Interoperable Interface Control Document ICD-03: Transactions File

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NORTH TEXAS TOLLWAY AUTHORITY

Document Status Sheet

Date	Revision	Author	Pages Modified	Sections Modified	Description of Modifications
03/23/2007	0.01	ETC	N/A	N/A	Initial draft of document.
05/15/2007	2.00	ETC	N/A	N/A	Made As-Built.
06/08/2007	2.01	ETC			Updated document per TXDOT Review.
06/18/2007	2.02	ETC			Updated per IOP ICD discussion with the IOP Authorities and ETC Internal Review.
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7/27/07 – 9/21/07	2.04	BA			Revised based on comments from TxDOT.
3/5/2008	2.05	Ansel Cheng	17	3.5.2	Added disposition code ‘F’ to Toll Reconciliation Record Format Type 1

Software Release

Date	Software Revision	Description of Modifications
January 2007	1.0	New Subscribers and Service Providers as of January 1, 2007 must: 1. Standardize date and time fields as GMT: a. YYYYMMDD is the GMT date where YYYY is the year in four-digit format (i.e. 2007), MM is the month in numerical format (i.e. October would be 10) and DD is the day of the month.[1] b. HH24MISS is the GMT time where HH24 is the 2-digit hour in 24-hour format, MI are the minutes, and SS are the seconds. The time used to create this external file name is the GMT time. 2. Checksums shall be calculated and incorporated in the files transferred. Previous IOPHub software versions shall be supported until further notice.

[1] Dates and times are expressed in Greenwich Mean Time (GMT) to facilitate date/time processing unaffected by daylight savings time changes, or time zone differences.

Table of Contents

1 Introduction

1.1 Purpose

This Interoperability Interface Control Document (ICD) describes the general file structure used by interoperable Authorities to construct and exchange Transactions files and Financial Reconciliation files that are exchanged between Service Providers by means of the IOPHub.

1.2 Definitions, Acronyms and Abbreviations

A comprehensive glossary of terms is being maintained for the entire Interoperability project. The terms, acronyms and abbreviations used in this document will be contained in the Interoperable Project Glossary.

For easy reference, the following terms are provided.

Table 1.2: Definitions, Acronyms, and Abbreviations[2]

Term	Description
Home Authority (HA)	An Authority that issues transponders to patrons, owns and manages accounts associated with those transponders, and posts transactions to those accounts.
Service Providers (SP)	An Authority that operates and maintains a customer service center that issues AVI transponders for electronic payment of AVI transactions, such as toll road fees and parking fees. For this document, the Service Provider shall be defined as an authority that sends transponder transactions and toll variance transactions to the IOPHub system for reconciliation.
Subscriber	An authority that employs a Service Provider to conduct customer service center operations. These types of authorities do not maintain their own customer accounts, or operate a customer service center.
Tag Validation List (TVL)	A comprehensive list of transponders issued by each interoperable Authority..
Tag Validation List Update	A list of Tag Validation List (TVL) changes since the last TVL Update or TVL.
Visited Authority (VA)	Any Authority, or its designated representative, that is not the customer's Home Authority.

1.3 References

The following items are referenced in this document:

- *Interoperability Business Requirements Document*
- *Interoperable ICD-01: File Transfer*
- *Interoperable ICD-02: Tag Validation List*

[2] Note: If changes are made to this table, please verify against the IOPHub Project Glossary.

- *IOPHub Data Security Guidelines*
- *IOPHub Project Glossary*

1.4 Overview

The IOPHub uses a standard set of data exchange protocols that provide Interoperability between one or more authorized Service Providers and Subscribers to communicate and exchange data.

This document contains the specifications for the format of the interoperable Transactions Files and interoperable Financial Reconciliation Files. The exact structure of the file and the layout of the individual components are detailed in the remaining sections of this document. Security related issues and processing guidelines are also addressed. The exchange of data (Transactions and the Tag Validation List) is governed by the requirements as set forth in the Interoperability Business Requirements document.

2 Transactions File Specification

2.1 Type

The Transaction File is an ASCII text file. The file contains records with comma-delimited fields, terminated by Carriage Return & Line Feed characters.

2.2 Security

This type of file will be written with no special security considerations. The contents of the file are viewable in a standard text editor. The file contains no security-sensitive information.

The IOPHub shall utilize firewall scheme that will prevent unauthorized access by authorized or unauthorized users. Captive accounts or similar accounts shall be used to prevent unauthorized user from accessing other areas of the IOPHub and Service Providers' computer systems.

Each Service Provider shall utilize a firewall scheme that will prevent access by unauthorized users. Captive accounts or similar accounts shall be used to prevent unauthorized user from accessing other areas of the Service Providers' computer systems.

The IOPHub Data Security Guidelines provides documentation on the minimum and desired security standards.

2.3 Processing Guidelines

Files will be exchanged between IOPHub and Service Providers or Subscribers utilizing the protocol described in the *Interoperable-ICD-01: File Transfer*. The file transfer protocol verifies the file size, record count, checksum and validates the file format.

A Service Provider or Subscriber creates a Transactions File requesting payment for transactions associated with a Tag from a Visiting Authority. The Transactions File itself does not require acknowledgement from the IOPHub. The individual transactions within the file, however, do require a corresponding reconciliation record from the Home Authority. The reconciliation records are transmitted back to the Visited Authority where the Transactions occurred after posting of the transaction record has been completed by the Home Authority. The format of the Financial Reconciliation File is described later in the document in Section 3.

After the Transaction File is received from the Service Provider or Subscriber, IOPHub will process the file and determine the Home Authority for each transaction in the file and re-package the transactions for the corresponding Home Authority. The Home Authority will pick up the file from the FTP outgoing folder at IOPHub for processing.

If the originating Service Provider or Subscriber does not receive reconciliation for a transaction, the un-reconciled transaction should be included in a future Transactions File. It is the Sender's responsibility to repeat this failure processing before halting further attempts to submit the same Transaction and contacting the IOPHub Support for resolution. Each Sender can decide the number of attempts and the duration criteria for resending / repackaging files within the defined limitations of the Interoperable Business Requirements.

The Transactions File must be named and constructed according to the following convention:

IOP_{Originating-Authority}_{Destination-Authority}_YYYYMMDD_HH24MISS_{XXXXXXXXX}.TRX

The Transactions File naming convention description:

- "IOP" is the designation abbreviation for Interoperability files.
- {Origination-Authority} is name of the Authority creating the file. The Authority can be Service Provider, Subscriber or IOPHub.
- {Destination-Authority} is name of the Authority receiving the file. The Authority can be Service Provider, Subscriber or IOPHub.
- YYYYMMDD is the GMT date where YYYY is the year in four-digit format (i.e. 2007), MM is the month in numerical format (i.e. October would be 10) and DD is the day of the month.[3]
- HH24MISS is the GMT time where HH24 is the 2-digit hour in 24-hour format, MI are the minutes, and SS are the seconds. The time used to create this external file name is the GMT time.
- {XXXXXXXXX} is an arbitrary region of up to 9 characters to be used by the Origination Authority to allow unique file names to be generated. Any combinations of alphanumeric characters are allowed in this portion of the name.
- "TRX" is the file extension appended to the file name. This extension helps serve to identify the content type of the file.

Note: The Data File name and ZIP file name are both in upper case, including the file extension.

For example, a file created and sent from HCTRA to IOPHUB on March 13, 2007 at 5pm GMT might be named:

IOP_HCTRA_IOPHUB_20070313_170000_000002222.TRX

Once zipped, the file name of the zipped file would be named:

$IOP_HCTRA_IOPHUB_20070313_170000_000002222.ZIP

[3] Dates and times are expressed in Greenwich Mean Time (GMT) to facilitate date/time processing unaffected by daylight savings time changes, or time zone differences.

2.4 File Format

The file format conforms to the general structure described in the document *Interoperable-ICD-01: File Transfer* (see Figure 1). The files are in ASCII format, comprised of a file header and record header, followed by data records. The file header is constructed as described in *Interoperable-ICD-01: File Transfer*. This portion of the file is shown in gray in the figure below.

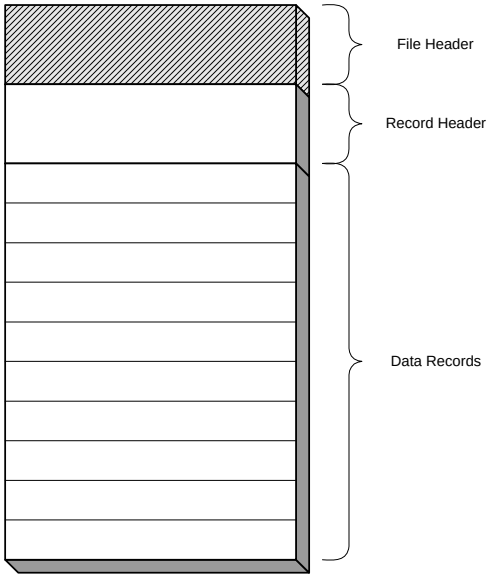

Figure 1. Interoperable File Structure

The record header and data records are created by the Visited Authority. The record header, as well as each data record, will be terminated by a Carriage Return & Line Feed (hex '0D 0A') character combination. Fields in a record header and data records are variable length and comma-delimited. Section 2.5 Record Formats describes the format of the record header and data records.

2.5 Record Formats

The first portion of all record types is similar. Each record begins with a record code composed of a two-digit alpha code and a two-digit version code. The remaining fields in the record vary based upon the record type. All fields are ASCII alphanumeric characters, variable length and comma-delimited.

The following record codes may appear in a Transactions File.

Transactions File Record Codes			
Record Code	**Meaning**	**Section**	**Description**
FH01	**F**inancial **H**eader	2.5.1	This is the record header. Each file contains one record of this type.
TB01	Vehicle **T**oll-**B**arrier Type	2.5.2	These are vehicle toll transaction records for which an Authority expects to receive payment. The toll is from a barrier-type roadway system.
VB01	**V**iolation Toll-**B**arrier Type	2.5.3	Records containing toll violations from a barrier-type roadway system identified by vehicle license plate and Tag ID.

2.5.1 Transactions Record Header Format

The Record Header contains information about the originating Authority, time of creation and record count.

Transactions Record Header Format					
Description	**Type**	**Max Length**	**Delimiter**	**Req'd**	**Comment**
Record Code	Character	4	,	Y	This field will always be "**FH01**"
Originating Authority	Character	8	,	Y	Abbreviation for the Authority generating the file. • CTRMA – Central Texas Regional Mobility Authority • HCTRA - Harris County Toll Road Authority • IOPHub • NTTA - North Texas Toll Authority • TXDOT – Texas Department of Transportation
Date-Time Created	Character	15	,	Y	GMT Date-time file was created. 'YYYYMMDD-HH24MISS'
Record Count	Number	10	,	Y	Number of records not including the header record to follow in this file.
Batch ID	Number	10	,	N	Optional Batch ID for the file. This field is a number between 0 and 4,294,967,295.
File Name	Character	60	CR&LF	N	Original file name for this file as created by the originator.

A batch ID is provided in the Record Header for use by the originating Service Provider. Since no acknowledgement is required for the file itself, this batch ID is never returned to the originating Service

Provider in the Financial Reconciliation File. Implementers may use this field for any internal tracking purposes they see fit.

The optional “File Name” field is available to record the original name of the file as created by the originator. This is the name constructed as per the file naming specifications in Section 2.3. Once a file is sent to a Service Provider, the external name given to the file by the operating system may be changed for various reasons. The destination Service Provider’s operating system may not support long file names, or the external file name may be changed as the file is moved through various stages of processing. The File Name field serves to preserve the original file name, as created by the originator, despite any external activity on the file.

2.5.2 Vehicle Toll-Barrier Type Record Format

The Vehicle Toll-Barrier Type Record (Record Code “TB01”) contains a vehicle toll transaction from a barrier type roadway system. Barrier type roadway systems are designed to collect payment at specific tolling locations, irrespective of the distance a patron may have traveled in arriving at the collection point.

The Transaction record may be resubmitted by the sending Service Provider or Subscriber if no response is received from the IOPHub. For example, the Home Authority sends TVL to IOPHub. After receiving TVL from the Home Authority, IOPHub sends TVL_ACK to the Home Authority. IOPHub then forwards TVL to the Visited Authority. After receiving TVL from IOPHub, the Visited Authority sends TVL_ACK to IOPHub. The receiving agency is responsible for noting the RCN file is a duplicate if they receive more than one RCN record for the same Transaction record.

The Transaction records containing invalid or unknown lane location will have the record rejected by the IOPHub, but the entire file will not be rejected.

Vehicle Toll-Barrier Type Record Format					
Description	**Type**	**Max Length**	**Delimiter**	**Req'd**	**Comment**
Record Code	Character	4	,	Y	This field will always be "**TB01**"
Reference ID	Character	20	,	N	An optional reference number created by the originating Authority for this transaction. If a value is present in the record, this reference ID must be included in the reconciliation record returned by the receiving Authority.
Transaction Date-Time	Character	15	,	Y	GMT date-time of transaction in format 'yyyymmdd-hh24miss'.
Location	Character	30	,	Y	Location description (e.g., Facility, Plaza, and Lane) for where transaction occurred. If the lane location is unknown to the Visited Authority, the IOPHub will reject the record, but not the entire file.
Tag ID	Character	20	,	Y	Complete Tag ID, i.e. 'DNT.12345678.....$'
Tag Status	Character	1	,	Y	Tag status at the collection point at the time of the transaction: G – Good B – Low Balance I – Invalid L – Lost N – Negative Balance R – Returned S – Stolen
Tag Status List Batch ID	Numeric	10	,	N	The Batch ID of the tag validation list used to determine the tag status. If the Batch ID is not available, this field may be set to zero (0).
Vehicle Classification	Numeric	3	,	Y	Classification of the vehicle, as determined at the time of the transaction. 2 – Two axle vehicle 3 – Three axle vehicle 4 – Four axle vehicle 5 – Five axle vehicle 6 – Six plus axle vehicle (other)
Toll Amount	Number	6	,	Y	Toll amount in Cents
Revenue Type	Numeric	2	,	Y	Revenue type associated with this transaction: 1 – Full-fare 2 – Non-revenue
Guaranteed	Character	1	,	Y	Based upon business rules associated with the timely receipt and deployment of AVI status validation lists, the transaction originating Authority makes a determination of guaranteed payment by the owning Authority: Y – Conditions met for guaranteed payment N – Conditions not met for guaranteed payment Default: N
Attribute_1	Character	2000	,	N	This field will have additional agency specific data, if necessary
Attribute_2	Character	20	,	N	This field will have additional agency specific data, if necessary
Attribute_3	Character	30	,	N	This field will have additional agency specific data, if necessary
Attribute_4	Character	30	,	N	This field will have additional agency specific data, if necessary
Attribute_5	Character	40	,	N	This field will have additional agency specific data, if necessary
Attribute_6	Character	40	,	N	This field will have additional agency specific data, if necessary
Attribute_7	Character	50	,	N	This field will have additional agency specific data, if necessary

Vehicle Toll-Barrier Type Record Format					
Description	**Type**	**Max Length**	**Delimiter**	**Req'd**	**Comment**
Attribute_8	Character	50	`,	Y	Field used by IOPHub to identify the Visited Authority. • CTRMA – Central Texas Regional Mobility Authority • HCTRA - Harris County Toll Road Authority • NTTA - North Texas Toll Authority • TXDOT – Texas Department of Transportation
Attribute_9	Character	250	,	N	Field used by IOPHub to identify the Home Authority. • CTRMA – Central Texas Regional Mobility Authority • HCTRA - Harris County Toll Road Authority • NTTA - North Texas Toll Authority • TXDOT – Texas Department of Transportation
Attribute_10	Character	250	CR&LF	N	This field will have additional agency specific data, if necessary

2.5.3 Violation Toll-Barrier Type Record Format

The Violation Toll-Barrier Type Record (Record Code "VB01") contains a violation toll variance transaction from a barrier type roadway system. Visited Authorities capable of capturing and identifying vehicle license plate information may resolve toll variances using vehicle information exchanged among Service Providers. In the event a toll variance is attributed to a Service Providers' Tag ID, this record type is used to request payment.

The IOPHub will automatically perform a Tag Validation List lookup service for violation records sent with license plate and state only and no Tag ID in a Violation Toll-Barrier Type record. If the Tag ID is present in a Violation Toll-Barrier Type record the IOPHub will use the Tag ID history information only to identify the transactions' Home Authority.

Violation Toll-Barrier Type Record Format					
Description	**Type**	**Max Length**	**Delimiter**	**Req'd**	**Comment**
Record Code	Character	4	,	Y	This field will always be "**VB01**"
Reference ID	Character	20	,	N	An optional reference number created by the originating Authority for this transaction. If a value is present in the record, this reference ID must be included in the reconciliation record returned by the receiving Authority.
Transaction Date-Time	Character	15	,	Y	GMT date-time of transaction in format 'yyyymmdd-hh24miss'.
Location	Character	30	,	Y	Location description (e.g., Facility, Plaza, and Lane) for where transaction occurred.
Tag ID	Character	20	,	N/Y	Complete Tag ID, i.e. 'DNT.12345678.....$' If VA does not save TVL history, then Tag ID should be sent as Null; IOPHub will use IOPHub history to determine the Tag ID. If VA does save TVL history and uses TVL history to determine the tag at the time of plate transaction, then Tag ID is required; otherwise IOPHub will use IOPHub history to determine the Tag ID.
Tag Status	Character	1	,	N/Y	Tag status at the collection point at the time of the transaction: G – Good B – Low Balance I – Invalid L – Lost N – Negative Balance R – Returned S – Stolen If Tag ID is present, then Tag Status should be populated as well.
Tag Status List Batch ID	Numeric	10	,	N	The Batch ID of the tag validation list used to determine the tag status.
Vehicle Classification	Numeric	3	,	Y	Classification of the vehicle, as determined at the time of the transaction. 2 – Two axle vehicle 3 – Three axle vehicle 4 – Four axle vehicle 5 – Five axle vehicle 6 – Six plus axle vehicle (other)

Violation Toll-Barrier Type Record Format					
Description	**Type**	**Max Length**	**Delimiter**	**Req'd**	**Comment**
Toll Amount	Number	6	,	Y	Toll amount in Cents
License Plate State	Character	3	,	Y	Three characters indicate the state code.
License Plate Number	Character	15	,	Y	License Plate Number associated with a Tag
Guaranteed	Character	1	,	Y	See "Guaranteed" field description in Section 2.5.2
Attribute_1	Character	2000	,	N	This field will have additional agency specific data, if necessary
Attribute_2	Character	20	,	N	This field will have additional agency specific data, if necessary
Attribute_3	Character	30	,	N	This field will have additional agency specific data, if necessary
Attribute_4	Character	30	,	N	This field will have additional agency specific data, if necessary
Attribute_5	Character	40	,	N	This field will have additional agency specific data, if necessary
Attribute_6	Character	40	,	N	This field will have additional agency specific data, if necessary
Attribute_7	Character	50	,	N	This field will have additional agency specific data, if necessary
Attribute_8	Character	50	,	Y	Field used to identify the Visited Authority. • CTRMA – Central Texas Regional Mobility Authority • HCTRA - Harris County Toll Road Authority • NTTA - North Texas Toll Authority • TXDOT – Texas Department of Transportation
Attribute_9	Character	250	,	N	Field used to identify the Home Authority, if available in the system. • CTRMA – Central Texas Regional Mobility Authority • HCTRA - Harris County Toll Road Authority • NTTA - North Texas Toll Authority • TXDOT – Texas Department of Transportation
Attribute_10	Character	250	CR&LF	N	This field will have additional agency specific data, if necessary

2.6 Sample Data

A sample Transaction File created by NTTA to IOPHub is shown below. It contains a record header and Transaction records. The Carriage Return & Line Feed characters are shown as a "¶".

a) TXN sample data from NTTA to IOPHUB:

FFFFFFFF,000000005914¶

FH01,NTTA,20070618-022846,63,450494,IOP_NTTA_IOPHUB_20070618_022846_000056548.TRX¶

TB01,44500577,20070618-015542,DNT-SPVRD-04,HCTR02667161.....$,G,0,2,30,1,Y,,,,,,,,NTTA,, ¶

TB01,44500579,20070618-015621,DNT-MLP2-08,HCTR02585968.....$,G,0,2,60,1,Y,,,,,,,,NTTA,, ¶

TB01,44500580,20070618-015622,DNT-MLP2-08,HCTR03150579.....$,G,0,2,60,1,Y,,,,,,,,NTTA,, ¶

VB01,44500667,20070610-022526,PGBT-MLP8-06,HCTR01383799.....$,I,0,2,60,TX,71YGP2,N,,,,,,,,NTTA,, ¶

VB01,44500668,20070610-032842,PGBT-MLP8-06,HCTR02392212.....$,I,0,2,60,TX,55RWN1,N,,,,,,,,NTTA,, ¶

VB01,44500670,20070613-014324,PGBT-MLP6-07,HCTR02117539.....$,I,0,2,60,TX,P83XCW,N,,,,,,,,NTTA,, ¶

A sample Transaction File created by IOPHub of the above file from NTTA and placed in FTP outgoing folder for HCTRA to pickup is shown below. It contains a record header and Transaction records. The Carriage Return & Line Feed characters are shown as a "¶".

b) TXN sample data from IOPHUB to HCTRA:

FFFFFFFF,000000005852¶

FH01,IOPHUB,20070618-024551,63,699709,IOP_IOPHUB_HCTRA_20070618_024551_000022912.TRX¶

TB01,16311891,20070618-015542,DNT-SPVRD-04,HCTR02667161.....$,G,0,2,30,1,Y,,,,,,,,NTTA,, ¶

TB01,16311892,20070618-015621,DNT-MLP2-08,HCTR02585968.....$,G,0,2,60,1,Y,,,,,,,,NTTA,, ¶

TB01,16311893,20070618-015622,DNT-MLP2-08,HCTR03150579.....$,G,0,2,60,1,Y,,,,,,,,NTTA,, ¶

VB01,16311924,20070610-022526,PGBT-MLP8-06,HCTR01383799.....$,I,0,2,60,TX,71YGP2,N,,,,,,,,NTTA,, ¶

VB01,16311925,20070610-032842,PGBT-MLP8-06,HCTR02392212.....$,I,0,2,60,TX,55RWN1,N,,,,,,,,NTTA,, ¶

VB01,16311926,20070613-014324,PGBT-MLP6-07,HCTR02117539.....$,I,0,2,60,TX,P83XCW,N,,,,,,,,NTTA,, ¶

2.7 Availability

IOPHub shall be available 24 hours a day, 7 days a week for the file exchanges. Exceptions will be for scheduled maintenance activities. All Service Providers and Subscribers should be notified in advance of scheduled maintenance activities and extended downtime periods. When IOPHub is down, the agencies should stop pushing and pulling files. File transfer may continue when the IOPHub is back up and operational.

3 Financial Reconciliation File Specification

3.1 Type

The Interoperable Financial Reconciliation File is an ASCII text file. The file contains a file header and multiple financial reconciliation data records with comma-delimited fields, terminated by a Carriage Return & Line Feed character.

3.2 Security

The data files will be written with no special security considerations. The contents of the files are viewable in a standard text editor. The files contain no security-sensitive information.

The IOPHub shall utilize a firewall scheme that will prevent unauthorized access. Captive accounts or similar accounts shall be used to prevent unauthorized user from accessing other areas of the IOPHub and Service Providers' computer systems.

Each Service Provider shall utilize a firewall scheme that will prevent unauthorized access. Captive accounts or similar accounts shall be used to prevent unauthorized user from accessing other areas of the Service Providers' computer systems.

The IOPHub Data Security Guidelines document should be reviewed and implemented where appropriate.

3.3 Processing Guide Lines

Financial Reconciliation (RCN) Files will be exchanged between IOPHub, Service Providers and Subscribers utilizing the protocol described in the document *Interoperable-ICD-01: File Transfer*. The file transfer protocol verifies the file size, record count, checksum, and format of the file.

As a Transaction File arrives from IOPHub, at the Home Authority, the Home Authority posts the transactions. The disposition of each transaction records in the file are maintained by the Home Authority.

Periodically, the Home Authority creates a Financial Reconciliation File containing the disposition of all the posted and rejected transactions received from IOPHub. The Home Authority then sends the file to IOPHub.

The Financial Reconciliation File does not require acknowledgement from the IOPHub. The individual reconciliation transactions within the file do not require any form of acknowledgement from the IOPHub back to the Home Authority.

After the Financial Reconciliation File arrives at the IOPHub, IOPHub will process the file and determine the Visited Authority for each RCN record and repackage the records for the corresponding Visited Authority. The Visited Authority will pick up the file from the FTP outgoing folder at IOPHub.

The Visited Authority then processes the Financial Reconciliation File. First the file header record is examined in order to perform a simple data integrity checks. The header contains file size, record count and checksum. Additionally the file format is verified to be correct based on the type of file. All four (4) checks must be verified correct before posting of the file can occur. If any one of the four (4) checks fails, the entire file should not be used.

A file noted as incorrect based on the file size, record count, checksum, or file format should be flagged as damaged and notification sent to the IOPHub Support. An Acknowledgement File is **not** required to be sent to the originating Authority indicating the error status.

The Financial Reconciliation File must be named and constructed according to the following convention:

IOP_{Originating-Authority}_{Destination-Authority}_YYYYMMDD_HH24MISS_{XXXXXXXXX}.RCN

The Transactions Reconciliation File naming convention description:

IOP" is the designation abbreviation for Interoperability files.

- {Origination-Authority} is name of the Authority creating the file. The Authority can be Service Provider, Subscriber or IOPHub.
- {Destination-Authority} is name of the Authority receiving the file. The Authority can be Service Provider, Subscriber or IOPHub.
- YYYYMMDD is the GMT date where YYYY is the year in four-digit format (i.e. 2007), MM is the month in numerical format (i.e. October would be 10) and DD is the day of the month.
- HH24MISS is the GMT time where HH24 is the 2-digit hour in 24-hour format, MI are the minutes, and SS are the seconds. The time used to create this external file name is the GMT time.
- {XXXXXXXXX} is an arbitrary region of up to 9 characters to be used by the Origination Authority to allow unique file names to be generated. Any combinations of alphanumeric characters are allowed in this portion of the name.
- "RCN" is the file extension appended to the file name. This extension helps serve to identify the content type of the file.

For example, a file created and sent from NTTA to IOPHUB on March 13, 2007 at 5pm GMT might be named:

IOP_NTTA_IOPHUB_20070313_170000_000002222.RCN

Once zipped, the file name of the zipped file would be named:

$IOP_NTTA_IOPHUB_20070313_170000_000002222.ZIP

3.4 File Format

The file format conforms to the general structure described in the document *Interoperable-ICD-01: File Transfer*. The files are in ASCII format, comprised of a file header and record header, followed by data records. The file header is constructed at the Sender's system as described in *Interoperable-ICD-01: File Transfer*. This portion of the file is shown in gray in the figure below.

The Financial Reconciliation File consists of a single Record Header and multiple Data Records described in this portion of the document. The record header, as well as each data record, will be terminated by a Carriage Return & Line Feed (hex 'OD OA') character combination. Fields in a record are variable length and comma-delimited. This section describes the format of the record header and data records.

3.5 Record Formats

The first portion of all record types is similar. Each record begins with a record code composed of a two-digit alpha code and a two-digit version code. The remaining fields in the record vary based upon the record type. All fields are ASCII alphanumeric characters, variable length and comma-delimited.

The record codes for the reconciliation records are constructed by reversing the record code for the transaction type being reconciled. That is, the reconciliation for a "TB01" record (Vehicle Toll-Barrier Type) is "BT01". The record codes that may appear in a Financial Reconciliation File are listed in the table below.

Financial Reconciliation File Record Codes			
Record Code	**Meaning**	**Section**	**Description**
RH01	**R**econciliation **H**eader	3.5.1	This is the record header. Each file contains one record of this type.
BT01	Vehicle **T**oll-**B**arrier Reconciliation	3.5.2	Reconciliation for a "TB01" record.
BV01	**V**iolation Toll-**B**arrier Reconciliation	3.5.2	Reconciliation for a "VB01" record.

3.5.1 Financial Reconciliation Record Header Format

The Record Header contains information about the originating Service Provider, time of creation and record count.

Financial Reconciliation Record Header Format					
Description	**Type**	**Max Length**	**Delimiter**	**Req'd**	**Comment**
Record Code	Character	4	,	Y	This field will always be "**RH01**"
Originating Authority	Character	8	,	Y	Abbreviation for the Authority generating the file. • CTRMA – Central Texas Regional Mobility Authority • HCTRA - Harris County Toll Road Authority • IOPHub • NTTA - North Texas Toll Authority • TXDOT – Texas Department of Transportation
Date-Time Created	Character	15	,	Y	GMT Date-time file was created. 'YYYYMMDD-HH24MISS'
Record Count	Number	10	,	Y	Number of records not including the header record to follow in this file.
Batch ID	Character	20	,	N	Optional Batch ID for the file.
File Name	Character	60	CR&LF	N	Original file name for this file as created by the originator.

A Batch ID is provided in the Record Header for use by the originating Service Provider. Since no acknowledgement is required for the file itself, this Batch ID is never returned to the originating Service Provider. Implementers may use this field for any internal tracking purposes.

The optional "File Name" field is available to record the original name of the file as created by the originator. See Section 2.5.1 for a discussion of this field.

3.5.2 Toll Reconciliation Record Format Type 1

The Toll Reconciliation Record Type 1 is used to communicate the disposition of Transactions received from a Service Provider associated with barrier type toll systems.

Toll Reconciliation Record Format Type 1					
Description	**Type**	**Max Length**	**Delimiter**	**Req'd**	**Comment**
Record Code	Character	4	,	Y	This field must be one of the following: ▪ "**BT01**" - Vehicle Toll-Barrier Reconciliation ▪ "**BV01**" - Violation Toll-Barrier Reconciliation
Reconciliation Reference ID	Character	20	,	N	An optional reference number created by the reconciling Authority for this reconciliation.
Original Reference ID	Character	20	,	Y/N	The reference number created by the Authority originating the transaction being reconciled. If the original transaction contained a reference ID, it must be included here.
Original Transaction Date-Time	Character	15	,	Y	GMT date-time of the original transaction in format 'yyyymmdd-hh24miss'.
Original Location	Character	30	,	Y	Location description (e.g., Facility, Plaza, and Lane) for original transaction.
Original Tag ID	Character	20	,	Y/N	Complete Tag ID, i.e. 'DNT.12345678.....$' For "**BT01**" record, this field is always required. For "**BV01**" record, if Visited Authority has history, then this field should be populated; if not, then IOPHub will determine this using IOPHub history.
Original License Plate State	Character	3	,	Y/N	If this is violation reconciliation, the license state code must be returned.
Original License Plate Number	Character	15	,	Y/N	If this is violation reconciliation, the license plate number must be returned.
Posted Date-Time	Character	15	,	Y	GMT date-time of the posting of this transaction in format 'yyyymmdd-hh24miss' by the receiving Authority.
Posting Disposition	Character	1	,	Y	Posting disposition for the Transaction. The following status codes indicate success: ▪ "P" - Posted successfully ▪ "R" – Posted with reservation, the tag is now invalid, but the status was not yet communicated to the peer Authority. The following codes indicate the transaction was rejected: ▪ "D" – Duplicate transaction, posting failed ▪ "I" – Invalid Tag, posting failed ▪ "V" – Tag validation status out of date, posting failed ▪ "M" – Manual Review Rejected – posting failed ▪ "T" – Transaction Type not found in IOP ▪ "C" – Tag Not Found in IOP ▪ "B" – Bad Transaction Amount ▪ "O" – Transaction too old ▪ "E" – Credit Card Failure – posting failed ▪ "F" – Unhandled Error – posting failed
Amount paid	Number	6	,	Y	Amount of original fee paid, in Cents, to Authority. Field defaulted to '0'.

Toll Reconciliation Record Format Type 1					
Description	**Type**	**Max Length**	**Delimiter**	**Req'd**	**Comment**
Processing Flat Fee Amount	Number	6	,	Y	Amount of flat fee surcharge, in Cents, associated with this transaction. Field defaulted to '0'.
Processing Flat Fee Type	Character	1	,	Y	Indication of flat fee type assessed for this transaction: ▪ "N" – No fee/surcharge assessed. Default value of field. ▪ "C" – Credit Card charges applied ▪ "T" – Transaction charge, as per peer Authority agreement ▪ "O" – Other fee assessed
Processing % Fee Amount	Number	6	,	Y	Amount of % surcharge, in Cents, associated with this transaction. Field defaulted to '0'.
Processing % Fee Type	Character	1	,	Y	Indication of % fee type assessed for this transaction: ▪ "N" – No fee/surcharge assessed. Default value of field. ▪ "C" – Credit Card charges applied ▪ "T" – Transaction charge, as per peer Authority agreement ▪ "O" – Other fee assessed
Repost Count	Number	2	,	N	This field will indicate the number of reposting attempts made by the HA to post the record. Field defaulted to '0'.
Attribute_1	Character	2000	,	N	This field will have additional agency specific data, if necessary
Attribute_2	Character	20	,	N	This field will have additional agency specific data, if necessary
Attribute_3	Character	30	,	N	This field will have additional agency specific data, if necessary
Attribute_4	Character	30	,	N	This field will have additional agency specific data, if necessary
Attribute_5	Character	40	,	N	This field will have additional agency specific data, if necessary
Attribute_6	Character	40	,	N	This field will have additional agency specific data, if necessary
Attribute_7	Character	50	,	N	This field will have additional agency specific data, if necessary
Attribute_8	Character	50	,	Y	Field used to identify the Visited Authority. • CTRMA – Central Texas Regional Mobility Authority • HCTRA - Harris County Toll Road Authority • NTTA - North Texas Toll Authority • TXDOT – Texas Department of Transportation
Attribute_9	Character	250	,	Y	Field used to identify the Home Authority. • CTRMA – Central Texas Regional Mobility Authority • HCTRA - Harris County Toll Road Authority • NTTA - North Texas Toll Authority • TXDOT – Texas Department of Transportation
Attribute_10	Character	250	CR&LF	N	This field will have additional agency specific data, if necessary

3.6 Sample Data

A sample Financial Reconciliation File created by HCTRA to IOPHub is shown below. This is the acknowledgement file created for the Transaction file contained in Section 2.6.The Carriage Return & Line Feed characters are shown as a "¶".

a) RCN sample data from HCTRA to IOPHUB:

FFFFFFFF,000000007803¶

RH01,HCTRA,20070618-025544,63,196161,IOP_HCTRA_IOPHUB_20070618_025544_000140689.RCN¶

BT01,7524526,16311891,20070618-015542,DNT-SPVRD-04,HCTR02667161.....$,,,20070618-025352,P,30,0,,0,,0,,,,,,,,NTTA,HCTRA, ¶

BT01,7524527,16311892,20070618-015621,DNT-MLP2-08,HCTR02585968.....$,,,20070618-025352,P,60,0,,0,,0,,,,,,,,NTTA,HCTRA, ¶

BT01,7524528,16311893,20070618-015622,DNT-MLP2-08,HCTR03150579.....$,,,20070618-025352,P,60,0,,0,,0,,,,,,,,NTTA,HCTRA, ¶

BV01,7524559,16311924,20070610-022526,PGBT-MLP8-06,HCTR01383799.....$,TX,71YGP2,20070618-025353,I,0,0,,0,,0,,,,,,,,NTTA,HCTRA, ¶

BV01,7524560,16311925,20070610-032842,PGBT-MLP8-06,HCTR02392212.....$,TX,55RWN1,20070618-025353,P,60,0,,0,,0,,,,,,,,NTTA,HCTRA, ¶

BV01,7524561,16311926,20070613-014324,PGBT-MLP6-07,HCTR02117539.....$,TX,P83XCW,20070618-025353,P,60,0,,0,,0,,,,,,,,NTTA,HCTRA, ¶

A sample file created by IOPHub of the above file from HCTRA and placed in FTP outgoing folder for NTTA to pickup is shown below. The Carriage Return & Line Feed characters are shown as a "¶".

b) RCN sample data from IOPHUB to NTTA:

FFFFFFFF,000000007992¶

RH01,IOPHUB,20070618-030007,63,699713,IOP_IOPHUB_NTTA_20070618_030007_000023297.RCN¶

BT01,16311891,44500577,20070618-015542,DNT-SPVRD-04,HCTR02667161.....$,,,20070618-025352,P,30,0,N,0,N,0,,,,,,,,NTTA,HCTRA, ¶

BT01,16311892,44500579,20070618-015621,DNT-MLP2-08,HCTR02585968.....$,,,20070618-025352,P,60,0,N,0,N,0,,,,,,,,NTTA,HCTRA, ¶

BT01,16311893,44500580,20070618-015622,DNT-MLP2-08,HCTR03150579.....$,,,20070618-025352,P,60,0,N,0,N,0,,,,,,,,NTTA,HCTRA, ¶

BV01,16311924,44500667,20070610-022526,PGBT-MLP8-06,HCTR01383799.....$,TX,71YGP2,20070618-025353,I,0,0,N,0,N,0,,,,,,,,NTTA,HCTRA, ¶

BV01,16311925,44500668,20070610-032842,PGBT-MLP8-06,HCTR02392212.....$,TX,55RWN1,20070618-025353,P,60,0,N,0,N,0,,,,,,,,NTTA,HCTRA, ¶

BV01,16311926,44500670,20070613-014324,PGBT-MLP6-07,HCTR02117539.....$,TX,P83XCW,20070618-025353,P,60,0,N,0,N,0,,,,,,,,NTTA,HCTRA, ¶

3.7 Availability

IOPHub shall be available 24 hours a day, 7 days a week for the file exchanges. Exceptions will be for scheduled maintenance activities. All Service Providers and Subscribers should be notified in advance of scheduled maintenance activities and extended downtime periods. When IOPHub is down, the agencies should stop pushing and pulling files. File transfer may continue when the IOPHub is back up and operational.