



## Interface Control Guide

**Note:** Before using this information and the product it supports, read the information in "Notices" on page 33.

This edition applies to version 1, release 4, modification 4 of IBM Tivoli Netcool Service Quality Manager GPRS GB PP service solution and to all subsequent releases and modifications until otherwise indicated in new editions.

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# 1 About this documentation

The *IBM Tivoli Netcool Service Quality Manager GPRS GB PP Service Solutions Interface Control Guide* details the GPRS (General Packet Radio Service) GB (The GPRS interface located between the SGSN (Serving GPRS Support Node) and the PCU (Packet Control Unit)) PP (Passive Probe) service solution input interface i.e. CSV input files in terms of:

- File naming conventions
- Data file format, structure, and semantics
- Supported delivery and collection mechanism
- Data file input and output directory
- File granularity
- File frequency
- Maximum latency tolerated

## 1.1 Audience

This guide is intended for parties wishing to provide mediated data to the IBM® Tivoli® Netcool® Service Quality Manager GPRS GB PP service solution.

## 1.2 Required skills and knowledge

This guide assumes you are familiar with:

- General IT (Information Technology) principles
- IP (Internet Protocol) networking
- UNIX® operating systems
- GPRS service solution

### 1.3 Guide conventions

The following command prompts can be seen throughout this guide where the user has to enter commands at the command line:

- # (hash): This prompt will be displayed if the user is logged in as user root.
- \$ (dollar): This prompt will be displayed if the user is logged in as either the saserver or oracle user.

Please note the above prompts are not part of commands. All commands must be entered after these prompts.

This guide uses the typographical conventions shown in the following table:

**Table 1: General guide conventions**

<b>Format</b>	<b>Examples</b>	<b>Description</b>
ALL UPPERCASE	GPS NULL MYWEBSERVER	Acronyms, device names, logical operators, registry keys, and some data structures.
<a href="#">Link</a>	See <a href="http://www.ibm.com">www.ibm.com</a>	For links within a document or to the Internet.
<b>Bold</b>	<b>Note:</b> The busy hour determiner is...	Heading text for Notes, Tips, and Warnings.
SMALL CAPS	The STORED SQL dialog box... ...click VIEW... In the main GUI window, select the FILE menu, point to NEW, and then select TRAFFIC TEMPLATE.	Any text that appears on the GUI.
<i>Italic</i>	<i>A busy hour</i> is... A web server <i>must</i> be installed... See the <i>User Guide</i>	New terms, emphasis, and book titles.
Monospace	<code>./wminstall</code> <code>\$ cd /cdrom/cdrom0</code> <code>/xml/dict</code> <code>addmsc.sh</code> <code>core.spec</code> Type OK to continue.	Code text, command line text, paths, scripts, and file names. Text written in the body of a paragraph that the user is expected to enter.

<b>Monospace Bold</b>	<code>[root] # pkginfo   grep -i perl</code> system Perl5 On-Line Manual Pages system Perl 5.005_03 (POD Documentation) system Perl 5.005_03	For contrast in a code example to show lines the user is expected to enter.
<i>&lt;Monospace italics&gt;</i>	<code># cd &lt;oracle_setup&gt;</code>	Used in code examples: command-line variables that you replace with a real name or value. These are always marked with arrow brackets.
[square bracket]	<code>log-archiver.sh [-i][-w][-t]</code>	Used in code examples: indicates options.

## 1.4 Guide structure

This guide is organized into the following chapters:

**Table 2: Guide structure**

<b>Chapter</b>	<b>Description</b>
Interface specifications	Provides interface specification and file naming conventions.
Enumerations and definitions	Describes the call types.
Glossary	Glossary.

## 1.5 User publications

The following user publications are provided with the GPRS GB PP Service Quality Manager service solution.

**Table 3: GPRS GB PP service solution customer documentation**

<b>Guide title</b>	<b>Description</b>
<i>Tivoli Netcool Service Quality Manager Service Solutions Installation Guide</i>	Details the generic steps required to install any Service Quality Manager service solution including GPRS GB PP.
<i>Tivoli Netcool Service Quality Manager GPRS GB PP Service Solution Interface Control Guide</i>	Details the GPRS GB PP service solution input interface.
<i>Tivoli Netcool Service Quality Manager GPRS Service Solution Release Notes</i>	Provides information on the GPRS service solution release contents, platform requirements, installation and upgrade procedures, and known issues.

The following user publications are provided with the Service Quality Manager software as Adobe® PDFs (Portable Document Format) Online help is available in HTML (Hypertext Markup Language) format.

**Table 4: Service Quality Manager user documentation**

<b>Guide title</b>	<b>Description</b>
<i>Release Notes</i>	Provides information on the Service Quality Manager release contents, platform requirements, installation and upgrade procedures, and known issues.
<i>Configuration Guide</i>	Describes SLA (Service Level Agreement) provisioning (parties, SLAs, and SLA templates applications) and Service Quality Manager provisioning (services resources, KQI models and service models applications) in Service Quality Manager.
<i>Monitoring Guide</i>	Describes monitoring (SLA monitor, KQI (Key Quality Indicator) analyzer, Alarm monitor, Audit manager and SLA Web monitor applications) in Service Quality Manager.
<i>Customer Experience Manager Monitoring Guide</i>	Describes how to use and monitor the Customer Experience Manager feature in Service Quality Manager.
<i>Customer Experience Manager Provisioning Guide</i>	This is a reference guide containing information for provisioning the Customer Experience Manager system.
<i>Solaris Server Installation Guide</i>	Describes how to install the Service Quality Manager server system on Solaris 10g.

<i>Client Installation Guide</i>	Describes how to install the Service Quality Manager client.
<i>AIX Server Installation Guide</i>	Describes how to install the Tivoli Netcool Service Quality Manager Server system on IBM AIX® 5.3L.
<i>Solaris System Administration Guide</i>	Provides an overview of the Service Quality Manager administrative tasks including instructions on how to complete the following tasks: <ul style="list-style-type: none"> <li>- Starting and stopping Service Quality Manager.</li> <li>- Running batch processes such as archiving trace files and log files.</li> <li>- Backing up and restoring the system.</li> </ul>
<i>AIX System Administration Guide</i>	Provides an overview of the AIX Service Quality Manager administrative tasks including instructions on how to complete the following tasks: <ul style="list-style-type: none"> <li>- Starting and stopping Service Quality Manager.</li> <li>- Running batch processes such as archiving trace files and log files.</li> <li>- Backing up and restoring the system.</li> </ul>
<i>Upgrade Guide</i>	Details how to upgrade from one version of Service Quality Manager to another.
<i>BusinessObjects Installation and Configuration Guide</i>	Provides information on the steps required to install and configure the BusinessObjects (v6.5 or XI) server and client for use with Service Quality Manager.
<i>Service Quality Manager Core Online Help</i>	Provides information and procedures for using Service Quality Manager client applications.
<i>Customer Experience Manager Online Help</i>	Describes how to use and monitor the Customer Experience Manager feature in the Service Quality Manager.
<i>SLA Webview Online Help</i>	Describes how to use and monitor the SLA Webview feature in the Service Quality Manager.

## 2 Interface specifications

### 2.1 Overview

This guide provides all the required information for parties intending to provide mediated GPRS GB PP, data to Tivoli Netcool Service Quality Manager GPRS GB PP service solution

### 2.2 Supported version

This guide refers to the GPRS GB PP service solution v1.4.4

### 2.3 Interface definition

#### 2.3.1 File naming convention

The file naming convention is:

```
A<YYYYMMDD>.<hhmm>-<YYYYMMDD>.<hhmm>_<UniqueID>.csv
```

Where:

<YYYYMMDD>.<hhmm> elements correspond to the file interval start time and end time respectively.

- YYYY is the year in four-digit notation.
- MM is the month in two digit notation (01-12).
- DD is the day in two-digit notation (01-31).
- hh is the two-digit hour of the day, based on 24-hour clock (00-23).
- mm is the two digit minute of the hour (00-59).

File names are expected to be adjusted to compensate for the difference between GMT and the local time of the host system where the GPRS GB PP service solution is deployed. The mediator must clarify the appropriate time zone adjustment with the Tivoli Netcool Service Quality Manager customer.

UniqueID is an optional element that can be used, for example, to uniquely identify the GPRS GB PP System. This element is recommended in situations where the deployed solution has multiple mediation points.

**File examples**

The following are example files which show the naming convention:

- A20081205.1200-20081205.1215\_SQM\_GPRS\_GB\_PP.csv
- A20090122.1430-20090122.1445\_GPRS\_GB\_PP\_file123.csv

**2.4 Data specification**

**2.4.1 GPRS GB PP CSV Data file format**

The data file must provide the fields in the top down order as shown in table below. The file is expected to contain a standard CSV header line containing the field names shown below.

**Table 5: CSV Data File format**

<b>Field name</b>	<b>Field description</b>	<b>Constraints</b>	<b>Example</b>
IMSI	Identity of the subscriber. The format of the IMSI is MCC-MNC-MSIN where:  MCC is the mobile country code.  MNC is the mobile network code.  MSIN is the mobile subscriber identity number.	INTEGER >=0  Not Null  Total length of IMSI is ≤ 15 digits, where  MCC = 3 digits MNC = 2 or 3 digits MSIN = 9 or 10 digits	789410129618744
MSISDN	The subscriber phone number in ITU-T E.164 format.  The format of the MSISDN is CC-NDC-SN where;  CC is the country code of the country where the MS is registered.  NDC is the national destination code.  SN is the subscriber number.	INTEGER  Nullable, but >= 0 if present	123410129618744

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MOBILESTATI ONIP	The IP address assigned to the MS.	<p>VARCHAR(64)</p> <p>Nullable</p> <p>The format of the IP address is: nnn.nnn.nnn.nnn where nnn is in the range 0 to 255.</p>	166.217.170.108
SUBSCRIBERT YPE	The type of subscriber i.e. home, national roamer, international roamer, MVNO subscriber	<p>VARCHAR(64)</p> <p>Nullable</p>	2
SUBSCRIBERG ROUP	The subscriber group that the subscriber is assigned to.	<p>VARCHAR(64)</p> <p>Nullable</p> <p>If the subscriber is not associated with a defined group then this field shall be empty.</p>	Enterprise a ceathair
IMEISV	<p>The identifier and software version number associated with the handset or terminal. The format is TAC-SNR-SV where:</p> <p>TAC is the Type Allocation Code SNR is the Serial number. SV is the Software Version Number</p>	<p>VARCHAR(64)</p> <p>Not Null</p> <p>Total length of IMEISV is 16 digits, where</p> <p>TAC = 8 digits SNR = 6 digits SV = 2 Digits</p>	3558290188297893
CGI	<p>The cell global identity for the current cell.</p> <p>The format of the CGI is MCC-MNC-LAC-CI where:</p> <p>MCC is the mobile country</p>	<p>VARCHAR(128)</p> <p>Not Null</p> <p>MCC = 3 decimal digits MNC = 2 or 3 decimal</p>	78941084D7F99F

	code. MNC is the mobile network code. LAC is the location area code CI is the cell identifier	digits LAC = 2 hexadecimal encoded octets CI = 2 hexadecimal encoded octets LAC values 0000 and FFFE are reserved.	
RAI	The identifier within the current location area.  The format of the RAI is LAI-RAC where:  LAI is the location area identifier (MCC-MNC-LAC) RAC is the routing area code.	VARCHAR(64)  Nullable  MCC = 3 decimal digits MNC = 2 or 3 decimal digits LAC = 2 hexadecimal encoded octets RAC = 1 hexadecimal encoded octet.	78941084D707
BSSNAME	The name of the current BSS	VARCHAR(64)  Nullable	VBSDNVRBSC06
SGSNNAME	The name of the current SGSN as known on the GB interface	VARCHAR(64)  Nullable	CBSSNC705
APN	The access point name (APN) that is associated with the current PDP context.	VARCHAR (64 characters)  Not Null  This field will only be present for transactions that occur after a valid PDP context has been established.	aontaithe7.ceathair.com
CAUSETYPE	The protocol-specific cause code type that is required to interpret the transaction termination cause and/or transaction initiation cause fields correctly	INTEGER  Not Null  The following cause types are expected to	7

		<p>be observed in the Gb probe data.</p> <p>1-BSSGPCause 3-GMMCause 7-SMCause</p> <p>The following cause types appear to be non-standard causes specific to one probe vendor and are not expected to be observed in the Gb probe data.</p> <p>8-AADeactivationCause 9-Protocol Violation 10-Timeout</p>	
TRANSACTIONTYPE	The type of transaction which the data set in this row applies to.	<p>INTEGER</p> <p>Not Null</p> <p>See GMM and SM Cause Codes for details of the set of valid cause codes</p>	112
TRANSACTIONTYPEINFO	Additional information about the transaction type e.g. NW-initiated or MS-Initiated.	<p>INTEGER</p> <p>Nullable</p> <p>See GMM and SM Cause Codes for details of the set of valid cause codes</p> <p>This is reserved for future use if more transaction type detail is required above and beyond data contained in the transaction type field.</p>	49

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TRANSACTIONTERMINATIONCAUSE	The protocol-specific cause code for that identifies the reason for the termination of the transaction.	INTEGER  Nullable  See GMM and SM Cause Codes for details of the set of valid cause codes	97
TRANSACTIONCOUNT	The number of transactions associated with the unique combination of IMSI, IMEI, CGI, APN, CauseType and TransactionType and TransactionOutcome and TransactionTerminationCause.	INTEGER >=0  Not Null	1
TOTALTRANSACTIONDURATION	The total transaction time observed during the sample period for the set of transactions reported on in this row (milliseconds).	INTEGER >= 0  Not Null	419
TRANSACTIONTIMESTAMP	The date and time associated with the last transaction observed for the unique combination of IMSI, IMEI, CGI, APN, CauseType, TransactionType and TransactionTerminationCause.	Nullable  VARCHAR(64)  YYYYMMDDHHmmss  Where:  YYYY = Year MM = Month DD = Day HH = Hour mm = Minutes ss = Seconds	20080213080001

The following examples show header and data fields:

```
IMSI,MSISDN,MOBILESTATIONIP,SUBSCRIBERTYPE,SUBSCRIBERGROUP,IMEISV,CGI,RAI,BSSNAME,SGSNNNAME,APN,CAUSETYPE,TRANSACTIONTYPE,TRANSACTIONTYPEINFO,TRANSACTIONTERMINATIONCAUSE,TRANSACTIONCOUNT,TOTALTRANSACTIONDURATION,TRANSACTIONTIMESTAMP
```

```
789410129618744,123410129618744,166.217.170.108,2,Enterprise ahaon,3558290188297894,78941084D7F99F,78941084D707,CBSKSCB7SM,TBSNWF2AX,isp.aonarach,51,112,,256,1,21,20080213070954
```

```
789170525356379,123170525356379,10.9.165.249,4,Enterprise a do,3558290188297891,7894101792E57A,789410179201,TBSSNTCBSC14,TBSSNTDCAERSG07,deisceartachvts.ccs,51,110,,256,1,85,20080213080001
```

### **CSV file granularity**

The granularity of the file is expected to be such that one CSV row will be specified for all CSV fields which have a single set of the values listed below in common.

- TRANSACTION\_COUNT
- TOTAL\_TRANSACTION\_DURATION
- IMSI
- IMEISV
- CGI
- APN
- CAUSETYPE
- TRANSACTIONTYPE

## **2.4.2 Service Quality Manager delivery and collection mechanism**

### ***Transfer mechanism***

The CSV data file is transferred by data push to the data directory on the Tivoli Netcool Service Quality Manager host platform where the adapter is configured.

Mediation systems must deliver the data files to that directory. The transfer mechanism must be agreed between the Tivoli Netcool Service Quality Manager customer and the data mediator, but could typically include methods such as FTP (File Transfer Protocol), SFTP (Secure File Transfer Protocol), SCP (Secure Copy), UUCP (Unix to Unix Copy Protocol) and local copy.

### ***Data directory***

The data directory is configurable by the Tivoli Netcool Service Quality Manager customer. The default value is `/appl/sa/var/adapter/gprs_gb_pp_loader`. The Tivoli Netcool Service Quality Manager customer needs to ensure that mediation can deliver files to the configured location.

**File interval**

The file interval is 15 minutes and must be on 15 minute boundaries, for example: 1230 to 1245.

**Transfer latency**

The transfer latency is configurable by the Tivoli Netcool Service Quality Manager customer. The default value is 15 minutes. The value of this parameter represents the maximum delay allowed in data presentation at the data directory.

**Files per interval**

The service solution expects 1 CSV file per mediation point per interval.

**2.5 CRM Interface Definition**

**2.5.1 CRM File naming convention**

The CRM file naming convention is as follows:

```
gprs_gb_pp_cellarea.map
gprs_gb_pp_location.map
```

This is not configurable and is predefined in the adapter property files.

**2.6 CRM Data specification**

**2.6.1 GPRS GB PP CellArea CRM file format**

The data file must provide the fields in the top down order as shown in table below. The file does not contain a CSV header.

**Table 6: CellArea CRM File format**

<b>Field Name</b>	<b>Field Description</b>	<b>Constraints</b>	<b>Example</b>
CGI	<p>The cell global identity for the current cell, logically consisting of</p> <ul style="list-style-type: none"> <li>MNC - Mobile Network Code</li> <li>MCC - Mobile Country Code</li> <li>LAC - Location Area Code</li> <li>CI - Cell identity</li> </ul> <p>The format of the CGI field is CCCNNLLLLIIII where:</p> <ul style="list-style-type: none"> <li>CCC is the mobile country code (3 decimal digits).</li> <li>NNN is the mobile network code (2 or 3 decimal digits).</li> <li>LLLL is the location area code</li> </ul>	LAC values 0000 and FFFE are reserved.	78941084D7F99F

	(4 hexadecimal digits) IIII is the cell identifier (4 hexadecimal digits).		
CellArea	The name of the CellArea. This is an arbitrary grouping of cells obtained usually from a CRM system. It can be (a) groups of Cells from a marketing point of view or possibly (b) a group of cells under the control of a BSC/RNC.	Text string (64 characters)	Cell Area 0

**Example Data**

The following is example data showing fields for the custom resource mapping:

78941084D7F99F,GPRS_GB_PP_Cell_Area_0,
7894104A3B03EB,GPRS_GB_PP_Cell_Area_01,
7894103E9576EA,GPRS_GB_PP_Cell_Area_02,

**Note:** In a scenario where there is a requirement to reassign a CGI to another Cell Area, this file should then be modified to reflect the change and the adapter will automatically reload the contents of the new map file when it processes the next batch of CSV data files

**2.6.2 GPRS GB PP Location CRM file format**

The data file must provide the fields in the top down order as shown in table below. The file does not contain a CSV header.

**Table 7: Location CRM File format**

<b>Field Name</b>	<b>Field Description</b>	<b>Constraints</b>	<b>Example</b>
CGI	The cell global identity for the current cell, logically consisting of MNC - Mobile Network Code MCC - Mobile Country Code LAC - Location Area Code CI - Cell identity  The format of the CGI field is CCCNNNLLLLIIII where:	LAC values 0000 and FFFE are reserved.	78941084D7F99F

	<p>CCC is the mobile country code (3 decimal digits).                  NNN is the mobile network code (2 or 3 decimal digits).                  LLLL is the location area code (4 hexadecimal digits)                  IIII is the cell identifier (4 hexadecimal digits).</p>		
Location Area	<p>The name of the Location Area. This is an arbitrary grouping of cells obtained usually from a CRM system. It can be (a) groups of Cells from a marketing point of view or possibly (b) a group of cells under the control of a BSC/RNC.</p>	Text string (64 characters)	Location Area 0

**Example Data**

The following is example data showing fields for the custom resource mapping:

78941084D7F99F,GPRS_GB_PP_Location_Area_0,
7894104A3B03EB,GPRS_GB_PP_Location_Area_01,
7894103E9576EA,GPRS_GB_PP_Location_Area_02,

**Note:** In a scenario where there is a requirement to reassign a CGI to another Location Area, this file should then be modified to reflect the change and the adapter will automatically reload the contents of the new map file when it processes the next batch of CSV data files

**2.6.3 Service Quality Manager delivery and collection mechanism**

The CRM mapping files are transferred by data push to the data directory on the IBM Tivoli Netcool Service Quality Manager host platform.

**CRM data directory**

The CRM directory is not configurable and the expected location is `/appl/sa/var/adapter/mappings/resources`. IBM Tivoli Netcool Service Quality Manager customers need to ensure that mediation can deliver files to the configured location.

***File interval***

The CRM files are expected to be present at startup of the adapter. Subsequently, if there is a change in the CRM file (timestamp), the adapter will automatically reload them before processing the next batch of incoming CSV data files.

***Transfer latency***

The CRM files are expected to be present at startup of the adapter

## 3 Enumerations and definitions

### 3.1 GPRS GB PP

The data file must use the following table to identify the GMM transaction type:

**Table 8: GMM transaction types**

<i><b>Id</b></i>	<i><b>GMM transaction types</b></i>
10	Attach
90	Mobile-Initiated Detach
91	Network-Initiated Detach

The data file must use the following table to identify the SM transaction type:

**Table 9: SM transaction types**

<i><b>Id</b></i>	<i><b>SM transaction types</b></i>
110	Mobile-Initiated PDP Context Activation
112	Mobile Initiated PDP Context Deactivation
113	Network-Initiated PDP Context Deactivation

The data file must use the following table to identify the GMM cause codes:

**Table 10: GMM cause codes**

<i><b>Id</b></i>	<i><b>GMM cause codes</b></i>
2	IMSI not known in HLR
3	Illegal MS
6	Illegal ME
7	GPRS Services Not Allowed
8	GPRS services and non-GPRS services not allowed.

9	MS identity cannot be derived by the network.
10	Implicitly detached
11	PLMN not allowed
12	Location area not allowed
13	Roaming not allowed in this location area
14	GPRS services not allowed in this PLMN.
15	No suitable cells in Location Area
16	MSC Temporarily Not Reachable
17	Network Failure
20	MAC Failure
21	Sync Failure
22	Congestion
23	GSM Authentication Unacceptable
40	No PDP Context activated
48	Re-try on entry to new cell
49	Re-try on entry to new cell
50	Re-try on entry to new cell
51	Re-try on entry to new cell
52	Re-try on entry to new cell
53	Re-try on entry to new cell
54	Re-try on entry to new cell
55	Re-try on entry to new cell
56	Re-try on entry to new cell
57	Re-try on entry to new cell
58	Re-try on entry to new cell
59	Re-try on entry to new cell
60	Re-try on entry to new cell
61	Re-try on entry to new cell

62	Re-try on entry to new cell
63	Re-try on entry to new cell
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message type not compatible with the protocol state
99	Information element non-existent or not implemented
100	Conditional IE error
101	Message not compatible with the protocol state
111	Protocol error, unspecified

The data file must use the following table to identify the SM cause codes:

**Table 11: SM cause codes**

<i><b>Id</b></i>	<i><b>SM cause codes</b></i>
8	Operator determined barring
24	MBMS bearer capabilities insufficient for service
25	LLC or SMDCP failure(GSM only)
26	Insufficient resources
27	Missing or unknown APN
28	Unknown PDP address or PDP type
29	User Authentication failed
30	Activation rejected by GGSN
31	Activation rejected, unspecified
32	Service option not supported
33	Requested service option not subscribed
34	Service option temporarily out of order
35	NSAPI already used (not sent)

36	Regular deactivation
37	QoS not accepted
38	Network failure
39	Reactivation required
40	Feature not supported
41	Semantic error in the TFT operation
42	Syntactical error in the TFT operation
43	Unknown PDP context
44	Semantic errors in packet filter(s)
45	Syntactical errors in packet filter(s)
46	PDP context without TFT already activated
47	Multicast group membership time-out
81	Invalid transaction identifier value
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message type not compatible with the protocol state
99	Information element non-existent or not implemented
100	Conditional IE error
101	Message not compatible with the protocol state
111	Protocol error, unspecified

The data file must use the following table to identify the BSSGP cause codes:

**Table 12: BSSGP cause codes**

<i><b>Id</b></i>	<i><b>BSSGP cause codes</b></i>
0	Processor overload
1	Equipment failure
2	Transit network service failure
3	Network service transmission capacity modified from zero kbps to greater than zero kbps
4	Unknown MS
5	BVCI unknown
6	cell traffic congestion
7	SGSN congestion
8	O&M intervention
9	BVCI-blocked
10	PFC create failure
11	PFC preempted
12	ABQP no more supported
32	Semantically incorrect PDU
33	Invalid mandatory information
34	Missing mandatory IE
35	Missing conditional IE
36	Unexpected conditional IE
37	Conditional IE error
38	PDU not compatible with the protocol state
39	Protocol error - unspecified
40	PDU not compatible with the feature set
41	Requested Information not available
42	Unknown Destination address

43	Unknown RIM Application Identity or RIM application disabled
44	Invalid Container Unit Information
45	PFC queuing
46	PFC created successfully
47	T12 expiry
48	MS under PS Handover treatment
49	Uplink quality
50	Uplink strength
51	Downlink quality
52	Downlink strength
53	Distance
54	Better cell
55	Traffic
56	Radio contact lost with MS
57	MS back on old channel
58	T13 expiry
59	T14 expiry
60	Not all requested PFCs created
61	CS cause
62	Requested ciphering and/or integrity protection algorithms not supported
63	Relocation failure in target system
64	Directed Retry
65	Time critical relocation
66	PS Handover Target not allowed
67	PS Handover not Supported in Target BSS or Target System
68	Incoming relocation not supported due to PUESBINE feature
69	DTM Handover - No CS resource

70	DTM Handover - PS Allocation failure
71	DTM Handover - T24 expiry
72	DTM Handover - Invalid CS Indication IE
73	DTM Handover - T23 expiry
75	DTM Handover - MSC Error

The data file must use the following table to identify the BSSGP radio cause codes:

**Table 13: BSSGP radio cause codes**

<i>Id</i>	<i>BSSGP Radio cause codes</i>
0	Radio contact lost with the MS
1	Radio link quality insufficient to continue communication
2	Cell-reselection ordered
3	Cell re-selection prepare. See Note below.
4	Cell reselection failure. See Note below.
<p><b>Note:</b> In case the Enhanced radio status feature is not negotiated the radio cause values in range of 3 - 4 should if received be handled as "radio contact lost with the MS". This is to allow backward compatibility with earlier releases of the standard.</p>	

The data file must use the following table to identify the BSSGP RA capability update cause codes:

**Table 14: BSSGP RA capability update cause codes**

<i>Id</i>	<i>BSSGP RA capability update cause codes</i>
0	OK, RA capability IE present
1	TLLI unknown in SGSN
2	No RA Capabilities or IMSI available for this MS

The data file must use the following table to identify the SMS CP cause codes:

**Table 15: SMS CP cause codes**

<i><b>Id</b></i>	<i><b>SMS CP cause codes</b></i>
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message not compatible with short message protocol status
99	Information element non-existent or not implemented
111	Protocol error, unspecified
255	Undefined field

The data file must use the following table to identify the SMS RP cause codes:

**Table 16: SMS RP cause codes**

<i><b>Id</b></i>	<i><b>SMS RP cause codes</b></i>
1	Unassigned number
8	Operator determined barring
10	Call barred
11	CUG reject
21	Short message transmission rejected
22	Memory capacity exceeded
27	Destination out of order
28	Unidentified subscriber
29	Facility rejected
30	Unknown subscriber
38	Network out of order
41	Temporary failure
42	Congestion
47	Resources unavailable, unspecified

50	Requested facility not subscribed
69	Requested facility not implemented
81	Invalid short message transmission reference value
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message not compatible with short message protocol status
99	Information element non-existent or not implemented
111	Protocol error, unspecified
127	Inter-working, unspecified
255	Undefined field

The data file must use the following table to identify the Tektronix GMM cause codes:

**Table 17: Tektronix GMM cause codes**

<i><b>Id</b></i>	<i><b>Tektronix GMM cause codes</b></i>
256	No Cause Value
257	GMM Timeout
259	GMM Auth Cipherring Failure
65537	Attach Reject

The data file must use the following table to identify the Tektronix GB SM cause codes:

**Table 18: Tektronix GB SM cause codes**

<i><b>Id</b></i>	<i><b>Tektronix GB SM cause codes</b></i>
256	No Cause Value
257	SM Timeout

The data file must use the following table to identify the CAUSETYPE:

**Table 19: CAUSETYPE**

<i>Id</i>	<i>CAUSETYPE</i>
1	BSSGPCause
2	BSSGPRadioCause
3	GMMCause
4	BSSGPRACAPUpdate
5	SMSCPCause
6	SMSRPCause
7	SMCause
8	AADeactivationCause
9	ProtocolViolation
10	Timeout
20	GTPCause
50	TekGMM Cause
51	TekSM Cause

## Appendix A Glossary

Table 20: Glossary of acronyms

<i>Acronym</i>	<i>Description</i>
ABQP	Aggregate BSS QoS Profile
AIX	Advanced Interactive eXecutive
BSS	Base Station Subsystem
BSSGP	BSS Gateway Protocol
BVCI	Basic Virtual Component Interface
CP	Control Protocol
CRM	Custom Resource Mapping
CS	Circuit Switched
CSV	Comma Separated Values
CUG	Closed User Group
DBCS	Double Byte Character Set
DTM	Data Transfer Module
FTP	File Transfer Protocol
GB	The GPRS interface located between the SGSN (Serving GPRS Support Node) and the PCU (Packet Control Unit).
GMM	GPRS Mobility Management
GMT	Greenwich Mean Time
GPRS	General Packet Radio Service
GPS	Global Positioning System
GTP	GPRS Tunneling Protocol
GUI	Graphical User Interface

IBM	International Business Machines
IE	Internet Explorer
IMSI	The International Mobile Subscriber Identity
IP	Internet Protocol
ISDN	Integrated Services Digital Network
IT	Information Technology
KQI	Key Quality Indicator
LLC	Logical Link Control
MAC	Media Access Control
MS	Mobile Station
MSC	Mobile Switching Centre
MSISDN	Mobile Station ISDN number
NSAPI	Network Service Area Point Identifier
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PFC	Packet Flow Context
PLMN	Public Land Mobile Network
POD	Plain Old Documentation
PP	Passive Probe
RA	Routing Area
RP	Rendezvous Point
SCP	Secure CoPy
SFTP	Secure File Transfer Protocol
SGSN	Serving GPRS Support Node
SLA	Service Level Agreement
SNDCP	Sub Network Dependent Convergence Protocol
SM	Session Management
SMS	Short Message Service

SQL	Structured Query Language
TFT	Traffic Flow Template
TLLI	Temporary Logical Link Identity
UUCP	Unix to Unix CoPy
XML	Extensible Markup Language

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