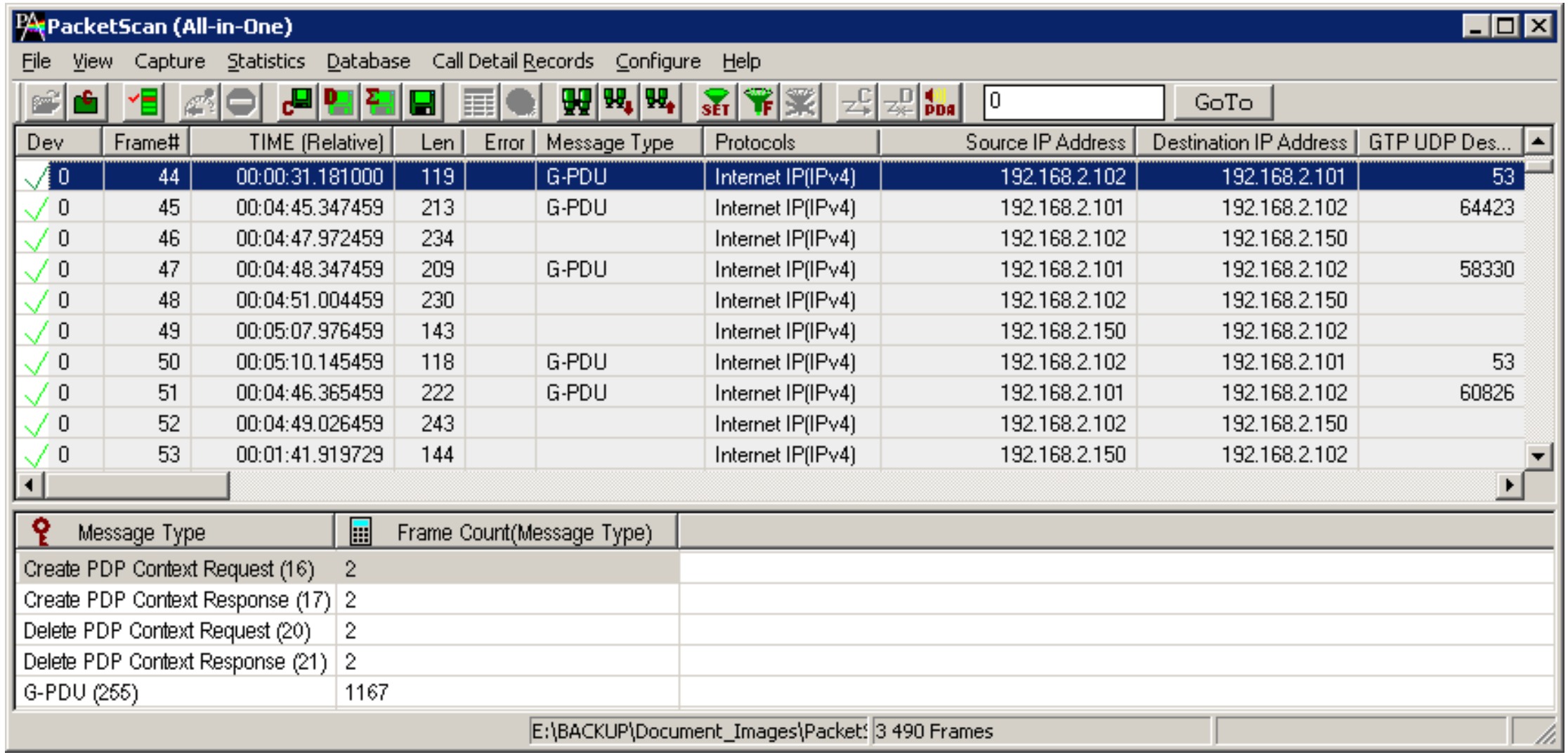
Supported Protocols	Standard / Specification Used
	GPRS Gb Interface
BSSGP	3GPP TS 08.18 V8.10.0
LLC	3GPP TS 04.64 V8.7.0
GMM	3GPP TS 04.08 V7.19.0
SMS	3GPP TS 03.40 V7.5.0 / GSM 03.38 version 7.2.0
TOM	3GPP TS 04.64 V8.7.0 (2001-12)-Annex B
SNDCP	3GPP TS 04.64 V8.7.0
SMG	3GPP TS 04.08 V7.19.0
NS (Network 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

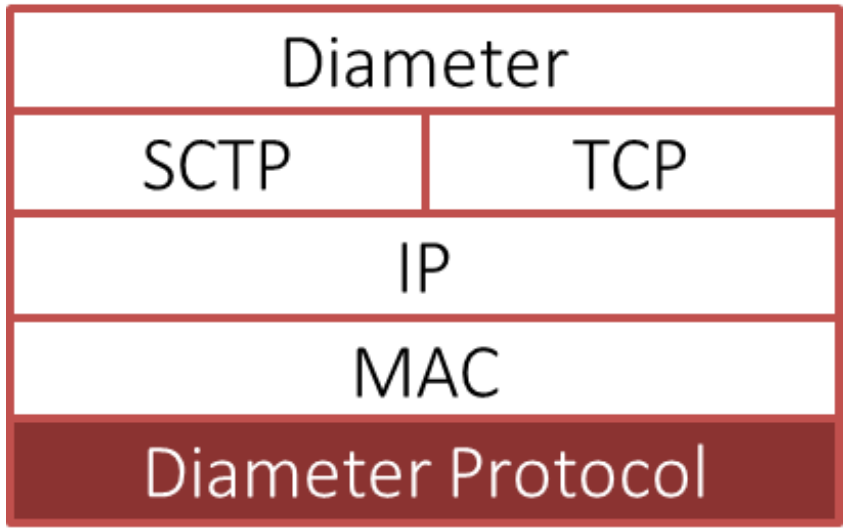


Statistics View



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

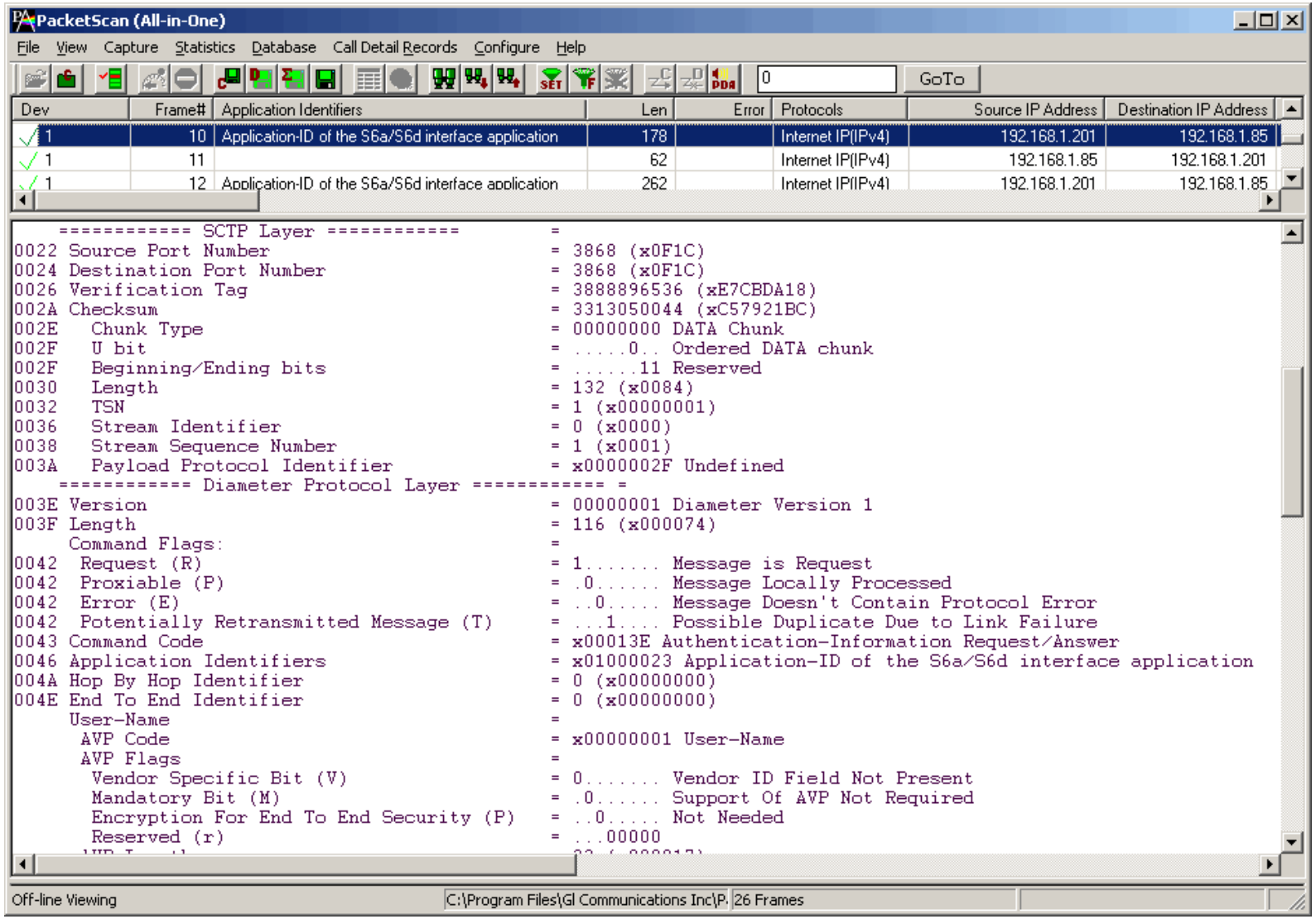
Supported Protocols

Supported Protocols	Standard / Specification Used
Diameter	IETF RFC 3588
	S6a, S6d, S13 - 3GPP TS 29.272 V10.3.0
	Rx - 3GGP TS 29214-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 – 3GGP TS 29.328 & TS 29.329
	Rf/RO – 3GGP 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

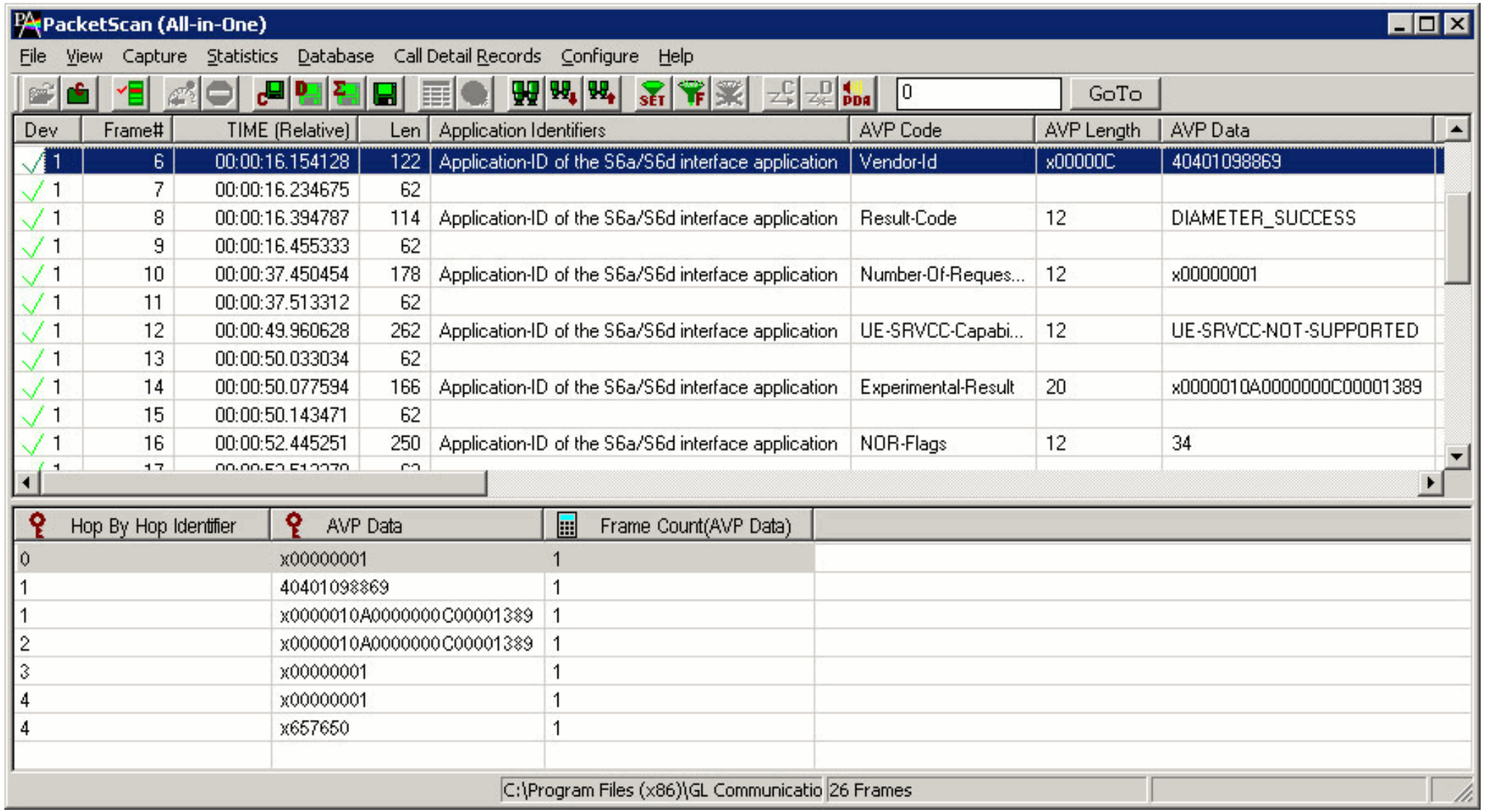
GL Communications

Detail View – Diameter

- The detail decode view of Diameter call displays the following:
  - MAC Layer
  - IP Layer
  - SCTP Layer
  - Diameter Protocol



Statistics View



Thank you