NETSCOUT.

DataCast
GB OHDR

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Contents

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Revision History

The revision history shows the documentation updates for this release. These updates include new features and changes to existing features. They also include changes resulting from documentation requests and issues.

Revision	Description
001	Original from 6.11.2; added MSIP in IPv6 format and IE description (section **5.6**)
002	Added IMEISV.
003	Updated per F-03848 Merge GeoBlade code into mainstream, DC-8553.

1   Introduction

1.1   Confidentiality Restrictions

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1.2   Disclaimer

NETSCOUT reserves the right to revise this document for any reason, including but not limited to, conformity with standards promulgated by various agencies, utilization of advances in the state of the technical arts, or the reflection of changes in the design of any equipment, techniques, or procedures described or referred to herein. NETSCOUT is under no obligation to provide any feature listed in this document.

1.3   Purpose

The purpose of this document is to describe the OHDR format for Binary Streaming and Binary and ASCII file output. NETSCOUT created this document for the development of an OHDR receiver in a third part application.

1.4   Content

Structures and parameters described in this document are related to the protocol:

- GB

1.5   Scope

The OHDR parameters described in this document are limited to DataCast. The ASCII and Binary outputs described in this document are limited to the OHDR receiver software developed by Tektronix.

1.6   Definitions

Listed below are common definitions for this guide.

xDR	Generic term to indicate Data Records generated by SpIprobes and G10, GeoBlade probes
SIPDR	IP Sip interface Detail Record
DR	Data Record. Within this document the term refers to components of a OHDR, resulting from the transformation of individual xDRs
HDR	Hybrid Data Record
OHDR	Output Hybrid Data Record. Output format generated by DataCast by processing xDRs
Blob	Blob is a chunk of binary data a receiver obtains on a TCP/IP socket from a DataCast server.
IE	Information Element

1 Defining the DataCast Mediation Platform

The DataCast Mediation platform provides an efficient and flexible process for generating a unique output—OHDRs. It provides the following functions:

- Filtering of data records for specific application needs
- Correlation of data records
- Serves as a single feed to multiple applications

The DataCast system's filtering capabilities enhance the bandwidth efficiency on Local and Wide Area Networks (LAN/WAN). The Flexible Component attachment allows a system administrator to combine the DataCast processing components in different ways to provide an efficient output to a downstream application. This feature helps the downstream application receive only those records of interest, reducing the number of records that must be discarded.

DataCast receives Programmable Detail records (xDRs) from the GeoProbe system. DataCast filters and correlates these input data records so it can produce the DataCast format, which is an OHDR. One OHDR contains content from one or more xDRs plus additional information.

After correlating the xDR into an OHDR, DataCast then broadcasts the OHDRs to multiple applications for business intelligence, planning, and service management. This result enables DataCast to reduce the load placed on network resources by alleviating the production of duplicated and customized data records from each network information source. DataCast also assists the network applications by delivering packaged and customized OHDRs.

Note: DataCast uses the Sun server family and is independent from the GeoProbe system's SpIserver.

2 Working with Binary OHDR Output – TCP/IP Streaming

This section describes the layout of the OHDR Binary Large Object (BLOB) that DataCast Transmitter sends across a TCP/IP socket.

2.1 Overview

The data record is encoded in the BLOB. Fields of the OHDR are divided into the following categories based on their sizes:

- OHDR header
- DR header
- Fixed section
    - First category for fixed section elements: four bytes in length
    - Second category for fixed section elements: two bytes in length
    - Third category for fixed section elements: various lengths, which can be any length other than four bytes and two bytes
- Variable section

Fixed section refers to fields that are always present in the OHDR.

Variable section contains information that can be present in the OHDR if the probes have been programmed to include it in xDRs.

2.2 Defining the Rules for Decoding a BLOB

To ensure the receiver decodes a BLOB, use the following generic rules:

- Each BLOB might contain multiple DR's and every DR is word aligned. The entire BLOB is always word aligned.
- When blobbing one single DR, all the 4 byte-sized parameters (in the fixed section of that DR) are packed together at the beginning. This section is followed by all the 2 byte-sized parameters (in the fixed section of that DR). This section is followed by the all the miscellaneous-sized parameters (in the fixed section of that DR). The last section in the blob is the variable section of the DR. Since all parameters in a DR (whether they belong to the fixed section or the variable section) are configurable, separate element-id masks are used for the three different categories (that are present in the fixed section of a DR). The purpose of these element-id masks is to indicate the different individual elements/parameters (that belong to a particular category) that are packed into this BLOB (based on the user's choice).
- When one single DR is packed into the BLOB, there might be instances where all three different categories of data are to be blobbed or only one category has to be blobbed (based on the user's choice). The number of element-id masks present in the blob is directly dependent on the number of different categories you had to pack into the blob.
- For a DR count that is greater than the value zero, you must read each record according to its specification and move on to the next record. For the purpose of this document, if the DR count is greater than the value zero, one or more data records are present:

2.3 OHDR Header

For the purpose of this document, bit positions are based on the digit one, not the digit zero. Bits one through eight in this document are identical to bits zero through seven in an environment that is based on the digit zero. The following table is an example of the OHDR header.

Parameter	Size (Bytes)	Description
Length of Data Blob	4	The length is not inclusive of this field.
Message Type	1	In the case of a data record, the value is 130.
Data Type	1	This value defines the application ID from the OHDR.format and Transmitter.
Format Type	1	This value defines the FormatID from the OHDR.format and Transmitter.
[Version (4 bits) – Spare (4 bits)]	1	Indicates the version of the data type (HDR). The maximum value of the version number is assumed to be 15
DrCount	1	This value defines the total number of DRs. If the value is zero, no data sections appear.
<Internal>	1	
Reserved	2	This parameter is reserved for future use.

2.4 DR Header, Fixed section

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
Total length of DR	2				This field indicates the length of this xDR (in number of bytes). The length indicated also includes the size of this field and any word padding at the end of the DR. The length unit is in number of 4 byte words.
Bitmask	1				If the bitmask contains a value of zero for a data element, the element does not appear in the record.
DR Type (bits 1-3)					The value for this parameter is 3 for GbDR.
Number of Element ID Masks: 2 bits (bits 4-5)					Indicates the number of Element IDs used in the next Fixed Sections (up to three sections as described below).
Interface Type: 3 bits (bits 6-8)					The value for this parameter is 0.
Total Length of Element ID Section	1				This value indicates the length of the entire Element ID section. This value is exclusive of the size of this field, but is inclusive of the padding bytes for the Element ID. The length unit shall be in number of (4 byte) words.
Word Fields Section					
Element ID Mask 1	4				This value is the Bitmask for all elements in Section 1. The three most significant bits (32–30) indicate the number of bytes within the parameters from this section. The following values are: **000: Word size (4 bytes)** 001: Short size (2 bytes) 010: Miscellaneous sizes (anything other than 4 or 2 bytes)
Call Number	4	24577	✓		This field is present if the Element ID Mask 1 bit location 1 is set. **Detailed Description** The value is an ID defined by the probe.

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
Start Time (seconds)	4	24578	✓		This field is present if the Element ID Mask 1 bit location 2 is set. **Detailed Description** The value expresses in second the Greenwich Mean Time (GMT) timestamp of the call starting based on the first message of the call.
Start Time (micro seconds)	4	24579	✓		This field is present if the Element ID Mask 1 bit location 3 is set. **Detailed Description** The value expresses in microsecond the Greenwich Mean Time (GMT) timestamp of the call starting based on the first message of the call.
End Time (seconds)	4	24580	✓		This field is present if the Element ID Mask 1 bit location 4 is set. **Detailed Description** The value expresses in second the Greenwich Mean Time (GMT) timestamp of the call ending based on the first message of the call.
End Time (micro seconds)	4	24581	✓		This field is present if the Element ID Mask 1 bit location 5 is set. **Detailed Description** The value expresses in microsecond the Greenwich Mean Time (GMT) timestamp of the call ending based on the first message of the call.
Status Bits	4	24582	✓		This field is present if the Element ID Mask 1 bit location 6 is set. **Detailed Description** This field indicates the contents of the Status field as defined for Gb interface Call Trace. See Table 5.1.3 for values that apply to this field.

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
Timeout Bits	4	24583	✓		This field is present if the Element ID Mask 1 bit location 7 is set. **Detailed Description** This field indicates the contents of the Time Out Bits as defined for Gb interface Call Trace. See **Table 5.3** for values that apply to this field.
Gb PDR Condition Indicator	4	24584	✓		This field is present if the Element ID Mask 1 bit location 8 is set. **Detailed Description** This field indicates various conditions within a Gb transaction. See **Table 5.2** for values that apply to this field.
MS to Network Traffic Volume Count for this record	4	24585	✓		This field is present if the Element ID Mask 1 bit location 9 is set. **Detailed Description** The number of octets of user data sent to the network by the MS. You must turn on bit 1 of the fixed optional part bit mask to use this option. This data is presented with the most significant byte first.
Network to MS Traffic Volume count for this record	4	24586	✓		This field is present if the Element ID Mask 1 bit location 10 is set. **Detailed Description** The number of octets of user data sent to the MS by the network expressed in binary. You must turn on bit 1 of the fixed optional part bit mask to use this option. This data is presented with the most significant byte first.
Mobile Station IP	4	24587	✓		This field is present if the Element ID Mask 1 bit location 11 is set. **Detailed Description** This field indicates the IP address of the mobile station performing the Packet Data Protocol (PDP) context procedure. You must turn on bit 2 of the fixed optional part bit mask to use this option.

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
Interface ID	4	24588	✓		This field is present if the Element ID Mask 1 bit location 12 is set. **Detailed Description** This field is the GeoProbe database id that identifies the Gb Interface.
Procedure ID	4	24589	✓		This field is present if the Element ID Mask 1 bit location 13 is set. **Detailed Description** This field contains the Procedure Id
Short Fields Section					
Element ID Mask 2	4				This value is the bitmask for all elements in Section 2. The three most significant bits (32–30) indicate the number of bytes within the parameters from this section. The following values are: 000: Word size (4 bytes) **001: Short size (2 bytes)** 010: Miscellaneous sizes (anything other than 4 or 2 bytes)
Equipment Id	2	25601	✓		This field is present if the Element ID Mask 2 bit location 1 is set. **Detailed Description** The value is the ID of the GeoProbe that created the call record, unique in the system.
Processor Id	2	25602	✓		This field is present if the Element ID Mask 2 bit location 2 is set. **Detailed Description** The value is the ID of the processing unit that created the call record, unique in the system.
Transaction Type	2	25603	✓		This field is present if the Element ID Mask 2 bit location 3 is set. **Detailed Description** This field indicates the transaction that generated this data record.

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
Subscriber Info	2	25604	✓		This field is present if the Element ID Mask 2 bit location 4 is set. **Detailed Description** this field is composed by SubscriberGroup (1B) + SubscriberType (1B) Subscriber Group: (0-Undefined, 1-National, 2-Foreign Visitor) Subscriber Type: (0-Undefined, 1-Home, 2-Visitor)
GMM/SM Cause	2	25605	✓		This field is present if the Element ID Mask 2 bit location 5 is set. **Detailed Description** This field indicates the contents of the last received GMM or SM cause Information Element (IE).
Sms Release Cause	2	25606	✓		This field is present if the Element ID Mask 2 bit location 6 is set. **Detailed Description** This field indicates the Sms Release Cause. You must turn on bit 4 of the fixed optional part bit mask to use this option.
LAC	2	25608	✓		This field is present if the Element ID Mask 2 bit location 8 is set. **Detailed Description** The LAC is a fixed length code of 2 octets and is part of the RAI.
RAC	2	25609	✓		This field is present if the Element ID Mask 2 bit location 9 is set. **Detailed Description** The RAC is part of the RAI and is a fixed length of 1 octet.
Current Cell ID	2	25610	✓		This field is present if the Element ID Mask 2 bit location 10 is set. **Detailed Description** This field indicates the binary contents of the last known Cell Identifier (CI) for this transaction.

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
NSAPI	2	25611	✓		This field is present if the Element ID Mask 2 bit location 11 is set. **Detailed Description** If data is ciphered, the NSAPI on the Gb interface requires successful deciphering.
Direction	2	25612	✓		This field is present if the Element ID Mask 2 bit location 12 is set. **Detailed Description** This field contains the Direction
Variable Fields Section					
Element ID Mask 3	4				This value is the bitmask for all elements in Section 3. The three most significant bits (32–30) indicate the number of bytes within the parameters from this section. The following values are: 000: Word size (4 bytes) 001: Short size (2 bytes) **010: Miscellaneous sizes (anything other than 4 or 2 bytes)**
IMSI	variable	26625	✓		The field is present if the Element ID Mask 3 bit location 1 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field indicates the binary contents of IMSI.[b]
MSISDN	variable	26626	✓		The field is present if the Element ID Mask 3 bit location 2 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field contains the subscriber mobile station ISDN.

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
IMEI	variable	26627	✓		The field is present if the Element ID Mask 3 bit location 3 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** The IMEI indicates the mobile station equipment type. You must turn on bit 3 of the fixed optional part bit mask in the Geo format to use this option.
P-TMSI	variable	26628	✓		The field is present if the Element ID Mask 3 bit location 4 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field indicates the binary contents of the last received P-TMSI for this transaction.
Subscriber ID	variable	26629	✓		The field is present if the Element ID Mask 3 bit location 5 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** A unique number that is associated with each data record. This number is used by the system to associate Signal Units with a transaction. This field is comprised of the following bytes: 4 bytes for Timestamp; 2 bytes for Sequence Number; and 2 bytes for protocol).
HLR ID	variable	26630	✓		The field is present if the Element ID Mask 3 bit location 6 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field contains the Home Location Register ID.

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
APN	variable	26631	✓		The field is present if the Element ID Mask 3 bit location 7 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field contains the Home Access Point Name.
MCC (associated with the current Cell ID)	variable	26632	✓		The field is present if the Element ID Mask 3 bit location 8 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field indicates the 3-digit part of the RAI, where RAI = LAI + RAC. The GeoProbe system provides the content in BCD format.
MNC (associated with the current Cell ID)	variable	26633	✓		The field is present if the Element ID Mask 3 bit location 9 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This MNC is part of the RAI and contains 2 or 3 digits. The GeoProbe system provides the content in BCD format.
BSS Name	variable	26634	✓		The field is present if the Element ID Mask 3 bit location 10 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field contains the Base Station Subsystem Name.

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
SGSN Name	variable	26635	✓		The field is present if the Element ID Mask 3 bit location 11 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field contains the name of the Serving GPRS Support Node
Subscriber MCC/MNC	variable	26636	✓		The field is present if the Element ID Mask 3 bit location 12 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field contains the Subscriber MCC/MNC.
MSIP IPv6	variable	26637	✓		The field is present if the Element ID Mask 3 bit location 13 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** This field contains the string representing the MSIP when it is encoded in IPv6 format. If multiple value are available in variable part, the first one is considered.
IMEISV	variable	26638	✓		The field is present if the Element ID Mask 3 bit location 14 is set. The format of the field includes the first byte indicating the length of the field, and is followed by the actual contents. Total bytes of actual field contents is equal to the first byte value. **Detailed Description** The IMEISV indicates the mobile station equipment type. You must turn on bit 3 of the fixed optional part bit mask in the Geo format to use this option.

Parameter	Size (Bytes)	Parameter Id Use only in ASCII decoding	Geo	G10 GeoBlade	Description
Padding	variable				Use padding to end on a four byte boundary.

2.5 Variable Section

Parameter	Size (Bytes)	Description
Length of Variable Section	2	This value indicates the length of the entire variable section. The value is inclusive of the size of this field plus all the padded bytes. The length unit shall be in number of (4 byte) words.
Number of Varfields Present	2	This value is defined by the total number of variable field.
Format ID	2	This value is defined by the format ID from the GeoProbe FSF file.
Variable Fields		This value is defined by the number of present variable fields in the Number of Varfields Present parameter. See Section 0 for more information about the Variable Fields (IEs) format.
Padding	Variable	If you need to use padding, this value is defined to end by a four-byte boundary.

2.5.1 Variable Fields (IEs)

The Variable Fields (IEs) format is defined by the following table.

Parameter	Size (Bytes)	Description
Data ID	2	
Bitmask for Variable Options	1	This bitmask defines for the optional value (for example, timestamp secs and usecs) after the Data Field.
Length of Data Field	1	
Data Field	Variable	This size is equal to the value in the Length of Data Field parameter.
Timestamp (secs)	4	This value is defined by bit 1 in the Bitmask for Variable Options parameter.
Timestamp (usecs)	4	This value is defined by bit 2 in the Bitmask for Variable Options parameter.

3 ASCII OHDR Output – File Based

In case a DataCast feed needs to be delivered in file format instead of as TCP data stream, the drRcvr standalone application will be deployed.

drRcvr receives OHDRs in Binary format and records them in a Binary or ASCII file depending on the configuration parameters.

3.1 Command Usage

The following text displays the command usage for DataCast ASCII OHDR output:

drRcvr [-hdr_port <value>] [-output_dir <value>] [-timeout_interval <value>] [-write_binary <value>]

3.1.1 Configuration Parameters

The following table displays the configuration parameters for the OHDR ASCII format.

Parameter	Name	Default Value	Possible Values	Description
Hdr Port Number—TCP/IP Listening port resource number	hdr_port	9171	Any available port resource number of the machine.	This parameter describes a port number, which is used to accept connections from the DataCast servers.
Output Directory Path— output directory path name	output_dir	$HOME/dr	output directory path name, path can contain environment variable	The path where the received data to be stored.
Timeout Interval—timer for generating log and statistics data.	timeout_interval	300	300, 600, 900, 1200, and 3600	This parameter is defined by the seconds of the timer.
Write Binary	write_binary	no	yes and no	You use this parameter only for the received HDRs that are dumped in either binary format or ASCII format.

3.1.2 Output Format Structure

The drRcvr decodes the OHDR and records it in the ASCII format associating the tag to the value for each parameter. The general ASCII format of the drRcvr appears below. The information in upper case letters appears as it is in the data record and the information in lower case letters is replaced by the actual content of the data record.

BEGIN_HDR_CONTENT|hdr_header|

BEGIN_DR_CONTENT|dr_name;

BEGIN_DR_FIRST_SECTION;fixed_section_data;END_DR_FIRST_SECTION;

BEGIN_DR_SECOND_SECTION;variable_section_data;END_DR_SECOND_SECTION;

END_DR_CONTENT|

END_HDR_CONTENT

The first section of the ASCII format corresponds to the fixed section of the data record and it is coded as a list of couples (tag values) that are separated by a comma. The second section of the ASCII format corresponds to the variable section of the data record.

IMPORTANT NOTE: after tag or label END_HDR_CONTENT there is a single space character followed by a single newline character (both not shown in above example).

4 ASCII Formats

4.1 FIRST_SECTION – ASCII format

Each Parameter of the First Section is in the format PARAMETER_ID:VALUE.

The Parameter IDs of the parameters that can be present in the first section of an ASCII format are provided in section 2.4 under column "Parameter Id Used only in ASCII decoding".

4.1.1 FIRST_SECTION – Example

BEGIN_HDR_CONTENT|1;255;2;1;0|BEGIN_DR_CONTENT|GPRS_GB_INTERFACE;BEGIN_DR_FIRST_SEC
TION;24577:334748663;24578:1243440904;24579:519000;24580:1243440906;24581:4000;24582:2359452;245
83:0;24584:16384;24585:0;24586:0;24587:4294967295;24588:1550993379;24589:0;25601:45;25602:1171;2560
3:1538;25604:0;25605:65535;25606:65535;25608:30095;25609:41;25610:20252;25611:65535;25612:65535;266
25:15,222106900195623;26628:8,C1609620;26629:16,A841D54279F40000;26632:3,222;26633:2,10;END_DR_
FIRST_SECTION;BEGIN_DR_SECOND_SECTION;4;2;4,[10],0,0;5,[22 f2 01 75 8f 29],0,0;6,[00],0,0;7,[22 f2 01
75 8f 29],0,0;END_DR_SECOND_SECTION;END_DR_CONTENT|END_HDR_CONTENT

Here is an example of how such format should be decoded:

25603:1538

25603	corresponding toTransaction Type
1538	0x602 = GPRS_RoutingAreaUpdate

26625:15,222106900195623

26625	corresponding to IMSI parameter
15	IMSI length
222106900195623	IMSI value

4.2 SECOND_SECTION – ASCII format

The second section (variable part) follows the same structure defined in 2.5. In the ASCII format its generic structure is:

BEGIN_DR_SECOND_SECTION;   (NOTE: Stat section for Variable Part parameter)

Numbers of IEs

Format Id used by Probe)

IE description

Data Id, [Value of Parameter], time sec., time msec.;

END_DR_SECOND_SECTION;

4.2.1 SECOND_SECTION - Example

BEGIN_DR_SECOND_SECTION;

4;

2;

4,[10],0,0;

5,[22 f2 01 75 8f 29],0,0;

6,[00],0,0;

7,[22 f2 01 75 8f 29],0,0;

END_DR_SECOND_SECTION;

(NOTE: Where all fields are decimal but the value of the parameter is a list of bytes in hexadecimal format and the timestamp reports a 0 if these fields are not configured in the option bit mask of the IE in the FSF file)

5 Appendix A

This appendix contains detailed information for the OHDR parameter's status bits, condition indicators, timeout bits, and call types.

5.1 GbDR Status Bits

This section contains the names and values of status bits you can use in an FSF file:

- Common DR Status Bits
- GbDR Status Bits

5.1.1 Decoding Status Bits

In data records, status events are aggregated into one hex value that must be converted to binary and decoded to interpret the status events that occurred during the call or transaction. For example, assume the statusBits value in the Fixed Part of a data record shows a hex value of 0x29c. The following graphic shows an example of hex to binary conversion.
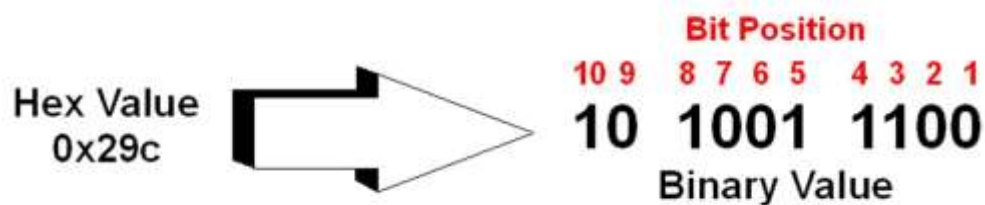
Once you convert the hex value to a binary value, you can read the bits from right to left. The bit number at the farthest right position is Bit 1; Bit 2 is the next bit at the left, continuing until all bits are counted as shown in graphic above. Each bit containing a "1" can be mapped to a status value using the status bit tables in this guide. In the graphic above, bits 3, 4, 5, 8, and 10 each represent a different status event that occurred during the call or transaction (not necessarily in chronological order).

5.1.2 Common DR Status Bits

The following table contains the names and descriptions of status bits. In data records, status events are aggregated into one hex value that must be converted to binary and decoded to interpret the status events that occurred during the call or transaction. See Decoding Status Bits for more information.

Bit Position	CDR Status Bit	Hex Value	Description
1	Sequence Error	0x00000001	Any instance where a message is received out of sequence triggers this status within a DR.
2	Error SU	0x00000002	Various error scenarios (such as, parsing error) trigger this status within a DR.
3	Address Complete	0x00000004	Reserved for internal use. Any instance where an ACM, ANM, CON, REL, RLC, GRS, or RSC is received after an IAM triggers this status within a CDR.

Bit Position	CDR Status Bit	Hex Value	Description
4	End of Call	0x00000008	Reserved for internal use. All termination triggers this status within a DR. Termination can be from various reasons, mostly due to normal call release and time-outs (same as Closure condition indicator).
5	Destruct	0x00000010	Reserved for internal use. A closed call record moved out of the look-back buffer that the GeoProbe system no longer tracks triggers this status within a DR.
6	State Machine Abort	0x00000020	Reserved for internal use. The GeoProbe abort processing logic triggers this status within a DR.
7	Failed Call	0x00000040	A failed call that you define in GeoProbe triggers this status within a DR.
8	Start of Call/Transaction	0x00000080	Reserved for internal use. Detection of call/transaction start triggers this status within a DR.
9	Inactivity Timeout	0x00000100	Reserved for internal use. Expiry of the inactivity timer triggers this status within a DR. Normally, a system is configured for inactivity timeout of 24 or 25 hours.
10	Start Call Trace	0x00000200	Reserved for internal use. Call Trace triggers this status within a DR.

5.1.3   GbDR Status Bits

The following table contains the names of the GbDR status bits, their descriptions, and hexadecimal values. In data records, status events are aggregated into one hex value that must be converted to binary and decoded to interpret the status events that occurred during the call or transaction. See Decoding Status Bits for more information.

Bit Position	PDR Status Bit Mask Description	Hex Value	Within PDR this Status is Triggered:
1-10	Refer to Common DR Status Bits for more information.		
11	Non-Periodic RAU	0x00000400	Reserved for Internal Use.
12	LongPDPC	0x00000800	For Long Call Candidate
13	Reserved for internal use	0x00001000	NA
14	Snooped Data	0x00002000	For User Data Snooping Call
15	SGSN Initiated	0x00004000	For all calls initiated from the SGSN side.
16	Reserved for internal use	0x00008000	NA
17	ContextActivated	0x00010000	PDP context activate
18	2ContextActivated	0x00020000	Secondary Context create
19	Procedure Accepted	0x00040000	GPRS procedure accepted
20	UserDataXfer	0x00080000	GPRS user data xfer
21	ContextModified	0x00100000	PDP context modify
22	Procedure Completed	0x00200000	GPRS procedure completed
23	ContextDeleted	0x00400000	Deactivate PDP context
24	CtxtCreateFailed	0x00800000	When context create rejected
25	Procedure Rejected	0x01000000	GPRS procedure rejected
26	Procedure Timeout	0x02000000	GPRS procedure timeout
27	DetachClosure	0x04000000	When closed due to detach request
28	ContextTeardown	0x08000000	Context closed due to teardown indicator in deactivate message
29	CtxtActivateClosure	0x10000000	Context closed due to PDP Context Request initiated by MS
30	ReqCRUpdateToAim	0x20000000	For internal use.
31	AbnormalRelease	0x40000000	The user defines which release causes are abnormal within the GeoProbe system.
32	Procedure Initiated	0x80000000	GPRS procedure initiated

5.2 GbDR Condition Indicators

The following table contains the GbDR condition indicators, their hexadecimal values, and their descriptions.

Bit Position	PDR Condition Indicator Bit Mask Description	Hex Value	Within PDR this Status is Triggered by:
1	Reserved for future use	0x00000001	NA
2	Reserved for future use	0x00000002	NA
3	Reserved for future use	0x00000004	NA
4	Reserved for future use	0x00000008	NA
5	Reserved for future use	0x00000010	NA
6	Reserved for future use	0x00000020	NA
7	Reserved for future use	0x00000040	NA
8	Reserved for future use	0x00000080	NA
9	Reserved for future use	0x00000100	NA
10	Reserved for future use	0x00000200	NA
11	Time of Day[a]	0x00000400	Time of Day timer expiration. The time of day is a user definable value from 00:00:00.0 to 23:59:59.9. This condition is only triggered when the transaction is up from more than 1440 minutes (24 hrs.) and the specified time of day is reached. The user will be able to decide whether to use Local time or GMT time. The time of day is configurable with default of midnight.
12	Time Elapsed[a]	0x00000800	Time Elapsed timer expiration from the Activate PDP Context Accept or Activate second PDP Context Accept. Similar to CDR, a value from 5 to 1440 minutes will be available in 5-minute increments. This condition will only be generated once no matter how long the session is in progress.
13	PDP Context Session Start[a]	0x00001000	The receipt of an Activate PDP Context Request or Activate Secondary PDP Context Request.
14	Reserved for future use	0x00002000	NA
15	Closure	0x00004000	Termination of the transaction.

Bit Position	PDR Condition Indicator Bit Mask Description	Hex Value	Within PDR this Status is Triggered by:
16	Periodic[a]	0x00008000	Periodic timer expiration after the Activate PDP Context Accept or Activate second PDP Context Accept message received. This condition will periodically be triggered as long as the transaction is still in progress and the periodic timer is reached. Similar to CDR, a value from 1 to 24 hours in hourly increments appears as a configuration choice.
17	Message Type[a]	0x00010000	The reception of a specific message type related to PDP context. The following message types applied: Activate PDP Context Accept, Activate 2nd PDP Context Accept, Modify PDP Context Request Network To MS, Modify PDP Context Request MS To Network, Modify PDP Context Accept Network To MS, Modify PDP Context Accept MS To Network, Modify PDP Context Reject, Deactivate PDP Context Request, Activate PDP Context Reject, Activate 2nd PDP Context Reject, Deactivate PDP Context Accept.
18	MS to Network Volume threshold[a]	0x00020000	The reception of a MS to Network volume count equal and/or greater than a user specified value.
19	Network to MS Volume threshold[a]	0x00040000	The reception of a Network to MS volume count equal and/or greater than a user specified value.
20	MS to Network + Network to MS Volume threshold[a]	0x00080000	The reception of a combined volume count equal and/or greater than a user specified value.
21	PDP Context Activation sub-call[a]	0x00100000	The reception of Activate PDP Context Request.
22	PDP Context Modification sub-call[a]	0x00200000	The reception of Modify PDP Context Request.
23	PDP Context Deactivation sub-call[a]	0x00400000	The reception of Deactivate PDP Context Request.
24	Secondary PDP Context Activation sub-call[a]	0x00800000	The reception of Activate Secondary PDP Context Request.

Bit Position	PDR Condition Indicator Bit Mask Description	Hex Value	Within PDR this Status is Triggered by:
25	Reserved for future use	0x01000000	NA
26	Reserved for future use	0x02000000	NA
27	Reserved for future use	0x04000000	NA
28	Reserved for future use	0x08000000	NA
29	Reserved for future use	0x10000000	NA
30	Reserved for future use	0x20000000	NA
31	Reserved for future use	0x40000000	NA
32	Reserved for future use	0x80000000	NA

5.3 GbDR Time Out Bits

The following table lists the Time Out bit types and values the GeoProbe system uses for GbDRs.

Bit Position	Timer Name	Hex Value
1	ReqPDPTimeout3385	0x00000001
2	ModRespTimeout3386	0x00000002
3	DeactivateResp3395	0x00000004
4	DeactivateResp3390	0x00000008
5	ActivatePDPTimeout3380	0x00000010
6	AttachReqTimeout3310	0x00000020
7	AttachCompTimeoutA3350	0x00000040
8	RAUReqTimeout3330	0x00000080
9	RAUCompTimeoutR3350	0x00000100
10	PTMSIReallocTimeoutP3350	0x00000200
11	AuthCiphReqTimeout3360	0x00000400
12	IdentityRespTimeout3370	0x00000800
13	DetachReqTimeout3321	0x00001000
14	DetachReqTimeout3322	0x00002000
15	ModRespTimeout3381	0x00004000
16	TransactionDuration	0x00008000
17	SndcpUpdate	0x00010000
18	MsRPAckTimeout	0x00020000
19	NetRPAckTimeout	0x00040000
20	MsCPAckTimeout	0x00080000
21	NetCPAckTimeout	0x00100000
22	PSPagingTimeout	0x00200000
23	CSPagingTimeout	0x00400000
24	MSSuspendTimeout	0x00800000
25	MsResumeTimeout	0x01000000
26	AuthCiphRespRejTimeout	0x02000000

5.4 GbDR Transaction Types

The following table lists the values you can use for the Call Types field in a GbDR.

NOTE: Only the least significant byte of the call values given in the following table is encoded to the 1-byte Call Type field defined in the DR Fixed section.

GPRS Gb Transaction Types	Hex Value
GPRS_Attach	0x600
GPRS_Detach	0x601
GPRS_RoutingAreaUpdate	0x602
GPRS_PTMSIReallocation	0x603
GPRS_Authentication	0x604
GPRS_GbMSIdentification	0x605
GPRS_GbPDPContext	0x606
GPRS_ReqPDPContext	0x607
GPRS_GbRadioStatus	0x61f
GPRS_GbSMSSubmit	0x611
GPRS_GbSMSCommand	0x612
GPRS_GbSMSDeliver	0x613
GPRS_GbSMSStatusReport	0x614
GPRS_GbSMSMemNotifMO	0x615
GPRS_GbPSPaging	0x616
GPRS_GbCSPaging	0x617
GPRS_GbSuspend	0x618
GPRS_GbResume	0x619
GPRS_GbDeactivatePDP	0x620
GPRS_GbSnsAdd	0x621
GPRS_GbSnsChangeWeight	0x622
GPRS_GbSnsConfig	0x623
GPRS_GbSnsDelete	0x624
GPRS_GbSnsSize	0x625

5.5 GPRS Gb PDR Message Types

The following table displays the messages and values for mobility management, session management, and Base Station System GPRS Protocol (BSSGP) message types you can use for GPRS Gb.

Message Type	Decimal Value
Mobility Management Messages	
GMM Attach Request	1
GMM Attach Accept	2
GMM Attach Complete	3
GMM Attach Reject	4
GMM Detach Request	5
GMM Detach Accept	6
GMM Routing Area Update Request	8
GMM Routing Area Update Accept	9
GMM Routing Area Update Complete	10
GMM Routing Area Update Reject	11
GMM P-TMSI Reallocation Command	16
GMM P-TMSI Reallocation Complete	17
GMM Authentication and Ciphering Request	18
GMM Authentication and Ciphering Response	19
GMM Authentication and Ciphering Reject	20
GMM Authentication and Ciphering Failure	28
GMM Identity Request	21
GMM Identity Response	22
Session Management Messages	
GSM Activate PDP Context Request	65
GSM Activate PDP Context Accept	66
GSM Activate PDP Context Reject	67
GSM Request PDP Context Activation	68

Message Type	Decimal Value
GSM Request PDP Context Activation Reject	69
GSM Deactivate PDP Context Request	70
GSM Deactivate PDP Context Accept	71
GSM Modify PDP Context Request (Network to MS Direction)	72
GSM Modify PDP Context Accept (MS to Network Direction)	73
GSM Modify PDP Context Request (MS to Network Direction)	74
GSM Modify PDP Context Accept (Network to MS Direction)	75
GSM Modify PDP Context Reject	76
GSM Activate Secondary PDP Context Request	77
GSM Activate Secondary PDP Context Accept	78
GSM Activate Secondary PDP Context Reject	79
BSSGP Message Types	
PS Paging	102
CS Paging	103
GMM BSSGP Radio Status	106
Suspend	107
SuspendAck	108
SuspendNack	109
Resume	110
ResumeAck	111
ResumeNack	112
Sub Network System (SNS) Messages	
SNS-ACK	140
SNS-ADD	141
SNS-CHANGEWEIGHT	142

Message Type	Decimal Value
SNS-CONFIG	143
SNS-CONFIGACK	144
SNS-DELETE	145
SNS-SIZE	146
SNS-SIZE-ACK	147

5.6 Non standard parameters

Below a list of IE parameters defined by Tektronix, and available for Geoprobe configuration.

IE	Parameter ID	Description
Number of Paging Requests Sent	0x8000	The content is 1 byte
Sub-call Info	0x9000	See 5.6.1
SMS Data	0xA004	See 5.6.2
MSIP in IPv6	0xB000	The content is the IPv6 address in hexadecimal format

5.6.1 Sub Call Info IE

Field	Bits								Total length (byte)
	8	7	6	5	4	3	2	1	
status	reserved					timeout[1]	cause[2]	direction[3]	1
cause	Cause value[4]								1
latency	Sub-Call Latency (ms)								4
	Reserved for future								2

[1] When the bit is ON (1), the sub-call has timed out

[2] When this bit is ON (1), a valid Cause is present in the sub-call

[3] When the bit is ON (1), the sub-call starts from BSS to SGSN in Gb or from Remote GSN Initiated in GTP

[4] The GeoProbe system populates the Gb SM cause and GTP cause into the Cause field for sub-call PDR generation. The GeoProbe system places 0xFF into this field if no cause is available. When the protocol standard defines a valid cause value of 0xFF, the Cause Status bit indicates whether 0xFF is relevant or not. The Cause field in the fixed section contains the last cause the GeoProbe system receives.

5.6.2 SMS Data IE

Parameter	Length (byte)	Default	Comments
CP-Data Cause value	1	0xFF	0xff indicates no error
RP-Data-Cause	1	0xFF	0xff indicates no error
RP-Data-Diagnostic	1	0xFF	
RP-Data-OA Length	1		Value 0, 2-11
RP-Data-OA	0, 2-11	NA	
RP-Data-DA Length	1		Value 0, 2-11
RP-Data-DA	0, 2-11	NA	