RGMA Electronic File Transfer Specification

Document Approval

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Document History

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Version 1.1	September 2004	First approved version
Version 1.2	October 2008	Update for clarity, reflect Gateway P. Pull
Version 1.3	January 2016	Update to extend the character set in the Group 9ZZ Erroneous Record Identifier from Char(3) to Char(5)

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Introduction

1. This defines the File Transfer Protocols used by the ElectraLink RGMA Service when handling RGMA format files, so that application developers can design and implement the necessary applications, to enable successful transfer of data across the ElectraLink RGMA Service.

2. The File Transfer Protocols are used to ensure the reliable transfer of data files across the ElectraLink RGMA Service, and encompass the acknowledgements and errors that may be returned during the transfer.

3. In order for data to be transferred across the ElectraLink RGMA Service, the transfer must conform to the following levels of protocols, in addition to the File Transfer Protocols specified in this document:

(a) **Host Interface Protocol (HIP):** This includes the network protocol to be used for access to the Gateways (for example, TCP/IP), the file transfer mechanism (for example, FTP) and the local acknowledge mechanism. These details are covered in the associated document “RGMA Gateway Interface Specification".

(b) **RGMA User File Design Specification:** This describes the standard structure required for RGMA files to be transferred including the information required in the file header and footer, and the rules for describing the data contained in the file. More details can be found in the RGMA User File Design Specification document.

(c) **Business Level or Application Protocols:** This includes business level (application to application) acknowledgements and the handling of application level errors. Business level and application protocols are not within the scope of this document, although some of the key issues are discussed in this document in the section entitled RGMA Acknowledgement Protocol. These issues are covered in detail by the various RGMA documents publicly available.

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RGMA acknowledgement background

4. This section provides background information associated with the RGMA acknowledgement protocol. This is the level of acknowledgement that deals with the reliable transfer of RGMA data files from one User to another, that is, from the local User's Host to the remote User's Gateway. It does not include application-to-application level acknowledgements, which may be required for business-specific purposes.

Message logs, alerts and acknowledgements

5. If data is transferred across the ElectraLink RGMA Service, various levels of reporting are available to the User. In addition to the user and RGMA network acknowledgements specified in this document, there are two other acknowledgements available to the User organisation regarding transfers:

(a) *An audit log* is held on the service which provides information on all significant events associated with file transfers through that local Gateway. This audit database is available for local User inspection. Events recorded include the arrival of a file at the Gateway and the receipt of the file at the remote Gateway.

(b) *Alerts* constitute all "significant" events and errors associated with the overall service and are raised at the Service Provider's network management centre.

6. RGMA Audit web tools provide details of each stage of the transmission of a message. Search and filter facilities are available through a browser in order to help Users obtain the details they require.

Significant points in the transfer

7. The ElectraLink RGMA Service provides a reliable end-to-end data transfer service, that is, from a Sending Gateway to a Receiving Gateway, and Users need not be concerned with the details of many of the stages of transfer within this end-to-end service. There are various points within the transfer however where the User is likely to require information about the progress of a file. The significant points are:

(a) *Start of transfer* is the point at which the service starts to transfer the file from the sender to the recipient. For FTP transfers, where the Gateway is "pulling" the files, it is the point when the Gateway successfully pulls a file, and renames or removes it from the originating Host. For FTP transfers where the Host "pushes" the files, it is the point when the file has been pushed, and has been accepted by the Gateway. For X.400 transfers, it is the point when the Gateway has received the X.400 message. This is the point from which the Service Levels apply and the point at which the User knows that they have started to transfer the required data, which may be required for their bilateral service level calculations.

(b) *Delivery of data* is the point at which the service has delivered the data to the recipient or made it available on the Gateway for delivery. It corresponds to the discharging of the Service Provider's responsibility for message delivery,

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and is the point at which the 'sending' User can relinquish responsibility for transferring the file to the recipient.

(c) *Data processed* is the point at which the data has actually been processed by the recipient application, either successfully or with errors. This corresponds to the business level protocol and is outside the scope of this document. However, because business level protocols are key to successful end-to-end operation, this issue is discussed further in the section on other aspects of data transfers later in this document.

8. The service has the ability to provide status information on other steps in the process of transferring a file from one party to another, much of which is recorded in the audit logs. In addition to the audit log, there are customised reports provided which can be used for routine monitoring of the achievement of service levels.

9. Any error detected during the transfer of a file is reported to the sending Host in the form of a negative Acknowledgement.

Time delay in transfers

10. The service provides a store and forward data transfer service, thus real-time or direct application-to-application online transfers are not supported. Consequently there can be significant time delays between the various stages of transferring a file, from one User to another. From the point at which a transfer is initiated by the sending Host, the following delays may occur:

(a) *Start of transfer by local Gateway:* This is likely to happen within a few minutes (or less) and is really only limited by the processing load of the Gateway at that time;

(b) *Data file reaches Receiving Gateway:* Normally, data transfer will be achieved within agreed service levels. However, a delay could occur after the transfer was initiated, depending on the size of the file to be transferred. The agreed service levels for the delivery times for files are contained in the DTSA;

(c) *Data file is collected by or delivered to the Receiving Host:* This may happen immediately after the file is available on the Receiving Gateway. Where the remote Host is in FTP pull mode however, it may not happen until several hours after the file is available. This will also be the case for Users with dial-up connections to the service, where the User may choose to dial in to the Service only occasionally during the day; and

(d) *Data file is processed by the Receiving Host:* Again, this may happen immediately after the file is delivered to the Host or may be many hours afterwards, if for example, the data was to be processed during a daily (overnight) batch run. It is possible for the data not to be processed for several days, for example if the file arrived after a batch run, and the next one was not due until the next working day, or after a weekend.

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Volume and performance issues

11. A large participant is likely to generate several thousand messages per day. If each of these were to generate multiple progress messages then this could add a significant processing load, both to the Gateway and to the sending applications. The acknowledgement policy has therefore been designed to provide sufficient useful information to the User application, to allow it to monitor the status of a transfer and take appropriate action, without creating large numbers of messages which are subsequently ignored.

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RGMA acknowledgement protocol

12. This section defines how the RGMA acknowledgements are supported by the ElectraLink RGMA Service. The general principle is that the application only requires a single acknowledgement from the service to the sending application, which indicates either:

(a) There was a failure in the transmission, and the reason for that failure;

(b) The transmission was successful, and the application relinquishes its responsibility for sending the data.

13. Any acknowledgement by the receiving application that it has successfully processed the data is outside the scope of the service, and hence not covered in this document.

Operation

14. When the network delivers a user file, the service sends an internal service message back to the originating Gateway. The service message is generated at the point where the Gateway has completed its processing of the message, and the file is available for collection by the recipient Host.

15. An acknowledgement message is generated in RGMA File Format as described below, and this is made available to the originating Host using the appropriate protocol.

16. Should there be a failure in delivery by the central hub or a Gateway, for instance due to addressing or security problems, then an appropriate service message and code is generated indicating the reason for the failure. This is routed to the sending Gateway which then generates a standard RGMA File Format message and makes it available to the originating Host.

17. A sending application may check that a transfer has been started within a particular time. The application can check to see whether the queued file has been deleted by the Gateway from the relevant directory. If not, the application does not re-send the data, as there is most likely to be a problem in communication, and the Host - local procedures need to be invoked to handle this.

18. An application that wishes to check that the data has been received by the remote Gateway, should wait for the RGMA acknowledgement (file) to be returned. If the file is not returned within a reasonable time this will usually be due to a problem, and there will be no benefit gained from re-sending the file. Automatic re-sending may in fact compound an already existing problem. If the application requires confirmation that the file has been received and processed by the remote application, rather than just delivered to the remote system, then a higher level of acknowledgement is required. This would be at a Business Process level and is outside the scope of the service. See also ‘Application level acknowledgement and error handling’ later in this document.

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19. Where an error occurs during the transfer of a file, then a negative user RGMA acknowledgement, or error return, is sent by the ElectraLink RGMA Service, indicating to the sending application the nature of the error. This negative acknowledgement is returned in the same form as the positive acknowledgement, in a file as described in 'Acknowledgement file format'.

Acknowledgement file format

20. Positive and negative acknowledgements are indicated via a RGMA acknowledgement file. This file is similar to the normal RGMA File Format structure, and contains a single Acknowledgement flow, as defined below. To identify the RGMA acknowledgement flows, and to easily differentiate them from the normal data flows, the format is slightly different as described below:

(a) *Header:* The acknowledgement file for normal data files contains a header record. The header record identifies the data flow as type "A0001". It is a copy of the header record in the original file that was sent, except that the time stamp is changed and the original "Originator" and "Recipient" fields are reversed. This ensures that the file can be handled as a normal RGMA User File. However, the acknowledgement file is not routed by the Gateway using the normal routing tables. It is returned to the Host that sent the original data file, refer to "*RGMA Gateway Interface Specification*" for a complete explanation of this process. The Timestamp reflects the time that the acknowledgement file was created.

(b) *RGMA Acknowledgement data flow* is a single data flow, consisting of two records (data sets), with the following fields:

Acknowledgement Data Flow – First Group			
Data Item	**Status**	**Format**	**Comments**
Originating Flow Group	M	Char (3)	"9ZY"
Flow Originator	M	Char(1)	"1"
Original File Type Code	M	Char(5)	File Type Code from the original message.
Original File Identifier	M	Char(8)	From the original message
Action Taken	M	Char(1)	"1" = Delivered OK "3" = Delivery Failed

Acknowledgement Data Flow – Second Group			
Data Item	**Status**	**Format**	**Comments**
Set of Errors Group	M	Char (3)	"9ZZ"
Erroneous Flow Instance Number	M	INT(8)	0 = applies to whole message
Erroneous Record Identifier	M	Char(5)	"0" = applies to whole message
Error Classification	M	INT(4)	See Table below
Error Description	M	Char(40)	Textual Description of Error

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Error Classification Codes	
Code	**Meaning**
10	Failed to Translate User File
20	Failed to Encrypt User File
30	Failed to Address Network File
40	Failed to Queue Network File
50	Failed to Send Network File
60	Failed to Deliver Network File
500	User File Delivered

(c) *Trailer record:* This is the standard RGMA format trailer, containing the Record Identifier "TRAIL" only.

21. Each ACK and NACK produced has a filename that relates to the name of the original data file. Each uses the original data file name and appends either ".ack" or ".nack", depending on whether the data transfer was successful or not. For example, if a data file with name GMT01.TN123456.ONA was successfully transferred, it's ACK file would be called GMT01.TN123456.ONA.ack. If the transfer failed, the NACK file would be called GMT01.TN123456.ONA.nack.

22. The procedure for handling these errors needs to be defined locally. For many of the errors, for example incorrect formatting of the data file, it is unlikely that the end user applications are able to handle this directly, and some level of manual intervention may be expected. However, such local procedures are outside the scope of the service, and hence this document.

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Example of RGMA acknowledgement file

23. Given below is an example of an RGMA acknowledgement file, for both a successful and a failed transfer.

File sent by Host:

```
"HEADR","ONJOB","SOP","SUP","ONS","MAM",20040224,"102358","28736465","PRDCT",2,1
… data …
"TRAIL"
```

In the case of successful delivery, the RGMA acknowledgement returned by the service would be:

```
"HEADR","A0001","ONS","MAM","SOP","SUP", 20040224 ," 102358","28736465","PRDCT",2,1
"9ZY","1","MDDTR","28736465","1"
"9ZZ",0,"0",0,"User File Delivered"
 "TRAIL"
```

In the case of rejection due to a failure to address the file, the RGMA acknowledgement returned by the service would have the following form:

```
"HEADR","A0001","ONS","MAM","SOP","SUP", 20040224  ,"102358","28736465","PRDCT",2,1
"9ZY","1","MDDTR"," 28736465","3"
"9ZZ",0,"0",30,"Failed to Address Network File"
 "TRAIL"
```


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Other aspects of data transfers

24. This section discusses some of the issues around the higher level aspects of the transfer of data between parties, in particular the areas of application level acknowledgements, and the sequencing and ordering of data flows.

Application level acknowledgement and error handling

25. The preceding section has described the acknowledgement process required for the transfer of RGMA files across the service. Additionally, there may be a requirement for application level acknowledgements or error handling. Such acknowledgements and errors are at a level above the transfer of data between systems, and associated with the receiving application, and whether it could successfully interpret the data contained within the file transferred.

26. Within this area, the following types of issues need to be addressed:

(a) whether each Transaction requires a business level acknowledgement, to confirm that the receiving application has successfully processed the data;

(b) whether there is an electronic mechanism provided to return errors found when processing the data, or whether manual or ad-hoc means are used.

27. These details may vary between individual types of Transaction.

Sequencing and cycle numbers

28. Each file transferred across the service includes a header record, which contains a file identifier. As noted in the specification for the RGMA User Files, the sending application / Host must ensure that these identifiers are unique (within the market participant). However, there is no other implied meaning to this identifier, and it is in the file header purely to enable the unique identification of files passing across the network. There is no requirement within the DTN on the sending party to ensure that subsequent identifiers are consecutive.

29. Some application processes may require sequencing or cycle numbers within data transfers, for example:

(a) to enable applications to determine when a file in the sequence is missing;

(b) to enable applications to determine the order in which multiple files should be processed; and

(c) to ensure that the file that is received is the file that is expected.

30. Where such functionality is required it is provided for within the definition of the Transaction itself. The service functionality and the file header does not provide support for this type of functionality, and the User must be aware of the above conditions.

31. The RGMA service does not guarantee to deliver RGMA User Files across the network in the same order that they are submitted to the local Gateway. Where such ordering is important it must be provided within the data content by the application.

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Message version control

32. There is no version management of RGMA messages, because the RGMA header and trailer records do not contain a data item for version management.

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Daily Gateway Report

33. A typical RGMA daily log report for a Gateway is shown in Appendix A. Note that it is split into four sections showing the Sent Messages, Received Messages, Incomplete Sent Messages and Incomplete Received Messages.

34. The Fields in the Sent Messages section of the report are as follows:

Column Name	**Description.**
From MPt	The Originator ID of the market participant that sent the message
From MRl	The Originator Role of the sender of the message
To MPt	The Recipient ID of the market participant that received the message
To MRl	The Recipient Role to which the message was sent
File Type Code	The file type code of the message
Test Flag	The file usage code from the message header
Message ID	Message ID (Internal reference - based on 8 character Gateway name, 7 character UNIX Epoch Time in Base 36 and 1 Char check digit)
File Date Time	Date /time the message was transmitted to the network
Gateway (Receiving)	Id of the Gateway receiving the message
Size Bytes	Message Size in bytes
Message Delivery Status	Gives information on the success or otherwise of the message transfer
File Id	The File Identifier from the User File Header
Elapsed Time	Time for message to be transferred across the service. The time is in the format HH:MM:SS (hours, minutes, seconds)
SLA Status	Gives information on the message's SLA status
Total	
Successfully sent KBytes	The number of User File Kilo Bytes successfully transmitted (total of bytes divided by 1024 rounded to the nearest kilobyte)

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35. The Fields in the Received Messages section of the report are as follows:

Column Name	**Description.**
From MPt	The Originator ID of the market participant that sent the message
From MRl	The Originator Role of the sender of the message
To MPt	The Recipient ID of the market participant that received the message
To MRl	The Recipient Role to which the message was sent
Data Flow	The file type code of the message
Test Flag	The file usage code from the message header
Message ID	Message ID (Internal reference - based on 8 character Gateway name, 7 character UNIX Epoch Time in Base 36 and 1 Char check digit)
File Date Time	Date /time the message was transmitted to the network
Gateway (Sending)	Id of the Gateway sending the message
Size Bytes	Message Size in bytes
Message Delivery Status	Gives information on the success or otherwise of the message transfer
User File Id	The File Identifier from the User File header.
Total	
Successfully received KBytes	The number of User File Kilo Bytes successfully received (total of bytes divided by 1024 rounded to the nearest kilobyte)

36. The information provided will enable Users to log and check all the messages sent against their own Host records. For example; the logs (overleaf) are shown for ABCDH001. Selecting a Message Id of ABCDH00100SD49A1 (the first in the list) shows an outbound message on 12th February at 09:41 destined for IJKLH001. The file type code ONAGE of 1154 Bytes. The status of the message is “User File Delivered” which means a RGMA Acknowledgement has been received.

37. The date/time reflects the time that the acknowledgement was received. It is not possible to retrieve the original message time from the log entry.

38. The report also gives summaries of the numbers of messages sent and received, with numbers of successes and failures for each.

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Appendix A RGMA Gateway Message Report

```
Gateway Message Report      RGMA  12-FEB-2004 10:47

Gateway :- ABCDH001

Sent Messages :-

    From              To     Data  Test    Message ID     File Date Time   Gateway     Size     Message Delivery  User     Elapsed   SLA
MPt      MRl      MPt    MRl Flow  Flag                                   (Receiving)   Bytes    Status           File Id     Time   Status

---   -  ---      ---  - --- ----  ----- ---------------- ---------------- -------- ------ -------------------  -------- --------   ------

MDDFORUM MDDFR    BGT    SUP ONAGE PRDCT ABCDH00100SD49A1 12/02/2004 09:41 IJKLH001   1154 User file delivered  00003080  00:08:33    01

MDDFORUM MDDFR    BGT    SUP MDDTR PRDCT ABCDH00100SD4991 12/02/2004 09:43 IJKLH001   1546 User file delivered  00003081  00:04:12    01

MDDFORUM MDDFR    BGT    SUP MDDTR PRDCT ABCDH00100SD4992 12/02/2004 10:47 IJKLH001  13000 User file delivered  00003082  00:18:21    01

Successfully sent KBytes                : 15

Received Messages :-

    From            To         Data  Test  Message ID       File Date  Time   Gateway      Size   Message Delivery     User
MPt      MRl   MPt      MRl   Flow  Flag                                       (Sending)    Bytes   Status               File Id
---  -   ---   --- -    ---   ----  ----  ---------------- ---------- ----- -------- ----------  -------------------  ----------

BGT      SUP   MDDFORUM MDDFR MDDTR PRDCT IJKLH00100SD4745 12/02/2004 09:41 ABCDH001        1172 User file delivered    00009586

Successfully received KBytes            : 1

Number of Complete Sent Messages        : 3

Number of Complete Received Messages    : 1

Number of Failed Sent Messages          : 0

Number of Failed Received Messages      : 0

Incomplete Sent Messages :-

    From              To     Data  Test    Message ID     File Date  Time   Gateway   Size   Message Delivery                User
MPt      MRl      MPt    MRl Flow  Flag                                   (Receiving) Bytes  Status                          File Id
---  -   ---      ---  - --- ----  ----- ---------------- ---------- ----- --------   -----  ------ ------------             -------

MDDFORUM MDDFR    BGT    SUP MDDTR PRDCT ABCDH00100SD4999 12/02/2004 09:35 IJKLH001   1054   Awaiting Delivery Confirmation  00003061

Incomplete Received Messages :-

    From            To         Data  Test  Message ID       File Date  Time   Gateway       Size  Message Delivery                User
MPt      MRl   MPt      MRl   Flow  Flag                                       (Sending)     Bytes  Status                          File Id
---   -  ---   ---  -   ---   ----  ----  ---------------- ---------- ----- -------- -----------  ------------------------------  -------

BGT      SUP   MDDFORUM MDDFR MDDTR PRDCT IJKLH00100SD4745 12/02/2004 09:41 ABCDH001        1172 Awaiting Delivery Confirmation  00009586

Number of Incomplete Sent Messages     : 1

Number of Incomplete Received Messages : 1

End of Report
```


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