

Ontario EBT Protocol Between Hubs and Points

Version 3.0

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1.0. Executive Summary

This document defines the Internet Data Transport protocol and rules for EBT transactions for communication between Hubs and Points as defined by the Ontario Energy Board's EBT Work Group for the deregulated Electric marketplace in Ontario, Canada.

2.0. Revision History

Author	Version	Date	Description
Jeff Feinrip / Grant Comissiong	0.1	August 21, 2001	Initial version
Jeff Feinrip	0.2	August 24, 2001	Incorporate comments from Systrends
Jeff Feinrip	1.0	September 4, 2001	Incorporate feedback from August 29/2001 EBT Working Group Meeting
Jeff Feinrip	1.1	September 13, 2001	Incorporate feedback from Jim Stewart
Jeff Feinrip	2.0	September 17, 2001	Incorporate feedback from September 14/2001 EBT Working Group Meeting
J. Stewart	2.1	December 21, 2001	Re-release of the document with only a change in the version number to match other parts of the standard.
T. Stark	2.2 Patch1	October 25, 2004	Incorporate changes from GIs 389, 449
T. Stark	3.0	January 10, 2005	Addition of Disclaimer Statement

3. Introduction

This document defines the Internet Data Transport protocol and rules for EBT transactions for communication between Hubs and Points as defined by the Ontario Energy Board's EBT Work Group for the deregulated Electric marketplace in Ontario, Canada.

This document assumes the reader is familiar with the Ontario EBT Specifications, the Ontario Data Transport Protocol, public key encryption, and HTTP.

3.11.0 Scope

The EBT Hub to Point Protocol defines the technical and functional standard for EBT messaging between Hubs and Points in the Ontario deregulated electric market. This includes Hub to Point messages and the responsibilities of Hubs and Points in a mixed Hub/Point environment.

This document does not cover the messaging between a Hub and its subscriber, or Point to Point connections directly between trading partners. This document does not cover the contents or format of PIPE Documents carrying consumer information.

The EBT Hub to Point Protocol consists of the following parts:

- Transport Level protocol and connections;
- The delivery of Functional Acknowledgements;
- Time synchronisation and time stamping of transactions;
- Routing of subscriber messages; and
- XML Parsers.

3.22.0 Definitions

This document uses the following definitions:

EBT Message	A transport-protocol object that includes HTTP information and encapsulates one PIPE Document.
EBT Document	One XML instance document consisting of a PIPE Document, which in turn is made up of one or more EBT transactions.
EBT Hub	<To be defined>
PIPE	Partner Interface Protocol for Energy.
Point	<To be defined>

3.33.0 Guiding Principles for this Protocol

The following principles were used as guidelines to develop the Ontario EBT Protocol between Hubs and Points:

- The rules for EBT communication between retailers and LDCs are defined in the (EBT) Standards Document and the Ontario EBT Data Transport Protocol. All solution offerings must conform to these standards.
- Hubs provide mailbox and route EBTs for their subscribers.
- In Point to Hub communication, the Market Participant Point is always the originator or end destination of the EBT; all other EBTs not specific to that Point are rejected.

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3.44.0 References

For additional information, please see the following documents:

- “Ontario EBT Data Transport Protocol”, Ontario EBT Working Group;
- “Ontario EBT Hub to Hub Protocol”, Ontario EBT Working Group;
- “Ontario Electronic Business Transactions (EBT) Standards Document” (Business Rules Document), Ontario EBT Working Group.

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4. Transport Level Protocol

This section defines the transport level issues for Hub to Point connections.

4.41.0 Basic Transport Level Protocol

The communication from a Hub to a Point or a Point to a Hub extends the protocol as is used in Hub to Subscriber communications and Hub to Hub communications. This Transport Protocol encompasses the:

- Security protocol;
- Message protocol; and
- Delivery protocol.

A Hub must have a unique identifier (the equivalent of an OEB License Number within the EBT Message standard) and a user id and password for each Point in the market that it needs to connect to. Similarly, a Point will have an OEB License Number as its unique identifier along with a user id and password for each Hub that it needs to connect to.

Note that the basic Transport Level Protocol is not end to end and therefore the EBT message will be encrypted by a sender (either a Point or a Hub) for its destination (either the Point or the Hub). For example, a Point sending an EBT message to a Hub's subscriber will encrypt the EBT message with the Hub's public key and sign the message with its private key. Conversely, a Hub will encrypt its subscriber's EBT message with the Point's public key and sign the message with its private key.

4.42.0 Hub to Point Push Communication Model

Each Hub or Point connects to another Hub or Point in order to deliver an EBT to its destination (EBT recipient). A Hub must maintain an inbound mailbox for each Point with which its subscribers wish to communicate. A Point must maintain an inbound mailbox for each Hub that has subscribers wishing to communicate with the Point.

Both Hubs and Points will meet the same processing guidelines to be defined by the OEB.

4.43.0 Store and Forward Storage Requirements

Upon a successful EBT upload, the Hub/Point (sender) must maintain an archive of the sent EBT in accordance to the OEB mandated retention time period. Original encryption/signature keys must be retained and associated with the archived messages.

4.44.0 Failures

The following is the minimum recommendation for handling Hub to Point / Point to Hub communication failures:

- ±.0.** A protocol failure occurs any time a sender cannot connect to the subscribed entity's server (Point or Hub). For example, if connection to a server fails, or posting a file fails, this is a protocol failure.

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2. An exchange failure is when a sender has had continual protocol failures over a minimum two-hour period. Each entity is required to try at least 3 times over the two-hour period before flagging an exchange failure.
3. E-mail is the recommended mechanism to notify the intended recipient of protocol and exchange failures. This will assist in resolving and documenting problems.

5. Functional Acknowledgements

This section describes the requirements for Functional Acknowledgements between Hubs and Points. Functional Acknowledgements are used to acknowledge the delivery of PIPE Documents. They identify invalid XML formatting of PIPE Documents and good and bad formatting of PIP transactions. A more complete description of Functional Acknowledgements can be found in the “Ontario Electronic Business Transactions (EBT) Standards Document” (Business Rules Document).

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5.11.0 Operation of Functional Acknowledgements

5.1.11.0.0 XML Validation

The Hub will XML-validate each EBT Message that it receives. The Point will also XML-validate each EBT Message that it receives. After checking for errors, the Hub will send a Functional Acknowledgement back to its subscriber as described in the “Ontario Electronic Business Transactions (EBT) Standards Document” (Business Rules Document). Similarly, the Point will send a Functional Acknowledgement back to the Hub as described in the “Ontario Electronic Business Transactions (EBT) Standards Document” (Business Rules Document).

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5.1.22.0.0 Hub Functional Acknowledgement Processing

The following lists the rules for a Hub to send Functional Acknowledgements to a Point:

- If the Market Participant Recipient in the EBT document is a subscriber of the Hub then the FunctionalAcknowledgement should be of type Accept if the document passes XML validation and consists of all good PIPs.
- If the Recipient is not a subscriber then the FunctionalAcknowledgement should be of type DocReject.
- If all transactions are bad in the originating PIPE document then the FunctionalAcknowledgement should be of type DocReject, and the Hub will forward none of the transactions.
- If the Hub is sending a FunctionalAcknowledgement of type PartialAccept, it will only send along good transactions to the destination subscriber. The PartialAccept Functional Acknowledgement being returned to the Point will list which transactions were accepted, and forwarded, and which transactions were rejected. A hub will remove messages that fail XML validation against the relevant schema from the EBT document before placing it in the intended recipient's mailbox.
- The Hub may send a DocReject Functional Acknowledgement if it detects other errors within the EBT document such as duplicate PIPE Document reference numbers and duplicate Transaction reference numbers from a sender.

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The following lists the responsibilities of a Hub when it sends Functional Acknowledgements to a Point:

- If the Hub returns a PIPEFunctionalAcknowledgement of type Accept to a Point then the Hub takes responsibility for delivery of its EBT Message to the destination Mailbox of its subscriber.
- If the Hub is unable to process the EBT Message by loading it into the destination Mailbox of the end subscriber, then it must report the problem back to the Point. Since all Hubs are validating based on public schemas at the OEB web site, this should only be due to network failures. This reporting is to be done via e-mail or some other mutually agreed upon method between the Hub and the Point.

The following lists the responsibilities of the Hub when it receives Functional Acknowledgements from a Point:

- When the Hub receives a DocumentReject or PartialAccept Functional Acknowledgement, within four hours it will notify the Point and trigger a process to resolve the issue. Best efforts should be made to resolve the issue. This mechanism is identical to the situation where a subscriber reports a PartialAccept Functional Acknowledgement to the Hub.

5.1.33.0.0 Point Functional Acknowledgements Processing

The following lists the rules for a Point to send Functional Acknowledgements to a Hub:

- If the Market Participant Recipient in the EBT document is the Point then the FunctionalAcknowledgement should be of type Accept.
- If the Recipient is not the Point then the FunctionalAcknowledgement should be of type DocReject.
- If all transactions are bad in the originating PIPE document then the FunctionalAcknowledgement should be of type DocReject.
- For a FunctionalAcknowledgement of type PartialAccept, the Point will list which transactions were accepted and which transactions were rejected.
- The Point may send a DocReject Functional Acknowledgement if it detects other errors within the EBT document.

The following lists the responsibilities of the Point when it receives Functional Acknowledgements from a Hub:

- When the Point receives a DocumentReject or PartialAccept Functional Acknowledgement, within four hours it will notify the Hub and trigger a process to resolve the issue. Best efforts should be made to resolve the issue.

5.1.44.0.0 Trading Partner Validation

The recipient will send a Document Reject Functional Acknowledgement if it determines that no trading partner agreement is in place.

5.22.0 Availability Requirements

For the purposes of dispute resolution, each Hub and Point must archive all EBT Messages it processes and their corresponding Functional Acknowledgements to the same criteria specified in the Hub to Subscriber protocol.

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5.33.0 XML Parsers

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This section describes a Hub and Point's requirements for XML Parsers.

Each party is free to select and use their own XML validating parser. If two parties disagree on the XML validity of a PIPE Document, final resolution will be determined by examination of the XML according to the schemas as published on the OEB web site. Validity will be determined using the current active specification of the XML Schema Definition Language as listed on the World Wide Web Consortium (W3C) web site.

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5.44.0 Detection of Other Errors

Where the error reporting tools and mechanisms of the protocol (i.e., HTTPS responses and Functional Acknowledgements) do not provide a mechanism for communicating the type of error back to the sender, the issue will be escalated based on business arrangements between the market participants. At a minimum, the problem will be escalated via a telephone call to the operations staff of the originator of the transaction.

Such errors include:

- Decryption errors;
- Signature errors;
- Receipt of a Partial Functional Acknowledgement or Document Reject Functional Acknowledgement from a Hub; and
- Lack of a Functional Acknowledgement from the recipient within the required four hours.

6. Time Synchronisation and Time Stamping

This section describes the Hub and Point requirements for time synchronisation and the time stamping of transactions. In a networked environment such as the EBT marketplace and since the arrival times for transactions are used for dispute resolution an accurate consistent time stamp is imperative.

6.11.0 Time Synchronisation

Each Hub or Point will maintain an accurate and consistent time by connecting through the NTP protocol to a service with an accuracy of at least that provided by a stratum-2 server¹. There are various stratum-2 timeserver sources available, including free servers, subscription servers and potentially the IMO time-servers if they become accessible.

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6.22.0 Time Stamping of Transactions

Each Hub or Point will date and time-stamp each EBT Document when it receives it. The Hub or Point should use Eastern Standard Time with no Daylight Savings Time change as specified in the "Ontario Electronic Business Transactions (EBT) Standards Document".

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¹ Stratum-1 servers connect to GPS or atomic clocks. Stratum-2 servers obtain their reference from stratum-1 servers. Stratum-2 does not define an accuracy of the clock, but instead defines the number of hops to a source time-base. The resulting accuracy is dependent on the Internet and the number of routers between the various timeservers. By connecting to a stratum-2 timeserver, the hub becomes stratum-3. Stratum-3 timeservers are expected to have a short-term drift of less than 3.7×10^{-7} in 24 hours.

7. Routing of Messages

In Point to Hub communication, the Market Participant Point is always the originator or end destination of the EBT. All other EBTs not specific to that point will be rejected. Note that Hubs will not forward EBTs between two or more Points. All Points are expected to communicate directly.

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7.11.0 Availability Requirements

Because the processing of EBT messages by Hubs and Points is critical to the success of the marketplace, Hubs and Points must commit to remain online connected to the Internet with no more than 15 minutes of downtime per day.

Where there are connectivity problems, it is suggested that a Hub or Point retry 3 times, waiting 15 minutes between retries before implementing the escalation process for handling failures. The initiator will log each transmission.

A suggested maintenance window exists between midnight Saturdays (EST) and noon Sundays (EST) when hub servers can be shut down for longer periods.

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7.22.0 Market Participant Information

In order to send an EBT message to the correct Hub or Point, each Hub or Point must maintain Market Participant addressing information within their systems. The communications parameters to be exchanged include URL, User ID, Password, OEB license number, trading partner agreement contract information, and the e-mail address. In other words, the Hub needs to know the URL, User ID, and Password to push EBTs to the Point, and the Point needs to know the URL, User ID, and Password to push EBTs to the Hub. The public key for PGP encryption/digital signature verification should be registered with the Massachusetts Institute of Technology worldwide PGP public key-server.

It is the responsibility of the initiating party to contact the second party to initiate communication set up.

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7.33.0 Routing Information Messages

Only the Upload request type will be allowed for Hub to Point communication:

```
Content-Disposition: form-data; name="request_type"
```

```
Upload
```

A Hub or Point will respond to the upload request based on the process and the response schema defined in the Ontario EBT Data Transport Protocol.

For the format of an HTTP Upload Request, see Appendix A - "HTTP Upload Request".
For the format of a HTTP Upload successful HTTP Response see Appendix B - "HTTP Upload Response".

Appendix A -- HTTP Upload Request

It is not the intention that the following sample be the basis for any programming effort. Compliance to IETF relevant RFC's and W3C standards should be consulted for syntactical references.

The following is an example of a Hub to Point or Point to Hub HTTP Upload Request:

```
POST /RecipientServer/mailbox HTTP/1.1
Date: Tue, 20 Dec 2000 08:12:31 GMT
Connection: Keep-Alive
Host: www.ontarioRecipientServer.com
Content-Language: en, fr
Content-Type: multipart/form-data; boundary=EBTpart;
Content-Length: 3222

--EBTpart
Content-Disposition: form-data; name="sender"

12345678

--EBTpart
Content-Disposition: form-data; name="user_id"

aUser

--EBTpart
Content-Disposition: form-data; name="user_password"

aPassword

--EBTpart
Content-Disposition: form-data; name="request_type"

Upload

--EBTpart
Content-Disposition: form-data; name="ebt_document";
filename="transaction.xml"
Content-Type: application/octet-stream

MIME-Version: 1.0
Content-Type: multipart/encrypted; boundary="---";
protocol="application/pgp-encrypted"

-----
Content-Type: pgp-encrypted

Version: 1

-----
Content-Type: application/octet-stream
```

-----BEGIN PGP MESSAGE-----
Version: 2.6.2

hIwDY32hYGCE8MkBA/wOu7d45aUxF4Q0RKJprD3v5Z9K1YcRJ2fve87lM1Dlx4OjeW
4GDdBfLbJE7VUpp13N19GL8e/AqbyyjHH4aS0YoTk10QQ9nnRvjY8nZL3MPXSZg9VG
QxFeGqzykzmykU6A26MSMexR4ApeeON6xzzWfo+0yOqAq61b46wsvldZ96YA
AABH78hyX7YX4uT1tNCWEIIBoqqvCeIMpp7UQ2IzBrXg6GtukS8NxbukLeamqVW31y
t21DYOjuLzcMNe/JNsD9vDVCvOOG3OCi8=
=zzaA

-----END PGP MESSAGE-----
--=-----
--EBTpart--

Appendix B -- HTTP Response

It is not the intention that the following sample be the basis for any programming effort. Compliance to IETF relevant RFC's and W3C standards should be consulted for syntactical references.

The following is an example of a Hub to Point or Point to Hub HTTP Upload Response:

```
HTTP/1.1 200 OK
Date: Tue, 20 Dec 2000 08:12:31 GMT
Host: www.ontarioRecipientServer.com
Content-Type: text/XML
Content-Length: 1234

<?xml version="1.0" encoding="UTF-8"?>
<RESPONSE xmlns:xsi=" http://www.w3.org/2001/XMLSchema"
xsi:noNamespaceSchemaLocation = "
http://www.oeb.gov.on.ca/Response.xsd">
  <HTTP_RESPONSE>
    <STATUS_CODE>200</STATUS_CODE>
    <REASON_PHRASE>OK</REASON_PHRASE>
    <REQUEST_TYPE>Upload</REQUEST_TYPE>
    <TIMESTAMP>Tue, 20 Dec 2000 08:12:31 GMT</TIMESTAMP>
  </HTTP_RESPONSE>
  <UPLOAD new_doc_id="12345678" doc_name="abcdefg.xml" />
</RESPONSE>
```