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Trace Server LTE MDT Data Northbound File Interface Developer Guide

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Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: https://www.huawei.com

Email: support@huawei.com

Preface

Purpose

This document provides information about the Trace Server northbound trace result file interface. It also provides guidance for interconnecting with the network management system (NMS).

NOTICE

When Trace Server collects NE data, such as, CHR, MR, and trace data, filters the data, and provides the data for the NMS, collection, storage, and transmission of personal data, such as MSISDNs, IMSIs, IMEIs, and cell IDs are involved. If the storage directory space or the storage duration reaches specified thresholds, data will be automatically deleted. The personal data in the content provided to NMS users is protected by the NMS. Sensitive data sources provided by NEs can be anonymized, and Trace Server provides the anonymization capability when data is moved out of the live network. To ensure personal data security, comply with applicable state laws or enterprise privacy policies and take sufficient measures.

Intended Audience

This document is intended for upgrade engineers. Upgrade engineers must:

- Be familiar with the current network topology and the version information of related NEs.
- Have device maintenance experience and be familiar with device operation and maintenance methods.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

Symbol	Description
⚠ CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Contents

1 Overview of the Northbound Trace Result File Interface

About This Chapter

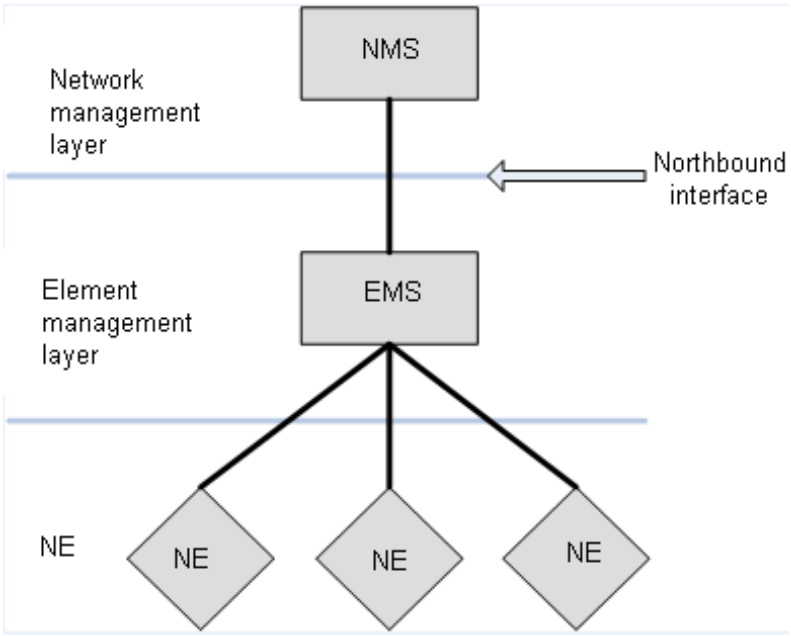
This section describes the definitions of the northbound interface and northbound trace result file interface provided by Trace Server.

1.1 Definition of the Northbound Interface

The northbound interface links the element management system (EMS) and the network management system (NMS).

The NMS obtains NE data, such as NE trace result data, from the EMS and issues commands over the northbound interface. Figure 1-1 shows the northbound interface.

Figure 1-1 Position of the northbound interface



1.2 Definition of the Northbound Trace Result File Interface

The Trace Server northbound trace result file interface is a northbound interface, over which the NMS can obtain northbound trace result files stored on Trace Server.

Trace Server northbound trace result file supports the following protocols for transferring northbound trace result files:

- File Transfer Protocol (FTP): common FTP protocol
- Secure File Transfer Protocol (SFTP): SSH-based FTP transfer protocol

NOTE

You are advised to use the SFTP protocols because the SFTP protocols is more secure than the FTP protocols.

1.3 Technical Specifications for the Standard Signaling Northbound Result File Interface

This section describes the technical specifications for the standard signaling northbound result file interface.

Table 1-1 describes the technical specifications for the LTE standard signaling northbound file interface provided by the Trace Server.

Table 1-1 Technical specifications for the LTE standard signaling northbound file interface

Specification	Value
Maximum period during which standard signaling northbound result files are stored on the Trace Server (unit: hour)	72
Maximum size of a standard signaling northbound result file that can be saved on a Trace Server (unit: GB)	180
Maximum size of a standard signaling northbound result file that can be saved on the shared space (unit: GB)	256 **NOTE** • If the size of files saved on the shared space is less than 256 GB and the storage period does not expire, trace result files generated by the Trace Server are not deleted. • If the size of files saved on the shared space is greater than 256 GB and the storage period does not expire, files generated by application systems (except the Trace Server) and trace result files generated by the Trace Server are deleted in sequence before sizes of the files are less than their respective storage specifications or the size of files saved on the share space is less than 256 GB. • If the space usage of the **export/home** directory is higher than 80%, data is deleted from the shared space.
Maximum size of a standard signaling northbound result file that can be saved on a high-specification VM (unit: GB)	720
Maximum size of a standard signaling northbound result file that can be saved on the shared space of the high-specification VM (unit: GB)	1024 **NOTE** • If the size of files saved on the shared space of the high-specification VM is less than 1024 GB and the storage period does not expire, trace result files generated by the Trace Server are not deleted. • If the size of files saved on the shared space of the high-specification VM is greater than 1024 GB and the storage period does not expire, files generated by application systems (except the Trace Server) and trace result files generated by the Trace Server are deleted in sequence before sizes of the files are less than their respective storage specifications or the size of files saved on the share space of the high-specification VM is less than 1024 GB. • If the space usage of the **export/home** directory is higher than 80%, data is deleted from the shared space.

2 Overview of Result Files

About This Chapter

This chapter describes the result files for users to easily locate and obtain the files.

NOTE

To obtain result samples, contact Huawei technical support.

2.1 Types of MDT Data Northbound Result Files

Trace Server generates NE northbound result files based on the corresponding NE data.

LTE northbound result files are LTE private signaling, which complies with the OSSii protocol.

2.2 Save Path of MDT Data Northbound Result Files

After collecting and processing NE data, Trace Server saves MDT data northbound trace result files in the **/export/home/omc/var/fileint/TSNBI/** directory on the server where NEs are located. Trace Server creates subdirectories in the directory.

The rule for creating subdirectories is as follows: **LTE_SIG***/yyyymmdd/NE identifier/*

NOTE

- yyyymmdd indicates the date when an MDT Data northbound result file is generated.
- NE identifiers consist of **NE FDN** and **NE Name**. **NE FDN** is a unique attribute of NEs, and the value range is 256 to 2945727. **NE Name** is user-defined and unique in the same EMS.

  For example:

- When NE identifier is **NE FDN**, if an LTE_SIG result file is generated on November 11, 2019, the **/export/home/omc/var/fileint/TSNBI/LTE_SIG/20191111/***NE FDN***/** directory is automatically created for saving all LTE_SIG result files that were generated on November 11, 2019.
- When the NE identifier is **NE Name**, if an LTE_SIG result file is generated on November 11, 2019, the **/export/home/omc/var/fileint/TSNBI/***LTE_SIG/20191111/NE Name***/** directory is automatically created for saving all LTE_SIG result files that are generated on November 11, 2019.
- To query the IP address of the server where an NE is located, choose **Maintenance** > **Trace Server Maintenance** > **Query Subscription Information** from the main menu of MAE. For details about operations on the **Query Subscription Information** page, click  on this page and view the help information.
- You can modify configuration items on MAE. For details, see **Modifying Configuration Items** in 4.1 Negotiating Interconnection Parameters for the MDT Data Northbound Result File Interface.
- To prevent the NMS data from being repeatedly collected, historical data remains unchanged after configuration items or NE names are changed.
- When the value of the configuration item is changed to **NE name** and is used as the name of the directory for storing trace result files, **NE name** cannot be **..**.
- The dataList subdirectory in the **/export/home/omc/var/fileint/TSNBI/LTE_SIG/** directory stores the index files whose names start with **Datalist**. These index files are used to quickly send the MDT data northbound trace result files to the NMS, improving the file sending efficiency.

2.3 Naming Conventions of MDT Data Northbound Result Files

Trace Server saves data reported by NEs as northbound result files.

The naming conventions are as follows:

- When the NE identifier is **NE FDN**,

  result files are named as follows: <NE FDN>_<StartTime>_<EndTime>_<SN>.<FilePostfix>.gz.
- When the NE identifier is **NE Name**,

  result files are named as follows: <NE Name>_<StartTime>_<EndTime>_<SN>.<FilePostfix>.gz.

Table 2-1 Naming convention parameters

Parameter	Description
NE FDN or NE name	NE identifiers consist of **NE FDN** and **NE Name**. They can be modified on MAE. For details, see **Modifying Configuration Items** in 4.1 Negotiating Interconnection Parameters for the MDT Data Northbound Result File Interface.
StartTime	Start time in the name of an NE-reported file. The time format is *YYYYMMDDhhmmssDST*. *YYYY* indicates the year, *MM* indicates the month, *DD* indicates the day, *hh* indicates the hour, *mm* indicates the minute, *ss* indicates the second, and *DST* indicates the DST flag (it depends on whether NEs use DST).
EndTime	End time in the name of an NE-reported file. The time format is *YYYYMMDDhhmmssDST*. *YYYY* indicates the year, *MM* indicates the month, *DD* indicates the day, *hh* indicates the

Parameter	Description
	hour, *mm* indicates the minute, *ss* indicates the second, and *DST* indicates the DST flag (it depends on whether NEs use DST). **NOTE** If another NE uploads no files or no NEs upload files for a long time, the end time increases by one file generation period in the name of the last NE-reported file.
SN	This parameter indicates the serial number of a file. Value range: 0000 to 9999. The serial number ranges from 0000 to 9999 cyclically.
FilePostfix	File name extension. The extension is **log** for LTE_SIG result files.

For example:

- When the NE identifier is **NE FDN**, the SN is 1234, the start time in an NE-reported file is 2019-11-11 17:30:30, and the end time in the NE-reported file is 2019-11-11 17:32:40, the name of the generated LTE_SIG result file is *NE FDN*_**20191111173030_20191111173240_1234.log.gz**.
- When the NE identifier is **NE Name**, the SN is 1234, the start time in an NE-reported file is 2019-11-11 17:30:30, and the end time in the NE-reported file is 2019-11-11 17:32:40, the name of the generated LTE_SIG result file is *NE Name*_**20191111173030_20191111173240_1234.log.gz**.

2.4 Generation Period of Northbound Result Files

This section describes the generation period of northbound result files.

When the volume or generation period of northbound result files is greater than those specified in 4.1 Negotiating Interconnection Parameters for the MDT Data Northbound Result File Interface, northbound trace result files are generated. The default file size and generation period are 10 MB and 5 minutes, respectively.

NOTE

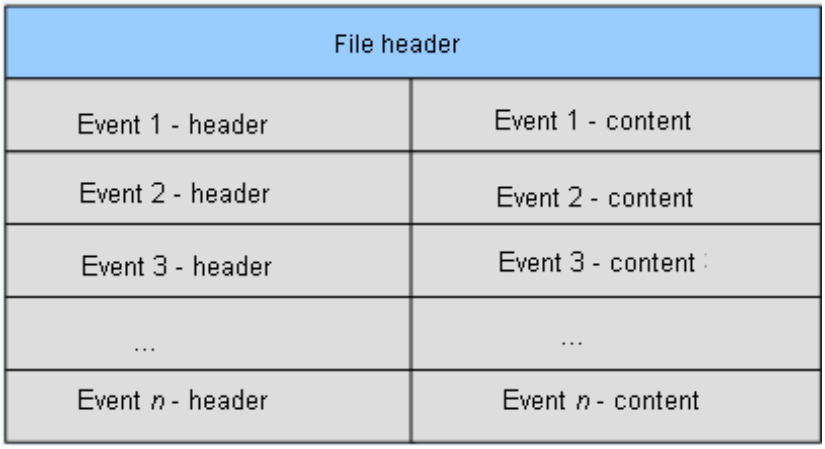
- If the NE does not report the new data file for at least 30 minutes or the Trace Server services stop, NE northbound result files are also generated.
- If the NE identifier has been modified, northbound result files are also generated.
- If the time sequence of files collected by Trace Server is incorrect, the out-of-order files are independently exported to generate northbound trace result files to ensure that contents of the northbound trace result files are properly arranged. In the name of a northbound result file, the start time is the time in the name of an out-of-order file, and the end time is the start time plus the file generation period.

2.5 Formats of MDT Data Northbound Result Files

This section describes the formats of northbound result files.

An LTE northbound trace result file consists of the header and body, as shown in Figure 2-1. File headers provide file information. File bodies consist of all events reported by NEs. Each event consists of the event header and event content.

Figure 2-1 Format of LTE northbound result files



Header Format of MDT Data Northbound Files

Table 2-2 Header format of LTE MDT Data northbound files

Field	Data Type and Length	Description
Data Version	-	File format version
>Main Version	UINT8	Main version
>Sub Version	UINT8	Sub-version
Spare	OCTET STRING (30)	Spare

NOTE

- > preceding a field indicates that this field is a subfield. For example, if seven fields **A**, **>B**, **>C**, **>>D**, **>>E**, **>F**, and **G** are available in a file in sequence, fields **B**, **C**, and **F** are the subfields of field **A** and fields **D** and **E** are the subfields of subfield **C**.
- In fields, invalid bytes are filled with **FF**, and invalid bits are filled with **0**.

Format of an LTE MDT Data Northbound Event Header

Table 2-3 Format of an LTE MDT data northbound event header

Field	Data Type and Length	Description	Earliest NE Matching Version
Event ID	UINT16	Event ID	SRAN11.1 Pico 11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
Event Length	UINT32	Event length, excluding lengths of **Event ID** and **Event Length**	SRAN11.1 Pico 11.1
eNodeB ID	UINT32	eNodeB identifier.	SRAN11.1 Pico 11.1
Cell ID	UINT8	Cell ID Invalid value: all Fs. For example, the value of this field is invalid for base station events or cell events.	SRAN11.1 Pico 11.1
Call ID	UINT32	Call ID Invalid value: all Fs For example, the value of this field is invalid for base station events.	SRAN11.1 Pico 11.1
Date Time	-	Time when an event is triggered UTC time	SRAN11.1 Pico 11.1
>Year	UINT8	Difference between the current year and the year 2000	SRAN11.1 Pico 11.1
>Month	UINT8	Month Value range: 1 to 12	SRAN11.1 Pico 11.1
>Day	UINT8	Day Value range: 1 to 31	SRAN11.1 Pico 11.1
>Hour	UINT8	Hour Value range: 0 to 23	SRAN11.1 Pico 11.1
>Minute	UINT8	Minute Value range: 0 to 59	SRAN11.1 Pico 11.1
>Second	UINT8	Second Value range: 0 to 59	SRAN11.1 Pico 11.1
>Millisecond	UINT16	Millisecond Value range: 0 to 999 The value is **0** for events accurate to	SRAN11.1 Pico 11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		seconds.	
Extend Head Length	UINT8	Extension header length	-
Item Type	BIT STRING (4)	Event type. • 0000: undefine • 0001: FDD • 0010: TDD • 0101: NB-IoT • 1111: Common	SRAN13.1
Reserved	BIT STRING (4)	reserved	-
C-RNTI	UINT16	C-RNTI Invalid value: all Fs. For example, the value of this field is invalid for base station events or cell events.	SRAN11.1 Pico 12.0

NOTICE

System Capacity Impact When independent MDT is enabled, reporting MDT data increases air interface resource consumption, and increases the CPU usage of boards by up to 5%.

Network Performance

- After independent MDT is enabled, intra-frequency or inter-frequency MDT measurement events may conflict with handover measurement events. As a result, the access success rate and the handover success rate decrease by not more than 0.5%.
- Inter-frequency measurement causes UEs to enter the GAP state, and some subframes will be temporarily unable to be adjusted, slightly decreasing the average cell throughput.

If NE-reported data contains the incorrect year, month, and day, the year, month, and day are 0-1-1 in the northbound analysis result. If NE-reported data contains the incorrect hour, minute, and second, the hour, minute, and second are 23-59-59 in the northbound analysis result. You are advised to prevent data analysis problems caused by data errors.

Formats of LTE MDT Data Event Content

Table 2-4 Content format of the Public Info (0x1001) event

Field	Data Type and Length	Description	Earliest NE Matching Version
GUTI	-	GUTI	SRAN11.1 Pico 11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
>GUMMEI	-	Globally unique MMF identifier See 3GPP TS 36.413 GUMMEI.	SRAN11.1 Pico 11.1
>>PLMN ID	For details, see Table 2-5.	PLMN identifier. PLMN identifier Invalid value: all Fs For example, the value of this field is invalid if RRC setup fails.	SRAN11.1 Pico 11.1
>>MME Group ID	UINT16	MME group identifier. PLMN identifier Invalid value: all Fs For example, the value of this field is invalid if RRC setup fails.	SRAN11.1 Pico 11.1
>>MME Code	UINT8	MME code Invalid value: all Fs For example, the value of this field is invalid if RRC setup fails.	SRAN11.1 Pico 11.1
>M-TMSI	UINT32	M-TMSI Invalid value: all Fs. For example, the value of this field is invalid if a UE reports a random number as the initial UE ID. After the anonymization function is enabled, the output is all 0s. See 3GPP TS 36.413 S-TMSI: M-TMSI.	SRAN11.1 Pico 11.1
S1AP ID	-	S1AP identifier	SRAN11.1 Pico 11.1
>MME UE S1AP ID	UINT32	UE S1AP identifier allocated by the MME.	SRAN11.1 Pico 11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		Invalid value: all Fs For example, the value of this field is invalid if RRC setup fails. See 3GPP TS 36.413 MME UE S1AP ID.	
>eNodeB UE SIAP ID	UINT32	UE S1AP identifier allocated by the eNodeB. Invalid value: all Fs For example, the value of this field is invalid if RRC setup fails. See 3GPP TS 36.413 eNB UE S1AP ID.	SRAN11.1 Pico 11.1

Table 2-5 Format of the PLMN Format 1 event content

Field	Data Type and Length	Description	Earliest NE Matching Version
PLMN ID Reserved	OCTET STRING (1)	Reserved PLMN identifier	SRAN11.1 Pico 11.1
PLMN ID	R-BCD (3)	PLMN identifier. For example: If MCC is 123 and MNC is 45, the value of this field is 21F354. If MCC is 123 and MNC is 456, the value of this field is 214365. Invalid value: **FFFFFFFF** See 3GPP TS 36.413 9.2.3.8.	SRAN11.1 Pico 11.1

Table 2-6 Table 2-7 Format of the UE Period TA MDT (0x1212) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
TA Value	UINT32	TA value Value range: 0 to 20512 Unit: Ts See 3GPP TS 36.133 Timing Advance (TADV): Type 2. If ucTaFlag is not 1 or ulTaValue is 7FFFFFFF, events are not reported.	SRAN11.1

Table 2-7 Table 2-8 Format of the PRIVATE CELL TRAFFIC TRACE (0x1301) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
S1AP ID	-	S1AP identifier	SRAN11.1 Pico 11.1
>MME UE S1AP ID	UINT32	UE S1AP identifier allocated by the MME. See 3GPP TS 36.413 MME UE S1AP ID.	SRAN11.1 Pico 11.1
>eNodeB UE SIAP ID	UINT32	UE S1AP identifier allocated by the eNodeB. See 3GPP TS 36.413 eNB UE S1AP ID.	SRAN11.1 Pico 11.1
Trace ID	UINT32	Trace identifier. See 3GPP TS 32.422 Trace Reference: Trace ID.	SRAN11.1 Pico 11.1
TRSR	UINT16	TRSR See 3GPP TS 32.422 Trace Recording Session Reference.	SRAN11.1 Pico 11.1

Table 2-8 Format of the M1 Intra-Freq MDT (0x1302) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
Measurement ID	UINT8	Measurement identifier. Value range: 1 to 32 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 MeasId.	SRAN11.1
Serving Cell RSRP	UINT8	RSRP of the serving cell Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
Serving Cell RSRQ	UINT8	Indicates RSRQ of a serving cell. Value range: 0 to 34 Invalid value: **FFFFFFFF** For details, see section "RSRQ-Range" in 3GPP TS 36.331.	SRAN11.1
Serving Cell SINR	UINT8	SINR of the serving cell Value range: 0-127 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 SINR-Range.	SRAN13.0
NCell Count	UINT8	Number of neighboring cells. Value range: 0 to 8	SRAN11.1
NCell Info List	-	Neighboring cell information list.	SRAN11.1
>PCI	UINT16	PCI Value range: 0 to 503 Invalid value:	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		FFFFFFFF For details, see section "PhysCellId" in 3GPP TS 36.331.	
>RSRP	UINT8	RSRP Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
>RSRQ	UINT8	RSRQ Value range: 0 to 34 Invalid value: **FFFFFFFF** For details, see section "RSRQ-Range" in 3GPP TS 36.331.	SRAN11.1
>SINR	UINT8	SINR SINR of the serving cell Value range: 0-127 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 SINR-Range.	SRAN13.0
Location Info Present	UINT8	Indicator for Location Info presence. 0: not exist 1: exist	SRAN11.1
Location Info	For details, see Table 2-23.	Location information.	SRAN11.1

Table 2-9 Format of the M1 Inter-Freq MDT (0x1303) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
Measurement ID	UINT8	Measurement	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		identifier. Value range: 1 to 32 Invalid value: **FFFFFFFF** See 3GPP TS 32.331 MeasId.	
Serving Cell RSRP	UINT8	Indicates RSRP of a serving cell. Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
Serving Cell RSRQ	UINT8	Indicates RSRQ of a serving cell. Value range: 0 to 34 Invalid value: **FFFFFFFF** For details, see section "RSRQ-Range" in 3GPP TS 36.331.	SRAN11.1
Serving Cell SINR	UINT8	SINR of the serving cell Value range: 0-127 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 SINR-Range.	SRAN13.0
NCell Count	UINT8	Number of neighboring cells. Value range: 0 to 8	SRAN11.1
NCell Info List	-	Neighboring cell information list.	SRAN11.1
>Cell ID	UINT32	Cell identifier, consisting of the eNodeB ID (the most significant three bytes) and cell ID (the least significant one	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		byte).	
>PCI	UINT16	PCI Value range: 0 to 503 Invalid value: **FFFFFFFF** For details, see section "PhysCellId" in 3GPP TS 36.331.	SRAN11.1
>Carrier Frequency	UINT32	Carrier.	SRAN11.1
>RSRP	UINT8	RSRP Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
>RSRQ	UINT8	RSRQ Value range: 0 to 34 Invalid value: **FFFFFFFF** For details, see section "RSRQ-Range" in 3GPP TS 36.331.	SRAN11.1
>SINR	UINT8	SINR of the serving cell Value range: 0-127 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 SINR-Range.	SRAN13.0
Location Info Present	UINT8	Indicator for Location Info presence. 0: not exist 1: exist	SRAN11.1
Location Info	For details, see Table 2-23.	Location information.	SRAN11.1

Table 2-10 Format of the M1 A2 MDT (0x130A) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
Measurement ID	UINT8	Measurement identifier. Value range: 1 to 32 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 MeasId.	SRAN11.1
Serving Cell RSRP	UINT8	Indicates RSRP of a serving cell. Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
Serving Cell RSRQ	UINT8	Indicates RSRQ of a serving cell. Value range: 0 to 34 Invalid value: **FFFFFFFF** For details, see section "RSRQ-Range" in 3GPP TS 36.331.	SRAN11.1
Location Info Present	UINT8	Indicator for Location Info presence. 0: not exist 1: exist	SRAN11.1
Location Info	For details, see Table 2-23.	Location information.	SRAN11.1

Table 2-11 Format of the M2 MDT (0x1304) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
UE PHR	UINT8	UE power headroom. Value range: 0 to 63	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		Invalid value: **FFFFFFFF** See 3GPP TS 36.213 Power Headroom.	
UL CA Flag	BIT STRING (1)	Whether the uplink CA is configured 0: unconfigured 1: configured	SRAN12.1
Reserved	BIT STRING (7)	reserved bit	-
CA Property	UINT8	Carrier aggregation attribute. 0: NON CA (non-CA UE) 1: CA PCELL (primary serving cell for CA UEs) 2: CA SCELL1 (secondary serving cell 1 for CA UEs) 3: CA SCELL2 (secondary serving cell 2 for CA UEs) 4: CA SCELL3 (secondary serving cell 3 for CA UEs) 5: CA SCELL4 (secondary serving cell 4 for CA UEs) 6: CA SCELL NO ACTIVE (inactive secondary serving cell configuration for CA UEs) Invalid value: **FFFFFFFF**	SRAN11.1

NOTE

Date Time in the header of an event of this type is accurate to seconds.

Table 2-12 Table 2-13 Format of the M2-Ext MDT (0x1321) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
UL Retrans Error Number	UINT32	Number of transmission failures after the maximum number of uplink retransmissions is reached	SRAN11.1
UL CRC Init Trans Total Number	UINT32	Number of initial CRC transmissions	SRAN11.1
DL Retrans Error Number	UINT32	Number of transmission failures after the maximum number of downlink retransmissions is reached	SRAN11.1
DL Code0 Init Trans Total Numer	UINT32	Total number of times that downlink code word 0, including the ACK, NAK, and DTX, is initially transmitted.	SRAN11.1
DL Code1 Init Trans Total Number	UINT32	Total number of times that downlink code word 0, including the ACK, NAK, and DTX, is initially transmitted.	SRAN11.1
UL RB Used Numer	UINT32	Uplink Used RB Num	SRAN11.1
DL RB Used Numer	UINT32	Downlink Used RB Num	SRAN11.1
DL Wideband CQI Code 0	UINT8	Downlink full bandwidth CQI (code 0) Value range: 0, 15 Invalid value: **FFFFFFFF**	SRAN11.1
DL Wideband CQI Code 1	UINT8	Downlink full bandwidth CQI (code 1) Value range: 0, 15 Invalid value: **FFFFFFFF**	SRAN11.1
RANK Indication	UINT8	Rank indicator Value range: 0 to 3 Invalid value: **FFFFFFFF**	SRAN11.1

NOTE

- Date Time in the header of an event of this type is accurate to seconds.
- Downlink BLER = DL Retrans Error Number/(DL Code0 Init Trans Total Number + DL Code1 Init Trans Total Number) and Uplink BLER = UL Retrans Error Number/UL CRC Init Trans Total Number

Table 2-13 Format of the M3 MDT (0x1305) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
Carrier Freq	UINT32	Carrier.	SRAN11.1
Cell Combination Info	-	Cell combination information. Invalid value: all Fs For example, the value of this field is invalid in non-SFN and non-LampSite scenarios.	SRAN11.1
>eNodeB ID	UINT32	eNodeB identifier. Invalid value: **FFFFFFFF**	SRAN11.1
>Sector Equipment (Group) Flag	UINT8	Sector equipment flag or sector equipment group flag. 0: Sector equipment 1: Sector equipment group Invalid value: **FFFFFFFF**	SRAN11.1
>Sector Equipment (Group) ID	UINT16	Sector equipment identifier or sector equipment group identifier. Invalid value: **FFFFFFFF**	SRAN11.1
Noise SubFrame Number	UINT8	Number of the subframe reporting interference. Value range: 0~99 Invalid value: **FFFFFFFF**	SRAN11.1
PRB Count	UINT8	Number of PRBs. Value range: 0 to 100	SRAN11.1
PRB Info List	-	PRB information list.	SRAN11.1
>PRB Index	UINT8	PRB index. Value range: 0~99 Invalid value:	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		FFFFFFFF	
>PRB Noise	UINT16	PRB interference value. Value range: 0–511 Invalid value: **FFFFFFFF** See 3GPP TS 36.133 Received Interference Power measurement report mapping.	SRAN11.1

NOTE

- Date Time in the header of an event of this type is accurate to seconds.
- The M3 MDT event is a cell-level event, and the others are the call-level events

Table 2-14 Format of the M4 MDT (0x1306) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
E-RAB Count	UINT8	Number of E-RABs. Value range: 0 to 8	SRAN11.1
E-RAB Throughput Stat List	-	E-RAB throughput statistics list.	SRAN11.1
>E-RAB ID	UINT8	E-RAB identifier. Value range: 0-15 See 3GPP TS 36.413 E-RAB ID.	SRAN11.1
>QCI	UINT8	QCI. See 3GPP TS 36.413 QCI.	SRAN11.1
>UL Data Volume	UINT32	Uplink PDCP SDU throughput. Unit: byte	SRAN11.1
>DL Data Volume	UINT32	Downlink PDCP PDU throughput. Unit: byte	SRAN11.1

NOTE

Date Time in the header of an event of this type is accurate to seconds.

Table 2-15 Format of the M5 MDT (0x1307) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
UL Data Volume per UE	UINT32	Uplink PDCP PDU throughput (excluding the last TTI) Unit: byte	SRAN11.1
UL Data Volume of Last TTI per UE	UINT32	Uplink throughput of the last TTI. Unit: byte	SRAN11.1
UL Data Transmission Time per UE	UINT32	Uplink data transmission duration (excluding the last TTI) Unit: ms	SRAN11.1
DL Data Volume per UE	UINT32	Downlink PDCP PDU throughput (excluding the last TTI) Unit: byte	SRAN11.1
DL Data Volume of Last TTI per UE	UINT32	Downlink throughput of the last TTI. Unit: byte	SRAN11.1
DL Data Transmission Time per UE	UINT32	Downlink data transmission duration (excluding the last TTI) Unit: ms	SRAN11.1
E-RAB Count	UINT8	Number of E-RABs. Value range: 0 to 8	SRAN11.1
E-RAB Throughput Statistic List	-	E-RAB throughput statistics list.	SRAN11.1
>E-RAB ID	UINT8	E-RAB identifier. Value range: 0-15 See 3GPP TS 36.413 E-RAB ID.	SRAN11.1
>QCI	UINT8	QCI	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		See 3GPP TS 36.413 QCI.	
>UL Data Volume per E-RAB	UINT32	Uplink PDCP PDU throughput. Unit: byte	SRAN11.1
>UL Data Transmission Time per E-RAB	UINT32	Uplink data transmission duration. Unit: ms	SRAN11.1
>DL Data Volume per E-RAB	UINT32	Downlink PDCP PDU throughput (excluding the last TTI) Unit: byte	SRAN11.1
>DL Data Transmission Time per E-RAB	UINT32	Downlink data transmission duration (excluding the last TTI) Sampling period: ms	SRAN11.1
UL Data Transmission Time of Last TTI per UE	UINT32	Uplink data transmission duration during the last TTI Unit: ms	SRAN11.1
DL Data Transmission Time of Last TTI per UE	UINT32	Uplink data transmission duration during the last TTI Unit: ms	SRAN11.1

NOTE

Date Time in the header of an event of this type is accurate to seconds.

Table 2-16 Format of the M5-Ext MDT (0x1322) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
UL MCS	UINT32	Average uplink MCS Value range: 0 to 31 Invalid value: **FFFFFFFF**	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
DL MCS	UINT32	Avg DL MCS Value range: 0 to 31 Invalid value: **FFFFFFFF**	SRAN11.1

NOTE

Date Time in the header of an event of this type is accurate to seconds.

Table 2-17 Format of the M6 UL MDT (0x1312) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
QCI Count	UINT8	Number of QCIs. Value range: 1 to 6 If maxQCI is 0, events are not recorded.	SRAN13.0
UL PDCP Delay Result List	-	List of uplink PDCP delays See 3GPP TS 36.331 UL-PDCP-DelayResult-r13.	SRAN13.0
>QCI ID	UINT8	Indicates the QCI. Value range: 0 to 3 Invalid value: **FFFFFFFF**	SRAN13.0
>Excess Delay	UINT8	Additional delay Value range: 0 to 31 Invalid value: **FFFFFFFF**	SRAN13.0
Location Info Present	UINT8	Indicator for Location Info presence. 0: not exist 1: exist	SRAN13.0
Location Info	For details, see Table 2-23.	Location information.	SRAN13.0

NOTE

Date Time in the header of an event of this type is accurate to seconds.

Table 2-18 Format of the M6 DL MDT (0x1313) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
E-RAB Count	UINT8	Number of E-RABs. Value range: 0 to 8	SRAN13.0
DL PDCP Delay Result List	-	List of downlink PDCP delays	SRAN13.0
>QCI	UINT8	QCI See 3GPP TS 36.413 QCI.	SRAN13.0
>DL Data Transmission Time	UINT32	Downlink data transmission duration (excluding the last TTI) Unit: ms	SRAN13.0
>DL Data Transmission Time of Last TTI	UINT32	Downlink data transmission duration during the last TTI Unit: ms	SRAN13.0
>DL PDCP SDU Num	UINT32	Total number of PDCP SDUs	SRAN13.0

NOTE

Date Time in the header of an event of this type is accurate to seconds.

Table 2-19 Format of the M7 MDT (0x1314) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
QCI Count	UINT8	Number of QCIs. Value range: 1 to 9	SRAN11.1
Packet Loss Info List	-	Packet loss information List.	SRAN11.1
>QCI	UINT8	QCI See 3GPP TS 36.413 QCI.	SRAN11.1
>DL Packet Total	UINT32	Total number of downlink PDCP SDUs. See 3GPP TS 36.314 4.1.5.2.	SRAN11.1
>DL Uu Packet Loss	UINT32	Number of PDCP SDUs lost over downlink air interfaces. For details, see 3GPP TS 36.314 4.1.5.2.	SRAN11.1
>DL PDCP Packet	UINT32	Number of PDCP SDUs lost over	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
Loss		downlink air interfaces. For details, see 3GPP TS 36.314 4.1.5.1.	
>UL Packet Total	UINT32	Total number of uplink PDCP SDUs. For details, see 3GPP TS 36.314 4.1.5.3.	SRAN11.1
>UL Packet Loss	UINT32	Number of PDCP SDUs lost over uplink interfaces. For details, see 3GPP TS 36.314 4.1.5.3.	SRAN11.1

NOTE

- Date Time in the header of an event of this type is accurate to seconds.
- If bitMDTUser is 1, events are recorded. If bitMDTUser is 0, recorded events are discarded.

Table 2-20 Format of the RLF Report MDT (0x1308) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
Serving Cell RSRP	UINT8	Indicates RSRP of a serving cell. Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
Serving Cell RSRQ	UINT8	Indicates RSRQ of a serving cell. Value range: 0 to 34 Invalid value: **FFFFFFFF** For details, see section "RSRQ-Range" in 3GPP TS 36.331.	SRAN11.1
Failed PCell Info	-	Failed primary cell information	SRAN11.1
>Cell Type	UINT8	Cell type.	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		1: Global Cell ID **2**: PCI-ARFCN Invalid value: **FFFFFFFF**	
>Global Cell ID	-	Global cell ID (available only when Cell Type is 1).	SRAN11.1
>>PLMN ID	For details, see Table 2-5.	PLMN identifier.	SRAN11.1
>>Cell ID	UINT32	Cell identifier, consisting of the eNodeB ID (the most significant three bytes) and cell ID (the least significant one byte).	SRAN11.1
>PCI ARFCN Info	-	PCI AFRCN information (available only when Cell Type is 2).	SRAN11.1
>>PCI	UINT16	PCI Value range: 0 to 503 Invalid value: **FFFFFFFF** For details, see section "PhysCellId" in 3GPP TS 36.331.	SRAN11.1
>>Carrier Frequency	UINT32	Carrier.	SRAN11.1
ReestablishmentCell ID	-	Identifier of the cell where reestablishment is attempted	SRAN11.1
>PLMN ID	For details, see Table 2-5.	PLMN identifier.	SRAN11.1
>Cell ID	UINT32	Cell identifier, consisting of the eNodeB ID (the most significant	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		three bytes) and cell ID (the least significant one byte).	
Time Connection Failure	UINT16	This field is used to indicate the time elapsed since the last HO initialization until connection failure. Actual value = IE value * 100ms. The maximum value 1023 means 102.3s or longer Invalid value: **FFFFFFFF** See 3GPP TS 36.331 UEInformationResponse: timeConnFailure.	SRAN11.1
Connection Failure Type	UINT8	Connection failure type. **0**: Radio Link Failure **1**: HO Failure Invalid value: **FFFFFFFF** See 3GPP TS 36.331 6.2.2 UEInformationResponse: connectionFailureType.	SRAN11.1
Previous PCell ID	-	Identifier of the previous primary cell before a failure	SRAN11.1
>PLMN ID	For details, see Table 2-5.	PLMN identifier.	SRAN11.1
>Cell ID	UINT32	Cell identifier, consisting of the eNodeB ID (the most significant three bytes) and cell ID (the least significant one	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		byte).	
EUTRAN NCell MR Valid Flag	UINT8	Whether the measurement report of an E-UTRAN neighboring cell is valid. 0: Invalid 1: Valid	SRAN11.1
EUTRAN Carrier Frequency Count	UINT8	Number of E-UTRAN carriers. Value range: 0 to 8	SRAN11.1
EUTRAN Carrier Frequency List	-	E-UTRAN carrier list.	SRAN11.1
>ARFCN	UINT32	ARFCN. See 3GPP TS 36.331 ARFCN-ValueEUTRA.	SRAN11.1
>NCell Count	UINT8	Number of neighboring list. Value range: 0 to 8	SRAN11.1
>NCell Info List	-	Neighboring cell information list.	SRAN11.1
>>PCI	UINT16	PCI Value range: 0 to 503 Invalid value: **FFFFFFFF** For details, see section "PhysCellId" in 3GPP TS 36.331.	SRAN11.1
>>RSRP	UINT8	RSRP Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
>>RSRQ	UINT8	RSRQ Value range: 0 to	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		34. Invalid value: **FFFFFFFF** For details, see section "RSRQ-Range" in 3GPP TS 36.331.	
Utran NCell MR Valid Flag	UINT8	Whether the measurement report of a UTRAN neighboring cell is valid. 0: Invalid 1: Valid	SRAN11.1
UTRAN Carrier Frequency Count	UINT8	Number of UTRAN carriers. Value range: 0 to 8	SRAN11.1
UTRAN Carrier Frequency List	-	UTRAN carrier list.	SRAN11.1
>DL ARFCN	UITN16	Downlink ARFCN Value range: 0 to 16383. See 3GPP TS 36.331 ARFCN-ValueUTRA.	SRAN11.1
>NCell Count	UINT8	Number of neighboring cells. Value range: 0 to 8	SRAN11.1
>NCell Info List	-	-	SRAN11.1
>>PCI	UINT16	PCI Value range: 0 to 511 Invalid value: **FFFFFFFF**	SRAN11.1
>>RSCP	INT8	RSCP: Value range: -5 to 91 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 utra-RSCP.	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
>>EcNo	UINT8	Ec/No: Value range: 0-49 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 utra-EcNo.	SRAN11.1
GERAN NCell MR Valid Flag	UINT8	Whether the measurement report of a GERAN neighboring cell is valid. 0: Invalid 1: Valid	SRAN11.1
GERAN NCell Count	UINT8	Number of GERAN neighboring cells Value range: 0 to 8	SRAN11.1
GERAN NCell Info List	-	GERAN neighboring cell information list	SRAN11.1
>Network Colour Code	UINT8	Network color code. Value range: 0-7 Invalid value: **FFFFFFFF** see 3GPP TS 36.331 PhysCellIdGERAN: networkColourCode.	SRAN11.1
>Base Station Colour Code	UINT8	Base station color code. Value range: 0-7 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 PhysCellIdGERAN: baseStationColourCode.	SRAN11.1
>ARFCN	UINT16	ARFCN. Value range: 0-1023. See 3GPP TS 36.331 ARFCN-ValueGER	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		AN.	
>Band Indicator	UINT8	Band indicator. **0**: DCS1800 **1**: PCS1900 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 BandIndicatorGERAN.	SRAN11.1
>RSSI	UINT8	Received signal strength indicator (RSSI). Value range: 0 to 63 Invalid value: **FFFFFFFF**	SRAN11.1
CDMA2000 NCell MR Valid Flag	UINT8	Whether the measurement report of a CDMA2000 neighboring cell is valid. 0: Invalid 1: Valid	SRAN11.1
Cdma2000 Carrier Frequency Count	UINT8	Number of CDMA2000 carriers. Value range: 0 to 8	SRAN11.1
Cdma2000 Carrier Frequency List	-	CDMA2000 carrier list.	SRAN11.1
>ARFCN	UINT16	ARFCN. Value range: 0–2047 See 3GPP TS 36.331 ARFCN-ValueCDMA2000.	SRAN11.1
>Band Class	UINT8	Band class. For details, see 3GPP TS 36.331 BandclassCDMA2000.	SRAN11.1
>NCell Count	UINT8	Number of	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		neighboring cells. Value range: 0 to 8	
>NCell Info List	-	-	SRAN11.1
>>PCI	UINT16	PCI Value range: 0 to 511 Invalid value: **FFFFFFFF**	SRAN11.1
>>Pilot PN Phase	UINT16	Pilot PN phase. Value range: 0-32767 See 3GPP TS 36.331 MeasResults: pilotPnPhase.	SRAN11.1
>>Pilot Strength	UINT8	Pilot signal strength. Value range: 0 to 63 See 3GPP TS 36.331 MeasResults: pilotStrength	SRAN11.1
Location Info Present	UINT8	Indicator for Location Info presence. 0: not exist 1: exist	SRAN11.1
Location Info	For details, see Table 2-23.	Location information.	SRAN11.1

Table 2-21 Format of the RCEF Report MDT (0x1309) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
Failed Cell ID	UINT32	Cell identifier, consisting of the eNodeB ID (the most significant three bytes) and cell ID (the least significant one byte).	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
Serving Cell RSRP	UINT8	Indicates RSRP of a serving cell. Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
Serving Cell RSRQ	UINT8	Indicates RSRQ of a serving cell. Value range: 0 to 34 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 RSRQ-Range.	SRAN11.1
Number of Preambles Sent	UINT8	Number of preamble transmissions. Value range: 0 to 200 Invalid value: **FFFFFFFF**	SRAN11.1
Contention Detected Flag	UINT8	Whether contention-based access is detected. 0: Not detected 1: Detected Invalid value: **FFFFFFFF**	SRAN11.1
Max Tx Power Reached Flag	UINT8	Whether the maximum TX power is reached. 0: Not reached 1: Reached Invalid value: **FFFFFFFF**	SRAN11.1
Time from Failure	UINT32	Time difference between the access failure and the measurement. Value range: 0 to 172800	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		Invalid value: **FFFFFFFF**	
EUTRAN NCell MR Valid Flag	UINT8	Whether the measurement report of an E-UTRAN neighboring cell is valid. 0: Invalid 1: Valid	SRAN11.1
EUTRAN Carrier Frequency Count	UINT8	Number of E-UTRAN carriers. Value range: 0 to 8	SRAN11.1
EUTRAN Carrier Frequency List	-	E-UTRAN carrier list.	SRAN11.1
>ARFCN	UINT32	ARFCN. See 3GPP TS 36.331 ARFCN-ValueEUTRA.	SRAN11.1
>NCell Count	UINT8	Number of neighboring cells. Value range: 0 to 8	SRAN11.1
>NCell Info List	-	-	SRAN11.1
>>PCI	UINT16	PCI Value range: 0 to 503 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 PhysCellId.	SRAN11.1
>>RSRP	UINT8	RSRP Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
>>RSRQ	UINT8	RSRQ Value range: 0 to 34. Invalid value:	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		FFFFFFFF See 3GPP TS 36.331 RSRQ-Range.	
Utran NCell MR Valid Flag	UINT8	Whether the measurement report of a UTRAN neighboring cell is valid. 0: Invalid 1: Valid	SRAN11.1
UTRAN Carrier Frequency Count	UINT8	Number of UTRAN carriers. Value range: 0 to 8	SRAN11.1
UTRAN Carrier Frequency List	-	UTRAN carrier list.	SRAN11.1
>DL ARFCN	UITN16	UARFCN-DOWNLINK Value range: 0 to 16383. See 3GPP TS 36.331 ARFCN-ValueUTRA.	SRAN11.1
>NCell Count	UINT8	Number of neighboring cells. Value range: 0 to 8	SRAN11.1
>NCell Info List	-	-	SRAN11.1
>>PCI	UINT16	PCI Value range: 0 to 511 Invalid value: **FFFFFFFF**	SRAN11.1
>>RSCP	INT8	RSCP: Value range: -5 to 91 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 utra-RSCP.	SRAN11.1
>>EcNo	UINT8	Ec/No:	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		Value range: 0-49 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 utra-EcNo.	
GERAN NCell MR Valid Flag	UINT8	Whether the measurement report of a GERAN neighboring cell is valid. 0: Invalid 1: Valid	SRAN11.1
GERAN NCell Count	UINT8	Number of GERAN neighboring cells. Value range: 0 to 8	SRAN11.1
GERAN NCell Info List	-	GERAN neighboring cell information list	SRAN11.1
>Network Colour Code	UINT8	Network color code. Value range: 0 to 7 Invalid value: **FFFFFFFF** see 3GPP TS 36.331 PhysCellIdGERAN: networkColourCode.	SRAN11.1
>Base Station Colour Code	UINT8	Base station color code. Data Range:0-7 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 PhysCellIdGERAN: baseStationColourCode.	SRAN11.1
>ARFCN	UINT16	ARFCN. Value range: 0-1023. See 3GPP TS 36.331 ARFCN-ValueGERAN.	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
>Band Indicator	UINT8	Band indicator. **0**: DCS1800 **1**: PCS1900 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 BandIndicatorGERAN.	SRAN11.1
>RSSI	UINT8	Received signal strength indicator (RSSI). Value range: 0 to 63 Invalid value: **FFFFFFFF**	SRAN11.1
CDMA2000 NCell MR Valid Flag	UINT8	Whether the measurement report of a CDMA2000 neighboring cell is valid. 0: Invalid 1: Valid	SRAN11.1
Cdma2000 Carrier Frequency Count	UINT8	Number of CDMA2000 carriers. Value range: 0 to 8	SRAN11.1
Cdma2000 Carrier Frequency List	-	CDMA2000 carrier list.	SRAN11.1
>ARFCN	UINT16	ARFCN. Value range: 0–2047 See 3GPP TS 36.331 ARFCN-ValueCDMA2000.	SRAN11.1
>Band Class	UINT8	Band class. See 3GPP TS 36.331 BandclassCDMA200.	SRAN11.1
>NCell Count	UINT8	Number of neighboring cells. Value range: 0 to 8	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
>NCell Info List	-	-	SRAN11.1
>>PCI	UINT16	PCI Value range: 0–511 Invalid value: **FFFFFFFF**	SRAN11.1
>>Pilot PN Phase	UINT16	Pilot PN phase. Value range: 0-32767 See 3GPP TS 36.331 MeasResults: pilotPnPhase.	SRAN11.1
>>Pilot Strength	UINT8	Pilot signal strength. Value range: 0 to 63 See 3GPP TS 36.331 MeasResults: pilotStrength.	SRAN11.1
Location Info Present	UINT8	Indicator for Location Info presence. 0: not exist 1: exist	SRAN11.1
Location Info	For details, see Table 2-23.	Location information.	SRAN11.1

Table 2-22 Format of the LOGGED MDT (0x1311) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
Serving Cell RSRP	UINT8	Indicates RSRP of a serving cell. Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
Serving Cell RSRQ	UINT8	Indicates RSRQ of a serving cell. Value range: 0 to 34	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		Invalid value: **FFFFFFFF** For details, see section "RSRQ-Range" in 3GPP TS 36.331.	
EUTRAN NCell Info Present	BIT STRING (1)	Indicator for EUTRAN NCell Info presence. 0: not exist 1: exist	SRAN11.1
UTRAN NCell Info Present	BIT STRING (1)	Indicator for UTRAN NCell Info presence. 0: not exist 1: exist	SRAN11.1
GERAN NCell Info Present	BIT STRING (1)	Indicator for GERAN NCell Info presence. 0: not exist 1: exist	SRAN11.1
CDMA2000 NCell Info Present	BIT STRING (1)	Indicator for CDMA2000 NCell Info presence. 0: not exist 1: exist	SRAN11.1
Trace Reference Present	BIT STRING (1)	Indicator for Trace Reference presence. 0: not exist 1: exist	SRAN11.1
bitSparePresent	BIT STRING (3)	-	SRAN11.1
EUTRAN NCell Info	-	E-UTRAN neighboring cell information.	SRAN11.1
>Carrier Frequency Count	UINT8	Number of carriers. Value range: 0 to 8	SRAN11.1
>Carrier Frequency List	-	Carrier list.	SRAN11.1
>>ARFCN	UINT32	ARFCN. See 3GPP TS 36.331	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		ARFCN-ValueEUTRA	
>>NCell Count	UINT8	Number of neighboring cells. Value range: 1 to 6	SRAN11.1
>>NCell Info List	-	Neighboring cell information list.	SRAN11.1
>>>PCI	UINT16	PCI Value range: 0 to 503 Invalid value: **FFFFFFFF** For details, see section "PhysCellId" in 3GPP TS 36.331.	SRAN11.1
>>>RSRP	UINT8	RSRP Value range: 0 to 97 Invalid value: **FFFFFFFF** For details, see section "RSRP-Range" in 3GPP TS 36.331.	SRAN11.1
>>>RSRQ	UINT8	RSRQ Value range: 0 to 34 Invalid value: **FFFFFFFF** For details, see section "RSRQ-Range" in 3GPP TS 36.331.	SRAN11.1
UTRAN NCell Info	-	UTRAN neighboring cell information.	SRAN11.1
>Carrier Frequency Count	UINT8	Number of carriers. Value range: 0 to 8	SRAN11.1
>Carrier Frequency List	-	Carrier list.	SRAN11.1
>>DL ARFCN	UINT16	UARFCN-DOWNLINK Value range: 0 to	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		16383. See 3GPP TS 36.331 ARFCN-ValueUTRA.	
>>NCell Count	UINT8	Number of neighboring cells. Value range: 1 to 3	SRAN11.1
>>NCell Info List	-	Neighboring cell information list.	SRAN11.1
>>>PCI	UINT16	PCI Value range: 0 to 511 Invalid value: **FFFFFFFF**	SRAN11.1
>>>RSCP	INT8	RSCP: Value range: -5 to 91 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 utra-RSCP.	SRAN11.1
>>>EcNo	UINT8	Ec/No: Value range: 0-49 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 utra-EcNo.	SRAN11.1
GERAN NCell Info	-	GERAN neighboring cell information.	SRAN11.1
>NCell Count	UINT8	Number of neighboring cells. Value range: 0 to 24	SRAN11.1
>>NCell Info List	-	Neighboring cell information list.	SRAN11.1
>>Network Colour Code	UINT8	Network color code. Value range: 0-7 Invalid value: **FFFFFFFF** see 3GPP TS 36.331	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		PhysCellIdGERAN: networkColourCode.	
>>Base Station Colour Code	UINT8	Base station color code. Value range: 0-7 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 PhysCellIdGERAN: baseStationColourCode.	SRAN11.1
>>ARFCN	UINT16	ARFCN. Value range: 0-1023. See 3GPP TS 36.331 ARFCN-ValueGERAN.	SRAN11.1
>>Band Indicator	UINT8	Band indicator. **0**: DCS1800 **1**: PCS1900 Invalid value: **FFFFFFFF** See 3GPP TS 36.331 BandIndicatorGERAN.	SRAN11.1
>>RSSI	UINT8	Received signal strength indicator (RSSI). Value range: 0 to 63 Invalid value: **FFFFFFFF**	SRAN11.1
CDMA2000 NCell Info	-	CDMA2000 neighboring cell information.	SRAN11.1
>Carrier Frequency Count	UINT8	Number of carriers. Value range: 0 to 8	SRAN11.1
>Carrier Frequency List	-	Carrier list.	SRAN11.1
>>ARFCN	UINT16	ARFCN.	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		Value range: 0–2047 See 3GPP TS 36.331 ARFCN-ValueCDMA2000.	
>>Band Class	UINT8	Band class. See 3GPP TS 36.331 BandclassCDMA200	SRAN11.1
>>NCell Count	UINT8	Number of neighboring cells. Value range: 1 to 3	SRAN11.1
>>NCell Info List	-	Neighboring cell information list.	SRAN11.1
>>>PCI	UINT16	PCI Value range: 0–511 Invalid value: **FFFFFFFF**	SRAN11.1
>>>Pilot PN Phase	UINT16	Pilot PN phase. Value range: 0 to 32767 See 3GPP TS 36.331 MeasResults: pilotPnPhase.	SRAN11.1
>>>Pilot Strength	UINT8	Pilot signal strength. Value range: 0 to 63 See 3GPP TS 36.331 MeasResults: pilotStrength.	SRAN11.1
Trace Reference	-	Trace reference.	SRAN11.1
>User PLMN ID	For details, see Table 2-5.	PLMN identifier used by a user.	SRAN11.1
>Trace PLMN ID	For details, see Table 2-5.	PLMN identifier in a measurement task.	SRAN11.1
>Trace ID	UINT32	Trace identifier. See 3GPP TS 32.422 Trace Reference: Trace ID.	SRAN11.1
>TRSR	UINT16	TRSR See 3GPP TS	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		32.422 Trace Recording Session Reference.	
Location Info Present	UINT8	Indicator for Location Info presence. 0: not exist 1: exist	SRAN11.1
Location Info	For details, see Table 2-23.	Location information.	SRAN11.1

Table 2-23 Format of the Location Info event field

Field	Data Type and Length	Description	Earliest NE Matching Version
Shape Type	UINT8	Shape type • **0**: Undefined • **1**: Ellipsoid Point • **2**: Ellipsoid Point With Altitude • **3**: Ellipsoid Point with uncertainty Circle • **4**: Ellipsoid Point with uncertainty Ellipse • **5:** Ellipsoid Point With Altitude And Uncertainty Ellipsoid	SRAN11.1
Undefined Info	-	Undefined information (available when Shape Type is set to 0)	SRAN11.1
>Latitude Sign	UINT8	Latitude sign. **0**: North **1**: South For details, see section "Ellipsoid-Point: latitudeSign" in	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		3GPP TS 36.355.	
>Degrees Of Latitude	UINT32	Latitude. Value range: 0 to 8388607. Invalid value: **FFFFFFFF** See 3GPP TS 36.355 Ellipsoid-Point: degreesLatitude.	SRAN11.1
>Degrees Of Longitude	INT32	Longitude. Value range: -8388608 to 8388607. Invalid value: **7FFFFFFF** See 3GPP TS 36.355 Ellipsoid-Point: degreesLatitude.	SRAN11.1
>Altitude Direction	UINT8	Altitude sign. **0**: Height **1**: Depth Invalid value: **FFFFFFFF** See 3GPP TS 36.355 EllipsoidPointWithAltitude: AltitudeSign.	SRAN11.1
>Altitude	UINT16	Height or depth. Value range: 0-32767 Invalid value: **FFFFFFFF** See 3GPP TS 36.355 EllipsoidPointWithAltitude: degreesLatitude.	SRAN11.1
>Uncertainty	UINT8	Roundness error. Value range: 0-127 Invalid value:	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		FFFFFFFF See 3GPP TS 36.355 Ellipsoid-PointWithUncertaintyCircle: uncertainty.	
Ellipsoid Point Info	-	Ellipsoid point information (available when **Shape Type** is set to **1**) See 3GPP TS 36.355 Ellipsoid-Point.	SRAN11.1
>Latitude Sign	UINT8	Latitude sign. **0**: North **1**: South Invalid value: **FFFFFFFF**	SRAN11.1
>Degrees Of Latitude	UINT32	Latitude. Value range: 0 to 8388607. Invalid value: **FFFFFFFF**	SRAN11.1
>Degrees Of Longitude	INT32	Longitude. Value range: -8388608 to 8388607.	SRAN11.1
Ellipsoid Point With Altitude Info	-	Ellipsoid point with altitude information (available when Shape Type is set to 2) See 3GPP TS 36.355 EllipsoidPointWithAltitude.	SRAN11.1
>Latitude Sign	UINT8	Latitude sign. **0**: North **1**: South Invalid value: **FFFFFFFF**	SRAN11.1 Pico 11.1
>Degrees Of	UINT32	Latitude.	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
Latitude		Value range: 0 to 8388607. Invalid value: **FFFFFFFF**	
>Degrees Of Longitude	INT32	Longitude. Value range: -8388608 to 8388607. Invalid value: **7FFFFFFF**	SRAN11.1
>Altitude Direction	UINT8	Altitude sign. 0: height 1: depth Invalid value: **FFFFFFFF**	SRAN11.1
>Altitude	UINT16	Height or depth. Value range: 0-32767	SRAN11.1
Ellipsoid Point with uncertainty Circle Info	-	Ellipsoid point with uncertainty circle information (available when Shape Type is set to 3) See 3GPP TS 36.355 Ellipsoid-PointWithUncertaintyCircle.	SRAN11.1
>Latitude Sign	UINT8	Latitude sign. **0**: North **1**: South Invalid value: **FFFFFFFF**	SRAN11.1
>Degrees Of Latitude	UINT32	Latitude. Value range: 0 to 8388607. Invalid value: **FFFFFFFF**	SRAN11.1
>Degrees Of Longitude	INT32	Longitude. Value range: -8388608 to 8388607.	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		Invalid value: **7FFFFFFF**	
>Uncertainty	UINT8	Roundness error. Value range: 0-127 Invalid value: **FFFFFFFF**	SRAN11.1
Ellipsoid Point with uncertainty Ellipse Info	-	Ellipsoid point with uncertainty ellipse information (available when **Shape Type** is set to **4**) See 3GPP TS 36.355 EllipsoidPointWithUncertaintyEllipse.	SRAN11.1
>Latitude Sign	UINT8	Latitude sign. **0**: North **1**: South Invalid value: **FFFFFFFF**	SRAN11.1
>Degrees Of Latitude	UINT32	Latitude. Value range: 0 to 8388607. Invalid value: **FFFFFFFF**	SRAN11.1
>Degrees Of Longitude	INT32	Longitude. Value range: -8388608 to 8388607. Invalid value: **7FFFFFFF**	SRAN11.1
>Uncertainty Semi-Major	UINT8	Semi-major axis error Value range: 0-127 Invalid value: **FFFFFFFF**	SRAN11.1
>Uncertainty Semi-Minor	UINT8	Semi-major axis error Value range: 0-127 Invalid value: **FFFFFFFF**	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
>Orientation Major Axis	UINT8	Major axis direction Value range: 0 to 179 Invalid value: **FFFFFFFF**	SRAN11.1
>Confidence	UINT8	Confidence Value range: 0 to 100 Invalid value: **FFFFFFFF**	SRAN11.1
Ellipsoid Point With Altitude And Uncertainty Ellipsoid Info	-	Ellipsoid point with altitude and uncertainty ellipsoid information (available when Shape Type is set to 5) See 3GPP TS 36.355 EllipsoidPointWithAltitudeAndUncertaintyEllipsoid.	SRAN11.1
>Latitude Sign	UINT8	Latitude sign. **0**: North **1**: South Invalid value: **FFFFFFFF**	SRAN11.1
>Degrees Of Latitude	UINT32	Latitude. Value range: 0 to 8388607. Invalid value: **FFFFFFFF**	SRAN11.1
>Degrees Of Longitude	INT32	Longitude. Value range: -8388608 to 8388607. Invalid value: **7FFFFFFF**	SRAN11.1
>Altitude Direction	UINT8	Altitude sign. **0**: Height **1**: Depth Invalid value:	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		FFFFFFFF	
>Altitude	UINT16	Height or depth. Value range: 0-32767 Invalid value: **FFFFFFFF**	SRAN11.1
>Uncertainty Semi-Major	UINT8	Semi-major axis error Value range: 0-127 Invalid value: **FFFFFFFF**	SRAN11.1
>Uncertainty Semi-Minor	UINT8	Semi-major axis error Value range: 0-127 Invalid value: **FFFFFFFF**	SRAN11.1
>Orientation Major Axis	UINT8	Major axis direction Value range: 0 to 179 Invalid value: **FFFFFFFF**	SRAN11.1
>Uncertainty Altitude	UINT8	Altitude error Value range: 0-127 Invalid value: **FFFFFFFF**	SRAN11.1
>Confidence	UINT8	Confidence Value range: 0 to 100 Invalid value: **FFFFFFFF**	SRAN11.1

Table 2-24 Table 2-24 Format of the UE Period SFN UL RSRP MDT (0x1323) event content

Field	Data Type and Length	Description	Earliest NE Matching Version
RRU Count	UINT8	Number of RRUs Value range: 0-15	SRAN11.1
MultiRRU InfoList	-	List of UE uplink RSRP values measured by the RRU for each	SRAN11.1

Field	Data Type and Length	Description	Earliest NE Matching Version
		physical cell	
>eNodeB ID	UINT32	eNodeB identifier.	SRAN11.1
>Cell ID	UINT16	Cell ID	SRAN11.1
>Sector Equipment (Group) Flag	UINT8	Sector equipment flag or sector equipment group flag. 0: Sector equipment 1: Sector equipment group Invalid value: **FFFFFFFF**	SRAN11.1
>Sector Equipment (Group) ID	UINT16	Sector equipment identifier or sector equipment group identifier. Invalid value: **FFFFFFFF**	SRAN11.1
>ULSRSRsrp	INT32	Uplink RS RSRP (instantaneous value) Value range: -15000 to -3000 Unit: 0.01 dBm	SRAN11.1

NOTE

- **Date Time** in the header of an event of this type is accurate to seconds.
- If **bitMDTUser** is **1**, events are recorded. If **bitMDTUser** is **0**, recorded events are discarded. If **RRU Count** is **0**, recorded events are discarded.

3 Managing Northbound Users in RAN Sharing Scenarios

About This Chapter

This section describes how to manage northbound users in RAN sharing scenarios. In such scenarios, multiple operators can share one radio access network (RAN). Northbound files reported by one NE contain northbound data from different operators. Trace Server identifies different operators according to the PLMN in the northbound files and saves generated northbound result files in different directories. Operators create specified northbound users to obtain required northbound result files in FTP mode.

3.1 Creating Northbound Users

This section describes how to create specified northbound users using the northbound user configuration tool, helping operators obtain required northbound result files.

Prerequisites

You have obtained passwords of users sopuser and ossuser on the MAE server (Trace Server co-deployed with the MAE-Access) or on the Trace Server (Trace Server independently deployed).

Context

- User name can contain 32 characters, including digits 0 to 9, lowercase letters a to z, uppercase letters A to Z, special characters underscores (-), and special characters underscores (_).

Procedure

Step 1 Use PuTTY to log in to the MAE master server (Trace Server co-deployed with the MAE-Access) or Trace Server master server (Trace Server independently deployed) in SSH mode as user sopuser.

Step 2 Run the following command to switch to the **root** user:

> **su - root**

```
Password: password for the root user
```

Step 3 Run the following commands to run the RAN sharing northbound user configuration tool:

\# **cd /opt/oss_sudobin_internal/oss/TSCollector/root/bin**

\# **bash setRANSharingUser.sh**

Step 4 When the following information is displayed, enter **B** or **b** and press **Enter**:

```
Please select an operation type.
A--Show the northbound user list.
B--Create a northbound user.
C--Reconfigure the password of northbound user.
D--Delete a northbound user or a single PLMN.
E--Set the RAN sharing switch.
F--Restart all Trace Server services.
Q--Exit
Please select:
```

Step 5 When the following information is displayed, enter the northbound user name and press **Enter**:

```
Please enter your user name.
```

Step 6 When the following information is displayed, enter the PLMN of the northbound user and press **Enter**:

```
Please enter your PLMN number.
```

Step 7 When the following information is displayed, choose **Yy** or **Nn** to determine whether northbound users need to access the public data and press **Enter**:

```
Are you sure you want to view common data? [Yy/Nn]:[default=Y]
```

Step 8 When the following information is displayed, enter the password of the northbound user and press **Enter**. You need to enter the new password twice.

```
Please enter password.
Please enter password again.
Changing password for Northbound user name
```

Step 9 If the following information is displayed, the RAN sharing northbound user has been created successfully. Otherwise, contact Huawei technical support.

```
User Northbound user name created successfully.
```

Step 10 Type **Q** or **q** and press **Enter** to exit the RAN sharing northbound user configuration tool.

Step 11 Add permissions for the new northbound user.

1. Use PuTTY to log in to the OSMU master node where Trace Server is installed as the **sopuser** user in SSH mode.

   NOTE

   If OSMU is deployed in cluster mode, perform the following operations only on OSMUM01.

2. Run the following command to switch to the **ossadm** user:

   > **su - ossadm**

   ```
   Password: password for the ossadm user
   ```

3. Run the following command to add permissions for the new northbound user:

   > **bash /opt/cloud/manager/tools/osconfigmgr/sshd_ipsadm.sh -type add_external_user -extuser** *northbound user name*

   NOTE

   Northbound user name is the user name entered in Step 5. Replace it as required.

----End

Follow-up Procedures

- If the PLMN needs to be separately added for created northbound users, repeat the operations from Step 1 to Step 6 and enter the PLMN to be added in Step 5. When the following information is displayed, the PLMN has been added successfully. Otherwise, contact Huawei technical support.

  ```
  The northbound user already exists.
  User Northbound user name created successfully.
  ```

- If access permissions of created northbound users on public data need to be changed, perform the operations from Step 1 to Step 6. Reconfigure the access permissions for northbound users in Step 6. When the following information is displayed, the permissions have been changed successfully. Otherwise, contact Huawei technical support.

  ```
  The northbound user already exists.
  User Northbound user name created successfully.
  ```

  NOTE

  After the access permissions of northbound users on public data are changed, you must log in to Trace Server again to make the change take effect.

3.2 Viewing Northbound Users

This section describes how to view created northbound users, their permissions, and PLMNs using the northbound user configuration tool.

Prerequisites

You have obtained passwords of users sopuser and ossuser on the MAE server (Trace Server co-deployed with the MAE-Access) or on the Trace Server (Trace Server independently deployed).

Procedure

Step 1 Use PuTTY to log in to the MAE master server (Trace Server co-deployed with the MAE-Access) or Trace Server master server (Trace Server independently deployed) in SSH mode as user sopuser.

Step 2 Run the following command to switch to the **root** user:

> **su - root**

```
Password: password for the root user
```

Step 3 Run the following commands to run the RAN sharing northbound user configuration tool:

cd /opt/oss_sudobin_internal/oss/TSCollector/root/bin

bash setRANSharingUser.sh

Step 4 When the following information is displayed, enter **A** or **a** and press **Enter** to view the created RAN sharing northbound users:

```
Please select an operation type.
A--Show the northbound user list.
B--Create a northbound user.
C--Reconfigure the password of northbound user.
D--Delete a northbound user or a single PLMN.
E--Set the RAN sharing switch.
F--Restart all Trace Server services.
Q--Exit
Please select:
```

Step 5 When information similar to the following is displayed, you can view created northbound users, their permissions to access public data, and PLMNs of all users:

```
-----------------------------------------------
Username    CommonData  PLMN
user1       Y           1111,22222,333333
user2       Y           44444
user3       N           555555
-----------------------------------------------
```

Step 6 Type **Q** or **q** and press **Enter** to exit the RAN sharing northbound user configuration tool.

----End

3.3 Modifying Northbound User Passwords

This section describes how to modify the password of a created northbound user using the northbound user configuration tool. To improve data security, properly keep the password of the northbound user and change it periodically.

Prerequisites

You have obtained passwords of users sopuser and ossuser on the MAE server (Trace Server co-deployed with the MAE-Access) or on the Trace Server (Trace Server independently deployed).

Procedure

Step 1 Use PuTTY to log in to the MAE master server (Trace Server co-deployed with the MAE-Access) or Trace Server master server (Trace Server independently deployed) in SSH mode as user sopuser.

Step 2 Run the following command to switch to the **root** user:

> **su - root**

```
Password: password for the root user
```

Step 3 Run the following commands to run the RAN sharing northbound user configuration tool:

\# **cd /opt/oss_sudobin_internal/oss/TSCollector/root/bin**

\# **cd /opt/oss_sudobin_internal/oss/TSCollector/root/bin**

Step 4 When the following information is displayed, enter **C** or **c** and press **Enter**:

```
Please select an operation type.
A--Show the northbound user list.
B--Create a northbound user.
C--Reconfigure the password of northbound user.
D--Delete a northbound user or a single PLMN.
E--Set the RAN sharing switch.
F--Restart all Trace Server services.
Q--Exit
Please select:
```

Step 5 When the following information is displayed, enter the northbound user name to be modified and press **Enter**:

```
Please enter the user name.
```

Step 6 When the following information is displayed, enter the new password of the northbound user and press **Enter**. You need to enter the new password twice.

```
Please enter password.
Please enter password again.
Changing password for Northbound user name
```

Step 7 If the following information is displayed, the password of the northbound user has been modified successfully. Otherwise, contact Huawei technical support.

```
Modify the password of Northbound user successfully.
```

Step 8 Type **Q** or **q** and press **Enter** to exit the RAN sharing northbound user configuration tool.

----End

3.4 Deleting Northbound Users

This section describes how to delete northbound users who are not used any more using the northbound user configuration tool.

Prerequisites

You have obtained passwords of users sopuser and ossuser on the MAE server (Trace Server co-deployed with the MAE-Access) or on the Trace Server (Trace Server independently deployed).

Procedure

Step 1 Use PuTTY to log in to the MAE master server (Trace Server co-deployed with the MAE-Access) or Trace Server master server (Trace Server independently deployed) in SSH mode as user sopuser.

Step 2 Run the following command to switch to the **root** user:

> **su - root**

```
Password: password for the root user
```

Step 3 Run the following commands to run the RAN sharing northbound user configuration tool:

cd /opt/oss_sudobin_internal/oss/TSCollector/root/bin

bash setRANSharingUser.sh

Step 4 When the following information is displayed, enter **D** or **d** and press **Enter**:

```
Please select an operation type.
A--Show the northbound user list.
B--Create a northbound user.
C--Reconfigure the password of northbound user.
D--Delete a northbound user or a single PLMN.
E--Set the RAN sharing switch.
F--Restart all Trace Server services.
Q--Exit
Please select:
```

Step 5 When the following information is displayed, enter **B** or **b** and press **Enter**:

```
Please select an operation type.
A--Delete a single PLMN under a user.
B--Delete a northbound user.
Q--Exit
Please select:
```

Step 6 When the following information is displayed, enter the northbound user name to be deleted, **user1** for example, and press **Enter**:

```
Please enter the user name to delete:
user1
```

Step 7 When the following information is displayed, enter **Y** or **y** and press **Enter**:

```
User user1 has the following PLMNs:
1111 22222 333333
Are you sure you want to delete all PLMNs under user user1? [Yy/Nn]
The operation will delete all NBI result files under the PLMN.
The operation will take a few minutes.
Please select:
```


Step 8 If the following information is displayed, the northbound user **user1** has been deleted successfully. Otherwise, contact Huawei technical support.

```
User user1 deleted successfully.
```

Step 9 Type **Q** or **q** and press **Enter** to exit the RAN sharing northbound user configuration tool.

----End

3.5 Deleting Northbound User PLMNs

This section describes how to delete northbound user PLMNs using the northbound user configuration tool.

Prerequisites

You have obtained passwords of users sopuser and ossuser on the MAE server (Trace Server co-deployed with the MAE-Access) or on the Trace Server (Trace Server independently deployed).

Procedure

Step 1 Use PuTTY to log in to the MAE master server (Trace Server co-deployed with the MAE-Access) or Trace Server master server (Trace Server independently deployed) in SSH mode as user sopuser.

Step 2 Run the following command to switch to the **root** user:

> **su - root**

```
Password: password for the root user
```

Step 3 Run the following commands to run the RAN sharing northbound user configuration tool:

cd /opt/oss_sudobin_internal/oss/TSCollector/root/bin

bash setRANSharingUser.sh

Step 4 When the following information is displayed, enter **D** or **d** and press **Enter**:

```
Please select an operation type.
A--Show the northbound user list.
B--Create a northbound user.
C--Reconfigure the password of northbound user.
D--Delete a northbound user or a single PLMN.
E--Set the RAN sharing switch.
F--Restart all Trace Server services.
Q--Exit
Please select:
```

Step 5 When the following information is displayed, enter **A** or **a** and press **Enter**:

```
Please select an operation type.
A--Delete a single PLMN under a user.
B--Delete a northbound user.
Q--Exit
Please select:
```


Step 6 When the following information is displayed, enter the northbound user name to be deleted that the PLMN belongs to, **user1** for example, and press **Enter**:

```
Please enter the user name to delete:
user1
```

Step 7 When the following information is displayed, enter the PLMN to be deleted, **1111** for example, and press **Enter**:

```
User user1 has the following PLMNs:
1111 22222 333333
Please enter the PLMN:
1111
```

Step 8 When the following information is displayed, enter **Y** or **y** and press **Enter**:

```
Are you sure you want to delete a single PLMN? [Yy/Nn]
The operation will delete all NBI result files under the PLMN.
The operation will take a few minutes.
Please select:
```

Step 9 If the following information is displayed, the value **1111** of the PLMN for northbound user **user1** has been deleted successfully. Otherwise, contact Huawei technical support.

```
Single PLMN under user user1 deleted successfully.
```

Step 10 Type **Q** or **q** and press **Enter** to exit the RAN sharing northbound user configuration tool.

----End

3.6 Configuring the Northbound RAN Sharing Function Switch

This section describes how to configure the RAN sharing function for Trace Server GSM/UMTS/LTE northbound file interfaces using the northbound user configuration tool. By default, the RAN sharing function is disabled.

Prerequisites

You have obtained passwords of users sopuser and ossuser on the MAE server (Trace Server co-deployed with the MAE-Access) or on the Trace Server (Trace Server independently deployed).

Context

After the RAN sharing function is enabled, northbound result files are saved in **/export/home/omc/var/fileint/TSNBI/shared/**. Trace Server creates subdirectories in this path.

- If PLMN values are not all Fs, the subdirectory naming conventions are ***PLMN value/Result File Name/yyyymmdd/NE identifier/***.
- If PLMN values are all Fs, the subdirectory naming conventions are **commonData/*Result File Name/yyyymmdd/NE identifier/***.

Procedure

Step 1 Use PuTTY to log in to the MAE master server (Trace Server co-deployed with the MAE-Access) or Trace Server master server (Trace Server independently deployed) in SSH mode as user sopuser.

Step 2 Run the following command to switch to the **root** user:

> **su - root**

```
Password: password for the root user
```

Step 3 Run the following commands to run the RAN sharing northbound user configuration tool:

cd /opt/oss_sudobin_internal/oss/TSCollector/root/bin

bash setRANSharingUser.sh

Step 4 When the following information is displayed, enter **E** or **e** and press **Enter**:

```
Please select an operation type.
A--Show the northbound user list.
B--Create a northbound user.
C--Reconfigure the password of northbound user.
D--Delete a northbound user or a single PLMN.
E--Set the RAN sharing switch.
F--Restart all Trace Server services.
Q--Exit
Please select:
```

Step 5 When the following information is displayed, enter **A** or **a** and press **Enter** (**enabling the GSM RAN sharing function is used as an example here**).

```
-----------RAN Sharing Switch Status-----------
A.GSM-------off
B.UMTS------off
C.LTE-------off
-----------------------------------------------
Please select an operation type.
A--Set the GSM switch status.
B--Set the UMTS switch status.
C--Set the LTE switch status.
Q--Exit
Please select:
```

Step 6 When the following information is displayed, enter **ON** or **on** and press **Enter** (**enabling the GSM RAN sharing function is used as an example here**).

```
Are you sure you want to set the status of the GSM switch? [ON/OFF]
```

Step 7 If the following information is displayed, the GSM RAN sharing function has been enabled successfully. Otherwise, contact Huawei technical support.

```
GSM switch set successfully.
-----------RAN Sharing Switch Status-----------
A.GSM-------on
B.UMTS------off
C.LTE-------off
-----------------------------------------------
Please select an operation type.
```



```
A--Set the GSM switch status.
B--Set the UMTS switch status.
C--Set the LTE switch status.
Q--Exit
Please select:
```

Step 8 Type **Q** and press **Enter**. Return to the RAN sharing northbound user configuration tool main interface.

Step 9 Type **F** and press **Enter** to restart the Trace Server services.

When information similar to the following is displayed, type **Y** and press **Enter** to restart the Trace Server services.

```
Are you sure to restart all Trace Server services, whether to continue (Y/N)
```

When the following information is displayed, the Trace Server services have been restarted successfully. Otherwise, contact Huawei technical support.

```
All Trace Server services restarted successfully.
```

Step 10 Type **Q** or **q** and press **Enter** to exit the RAN sharing northbound user configuration tool.

----End

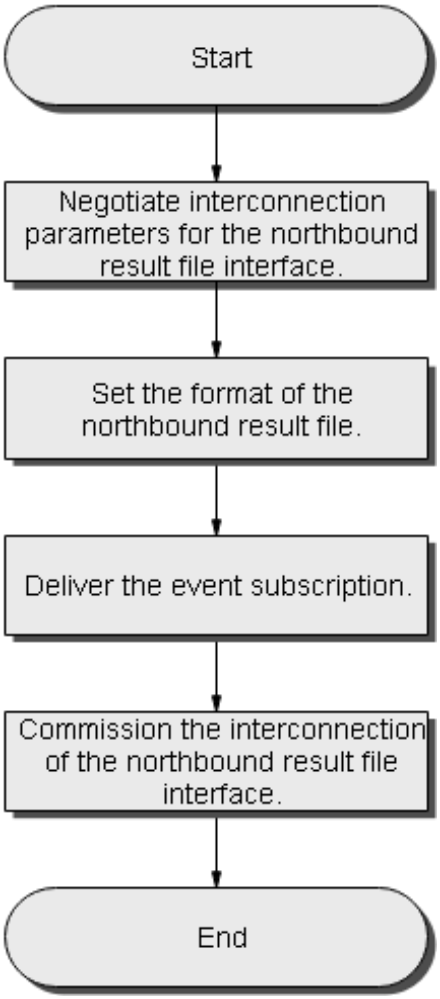
4 Process for Interconnecting the MDT Data Northbound Result File Interface

About This Chapter

This section describes the process for interconnecting the NMS with Trace Server using the northbound result file interface.

Figure 4-1 lists the process for interconnecting the MDT data northbound result file interface.

Figure 4-1 Flow chart of process for interconnecting the northbound result file interface



4.1 Negotiating Interconnection Parameters for the MDT Data Northbound Result File Interface

This section describes the preparations for interconnecting Trace Server with the NMS.

Checking Licenses

Perform the following steps to check whether licenses have been loaded on MAE before interconnection:

1. Log in to MAE.
2. In the **Apps** area of the MAE home page, click **Common** to enter the **Common** page.
3. Choose **System** > **License Management** > **License Information**. The **License Information** page is displayed.
4. Click the **Resource Control Items** tab. If **Resource Name** contains the **WOFD-914305 MDT trace data BIN file interface - L** item, the MDT Data northbound result file interface is available. If there is no license, the MDT Data northbound result file interface is unavailable. To enable this NBI, contact Huawei technical support.

Negotiating Interconnection Parameters

Table 4-1 describes interconnection parameters to be negotiated.

Table 4-1 Negotiating interconnection parameters

FTP	Parameter	Parameter Description
(Recommended) If Trace Server serves as an FTP server, the NMS obtains files from Trace Server.	FTP user name	Value: ftpuser or the northbound user in RAN sharing scenery.
	Password	For details about how to obtain the password, contact the Trace Server administrator.
	FTP port	Value: **21** If you use FTP to transfer files, open the port on Trace Server.
	SFTP port	Value: **22** If you use SFTP to transfer files, open the port on Trace Server.
	Path for saving files	After collecting and processing NE-reported data, Trace Server saves northbound result files on the server managing NEs. • If RAN sharing is enabled, Trace Server saves northbound trace result files in the **/export/home/omc/var/fileint/TSNBI/shared/** directory and creates subdirectories. • If RAN sharing is disabled, Trace Server saves northbound trace result files in the **/export/home/omc/var/fileint/TSNBI/** directory and creates subdirectories.
If Trace Server serves as an FTP client, it automatically uploads files to the NMS.	FTP user name	Provided by the NMS.
	Password	Provided by the NMS.
	FTP port	Value: 21 If you use FTP to transfer files, open the port on the NMS.

FTP	Parameter	Parameter Description
	SFTP port	Value: 22 If you use SFTP to transfer files, open the port on the NMS.
	Path for saving files	Provided by the NMS. Trace Server uploads northbound trace result files to this path on the NMS.

Modifying Configuration Items

Prerequisites

- You have logged in to MAE.
- You have loaded the northbound trace licenses on MAE.

Procedure

1. In the **Apps** area of the MAE home page, click **Access** to enter the MAE-Access home page.
2. In the **Apps** area of the MAE home page, click **Common** to enter the **Common** page.
3. In the navigation pane, choose **LTE Common Trace Server NBI**.
4. In the **Signaling Format** area box, select **OSSii**.
5. In the navigation pane, choose **OSSii**.
6. Set related parameters in the right area box by referring to Table 4-2 and Table 4-3.

Table 4-2 OSSii parameter settings

Area Box Name	Parameter Name	Description
OSSii Parameter Settings	Storage duration(hours)	Storage duration that northbound trace result files can be saved in the directory on the server Value range: 1 to 72 (hour) Default value: **72**
	NE identifier	You can change NE identifiers to set naming conventions for northbound result files. Value: **NE Name** or **NE FDN** Default value: **NE Name**
	Generated file size(MB)	Maximum size of the generated northbound trace result file Values: **1**, **5**, **10**, **15**, and **30**

Area Box Name	Parameter Name	Description
		(MB) Default value: **10**
	File generation period(mins)	Generation period of northbound trace result files Values: **1**, **5**, and **10** (minute) Default value: **5**
	MDT extended field display switch	This switch can be turned on or off to determine whether to report new parameters during the subscription to events with new parameters. Default value: **Off** If this switch is turned on, the settings of the following parameters change during subscription: • The version number in the file header is changed to 2.0. • Fields **Serving Cell SINR** and **>SINR** are added in the 0x1302 M1 Intra-Freq MDT event. • Fields **Serving Cell SINR** and **>SINR** are added in the 0x1303 M1 Inter-Freq MDT event. • Fields **UL CA Flag**, **Reserved**, and **CA Property** are added in the 0x1304 M2 MDT event. • Fields **UL Data Transmission Time of Last TTI per UE** and **DL Data Transmission Time of Last TTI per UE** are added in the 0x1307 M5 MDT event. **NOTICE** Before turning on this switch, ensure that the NMS has updated the data parsing tool. Otherwise, the NMS cannot parse events with new parameters.
Subscription Time Offset	Start subscription	To prevent subscription

Area Box Name	Parameter Name	Description
Settings	time(mins)	issuing delays and ensure integrity of data reported over northbound interfaces, northbound interface data subscription allows you to issue subscription commands in advance. Values: **0**, **5**, **10**, and **15** (minute) Default value: **10**
	Stop subscription time(mins)	To prevent delays during southbound interface data reporting and northbound interface data processing and ensure integrity of data reported over northbound interfaces, northbound interface data subscription allows you to delay subscription cancellation. Values: **0**, **5**, **10**, and **15** (minute) Default value: **15**

Table 4-3 Compression parameter settings

Navigation Tree	Area Box Name	Parameter Name	Description
LTE Data Compression Switch **NOTE** This function applies only to LTE NEs whose version is eRAN13.0 or later and whose MPT type is not LMPT.	Compression Parameter Settings	Enable data compression	• **OFF**: After **OFF** is selected, data that Trace Server subscribes to is transmitted without being compressed. • **ON**: After **ON** is selected, data that Trace Server subscribes to is transmitted after being compressed. Default value: **OFF**

7. After settings are complete, click **Save**.

4.2 Delivering the Event Subscription

Before configuring the MDT data northbound file interface, you need to deliver an event subscription task. After the event subscription is issued, NEs upload the MDT data to Trace Server, and Trace Server processes the uploaded data and generates a northbound trace result file.

4.2.1 Subscribing to an LTE NE Trace Task

This section describes how to subscribe to an LTE NE trace task. You can subscribe to an NE trace task to obtain the northbound trace result files of Trace Server from a specified directory on the MAE server for northbound interconnection.

Prerequisites

- You have purchased the license for LTE cell trace.
- You have installed the mediations of LTE NEs. NEs are connected to MAE properly.
- You have obtained the Trace Server NBI management permission.
- You are authorized to use the **Trace Server NE Management** function.

Context

- After the NE version is upgraded, do not resubscribe to the messages that have been subscribed to on MAE.

Procedure

Step 1 In the **Apps** area of the MAE home page, click **Access** to enter the MAE-Access home page.

Step 2 Choose **Monitor** > **Trace Server NBI** > **LTE Common Trace Server NBI**. The **LTE Common Trace Server NBI** window is displayed.

Step 3 In the **NE** navigation tree, choose an NE type, an NE version, and NE information.

NE Name, **Subscribe Status**, **Start Time**, **End Time**, **Collection State**, **Collection Time**, and **Operation Result** are displayed on the right pane.

Step 4 In the right pane, select the NEs to which subscription is to be issued, and click **Subscribe**.

Step 5 Select **Auto**, **ALL**, or **Selected** as required.

NOTE

To use the function of automatically subscribing to new NEs, select **Auto**. After you select **Auto subscribe new NEs** and set related parameters as required, the system automatically issues the preset subscription to the new NEs. In this scenario, **Set area scope** is unavailable in the **Logged MDT Parameter Settings** page. For details about subscription parameters, see 4.2.3 Parameters for Subscribing to an LTE NE Trace Task (OSSii).

Step 6 In the **Message Settings** area, select the message contents that you want to subscribe to.

The **Message Settings** area displays the message contents supported by the NE, the message contents that you have subscribed to, and subscribe to a failed message.

NOTE

- If many message contents are available, enter the message keywords in the **Find message** text box and click **Previous** or **Next** to search for the required message contents.

- To subscribe to or unsubscribe from all message content, you can select **Select all** or **Clear all** for **Selection ploy** in the **Message Settings** area to quickly subscribe to or unsubscribe from all message content.
- To subscribe to message content, click **Export** or **Import** in the message list in the **Message Settings** area to export or import the configured message content.

Step 7 In the **Basic Settings** area, set the parameters related to the subscription.

NOTE

Collection time is used for controlling the time segment for reporting data. After this parameter is set to a time segment, Trace Server processes and reports data collected within the time segment. For example, if the subscription start time is 10:05 on December 22, 2019, the end time is 10:05 on December 23, 2019, and the collection time is 11:00-12:00, only the data from 11:00:00 on December 22 to 11:59:59 on December 22 is reported. If this parameter is not set (that is, the **Collection time** check box is deselected), data generated from the subscription start time to the end time is processed and reported.

Step 8 Click **Next**. In the displayed dialog box, set related subscription parameters in the **Periodic Messages Parameters Settings** and **MDT Parameter Settings** areas.

Step 9 Click **Apply**.

After the subscription is started, the NE subscription information is displayed on the GUI.

----End

4.2.2 GUIs for LTE Northbound Interface Trace (OSSii)

This section describes the function of each component in the **LTE Trace Server NBI** window.

Figure 4-2 shows the **LTE Trace Server NBI** window. Table 4-4 describes the window shown in Figure 4-2.

Figure 4-2 LTE Trace Server NBI-main window

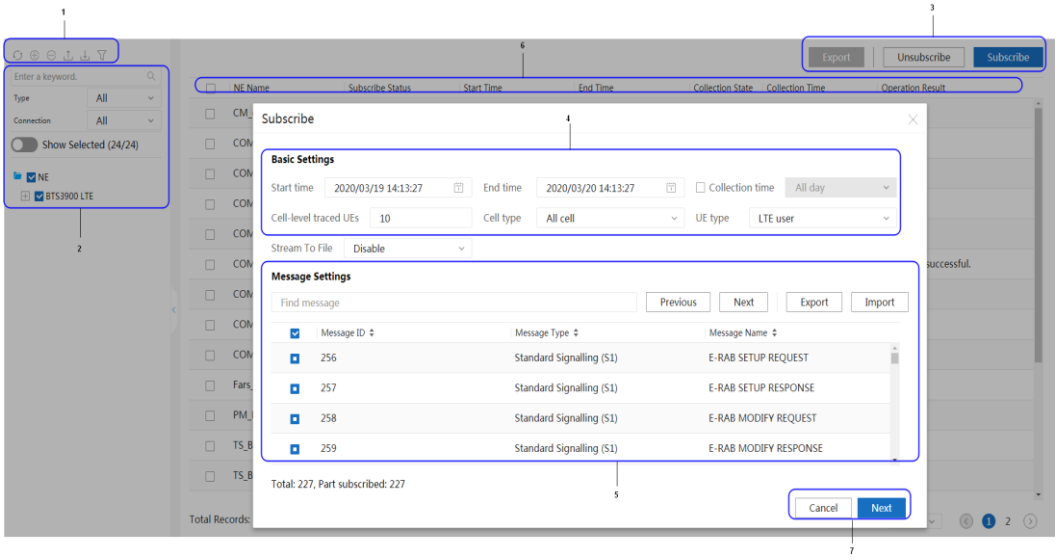


Table 4-4 LTE Trace Server NBI-main window

No.	Name	Description
1	Area for displaying function icons	You can click a function icon as required. The import and export icons allow you to import and export selected NEs. This function supports the import and export of only NEs of the same version. Therefore, you cannot select NEs of different versions at the same time.
2	NE navigation tree	By default, the NE navigation tree is displayed by **NE Type**.
3	Buttons	Allows you to export data, unsubscribe to NEs, or subscribing to NEs.
4	Parameter setting area	Allows you to set basic parameters for NE trace tasks. **NOTE** If a parameter setting area is unavailable, this parameter is inapplicable for the selected message.
5	Message setting area	Allows you to set messages provided by NEs. **NOTE** • If different licences of the northbound file interface are loaded, the displayed message list is different. • For the virtual cluster system, IP address here refers to OSS_Service plane IP address of the Trace Server master server. If NAT is configured, IP address here refers to default network port IP address or OSS_Service plane IP address after NAT. If you modify the IP address of the MAE master server or the Trace Server master server, you need to reconfigure the mapping between the TCE ID and TCE IP address.
6	Detailed subscription information area	Displays detailed subscription information.
7	Buttons	Provides the **Next** and **Cancel** functions.

NOTE

If the attributes of Cell, eNodeB ID, PLMN, and TAC are modified, you need to re-issued subscription of the entire network.

4.2.3 Parameters for Subscribing to an LTE NE Trace Task (OSSii)

This section describes the parameters for subscribing to LTE NE trace tasks.

NOTICE

When you query multiple NEs. If the parameters of **Basic Settings** area are different, all parameters are displayed as default values. If the parameters of **Basic Settings** area are the same, all parameters are displayed as specific setting. When you click **Apply**, Trace Server will issue the parameters which are displayed to NEs.

Table 4-5 Parameters for subscribing to an LTE NE trace task

Area		Parameter	Description
NE			By default, the NE navigation tree is displayed by network topology.
Basic Settings	Time parameter settings	Start time	Indicates the subscription start time.
		End time	Indicates the subscription end time.
		Collection time	Indicates the specific hour-level time segment for subscription. You can specify some hour-level time segments intersecting with the subscription start time and end time as the subscription time segments. Default value: **All day**
	Cell parameter settings	Cell-level traced UEs	Indicates the number of cell-level traced UEs and is used to group measurement report messages. Value range: 0 to 400 Default value: **10** **NOTE** • **0** indicates all UEs. Due to the limited capability of the LBBP, a maximum of 400 UEs are supported. • The more the number of UEs to be traced concurrently, the greater the impact on system performance and subscriber services. • After periodic event subscription is issued, the base station randomly selects X online UEs (X is the preset number of cell-level traced UEs) and instructs each UE to periodically measure the throughput based on the period Y (Y is the preset measurement reporting period). When the period arrives, a periodic throughput measurement event is generated. Each UE reports the event for consecutive Z times (Z is the default consecutive reporting times, default value is 16) when the UE is online. The events reported are cached in NE memories. When the cache time reaches five minutes or the cache size reaches 1 MB, the NE reports the cached events to Trace Server. • After subscription to maximum-level standard signaling events is issued to a base station, the base station selects *X* UEs newly connected to

Area		Parameter	Description
			the base station and reports events of the selected UEs to Trace Server. *X* indicates the predefined number of cell-level traced UEs. The base station saves the events in its memory. When the cache duration reaches 5 minutes or the cache size reaches 1 MB, the base station reports the cached events to Trace Server.
		Cell type	Indicates the cell type during cell tracing. This parameter is used to group messages of different events. Default value: **ALL cell** Values: **ALL cell**, **NB-loT cell**, and **FDD-TDD cell**. • **ALL cell**: indicates configurations take effect for all cells on NEs. • **NB-loT cell**: indicates configurations take effect for all NB-IoT cells on NEs. • **FDD-TDD cell**: indicates configurations take effect for all FDD-TDD cells on NEs. **NOTE** • Non-cell events and subscriber events are supported by default without being distinguished. • This parameter applies only to LTE NEs whose version is SRAN13.1 or later. • The pico NE only supports the **ALL cell** value.
		UE type	Indicates the type of the user to which the NE issues subscription. You can select different users as required. Value range: **LTE user**, **eMTC user**, and **LTE user and eMTC user** Default value: **LTE user**
		Stream To File	Indicates that Trace Server converts stream data reported by NEs to a file. This option is deselected by default. **NOTE** When users subscribe to events for an NE that has been subscribed to, the last stream-to-file conversion setting is inherited.
	Periodic Messages Parameters Settings	Report interval	Select a period from the drop-down list. When the period is selected, the NE reports measurement events based on this period. **NOTE** If this parameter is set to different values for the same periodic measurement event on multiple upper-layer applications, Trace Server issues the minimum period to NEs. Values: **2048 ms**, **5120 ms**, **10240 ms**, and **1**

Area		Parameter	Description
			Minute. Default value: **10240 ms**.
		Report amount	Value range: **Eight Times**, **Sixteen Times**, **Thirty-two Times**, **Sixty-four Times**, and **Infinite Times**. Default value: **Sixteen Times**. **NOTE** If this parameter is set to different values for the same periodic measurement event on multiple upper-layer applications, Trace Server issues the maximum number of times to NEs.
	MDT Parameters Settings	UE selection	Value range: **Polling** and **Ability first**. Default value: **Polling**. **NOTE** If this parameter is set to different values for the same periodic measurement event on multiple upper-layer applications, Trace Server issues the polling policy to NEs.
		Proactively open UE GNSS	Value range: **YES** and **NO**. Default value: **NO**. **NOTE** Whether the GPS takes effect also depends on UE capability and behavior. If this parameter is set to different values for the same periodic measurement event on multiple upper-layer applications, Trace Server issues the most recent value to NEs.
		Subframe index	Indicates the subframe index of the M3 MDT event. Value range: **0** to **9**. Default value: **2**.
		UEs	Indicates the number of cell-level traced UEs during MDT. When the number of cell-level traced UEs is 0, the value of this parameter ranges from 0 to 400. **NOTE** **0** indicates all UEs. The entered value of **Cell-level traced UEs** during MDT must be less than or equal to the number of cell-level traced UEs.
	Logged MDT Parameter	Logging interval	Value range: **5120 ms**, **10240 ms**, **20480 ms**, **30720 ms**, **40960 ms**, and **61440 ms**. Default value: **10240 ms**.
		Logging duration	Value range: **10 Minutes**, **20 Minutes**, **40 Minutes**, **60 Minutes**, **90 Minutes**, and **120 Minutes**.

Area		Parameter	Description
			Default value: **10 Minutes**.
		Area Scope	• The **Set area scope** is cleared by default. If the measurement scope of Logged MDT events needs to be specified, select **Set area scope**. You can select **Cell** or **Tracking area**. A maximum of 32 cells or 8 tracking areas can be selected for each NE. – When **Cell** is selected: You can select the specified NE from the NE navigation tree, and the table in the right pane displays information about the cells under the NE; you can also configure the cells. – When **Tracking area** is selected: The system displays information about the tracking areas. You can configure the tracking areas. • If the measurement scope of Logged MDT events does not need to be specified, deselect **Set area scope**. If the measurement scope has been set by following **Cell** or **Tracking area**, select **Set area scope**, delete the original settings, and deselect **Set area scope**. **NOTE** When you only switch over to **Cell** or **Tracking area** without modifying other parameters, clicking **OK** will not modify parameters.
Message Settings		Find message	You can type the keywords and click **Previous** or **Next** to search for the required messages.
		Message ID	Uniquely identifies a message.
		Message Name	Indicates the name of a message.
		Message Type	Indicates the type of a message. **NOTICE** The following operations have impact on system performance and user services. Be caution when performing these operations. • Select too many periodic MR events at a time. • Set the period for reporting periodic MR events too small. • Set the number of reporting periodic MR events too large.
		Export	Allows you to export message events configured on existing NEs and import them to message configurations on other NEs to configure message events quickly. You can

Area	Parameter	Description
		also export a template that is not configured with message events, set required message events, and import the configured template to NE message configurations. TXT, HTML, CSV, PDF, XLS, and XLSX export files are available.
	Import	Allows you to import recently exported message event configurations or manually modified message event templates to NE message configurations to configure message events quickly. Message events to be imported are in the unavailable and selected state. If the message events are contained in the imported file, the message events are in the available state. Otherwise, status of the message events remains unchanged. CSV, XLS, and XLSX import files are available.
Detailed subscription information area	NE Name	Indicates the name of the NE whose data needs to be subscribed to.
	Subscribe Status	Indicates the existing subscription status. Values of the parameter are as follows: • **Subscribing**: indicates that the system is issuing subscription to a target NE. • **Subscribed**: indicates that the system issues subscription to a target NE successfully. • **Unsubscribed**: indicates that the system has issued no subscription to a target NE or canceled subscription to a target NE. • **Unsubscribing**: indicates that the system is canceling subscription to a target NE.
	Start Time	Indicates the subscription start time.
	End Time	Indicates the subscription end time.
	Collection State	Indicates whether the system is collecting data from a selected NE. Values of the parameter are as follows: • **Running**: indicates that the system is collecting data from a target NE. • **Idle**: indicates that the system collects no data from a target NE.
	Collection Time	Indicates the specific hour-level time segment for subscription in a day.

Area	Parameter	Description
	Operation Result	Summarizes successful and failed subscription information.

4.3 Commissioning the Interconnection of the Northbound Result File Interface

The NMS obtains MDT Data northbound result files generated by Trace Server by using FTP or SFTP. Based on the files, you can determine whether the MDT data northbound result interface meets the requirements for interconnecting with the NMS.

Prerequisites

- The NMS and Trace Server are properly connected.
- You have obtained the IP address of Trace Server (the FTP server) and the FTP user name and password.
- You have obtained the names and directory of the northbound result files. For details, see 2 Overview of Result Files.
- You have issued an event subscription task. For details, see 4.2.1 Subscribing to an LTE NE Trace Task.
- You have logged in to the NMS.

Context

The NMS obtains northbound result files from a specified directory on Trace Server using FTP or SFTP.

Procedure

Step 1 Run the following command to set the destination directory for storing northbound result files on the NMS, for example, **/opt/file**:

> **lcd** ***/opt/file***

Step 2 Log in to Trace Server in FTP or SFTP mode.

If You Need To...	Then...
Log in to Trace Server in FTP mode	Run the following command: **ftp** ***IP address of Trace Server***
Log in to Trace Server in SFTP mode	Run the following command: **sftp** ***user name@IP address of Trace Server***

> NOTE
>
> You are advised to use the SFTP protocols because the SFTP protocols is more secure than the FTP protocols.

Step 3 Enter the password as prompted. The following uses the login in SFTP mode as an example.

Step 4 Run the following command to enter the directory for saving northbound trace result files on Trace Server:

> **cd /export/home/omc/var/fileint/***TSNBI/FileType/yyyymmdd/NE identifier/*

> NOTE
>
> *FileType* indicates the data type, such as LTE_SIG. *yyyymmdd* indicates the date. *NE identifier* contains NE name and NE FDN.

Step 5 Run the following command to set the transfer mode to binary mode if files are obtained by using FTP. Otherwise, skip this step.

> **bin**

Step 6 Run the following command to obtain files.

> **get *Northbound result file name***

Step 7 Run the **bye** command to exit the FTP or SFTP login mode.

Step 8 Check the obtained northbound result files.

1. Based on the file name, check that the NE information and time are consistent with those of the task issued by a customer.
2. Parse northbound result files by following the instructions provided in 2.5 Formats of MDT Data Northbound Result Files.

   If parsed data in files is consistent with signaling data that a customer subscribes to, the MDT data northbound file interface meets the interconnection requirements. Otherwise, contact Huawei technical support.

----End

4.4 Optional: Setting the Northbound Push FTP Server

Before commissioning the XFTP northbound file push function, you need to set an FTP server to receive data. After the FTP server is set successfully, Trace Server will scan the northbound files every 5 minutes and push the scanned files to the specified FTP server.

Prerequisites

- You have logged in to MAE.
- The mediation software of the NE has been installed on the MAE server.
- You have loaded the northbound trace licenses on MAE.
- You must have the permission of file server setting.

NOTE

- If you need to set the transmission mode between MAE co-deployed in the cluster system and the NMS to SFTP, see the "Configuring the SFTP for Actively Transferring Files over the Northbound Interface (Public and Private Keys)" or "Configuring the SFTP for Actively Transferring Files over the Northbound Interface (Password Authentication)" section for a specific MAE networking mode in the administrator guide.
- If you need to set the transmission mode between independently-deployed Trace Server and the NMS for the authentication to SFTP, see 5.3 Configuring the SFTP for Actively Transferring Files over the Northbound Interface (Public and Private Keys) or 5.4 Configuring the SFTP for Actively Transferring Files over the Northbound Interface (Password Authentication).

Procedure

Step 1 In the **Apps** area of the MAE home page, click **Access** to enter the MAE-Access home page.

Step 2 Choose **Software** > **FTP Auto Upload Management** > **Target Server Settings**. The **Target Server Setting** window is displayed.

Step 3 Set **Module Type** to **Trace Server NBI** and click **Add**. The **Target Server Settings** dialog box is displayed.

Step 4 In the **Target Server Settings** dialog box, set **Server IP**, **User Name**, **Password**, **Server Directory**, **Source Directory**, and **File Compression Type** parameters.

----End

5 Troubleshooting for the MDT Data Northbound Result File Interface

About This Chapter

The NMS is interconnected with Trace Server through the MDT data northbound file interface. If problems occur when getting MDT data of NEs on the network, you can solve problems using the methods described in this section.

When Trace Server actively uploads files to the NMS over the northbound interface, Trace Server functions as an FTP client and the NMS functions as an FTP server. To ensure data security during file transmission, you can set the SFTP encryption mode.

When Trace Server actively uploads files to the NMS over the northbound interface, Trace Server functions as an FTP client and the NMS functions as an FTP server. To ensure data security during file transmission, you can set the SFTP encryption mode.

5.1 Troubleshooting and Information Collection

If faults occur when the NMS attempts to obtain MDT Data northbound results of NEs through the MDT Data northbound result file interface, you can handle the faults by referring to common troubleshooting methods. If uncommon faults occur, collect information about the faults by following the instructions provided and contact Huawei technical support.

Common Troubleshooting

Table 5-1 describes the common fault and the troubleshooting method.

Table 5-1 Common Troubleshooting

Common Fault	Troubleshooting Method
No MDT Data northbound result file is generated.	See 5.2 Handle the Problem That No MDT Data Northbound Result File Is Generated.

Information Collection

If an unusual fault occurs when the NMS obtains MDT data of NEs, you need to collect the related information to help locate the fault. For details about how to collect faulty information, see Table 5-2.

Table 5-2 Information collection

Related Information	Description
Operation information	Record the operations performed before a fault occurs and the troubleshooting measures taken later.
Version information	Obtain version information about Trace Server and MAE-Access, NE mediations, and NEs.
IP information	Obtain IP addresses of Trace Server and MAE.
Log information	• If Trace Server is co-deployed in a cluster system, obtain logs from the **/export/home/osslog/MAE/TSCollector/log/iMAP.tscollector***XXXX***_agent.trace** and **/export/home/osslog/MAE/TSCollector/log/TS_CBB/***XX***/***XX***/CBB.log** directories on Trace Server nodes. **NOTE** • In **tscollector***XXXX*, the first two digits *XX* indicate the server number, and the last two digits *XX* indicate the number of the service on the server. • In **/export/home/osslog/MAE/TSCollector/log/TS_CBB/***XX***/***XX***, *XX* indicates the number of the service on the server. • If Trace Server is independently deployed in a cluster system, obtain logs from the **/export/home/osslog/TS/TSCollector/log/iMAP.tscollector***XXXX***_agent.trace**

Related Information	Description
	and **/export/home/osslog/TS/TSCollector/log/TS_CBB/***XX***/***XX***/CBB.log** directories on nodes. **NOTE** • In **tscollector***XXXX*, the first two digits *XX* indicate the server number, and the last two digits *XX* indicate the number of the service on the server. • In **/export/home/osslog/TS/TSCollector/log/TS_CBB/***XX***/***XX***/***XX***, *XX* indicates the number of the service on the server. • For the Trace Server system deployed in upgrade mode, the log path is **/export/home/osslog/*TS-X*/TSCollector/log**. Replace *X* in *TS-X* as required.

5.2 Handle the Problem That No MDT Data Northbound Result File Is Generated

Either of the following causes may lead to the problem that no MDT data result file is generated: NEs are disconnected, or free disk space of Trace Server is insufficient. This section describes how to handle this problem in either of the two situations.

Problem Description

No MDT Data northbound result file is generated in the path, and the NMS cannot collect MDT Data northbound results of NEs.

Problem Analysis

Either of the following causes can result in the problem:

- NEs are disconnected.
- The disk space of Trace Server is insufficient.

Analysis of NE Disconnection

1. In the **Apps** area of the MAE home page, click **Access** to enter the MAE-Access home page.
2. Choose **Topology** > **Main Topology**, right-click a disconnected NE, and then choose **Reconnect NE** from the shortcut menu.
3. Check whether the network connection is normal.
4. Debug the NE mediation. To reinstall the NE mediation, see *Commissioning Guide* of the corresponding Trace Server networking mode.

Analysis of the Insufficient Disk Space of Trace Server

Clean up the disk space of Trace Server.

NOTICE

You must check whether files can be deleted when clearing the disk space. If you delete the files by mistake, the system may run improperly.

Solution

Contact Huawei technical support.

5.3 Configuring the SFTP for Actively Transferring Files over the Northbound Interface (Public and Private Keys)

When Trace Server actively uploads files to the NMS over the northbound interface, Trace Server functions as an FTP client and the NMS functions as an FTP server. To ensure data security during file transmission, you can set the SFTP encryption mode.

Prerequisites

You have logged in to the NMS server as user *UserA*. *UserA* is the NMS server user. Replace it as required.

Context

- To set up an SFTP connection using public or private key authentication, save the public key file for the Trace Server server in the **authorized_keys** file of the related NMS server user. The system performs authentication using the private key for the Trace Server server and the public key for the Trace Server server stored on the NMS server. After the authentication is successful, the SFTP connection is set up successfully. Trace Server is not required to provide the NMS login password.
- The public and private key authentication files can be encrypted or not. For encrypted public and private key authentication files, set the password. If you forget the password, all public and private key authentication files must be generated again, and the new files will replace the existing files.
- When the XFTP service uploads files in FTP mode:
  - If the northbound server runs the Linux or Unix operating system, use the vsftpd software whose version is 2.0.5 or later.
  - If the northbound server runs the Windows operating system, use the ftpserver service delivered with the system.
- Unless otherwise specified, perform the following operations on each Trace Server node:

NOTE

- xftp-x-1 indicates the XFTP service name of the Trace Server server. Replace it as required.
- The service is deployed on the master and slave servers. The service name for the master server is xftp-1-1. The service name for the first slave server is xftp-2-1. The service name for the second slave server is xftp-3-1. This method applies to the service names for other servers.

Procedure

Step 1 Use PuTTY to log in to Trace Server as the **sopuser** user in SSH mode.

Step 2 Run the following command to switch to the **ossuser** user:

> **su - ossuser**

```
Password: password for the ossuser user
```

Step 3 Public and private key files are generated on the Trace Server master service server.

If You Need To...	Then...
Generate encrypted public and private key files	Only perform Step 3.1 to Step 3.4.
Generate non-encrypted public and private key files	Only perform Step 3.5 to Step 3.8.

1. Run the following command on Trace Server to check whether the **.ssh** directory exists in the home directory.

   ~> **cd /export/home/omc/.ssh/**

   - If **No such file or directory** is displayed, the **.ssh** directory is unavailable in the home directory. Perform Step 3.3 after running the following commands:

     ~> **mkdir -p /export/home/omc/.ssh/**

     ~> **cd /export/home/omc/.ssh/**

   - If no command output is displayed, the **.ssh** directory is available in the home directory. Perform Step 3.2.

2. Run the following command to check whether the **id_rsa_pwd.pub** file exists.

   ~> **ls id_rsa_pwd.pub**

   - If the system displays **id_rsa_pwd.pub: No such file or directory**, perform Step 3.3 to create a public key file.
   - If the system displays **id_rsa_pwd.pub**, perform Step 4.

3. Run the following command to create encrypted public and private key files.

   ~> **. /opt/oss/apps/OSSToolService/bin/ssh-keygen.sh**

   If the system displays the following message, enter **1** to create encrypted public and private key files.

   ```
   ------------------------------------------------------------------
   Please select an operation type:
   1--Generate PubKey File with Encrypt Key.
   2--Generate PubKey File without Encrypt Key.
   ------------------------------------------------------------------
   Please make a choice : 1
   ```

   If the system displays the following message, enter **/export/home/omc/.ssh/id_rsa_pwd**.

   ```
   Generating public/private rsa key pair.
   Enter file in which to save the key (/export/ossuser/.ssh/id_rsa):
   ```


If the following message is displayed, enter the password twice. When ~> is displayed, the encrypted public key file is generated.

```
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
```

NOTICE

- Keep the password for future use. If the password is lost, all public and private key files must be generated again, and the new files will replace the existing files.
- The password can contain 8 to 30 characters, including lowercase letters a to z, uppercase letters A to Z, digits 0 to 9, and special characters]@%-=_.}{. To improve password security, the password must meet the following requirements:
- The password contains at least one uppercase letter.
- The password contains at least one lowercase letter.
- The password contains at least one digit.
- The password contains at least one special character.

4. Run the following commands to modify permission of the public key file.

   ~> **cd /export/home/omc/.ssh/**

   ~> **chmod 600 id_rsa_pwd.pub**

5. Run the following command on the Trace Server master service server to check whether the **.ssh** directory exists in the home directory.

   ~> **cd ${HOME}/.ssh/**

   - If **No such file or directory** is displayed, the **.ssh** directory is unavailable in the home directory. Perform Step 3.7 after running the following command:

     ~> **mkdir -p ${HOME}/.ssh/**

   - If no command output is displayed, the **.ssh** directory is available in the home directory. Perform Step 3.6.

NOTE

The **${HOME}** parameter indicates the home directory of user **ossuser**.

6. Run the following command to check whether the **id_rsa** file exists.

   ~> **ls id_rsa**

   - If the system displays **id_rsa: No such file or directory**, perform Step 3.7 to create public and private key files.
   - If the system displays **id_rsa**, perform Step 4.

7. Run the following command to create non-encrypted public and private key files.

   ~> **. /opt/oss/apps/OSSToolService/bin/ssh-keygen.sh**

   If the system displays the following message, enter **2** to create non-encrypted public and private key files.

```
----------------------------------------------------------------
Please select an operation type:
1--Generate PubKey File with Encrypt Key.
2--Generate PubKey File without Encrypt Key.
```



```
----------------------------------------------------------------
Please make a choice : 2
```

If the system displays information similar to the following, the non-encrypted public key file has been created successfully:

```
Generating public/private rsa key pair.
Your identification has been saved in id_rsa.
Your public key has been saved in id_rsa.pub.
```

8. Run the following commands to modify permission of the public key file.

   ~> **cd ${HOME}/.ssh/**

   ~> **chmod 600 id_rsa.pub**

Step 4 Enable public key authentication on the NMS.

1. Log in to the NMS server as user **UserA**. Run the **cd ${HOME}/.ssh/** command to check whether the **.ssh** directory exists in the home directory.
   - If **No such file or directory** is displayed, the **.ssh** directory is unavailable in the home directory. After running the **mkdir -p ${HOME}/.ssh/** command, perform Step 4.2.
   - If no command result is displayed, the **.ssh** directory is available in the home directory. Perform Step 4.2.

NOTE

The **${HOME}** parameter indicates the home directory of user **UserA**.

2. Run the **ls authorized_keys** command to check whether the **authorized_keys** file exists.
   - If the system displays **authorized_keys: No such file or directory**, run the **touch authorized_keys** command to create the **authorized_keys** file. Then, perform Step 4.3.
   - If the system displays **authorized_keys**, proceed to Step 4.3.
3. Copy the content of the **id_rsa.pub** or **id_rsa_pwd.pub** file on the Trace Server server to the **authorized_keys** file on the NMS server.

NOTICE

- For a non-encrypted public key file, copy the **id_rsa.pub** file's content.

  If the **id_rsa.pub** file does not exist, copy the **${HOME}/.ssh/authorized_keys** file's content on Trace Server.
- For an encrypted public key file, copy the **id_rsa_pwd.pub** file's content.

   a. Run the **cat id_rsa.pub** or **cat id_rsa_pwd.pub** command on the Trace Server server. The content of the **id_rsa.pub** or **id_rsa_pwd.pub** file is displayed.
   b. Run the vi command on the NMS server to write the content of the **id_rsa.pub** or **id_rsa_pwd.pub** file into the **authorized_keys** file.

NOTICE

- The content to be written into the **authorized_keys** file cannot contain any line feed. If any line feed exists, delete it.
- If the **authorized_keys** file contains any other data, perform a line feed operation. Then, write the content.

4. Run the vi command to modify the **/etc/ssh/sshd_config** file and configure SFTP parameters on the NMS server.

   su - root

   Password: *password for the root user*

   # **vi /etc/ssh/sshd_config**

   Table 5-3 lists the parameters to be configured.

Table 5-3 Parameters to be configured for the SFTP

Parameter	Value
RSAAuthentication	yes
PubkeyAuthentication	yes
AuthorizedKeysFile	.ssh/authorized_keys
PasswordAuthentication	yes/no. This parameter specifies whether the password authentication is used when the authentication of the public key and private key fails. You are advised to set this parameter to **yes**. • yes: password authentication is used. • no: password authentication is not used.

MaxStartups	Number of concurrent connections.
	The calculation method is as follows:
	1. Run the following command to query the number of the SFTP tasks deployed on Trace Server:
	• If the installed Trace Server software is a Chinese edition, run the following command:
	# **vi /export/home/ossshare/TS/XFTPService/etc/XFTPService/locale/zh_CN/TaskInfoCache.xml**
	NOTE
	TS is an example product alias. You can run the **ls /opt/cloud/ |grep TS** command to query the actual product alias.
	• If the installed Trace Server software is an English edition, run the following command:
	# **vi /export/home/ossshare/TS/XFTPService/etc/XFTPService/locale/en_US/TaskInfoCache.xml**
	`.....`
	`<ftpset>`
	`<dest>10.10.10.10</dest>`
	`<localpath.....`

Parameter	Value
	<localpath..... </ftpset> ..... The preceding command output is used as an example. **10.10.10.10** indicates the IP address of the northbound server, and each `localpath` value corresponds to a task. Record the number of tasks and enter **:q!** to exit the vi editor. 2. Run the following command to query the number of threads occupied by the SFTP tasks: # **cat /export/home/osshare/TS/XFTPService/etc/XFTPService/ModuleParam.xml |grep TaskThreadNum** <param name="TaskThreadNum">**10**</param> The preceding command output is used as an example. **10** indicates the number of threads occupied by the SFTP tasks. Record the number of threads. 3. The number of concurrent connections is obtained by multiplying the number of tasks by the number of occupied threads. **NOTE** If you change the number of SFTP tasks, you must change the number of concurrent connections at the same time.

5. Perform the following operations on the NMS server to check the SFTP service status.

If...	Then...
The NMS is running Euler OS	# **service sshd status** Checking for service sshd **running** • If the command result contains **running**, the SFTP service is running. Run the following command to restart the SFTP service: # **service sshd restart** • If the command result does not contain **running**, the SFTP service is disabled. In this case, contact Huawei technical support.
The NMS server is running any other OS	Contact Huawei technical support.

Step 5 If you use encrypted public and private key authentication files, perform this step. If you use non-encrypted public and private key authentication files, perform Step 6.

1. Run the following commands on Trace Server to query the password for encrypting the private key.

   ~> **. /opt/oss/oss_profile.sh**

~> **. /opt/oss/apps/XFTPService/tools/env_profile.sh > /dev/null 2>&1**

~> **/opt/oss/apps/XFTPService/bin/internal/XFTPPasswdEncrypt**

When the following information is displayed, enter the encryption password twice.

```
Please Enter Password :
Please Re-enter Password :
```

NOTICE

- The encryption password must be the same as that in Step 3.3.
- Keep the encryption password for future use. If the encryption password is lost, all public and private key files must be generated again, and the new files will replace the existing files.

The following information is displayed. **d67A29C93775A68AE21DDAF1052EBBD1** is the encryption password.

```
Success. Encrpt passwd :d67A29C93775A68AE21DDAF1052EBBD1
```

2. Run the **vi** command to change the values of **IsSupportEncrpt**, **PrivateExKeyFile**, and **EncrptKey** in the **ModuleParam.xml** file.

   This operation must be performed on each server where the *XFTPService* service is deployed.

   ~> **cd /export/home/osshare/TS/XFTPService/etc/XFTPService**

   ~> **vi ModuleParam.xml**

Table 5-4 Parameter description

Parameter	Description
IsSupportEncrpt	Change the value to **1**, indicating that the encryption password transfer mode is supported.
PrivateExKeyFile	Set this parameter to the absolute path where the public key file generated in Step 3.3 is saved, for example, **/export/home/omc/.ssh/id_rsa_pwd**.
EncrptKey	Enter the queried encryption password, for example, **d67A29C93775A68AE21DDAF1052EBBD1**.

3. Run the following command to check whether the **config** file exists:

   ~> **cd ${HOME}/.ssh/**

   - If **No such file or directory** is displayed, the **.ssh** directory is unavailable in the home directory. After running the following command. Perform the following steps.

     ~> **mkdir -p ${HOME}/.ssh/**

   - If no command output is displayed, the **.ssh** directory is available in the home directory. Perform the following steps.

   ~> **ls config**

NOTE

The **${HOME}** parameter indicates the home directory of user **ossuser**.

- If **config:No such file or directory** is displayed, the **config** file does not exist. Perform Step 5.4 after running the following command:

  ~> **touch ${HOME}/.ssh/config**

  ~> **chmod 600 ${HOME}/.ssh/config**
- If **config** is displayed, the **config** file exists. Proceed to Step 5.4.

4. Run the **vi** command to add the following contents to the **config** file:

   ~> **cd ${HOME}/.ssh**

   ~> **vi config**

```
IdentityFile /export/home/omc/.ssh/id_rsa pwd
IdentityFile ~/.ssh/id_rsa
```

NOTE

If the **config** file contains the preceding information, you do not need to modify the **config** file.

Step 6 Run the Vi command on the Trace Server server to change the value of **DefaultFTPType** in the **ModuleParam.xml** file.

This operation must be performed on each server where the *XFTPService* service is deployed.

~> **cd /export/home/ossshare/TS/XFTPService/etc/XFTPService**

~> **vi ModuleParam.xml**

Search for the **DefaultFTPType** parameter and change the value to **1**.

NOTE

If **DefaultFTPType** is set to **1**, the SFTP encryption mode is used. If **DefaultFTPType** is set to **0**, the plaintext FTP mode is used.

To change the SFTP encryption mode to the plaintext FTP mode, change the value of **DefaultFTPType** to **0** and restart the XFTPService service.

Using the plaintext FTP mode has security risks. It is recommended that you use the SFTP mode.

```
<GeneralParams>
...
<param name="DefaultFTPType">1</param>
...
</GeneralParams>
```

Step 7 Run the following command to switch to the **ossadm** user:

~> **su - ossadm**

```
Password: password for the ossadm user
```

Step 8 Run the following commands on Trace Server to restart XFTPService to make the modification take effect.

This operation must be performed on each server where the *XFTPService* service is deployed.

~> **. /opt/cloud/manager/bin/engr_profile.sh**

~> **ipmc_adm -cmd restartapp -app XFTPService**

Step 9 Run the following command on Trace Server to view the XFTPService status.

This operation must be performed on each server where the *XFTPService* service is deployed.

~> **ipmc_adm -cmd statusapp -app XFTPService**

- If the xftp-x-0 service is in the **running** state in the command output, the service is running properly.
- If the xftp-x-0 service is in **not running** state in the command output, the service is not started. When this occurs, contact Huawei technical support.

----End

5.4 Configuring the SFTP for Actively Transferring Files over the Northbound Interface (Password Authentication)

When Trace Server actively uploads files to the NMS over the northbound interface, Trace Server functions as an FTP client and the NMS functions as an FTP server. To ensure data security during file transmission, you can set the SFTP encryption mode.

Prerequisites

You have logged in to the NMS server as user *UserA*. *UserA* is an NMS server user. Replace it as required.

Context

- When the password authentication is used, the password for logging in to the NMS server is required to set up an SFTP connection.
- Unless otherwise specified, perform the following operations on each Trace Server node:

NOTE

xftp-x-1 indicates the XFTP service name of the Trace Server server. Replace it as required.

The XFTP service is deployed on the master and slave servers. The service name for the master server is xftp-1-1. The service name for the first slave server is xftp-2-1. The service name for the second slave server is xftp-3-1. This method applies to the service names for other servers.

- When the XFTP service uploads files in FTP mode:
  - If the northbound server runs the Linux or Unix operating system, use the vsftpd software whose version is 2.0.5 or later.
  - If the northbound server runs the Windows operating system, use the ftpserver service delivered with the system.

Procedure

Step 1 Use PuTTY to log in to Trace Server as the **sopuser** user in SSH mode.

Step 2 Run the following command to switch to the **ossuser** user:

> **su - ossuser**

```
Password: password for the ossuser user
```

Step 3 Run the vi command to modify the **/etc/ssh/sshd_config** file and configure SFTP parameters on the NMS server.

~> **su - root**


```
Password: password for the root user
```

vi /etc/ssh/sshd_config

Table 5-5 lists the parameters to be configured.

Table 5-5 Parameters to be configured for the SFTP

Parameter	Value
PasswordAuthentication	yes/no. Set this parameter to **yes**. • yes: password authentication is used. • no: password authentication is not used.

MaxStartups	Number of concurrent connections.
	The calculation method is as follows
	1. Run the following command to query the number of the SFTP tasks deployed on Trace Server:
	• If the installed Trace Server software is a Chinese edition, run the following command:
	# **vi /export/home/osshare/TS/XFTPService/etc/XFTPService/locale/zh_CN/TaskInfoCache.xml**
	NOTE
	TS is an example product alias. You can run the **ls /opt/cloud/ |grep TS** command to query the actual product alias.
	• If the installed Trace Server software is an English edition, run the following command:
	# **vi /export/home/osshare/TS/XFTPService/etc/XFTPService/locale/en_US/TaskInfoCache.xml**
	`...... <ftpset> <dest>10.10.10.10</dest> <localpath...... <localpath...... </ftpset> ......`
	The preceding command output is used as an example. **10.10.10.10** indicates the IP address of the northbound server, and each `localpath` value corresponds to a task. Record the number of tasks and enter **:q!** to exit the vi editor.
	2. Run the following command to query the number of threads occupied by the SFTP tasks:
	# **cat /export/home/osshare/TS/XFTPService/etc/XFTPService/ModuleParam.xml |grep TaskThreadNum**
	`<param name="TaskThreadNum">10</param>`
	The preceding command output is used as an example. **10** indicates the number of threads occupied by the SFTP tasks. Record the number of threads.

Parameter	Value
	3. The number of concurrent connections is obtained by multiplying the number of tasks by the number of occupied threads. **NOTE** If you change the number of SFTP tasks, you must change the number of concurrent connections at the same time.

Step 4 Perform the following operations on the NMS server to check the SFTP service status.

If...	Then...
The NMS is running Euler OS	# **service sshd status** `Checking for service sshd running` • If the command result contains **running**, the SFTP service is running. Run the following command to restart the SFTP service: # **service sshd restart** • If the command result does not contain **running**, the SFTP service is disabled. In this case, contact Huawei technical support.
The NMS server is running any other OS	Contact Huawei technical support.

Step 5 Perform the following operations on Trace Server to change the value of the **DefaultFTPType** field in the **ModuleParam.xml** file.

This operation must be performed on each server where the *XFTPService* service is deployed.

~> **cd /export/home/ossshare/TS/XFTPService/etc/XFTPService**

~> **vi ModuleParam.xml**

Search for the **DefaultFTPType** parameter and change the value to **1**.

NOTE

If **DefaultFTPType** is set to **1**, the SFTP encryption mode is used. If **DefaultFTPType** is set to **0**, the plaintext FTP mode is used.

To change the SFTP encryption mode to the plaintext FTP mode, change the value of **DefaultFTPType** to **0** and restart the XFTPService service.

```
<GeneralParams>
...
<param name="DefaultFTPType">1</param>
...
</GeneralParams>
```

Press **Esc** and run the **:wq** command to save the file and exit the vi editor.

Step 6 Run the following command to switch to the **ossadm** user:

~> **su - ossadm**

```
Password: password for the ossadm user
```

Step 7 Run the following commands on Trace Server to restart XFTPService to make the modification take effect.

This operation must be performed on each server where the *XFTPService* service is deployed.

~> **. /opt/cloud/manager/bin/engr_profile.sh**

~> **ipmc_adm -cmd restartapp -app XFTPService**

Step 8 Run the following command on Trace Server to view the XFTPService status.

This operation must be performed on each server where the *XFTPService* service is deployed.

~> **ipmc_adm -cmd statusapp -app XFTPService**

- If the xftp-x-0 service is in the **running** state in the command output, the service is running properly.
- If the xftp-x-0 service is in **not running** state in the command output, the service is not started. When this occurs, contact Huawei technical support.

----End

5.5 Impact of Enabling MR Collection on the Network

Before the measurement report (MR) function is enabled, the impacts of this function on the throughput, CPU usage, memory usage, and O&M bandwidth must be considered. For detailed information, contact Huawei technical support.

Impact on KPIs

Due to problems in UE capability and compatibility, exceptions occur on some UEs when MR collection is enabled. As a result, KPIs, such as the service drop rate and handover success rate, may deteriorate.

UE-based MRs are reported to the network by UEs, increasing the load over the air interface. If the load over the air interface is heavy, KPIs related to the network access, call drops, and access delay may deteriorate.

After MR collection is enabled, UEs perform periodic measurement, increasing the power consumption of UEs.

Impact on Throughput

When inter-frequency or inter-RAT periodic MRs are subscribed to, inter-frequency or inter-RAT MR measurements are issued to the base stations that meet the requirements (the cells under the base stations have inter-frequency or inter-RAT neighboring cells).

UEs need to enable the measurement gap during inter-frequency or inter-RAT MR measurement. UEs measure the frequencies on other frequency bands or in other RATs during the measurement GAP. During the measurement GAP, UEs cannot send or receive data. The uplink and downlink throughput for UEs that perform inter-frequency or inter-RAT periodic MR measurement decreases in the MR measurement period by about 25% to 30%.

Impact on the CPU and Memory Usage of Base Stations

When MR collection is enabled, the CPU and memory usage of base stations increases. If the CPU usage is excessively high, performance specifications will decrease, affecting the service processing capability of the system.

The factors affecting the CPU usage include the period over which MR collection is enabled and the number of UEs reporting MRs.

5.6 Setting the DST

DST is optional, depending on whether the NE is in daylight saving time (DST) mode. The DST identifier is disabled by default.

Prerequisites

- You have obtained the IP addresses of the Trace Server master service board (independently-deployed) and the MAE master server (co-deployed in the cluster system).
- You have obtained the password for the **sopuser** user.
- The trust relationship between Trace Server and MAE has been configured.

Context

NOTE

The following command output is for reference only.

Procedure

Step 1 Use PuTTY to log in to the MAE master server (Trace Server co-deployed with the MAE-Access) or Trace Server master server (Trace Server independently deployed) in SSH mode as user sopuser.

Step 2 Run the following command to switch to the **ossuser** user:

> **su - ossuser**

```
Password: password for the ossuser user
```

Step 3 Run the following commands to run the Trace Server maintenance and measurement tool:

~> **. /opt/oss/oss_profile.sh**

~> **executeScriptProxy.sh single tsNorthTools.sh**

Step 4 When information similar to the following is displayed, select **Set Trace Server Param** and press **Enter** to access the setting Trace Server parameter function.

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+                                                                +
+                                                                +
+                  Welcome to use Trace Server Toolkit                 +
+                                                                +
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Please select query condition
```

```
A--Set Trace Server Param
Q--Quit
Please make a choice:
```

NOTE

You can select **Set Trace Server Param** by typing **A**.

Step 5 When information similar to the following is displayed, select **Set the DST identifier** and press **Enter** to run the setting DST identifier function.

```
A--Set the switch of the CDR
B--Set the NE label type
C--Set the WLAN Result Format
D--Set the DST identifier
Q--Quit
```

NOTE

You can select **Set the DST identifier** by typing **D**.

Step 6 When information similar to the following is displayed, select **disabled:false** or **enabled:true** and press **Enter** to change the DST identifier.

```
The value of DST in the current configuration file is false.

Please enter a DST number to be set:
A--disabled:false
B--enabled:true
Q--Quit
```

NOTE

You can select **disabled:false** or **enabled:true** by typing **A** or **B**.

Step 7 When information similar to the following is displayed, type **Y** and press **Enter** to restart the Trace Server services.

```
Are you sure to restart all Trace Server services, whether to continue (Y/N)
```

When the following information is displayed, the Trace Server services have been restarted successfully. Otherwise, contact Huawei technical support.

```
All Trace Server services restarted successfully.
```

When the following information is displayed, the modification is successful. Otherwise, contact Huawei technical support.

```
Set the DST successfully.
```

Step 8 Type **Q** and press **Enter** to return to the Trace Server maintenance and measurement tool home page.

Step 9 Type **Q** and press **Enter** to exit the Trace Server maintenance and measurement tool.

----End

5.7 Configuring the MDT Data Collection Server

If you start **0x1208 UE LOGGED MDT** or **0x1311 LOGGED MDT** collection on Trace Server, you must add the mapping between the Trace Collection Entity (TCE) ID and TCE IP

address on the eNodeB. The collected information is sent to the specified TCE based on the mapping.

Prerequisites

- You have logged in to Trace Server.
- You have obtained the IP address of the TCE.

NOTE

For ATAE cluster systems, the IP address of the Trace Server master service board is the IP address of the default plane. For virtual cluster systems, the IP address of the Trace Server master service board is the OSS_Service plane IP address. If NAT is configured, use the NAT-translated IP address of the default plane or OSS_Service plane. If the IP address of the Trace Server master server is changed, the mapping relationship between the TCE ID and the TCE IP needs to be configured.

Procedure

Step 1 Choose **Maintenance** > **MML Command**. The **MML Command** window is displayed.

Step 2 In the navigation tree of the **MML Command** window, select the eNodeB involved in the trace creation task.

Step 3 In the **Command Input** area, type **LST TCEIPMAPPING** to query TCE mapping.

Step 4 Click **Exec** to run the command.

If...	Then...
The command output displays a correct TCE IP address	The TCE mapping is correctly configured. In this case, the operation ends.
The command output displays an incorrect TCE IP address	The TCE mapping is not correctly configured. In this case, type **MOD TCEIPMAPPING** in **Command Input**.
The command output does not display TCE mapping	The TCE mapping is not configured. In this case, type **ADD TCEIPMAPPING** in **Command Input**.

NOTE

You can click **MML Help** in the **MML Command** window to view command descriptions.

----End

6 Appendix

About This Chapter

6.1 Supported NE Types and Versions

Table 6-1 lists types and versions of the Supported NE required for the northbound MDT Data northbound result file.

Table 6-1 Related NE types and versions

NE Type	NE Version
BTS3900	BTS3900 V100R016C10 BTS3900 V100R016C00 BTS3900 V100R015C10 BTS3900 V100R015C00 BTS3900 V100R013C10 BTS3900 V100R013C00
BTS5900	BTS5900 V100R016C10 BTS5900 V100R016C00 BTS5900 V100R015C10 BTS5900 V100R015C00 BTS5900 V100R013C10 BTS5900 V100R013C00
PICO BTS5900	PICO BTS5900 V100R016C00 PICO BTS5900 V100R015C10 PICO BTS5900 V100R015C00 PICO BTS5900 V100R013C10

NE Type	NE Version
PICO BTS3900	PICO BTS3900 V100R016C00 PICO BTS3900 V100R015C10 PICO BTS3900 V100R015C00 PICO BTS3900 V100R013C10 PICO BTS3900 V100R013C00
MICRO BTS3900	MICRO BTS3900 V100R016C10 MICRO BTS3900 V100R016C00 MICRO BTS3900 V100R015C10 MICRO BTS3900 V100R015C00 MICRO BTS3900 V100R013C10 MICRO BTS3900 V100R013C00
eNodeB	DBS5900 LTE V100R016C10 BTS5900L LTE V100R016C10 BTS5900AL LTE V100R016C10 BTS5900A LTE V100R016C10 BTS5900 LTE V100R016C10 DBS5900 LampSite LTE V100R016C10 DBS3900 LTE V100R016C10 BTS3900L LTE V100R016C10 BTS3900AL LTE V100R016C10 BTS3900A LTE V100R016C10 BTS3900 LTE V100R016C10 BTS3901A LTE V100R016C10 BTS3901E TDLTE V100R016C10 BTS3202B V100R016C10 BTS3202E V100R016C10 BTS3203E LTE V100R016C10 BTS3205E V100R016C10 DBS5900 LTE V100R016C00 BTS5900L LTE V100R016C00 BTS5900AL LTE V100R016C00 BTS5900A LTE V100R016C00 BTS5900 LTE V100R016C00 DBS5900 LampSite LTE V100R016C00 DBS3900 LTE V100R016C00 BTS3900L LTE V100R016C00 BTS3900AL LTE V100R016C00 BTS3900A LTE V100R016C00 BTS3900 LTE V100R016C00

NE Type	NE Version
	BTS3901A LTE V100R016C00 BTS3901E TDLTE V100R016C00 BTS3202B V100R016C00 BTS3202E V100R016C00 BTS3203E LTE V100R016C00 BTS3205E V100R016C00 DBS5900 LTE V100R015C10 BTS5900L LTE V100R015C10 BTS5900AL LTE V100R015C10 BTS5900A LTE V100R015C10 BTS5900 LTE V100R015C10 DBS5900 LampSite LTE V100R015C10 DBS3900 LTE V100R015C10 BTS3900L LTE V100R015C10 BTS3900AL LTE V100R015C10 BTS3900A LTE V100R015C10 BTS3900 LTE V100R015C10 BTS3901A LTE V100R015C10 BTS3901E TDLTE V100R015C10 BTS3202B V100R015C10 BTS3202E V100R015C10 BTS3203E LTE V100R015C10 BTS3205E V100R015C10 DBS5900 LTE V100R015C00 BTS5900L LTE V100R015C00 BTS5900AL LTE V100R015C00 BTS5900A LTE V100R015C00 BTS5900 LTE V100R015C00 DBS5900 LampSite LTE V100R015C00 DBS3900 LTE V100R015C00 BTS3900L LTE V100R015C00 BTS3900AL LTE V100R015C00 BTS3900A LTE V100R015C00 BTS3900 LTE V100R015C00 BTS3901A LTE V100R015C00 BTS3901E TDLTE V100R015C00 BTS3202B V100R015C00 BTS3202E V100R015C00 BTS3203E LTE V100R015C00 BTS3205E V100R015C00

NE Type	NE Version
	DBS5900 LTE V100R013C10 BTS5900L LTE V100R013C10 BTS5900AL LTE V100R013C10 BTS5900A LTE V100R013C10 BTS5900 LTE V100R013C10 DBS5900 LampSite LTE V100R013C10 DBS3900 LTE V100R013C10 BTS3900L LTE V100R013C10 BTS3900AL LTE V100R013C10 BTS3900A LTE V100R013C10 BTS3900 LTE V100R013C10 BTS3901A LTE V100R013C10 BTS3901E TDLTE V100R013C10 BTS3202B V100R013C10 BTS3202E V100R013C10 BTS3203E LTE V100R013C10 BTS3205E V100R013C10 DBS5900 LTE V100R013C00 BTS5900L LTE V100R013C00 BTS5900AL LTE V100R013C00 BTS5900A LTE V100R013C00 BTS5900 LTE V100R013C00 DBS5900 LampSite LTE V100R013C00 DBS3900 LTE V100R013C00 BTS3900L LTE V100R013C00 BTS3900AL LTE V100R013C00 BTS3900A LTE V100R013C00 BTS3900 LTE V100R013C00 BTS3901A LTE V100R013C00 BTS3901E TDLTE V100R013C00 BTS3202B V100R013C00 BTS3202E V100R013C00 BTS3203E LTE V100R013C00 BTS3205E V100R013C00

6.2 LTE Event List

Table 6-2 LTE MDT event list

Event ID	Event Name	Initial NE Version
0x1001	Public Info	SRAN11.1 Pico 11.1
0x1212	UE Period TA MDT	SRAN11.1
0x1301	PRIVATE CELL TRAFFIC TRACE	SRAN11.1
0x1302	M1 Intra-Freq MDT	SRAN11.1
0x1303	M1 Inter-Freq MDT	SRAN11.1
0x1304	M2 MDT	SRAN11.1
0x1305	M3 MDT	SRAN11.1
0x1306	M4 MDT	SRAN11.1
0x1307	M5 MDT	SRAN11.1
0x1308	RLF Report MDT	SRAN11.1
0x1309	RCEF Report MDT	SRAN11.1
0x1311	LOGGED MDT	SRAN11.1
0x130A	M1 A2 MDT	SRAN11.1
0x1312	M6 UL MDT	SRAN13.0
0x1313	M6 DL MDT	SRAN13.0
0x1314	M7 MDT	SRAN13.0
0x1321	M2-Ext MDT	SRAN11.1
0x1322	M5-Ext MDT	SRAN11.1
0x1323	UE Period SFN UL RSRP MDT	SRAN13.0

