



<p>Note: Before using this information and the product it supports, read the information in Notices.</p>

This edition applies to version 1, release 2 of IBM Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service (Product number 5724-V48) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

1	About this publication	1
1.1	Intended audience	1
1.2	What this publication contains	1
1.3	Publications.....	2
1.3.1	IBM Tivoli Netcool Customer Experience Manager core library	2
1.3.2	IBM Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service library	3
1.3.4	Accessing terminology online	4
1.3.5	Accessing publications online	4
1.3.6	Ordering publications	4
1.4	Tivoli technical training	4
1.5	Tivoli user groups	5
1.6	Support information	5
1.6.1	Online	5
1.6.2	IBM Support Assistant.....	5
1.7	Conventions used in this guide	5
1.7.1	Typeface conventions	5
1.7.2	Operating system-dependent variables and paths	6
2	Interface specifications	7
2.1	Data collection and transfer mechanisms	10
2.2	Data compression	11
2.3	Data specification.....	12
2.3.1	Data file aggregation	17
2.4	Custom resource mapping.....	18
3	Enumerations and definitions.....	20
3.1.1	TRANSACTIONTYPE	20
3.1.2	CAUSETYPE	23
3.1.3	RAT	24
3.1.4	CAUSECODE Values	24
4	Service provisioning	31
4.1	Resource instance provisioning	31
4.2	Provisioning examples	32
4.2.1	Resource type 1 SERVICE.....	32
4.2.2	Resource type 2 GGSN.....	32
4.2.3	Resource type 3 SGSN	32
4.2.4	Resource type 4 APN.....	32
4.2.5	Resource type 5 MIMETYPE.....	32
Appendix A: Provisioning		34
Appendix B: Data field types		37
Appendix C: Product acronyms		39
Index		41
Notices		43

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

1 About this publication

This publication details the IBM® Tivoli® Netcool® Customer Experience Manager Module for Mobile User Plane Service input interface, such as comma-separated value (CSV) input files, in terms of:

- File-naming conventions and upload directories
- Data file format, granularity, and latency
- Supported delivery and collection mechanism and frequency
- Custom resource mapping

This guide also details the set of resources that must be provisioned, including the provisioning details that are specific to the Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service module.

1.1 Intended audience

This publication is intended for parties who want to provide mediated data to the Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service version 1.2.

Readers need to be familiar with the following topics:

- IT principles
- IP networking
- UNIX operating systems

1.2 What this publication contains

This publication contains the following chapters:

- Chapter 2 "Interface specifications"
Provides interface specifications and file-naming conventions.
- Chapter 3 "Enumerations and definitions"
Provides a description of the enumeration types.
- Chapter 4 "Service provisioning"
Provides a description of the steps you take to provision the customer-specific portions of a service module.

This publication contains the following appendixes:

- **Appendix A "Provisioning"**
Provides a description of the provisioning system and resource types.
- **Appendix B "Data field types"**
Provides a description of data field types.
- **Appendix C "Product acronyms"**
Provides a description of product acronyms.

1.3 Publications

This section lists the following publications:

- IBM Tivoli Netcool Customer Experience Manager version 4.1.2 core library
- IBM Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service library

It also describes how to access Tivoli publications online and how to order Tivoli publications.

1.3.1 IBM Tivoli Netcool Customer Experience Manager core library

- *IBM Tivoli Netcool Service Quality Manager AIX Server Installation Guide, GC23-9847-00*
Describes how to install the Tivoli Netcool Service Quality Manager Server system on IBM AIX®.
- *IBM Tivoli Netcool Service Quality Manager Solaris Server Installation Guide, GC23-9846-00*
Describes how to install the Tivoli Netcool Service Quality Manager Server system on Solaris.
- *IBM Tivoli Netcool Service Quality Manager Client Installation Guide, GC23-9850-00*
Describes how to install the Tivoli Netcool Service Quality Manager client.
- *IBM Tivoli Netcool Service Quality Manager Upgrade Guide, SC23-9842-00*
Details how to upgrade from one Tivoli Netcool Service Quality Manager version to another.
- *IBM Tivoli Netcool Service Quality Manager AIX System Administration Guide, SC23-9845-00*
Provides an overview of the IBM AIX Tivoli Netcool Service Quality Manager administrative tasks including instructions on how to complete the following tasks:
 - Starting and stopping Tivoli Netcool Service Quality Manager.
 - Running batch processes such as archiving trace files and log files.
 - Backing up and restoring the system.
- *IBM Tivoli Netcool Service Quality Manager Solaris System Administration Guide, SC23-9844-00*
Provides an overview of the Solaris Tivoli Netcool Service Quality Manager administrative tasks including instructions on how to complete the following tasks:
 - Starting and stopping Tivoli Netcool Service Quality Manager.
 - Running batch processes such as archiving trace files and log files.
 - Backing up and restoring the system.

- *IBM Tivoli Netcool Service Quality Manager Provisioning Service SI Guide, SC23-9852-00*
Reference guide containing information for provisioning the Tivoli Netcool Service Quality Manager system.
- *IBM Tivoli Netcool Service Quality Manager Service Quality Manager Provisioning Guide, SC23-9843-00*
Provides information for provisioning the Tivoli Netcool Service Quality Manager system.
- *IBM Tivoli Netcool Service Quality Manager Service Quality Manager Monitoring Guide, SC23-9482-00*
Describes how to use and monitor the Tivoli Netcool Service Quality Manager feature in Tivoli Netcool Service Quality Manager.
- *IBM Tivoli Netcool Service Quality Manager Monitoring Guide, SC23-9103-01*
Describes monitoring (Service level agreement (SLA) monitor, Key quality indicator (KQI) analyzer, alarm monitor, audit manager and SLA Webview applications) in Tivoli Netcool Service Quality Manager.
- *IBM Tivoli Netcool Service Quality Manager Configuration Guide, SC23-9102-01*
Describes SLA provisioning (parties, SLAs, and SLA templates applications) and Tivoli Netcool Service Quality Manager provisioning (services resources, KQI models, and service models applications) in Tivoli Netcool Service Quality Manager.
- *IBM Tivoli Netcool Service Quality Manager BusinessObjects Installation and Configuration Guide, SC23-9473-00*
Provides information on the steps required to install and configure the BusinessObjects server and client for use with Tivoli Netcool Service Quality Manager.
- *IBM Tivoli Netcool Service Quality Manager Customer Relationship Management Development Guide, SC23-9857-00*
Provides an overview of the Customer Relationship Management (CRM) proxy server and the CRM plug-in module. The CRM plug-in modules, developed using Java code, mediate between the Tivoli Netcool Customer Experience Management framework and an external CRM system.
- *IBM Tivoli Netcool Service Quality Manager Release Notes, G111-9221-00*
Provides information on the Tivoli Netcool Service Quality Manager release contents, platform requirements, installation and upgrade procedures, and known issues.

1.3.2 IBM Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service library

- *IBM Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service Installation Guide*
Provides the steps required to install the service module and its data sources.
- *IBM Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service Overview Guide*
Provides an overview of the product architecture and services.

- *IBM Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service Interface Control Guide*

Provides details of the input interface for the service module.

- *IBM Tivoli Netcool Customer Experience Manager Module for Mobile User Plane Service Release Notes*

Provides information on the service module release contents, platform requirements, installation procedures, and known issues.

1.3.4 Accessing terminology online

The IBM Terminology Web site consolidates the terminology from IBM product libraries in one convenient location. You can access the Terminology Web site at the following Web address:

<http://www.ibm.com/software/globalization/terminology>

1.3.5 Accessing publications online

The product CD contains the publications that are in the product library. The format of the publications is PDF.

IBM posts publications for Tivoli products, as they become available and whenever they are updated, to the Tivoli Documentation Central Web site at <http://www.ibm.com/tivoli/documentation>.

Note: If you print PDF documents on other than letter-sized paper, set the option in the **File -> Print** window that allows Adobe Reader to print letter-sized pages on your local paper.

1.3.6 Ordering publications

You can order many Tivoli publications online at

<http://www.elink.ibm.link.ibm.com/publications/servlet/pbi.wss>.

You can also order by telephone by calling one of these numbers:

- In the United States: 800-879-2755
- In Canada: 800-426-4968

In other countries, contact your software account representative to order Tivoli publications. To locate the telephone number of your local representative, perform the following steps:

1. Go to <http://www.elink.ibm.link.ibm.com/publications/servlet/pbi.wss>.
2. Select your country from the list and click **Go**.
3. Click **About this site** in the main panel to see an information page that includes the telephone number of your local representative.

1.4 Tivoli technical training

For Tivoli technical training information, refer to the following IBM Tivoli Education Web site at

<http://www.ibm.com/software/tivoli/education>.

1.5 Tivoli user groups

Tivoli user groups are independent, user-run membership organizations that provide Tivoli users with information to assist them in the implementation of Tivoli Software solutions. Through these groups, members can share information and learn from the knowledge and experience of other Tivoli users. Tivoli user groups include the following members and groups:

- 23,000+ members
- 144+ groups

Access the link for the Tivoli Users Group at www.tivoli-ug.org.

1.6 Support information

If you have a problem with your IBM software, you want to resolve it quickly. IBM provides the following ways for you to obtain the support you need:

1.6.1 Online

Access the Tivoli Software Support site at

<http://www.ibm.com/software/sysmgmt/products/support/index.html?ibmprd=tivmanok>.

Access the IBM Software Support site at <http://www.ibm.com/software/support/probsub.html>.

1.6.2 IBM Support Assistant

The IBM Support Assistant is a free local software serviceability workbench that helps you resolve questions and problems with IBM software products. The Support Assistant provides quick access to support-related information and serviceability tools for problem determination. To install the Support Assistant software, go to: <http://www.ibm.com/software/support/isa>

1.7 Conventions used in this guide

This publication uses several conventions for special terms and actions, operating system-dependent commands and paths, and margin graphics.

1.7.1 Typeface conventions

This publication uses the following typeface conventions:

Bold

- Lowercase commands and mixed case commands that are otherwise difficult to distinguish from surrounding text.
- Interface controls (check boxes, push buttons, radio buttons, spin buttons, fields, folders, icons, list boxes, items inside list boxes, multicolumn lists, containers, menu choices, menu names, tabs, property sheets), labels (such as **Tip:** and **Operating system considerations:**)
- Keywords and parameters in text.

Italics

- Citations (examples: titles of publications, diskettes, and CDs)
- Words defined in text (example: a nonswitched line is called a *point-to-point line*)

- Emphasis of words and letters (words as words example: "Use the word *that* to introduce a restrictive clause."; letters as letters example: "The LUN address must start with the letter *L*.")
- New terms in text (except in a definition list): a *view* is a frame in a workspace that contains data.
- Variables and values you must provide (example: ...where *myname* represents...)

Monospace

- Examples and code examples.
- File names, programming keywords, and other elements that are difficult to distinguish from surrounding text.
- Message text and prompts addressed to the user.
- Text that the user must type.
- Values for arguments or command options.

1.7.2 Operating system-dependent variables and paths

This publication uses the UNIX convention for specifying environment variables and for directory notation. When using the Windows command line, replace *\$variable* with *%variable%* for environment variables and replace each forward slash (/) with a backslash (\) in directory paths. The names of environment variables are not always the same in the Windows and UNIX environments. For example, *%TEMP%* in Windows environments is equivalent to *\$TMPDIR* in UNIX environments.

Note: If you are using the bash shell on a Windows system, you can use the UNIX conventions.

2 Interface specifications

This section covers the interface specification between Tivoli Netcool Customer Experience Manager and the mediation subsystem. This interface is used to collect raw data.

The Tivoli Netcool Customer Experience Manager Module for Mobile User Plane 1.2 comes packaged with three adapter instances.

`cem_mup_prb_dns_loader`

`cem_mup_prb_http_loader`

`cem_mup_prb_other_loader`

Table 1: Interface specifications summary

CEM_MUP_PRB_DNS_LOADER	
Service module version	1.2.
Data type	American standard code for information interchange (ASCII) files; comma-separated values (CSVs); header row (or predefined field order); optionally compressed using the GNU zip (gzip) utility
	Map file
Collection method	Local directory
Transfer method	Defined by mediation
Mapping files in use? Y N	Yes
File name syntax	<p><i>A<startdate><starttime>-<enddate><endtime>[_<Optional>]_dns.csv</i></p> <p>The timestamps on the file name are mandatory and identify the collection period. The format is YYYYMMDD.HHMMshhmm where:</p> <p><i>Startdate</i> and <i>Enddate</i>:</p> <ul style="list-style-type: none"> • <i>YYYY</i> is the year in four-digit notation; • <i>MM</i> is the month in two digit notation (01 - 12); • <i>DD</i> is the day in two-digit notation (01 - 31); <p><i>Starttime</i> and <i>Endtime</i>:</p> <ul style="list-style-type: none"> • <i>HH</i> is the two-digit hour of the day (local time), based on 24-hour clock (00 - 23);

TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE CONTROL GUIDE

	<ul style="list-style-type: none"> • <i>MM</i> is the two digit minute of the hour (local time); • <i>s</i> (optional) is the sign of the local time differential from UTC (+ or -), in case the time differential to UTC is 0 then the sign may be arbitrarily set to "+" or "-"; • <i>hh</i> (optional) is the two-digit number of hours of the local time differential from UTC (00-23); • <i>mm</i> (optional) is the two-digit number of minutes of the local time differential from UTC (00-59). <p>The <i>Optional</i> part of the naming is used to uniquely identify attributes such as:</p> <p><i>[recommended]</i> The service module, for example: _VoIP</p> <p>The input data source type, for example: _CDR</p> <p>The mediation instance providing the files.</p> <p>The file name may have multiple optional tokens, For Example: [_<Optional 1>][_<Optional 2>].</p> <p>File name examples:</p> <pre>A20050907.1030+0000-20050907.1100+0000_MUP_dns.csv A20050907.1030-20050907.1100_MUP_mediation1_dns.csv</pre> <p>Description: start of first granularity period 07 September 2005, 10:30 local, end of last granularity period 07 September 2005, 11:00 local, with a time differential of 0 against UTC.</p>
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CEM_MUP_PRB_HTTP_LOADER	
Service module version	1.2.
Data type	ASCII files; comma-separated values; header row (or predefined field order); optionally compressed using the GNU zip (gzip) utility
	Map file
Collection method	Local directory
Transfer method	Defined by mediation
Mapping files in use? Y N	Yes
File name syntax	<p><i>A<startdate><starttime>-<enddate><endtime>[_<Optional>]_http.csv</i></p> <p>The timestamps on the file name are mandatory and identify the collection period. The format is YYYYMMDD.HHMMshhmm where:</p> <p><i>Startdate</i> and <i>Enddate</i>:</p> <ul style="list-style-type: none"> • YYYY is the year in four-digit notation; • MM is the month in two digit notation (01 - 12);

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

	<ul style="list-style-type: none"> • <i>DD</i> is the day in two-digit notation (01 - 31); <p><i>Starttime</i> and <i>Endtime</i>:</p> <ul style="list-style-type: none"> • <i>HH</i> is the two-digit hour of the day (local time), based on 24-hour clock (00 - 23); • <i>MM</i> is the two digit minute of the hour (local time); • <i>s</i> (optional) is the sign of the local time differential from UTC (+ or -), in case the time differential to UTC is 0 then the sign may be arbitrarily set to "+" or "-"; • <i>hh</i> (optional) is the two-digit number of hours of the local time differential from UTC (00-23); • <i>mm</i> (optional) is the two-digit number of minutes of the local time differential from UTC (00-59). <p>The <i>Optional</i> part of the naming is used to uniquely identify attributes such as:</p> <p>[<i>recommended</i>] The service module, for example: <i>_VoIP</i></p> <p>The input data source type, for example: <i>_CDR</i></p> <p>The mediation instance providing the files.</p> <p>The file name may have multiple optional tokens, For Example:</p> <p>[_<Optional 1>][_<Optional 2>].</p> <p>File name examples:</p> <p>A20050907.1030+0000-20050907.1100+0000_MUP_http.csv</p> <p>A20050907.1030-20050907.1100_MUP_mediation1_http.csv</p> <p>Description: start of first granularity period 07 September 2005, 10:30 local, end of last granularity period 07 September 2005, 11:00 local, with a time differential of 0 against UTC.</p>
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CEM_MUP_PRB_OTHER_LOADER	
Service module version	1.2.
Data type	ASCII files; comma-separated values; header row (or predefined field order); optionally compressed using the GNU zip (gzip) utility
	Map file
Collection method	Local directory
Transfer method	Defined by mediation
Mapping files in use? Y N	Yes
File name syntax	<i>A<startdate><starttime>-<enddate><endtime>[_<Optional>]_other.csv</i> The timestamps on the file name are mandatory and identify the collection

	<p>period. The format is YYYYMMDD.HHMMshhmm where:</p> <p><i>Startdate and Enddate:</i></p> <ul style="list-style-type: none"> • <i>YYYY</i> is the year in four-digit notation; • <i>MM</i> is the month in two digit notation (01 - 12); • <i>DD</i> is the day in two-digit notation (01 - 31); <p><i>Starttime and Endtime:</i></p> <ul style="list-style-type: none"> • <i>HH</i> is the two-digit hour of the day (local time), based on 24-hour clock (00 - 23); • <i>MM</i> is the two digit minute of the hour (local time); • <i>s</i> (optional) is the sign of the local time differential from UTC (+ +or -), in case the time differential to UTC is 0 then the sign may be arbitrarily set to "+" or "-"; • <i>hh</i> (optional) is the two-digit number of hours of the local time differential from UTC (00-23); • <i>mm</i> (optional) is the two-digit number of minutes of the local time differential from UTC (00-59). <p>The <i>Optional</i> part of the naming is used to uniquely identify attributes such as:</p> <p><i>[recommended]</i> The service module, for example: _VoIP</p> <p>The input data source type, for example: _CDR</p> <p>The mediation instance providing the files.</p> <p>The file name may have multiple optional tokens, For Example:</p> <p>[_<Optional 1>][_<Optional 2>].</p> <p>File name examples:</p> <p>A20050907.1030+0000-20050907.1100+0000_MUP_other.csv</p> <p>A20050907.1030-20050907.1100_MUP_mediation1_other.csv</p> <p>Meaning: start of first granularity period 07 September 2005, 10:30 local, end of last granularity period 07 September 2005, 11:00 local, with a time differential of 0 against UTC.</p>
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2.1 Data collection and transfer mechanisms

This section defines how, how often, and from where the Tivoli Netcool Customer Experience Manager adapter collects input data for processing. It also defines how the data files are transferred from the mediation subsystem to the Tivoli Netcool Customer Experience Manager adapter.

Table 2: Data collection and transfer mechanisms

Collection method	Local directory
--------------------------	-----------------

Collection point (default data directories¹)	<code>\${SAVARDIR}/adapter/cem_mup_prb_dns_loader</code> <code>\${SAVARDIR}/adapter/cem_mup_prb_http_loader</code> <code>\${SAVARDIR}/adapter/cem_mup_prb_other_loader</code>
Collection frequency	15 minutes
Distribution method	Data push
Distribution frequency²	15 minutes
Max delivery latency³	30 minutes
Compression	Files may be compressed using the gzip utility.

Data files are collected by the Tivoli Netcool Customer Experience Manager adapter or delivered by the mediation. Transfer protocols such as file transfer protocol (FTP), secure file transfer protocol (SFTP), secure copy protocol (SCP), UNIX-to-UNIX copy protocol (UUCP), and local copy are most often used to transfer data. The transfer protocol is defined by the mediation capabilities or agreed on between the Tivoli Netcool Customer Experience Manager customer and the party providing the mediation.

Where the collection mechanism is *Local directory*, the mediation must deliver the data files to the defined *Collection point* directory. This transfer or distribution mechanism is referred to as *data push*, where data is pushed to the adapters.

The default value for the root data directory (`${SAVARDIR}`) is `/appl/sa/var`.

2.2 Data compression

The interface supports data files compressed by the gzip utility. In such cases, the files without time zone offset are similar to the following format:

```
A20050907.1030-20050907.1100_MUP_http.csv.gz
A20050907.1030-20050907.1100_MUP_dns.csv.gz
A20050907.1030-20050907.1100_MUP_other.csv.gz
```

Such compression is used in deployments to reduce network bandwidth, improve link latency, and so on. However data compression can increase both disk Input/Output and CPU load.

¹ Default data directory, configured in the Tivoli Netcool Customer Experience Manager adapter.

² The distribution frequency indicates how often the mediation component should provide input data to the adapter process. This value is often identical to the collection frequency.

³ Max latency, configured in the Tivoli Netcool Customer Experience Manager adapter known as *Grace Period*. Data files that arrive past this time are not processed. Typically, by default it is configured to be two times the collection interval. Max latency is configured in the files

`${WMCROOT}/conf/adapter/collector/cem_mup_prb_dns_loader.properties.`

`${WMCROOT}/conf/adapter/collector/cem_mup_prb_http_loader.properties.`

`${WMCROOT}/conf/adapter/collector/cem_mup_prb_other_loader.properties.`

The interface also support archive files such as archives that contain multiple comma-separated value (CSV) files.

The following files are not currently supported:

- Tar files, or files that include the `.tar` file name extension.
- Tar files that are compressed with the `gzip` utility. These files include the `tar.gz` or `.tgz` file name extension.
- UNIX compressed files that include the `.z` file name extension.
- Compressed files that include the `.zip` file name extension.

2.3 Data specification

This section defines the content format of the data files. All three adapter instances process the data files with the same structure.

Table 3: Data file format

Field name	Type ⁴	Maximum Length	Constraints	Field description	Notes
IMSI	Varchar	16	NON NULLABLE	<p>The International Mobile Subscriber Identity (IMSI) of the subscriber.</p> <p>IMSI uniquely identifies the Customer who instigated each specific transaction type.</p> <p>The format of the IMSI is MCC-MNC-MSIN where:</p> <ul style="list-style-type: none"> • MCC is the mobile country code. • MNC is the mobile network code. • MSIN is the mobile subscriber identity number. 	
IMEISV	Varchar	16	NULLABLE	<p>The International Mobile Equipment Identifier and Software Version Number associated with the customer's handset or terminal.</p>	

⁴ The list of valid data types and their descriptions is given in Appendix B.

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

Field name	Type ⁴	Maximum Length	Constraints	Field description	Notes
				<p>The format of the IMEISV is TAC-SNR-SV where:</p> <ul style="list-style-type: none"> • TAC is the type allocation code • SNR is the serial number. • SV is the software version number <p>The older IMEI format which only includes the TAC and SNR is also supported.</p>	
SRC_IPADDRESS	Varchar	64	NULLABLE	The source or client IP address	
DEST_IPADDRESS	Varchar	64	NULLABLE	<p>The destination or host IP address.</p> <p>This field can identify the remote server IP address that the client communicates with.</p> <p>For example, the destination IP address may be the IP address of the SMTP server for a SMTP_TRANS transaction or the application Web server for a HTTP GET transaction or the destination GGSN or PDSN for the client command.</p> <p>If the DEST_IPADDRESS is non-null, see the DEST_IPADDRESS to DEST_HOST mapping file to resolve to the DestDomain ResourceType</p>	
SRC_PORT	Integer		NULLABLE > 0 Integer	The source or client port number	
DEST_PORT	Integer		NULLABLE > 0 Integer	The destination or HOST port number	
DEST_URI	Varchar	256	NULLABLE	The partial Uniform Resource Identifier (URI) is a compact string of characters used to identify or name a destination resource on the Internet/Intranet	

Interface specifications

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

Field name	Type ⁴	Maximum Length	Constraints	Field description	Notes
				that is used for the set of user data transaction types. The URI syntax is essentially a URI scheme name like "http", "ftp", "mailto", "dns", "imap" etc., followed by a colon character, and then a scheme-specific part. Note: any trailing path, parameter, query or fragment strings following the authority string (hostname:port) is excluded from the DEST_URI field. i.e. We are only interested in the Domain the DEST_URI is pointing to. For example: imap://[<user>[;AUTH=<type>]@]<host>[:<port>]/ Examples: http://www.ibm.com/ 152.16.78.100:10021/	
CGI	Varchar	32	NON NULLABLE	The CGI is the cell global identity for the current cell. The format of the CGI is MCC-MNC-LAC-CI where: <ul style="list-style-type: none"> • MCC is the mobile country code. • MNC is the mobile network code. • LAC is the location area code • CI is the cell identifier It is also possible to use service area identifier (SAI) = MCC-MNC-LAC-SAC SAC = Service area code or routing area identifier (RAI) = MCC-MNC-LAC-RAC RAC = routing area code Where CGI is not available in the data source.	
SGSN	Varchar	64	NON NULLABLE	The name or IP address of the SGSN.	
GGSN	Varchar	64	NON NULLABLE	The name or IP address of the GGSN.	

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

Field name	Type ⁴	Maximum Length	Constraints	Field description	Notes
APN	Varchar	64	NULLABLE	The access point name (APN) that is associated with the current PDP context.	
RAT	ENUM		NULLABLE	The Radio Access Technology (RAT) that this Application Layer Protocol crosses. See Section 3 Enumerations and Definitions for a list of valid values	
USERAGENT	Varchar	256	NULLABLE	A user agent is the client application used with a particular network protocol; For example: Go!Zilla 3.x (www.gozilla.com) Mozilla/4.0 (compatible; MSIE 4.01; Windows 95) Python-urllib/2.0a1	
MIMETYPE	Varchar	128	NULLABLE	The Multipurpose Internet Mail Extension (MIME) type name for the particular TRANSACTIONTYPE For example: text/html application/x-java-jnlp-file application/xhtml+xml	
TRANSACTIONTYPE	ENUM		NON NULLABLE	The TransactionType to which the data on this row applies See Section 3 Enumerations and Definitions for a list of valid values.	
CAUSETYPE	ENUM		NON NULLABLE	The protocol-specific cause code type that is required to interpret the transaction termination cause. See Section 3 Enumerations and Definitions for a list of valid values.	
CAUSECODE	ENUM		NON NULLABLE	The protocol-specific cause code that identifies the reason for the termination of the transaction. See Section 3 Enumerations and Definitions for a list of valid	

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

Field name	Type ⁴	Maximum Length	Constraints	Field description	Notes
				values.	
COUNT	Integer		NON NULLABLE >= 1	The number of transactions associated with the unique combination of IMSI, IMEI, GGSN, RAT, USER_AGENT, MIMETYPE, SRC_IPADDRESS, DEST_IPADDRESS, URI, SRC_PORT, DEST_PORT, CAUSETYPE, TRANSACTIONTYPE, CAUSECODE for this row. COUNT should always be >= 1.	
DURATION	Integer		NULLABLE >= 0	This is the total transaction duration or round trip time (RTT) in milliseconds for the transactions reported on this row.	
UPTOTDATACOUNT	Double		NULLABLE >= 0	Upload total data count - represents the total number of user data kilobytes sent in the uplink direction for the set of transactions reported in this row.	
DOWNTOTDATA COUNT	Double		NULLABLE >= 0	Download total data count - represents the total number of user data kilobytes sent in the downlink direction for the set of transactions reported in this row.	

Example:

```
IMSI,IMEISV,SRC_IPADDRESS,DEST_IPADDRESS,SRC_PORT,DEST_PORT,DEST_URI,CGI,SGSN,G
GSN,APN,RAT,USERAGENT,MIMETYPE,TRANSACTIONTYPE,CAUSETYPE,CAUSECODE,COUNT,DURATI
ON,UPTOTDATACOUNT,DOWNTOTDATACOUNT

3104100230000000,VDO0000000000000000,40.309.445.479,303.75.433.49,2517,80,www.ibm.co
m,78941084D7F99F,MUP_SGSN1,MUP_GGSN1,MUP_net,1,Nokia2626/2.0 (06.80)
Profile/MIDP-2.0 Configuration/CLDC-1.1,image-gif,15,83,1,1,205,0.75,120.56
```

Each of the three Tivoli Netcool Customer Experience Manager Module for Mobile User Plane adapters process separate sets of transactions. The table below shows the set of cause types that should be processed by each of the adapter instances:

Adapter	Cause types
CEM_MUP_PRB_DNS_LOADER	DNS, TCP and RADIUS
CEM_MUP_PRB_HTTP_LOADER	HTTP and WSP
CEM_MUP_PRB_OTHER_LOADER	SMTP, POP, FTP and IMAP

2.3.1 Data file aggregation

The CSV data file should contain a row for each unique combination of the following data field values:

- IMSI
- CAUSETYPE
- TRANSACTIONTYPE
- CAUSECODE

Additionally, new rows are created for the following columns if the supplied column values are not null.

- IMEISV
- GGSN
- SGSN
- APN
- CGI
- RAT
- MIMETYPE
- USERAGENT
- SRC_IPADDRESS
- DEST_IPADDRESS
- DEST_URI
- SRC_PORT
- DEST_PORT

Each data value which appears in a row is aggregated to provide a single value for this combination of key field values.

The columns below are expected to contain the following data sums in each row based on the above grouping:

- COUNT
- DURATION
- UPTOTDATACOUNT
- DOWNTOTDATACOUNT

2.4 Custom resource mapping

Tivoli Netcool Customer Experience Manager uses mapping files to resolve some fields, and keys from the input data files. For instance, the input file can contain an IMSI field where the map file resolves to an IMSI group or provide additional enrichment.

This section describes the format of the map files.

Table 4: Custom mapping files

Data type	ASCII files; comma-separated values; header row
Default location	\${SAVARDIR}/adapter/mappings/resources/
File name syntax	cem_mup_cellarea.map cem_mup_service.map

The map files are reloaded at the beginning of every adapter data interval. By using map-file reloading, the map files can be updated at any time.

Example:

The following is an example mapping between cells (CGI) and cell areas:

```
78941007E43150,Cell Area 0,
78941007EF1600,Cell Area 0,
789410083DC360,Cell Area 0,
789410083DC5C0,Cell Area 1,
7894100BCE00C0,Cell Area 1,
7894100BCF20F0,Cell Area 1,
7894100BD622D0,Cell Area 1,
7894100BD70B10,Cell Area 2,
```

Example:

The following is an example mapping between destination URI's (DEST_URI) and services:

```
http://www.socialnetwork.com/, Social_network,  
https://210.10.11.12/, Social_network,  
www.socialnetwork.co.uk/, Social_network,  
ftp://10.111.120.134, IBM_FTP_Server,
```

3 Enumerations and definitions

This chapter defines the enumerations to be used by the mediation when creating the data files for the adapters.

3.1.1 TRANSACTIONTYPE

Table 5: TRANSACTIONTYPE ENUM VALUES

<i>ID</i>	<i>Description</i>
1	HTTP_GET
2	HTTP_PUT
3	HTTP_POST
4	HTTP_DELETE
5	HTTP_HEAD
6	HTTP_CONNECT
7	SMTP_EHLO
8	SMTP_HELO
9	SMTP_MAILFROM
10	SMTP_VRFY
11	SMTP_EXPN
12	SMTP_RCPTTO
13	SMTP_DATA
14	SMTP_QUIT
15	POP_USER
16	POP_AUTH
17	POP_RETR
18	POP_PASS
19	POP_APOP
20	POP_UIDL

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

<i>ID</i>	<i>Description</i>
21	POP_LIST
22	POP_STAT
23	POP_DELE
24	POP_RSET
25	POP_QUIT
26	IMAP_CAPABILITY
27	IMAP_LOGOUT
28	IMAP_STARTTLS
29	IMAP_AUTHENTICATE
30	IMAP_LOGIN
31	IMAP_SELECT
32	IMAP_EXAMINE
33	IMAP_CREATE
34	IMAP_DELETE
35	IMAP_RENAME
36	IMAP_SUBSCRIBE
37	IMAP_UNSUBSCRIBE
38	IMAP_STATUS
39	IMAP_LSUB
40	IMAP_APPEND
41	IMAP_CHECK
42	IMAP_CLOSE
43	IMAP_EXPUNGE
44	IMAP_SEARCH
45	IMAP_FETCH
46	IMAP_STORE
47	IMAP_COPY
48	IMAP_UID
49	DNS_Query
50	WSP_GET

Enumerations and definitions

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

<i>ID</i>	<i>Description</i>
51	WSP_PUT
52	WSP_POST
53	WSP_DELETE
54	WSP_HEAD
55	WSP_CONNECT
56	WSP_PUSH
57	WSP_CONFIRM_PUSH
58	WSP_DISCONNECT
59	WSP_SUSPEND
60	WSP_RESUME
61	FTP_SMNT
62	FTP_CWD
63	FTP_CDUP
64	FTP_REIN
65	FTP_STOR
66	FTP_RETR
67	FTP_USER
68	FTP_PASS
69	FTP_QUIT
70	FTP_REST
71	FTP_ABOR
72	FTP_PWD
73	FTP_MODE
74	FTP_STOU
75	FTP_RNFR
76	FTP_RNTO
77	FTP_RMD
78	FTP_MKD

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

79	FTP_LIST
80	FTP_DELE
81	TCP_CONNECTION
82	ACCESS_REQUEST
800	SMTP
801	HTTP
802	WSP
803	POP
804	DNS
805	FTP
806	IMAP
807	TCP
808	RADIUS

Note: The TransactionType ENUM values 800 to 808 are to be used when mapping to the individual user plane protocol TransactionTypes such as HTTP_GET, HTTP_POST, FTP_RETR and so on are not available from the data source or where data compression is needed for performance reasons. When mediating to the adapter using the TransactionType ENUM values 800 to 808 no other TransactionType ENUM values should be used, otherwise double counting of transactions can occur.

3.1.2 CAUSETYPE

Table 6: CAUSETYPE ENUM VALUES

<i>Id</i>	<i>Description</i>
99	Unrecognized Cause
80	SMTP
81	HTTP
82	WSP
83	POP
84	DNS
85	FTP
86	IMAP
87	TCP

TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE CONTROL GUIDE

88	RADIUS
----	--------

3.1.3 RAT

Table 7: RAT ENUM VALUES

<i>Id</i>	<i>Description</i>
1	GPRS
2	UMTS

3.1.4 CAUSECODE Values

Table 8: CAUSECODE VALUES

<i>CAUSETYPE</i>	<i>CAUSECODE Id</i>	<i>Description</i>
Unrecognized Cause	-1	Unrecognized Cause Type
SMTP	211	System status, or system help reply
SMTP	214	Help message
SMTP	220	Service ready
SMTP	250	Requested mail action okay, completed
SMTP	251	User not local; will forward to <forward-path>
SMTP	252	Cannot VRFY user, but will accept message and attempt delivery
SMTP	354	Start mail input; end with <CRLF>.<CRLF>
SMTP	421	<domain> Service not available, closing transmission channel
SMTP	450	Requested mail action not taken: mailbox unavailable
SMTP	451	Requested action aborted: local error in processing
SMTP	452	Requested action not taken: insufficient system storage
SMTP	455	Server unable to accommodate parameters
SMTP	500	Syntax error, command unrecognized
SMTP	501	Syntax error in parameters or arguments
SMTP	502	Command not implemented
SMTP	503	Bad sequence of commands
SMTP	504	Command parameter not implemented
SMTP	550	Requested action not taken: mailbox unavailable
SMTP	551	User not local; please try <forward-path>
SMTP	552	Requested mail action aborted: exceeded storage allocation
SMTP	553	Requested action not taken: mailbox name not allowed
SMTP	554	Transaction failed
SMTP	555	MAIL FROM/RCPT TO parameters not recognized or not implemented

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

CAUSETYPE	CAUSECODE Id	Description
HTTP	100	Continue
HTTP	101	Switching Protocols
HTTP	102	Processing
HTTP	200	OK
HTTP	201	Created
HTTP	202	Accepted
HTTP	203	Non-Authoritative Information (since HTTP/1.1)
HTTP	204	No Content
HTTP	205	Reset Content
HTTP	206	Partial Content
HTTP	207	Multi-Status
HTTP	300	Multiple Choices
HTTP	301	Moved Permanently
HTTP	302	Found
HTTP	303	See Other
HTTP	304	Not Modified
HTTP	305	Use Proxy
HTTP	306	Switch Proxy
HTTP	307	Temporary Redirect
HTTP	400	Bad Request
HTTP	401	Unauthorized
HTTP	402	Payment Required
HTTP	403	Forbidden
HTTP	404	Not Found
HTTP	405	Method Not Allowed
HTTP	406	Not Acceptable
HTTP	407	Proxy Authentication Required
HTTP	408	Request Timeout
HTTP	409	Conflict
HTTP	410	Gone
HTTP	411	Length Required
HTTP	412	Precondition Failed
HTTP	413	Request Entity Too Large
HTTP	414	Request-URI Too Long
HTTP	415	Unsupported Media Type
HTTP	416	Requested Range Not Satisfiable
HTTP	417	Expectation Failed
HTTP	422	Unprocessable Entity

Enumerations and definitions

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

CAUSETYPE	CAUSECODE Id	Description
HTTP	423	Locked
HTTP	424	Failed Dependency
HTTP	425	Unordered Collection
HTTP	426	Upgrade Required
HTTP	449	Retry With
HTTP	450	Blocked
HTTP	500	Internal Server Error
HTTP	501	Not Implemented
HTTP	502	Bad Gateway
HTTP	503	Service Unavailable
HTTP	504	Gateway Timeout
HTTP	505	HTTP Version Not Supported
HTTP	506	Variant Also Negotiates (Experimental)
HTTP	507	Insufficient Storage
HTTP	509	Bandwidth Limit Exceeded
HTTP	510	Not Extended
WSP	100	Continue
WSP	101	Switching Protocols
WSP	102	Processing
WSP	200	OK
WSP	201	Created
WSP	202	Accepted
WSP	203	Non-Authoritative Information (since WAP/1.1)
WSP	204	No Content
WSP	205	Reset Content
WSP	206	Partial Content
WSP	207	Multi-Status
WSP	300	Multiple Choices
WSP	301	Moved Permanently
WSP	302	Found
WSP	303	See Other
WSP	304	Not Modified
WSP	305	Use Proxy
WSP	306	Switch Proxy
WSP	307	Temporary Redirect
WSP	400	Bad Request
WSP	401	Unauthorized
WSP	402	Payment Required

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

CAUSETYPE	CAUSECODE Id	Description
WSP	403	Forbidden
WSP	404	Not Found
WSP	405	Method Not Allowed
WSP	406	Not Acceptable
WSP	407	Proxy Authentication Required
WSP	408	Request Timeout
WSP	409	Conflict
WSP	410	Gone
WSP	411	Length Required
WSP	412	Precondition Failed
WSP	413	Request Entity Too Large
WSP	414	Request-URI Too Long
WSP	415	Unsupported Media Type
WSP	416	Requested Range Not Satisfiable
WSP	417	Expectation Failed
WSP	422	Unprocessable Entity
WSP	423	Locked
WSP	424	Failed Dependency
WSP	425	Unordered Collection
WSP	426	Upgrade Required
WSP	449	Retry With
WSP	450	Blocked
WSP	500	Internal Server Error
WSP	501	Not Implemented
WSP	502	Bad Gateway
WSP	503	Service Unavailable
WSP	504	Gateway Timeout
WSP	505	HTTP Version Not Supported
WSP	506	Variant Also Negotiates (Experimental)
WSP	507	Insufficient Storage
WSP	509	Bandwidth Limit Exceeded
WSP	510	Not Extended
POP	1	OK
POP	2	ERR
POP	3	IN-USE
POP	4	LOGIN-DELAY
POP	5	SYS/TEMP
POP	6	SYS/PERM

Enumerations and definitions

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

CAUSETYPE	CAUSECODE Id	Description
POP	7	AUTHENTICATION
DNS	0	No Error Condition
DNS	1	Format error
DNS	2	Server failure
DNS	3	Name Error
DNS	4	Not Implemented
DNS	5	Refused
DNS	6	YXDomain
DNS	7	YXRRSet
DNS	8	NXRRSet
DNS	9	NotAuth
DNS	10	NotZone
DNS	15	Unassigned (11-15)
DNS	16	BADSIG
DNS	17	BADKEY
DNS	18	BADTIME
DNS	19	BADMODE
DNS	20	BADNAME
DNS	21	BADALG
DNS	22	BADTRUNC
FTP	110	Restart marker reply
FTP	120	Service ready in nnn minutes
FTP	125	Data connection already open; transfer starting
FTP	150	File status okay; about to open data connection
FTP	200	Command okay.
FTP	202	Command not implemented, superfluous at this site.
FTP	211	System status, or system help reply
FTP	212	Directory status
FTP	213	File Status
FTP	214	Help message.
FTP	215	NAME system type
FTP	220	Service ready for new user.
FTP	221	Service closing control connection.
FTP	225	Data connection open; no transfer in progress.
FTP	226	Closing data connection.
FTP	227	Entering Passive Mode (h1,h2,h3,h4,p1,p2).
FTP	230	User logged in, proceed.
FTP	250	Requested file action okay, completed.

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

CAUSETYPE	CAUSECODE Id	Description
FTP	257	"PATHNAME" created.
FTP	331	User name okay, need password.
FTP	332	Need account for login.
FTP	350	Requested file action pending further information.
FTP	421	Service not available, closing control connection.
FTP	425	Can't open data connection.
FTP	426	Connection closed; transfer aborted.
FTP	450	Requested file action not taken.
FTP	451	Requested action aborted: local error in processing
FTP	452	Requested action not taken.
FTP	500	Syntax error, command unrecognized.
FTP	501	Syntax error in parameters or arguments.
FTP	502	Command not implemented.
FTP	503	Bad sequence of commands.
FTP	504	Command not implemented for that parameter.
FTP	530	Not logged in.
FTP	532	Need account for storing files.
FTP	550	Requested action not taken. File unavailable (e.g., file not found, no access).
FTP	551	Requested action aborted: page type unknown.
FTP	552	Requested file action aborted. Exceeded storage allocation (for current directory or dataset).
FTP	553	Requested action not taken. File name not allowed.
IMAP	1	OK
IMAP	2	NO
IMAP	3	BAD
TCP	0	OK
TCP	2	Missing SU
TCP	3	Abnormal End
TCP	4	Suspicious sequence of MSUs
TCP	15	Unknown MSU
TCP	64	Collision seizure
TCP	128	Timer Expiry
TCP	101	Problem has occurred during decoding
TCP	102	Collision, collision of two Begins
TCP	203	Unrecognized PDU
TCP	205	Unexpected PDU
TCP	248	End, missing or abnormal end
TCP	249	Node not allocated, memory limitation

Enumerations and definitions

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

CAUSETYPE	CAUSECODE Id	Description
TCP	250	Internal Error
TCP	251	Unexpected, missing Beginning of the procedure
TCP	252	Not accepted MSU
TCP	253	Not matched MSU
TCP	254	Out of sequence
RADIUS	2	Access-Accept
RADIUS	3	Access-Reject
RADIUS	11	Access-Challenge

4 Service provisioning

This chapter describes the steps to provision the customer-specific portions of the service module. It also covers provisioning examples for the service module and customer provisioning for the Tivoli Netcool Customer Experience Manager service modules.

To install a package, invoke the `package_mgmt` script with the `-i` flag followed by the package name. Similarly to clean a package, invoke the `package_mgmt` script with the `-c` flag followed by the package name.

For a normal installation, if an element already exists, the installation fails and an error file is generated for that package. By using the force option (pass a `-f` flag at the end of the command), the operation does not fail if an element already exists. Always use the `-f` option for service module installations if the service module contains elements that are already provisioned elsewhere.

For more information on provisioning, see Appendix A: Provisioning.

4.1 Resource instance provisioning

This section lists the resource types that must be provisioned for this solution.

Table 9: Resources to provision

Resource type key		
Resource type name	Roll up level	Auto-discovery
Service	Service	No
GGSN	GGSN	No
SGSN	SGSN	No
APN	APN	No
MIMETYPE	MIMETYPE	No
UTRAN	H_RNC	No

Note: The expected maximum granularity of resource Instances for the service ResourceType is approximately 200 services. Service is a grouping of destination URI's based on the DEST_URI field from the CSV which is mapped using the `cem_mup_service.map` file. Many domains (DEST_URI) can map to the one Service, for example, for a service that has distributed application servers all DEST_URI's for the service can map to one service name. The `cem_mup_service.map` file in section 2.4 uses the example where three different DEST_URI map to the one Social_network service. All DEST_URI that are not mapped in the `cem_mup_service.map` file will default to the unknown_Service Resource Instance for monitoring. Any deviation above the maximum of 200 services should be verified with the IBM professional services team.

Note: To see data populated in the "User Plane MMS" service wheel in the Tivoli Netcool Customer Experience Manager User Interface, the user must first map the MMSC's DEST_URI to the "User Plane MMS" Resource Instance of the SERVICE ResourceType.

4.2 Provisioning examples

4.2.1 Resource type 1 SERVICE

```
<resource>
  <key name="abc" resourceType="SERVICE" level="service" />
</resource>
```

4.2.2 Resource type 2 GGSN

```
<resource>
  <key name="GGSN1" resourceType="GGSN" level="ggsn" />
</resource>
```

4.2.3 Resource type 3 SGSN

```
<resource>
  <key name="SGSN1" resourceType="SGSN" level="SGSN" />
</resource>
```

4.2.4 Resource type 4 APN

```
<resource>
  <key name="net" resourceType="APN" level="apn" />
</resource>
```

4.2.5 Resource type 5 MIMETYPE

```
<resource>
  <key name="application-vnd.wap.wbxml" resourceType="MIMETYPE" level="mimetype"
/>
```

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

</resource>

Appendix A: Provisioning

Provisioning is performed using the `package_mgmt` interface. This script supports the following commands:

```
Usage:
    package_mgmt {i|c} [options]
Commands:
    install    : package_mgmt -i package_name [-f] [-e entity_key]
    clean      : package_mgmt -c package_name [-f] [-e entity_key]
Options:
    -f          : force install or clean
```

The provisioning files for the service module are located in the `$WMCROOT/packages` directory. Do not modify existing packages. Create a new package in this directory instead. This package consists of a `package.properties` file and several XML provisioning files for the entities to be provisioned. These files are located in the `admin/provision` directory underneath the main package directory, for example, `$WMCROOT/packages/cem_mup_prb_dns_1.2/admin/provision`.

`DsTypes_package.xml` `KPIModels_package.xml` `Resources_package.xml`

`SVCReports_package.xml` `Services_package.xml` `install` `package.properties`

The `package.properties` file contains key and value pairs that map between a provisioning entity such as resource types and a comma-separated list of XML provisioning files for that entity type. The valid entity type keys are listed in the following table.

```
dataSourceType=DsTypes_package.xml
resource=Resources_package.xml
kpiModel=KPIModels_package.xml
svcReport=SVCReports_package.xml
service=Services_package.xml
```

Figure 1: Sample package.properties file

Table 10: Provisioning keys and entities

Key	Entity type
dataSourceType	Data source type
kpiModel	Key performance indicator (KPI) model
Report	Report
Resource	Resource
resourceGroup	Resource group
resourceType	Resource type
Service	Service
serviceElement	Service element
serviceModel	Service model
Customer	Customer
customerGroup	Customer group

For more information on provisioning, see the *IBM Tivoli Netcool Customer Experience Manager Provisioning Guide*.

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

Appendix B: Data field types

The following table lists the data field types and their descriptions:

Table 11: Data field type descriptions

<i>Data field type</i>	<i>Description</i>
Integer	Number with no decimal fraction.
Long	Number with no decimal fraction.
Float	Real number with decimal fraction.
Double	Real number with decimal fraction.
Varchar	Variable length character string, consisting of letters and numbers.
Enum	Number with no decimal fraction.

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

Appendix C: Product acronyms

Table 12: Description of product acronyms

<i>Acronym</i>	<i>Description</i>
ASCII	American Standard Code for Information Interchange
CDR	Call Data Record
CPU	Central Processing Unit
CRM	Custom Resource Mapping
CSV	Comma-Separated Value
FTP	File Transfer Protocol
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IT	Information Technology
KPI	Key Performance
KQI	Key quality indicator
PDF	Portable Document Format
SCP	Secure Copy Protocol
SFTP	Secure File Transfer Protocol
SLA	Service-Level Agreement
UTC	Universal Time Coordinated
UUCP	UNIX-To-UNIX Copy Protocol
XML	Extensible Markup Language

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

Index

A

audience, 1

C

custom resource mapping, 18

D

data

- collection, 10
- compression, 11
- specification, 12

I

interface specifications, 7

R

resource instance
provision, 31

T

transfer mechanisms, 10

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR MOBILE USER PLANE SERVICE INTERFACE
CONTROL GUIDE**

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