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Supplement

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SERIES Q: Switching and signalling, and associated measurements and tests

Supplements to ITU-T Q-series Recommendations

Common approaches and interfaces for data exchange between the central equipment identity register and the equipment identity register

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Supplement 76 to ITU-T Q-series Recommendations

Common approaches and interfaces for data exchange between the central equipment identity register and the equipment identity register

Summary

As defined in the ITU-T Q.5050 series of Recommendations, a central equipment identity register (CEIR) can be used to combat counterfeit information and communication technology (ICT) devices, to combat the use of stolen ICT devices and for other purposes. However, implementing a CEIR is a complex project that involves and impacts multiple stakeholders, and may require different processes in each country.

Therefore, to assist ITU members on implementation, Supplement 76 to ITU-T Q-series Recommendations aims to identify current industry approaches on the data exchange between CEIR and the equipment identity register (EIR) and propose common approaches and interfaces on this topic.

History*

Edition	Recommendation	Approval	Study Group	Unique ID
1.0	ITU-T Q Suppl. 76	2023-10-20	11	11.1002/1000/15780

Keywords

CEIR, EIR, interface, replication, synchronization.

* To access the Recommendation, type the URL https://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID.

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Supplement 76 to ITU-T Q-series Recommendations

Common approaches and interfaces for data exchange between the central equipment identity register and the equipment identity register

1 Scope

The scope of this Supplement is to identify current industry approaches to data exchange between a central equipment identity register (CEIR) and an EIR and propose common approaches and interfaces on this topic.

2 References

[ITU-T Q.5050] Recommendation ITU-T Q.5050 (2019), *Framework for solutions to combat counterfeit ICT devices*.

[ITU-T Q.5051] Recommendation ITU-T Q.5051 (2020), *Framework for combating the use of stolen mobile devices*.

[ITU-T Q.5052] Recommendation ITU-T Q.5052 (2020), *Addressing mobile devices with a duplicate unique identifier*.

[ITU-T Q.5053] Recommendation ITU-T Q.5053 (2021), *Mobile device access list audit interface*.

3 Definitions

3.1 Terms defined elsewhere

This Supplement uses the following terms defined elsewhere:

3.1.1 central equipment identity register (CEIR) [b-ITU-T Q-Sup.73]: The central equipment identity register (CEIR) maintains information on the eligibility of mobile devices to control access to the mobile networks. The CEIR interconnects with multiple equipment identity registers (EIRs) so that a common set of data is maintained and available to participating operators.

3.1.2 blacklist override (BLO) [ITU-T Q.5053]: The list of subscribers that have blacklisted mobile devices (blocked international mobile equipment identities (IMEIs)), but who are still allowed to access mobile networks and services.

3.2 Terms defined in this Supplement

This Supplement defines the following terms:

3.2.1 equipment identity register (EIR): A network element in the core of mobile networks that is used to terminate an access attempt or ongoing call when performing an international mobile equipment identity (IMEI) check procedure depending on the status of the IMEI in one of its registers; blocked-list, permitted-list, or tracked-list.

NOTE – Definition adapted from [ITU-T Q.5052].

3.2.2 mobile device: An electronic device used for making phone calls and sending text messages across a wide geographic area through radio access to public mobile networks, while allowing the user to be mobile, or a smartphone.

NOTE – Definition adapted from [b-ITU-T X-Sup.19].

4 Abbreviations and acronyms

This Supplement uses the following abbreviations and acronyms:

API Application Programming Interface

BLO Blacklist Override

CEIR Central Equipment Identity Register

EIR Equipment Identity Register

HTTP Hypertext Transfer Protocol

HTTPS Hypertext Transfer Protocol Secure

IMEI International Mobile Equipment Identity

IMSI International Mobile Subscriber Identity

MNO Mobile Network Operator

MSISDN Mobile Station Integrated Services Digital Network

SFTP SSH File Transfer Protocol

SMPP Short Message Peer-to-Peer Protocol

SMS Short Message Service

ZIP Well-known archive file format that supports lossless data compression

5 Conventions

None.

6 Common approaches

There are three options to exchange data between a mobile network operator (MNO) equipment identity register (EIR) and a central equipment identity register (CEIR):

– API-based synchronous (i.e., real time) communication,

– API-based asynchronous (i.e., near real time) communication, and

– file-based (i.e., after periodic interval) communication.

MNO EIR usually have the international mobile equipment identity (IMEI), the international mobile subscriber identity (IMSI) and the mobile station integrated services digital network (MSISDN) (optional) of all legitimate subscribers using the network. These data need to be synchronised between the EIR and CEIR. In the case of real time communication, synchronisation will be on the fly and the actual CEIR response could be communicated to the requesting mobile device. But in the case of file-based communication, the requesting mobile device will receive a registration response from the MNO EIR and the MNO EIR will send an accumulated list of such data to the CEIR periodically.

A comparison of these three communication options is shown in Table 1.

Table 1 – Comparison among different data exchange options

Functionality	API-based (synchronous) interface	API-based (asynchronous) interface	File-based interface
IMEI-IMSI synchronisation	In real time	In real time	Periodically
Data validation by CEIR	In real time	In near real time	Periodically
IMEI categorisation by CEIR	In real time	In real time	Periodically
Service baring of any mobile device	In real time	In near real time	After defined time period
Action confirmation	In real time	In near real time	Periodically

7 Description of synchronous API-based interface

Two different types of interfaces are required between the EIR and CEIR – a query interface and a broadcast interface.

The MNO EIR and the CEIR will use an interface such as hypertext transfer protocol secure (HTTPS) for message communication between them and both will work as server and client. When the EIR initiates the message then it will work as a client and the CEIR will work as a server. Similarly, when the CEIR initiates the message then the CEIR will work as a client and the MNO as a server.

7.1 Synchronous API-based query interface

When a mobile subscriber tries to switch ON his/her mobile device, a network register/location update (LU) message is received by the MNO network nodes and the MNO gets the IMEI status verified from its local EIR for confirming network access of that mobile device. If IMEI-IMSI or IMEI-IMSI-MSISDN is present in the permitted-list or in the tracked-list in the local EIR database then, it will allow network access. Otherwise, if the IMEI is present in a blocked-list in the local EIR database then the network access will be blocked. Figure 1 shows the registration process for the API-based synchronous approach.

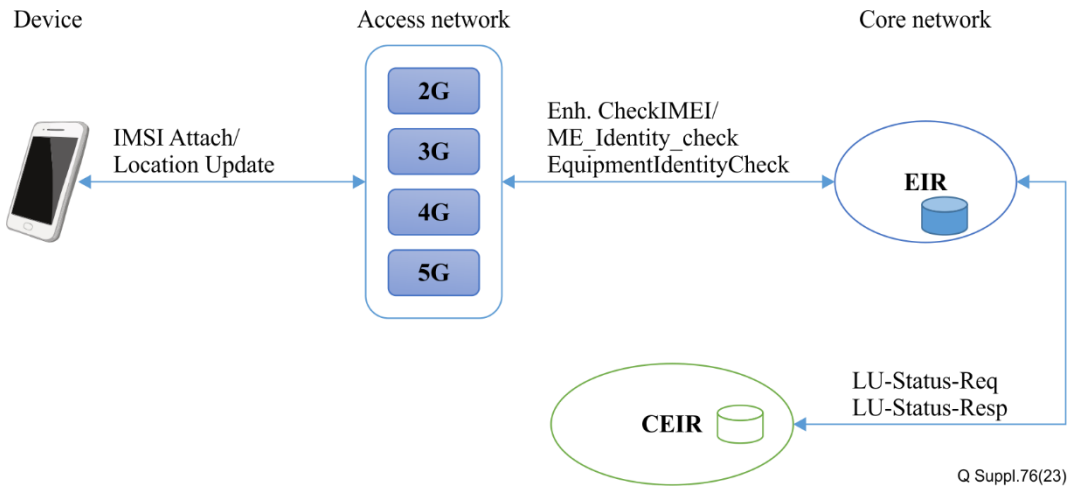

Figure 1 – Registration process for API-based synchronous approach

Whenever the EIR does not have enough information to handle the device registration event (CheckIMEI request), it requests the IMEI status from the CEIR. For this the EIR will send a LUStatusReq message to the CEIR and will synchronously receive the IMEI status in the LUStatusResp response message from the CEIR. After receiving the response from the CEIR, the local EIR will send the response of the CheckIMEI request and at the same time it will insert the

IMEI status with the IMSI in its local EIR database so that a subsequent CheckIMEI will be handled by the local EIR itself. As CheckIMEI is a real time procedure, the response from the MNO network should be provided within the time-limit as per 3GPP. Figure 2 shows the IMEI status message flow between the MNO and CEIR.

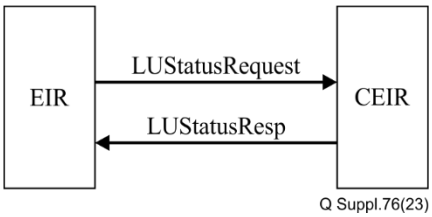

Figure 2 – IMEI status message flow between MNO and CEIR

IMSI registration will be successful when the MNO receives the IMEI status as permissible for the requested IMEI-IMSI from CEIR.

IMSI registration will be a failure when the MNO receives the IMEI status as blocked for the requested IMEI-IMSI or IMEI-IMSI-MSISDN from the CEIR.

Whenever the MNO EIR is unable to send a LUStatusReq message to the CEIR, it can send the IMEI status as ALLOWED in response of the received IMSI registration to temporarily allow the mobile device but it will not insert that IMEI-IMSI in its EIR database, so that subsequent IMSI registrations will be sent to CEIR again.

7.2 Synchronous API-based broadcast message interface

The CEIR will send a CeirBroadcast message to the MNO whenever there is any change in the blocked-list or BLO. In the CeirBroadcast message, the CEIR will send the IMEI for the blocked-list data and an IMEI-IMSI or IMEI-IMSI-MSISDN for the BLO data.

The MNO will send a CeirBroadcastResp message as a response to the CEIR. In the CeirBroadcastResp message, the MNO will send details of successful addition/deletion of the blocked-list or BLO list. Figure 3 shows the broadcast message flow between the CEIR and MNO EIR.

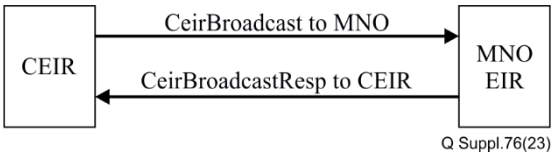

Figure 3 – Broadcast message flow between CEIR and MNO EIR

Whenever the CEIR is unable to send a broadcast message to the MNO due to link down then after link recovery, it will send the link down data in a CeirBroadcast message to that MNO.

In the case of any new EIR installations, mis-match/missing data, the EIR(s) should be able to synchronize their local data with the CEIR – for that a synchronization message could be sent additionally by the MNO EIR to the CEIR and get either the whole broadcasted data sent by CEIR to all other EIRs up to that point of time or data for a specific duration of time.

Details of the API-based synchronous message interface can be found in Appendix II.

8 Description of asynchronous API-based interface

Like the synchronous interface, the asynchronous interface requires two different types of interfaces between the EIR and CEIR – a query interface and a broadcast interface. These interfaces use the same communication methods as the synchronous API based on client and server principles.

The asynchronous API minimizes the impact of communication and performance issues between the CEIR and EIR on the MNO's network. At the same time, with a heavy load on the CEIR, the asynchronous method allows use of the queue to successfully complete any request, but with an acceptable delay. The response from the CEIR to the EIR is sent using a broadcast message.

8.1 Asynchronous API-based query interface

The main difference between the synchronous and asynchronous methods is that in the asynchronous method the EIR does not wait for the synchronous CEIR's response to send a response to the CheckIMEI request. Instead, if it is a new occurrence of the IMEI-IMSI or IMEI-IMSI-MSISDN detected by the MNO, which is not yet in the white list or blocked list, it always sends the IMEI status as ALLOWED in response to the received IMSI registration to temporarily allow the mobile device. The EIR will insert that IMEI-IMSI or IMEI-IMSI-MSISDN in its BLO list so that subsequent IMSI registrations will not be sent to the CEIR again if the CEIR has not yet updated the EIR's blocked list or BLO list by sending the CEIR's broadcast message.

The delivery of each EIR's request to the CEIR will be synchronously in this case also, but this response does not provide any information about the IMSI registration. The CEIR response is needed to include the IMEI-IMSI or IMEI-IMSI-MSISDN in its permitted list or BLO list.

The delivery of each EIR's request to the CEIR is synchronously confirmed, but this response does not provide any information about the IMSI registration. A synchronous response is needed to temporarily include the IMEI-IMSI or IMEI-IMSI-MSISDN in its BLO list.

8.2 Asynchronous API-based broadcast message interface

As with the synchronous API, in the case of the asynchronous API, the CEIR will broadcast a CEIR message to the MNO whenever there is any change to the block list or BLO. In the CEIR broadcast message, the CEIR will send the IMEI for the blocked list data and the IMEI-IMSI or IMEI-IMSI-MSISDN for the BLO data.

In addition, an API-based asynchronous broadcast message interface is used to send an asynchronous update response message to an EIR query request. This message provides the final IMSI registration information by updating the BLO or block lists in the EIR so that a subsequent IMEI checks will be provided with an updated response.

9 Description of file-based interface

In case of a file-based interface – the IMEI, IMSI, MSISDN (optional) will be passed from the MNO local EIR to the CEIR periodically through secure data transfer protocol such as SSH file transfer protocol (SFTP) or HTTPS. Similarly, the broadcast messages generated at the CEIR will be provided to the MNO EIR periodically through a secure FTP interface.

If confirmation is required by the CEIR, then the MNO EIR is expected to send a response back to the CEIR through the same secure FTP interface regarding the implementation of the blocked-list or BLO list in their own EIR.

The interface represents an exchange using a data transfer protocol (i.e., SFTP or HTTPS). The exchange is performed through an SFTP directory of a certain structure. The directory for data exchange is implemented on a centralized site (for example, on CEIR resources). Directories should be MNO-wise, and input and output directories should be created in each directory.

The CEIR creates uploads for the EIR operator systems and puts them in each operator's output directory. EIRs create uploads for transfer to the CEIR and place them in their input directory.

The CEIR processes the data files from the input directory, and stores the data as needed. Each EIR processes the data files from the output directory, and stores the data as needed.

Periodicity of uploading files by each system is configured on that system. When a new file appears in the directory from which the system is supposed to fetch files, the system should start processing it immediately. If there are several files in the folder at once, the system must process them in chronological order, from the oldest to the most recent.

Figure 4 shows the registration process involving CEIR – EIR in a file-based approach.

An example of file formats can be found in Appendix I.

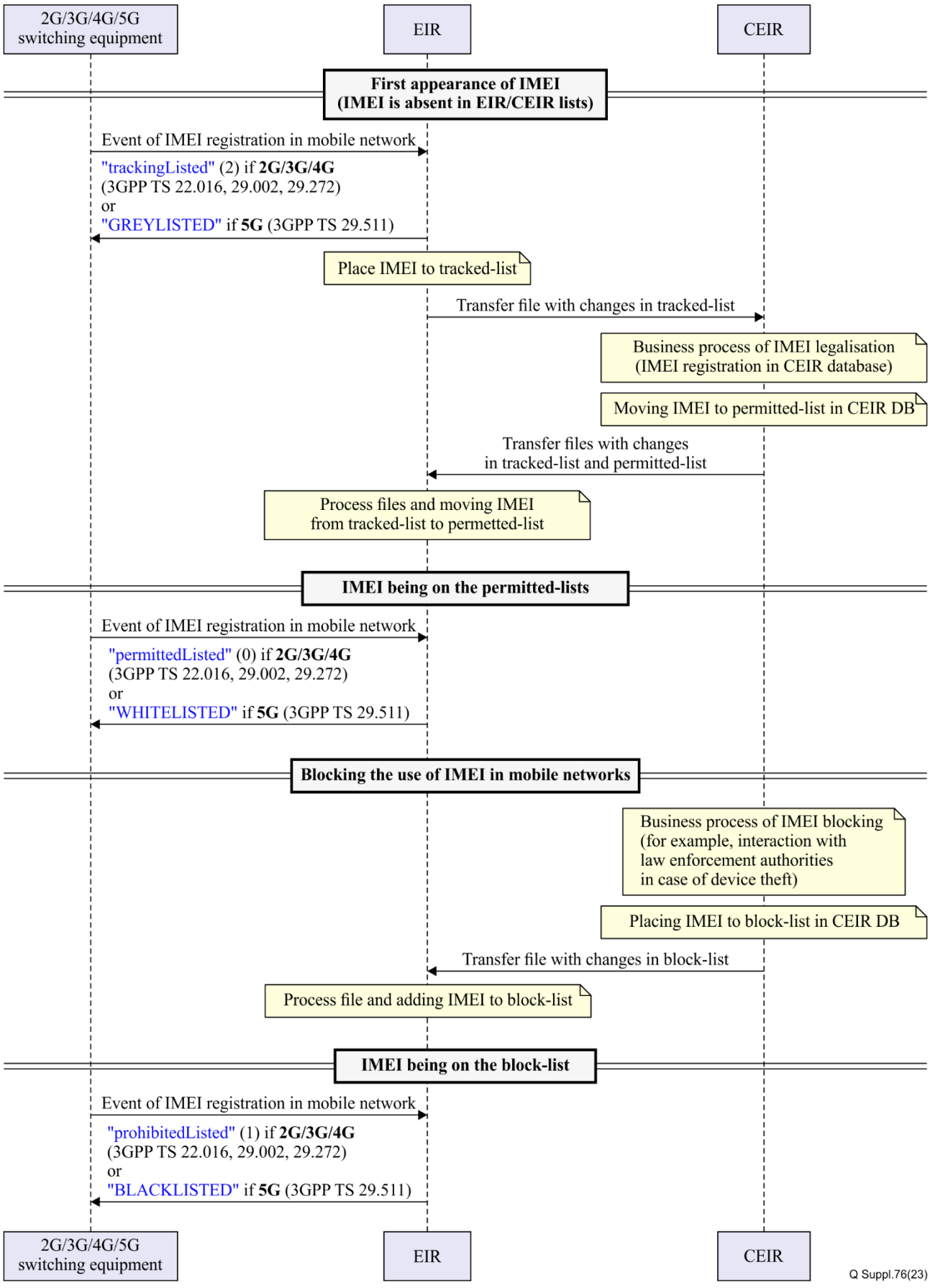

Figure 4 – Registration process involving CEIR – EIR on the file-based approach

9.1 Changing exchange parameters during operation

The only exchange parameter that can change is the periodicity of the upload. To change it, the software on the side of the system that generates the uploads (CEIR or a specific EIR) needs to be reconfigured. Files can start unloading more often or less often at any time. The main conditions are:

1) The system that processes these files must be able to keep up with the time between successive uploads.
2) The replication sequence number must change in accordance with the rules described above when changing the periodicity of unloading.

9.2 Security, reliability and integrity

The interface uses the following mechanisms:

– Using secure data transfer protocol (i.e., SFTP or HTTPS).
– Using a checksum on file contents.
– Using a checksum on the list of replicated files (tables).
– Operator systems' (EIRs') access differentiation.
– Keeping track of the sequence number of uploads. If the sequence is violated, the upload should stop until the administrator intervenes.

9.3 The interface usage area

The interface should not be used for real-time interaction. For example, if the CEIR is to perform short message service (SMS) delivery to subscribers via operator systems, it should do so via the short message peer-to-peer protocol (SMPP) protocol and not via the interface described here.

Appendix I

Sample description of file-based implementation

I.1 File format

Each upload (replication) is formed as a bundle of files. The format of the bundle name is:

<YYYYMMDD_HH24MISS>'_'<TYPE>'_'<SEQUENCE>

- YYYYMMDD_HH24MISS – date and time when the bundle of files started, must be the same for each file in the bundle.

  YYYY – year, 4 digits
  MM – month, 2 digits (01-12)
  DD – day of the month, 2 digits (01-31)
  HH24 – hour in 24-hour format, 2 digits (00-23)
  MI – minutes, 2 digits (00-59)
  SS – seconds, 2 digits (00-59)
- TYPE – replication type: increment - for incremental replication, full – for full replication.
- SEQUENCE – replication sequence number.

Each subsequent incremental replication must increment the number sequentially by 1. Gaps between numbers are not allowed. Full replication must always be followed by replication with number 1. The next full replication must contain the number +1 from the last incremental replication, and reset the replication number to 0.

Example:
1. full 0
2. increment 1
3. increment 2
4. full 3
5. increment 1
6. increment 2
7. increment 3
8. increment 4
9. full 5
10. increment 1
... etc.

Each bundle of files consists of 4 files:

1) *bundle*.zip – replication file archive.
2) *bundle*.md5 **–** MD5 hash of "bundle.zip" file.
3) *bundle*.zip.meta **–** file list at "bundle.zip".
4) *bundle*.zip.meta.md5 – MD5-hash of "*bundle*.zip.meta" file.

The MD5 algorithm is shown here as an example. In a particular implementation, a different kind of hash function may be chosen based on security and overhead considerations. In this case the hash is used to control the integrity of the data. The security of such systems is usually ensured at a higher level by using a secure communication channel (VPN/IPSec) or a dedicated channel (in a demilitarized zone, not the Internet).

The file archive must contain a replication file *replica*.dmp for each table, and its MD5 hash (*replica*.md5).

Replication file name format (*replica*):

<TABLE> '_'<YYYYMMDD_HH24MISS>'_'<TYPE>'_'<SEQUENCE>

- TABLE – name of the replicated table.
- YYYYMMDD_HH24MISS – date and time when the bundle of files was started.
- TYPE – replication type: increment – for incremental replication, full – for full replication.
- SEQUENCE – replication sequence number.

Another archiving method can be used instead of the ZIP method.

I.2 Data format

Replication file format – CSV, delimiter is ';', string data are without quotes. Fields:

1) Action type:
   a) 'I' – new record in a table,
   b) 'U' – update a table entry,
   c) 'D' – record deletion,
   d) 'C' – record availability check (for full replication only).
2) Identifier – unique object identifier in the table.
3) The remaining fields – the remaining fields of the corresponding table.

File contents by replication type:

- full – must contain records with the action type 'C' and contain the full content of the table at the time of the file batch.
- increment – must contain the changes made to the data in the table since the last full or incremental replication.

I.3 Example of the contents of one file-based replication

```
20190920_150631_increment_302.zip
20190920_150631_increment_302.zip.md5
20190920_150631_increment_302.zip.meta
20190920_150631_increment_302.zip.meta.md5
```

An example of the contents of a replication file archive:

```
lst_grey_20190920_150631_increment_302.dmp
lst_grey_20190920_150631_increment_302.dmp.md5
prof_imei_imsi_20190920_150631_increment_302.dmp
prof_imei_imsi_20190920_150631_increment_302.dmp.md5
prof_imsi_msisdn_20190920_150631_increment_302.dmp
prof_imsi_msisdn_20190920_150631_increment_302.dmp.md5
```

An example of the contents of any md5 file:

```
bf260aeb21f9d7b6f472bbdfe6137965 20190920_150631_increment_302.zip
```

An example of the contents of a meta file:

```
0,lst_grey_20190920_150631_increment_302.dmp
77,lst_grey_20190920_150631_increment_302.dmp.md5
26544210,prof_imei_imsi_20190920_150631_increment_302.dmp
83,prof_imei_imsi_20190920_150631_increment_302.dmp.md5
```

```
9231405,prof_imsi_msisdn_20190920_150631_increment_302.dmp
85,prof_imsi_msisdn_20190920_150631_increment_302.dmp.md5
```

An example of the contents of a dmp file:

```
I;4645743;;35765308925140;1;2019-11-15 18:30:24.978269+05
I;4645744;;35234805292623;1;2019-11-15 18:30:25.458509+05
I;4645745;;35315309011137;1;2019-11-15 18:30:30.988295+05
I;4645746;;35262410040777;1;2019-11-15 18:30:32.992414+05
I;4645747;;86001401896926;1;2019-11-15 18:30:35.521089+05
I;4645748;;35805109078236;1;2019-11-15 18:30:35.522695+05
I;4645749;;35539404139069;1;2019-11-15 18:30:35.526653+05
I;4645750;;86309604126198;1;2019-11-15 18:30:36.997812+05
I;4645751;;86894701594683;1;2019-11-15 18:30:39.001608+05
```

Appendix II

Example of synchronous API based interface

II.1 Defined simple types

Name	Type	Length	Description
AREAType	enum	2	Service Area of the MNO sending messages – it could be specific area or the whole country.
MnoIdType	enum	1	Pre-defined Id of MNO sending messages.
ReqIdType	Alphanumeric	21	Will be there in case of broadcast messages and their responses.
IMEIType	String	14-16	Will represent the IMEI of mobile handset.
IMSIType	String	15	Will represent the IMSI of mobile handset.
MSISDNType	String	12-15	Subscriber number prefixed with country code.
StatusType	enum		Can be BLOCKED or PERMITTED.
BlockedErrorCodeType	enum		Can be from list of Blocked Error codes (not a part of this document).
BLOErrorCodeType	enum		Can be from list of BLO Error codes (not a part of this document).
RemarkType	String	1-250	For sending any remark to the receiver.
DateType	DateTime		For date type elements.
SyncListType	enum		Can be Full or Partial.
FilePathType	String	1-250	For file path at the server.
RecordCountType	Int	1-1 000	Will be used for checksum purpose.
ListActionType	enum		Can be INSERT or DELETE.
OrganisationType	String	1-50	Type of the organization from where the information is provided.
RequestSourceType	String	1-50	Reason for the inclusion on the blocklist.
CommentsType	String	1-250	For providing any comment.
ResultType	enum		SUCCESS or FAILURE.
FailCauseType	enum		MSISDN_NOT_FOUND/ SYSTEM_FAILURE/ UNKNOWN_FAILURE

II.2 Defined complex types

In the column marked 'Required/Optional/Conditional', 'R' indicates that the field is Required i.e., Mandatory, 'O' indicates that it is Optional – provided at the discretion of the implementation and 'C' indicates that it is conditional parameter – required for a specific situation.

Complex type	Child elements	Type	Req/Opt/ Cond	Description
MessageHeaderType	AREA	AREAType	O	
	MnoId	MnoIdType	R	
	Date	DateType	R	
IMEIRangeType	IMEIFrom	IMEIType	R	
	IMEITo	IMEIType	R	
BlockedErrorRecordType	IMEI/IMEIRange	IMEIType/IMEIRangeType	R	
	ListAction	ListActionType	R	
	Organisation	OrganisationType	O	
	RequestSource	RequestSourceType	O	
	Comments	CommentsType	O	
	ErrorCode	BlockedErrorCodeType	R	
	ErrorDesc	CommentsType	R	
BLOErrorRecordType	IMEI	IMEIType	R	
	IMSI	IMSIType	R	
	ListAction	ListActionType	R	
	Organisation	OrganisationType	O	
	RequestSource	RequestSourceType	O	
	Comments	CommentsType	O	
	ErrorCode	BLOErrorCodeType	R	
	ErrorDesc	CommentsType	R	
BLOFailureType	Count	int	R	
	Record	BLOErrorRecordType	R	
BlockedFailureType	Count	int	R	
	Record	BlockedErrorRecordType	R	
SuccessType	Count	int	R	
RespTripletType	IMEI	IMEIType	R	
	IMSI	IMSIType	R	

Complex type	Child elements	Type	Req/Opt/ Cond	Description
	Status	StatusType	C	If pair is available in the system
ReqTripletType	IMEI	IMEIType	R	
	IMSI	IMSIType	R	
	MSISDN	MSISDNType	O	
LUStatusReqType	Triplet	ReqTripletType	R	
LUStatusRespType	Result	ResultType	R	
	FailCause	FailCauseType	C	If result is failure
	Triplet	RespTripletType	R	
BlockedRecordType	IMEI/IMEIRange	IMEIType/IMEIRangeType	R	
	ListAction	ListActionType	R	
	ErrorCode	BLOErrorCodeType	O	
	ErrorDesc	CommentsType	O	
	Organisation	OrganisationType	O	
	RequestSource	RequestSourceType	O	
	Comments	CommentsType	O	
BlockedType	RecordCount	RecordCountType	R	Conditional
	Record	BlockedRecordType	R	
BLORecordType	IMEI	IMEIType	R	
	IMSI	IMSIType	R	
	ListAction	ListActionType	R	
	ErrorCode	BLOErrorCodeType	O	
	ErrorDesc	CommentsType	O	
	Organisation	OrganisationType	O	
	RequestSource	RequestSourceType	O	
	Comments	CommentsType	O	
BLOType	RecordCount	RecordCountType	R	
	Record	BLORecordType	R	
CeirBroadcastType	BLO	BLOType	C	If any BLO is generated during blocking
	Blocked	BlockedType	C	

Complex type	Child elements	Type	Req/Opt/ Cond	Description
	ReqId	ReqIdType	R	This is an attribute
BLORespType	Success	SuccessType	C	If BLO processing is successful
	Failure	BLOFailureType	C	If BLO processing is not successful
BlockedRespType	Success	SuccessType	C	If blocking processing is successful
	Failure	BlockedFailureType	C	If blocking processing is not successful
CeirBroadcastRespType	BLO	BLORespType	C	If BLO was received in request
	Blocked	BlockedRespType	C	If blocking was received in request
	ReqId	ReqIdType	R	This is an attribute
CEIRMessageType	MessageHeader	MessageHeaderType	R	
	LUStatusReq	LUStatusReqType	O	
	LUStatusResp	LUStatusRespType	O	
	CeirBroadcast	CeirBroadcastType	O	
	CeirBroadcastResp	CeirBroadcastRespType	O	
	CeirSyncReq		O	
	CeirSyncResp		O	
Full	List	SyncListType	R	
Partial	StartDate	DateType	R	
	EndDate	DateType	R	
	List	SyncListType	R	
SyncRespListType	FilePath	FilePathType	C	If there is data for requested duration
	Remark	RemarkType	O	
	Type	SyncListType	C	It is an attribute

Complex type	Child elements	Type	Req/Opt/ Cond	Description
SyncReqType	Full		C	Either full or partial
	Partial		C	Either full or partial
	ReqId		R	It is an attribute
SyncRespType	List	SyncRespListType	R	
	ReqId	ReqIdType	R	It is an attribute

II.3 LUStatusReq message

LUStatusReq				
Name	**Type**	**Length**	**Required**	**Description**
MessageHeader	MessageHeaderType		R	Will contain the information of AREA, MNO and Date
LUStatusReq elements				
Triplet			R	This will contain the information of IMEI and IMSI
Triplet/IMEI	Integer	14-16	R	IMEI of the mobile handset being used
Triplet/IMSI	Integer	15	R	IMSI of SIM being used

II.4 LUStatusRespmMessage

LUStatusResp				
Name	**Type**	**Length**	**Required**	**Description**
MessageHeader	MessageHeaderType		R	Will contain the information of AREA, MNO and Date
LUStatusResp Elements				
Result	ResultType		R	
FailCause	FailCauseType		C	In case result is failure.
Triplet			R	
Triplet/IMEI	Integer	14-16	R	IMEI of the mobile handset being used
Triplet/IMSI	Integer	15	R	IMSI of SIM being used
Triplet/Status	String	5	C	It can be BLOCKED or PERMITTED

II.5 Broadcast message

CeirBroadcast				
Name	**Type**	**Length**	**Required/ Conditional**	**Description**
MessageHeader	MessageHeaderType		R	Will contain the information of AREA, MNO and Date
CeirBroadcast Elements				
BLO			C	Will be there if there is any BLO addition or deletion
BLO/RecordCount	RecordCountType		C	Will be there if there is any BLO record to be inserted or deleted
BLO/Record	BLORecordType		R	No of record elements will be equal to record count value
Blocked			C	Will be there if there is any blocked addition or deletion
Blocked/ RecordCount	RecordCountType		C	Will be there if there is any blocked record to be inserted or deleted
Blocked/Record			R	No of record elements will be equal to record count value

II.6 Broadcast response message

CeirBroadcast Resp			
Name	**Type**	**Required/ Conditional**	**Description**
MessageHeader	MessageHeaderType	R	Will contain the information of AREA, MNO and Date
CeirBroadcastResp elements			
BLO		C	Will be there if there is any BLO addition or deletion
BLO/Success		R	Required if parent is present
BLO/Success/ Count	Integer	R	Required if parent is present
BLO/Failure/		R	Required if parent is present
BLO/Failure/Count	Integer	R	Required if parent is present
BLO/Failure/Record	BLOErrorRecordType	C	Required if value of failure count is more than 0
Blocked		C	Will be there if there is any blocked addition or deletion
Blocked/Success		R	

CeirBroadcast Resp			
Name	**Type**	**Required/ Conditional**	**Description**
Blocked/Success/Count	Integer	R	
Blocked/Failure/		R	
Blocked/Failure/Count	Integer	R	
Blocked/Failure/Record	BlockedErrorRecordType	R	Required if value of failure count is more than 0

II.7 Synchronization request

CeirSyncReq				
Name	**Type**	**Length**	**Required**	**Description**
MessageHeader	MessageHeaderType		R	Will contain the information of AREA, MNO and Date
CeirSyncReq elements				
Full or Partial			R	Any one is required
Partial/StartDate	DateType		R	Start time from where partial data is requested
Partial/EndDate	DateType		R	End time up to which partial data is requested
List	SyncListType	5	R	It can be BLOCKED, BLO, PERMITTED and TRACKED

II.8 Synchronization response

CeirSyncResp				
Name	**Type**	**Length**	**Required**	**Description**
MessageHeader	MessageHeaderType		R	Will contain the information of AREA, MNO and Date
CeirSyncResp Elements				
List	SyncListType		R	
List/FilePath	FilePathType	1-250	C	FilePath will be available if data is present in the list
List/Remark	RemarkType	1-250	C	Remark will be there if no data is available for list

Appendix III

Examples of the current industry approach

III.1 Republic of Uzbekistan

In Uzbekistan, the CEIR system was launched in 2019. It is integrated with 4 EIR systems using the file-based approach. The interface described in this document is being implemented. Since the launch, the interface settings have been changed: the list of replicated tables in both directions was changed, replication periodicity was changed (replication period was reduced).

III.2 Republic of Tunisia

In Tunisia, the CEIR system was launched in 2019. CEIR is integrated with 3 EIR systems using the asynchronous API-based interface and IMEI-IMSI-MSISDN registration.

III.3 Republic of India

In India, CEIR implementation started from 2018, deployment started from 2019 and pan India deployment completed in 2023. File-based offline interface has been implemented and synchronous API-based query interface implementation is in progress.

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