CTS CLEARING HOUSE INTERFACE

SPECIFICATIONS

9th March 2016

100-0010782 Revision 2.4

MAIN CHANGE SHEET

Rev	Date	Description of Change
Rev 1.1	January 16, 2006	- Initial
Rev 1.2	March 8, 2006	NCR & RBI/NPCI internal review & changes
Rev 1.3	April 12, 2006	NCR & RBI/NPCI internal review & changes
Rev 1.4	April 18, 2006	NCR & RBI/NPCI internal review & changes
Rev 1.5	April 26, 2006	NCR & RBI/NPCI internal review & changes
Rev 1.6	June 27-Jul 1, 2006	NCR & RBI/NPCI internal review & changes
Rev 1.7	July 20 – Aug 01, 2006	NCR & RBI/NPCI internal review & changes
Rev 1.8	17 Aug – 28 Aug 2006	NCR & RBI/NPCI internal review & changes
Rev 1.9	08 Sep – 19 Sep 2006	Changes in response to RBI/NPCI Document Review & discussions through 02 Sep 2006.
Rev 1.10	22 Sep 2006	Changes shown via document markups. • Change Sheets prior to Rev 1.9 reduced. • Sect 2 Step 1 Physical Endorsement clarified • Sect 7 details of security in separate document • Appendix A corrections in CHI Interface
Rev 1.11	17 Nov 2006	Changes are shown via document markups, relative to Rev 1.10 previously released. • fixed corrupted Cover Page • sect 9.3.1 deleted extraneous paragraph re: 4GB Memory • sect 12, deleted reference to future Government Account Master in the CHMaster tables. • Appx 1 deleted reference to host (recon) file • Appx 2.1 clarify Extension File (EF) as well as DREF • Appx 2.4, Appx 2.5, Appx 3.4.1, Appx 4.8, Appx 4.8.1 describe DREF • Appx 2.5, Appx 4.11.2, Appx 4.11.3.3, Appx 6 add necessary detail for AtParBankMaster element • Appx 2.5, Appx 4.12, Appx 5.9 add detail and example for Unwound Item File • Appx 4.11.2 redraw picture, A1 adjust indent of "Branch" • Appx 4.11.3.7 completed description of DesignatedBranchForTransCode

Rev 1.12	15 Feb 2007	• Changes are shown via document markups, relative to Rev 1.11 previously released.
		
		• Sect 3.8 (IQA Defect Tests) -- use Thresholds from 23 Nov 2006 Image Quality Assessment Report; Remove "ENABLE" column
		
		• Sect 11.1 – license clarification
		
		• Appx 1.2
		  ○ C4 -- clarify Mandatory/Optional as applies to elements and attributes. Note that Fields having NULL or no default value are to be omitted from input files. Default/pre-defined values for attributes are case-sensitive
		  ○ C8 -- clarify element tags and attribute names are case-sensitive.
		
		• Appx 2.1 -- diagram add DREF file
		
		• Appx 2.5 -- specifically list DREF Drawee Extension File (it was already given in the description)
		
		• Appx 3.3 -- add suggestion for better exception processing by inclearing system, clarify purging.
		
		• Appx 4.1.2 -- diagram to swap ImageDS with ImageViewData to agree with order in A1; corrected legend.
		
		• Appx 4.1.3.1 -- xmlns is lower case, VersionNumber xxyyyy is lower case, added DREF file
		
		• Appx 4.1.3.3 -- IQAIgnoreInd is optional, default value is 0
		
		• Appx 4.1.3.4 – MICRFingerPrint NOTE: clarified, added "Drawee" as possible value
		
		• Appx 4.1.3.6 -- provided attribute descriptions, remove ViewSideIndicator values that are not supported.
		
		• Appx 4.1.3.7 -- clarified Filename, and digital signature attributes, StartOfProtectedData and ProtectedDataLength are Mandatory, lengths must be greater than 0
		
		• Appx 4.1.3.8 -- clarified ImageReferenceKeyLength, length must be greater than 0
		
		• Appx 4.1.3.9 -- described ImageViewAnalysis and IQA interpretations.
		
		• Appx 4.3.2 -- diagram to swap ImageDS with ImageViewData to agree with order in C1; corrected legend.
		  ○ C1 list multiple MICRDS and ImageDS, ImageViewAnalysis elements
		
		• Appx 4.3.3 -- diagram to swap ImageDS with ImageViewData to agree with order in B1; corrected legend.
		  ○ C1 list multiple MICRDS and ImageDS, ImageViewAnalysis elements
		  ○ C2 -- added Mandatory elements
		
		• Appx 4.3.4.1 -- xmlns is lower case, VersionNumber

		xxyyyy is lower case
		• Appx 4.4.2 – corrected diagram
		• Appx 4.5.2 -- diagram - corrected legend.
		◦ C1,C2 -- added structure and Mandatory elements
		Appx 4.5.3.4 – MICRDS for RRF sets source = "Drawee"
		Appx 4.6.2 -- diagram - corrected legend.
		• Appx 4.6.3 -- diagram - corrected legend.
		◦ C2 -- added Mandatory elements
		• Appx 4.7.2 -- diagram added
		◦ C1,C2 -- properly named the file, and added Mandatory elements
		• Appx 4.8.1 C1, C3 -- list EF and DREF files
		• Appx 4.8.2 -- diagram - corrected legend.
		• Appx 4.9.1 C1 -- clarify File ID is unique
		• Appx 4.9.3.1 -- clarify CreationDate and CreationTime, VersionNumber xxyyyy is lower case
		• Appx 4.3.10.3.3.1–augment error resolution for FileStatusCode 2
		• Appx 4.9.2 -- diagram to agree with C2; corrected legend.
		◦ C2 -- update diagram and clarify Mandatory elements
		• Appx 4.9.3.1 -- xmlns is lower case, VersionNumber xxyyyy is lower case
		• Appx 4.9.3.2 -- update that 2 attributes are Mandatory
		• Appx 4.10.2 -- diagram - corrected legend.
		◦ C2 added Mandatory elements
		• Appx 4.10.3.1 -- xmlns is lower case, VersionNumber xxyyyy is lower case
		• Appx 4.11.3.1 -- xmlns is lower case
		• Appx 4.11.3.7 -- TRANSCODE size is 3
		• Appx 4.11.3.18 -- CODE size is 3
		• Appx 5.1 -- corrected errors in CXF example
		• Appx 5.2 -- corrected errors in PXF example
		• Appx 5.3 -- corrected errors in RRF example, MICRDS is "Drawee"
		• Appx 5.4 – corrected errors in RF example, MICRDS is "Drawee"
		• Appx 5.5 -- corrected errors in ERF example
		• Appx 5.6 -- corrected errors in EF example
		• Appx 5.7 -- corrected errors in RES example
		• Appx 9.1 -- C11, C22 removed extraneous NCR transport specifics
		• Appx 9.2 -- table deleted as RBI/NPCI does not support JPEG images in TIFF files.
		• Appx 9.3 -- C2 removed extraneous NCR transport

		specifics • Appx 9.4 -- C2 deleted • Appx 9.5 -- C1 deleted • Appx 9.6 new to define Required JFIF markers and tags for grayscale JFIF images
Rev 1.12	14 March 2007	Further changes are shown via document markups, relative to Rev 1.11 previously released. • Sect 11.1 – remove sentence regarding separate license • Appx 2.5 PXF – added that number of items is a configurable parameter • Appx 4.1.3.9 – corrected attribute spelling LegalAmountUsability • Appx 4.5.3.3.1 – corrected to agree with RBI/NPCI Procedural Guidelines; 39 clarified; 40 added, 82,83,84 deleted. • Appx 4.7 – corrected working in introduction paragraph • Appx 4.7.3.3.1 – changed descriptions 01,02,03 • Corrected sample files to reflect India values – Appxs: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.8
Rev 1.13	04 July 2007	• Made a change in Section 2 – Step 2 Corrected the definition of calculation of maximum return period. Added following words – "Capture shall use SessionDate, CLOSE_RECEIVING_TIME of the Session and SessionExtensionHrs for the session to calculate the maximum return period."
Rev1.13	19 July 2007	• Updated Section 2 – Step 3 – Removed the FID reference. FDD shall contain both data and images. • Section 7 Security – Updated the diagram that shows the data flow through ECPIX and the digital signatures that are applied to items and files as the data flows. • Added AtParBankMaster reference in Section 12. • Updated Appx 3.7.1 Presentation Validations – Wrongly Presented Item Check para. • Updated Appx 3.7.2 Returns and Extension Validations
Rev 1.15	14 July 2010	• Addition of a new reject reason code in section 4.9.3.3 • Modified the description for "Item Presentment Date vs item session date validation" in section 3.7.1 • Added 2 new validations in section 7.1 • Added support for 2048 bit key length in section 7 • Modified list of reports in section 8 • Updated TOC • Updated memory configuration in sections 9.1.1, 9.2.1, 9.3.1 & 9.4.1 • Updated software configuration in sections 9.1.2, 9.2.2,

		9.3.2 & 9.4.2
		• Updated section 3.8 for IQA thresholds parameters as per the site.
Rev 1.16	24 August 2010	• Modified the document to replace RBI with RBI/NPCI • Modified section 1 for replacing word "pilot" with "project" • Modified section 3.7.1 for Drawee city validation. • Added a Note in section 3.7.2 • Modified section 8 for adding two reports, IQA Fail & IQA Pass • Modified section 8 for rephrasing the statement for manual generation of reports • Modified section 10 for updating the network capacity planning for 85kb • Modified section 11.1 replacing "CHI" with "Bank" • Modified section 8 for synchronizing the report names with that of the site. Also added 2 reports that were present on site but not in the document.
Rev 1.17	7th September 2010	• Added section 9.6 to mention about the CHI High Availability. • Added a Note in section 9 for the Grid support for 32 bit CHI. • Modified section 1 to rephrase the statement as suggested by NPCI. • Modified section 11.1 to add the reference for Hardware configuration of the A-CHI server.
Rev 1.18	1st August 2011	• Deleted the comment in section 7 that says that 2048 bit certificates shall be supported by means of a CR. • Modified size of field "SecurityKeySize" in sections Appx 4.1.3.4 and Appx 4.1.3.7 to support 2048 bit certificates.
Rev 1.19	11th August 2011	• Modified size of field "DigitalSignatureMethod" in sections Appx 4.1.3.4 and Appx 4.1.3.7 to support SHA256 signature algorithm. • Added version (0002- for 2048 securitykey support) and (0003 – SHA256 algorithm support) in section 4.1.3.1 & 4.5.3.1 for CXF and RRF files. • Added the file header along with file version used in section 4.5.3.1, 4.6.4.1, 4.7.3.1, 4.8.3.1.
	27th Feb 2012	• For CXF and RRF files added version (0002- for 2048 securitykey support) and (0003 – SHA256 algorithm support) for xmlns attribute.
Rev 1.20	22nd March 2012	• Modified field value for DigitalSignatureLength in section Appx 4.1.3.7 ImageDS for SHA1 and SHA2
Rev 1.21	27th June 2012	• Modified the section 4.2.2 and 4.4.2 in appendix for CIBF and PIBF file structure.

Rev 1.22	22nd Aug 2012	• Modified the section 9.1.1,9.2.1,9.3.1,9.4.1 and 9.5.1 to Add Windows 2008 OS and to modify Windows Disk requirement for Windows 2008. • Modified the section 9.1.2,9.2.2,9.3.2,9.4.2 and 9.5.2 to add new Thirdpaty software requirement for Windows 2008. • Modified the section 9.6.1 to to Add Windows 2008 OS in CHI Cluster requirement.
Rev 1.23	9th Sep 2012	• Modified the the Roxio Entries in 9.1.2,9.2.2,9.3.2,9.4.2 and 9.5.2 section. Modified the Software list in order show the Paid Third Parties in first followed by the free Third Parties. • Modified the section 9.1.1,9.2.1,9.3.1,9.4.1 and 9.5.1 to separate Windows 2003 and Widows 2008 OS and And added note for Windows clustering requirement.
Rev 1.24	30th Nov 2012	• Updated section 9.1.1, 9.2.1, 9.3.1, 9.4.1 and 9.5.1 for change in processor model • Updated section 9.1.2, 9.2.2, 9.3.2 and 9.4.2 for change in WebSphere edition from Standard to Express
Rev 2.0	7th Dec 2012	• Updated section 9.1.1, 9.2.1, 9.3.1, 9.4.1 and 9.5.1 for change in processor core details and model details. • Updated section 9.1.1, 9.2.1, 9.3.1, 9.4.1 and 9.5.1 for change in disk drive details, drive configuration and formatting changed to tabular format. • Updated section 9.1.1, 9.2.1, 9.3.1, 9.4.1 and 9.5.1 for modification of Database backup drive size. • Updated section 9.1.2, 9.2.2, 9.3.2, 9.4.2 and 9.5.2 for removal of Windows 2003 Thirdparty requirement and addition of Oracle 11.2 32 bit client. • Third-Party software components grouped separately based on license procurement. Formatting changed to tabular format. • Updated section 9.1.2, 9.2.2, 9.3.2, 9.4.2 and 9.5.2 for removal of Windows 2003 Third-Party software requirement. • Updated Security Module section of 9.1.1, 9.2.1, 9.3.1, 9.4.1, 9.5.1 9.1.2, 9.2.2, 9.3.2, 9.4.2 and 9.5.2 for removal of Rainbow HSM card support. • Updated section 9.1.2, 9.2.2, 9.3.2, 9.4.2 and 9.5.2 for addition of Third-Party software additional vesrion details and categorization of Third-Party as per there licensing term. • Updated section 9.1.2, 9.2.2, 9.3.2, 9.4.2 and 9.5.2 for addition of Windows 2008 vesrion details and removal of Windows 2003. • Moved section 9.6 (High Availability for CHI) under section 11 (High Availability and Disaster Recovery). • Modified section 7 to remove the support for SHA1 signature algorithm and 1024 security key length support and to add support for SHA256 signature

		algorithm and 2048 security key length support.

Rev 2.1	05th OCT 2013	• Addition of a new section for interface specification of FILE for CHI Branch interface module's bulk search
		
		   o Appx 4.4 FILE for CHI Branch interface module's bulk search
		
		   o Appx 4.4.1 File Name Convention
		
		   o Appx 4.4.2 Elements
		
		   o Appx 5.10 Example of FILE for CHI Branch interface module's bulk search
		
		• Updated some format changes in below section.
		
		   o Appx 4.1.3 Elements and Attributes
		
		• *Addition of section 9.6 for Extra Large CHI (Between 400,000 and 550,000 items/day Inward + Outward)*
		
		• *Addition of section 9.7 for Extra-Extra Large CHI (XXL CHI) (Between 450,000 and 800,000 items/day)*
		
		• *Modified the 3.8 section for "Below Minimum Image Size" and "Exceeds Maximum Image Size" values for 100DPI and 200DPI image resolution related changes.*

Rev 2.1	26th DEC 2013	• Modified the change sheet section name so that it can be distinctly differentiated the following section in the document.
		
		   o Main Change Sheet.
		
		   o Appendix Change Sheet.

Rev 2.1	24th Jan 2014	• *Modified the note in 3.8 section to remove the SRS word, because SRS (System requirement specification) is not meant for CHI.*
Rev 2.1	28th Jan 2014	• *Modified the "11.2 Disaster Recovery – Alternate CHI" section to add Oracle Data guard as optional solution for database synchronization between Primary CHI and Alternate CHI.* • *Added note in Third-Party Software section of 9.1.2, 9.2.2, 9.3.2, 9.4.2, 9.5.2, 9.6.2, 9.7.2 to use Oracle Enterprise Edition for CHI's database if Bank's user wants to use Oracle Data Guard feature to replicate database between Primary and Alternate CHI.*
Rev 2.2	18th Sep 2014	• *Modified Appx 4.1.3.1 FileHeader section.* • *Modified Appx 4.1.3.7 Image DS section.* • *Modified Appx 5.1, 5.3 & 5.5 ECPIX file examples section.* • *Modified Appx 3.7.1 Presented ValidationsRemoved FootNote from Appendix 4.1.3.3* •
Rev 2.2	10th Feb 2015	• *Modified Appx 4.1.3.3 Item section.Footnote added for AccountNo* • *Modifed Appx 4.3.10.3.3.1 Reject reason section.*
Rev 2.2	16th Mar 2015	• *Updated section 9.1.2,9.2.2,9.3.2,9.4.2,9.5.2,9.6.2,9.7.2,for installation of SP1 on top of Windows server 2008 R2.* • *Modified the section 8 for adding three reports Outward Clearing branch wise, MICR Reject Repair Report and Bank wise Reports*

		• *Updated section 4.3.10.3.3.1 to add new item reject reason codes for Return Reason comment validation and validation of BOFD routing number for P2F instrument*
		• *IPSwitch WS_FTP version added in Footnote for SFTP in following section 9.2.1, 9.2.2, 9.3.2, 9.4.2, 9.5.2, 9.6.2, 9.7.2.*
Rev 2.3	20th Nov 2015	• *Modified Appx 4.1.3.1 and Appx 5.1 section, new schema version is added CXF for adding validations for MICRRepairFlags attributes.* • *Foot note is added for MICRRepairFlags validations.*
Rev 2.3	11th Jan 2016	• *Modified Appx 4.1.3.1 update validations for MICRRepairFlags attributes.* • *Foot note is updated for MICRRepairFlags validations.*
Rev 2.4	10th Feb 2016	• *Modified Appx 4.1.3.1 update validations for Government validations. Description for Reject reason 15 and 27 are updated*
Rev 2.4	03RD Mar 2016	• *Modified footnote in Appx 4.1.3.3, Added Foot note for Mandatory condition of AccountNo field*
Rev 2.4	09th Mar 2016	• *Modified Appx 4.1.3.3 Description changed for MICRRepairFlags - 'xxxx5x' to "if account is old."*

Note : This document has the following change sheet section.

- **Main Change Sheet.**

    This section tracks all the changes in the document excluding the changes in the Appendix section.

- **Appendix Change Sheet.**

    This section tracks all the changes in the Appendix section.

TABLE OF CONTENTS

1 Introduction

The CTS Clearing House Interface (CHI) provides an easy-to-use and standardised connectivity between the capture/drawee bank systems of a Bank to the RBI/NPCI Clearing House (CH). It provides a gateway for conduit of data and images. It provides the required validation to ensure that the data entering the CH is free of operational errors.

RBI/NPCI will provide or facilitate to provide each Bank participating in the clearing process with a license to install the CHI software on a server. Each Bank should be associated with a CHI for communication to the CH. It is the responsibility of each Commercial Bank (or its designate) intending to participate in the Cheque Truncation System, to procure the required hardware, hardware security modules (HSM), connectivity equipment and base platform software (Operating System, Database, Application Server etc). It is also the responsibility of the bank to arrange for installation, connectivity as agreed between NPCI & Banks and certification services from the vendors most suited to perform these services.

This document is intended to provide an overview of the CHI application, present the hardware platform sizing and software required at the CHI that will allow a bank to connect itself to the CH for the CTS system. Appendix-A in this document provides the interfacing specification between External systems (Capture Systems & Drawee bank systems) and the CHI.

The Interface Specification in Appendix-A is subject to modification as and when errors/concerns and enhancements are identified by RBI/NPCI, Banks or NCR.

2 CTS Architecture

The following is the high level overview of the CTS System.
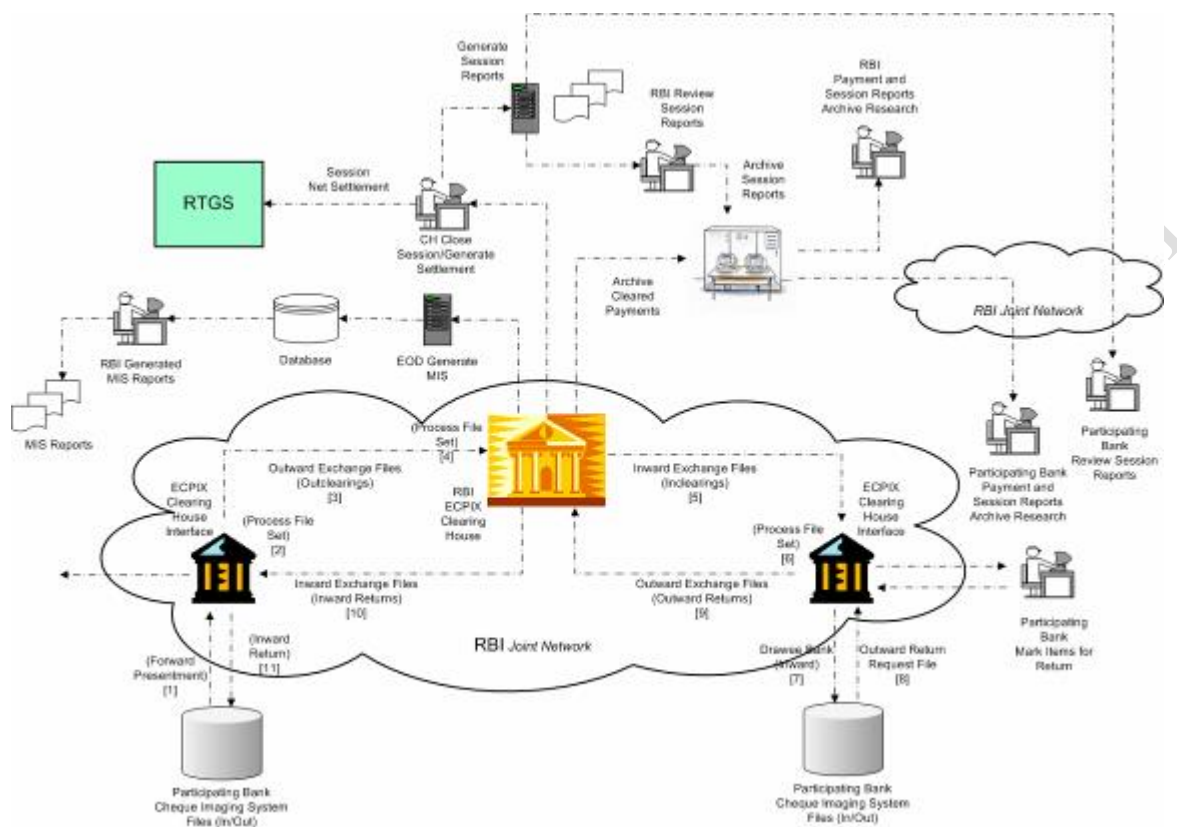
The following paragraphs describe the high-level data content & data flow through the overall solution. The numbers denote the steps in this process and are summarized below.

Step1   Forward Presentments

Note: The Capture system feature|function is out-of-scope for this document.

Note: The following ASSUMPTIONS apply to the Capture File set.
- the capture files are not encrypted. They are sent in-the-clear to the CHI.

Note: The following ASSUMPTIONS apply to the captured item data.
- the captured item data (MICR lines, images) may-or-may-not be digitally signed.
- There will be 3 image views of each item (grayscale front, binary front, binary back)

Note: Physical Item 'endorsement' is to consist of the following:
- Presentment Date of the item (ddmmyyyy) 8 N
- Clearing Type 2 N
- ISN (Item Seq No) consisting of:
  - Sorter ID 6 N
  - Run Number 2 N
  - Sequence Number 6 N
- Truncating / Presenting BankBranch Routing Number 9 N (per operation guidelines)

- IFSC (Indian Financial System Code) 11 AN (where 'IFSC = all '0' if IFSC does not exist.')

Capture File set shall conform to Capture Interface Specification in Appendix - A. The basic details of the Capture File set are:
- an XML file, containing financial data for exchange, possibly capture-generated digital signature information of MICR, and pointer into the IBF file
- an IBF file, containing the images, possibly capture-generated digital signature information of images

The ECPIX Gateway (CHI) has file folders for use by the capture modules and drawee modules of the bank, to send/receive data.
It is the responsibility of the banks capture and drawee modules to get and put files using one of the methods as outlined in "Appendix 3.2 Connectivity For File transfer".

Capture File set may be either of 'unsorted' (mixed-bag) batch of items & data; or 'sorted' batch of items & data.

Capture file shall require Bank-Of-First-Deposit ADDEND A records.
The Electronic Endorsements ADDEND C records are not required.
Note: RBI/NPCI requires that the cheques are physically endorsed, so endorsement data is visible in the image. No electronic endorsements are needed.

Step2   Process File Set

CHI Server shall ingest/process a Capture File set.

Note: RBI/NPCI requires the system to ensure that any data received for processing, is unchanged throughout the life of that data. To this end, Digital Signatures are used as follows:
- A digital signature of the Financial data (aka MICR Fingerprint) is calculated by the CHI
- A digital signature of each image view is calculated by the CHI.

Note: CHI generated digital signatures will be used in ensuring data is unchanged as per RBI/NPCI's business requirement.

'Digital signature placeholder positions' shall be provided within the CTS system for storage of any pre-existing (capture generated) digital signature data.

There may exist 1 'placeholder' for each image view, and 1 'placeholder' for the MICR Fingerprint.

The Bank can choose to use/fill these placeholders with digital signatures.

The ECPIX system passes along all digital signatures (CHI generated as well as capture generated 'placeholders') throughout the processing. The CTS Central Archive system stores all digital signatures.

RBI/NPCI has provided a 25 character (alphanumeric) 'User Field' for purposes important to the commercial bank. This 'user field' is 'pass-through' for all of CTS processing. This 'user field' is stored in the CTS Central Archive index for research.

CHI Server shall perform item data validation on each item within the Capture File set, specified in detail in the ECPIX (CHI) Requirements section (below).

CHI Server shall perform IQA on each item within the Capture File set, details of the IQA tests are in later sections in this document.

For purposes of handling the same capture file that was submitted multiple times, the CHI Server shall perform Duplicate Detection on each item within the Capture File set.

This duplicate detection is performed based on a UDK (Unique Document Key consisting of: Presentment Date, PresentingBank Routing Number, Cycle Number and Item Sequence Number). All items that are detected as UDK duplicates are returned to the capture system as 'rejected items'.

The items are assigned to an appropriate clearing session that is open and inherit a 'session date' that is the business date of the session. If there is no appropriate session that is open, then those items wait at the CHI until such a session opens.

Capture shall use SessionDate, CLOSE_RECEIVING_TIME of the Session and SessionExtensionHrs for the session to calculate the maximum return period.

A validation of the items Presentment Date vs the items session date is performed and items that exceed a system-limit are rejected.

Step3   Outward Exchange Files (Outclearings)

CHI Server shall create an Exchange File set.
    The Exchange File set shall be encrypted, and digitally signed.

Exchange File set shall contain the following:
- an ebXML container (aka an 'FDD') – holds the 'financial settlement data and Images'

Step4   Process File Set

CH Server shall ingest/process an Exchange File set.

CH Server shall perform decryption and digital signature validation of the Exchange File set as standards by RBI/NPCI.

CH Server shall perform verification and digital signature validation of each item in the Exchange File set as standards by RBI/NPCI.

For purposes of handling the same exchange file being submitted multiple times, the CH Server shall perform Duplicate Detection on each item within the Exchange File set. This duplicate detection is performed based on the UDK. All items that are detected as UDK duplicates are ignored.

Step5   Inward Exchange Files (Inclearings)

CH Server shall create an Exchange File set of Financial data for transmission to the CHI. This is done after settlement is approved.

Note: The Exchange files for Image data are created throughout the clearing process and transmission takes place in the background throughout the clearing process.

The Exchange File set shall be encrypted, and digitally signed.

Note: Exchange File set details are the same as step 3 previous.

Step6   Process File Set

CHI Server shall ingest/process an Exchange File set.

CHI Server shall perform decryption and digital signature validation of the Exchange File set as standards by RBI/NPCI.

CHI Server shall ensure valid digital signatures exist for each item in the Exchange File set as standards by RBI/NPCI

For preventing the same exchange file from being submitted multiple times, the CHI Server shall perform Duplicate Detection on each item within the Exchange File set. This duplicate detection is performed based on the UDK. All items that are detected as UDK duplicates are ignored.

Step7   Drawee Bank (Inward)

CHI Server shall create a Host/Posting File set that can be used by automated Drawee Bank Modules for inward processing at the receiving CHI.

Host/Posting File set shall conform to details in Appendix - A.

Step8   Outward Return Request File

A CHI will accept returns for the presented data (within the specified return cycle) from either:
- the CHI Branch module (interactive web session); or
- from any external system via the Return Request File interface provided.

Return File set shall conform to details in Appendix – A.

Step9   Outward Exchange Files (Outward Returns)

CHI Server shall create an Exchange File set.

The Exchange File set shall be encrypted, and digitally signed.

Exchange File set shall contain the following:
- an ebXML container (aka an 'FDD') – holds the 'financial settlement data'

Step10   Inward Exchange Files (Inward Returns)

CH Server shall create an Exchange File set of Financial data for transmission to the CHI. This is done after settlement is approved.

The Exchange File set shall be encrypted, and digitally signed.

Exchange File set shall contain the following:
- an ebXML container (aka an 'FDD') – holds the 'financial settlement data'

Step11   Inward Return

A CHI will create the inward returns for external systems via the Inward Return File interface provided.

Inward Return File set shall conform to details in Appendix – A.

3 CHI Feature Functionality

This section provides details of the CHI application functionality. Detailed operator manuals are available. The key characteristics on which the CHI has been designed are as follows:

- Easy to use Interface
- Published Interface (Appendix – A) to external systems
- Encryption of data, signing of exchange files containing outward cheques or returns for clearing to be sent to CH ensuring confidentiality either on network or using media (CDROM/DVD)
- Validation of presentment data before transmission to the CH
- Access to CH for research, report and broadcasts.

Listed below is the main functionality that a CHI performs.

a. Accept cheque data and images in manageable lots from the Capture systems
b. Validate, Analyze, Sort, Merge and send batched sets of data and images to the CH
c. Confirm delivery and acceptance of sent batches
d. Provide scrutiny of session and current ongoing activities at the CH
e. Retrieve inward cheque data and images from the CH
f. Provide a file Interface to the host bank's in-clearing system to deliver received data
g. Accept 'returns' to communicate exceptions decisions to the Presenting Bank through the CH.
   - A drawee bank module can use the RRF file to send a list of unpaid items to the CHI (see section 3.4 below)
   - Branches can login to the CHI webserver, and mark returns using the "Online Marking of Returns" module (see section 5.1 below)
   - CHI Supervisor can login to the CH, navigate down through their inward files and perform "Pre-Settlement Returns".
   - CH Supervisor can research items, and then mark returns. (this is only used in exceptional circumstances, at the discretion of RBI/NPCI).
h. Accept 'extensions' to communicate a need to extend making final decisions to the Presenting Bank through the CH.
   - A drawee bank module can use the ERF file to request extensions for items drawn upon it. The CH extensions can be for reasons of holiday, further researching needed, physical paper requests etc.
i. Provide external touch points to Presenting and Drawee Bank Systems.

3.1 Daily Processing Timelines

The CHI will support the processing timelines recommended by RBI/NPCI. The session timings are flexible and can be changed by RBI/NPCI to suit clearing requirements.
A session has a Clearing Cycle Length that does not include an Extension period. An Extension Request will extend the return cycle period based on the clearing rules and the holiday calendar.

3.2 CHI for Outward Presentment

The Outward presentment deals with accepting forward presentment data and images from the banks image capture system and exchanging them at the CH.

CHI performs the following steps during the outward presentment workflow.

i. Receive cheque MICR data in xml file and corresponding cheque image data in a binary file from image based capture unit that meets the standards stipulated by RBI/NPCI.
ii. Register the files received in step i and transfer them to their specified directories

   iii. Load, validate, authenticate and analyze (IQA Defect tests – See section on IQA later in this document) the received data and images
   iv. Digitally sign the Financial and each item view of the Image data
   v. Sort the MICR data and their related images as per drawee bank and payment type and create batches
   vi. Validate the MICR data against the session window to which they will be added at the CH
   vii. Build financial exchange files for the MICR data and image exchange files for the cheque image data
   viii. Transmit the above built exchange files via network or media
   ix. Process the acknowledgement from the CH and take appropriate action for informing the operator on the status of the transmission and loading status of the file

3.3 CHI for Inward Presentment

The Inward presentment deals with accepting inward presentment data and images from the CH and providing data in the form of files for use within the bank's in-clearing (drawee bank) system.

CHI performs the following activities during the inward presentment workflow.

   i. Receive inward financial data exchange files and image exchange files from the CH.
   ii. Authenticate and load the exchange file data into the system
   iii. Send an error exchange file to the CH if the inward financial data exchange file or image exchange file failed decryption or authentication
   iv. Send an acknowledgement exchange file to the CH if the inward financial data exchange file or image exchange file gets successfully loaded
   v. Validate the digital signatures on the MICR and Image Data
   vi. Generate files for interfacing with the bank's inclearing or exception processing system

3.4 CHI for Outward Returns

The Outward returns deals with accepting outward return data from the bank's inclearing or exception handling system. The return data is provided in a file known as Return Request file.

CHI performs the following activities during the outward returns workflow.

   i. Receive return request files from the bank's in-clearing system
   ii. Load the file and validate return data against the session window they will be added to at the CH
   iii. Build return Exchange file for the validated return data (This type of exchange file is devoid of any images and contains only the financial data and return reason codes for the returned cheque)
   iv. Transmit the above built exchange file via network or media depending upon system settings
   v. Process the acknowledgement from the CH and take appropriate action for informing the operator on the status of the transmission and loading status of the file

3.5 CHI for Inward Returns

The Inward returns deals with accepting inward return data from the CH and sharing this data in the form of return files with the bank's inward return processing system.

CHI performs the following activities during the inward returns workflow.

   i. Receive inward return financial data exchange files from the CH.
   ii. Authenticate and load the exchange file data into the system
   iii. Send an error exchange file back to the CH if the inward return financial data exchange file failed decryption or authentication

    iv. Send a acknowledgement exchange file back to the CH if the inward return financial data exchange file gets successfully loaded

    v. Generate Return files comprised of received inward return financial for interfacing with the bank's inward return processing system.

3.6 CHI User Roles

The proposed CHI has user interfaces dedicated to the operations of the system.

Images flow through the system unattended. All operations in the CHI workflow operate in both Automatic modes thus making the CHI an unattended system.

The administration of the CHI processes is shared between the following four types of users:

a. <u>System Administrator</u>

System Administrator is the Windows operating system administrator who installs the CHI application and creates users and groups.

This user does not have any access to CHI application but is the super-administrator handling system and Operating system level exceptions and functionalities.

System Administrator account is also used to manage the user privileges of other users created at an Operating system level.

b. <u>Supervisor</u>

Supervisor is the super-user of the CHI Application. Role based security is used to grant privileges to the Supervisor by the System Administrator.

Supervisor is the only user enabled to monitor and view the clearing session going on at the CH. Creation of accounts for the Branch users will be performed by the Supervisor.

Besides, some system level exceptions require the Supervisor privilege to handle and recover from exceptions.

c. <u>Operator</u>

Operator is the user that handles routine activities within the CHI Application. Role based security is used to grant privileges to the Operator by the System Administrator.

Some of the functions handled by the operator include monitoring the application, maintaining the system, handling exceptions, recovering errors and informing the supervisor when in need of a critical decision.

d. <u>Application Administrator</u>

Application Administrator takes care of the application level maintenance and support activities of backup, cleanup, key generation and audit report generation.

Application Administrator is also the Database administrator to manage and maintain the database.

e. <u>Branch Users</u>

Branch users are managed and maintained within the CHI Application by the Supervisor. Branch users connect to the Branch interface webserver provided by the CHI to perform branch level

activities such as Online returns, Online retrieval of branch posting data, Online upload of Return Request data.

3.7 Validation

The data is validated for its completion and correctness to conform to the details defined by the Interface Specification in Appendix – A.

3.7.1 Presentation Validations:

A high-level summary of the validations that are performed during presentation are:

- InterCity validation:
  1) Drawee bank code obtained from drawee bank sort code exists in 'bank master' table
  2) Drawee city code obtained from drawee bank sort code is eligible for intercity clearing in 'city master' table
  3) Bank of First Deposit and Drawee bank cannot be in the same city
  4) Bank of First Deposit city is eligible for intercity clearing in 'city master' table

- "PresentingBankRoutNo" field validation:
  This validation ensures that the PresentingBankRoutNo is a valid bank under the CHI, has not been BLOCKED or SUSPENDED and is in the CLEARING state.

- Clearing_Type and DocType validation:
  This validation ensures that the values within the ClearingType and DocType fields correspond to the values mentioned in the CHI Interface.

- Item Presentment Date vs item session date validation:
  This validation ensures that the difference in days between Presentment/Capture date and Session date does not exceed the RBI/NPCI set limit. This validation also ensures that the presentment date of the items is not greater than the Clearing Date.

- IQA and number of image views validation:
  1) This validation ensures that the image views sent by capture are of the correct specification and their IQA defect test results fall within the purview of thresholds set by RBI/NPCI.
  2) This validation ensures that for items presented with the IQAIgnoreInd set to '1', then the DocType must also be set to 'C' indicating 'Image-to-follow-with-paper-to-follow'.

- ON_US check:
  This validation ensures that ON_US cheques are processed as per the RBI/NPCI defines ON_US settings for Banks and CHI.

- Payor Routing Code validation:
  This validation ensures that the Payor Routing code is valid, so that the cheque can be routed to the correct financial institution and its CHI.

- Wrongly Presented Item check:
  This validation ensures that the Bank code of Payor Routing code is a valid bank participating in clearing. If the bank does not participate directly in clearing, it should designate a participating bank to receive its cheques using translation rule.

- Transaction Code validation:
  This validation ensures that the Transaction Code is a valid code for the particular clearing type in the CHTables.

- Duplicate item validation:
  This validation ensures that the Unique Document Key (UDK) of the item is not a duplicate of an item already in the system.

- Paper to follow validation:
  A new validation shall be introduced to ensure that BOFD city code equals drawee city code for P2F cheques. This ensures that paper to follow transactions are allowed only within the city and not across cities.

- Drawee city validation:
  This validation obtains the value of the CBS flag for the drawee bank. This validation will not be performed if the CBS flag is enabled for drawee bank. If the CBS flag is not enabled, this validation ensures that drawee city code obtained from the drawee bank sort code is eligible for clearing in the 'city master' table for that ClearingType.

3.7.2 Return and Extension Validations:

A high-level summary of the validations that are performed during returns and extensions are:

- Original item exists validation:
  This validation ensures that the referenced item is in the system

- Extension Period validation:
  1) that the Extension Period is within the maximum extension period allowed
  2) that the Extension was requested within the configured number of hours from inward presentment
  3) that the Extension Reason code is valid
  4) that the Item is not extended before
  5) that the item is not returned before
  Note : Its the banks onus to develop capabilities in their capture systems of marking extension city or bank wise

- Return validation:
  1) that the Return Period is within the maximum return period allowed
  2) that the item has not already been subject to Unwinding (bank put in SUSPENDED mode) or Bank Exclusion at the CH
  3) that the Return Reason code is valid
  4) that the item is not returned before

3.8 IQA Defect Tests

The following IQA Defect Tests will be carried out on the images at the CHI.

Capture solutions must ensure that the IQA thresholds in their solutions are PARAMETERISED and can be changed to the values communicated by RBI/NPCI. RBI/NPCI will be monitoring and adapting these thresholds for the Indian Cheque environment. Any thresholds given in the table below are the current values. Banks will have to contact RBI/NPCI in order to receive the most-up-to-date values for the Indian Cheque environment.

DEFECT TESTS			
	Gray Front	**Binary Front**	**Binary Rear**
Partial Image	0	0	0
Excessive Image Skew	20	20	20

Piggyback Image	n/a	n/a	n/a
Streaks and|or Bands	3	3	9
Bent Corner	20	20	20
Below Minimum Image Size	44236	6553	2457
Exceeds Maximum Image Size	68812	15974	3687
Additional tests for RBI/NPCI			
Binary Too Light	n/a	3	**1**
Binary Too Dark	n/a	39	39
Image Height Mismatch	10	10	10
Image Length Mismatch	10	10	10
Below Minimum Image length	150	150	150
Exceeds Maximum Image length	215	215	215
Below Minimum Height	60	60	60
Exceeeds Maximum Height	105	105	105
Torn Corner	20	20	20

Note : "Below Minimum Image Size" and "Exceeds Maximum Image Size" values have been calculated as -20% and +20% of the imagesize mentioned in previous releases of CHI IFS.

The following table provides an explanation of the test, the thresholds and computed metrics.

Test	Threshold	Units	Range
ANSI X9.37 Partial Image	Maximum allowable percentage of area of the image detected to be missing	Percent	**0-100**
ANSI X9.37 Excessive Image Skew	Maximum absolute value of the allowable angle of skew. Images with detected skew above this angle are flagged as suspects.	Tenths of degree	**0-900**
ANSI X9.37 Piggyback Image	None		
ANSI X9.37 Streaks and or bands	Maximum allowable height of horizontal streaks and or bands detected in the image.	Mm	**0-image height**
NCR Bent Corners	Maximum allowable intrusion distance. This distance is measured on a 45 degree angle from the corner of the image.	Mm	**0-100**
ANSI X9.37 Below minimum image size	Minimum allowable binary image size. Minimum allowable grayscale image size	bytes	**0-LONG_MAX**
ANSI X9.37 Exceeds maximum image size	Maximum allowable binary image size. Maximum allowable grayscale image size.	bytes	**0-LONG_MAX**
NCR Binary too light	Minimum allowable percentage black pixels in the image	Percent	**0-100**
NCR Binary too dark	Maximum allowable percentage black pixels in the image	Percent	**0-100**
NCR Image Height Mismatch	Maximum allowable difference in image heights of all image views of a document.	Mm	**0-LONG_MAX**
NCR Image Length Mismatch	Maximum allowable difference in image lengths of all image views of a document.	Mm	**0-LONG_MAX**

Test	Threshold	Units	Range
NCR Below Minimum Image Length	Minimum allowable image/document length. This value should be set to the length of the shortest document expected to be scanned, within an allowable tolerance. Images narrower than this length will be flagged as a suspect for this test condition.	Mm	**0-LONG_MAX**
NCR Exceeds Maximum Image Length	Maximum allowable image/document length. This value should be set to the length of the longest document expected to be scanned, within an allowable tolerance. Images that are longer/wider than this length will be flagged as a suspect for this test condition.	Mm	**0-LONG_MAX**
NCR Below Minimum Image Height	Minimum allowable image/document height. This value should be set to the height of the shortest document expected to be scanned, within an allowable tolerance. Images that are shorter than this length will be flagged as a suspect for this test condition.	Mm	**0-LONG_MAX**
NCR Exceeds Maximum Image Height	Maximum allowable image/document height. This value should be set to the height of the tallest document expected to be scanned, within an allowable tolerance. Images that are taller than this height will be flagged as a suspect for this test condition.	Mm	**0-LONG_MAX**
NCR Torn Corner	Maximum allowable intrusion distance.	Mm	**0-100**

3.9 Posting File Creation

Once the financial MICR data and corresponding images arrive at the CHI from the CH after the closing of a session, the system automatically generates the inclearings file for use in the drawee bank modules at the bank.

3.10 Status Monitor

3.10.1   Monitor Status of Data and Images

The CHI allows the supervisor to monitor the status of data and image Exchange files sent to the CH.

The CH sends a positive, negative or error acknowledgement to the sending CHI depending upon whether the data within the Exchange file gets loaded and validated successfully against the session window.

The CHI receives and loads the acknowledgement file and allows the supervisor to re-build and re-send the exchange file or take any other appropriate action depending upon the error identified in the acknowledgement file and displayed on the Operator Session Monitor window.

3.10.2   Monitor Status of Sessions at CH

The CHI allows the system supervisor to monitor the status of the current on-going sessions at the CH. The supervisor can monitor the following details about each session.

i. View the financial data and images sent from the CHI (outward) and received at the CH
ii. View the financial data and images received by the CH (inward) that will be transmitted to the CHI.
iii. View Net / Gross Settlement figures for institutions associated with this CHI.
iv. View and Download various reports generated at the CH.

3.11 Media Based Transmission of Exchange Files

In the event of a network failure, the application allows for data and image files to be exchanged with the CH using different types of Electronic medium (Magnetic and Optical). The same PKI infrastructure that is used during network transmission is used to create the files for transfer using physical media options.

4 Interface with Capture/Drawee Bank Systems

The CHI is capable of supporting image based capture systems that meets the standards stipulated by RBI/NPCI. To make it simple to use, a file based communication medium is used to accept capture cheque MICR and image data.

The protocol used for communication and transmission of files is FTP. Each capture uses a predefined account (set-up during installation) to send files to the CHI FTP directory from which the loading process takes place in the CHI application. The capture system informs the successful transmission of files by placing a '.done' file in the target directory. The transmitted data and image files will be picked up by the CHI for processing only after it detects the presence of the corresponding '.done' file.

The details of the file interface is available in Appendix-A.

5 Interface with Bank Branch

The CHI enables the various branches defined in its database to access it using a web server and process inward data and images.

The following functionality is provided using this interface.

5.1 Online marking of returns

The CHI user can mark the cheque returns online using a browser interface to the CHI. An appropriate return reason code can be chosen and the user can authorize to return the cheque.

The system internally generates a Return Request file, adds it to a session window with a payment type indicating a return to be accounted in the next settlement.

5.2 Online retrieval of branch posting data

This feature is useful for branches that have access to computers but have a problem maintaining live online connectivity with the CHI web server.

Such branches can opt to download all their inward posting data from the CHI server at a designated time after session closure and then import this data into any branch returns processing software.

5.3 Online upload of Return Request data

This section of the CHI Branch interface module allows the branch user to submit the Return Request file containing the exception items from the branch returns processing software.

The CHI accepts the file and adds it to a session window with a payment type indicating a return to be accounted in the next settlement.

6 Enquiries

The research functionality in the CHI supports research screens for locating and viewing data. The duration for this data maintained will be for a typical return cycle. The CHI is not intended to become a long-term storage and research platform. These screens are all web based.

Users can inquire the following cheques that have passed through the CHI system:
- i. Forward Presentment cheques
- ii. Inward Presentment cheques
- iii. Forward Return cheques
- iv. Inward Return cheques

The research section allows the user to inquire items via the following methods:

a. <u>Research items based on item index</u>
   Item index includes the combination of unique attributes used to identify each item distinctly

b. <u>Research items based on MICR data</u>
   MICR data includes fields like Serial Number, Payor Sort Code, Account Number and Amount

c. <u>Research items based on Miscellaneous data</u>
   Miscellaneous data includes other related fields like Return Reason code, Clearing Status, MICR repair flag etc.

7 Security

The CHI has been designed with the cryptography functions of encryption and digital signatures, using public and private keys.

All data interchanged between participants are both digitally signed and encrypted. The PKI infrastructure is used for this purpose. The CHI will be integrated with HSM (Hardware Security Module) to provide a higher level of security. In HSM, the PKI public and private keys will be stored inside the hardware module thus making it inaccessible, tamper proof and highly secure.

The following diagram shows the data flow through ECPIX and the digital signatures that are applied to items and files as the data flows.
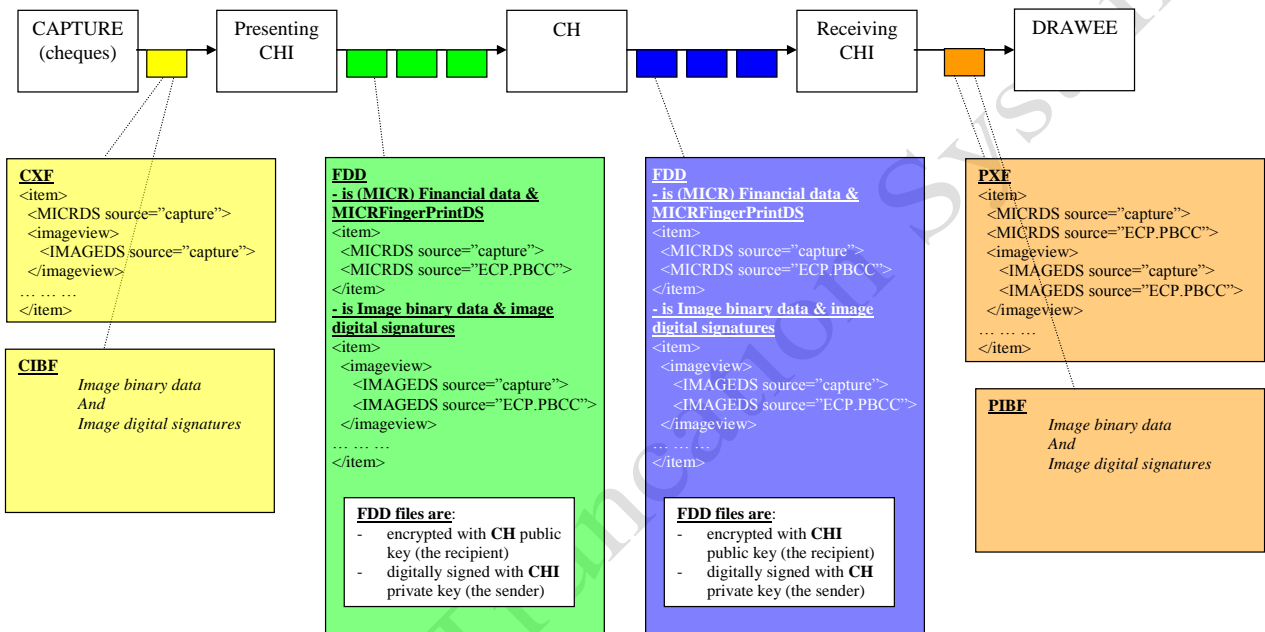
PKI technical details are in accordance with appropriate India Acts & IDRBT practice. In summary:
Hash algorithm SHA-256
Padding algorithm pkcs#1
RSA asymmetric encryption with 2048 bit key length
Triple DES (3DES, TDES) symmetric encryption with 168 bit key length
Certificates in X.509v3 format system certificate

Security is managed by the creation of user role identifiers that will enable the assignment of certain functions to users of the system. For users of the CHI webserver, an additional application level security is included to only allow users to view the data they are allowed to view.

All Web services are delivered using the SSL communication protocol.

The details of smart card access for CHI shall be described in a separate Security document.

8 Reports

The CHI allows connection with the CH to view and download clearing and settlement reports. The reports are available in the popular PDF format. Some of the reports available for the CHI generated at the CH are:

a. <u>Outward Items detailed Report</u> – A comprehensive detailed report that lists each item presented by the CHI on a per session basis

b. <u>Inward Clearing Items - Branchwise Report</u> – A comprehensive detailed report that lists each item received by branches in a bank on a per session basis

c. <u>Outward Items Summary Report</u> – A concise report summarizing items presented by the CHI on a per session basis

d. <u>Inward Items Summary Report</u> – A concise report summarizing items received by the CHI on a per session basis

e. <u>Gross/Net Settlement Report</u> – Report detailing out the settlement position of the bank along with details per payment type on a per session basis

f. <u>Branch Settlement Report</u> – Report that summarizes the outward and inward items for every branch in a bank on a per session basis

g. <u>Pre-Settlement Return Items Report</u> - A comprehensive detailed report that lists each item presented by the CHI that has been returned at the CH before final settlement on a per session basis

h. <u>Clearing House Balance Register Report</u> – A concise report summarizing the settlement position for a bank on a per session basis

i. <u>Duplicate Instruments Report</u> – A comprehensive detailed report that lists the duplicate items sent and received by the CH on a per session basis

j. <u>Clearing Items Extension List </u>– A detail report that list items which have been extended by the CH for a given business date.

k. <u>Inward Returns Clearing Items –Branchwise report</u> - A comprehensive detailed report that lists each return item received by branches in a bank on a per session basis

l. <u>Outward clearing branch wise</u> - contains BOFD branch wise details of presented items.

m. <u>Outward clearing branch wise XLS format</u> - contains BOFD branch wise details of presented items. Format for this report is XLS

n.

The CHI also has an option of manually generating audit and exception reports. The following reports are generated locally at the CHI:

a. <u>Application Audit Report</u> – Contains the audit of processes occurring within the CHI like loading of files, building of files, validation of data, IQA and creation of inward data

b. <u>Exception Audit Report</u> – Contains the list of exceptions encountered during processing of data and images

c. <u>User Activity Audit Report</u> – Contains the audit of user actions and operations performed in the system by each user

The CHI also has an option of scheduling daily reports. The following reports are generated locally at the CHI:

a. <u>Report on Items Failing Data Validation</u> – Contains the list of items that were rejected at CHI

b. <u>Report of items detected as 'Government Cheques'</u> – Contains the list of government cheques

c. <u>IQA Pass report</u> – A detailed report of every IQA test results for all items that have passed the IQA validations.

d. <u>IQA Fail report</u> - A detailed report of every IQA test results for all items that have failed the IQA validations.

e. <u>Paper to follow report</u> – A script will be available to generate a csv file containing details of paper to follow cheques

f. <u>MICR Reject Repair Report</u> - contains item details which got rejected due to MICR validation failures. Format for this report is PDF

g. <u>MICR Reject Repair Report XLS format</u> - contains item details which got rejected due to MICR validation failures. Format for this report is XLS

h. <u>SAN Validation Report</u> – contains item details which got rejected due to short account validation failures Format for this report is PDF and RPT

9　Equipment Sizing

Minimum recommended equipment configurations have been provided for five categories. For purposes of selecting the category it is essential that the volumes at the CHI should take into account the outward and inward items. Thus, upto 10,000 items per day would mean 5000 inward items and 5000 outward items. For purposes of total size computation, it is assumed that the **average image size per item consisting of 3 views is 75 Kbytes (using a Q-Factor between 25-30)**. Sizing has also taken into account that 40% of the total volume at the CHI should be processed in a peak-hour.
Note: Grid Clearing House shall support any existing 32 bit CHI's. It is recommended to upgrade the existing CHI's to 64 bit platform.

9.1　Mini CHI (upto 10,000 items/day)

9.1.1 Hardware

The following provides the guidelines for the sizing of a CHI server that is expected to handle a volume of loading 10,000 items/day (4,000 items in a peak hour).

Processor

Dual Intel Xeon Processors E5-2637 (2C, 5M Cache, 3.00 GHz, 8.00 GT/s Intel QPI).

Memory

16GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External[*]	Contents
1	RAID 1	C	80	Internal Only	OS
2	RAID 1	D	28	Internal or External	CHI Binaries, Database tables, data
		F	10		Oracle Logs, Index
3	RAID 1	E	20	Internal or External	Oracle Binaries & System tables
		G	20		Oracle Logs, data (copy 2)
		K	30		Database Backup

*　　Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
　　External: 15K RPM, SAN Drive, RAID on separate disk spindles
　　　　　　with SCSI RAID Enabled Backplane (or external SCSI/SAN Fibre Connect)

Please note that the daily database backup should be transferred from disk to tape or backup CHI.

Security Module

LUNA PCIe 7000 HSM from Safenet Inc.

9.1.2 Software

Operating System

Microsoft Windows 2008 R2 (64 bit) Standard edition with appropriate CALs to handle the users within the Bank.

Note: 1) W2008 R2 (64 bit) Enterprise edition is required if High Availability with Windows Active Passive Clustering needs to be configured.
2) Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the following Third-Party software components for its operation. It is the responsibility of the commercial banks to procure licenses for these software components. Appropriate software media and installation instructions will be provided by RBI/NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	Oracle Standard Edition - 64bit	11.2	5 Named User Licenses
2	IBM WebSphere Application Server - Express Edition	8.0	280 PVUs
3	IPSwitch WSFTP Server[1]	7.6	
4	Netal SL4NT Logger	3.2	
5	CD Creator Software		Roxio or similar

Note: Oracle 11.2 Enterprise Edition - 64bit is required if Alternate CHI with Oracle Data Guard needs to be configured.

The following Third-Party Software components are included with NCR CHI Software. Commecial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	IPSwitch WS FTP Professional	2006	
2	Crystal Reports	11.0	
3	Java Runtime Environment (JRE)	1.5	
4	MSXML	4.0	
5	PERL	5.6	
6	MDAC	2.8	
7	Adobe Reader	10.0	
8	Oracle Client - 32 bit	11.2	

9.2 Small CHI (upto 30,000 items/day)

9.2.1 Hardware

The following provides the guidelines for the sizing of a CHI server that is expected to handle a volume of loading 30,000 items/day (12,000 items in a peak hour).

Processor

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[1] For SFTP File Transfer.It requires IPSwitch WSFTP Server with SSH version 7.6.3 and above.

Dual Intel Xeon Processors E5-2637 (2C, 5M Cache, 3.00 GHz, 8.00 GT/s Intel QPI).

Memory

16GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID 1	C	80	Internal Only	OS
2	RAID 1	D	56	Internal or External	CHI Binaries, Database tables, data
3	RAID 1	E	22	Internal or External	Oracle Binaries & System tables
		G	22		Oracle Logs, data (copy 2)
4	RAID 1	F	15	Internal or External	Oracle Logs, Index
		K	30		Database Backup

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
  External: 15K RPM, SAN Drive, RAID on separate disk spindles
    with SCSI RAID Enabled Backplane (or external SCSI/SAN Fibre Connect)

 Please note that the daily database backup should be transferred from disk to tape or backup CHI.

Security Module

LUNA PCIe 7000 HSM from Safenet Inc.

9.2.2 Software

Operating System

Microsoft Windows 2008 R2 (64 bit) Standard edition with appropriate CALs to handle the users within the Bank.

Note: 1) W2008 R2 (64 bit) Enterprise edition is required if High Availability with Windows Active Passive Clustering needs to be configured.
2) Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the following Third-Party software components for its operation. It is the responsibility of the commercial banks to procure licenses for these software components. Appropriate software media and installation instructions will be provided by RBI/NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	Oracle Standard Edition - 64bit	11.2	5 Named User Licenses
2	IBM WebSphere Application Server - Express Edition	8.0	280 PVUs
3	IPSwitch WSFTP Server[2]	7.6	

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[2] For SFTP File Transfer. It requires IPSwitch WSFTP Server with SSH version 7.6.3 and above.

No.	Software	Version	Additional Details
4	Netal SL4NT Logger	3.2	
5	CD Creator Software		Roxio or similar

Note: Oracle 11.2 Enterprise Edition - 64bit is required if Alternate CHI with Oracle Data Guard needs to be configured. The following Third-Party Software components are included with NCR CHI Software. Commecial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	IPSwitch WS FTP Professional	2006	
2	Crystal Reports	11.0	
3	Java Runtime Environment (JRE)	1.5	
4	MSXML	4.0	
5	PERL	5.6	
6	MDAC	2.8	
7	Adobe Reader	10.0	
8	Oracle Client - 32 bit	11.2	

9.3 Medium CHI (Between 30,000 and 100,000 items/day)

9.3.1 Hardware

The following provides the guidelines for the sizing of a CHI server that is expected to handle a volume of loading 100,000 items/day (40,000 items in a peak hour).

Processor

Dual Intel Xeon Processors E5-2637 (2C, 5M Cache, 3.00 GHz, 8.00 GT/s Intel QPI).

Memory

24GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID 1	C	80	Internal Only	OS
2	RAID 1	D	180	Internal or External	CHI Binaries, Database tables, data
3	RAID 1	E	40	Internal or External	Oracle Binaries & System tables
		F	20		Oracle Logs, Index
4	RAID 1	G	20	Internal or External	Oracle Logs, data (copy 2)
		K	60		Database Backup

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
   External: 15K RPM, SAN Drive, RAID on separate disk spindles
            with SCSI RAID Enabled Backplane (or external SCSI/SAN Fibre Connect)

Please note that the daily database backup should be transferred from disk to tape or backup CHI.

Security Module

LUNA PCIe 7000 HSM from Safenet Inc.

9.3.2 Software

Operating System

Microsoft Windows 2008 R2 (64 bit) Standard edition with appropriate CALs to handle the users within the Bank.

Note: 1) W2008 R2 (64 bit) Enterprise edition is required if High Availability with Windows Active Passive Clustering needs to be configured.
2) Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the following Third-Party Software for its operation. It is the responsibility of the commercial banks to procure licences for these components. Appropriate software media and installation instructions will be provided by RBI/NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	Oracle Standard Edition - 64bit	11.2	5 Named User Licenses
2	IBM WebSphere Application Server - Express Edition	8.0	280 PVUs
3	IPSwitch WSFTP Server[3]	7.6	
4	Netal SL4NT Logger	3.2	
5	CD Creator Software		Roxio or similar

Note: Oracle 11.2 Enterprise Edition - 64bit is required if Alternate CHI with Oracle Data Guard needs to be configured.

Following Third-Party Software components are included with NCR CHI Software. Commecial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	IPSwitch WS FTP Professional	2006	
2	Crystal Reports	11.0	
3	Java Runtime Environment (JRE)	1.5	
4	MSXML	4.0	
5	PERL	5.6	
6	MDAC	2.8	
7	Adobe Reader	10.0	
8	Oracle Client - 32 bit	11.2	

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[3] For SFTP File Transfer.It requires IPSwitch WSFTP Server with SSH version 7.6.3 and above.

9.4 Large CHI (Between 100,000 and 250,000 items/day)

9.4.1 Hardware

The following provides the guidelines for the sizing of a CHI server that is expected to handle a volume of loading 250,000 items/day (100,000 items in a peak hour).

Application Server

Processor

Dual Intel Xeon Processors E5-2637 (2C, 5M Cache, 3.00 GHz, 8.00 GT/s Intel QPI).

Memory

32GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID 1	C	80	Internal Only	OS
		D	20	Internal Only	CHI Binaries
2	RAID 1	J	225	Internal or External	CH Data Files
3	RAID 1	K	225	Internal or External	CH Data Files

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
 External: 15K RPM, SAN Drive, RAID on separate disk spindles with RAID Enabled Backplane and external SAN Fibre Connect

Security Module

LUNA PCIe 7000 HSM from Safenet Inc.

Database Server

Processor

Dual Intel Xeon Processors E5-2637 (2C, 5M Cache, 3.00 GHz, 8.00 GT/s Intel QPI).

Memory

32GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID 1	C	80	Internal Only	OS
		D	20	Internal Only	Oracle Binaries
2	RAID 1	E	25	Internal or External	Oracle System Tables, Control Files
		F	30		Oracle Redo Log Archive
3	RAID 1	G	20	Internal or External	Oracle Redo Logs 1, Data, Control Files

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
4	RAID 1	H	20	Internal or External	Oracle Redo Logs 2, Index, Control Files
5	RAID 1	I	15	Internal or External	Undo Tablespace
6	RAID 1	K	150	Internal or External	Database Backup

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
 External: 15K RPM, SAN Drive, RAID on separate disk spindles with RAID Enabled Backplane and external SAN Fibre Connect

Please note that the daily database backup should be transferred from disk to tape or backup CHI.

9.4.2 Software

Application Server

Operating System

Microsoft Windows 2008 R2 (64 bit) Standard edition with appropriate CALs to handle the users within the Bank.

Note: 1) W2008 R2 (64 bit) Enterprise edition is required if High Availability with Windows Active Passive Clustering needs to be configured.
2) Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the following Third-Party software components for its operation. It is the responsibility of the commercial banks to procure licenses for these software components. Appropriate software Media and installation instructions will be provided by RBI/NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	IBM WebSphere Application Server - Express Edition	8.0	280 PVUs
2	IPSwitch WSFTP Server[4]	7.6	
3	Netal SL4NT Logger	3.2	
4	CD Creator Software		Roxio or similar

The following Third-Party Software components are included with NCR CHI Software. Commecial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	IPSwitch WS FTP Professional	2006	
2	Crystal Reports	11.0	
3	Java Runtime Environment (JRE)	1.5	
4	MSXML	4.0	
5	PERL	5.6	

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[4] For SFTP File Transfer.It requires IPSwitch WSFTP Server with SSH version 7.6.3 and above.

6	MDAC	2.8	
7	Adobe Reader	10.0	
8	Oracle Client - 32 bit	11.2	

Database Server

Operating System

Microsoft Windows 2008 R2 (64 bit) Standard edition with appropriate CALs to handle the users within the Bank.

Note: 1) W2008 R2 (64 bit) Enterprise edition is required if High Availability with Windows Active Passive Clustering needs to be configured.
2) Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the commercial versions of the following Third-Party Software for its operation. It is the responsibility of the commercial banks to procure a license of software for installation. Appropriate Software Media and Installation instructions will be provided by RBI/NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	Oracle Standard Edition - 64bit	11.2	5 Named User Licenses
2	Netal SL4NT Logger	3.2	

Note: Oracle 11.2 Enterprise Edition - 64bit is required if Alternate CHI with Oracle Data Guard needs to be configured.

The following Third-Party Software components are included with NCR CHI Software. Commecial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	PERL	5.6	

9.5 Very Large CHI (Between 250,000 and 400,000 items/day)

9.5.1 Hardware

The following provides the guidelines for the sizing of a CHI server that is expected to handle a volume of loading 400,000 items/day (160,000 items in a peak hour).

Application Server

Processor

Dual Intel Xeon Processor E5-2643 (4C,10M Cache, 3.30 GHz, 8.00 GT/s Intel QPI)

Memory

32GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID 1	C	80	Internal Only	OS
		D	20	Internal Only	CHI Binaries
2	RAID 10	J	360	Internal or External	CH Data Files
3	RAID 10	K	360	Internal or External	CH Data Files
4	RAID 1	E	30	Internal or External	Temp Directory

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
   External: 15K RPM, SAN Drive, RAID on separate disk spindles with RAID Enabled Backplane and external SAN Fibre Connect

Security Module

LUNA PCIe 7000 HSM from Safenet Inc. – **2 Cards**

Database Server

Processor

Dual Intel Xeon Processor E5-2643 (4C,10M Cache, 3.30 GHz, 8.00 GT/s Intel QPI)

Memory

32GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID 1	C	80	Internal Only	OS
		D	26	Internal Only	Oracle Binaries
2	RAID 1	E	40	Internal or External	Oracle System Tables, Control Files
		F	48		Oracle Redo Log Archive
3	RAID 1	G	40	Internal or External	Oracle Redo Logs 1, Data, Control Files
4	RAID 1	H	40	Internal or External	Oracle Redo Logs 2, Index, Control Files
5	RAID 1	I	24	Internal or External	Undo Tablespace
6	RAID 1	K	250	Internal or External	Database Backup

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
 External: 15K RPM, SAN Drive, RAID on separate disk spindles with RAID Enabled Backplane and external SAN Fibre Connect

Please note that the daily database backup should be transferred from disk to tape or backup CHI.

9.5.2 Software

Application Server

Operating System

Microsoft Windows 2008 R2 (64 bit) Standard edition with appropriate CALs to handle the users within the Bank.

Note: 1) W2008 R2 (64 bit) Enterprise edition is required if High Availability with Windows Active Passive Clustering needs to be configured.
2) Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the following Third-Party software components for its operation. It is the responsibility of the commercial banks to procure licenses for these software components. Appropriate software Media and installation instructions will be provided by RBI/NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	IBM WebSphere Application Server - Standard Edition	8.0	560 PVUs
2	IPSwitch WSFTP Server[5]	7.6	
3	Netal SL4NT Logger	3.2	
4	CD Creator Software		Roxio or similar

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[5] For SFTP File Transfer.It requires IPSwitch WSFTP Server with SSH version 7.6.3 and above.

Following Third-Party Software components are included with NCR CHI Software. Commecial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	IPSwitch WS FTP Professional	2006	
2	Crystal Reports	11.0	
3	Java Runtime Environment (JRE)	1.5	
4	MSXML	4.0	
5	PERL	5.6	
6	MDAC	2.8	
7	Adobe Reader	10.0	
8	Oracle Client - 32 bit	11.2	

Database Server

Operating System

Microsoft Windows 2008 R2 (64 bit) Standard edition with appropriate CALs to handle the users within the Bank.

Note: 1) W2008 R2 (64 bit) Enterprise edition is required if High Availability with Windows Active Passive Clustering needs to be configured.
2) Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the following Third-Party Software for its operation. It is the responsibility of the commercial banks to procure licences for these components. Appropriate software media and installation instructions will be provided by RBI/NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	Oracle Standard Edition - 64bit	11.2	5 Named User Licenses
2	Netal SL4NT Logger	3.2	

Note: Oracle 11.2 Enterprise Edition - 64bit is required if Alternate CHI with Oracle Data Guard needs to be configured.

The following Third-Party Software components are included with NCR CHI Software. Commecial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	PERL	5.6	

9.6 Extra Large CHI (Between 400,000 and 550,000 items/day Inward + Outward)

9.6.1 Hardware

The following provides the guidelines for the sizing of a CHI server that is expected to handle a volume of loading 550,000 items/day (Inward+Outward) with 30% of total daily volume in peak hour.

Application Server

One Application Server is required for handling load of Extra Large CHI. Following is the required hardware configuration for the Application Server.

Processor

Dual Intel Xeon Processor E5-2690 (8C, 20M Cache, 2.90 GHz, 8.00 GT/s Intel QPI)

Memory

32GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID 1	C	80	Internal Only	OS
		D	180	Internal Only	CHI Binaries
2	RAID 10	J	900	External	CH Data Files
3	RAID 10	K	900	External	CH Data Files
4	RAID 1	E	50	Internal Only	Temp Directory

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
  External Shared: Shared storage array 15K RPM, SAN Drive, RAID on separate disk spindles with RAID Enabled Backplane and external SAN Fibre Connect

Security Module

LUNA PCIe 7000 HSM from Safenet Inc. – 2 Cards

Database Server

One Database Servers are required to handle load of Extra Large CHI. Following is the required hardware configuration for the database server.

Processor

Dual Intel Xeon Processor E5-2690 (8C, 20M Cache, 2.90 GHz, 8.00 GT/s Intel QPI)

Memory

32GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID 1	C	80	Internal Only	OS
		D	60	Internal Only	Oracle Binaries
2	RAID 1	E	100	Internal or External	Oracle System Tables, Control Files
		F	300		Oracle Redo Log Archive
3	RAID 1	G	100	Internal or External	Oracle Redo Logs 1, Data, Control Files

4	RAID 1	H	100	Internal or External	Oracle Redo Logs 2, Index, Control Files
5	RAID 1	I	60	Internal or External	Undo Tablespace
6	RAID 10	K	1200	Internal or External	Database Backup

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
External Shared: Shared storage array 15K RPM, SAN Drive, RAID on separate disk spindles with RAID Enabled Backplane and external SAN Fibre Connect

9.6.2 Software

Application Server

Operating System

Microsoft Windows 2008 R2 (64 bit) Standard edition with appropriate CALs to handle the users within the Bank.

Note : Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the following Third-Party software components for its operation. It is the responsibility of the commercial banks to procure licenses for these software components. Appropriate installation instructions will be provided by NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	IBM WebSphere Application Server - Standard Edition	8.0	1120 PVUs
2	IPSwitch WSFTP Server[6]	7.6	
3	Netal SL4NT Logger	3.2	
4	CD Creator Software		Roxio or similar

Following Third-Party Software components are included with NCR CHI Software. Commercial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	IPSwitch WS FTP Professional	2006	
2	Crystal Reports	11.0	
3	Java Runtime Environment (JRE)	1.5	
4	MSXML	4.0	
5	PERL	5.6	
6	MDAC	2.8	
7	Adobe Reader	10.0	
8	Oracle Client - 32 bit	11.2	

Database Server

Operating System

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[6] For SFTP File Transfer.It requires IPSwitch WSFTP Server with SSH version 7.6.3 and above.

Microsoft Windows 2008 R2 (64 bit) Standard edition with appropriate CALs to handle the users within the Bank.

Note : Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the following Third-Party Software for its operation. It is the responsibility of the commercial banks to procure licenses for these components. Appropriate installation instructions will be provided by NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	Oracle Standard Edition - 64bit	11.2	5 Named User Licenses
2	Netal SL4NT Logger	3.2	

Note: Oracle 11.2 Enterprise Edition - 64bit is required if Alternate CHI with Oracle Data Guard needs to be configured.

The following Third-Party Software components are included with NCR CHI Software. Commercial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	PERL	5.6	

9.7 Extra-Extra Large CHI (XXL CHI) (Between 550,000 and 800,000 items/day)

9.7.1 Hardware

The following provides the guidelines for the sizing of a CHI server that is expected to handle a volume of loading 800,000 items/day (Inward+Outward) with 30% of total daily volume in peak hour.

Application Server

One Application Server is required for handling load of Extra-Extra Large CHI. Following is the required hardware configuration for the Application Server.

Processor

Dual Intel Xeon Processor E5-2690 (8C, 20M Cache, 2.90 GHz, 8.00 GT/s Intel QPI)

Memory

64GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID 1	C	80	Internal Only	OS
		D	180	Internal Only	CHI Binaries
2	RAID 1	E	50	Internal Only	Temp Directory
3	RAID 10	J	450	External Shared	CHI Data Files

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
4	RAID 10	K	450	External Shared	CHI Data Files
5	RAID 10	L	450	External Shared	CHI Data Files
6	RAID 10	M	450	External Shared	CHI Data Files

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
  External Shared: Shared storage array 15K RPM, SAN Drive, RAID on separate disk spindles with RAID Enabled Backplane and external SAN Fibre Connect

Security Module

LUNA PCIe 7000 HSM from Safenet Inc. – 3 Cards

Database Server

One Database Servers are required to handle load of Extra-Extra Large CHI. Following is the required hardware configuration for the database server.

Processor

Dual Intel Xeon Processor E5-2690 (8C, 20M Cache, 2.90 GHz, 8.00 GT/s Intel QPI)

Memory

64GB (DDR3, 1600MHz)

Disk Drive Specification

Disk	RAID	Drive	Size (GB)	Internal / External*	Contents
1	RAID1	C	80	Internal Only	OS
2	RAID1	D	120	Internal Only	Oracle Binary and Diag
3	RAID1	M	32	External Shared	Data , Control Files
4	RAID1	N	32	External Shared	Data
5	RAID1	O	25	External Shared	Undo Tablespace
6	RAID1	P	64	External Shared	Data
7	RAID1	Q	24	External Shared	Index Data
8	RAID1	R	16	External Shared	Control Files, Oracle Redo Logs, Oracle System Tables
9	RAID1	S	6	External Shared	Control Files, Oracle Redo Logs
10	RAID5	U	357	External Shared	Oracle Redo Log Archive
11	RAID1	W	27	External Shared	Temp Data
12	RAID5	Y	1600	External Shared	Backup files

* Internal: 15K RPM, Internal Drive, RAID on separate disk spindles.
External Shared: Shared storage array 15K RPM, SAN Drive, RAID on separate disk spindles with RAID Enabled Backplane and external SAN Fibre Connect

9.7.2 Software

Application Server

Operating System

Microsoft Windows 2008 R2 (64 bit) Enterprise edition with appropriate CALs to handle the users within the Bank.

Note : Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

The CHI requires the following Third-Party software components for its operation. It is the responsibility of the commercial banks to procure licenses for these software components. Appropriate installation instructions will be provided by NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	IBM WebSphere Application Server - Standard Edition	8.0	1120 PVUs
2	IPSwitch WSFTP Server[7]	7.6	
3	Netal SL4NT Logger	3.2	
4	CD Creator Software		Roxio or similar

Following Third-Party Software components are included with NCR CHI Software. Commercial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	IPSwitch WS FTP Professional	2006	
2	Crystal Reports	11.0	
3	Java Runtime Environment (JRE)	1.5	
4	MSXML	4.0	
5	PERL	5.6	
6	MDAC	2.8	
7	Adobe Reader	10.0	
8	Oracle Client - 32 bit	11.2	

Database Server

Operating System

Microsoft Windows 2008 R2 (64 bit) Enterprise edition with appropriate CALs to handle the users within the Bank.

Note : Install Windows Server 2008 R2 with Service Pack 1.

Third-Party Software

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[7] For SFTP File Transfer.It requires IPSwitch WSFTP Server with SSH version 7.6.3 and above.

The CHI requires the following Third-Party Software for its operation. It is the responsibility of the commercial banks to procure licenses for these components. Appropriate installation instructions will be provided by NPCI as part of the CTS project.

No.	Software	Version	Additional Details
1	Oracle Enterprise Edition - 64bit	11.2	5 Named User Licenses
2	Netal SL4NT Logger	3.2	

The following Third-Party Software components are included with NCR CHI Software. Commercial Banks are NOT required to procure separate licenses for these components.

No.	Software	Version	Additional Details
1	PERL	5.6	

10 Network Capacity Planning

The networking capacity required at the CHI to communicate to the CH has been approximated as per the formula below. The banks are requested to choose a suitable router and communication equipment to handle the workload as computed below.

The highlevel steps in computing your network capacity are:
   a) determine your peak day item volume by summing:
      i. outward volume for the biggest peak day
      ii. inward volume for the biggest peak day
   b) multiply by 0.0001537

Example: outward volume on biggest peak day is 13,500 items, inward volume on biggest peak day is 11,800 ; sum is 25,300 items. Now multiply by 0.0001537 results in 3.888 Mbps of required network capacity (minimum).

The assumptions in place for the network capacity are:
   - that the maximum image size is being transferred – namely 85KB
   - that the busiest hour of the day moved 40% of the total item volume
   - that a network can only be used up to 60% of it's theoretical maximum
   - that 10-bits represents the data plus network overhead
   - there are 1024 KB in a MB and 3600 seconds per hour

The actual formula is:

$$\text{Network capacity (Mbps)} = \frac{(itemvolume * 85KB * 0.40 * 10bits)}{(1024 * 3600 * 0.6)}$$

11 High Availability and Disaster Recovery

11.1 High Availability – Active-Passive Cluster

The HA Capability for the CHI can be implemented using Microsoft Windows 2008 Failover Cluster.

In Microsoft Windows 2008 Failover cluster, the first installed server acts as a primary server. If the primary server fails, switch over to passive server will happen automatically.

Notes:
   i. Hardware configuration for each server is as detailed in section 9 for the corresponding CHI variant
   ii. All application drives should be on external shared storage.
   iii. Microsoft Windows 2008 R2 64 bit **Enterprise Edition** is required on all servers.
   iv. All servers should be on the same CHI software version.
   v. Third-Party Software license requirements are applicable for each server as detailed in section 9 for the corresponding CHI variant.

11.2 Disaster Recovery – Alternate CHI

The Alternate CHI can be setup as an independent replica of the primary CHI. Database replication between primary CHI and alternate CHI can be achived by following ways.

1. Using Oracle Data Guard solution
   For operational readiness, the bank's CHI Administrator must ensure that the primary CHI's end-of-day database archive log is applied at the Alternate CHI on a daily basis.

2. Using Oracle RMAN Backup recovery solution
   For operational readiness, the bank's CHI Administrator must restore the primary CHI's end-of-day database backup at the Alternate CHI on a daily basis.

In case of a disaster at the primary CHI, operations can start at the Alternate CHI from StartOfDay.

Notes:
   i. Hardware configuration for the Alternate CHI is the same as the primary CHI as detailed in section 9 for the corresponding CHI variant.
   ii. Primary and Alternate CHIs must be on the same CHI software version.
   iii. Oracle 11.2 Enterprise Edition - 64bit is required for both primary and alternate CHI's database if Oracle Data Guard feature is used as a database replication solution for Alternate CHI processing. Appropriate Oracle license need to be procured as per the CHI flavor.
   iv. Third-Party Software license requirements are applicable for each server as detailed in section 9 for the corresponding CHI variant.

11.3 Alternate during Network Failure
See section 3.11.

12 Clearing House Tables available for capture system

The following Clearing House Master data shall be available for use by the capture systems.

- Clearing House and Clearing Center, including Bank/Branch and blockages
- Item Return Reason
- Calendar
- Bundle Collection
- Session Definition and Collection Type
- Clearing Type and DocType definitions
- Item Extension Reason
- Translation Rules
- Transaction Code
- City Master
- AtParBankMaster

The Clearing House Table data will be contained in a single XML file, available in a file folder on the CHI server as described in section Appendix 3.4. Capture and Drawee modules will have to detect that a new Clearing House Table Data file exists, and then undertake to get the file and use it for their purposes.

The details of the CH Master XML file can be found in the Interface Specification in Appendix A.

13 Appendix A – CHI Interface Specification

APPENDIX CHANGE SHEET

Rev	Date	Section	Description of Change	By
A	Apr 12, 2006		Rev A Initial, Available for RBI/NPCI and banks	G. Franklin
B1	18 Apr 2006	many	NCR & RBI/NPCI internal review and changes	G.Franklin
B2	25 Apr 2006	many	NCR & RBI/NPCI internal review and changes	G.Franklin
B3	27 – 29 June2006	many	NCR & RBI/NPCI internal review and changes	G.Franklin
For CHI V1.7	20 July - 01 Aug 2006	many	NCR & RBI/NPCI internal review and changes	G.Franklin
For CHI V1.8	17 Aug – 28 Aug 2006	many	NCR & RBI/NPCI internal review and changes	Sunil Babu
For CHI V1.9	Thru Sep 19 2006	Many	Very many changes in almost all sections due to RBI/NPCI Feedback on DRS.	GF
V1.10	22 sep 2006	Many	- Appx 4.1.2 re-order ImageDS - Appx 4.1.3.3 TruncatingRTNo - Appx 4.3.1 typo/grammer - Appx 4.3.2 re-order ImageDS - Appx 4.3.3 re-order ImageDS - Appx 4.3.4.1 added SettlementDate and SettlementTime to FileHeader - Appx 4.8.1 filename typo - Appx 4.10.3.1 added SettlementDate and SettlementTime to FileHeader - Appx 4.11.x CHMaster Table cleanup - Appx of sample files – corrected to agree - Appx 9.2 is for information only	

| V1.11 | 17 Nov 2006 | | • Appx 1 deleted reference to host (recon) file
• Appx 2.1 clarify Extension File (EF) as well as DREF
• Appx 2.4, Appx 2.5, Appx 3.4.1, Appx 4.8, Appx 4.8.1 describe DREF
• Appx 2.5, Appx 4.11.2, Appx 4.11.3.3, Appx 6 add necessary detail for AtParBankMaster element
• Appx 2.5, Appx 4.12, Appx 5.9 add detail and example for Unwound Item File
• Appx 4.11.2 redraw picture, A1 adjust indent of "Branch"
• Appx 4.11.3.7 completed description of DesignatedBranchForTransCode
• Appx 4.12 added section for Unwound Item File | |

| V1.12 | 15 Feb 2007 | | • Appx 1.2 C4 -- clarify Mandatory/Optional as applies to elements and attributes. Note that Fields having NULL or no default value are to be omitted from input files. Default/pre-defined values for attributes are case-sensitive
    C8 -- clarify element tags and attribute names are case-sensitive.
• Appx 2.1 -- diagram add DREF file
• Appx 2.5 -- specifically list DREF Drawee Extension File (it was already given in the description)
• Appx 3.3 -- add suggestion for better exception processing by inclearing system, clarify purging.
• Appx 4.1.2 -- diagram to swap ImageDS with ImageViewData to agree with order in A1; corrected legend.
• Appx 4.1.3.1 -- xmlns is lower case, VersionNumber xxyyyy is lower case, added DREF file
• Appx 4.1.3.3 -- IQAIgnoreInd is optional, default value is 0
• Appx 4.1.3.4 – MICRFingerPrint NOTE clarified, added "Drawee" as a possible value.
• Appx 4.1.3.6 -- provided attribute descriptions, removed ViewSideIndicator values that are not supported.
• Appx 4.1.3.7 -- clarified Filename, and digital signature attributes, StartOfProtectedData and ProtectedDataLength are Mandatory, lengths must be greater than 0
• Appx 4.1.3.8 -- clarified ImageReferenceKeyLength, lengths must be greater than 0
• Appx 4.1.3.9 -- described ImageViewAnalysis and IQA interpretations.
• Appx 4.3.2 -- diagram to swap ImageDS with ImageViewData to agree with order in C1; corrected legend.
    C1 list multiple MICRDS and ImageDS, ImageViewAnalysis elements
• Appx 4.3.3 -- diagram to swap ImageDS with ImageViewData to agree with order in B1; corrected legend.
    C1 list multiple MICRDS and ImageDS, ImageViewAnalysis elements
    C2 -- added Mandatory elements
• Appx 4.3.4.1 -- xmlns is lower case, VersionNumber xxyyyy is lower case
• Appx 4.4.2 – corrected diagram
• Appx 4.5.3.4 – MICRDS for RRF sets source = "Drawee"
• Appx 4.5.2 -- diagram - corrected legend.
    C1,C2 -- added structure and Mandatory elements
• Appx 4.6.2 -- diagram - corrected legend.
• Appx 4.6.3 -- diagram - corrected legend.
    C2 -- added Mandatory elements
• Appx 4.7.2 -- diagram added | GF |

| V1.12 | 15 Feb 2007 -contd | | • Appx 4.8.1 C1, C3 -- list EF and DREF files
• Appx 4.8.2 -- diagram - corrected legend.
• Appx 4.9.1 C1 -- clarify File ID is unique
• Appx 4.9.2 -- diagram to agree with C2; corrected legend.
    C2 -- update diagram and clarify Mandatory elements
• Appx 4.9.3.1 -- xmlns is lower case, VersionNumber xxyyyy is lower case,
• Appx 4.9.3.1 -- clarify CreationDate and CreationTime,
• Appx 4.9.3.2 -- update that 2 attributes are Mandatory
• Appx 4.3.10.3.3.1– augment Error Resolution for FileStatusCode 2
• Appx 4.10.2 -- diagram - corrected legend.
    C2 added Mandatory elements

• Appx 4.10.3.1 -- xmlns is lower case

• Appx 4.11.3.1 -- xmlns is lower case

• Appx 4.11.3.7 -- TRANSCODE size is 3
• Appx 4.11.3.18 -- CODE size is 3

• Appx 5.1 -- corrected errors in CXF example
• Appx 5.2 -- corrected errors in PXF example
• Appx 5.3 -- corrected errors in RRF example, MICRDS for RRF sets source = "Drawee"
• Appx 5.4 – corrected errors in RF example, MICRDS for RF sets source = "Drawee"
• Appx 5.5 -- corrected errors in ERF example
• Appx 5.6 -- corrected errors in EF example
• Appx 5.7 -- corrected errors in RES example
• Appx 9.1 -- C11, C22 removed extraneous NCR transport specifics
• Appx 9.2 -- table deleted as RBI/NPCI does not support JPEG images in TIFF files.
• Appx 9.3 -- C2 removed extraneous NCR transport specifics
• Appx 9.4 -- C2 deleted
• Appx 9.5 -- C1 deleted
• Appx 9.6 new to define Required JFIF markers and tags for grayscale JFIF images | |

| V1.12 | 14 March 2007 | | • Appx 2.5 PXF – added that number of items is a configurable parameter
• Appx 4.1.3.9 – corrected attribute spelling LegalAmountUsability
• Appx 4.5.3.3.1 – corrected to agree with RBI/NPCI Procedural Guidelines; 39 clarified; 40 added, 82,83,84 deleted.
• Appx 4.7 – corrected working in introduction paragraph
• Appx 4.7.3.3.1 – changed descriptions 01,02,03
• Corrected sample files to reflect India values – Appxs: 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.8 | |

| V1.1 3 | 4 July 2007 | | • Appx 4.3.10.3.3.1Reject Reason – Modified Existing Reject Reason Code "11" and Added 2 New Reject Reason Code – "24 and 25".
• Appx 4.1.3.3 and Appx 4.3.4.7 In Attributes of Item – "MICRRepairFlags" which was N is now NS
• In Appx 4.10.3.2 OACK FileSummary. TotalItemAmount attribute is removed as Item Tag does not not have amount attribute
• Account No (Drawee Account Number) is Optional. This correction is made in following sections – Appx 4.5.3.3, Appx 4.7.3.3, Appx 4.8.3.3, Appx 4.9.3.3, Appx 4.12.3.2
• "DepositorAcct" is made Optional in Section – Appx 4.1.3.5,
• In Appx 4.3.10.3.3.1Reject Reason Section, added a new Reject Code - 26 for AT PAR Validation
• In Appx 4.7.3.3.1 Extension Reason Section - Added Extension Reason Code 07 for Blockage.
• Appx 4.3.4.7 Item Section – "ItemStatus" Attribute is now made Mandatory and Default is changed from "00" to "0"
• Appx 4.3.4.7.1 ItemStatus Section the ItemStatus Code which earlier was – "00", "08", "09" is now changed to "0", "8", "9"
• Appx 4.3.4.7.1 ItemStatus Section - Description of ItemsStatus Code after change 9 (prior to change was 09) for Duplicate MICR Fields Check has been updated.
• Appx 4.10.3.3 Item now has ItemStatus Attribute to pass the Duplicate MICR Fields Detect Flag to Presenting Bank via OACK File
• Added Appx 4.10.3.3.1 Item Staus table for OACK File
• Changed the description of EOS in Appx 2.5. "These are 0KB files created to signal the bank modules that all the PXF and PIBF Files have been created for a session".
• Update Appx 5.3 Return Request File Example, Update Appx 5.4 Return File Example with IFSC Code as 11 digits.
• "SettlementTime" attribute deleted from Appx 4.3.4.1 Section, Appx 4.10.3.1, Appx 5.2 Posting Exchange File Example, Appx 5.8 Outward Acknowledgement File Example.
• Updated "SettlementDate" Description - "Value Date – Date on which the Items shall be posted in books of account for release of funds" in Appx 4.3.4.1 Section, Appx 4.10.3.1 Section.
• Updated Note below Appx 4.3.4.1 - "Drawee Module shall use SessionDate and CLOSE_RECEIVING_TIME of the Session, to determine extension and return lengths for items in the session" | RP |

V1.1 3	4 July 2007		• Added "SessionExtensionHrs" attribute in Appx 4.3.4.1 and Appx 4.10.3.1.	RP
			• Added following statement in Appx 4.10 – "Capture shall use SessionDate and CLOSE_RECEIVING_TIME of the Session to calculate the maximum return period."	
			• Corrected Sample CHM in Appx 6 – Appendix BB – "Blockage FROM_DATE="09072006" TO_DATE="10072006".	
			• Corrected Sample CHM in Appx 6 – Appendix BB – "CALENDAR_ID="23062006"".	
			• Corrected Sample CHM in Appx 6 – Appendix BB – In TranslationRule – "FROM_DATE="20062006" TO_DATE="20082006""	

V1.1 3	19 July 2007		• Updated Government Cheque footnote in Appx 4.1.3.3. Account Number shall no longer have AccountNumber + Transaction Code.	RP
			• In Appx 5.8, Updated complete Outward Acknowledgement File Example	
			• Appx 3.4.1 Participating Bank and Remote Branch Folders. Remote Branch Folders shall be under respective Bank Folders.	
			• Appx 4.3.10.3.3.1Reject Reason – Added a new Reject Reason Code for Government Cheque Validation	
			• Appx 2.5, 3.3 and 3.4.1 EOP File reference has been removed as it is no longer required in the system.	
			• Appx 4.8.1 Extension File (EF) Naming Convetion added AO File Option.	
			• Appx 4.11.3.13 – Session Definition Table, deleted field "CLOSE_RECEIVING_RETURNS_TIME", Altered Description for field "CLOSE_RECEIVING_TIME"	
			• Appx 4.11.3.16 TranslationRule Element – FROM_DATE and TO_DATE date format deleted and size changed to 8	
			• Appx 4.11.3.17 Blockage Element – FROM_DATE and TO_DATE date format deleted and size changed to 8	
			• In Appx 4.12.1, Session No & Session Date added in UIF file name.	
			• In Appx 4.12.3.1, Session No & Session Date added in File Summary Record.	
			• In Appx 4.12.3.2, current default values replaced with 2 default values for "Record type" field. "PI" => to Indicate Presentment Item."RI" => to Indicate Return Item	
			• Updated Appx 5.9 Unwound Item File Example to reflect Session No, Session Date, Record Type changes.	
			• Appx 4.10.3.3, Update the Value (Default) Coloumn description for ItemStatus Field.	
			• Appx 4.11.3.13- removed "CLOSE_RECEIVING_RETURNS_OFFSET_ DAYS" & "DO_SAME_SESSION_RETURNS".	
			• Appx 4.11.3.17 Blockage Element – TO_DATE Usage is now set as NOT NULL.	

			• Appx 4.11.3.6 Bank Element – Description for CLEARING_STATUS_CODE updated with SUSPENDED possible value used during Un-Winding. • Updated Process Flow diagram in Appx 2.1 • Added Appx 9.7 Note – Calculation of Extensions and Returns • Added Note in Appx 4.11.3.20 AtParBankMaster Element. • Added Return Reason Code for Blockage in Appx 4.5.3.3.1	
V1.14	26th Feb 2008		• Implementation of CRF for MICR Repair Flag. Update sections; 4.1.3.3, 4.3.4.7 • Change impacting the resolution of GEMS ID 33625678. Change the description of reject reason code 18 in Appx 4.3.10.3.3.1	
V1.15	14th July 2010		• Modified folder structure in Appx 3.4.1 • Modified Appx 4.3 to mention location of branch folder in city folder • Added new SPEED_CLEARING attribute in Appx 4.11.3.6 • Added new SPEED_CLEARING attribute in Appx 6 Appendix BB – CH Master Data File Example • Added a new section Appx 10 List of Paper to Follow (P2F) Items	
V1.16	23rd August 2010		• Modified appx 3.4.1 for adding the city folder in the table • Modified appx 10 to add the ascending order for P2F file. • Modified appx 4.11.3.6 to change the name of the new field to "CBS enabled"	
V1.17	6th September 2010		• Modified appx 4.11.3.6 to modify the comment column for the field "CBS enabled" • Modified appx 4.5.3.3.1 to change the name of the return reason section for codes 70-79	
V2.0	7th December 2012		• Modified appx 4.1.3.1, 4.1.3.4, 4.1.3.7 section to remove the support for SHA1 signature algorithm and 1024 security key length support. • Modified appx 5.1, 5.2, 5.3 and 5.4 to update the file example for support for SHA256 signature algorithm and 2048 security key length support.	

V2.1	5th October 2013		• Addition of a new section for interface specification of FILE for CHI Branch interface module's bulk search	
			o Appx 4.4 FILE for CHI Branch interface module's bulk search	
			o Appx 4.4.1 File Name Convention	
			o Appx 4.4.2 Elements	
			o Appx 5.10 Example of FILE for CHI Branch interface module's bulk search	
			• Updated some format changes in below section.	
			o Appx 4.1.3 Elements and Attributes	
			Added Min and Max size of attribute for following sesction	
			o CXF	
			▪ Appx 4.1.3 Elements and Attributes	
			▪ Appx 4.1.3.2 FileSummary	
			▪ Appx 4.1.3.3 Item	
			▪ Appx 4.1.3.4 MICRDS	
			▪ Appx 4.1.3.5 AddendA	
			▪ Appx 4.1.3.7 ImageDS	
			▪ Appx 4.1.3.8 ImageViewData	
			▪ Appx 4.1.3.9 ImageViewAnalysis	
			o PXF	
			▪ Appx 4.3.4.1 FileHeader	
			▪ Appx 4.3.4.1.1 FileSummary	
			▪ Appx 4.3.4.1.6 Item	
			o RRF	
			▪ Appx 4.3.6.3.3 Item	
			o ERF	
			▪ Appx 4.3.8.3.3 Item	
			o EF	
			▪ Appx 4.3.9.3.3 Item	
			o RES	
			▪ Appx 4.3.10.3.1 FileHeader	
			▪ Appx 4.3.10.3.2 FileSummary	
			▪ Appx 4.3.10.3.3 Item	
			o OACK	
			▪ Appx 4.3.11.3.1 FileHeader	
			▪ Appx 4.3.11.3.2 FileSummary	
			▪ Appx 4.3.13.3.2 Item Record	

V2.1	9th December 2013		o UIF ▪ Appx 4.3.11.3.3 Item Appx ▪ 4.3.13.3.2 Item Record Updated the Appx 4.1.3.9 ImageViewAnalysis section to add "-1" as a new flag for some of the IQA related test.	
V2.1	9th December 2013		• Addition of new Clering Type code for "LOCAL " Clearing Type under section Appx 7 Appendix CC – ClearingType	
V2.1	26th January 2014		• Added new Clearing Type "11" for NON CTS Cheqes under section "Appx 7 Appendix CC – ClearingType" and removed Clearing Type 12 and 13 which are not being used in current scenario.	
V2.1	28th January 2014		• Modified the "Appx 4.1.3.3 Item" section to change the "UserField" attribute as mandatory field in "Item" element in CXF. This change was initiated as per NPCI's request.	

| V2.2 | 18th September er 2014 | | Modified Appendix 4.1.3.1 FileHeader. Changed VersionNumber attribute value from 0003 to 0004.This change shall enable the system to validate the attribute level contraints. New CXF, RRF Schemas will be available in 0004 Version.Version 0004 will cater to Interface specification changes from version 2.0 to 2.2. Xmlns attribute value changed for CXF, RRF & ERF.

For CXF & RRFupdated value from 0003 to 0004.

For ERF Updated value from 0001 to 0002.
Modified Appx 4.1.3.7 Image DS Section.
Attribute SecurityKeySize & DigitalSignatureMethod value changed to v0004.
Modified Appx 5.1, 5.3 & 5.5 ECPIX file examples section.
Removed footnote from Appendix 4.1.3.3
With reference to RBI Circular : *"RBI/2014-15/237 DGBA.GAD.No.H - 1204/42.01.035/2014 -15* : Dispensation of the requirement of forwarding of government cheques in physical form to Government "* deleted the footnote for capture treating 7 digit account as special case for government cheques

Modified Appx 3.7.1 Presented Validations "With reference to RBI Circular : RBI/2014-15/237 DGBA.GAD.No.H - 1204/42.01.035/2014 -15 : Dispensation of the requirement of forwarding of government cheques in physical form to Government "
*Removed the "*Government Cheque validation:" | |

V2.2	10th February 2015		• Modified Appx 4.1.3.3 Item Section.
			  • AccountNo attribute modified for Short Account Number Validation.
			  • Footnote added for AccountNo attribute.
			  • Comment added for userField Attribute. Userfiled string validation is as per RBI guidelines.
			• Modified Appx 4.3.10.3.3.1 Reject Reason
			  • Reject Reason 7/15 is used for Short Account Number validation failure.	

V2.2	16th March 2015		• Modified Appx 4.3.10.3.3.1 Reject Reason
			  • Reject Reason 7/35 is used for reject reason comment validation
			  • Reject Reason 7/34 is used for validation of BOFD routing number for P2F instrument	

V2.3	20th November 2015		• Modified Appx 4..1.3.1 and Appx 5.1 section
			  • Changed VersionNumber attribute value of CXF schema from 0004 to 0005. This change shall enable new validations on MICRRepairFlags attribute of item element.
			  • FootNote added for MICRRepaireFlags attributes validations.	

V2.3	11th January 2016		• *Modified Appx 4.1.3.1 update validations for MICRRepairFlags attributes.* • *Foot note is updated for MICRRepairFlags validations.*	
V2.4	10th February 2016		• *Modified Appx 4.1.3.1 updated validations for Government validations. Description for Reject reason 15 and 27 are updated*	
V2.4	03rd March 2016		• *Modified footnote in Appx 4.1.3.3, Added Foot note for Mandatory condition of AccountNo field*	
V2.4	09th March 2016		• *Modified Appx 4.1.3.3 Description changed for MICRRepairFlags - 'xxxx5x' to "if account is old."*	

Note: This document has the following change sheet section.

- **Main Change Sheet**

  This section tracks all the changes in the document excluding the changes in the Appendix section.

- **Appendix Change Sheet.**

  This section tracks all the changes in the Appendix section.

Appx 1   Introduction

This document describes the interface between the ECPIX's Clearing House Interface (CHI) and the capture system. The capture system includes POD, Inclearings and Return-processing. The interface is based on the ANSI X9.37 DSTU 2003 definition but is not taken in its entirety and the format is changed from the record structure to XML. The images are provided in separate binary image files. The X9.37 DSTU 2003 should be used only as reference. This document will supersede X9.37 DSTU 2003.

> This document describes the files used by depository (capture) institutions to send check data and images to the RBI/NPCI or when RBI/NPCI presents or returns check data and images to a depository institution. This document is updated from time to time and NCR and RBI/NPCI reserve the right to update or amend this document without prior notice. Updates to this document will be posted on the RBI/NPCI's Web site. Every depository institution is required to work with this file structure and field definitions.

CHI supports the receipt and the delivery of check data and images using this interface in the following ways:

Items sent to CHI: 1. Forward Presentment of checks with data and images

2. Outward Returns with data only.

3. Extension Requests from the drawee bank with data only

Items sent by CHI: 1. Inward Presentment of checks with data and images

2. Inward Returns with data only

3. Response file (ack/reject) for every incoming file from CHI with data only

4. Extension file to depository bank with data only

5. Outward Acknowledgement file with data only

Appx 1.1   *Nomenclature and Notes on Reading this Document*

A1   Within this interface specification, the following nomenclature shall be used:

The word "shall" is used to indicate a binding function that must be performed by the system implementing the interface. The word "will" is used to describe additional details of the binding function.

In the leftmost column of this document, each function has a unique identifier in the form: Rxx. The 'R' refers to the revision level of the document in which the function was first introduced or last changed. The 'xx' is a sequence number, starting at 1 within each section. As an example, the first function in each section of the document's initial release will be "A1", the second function will be "A2", etc.

When an existing function is changed between revisions, only the revision level changes; the sequence number remains the same. When a new function is added, it is assigned the new

revision level and the next new sequence number in the section. If a function is deleted within a section, its sequence number can no longer be used in that section. The change log will reflect all functions changed, added or deleted.

A2 In this document term "ECPIX" refers to the CHI component of ECPIX.
A3 In this document "capture file" will be used synonymous with "capture exchange file".
A4 In this document "posting file" will be used synonymous with "posting exchange file".

Appx 1.2   Conventions

A1 All XML elements in this document shall be documented in "BOLD and Italic". This is for readability only and is not a restriction for implementation.

A2 All attribute values shall be in quotes "".

A3 All XML element and their attributes are fixed and shall be used as defined in this document. All XML examples in this document are examples only and values are not real. The actual attribute values used in real applications will be different than values shown in the examples. The examples are given to help understand the concepts.

C4 The convention that shall be followed to describe the "Usage" column in all tables in this document is as follows:
      M – for Mandatory
      O - for Optional
      N – Not applicable

Mandatory Element means that the element is required. If the element is missing, it will result in an error.
Optional Element means that the element may or may not be present.

Mandatory Attribute means that the attribute is required and its value should adhere to the data type and size specified. If the attribute is missing, it will result in an error.
Optional Attribute means that the attribute may or may not be present. If present, its value should adhere to the data type and size specified.

Fields having NULL or no default value should be omitted from input files.
Default/pre-defined values for attributes are case-sensitive.

A5 The convention that shall be followed to describe the "Type" column in all tables in this document is as follows:
N- Numeric. Shall be the numbers zero (0) through nine (9). No left padding with zeros required or supported.
A- Alphabetic. The alphabetic characters shall consist of the upper case letters A through Z, the lower case letters a through z, and the blank (space) character. No distinction shall be made between the upper case and the lower case.
AN – Alpha Numeric. An alphanumeric character shall be any of the alphabetic or numeric characters.
ANS – String or Variable Characters
NS – Numeric string. Will maintain the leading zeros.
DATE – Numeric field in a localized format – **RBI/NPCI requires "DDMMYYYY"**
TIME – Numeric field in the format "HHMMSS". HH is hours in range 0-23.

A6 XML documents used in this interface shall conform to well formed XML in compliance with the W3C specification.

B7   Every XML document used in this interface shall begin with an XML prolog:
       <?xml version="1.0" encoding="UTF-8"?>

C8   All element tags and attribute names are case-sensitive.

Appx 1.3   References

1   XML 1.0 (Third Edition) – World Wide Web Consortium. Extensible Markup Language (XML) 1.0,
       Third Edition.
       Available at: http://www.w3.org/TR/2004/REC-xml-20040204/
       Abstract: The Extensible Markup Language (XML) is a subset of SGML that is completely described in this
       document. Its goal is to enable generic SGML to be served, received, and processed on the Web in the way
       that is now possible with HTML. XML has been designed for ease of implementation and for interoperability
       with both SGML and HTML.

2   DSTU X9.37-2003 http://webstore.ansi.org/ansidocstore/dept.asp?dept_id=80

3   ISO 4217 Codes for the Representation of Currency and Funds
       Available at: http://www.iso.org/iso/en/prods-services/popstds/currencycodes.html

4   Namespaces in XML 1.0 – World Wide Web Consortium.
       Available at: http://www.w3.org/TR/REC-xml-names/
       Abstract: XML namespaces provide a simple method for qualifying element and attribute names used in
       Extensible Markup Language documents by associating them with namespaces identified by URI references.

Appx 2   Process flow in the Check Truncation System (CTS) using ECPIX

Appx 2.1   Process Flow Diagram
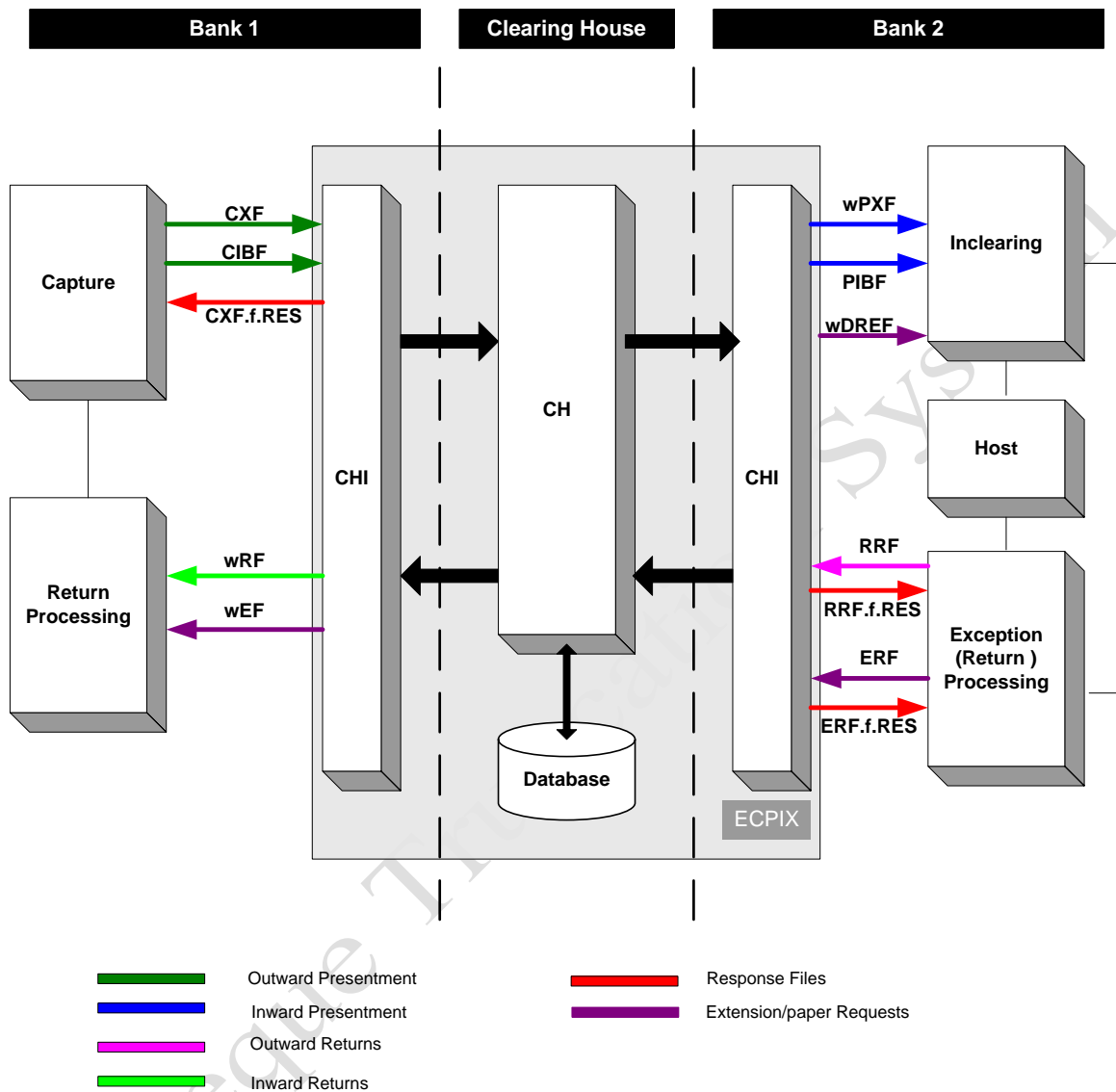
Files sent to CHI: 1. CXF*.XML and CIBF*.IMG – Outward Presentment of checks with images

2. RRF*.XML – Outward Returns of checks

3. ERF*.XML – Extension/paper Request File from drawee bank

Files sent by CHI: 1. wPXF*.XML and wPIBF*.IMG – Inward Presentment of checks with images

2. wRF*.XML – Inward Returns of checks

3. *.XML.f.RES – Response file for every incoming file (ack/reject)

4. wEF*.XML – Extension/Paper request File
wDREF*.XML – Extension request File for DRAWEE Module to indicate its items
that were extended by the CH on behalf of the CHI (e.g. Holiday)

5. *.xml.<session_information>.OACK – Outward Acknowledgement File for CXF & RRF

Where, "w" indicates either Master, Bank, Branch or All other files and "f" indicates the file id of the Response file.

Appx 2.2   Presentment Flow

The capture system sends captured items to the CHI as outward presentment. These items are sent in a set of two files;

1) Capture eXchange File (CXF) which contains check data in XML format and a

2) Capture Image Binary File (CIBF) containing check images.

CHI receives the files and validates the files for file integrity, data integrity and Image Quality.

- If a file is invalid, then the whole file is rejected (.RES) and sent back to the capture system, with the FileStatus set to indicate the problem (By invalid file, we mean a file whose syntax is incorrect or whose format does not match with what we have mentioned in this specification. For reasons due to which a file can be termed as invalid, refer section 4.3.10.3.3.1in which the REJECT REASON attribute is N.A.).

- If any items in the file are invalid then those items are included in the Response file (.RES) with reject reason, and with the FileStatus set to indicate some items failed (For reasons due to which an item can be termed as invalid, refer section 4.3.10.3.3.1in which the REJECT REASON attribute is not N.A.).

- If the file is successfully accepted by CHI, then no items are included in the Response file (.RES), and the FileStatus is set to indicate success so that a positive acknowledgement is sent to the capture system.

Once the items are accepted by the CHI, it processes the data, digitally signs the MICR data and image views and generates exchange file for the Clearing House (CH). Each exchange file is digitally signed and encrypted before it is transmitted to the CH. A clearing session must be open and available with CH, in order to send exchange files to the CH.

CH decrypts the files, loads its contents into database, validates the data, clears and sorts the items by receiving bank, settles the data and generates inward exchange files for the CHI.

CHI receives the inward exchange files, decrypts them, loads into database and generates inward presentment files for the drawee bank. The inward presentment data is sent in a set of two files;

1) Posting eXchange File (wPXF) which contains check data in XML format and

2) Posting Image Binary File (PIBF) containing check images.

The single posting file set (PXF and PIBF) contain the data and images for the entire session.

When the CHI receives end of session information from the CH, it creates an Outward Acknowledgement file for Presenting Bank module which contains Outward Presentment items that were accepted and settled successfully at the CH.

Appx 2.3   Return Flow

A drawee bank receives the inward presentment as inclearings and processes them for pay/no pay decisioning (exception processing). A Return Request File (RRF) is generated in XML format and sent to CHI. The Return Request File has all the outgoing returns with return reason in it. This file does not include images of returns.

CHI receives the file, validates the file for the file integrity and data integrity.

- If a file is invalid, then the whole file is rejected (.RES) and sent back to the drawee system, with the FileStatus set to indicate the problem (By invalid file, we mean a file whose syntax is incorrect or whose format does not match with what we have mentioned in this specification. For reasons due to which a file can be termed as invalid, refer section 4.3.10.3.3.1in which the REJECT REASON attribute is N.A.).

- If any items in the file are invalid then those items are included in the Response file (.RES) with reject reason, and with the FileStatus set to indicate some items failed (For reasons due to which an item can be termed as invalid, refer section 4.3.10.3.3.1in which the REJECT REASON attribute is not N.A.).

- If the file is successfully accepted by CHI, then no items are included in the Response file (.RES), and the FileStatus is set to indicate success so that a positive acknowledgement is sent to the return processing system.

The CHI then processes the data and generates exchange file for the CH. Each exchange file is digitally signed and encrypted before it is transmitted to CH.

CH decrypts the files, loads its contents into database, validates the data, clears and sorts the items by receiving bank, settles the data and generates inward exchange files for the CHI.

CHI receives the inward exchange file, decrypts them, loads into database and generates inward Returns File (RF) for the presenting bank.

When the CHI receives end of session information from the CH, it creates an Outward Acknowledgement file for Drawee Bank module which contains Outward Return items that were accepted and settled successfully at the CH.

Appx 2.4   Extension or paper request Flow

A drawee bank can request an extension on the return period for an item or request paper for an item using Extension request file. These extension requests, if valid as per the clearing rules set by RBI/NPCI, will be routed back to the presenting bank with extension period and extension reason.

- If a file is invalid, then the whole file is rejected (.RES) and sent back to the drawee system, with the FileStatus set to indicate the problem (By invalid file, we mean a file whose syntax is incorrect or whose format does not match with what we have mentioned in this specification. For reasons due to which a file can be termed as invalid, refer section 4.3.10.3.3.1in which the REJECT REASON attribute is N.A.)..

- If any items in the file are invalid then those items are included in the Response file (.RES) with reject reason, and with the FileStatus set to indicate some items failed (For reasons due to which an item can be termed as invalid, refer section 4.3.10.3.3.1in which the REJECT REASON attribute is not N.A.).

- If the file is successfully accepted by CHI then no items are included in the Response file (.RES) , and the FileStatus is set to indicate success so that a positive acknowledgement is sent to the return processing system.

For items that have been extended at the CH on behalf of the CHI, then the Drawee CHI will send a DREF file to the Drawee module to communicate the extension period and extension reason for the items.

Appx 2.5   Interface Files

Capture Exchange File
Capture eXchange File (CXF) is generated by the Capture and sent to the CHI for outward presentment

.

One CXF file contains a group of items (recommended 250 items) of the same presentment date.

CXF file contains the MICR financial data of items along with the image data attributes to locate, interpret and process images within its corresponding CIBF file.

Capture Image Binary File
The Capture Image Binary File (CIBF) contains the image binary data for every item view described in corresponding CXF file.

Every CXF file must have one associated CIBF file.

Response Files
Response file (.RES) is created for every file received by the CHI. The file name will be the original filename with a file id and ".RES" extension added at the end.

If any items from the incoming file are rejected either for a syntax error or any other valid reasons, then the items are returned in the Response file with a reject reason and a FileStatus set to indicate the problem.

CHI will generate a Response file with no items included and the FileStatus set to indicate success, thus making this file a positive acknowledgement.

Response files do not include any images. They are created in the same directory in which the CHI receives its corresponding CXF / RRF / ERF file.

Posting Exchange File
The Posting eXchange file (PXF) is generated by the CHI for the Receiving bank's in-clearing system, using the data received from the Clearing House. These are inward presentments. The CHI generates mainly three types of posting files: Master Posting Files for all items received at the CHI, Bank Posting file for every bank within the CHI and Branch Posting file for every branch configured within a bank. In case of Branch posting file, a separate file is created for every unique transaction code.

PXF contains the MICR financial data of items along with the image data attributes to locate, interpret and process images within its associated PIBF file. The number of items in PXF file will be a configurable parameter at the CHI.

Posting Image Binary File
The Posting Image Binary File (PIBF) contains the image binary data for every item view described in corresponding PXF file and the digital signatures of image views.

Every PXF file shall have at least one associated PIBF file.

Return Request File
The Return Request file (RRF) is provided to the CHI by the receiving bank's return processing system. The Return Request file consists of a list of items that are to be returned unpaid by the receiving bank, with a return reason for each item. These items do not need to be sorted by presenting bank. The return request files have no associated image files as returns are MICR data only.

Return File	Return File (RF) is generated by the CHI system for the Presenting bank's Return / Exception processing system using the return data received from the clearing house system.
	CHI generates three types of Return files: Master Return files for all items received at the CHI, Bank Return file for every bank within the CHI and Branch Return file for every branch configured within every bank. In case of branch Return file, a separate file is created for every unique transaction code.
	RF contains only the MICR financial data of items along with their Return Reason code.
	Return file has no associated images.
Extension Request File	The Extension Request file (ERF) is generated by the drawee bank when it needs an extension for an item or needs the physical paper item. The extension required could be a result of:
	1) fail to process inward clearing for whatever reason and desire extension on return time,
	2) Need extra day for cash,
	3) item needs to be researched,
	4) bad image need paper etc.
	The file will include extension period and extension reason.
Extension File **Drawee Extension File**	Extension File (EF) is generated by the CHI system for the Presenting bank's capture system. Extension File (DREF) is generated by the Drawee CHI system for the Drawee bank's drawee system. The file will have items that require the physical paper to be sent, and items that need extensions on return period and can be used by the bank/branch to hold credit on the customer account.
Outward Acknowledgement File	The Outward Acknowledgement (OACK) File consists of a list of all items that were successfully added to a session and settled at the CH. Outward Acknowledgement Files are generated for all outward files that affect the settlement of a session i.e. capture file (CXF) and Return Request File (RRF).
	OACK files are created in the same directory in which the CHI receives its corresponding CXF / RRF file.
CH Master Data File	The following Clearing House Master data shall be available for use by the capture systems.

- Clearing House and Clearing Center, including Bank/Branch and blockages
- Item Return Reason
- Calendar
- Bundle Collection
- Session Definition and Collection Type
- Clearing Type and DocType definitions
- Item Extension Reason

- Translation Rules
- Transaction Code
- City Master
- AtParBank Master

End of Session File

The End of Session file (.eos) is created by the CHI after creating all the applicable PXF/PIBF and RF files for a session.

These are 0KB files created to signal the bank modules that all the PXF and PIBF Files have been created for a session.

Unwound Item File

The Unwound item(s) file notifies the bank of items that have been unwound at the CH due to a Clearing House Notification. This file will be generated and given to each affected bank directly by the CH.

► **Unlike other interface files, this file will not be created at the CHI, and is not a part of the normal CHI interface.**

Appx 3   File Transmission Specifications

Appx 3.1   *Presentment and Return Files deposit time*

Presentment and Return files from the bank must be received at the CH via the CHI prior to the clearing session deadline. A capture file has been sent to a CHI only when the entire file has been transmitted and delivered to the CHI folder. Based on the size of the file, there may be a significant delay between the time you begin to send a file and the completion of the file transmission. The CHI must load, validate and process this file for onward transmission to the CH (outward file). Files that are received by the CHI after a session deadline will be considered deposited for the next session deadline. Outward files received at the CH after a session deadline will be rejected and will have to be reattached to a new session at the CHI.

Appx 3.2   *Connectivity for Files Transfer*

Bank will send its presentment and return files to CHI using predefined folders. Banks also have an option to send presentments and returns on a media (CD/DVD). The files on the media must be copied to the appropriate predefined folders.

Banks will receive presentments and returns from the predefined folders on CHI. The files can be received either using ftp, file-copy, or shared-drive, but ftp (secure FTP) is the preferred method for ECPIX. Banks have an option to receive presentments and returns on a media (CD/DVD).

Appx 3.3   *File Transfer*

In order to ensure files are completely transferred to CHI before CHI can start processing, the capture systems will ftp or copy a semaphore file with the same file name as the data file with ".done" extension at the end E.g. after ftp'ing a given capture file "CXF*", the capture will ftp an empty file with name "CXF*.done" indicating CXF* file can now be used for processing. This is required for any file sent to CHI. For completeness, all *.done files will be included on the media as well.

The CHI shall ensure that any file it creates are complete when they appear in the predefined directory, so the inclearing or return processing system can pull them using ftp. Once the files are picked up from the CHI, the files must be validated to ensure they were not corrupted or interrupted during transmission, and then they must be renamed to *.done by the bank's inclearing or return processing system. Inclearing systems may decide to pickup PXF files first, and then the PIBF files for better exception handling.

The files renamed as *.done shall be purged by the CHI from the output folder.

In order for bank modules to determine that the CHI has created all the inward files (PXF/PIBF and RF) for a session, then the CHI will create empty semaphore files. The file is named as follows:

- <session_no>_<session_date>.eos   - indicates the end-of-session

This file is created in the same folder location as the PXFs and RFs that they are semaphoring.

Appx 3.4   *File Folder*

The CHI has file folders for use by all the systems that connect to the CHI to perform tasks related to the Clearing System. This section describes the various folders and indicates how they are used in interacting with the CHI.

- For use by participating banks and remote branches. These are the main folders where the clearing data goes.

- For providing the necessary ClearingHouse Master data, that can be used by the presenting bank and drawee bank modules for their clearing operations
- For use by the CHI in communications with the CH

Appx 3.4.1 Participating Bank and Remote Branch Folders

CHI will have file folders created for the participating banks and remote branches. The banks/branches will send their files to these folders as well as receive their files from these folders.

The folder structure for capture and bank level posting files are:

<ftp_root>/users/<CHI_RT_number>/<bank1_RT_number>

<ftp_root>/users/<CHI_RT_number>/<bank2_RT_number>

The folder structure for capture and city level posting files are:

<ftp_root>/users/<CHI_RT_number>/<bank1_RT_number>/<city1>/<branch1_RT_number>

<ftp_root>/users/<CHI_RT_number>/<bank1_RT_number>/<city1 >/<branch2_RT_number>

<ftp_root>/users/<CHI_RT_number>/<bank1_RT_number>/<city2>/<branch3_RT_number>

<ftp_root>/users/<CHI_RT_number>/<bank1_RT_number>/<city2 >/<branch4_RT_number>

The folder structure for capture and branch level posting files are:

<ftp_root>/users/<CHI_RT_number>/<bank1_RT_number>/<branch1_RT_number>

<ftp_root>/users/<CHI_RT_number>/<bank1_RT_number>/<branch2_RT_number>

The "<root ftp>" folder will be configurable on the CHI, and Valid 'users' are created in it.

"<CHI_RT_number>" refers to Routing Number of CHI.

"<bank1_RT_number>" refers to Routing Number of Bank.

"<city2 >" refers to city code.

"<branch1_RT_number>" refers to Routing Number of Branch.

The following table lists the input and output folders that are used by the Presenting Bank module, and the Drawee Bank module. Further it explains the folder use for situations where the module exists in an 'centralised' fashion, and in a 'distributed' fashion.

PRESENTING BANK MODULE		
FILE TYPE	CENTRALISED	DISTRIBUTED
CXF CIBF	1. FTP to Bank folder and transfer files 2. Directly copy to shared Bank folder	1. FTP to City/Branch folder and transfer files 2. Directly copy to shared City/Branch folder
RES (for CXF)	Shall be placed in the same folder where CXF is received	Shall be placed in the same folder where CXF is received
OACK (for	Shall be placed in the same folder	Shall be placed in the same

CXF)	where CXF is received	folder where CXF is received
EF	1. FTP Login to Bank folder and pick up files 2. Pick up files directly from shared Bank folder	1. FTP Login to Branch folder and pick up files 2. Pick up files directly from shared Branch folder
RF .eos	1. FTP Login to Bank folder and pick up files 2. Pick up files directly from shared Bank folder	1. FTP Login to Branch folder and pick up files 2. Pick up files directly from shared Branch folder
DRAWEE BANK MODULE		
FILE TYPE	CENTRALISED	DISTRIBUTED
PXF PIBF .eos	1. FTP Login to Bank folder and pick up files 2. Pick up files directly from shared Bank folder	1. FTP Login to Branch folder and pick up files 2. Pick up files directly from shared Branch folder
ERF	1. FTP to Bank folder and transfer files 2. Directly copy to shared Bank folder	1. FTP to City/Branch folder and transfer files 2. Directly copy to shared City/Branch folder
RES (for ERF)	Shall be placed in the same folder where ERF is received	Shall be placed in the same folder where ERF is received
DREF	1. FTP Login to Bank folder and pick up files 2. Pick up files directly from shared Bank folder	1. FTP Login to Branch folder and pick up files 2. Pick up files directly from shared Branch folder
RRF	1. FTP to Bank folder and transfer files 2. Directly copy to shared Bank folder	1. FTP to City/Branch folder and transfer files 2. Directly copy to shared City/Branch folder
RES (for RRF)	Shall be placed in the same folder where RRF is received	Shall be placed in the same folder where RRF is received
OACK (for RRF)	Shall be placed in the same folder where RRF is received	Shall be placed in the same folder where RRF is received

Appx 3.4.2 Clearing House Master Data Folder

The folder structure for Clearing House Master data file is:

<ftp_root>/users/CHMaster

Appx 3.4.3 CHI and CH Data Folder

CHI will also have file folders created for exchanging files with the CH (these folders are ECPIX system folders, and are not exposed or used by the presenting/drawee systems).

The folder structures for exchange files between the CHI and CH are:

> <system path>/date/exchangeout
>
> <system path>/date/exchangein

Appx 3.5 Duplicate Files

CHI will prevent duplicate files having the same filename from being processed again. Duplicate file will be rejected with reject reason.

Appx 4 Interface Files

All systems across the Cheque truncation System should uniquely identify items by using the Unique Document Key (UDK). The UDK used in ECPIX is defined in section Appx 4.1.3.3.

Appx 4.1 CAPTURE EXCHANGE FILE (CXF)

Capture eXchange files are provided by the Capture to CHI with forward presentment data for clearing purposes.

One CXF File will contain a group of items (typically 250 items) of the same presentment date and from the same bank. The bank may present more than one CXF file at any time.

CHI will be performing IQA on the items, and will digitally sign the items. In addition the capture system must include the following before sending the data to the CHI

- digitally signed MICR data and images
- IQA results for the images

There can be only one MICRDS tag for an item in the CXF file. There can be only one ImageDS tag and ImageViewAnalysis tag for an image view in the CXF file.

Appx 4.1.1 File Name Convention

B1	The Capture eXchange File name shall use the following naming convention:
	CXF_nnnnnnnnn_ddmmyyyy_hhmmss_xx_bbbbbbbbbb.XML
	Where:
	CXF Capture eXchange File nnnnnnnnn Capturing bank/branch Routing Number ddmmyyyy Creation Date (same as in File Header) hhmmss Creation Time (same as in File Header) xx Clearing Type (see Appendix CC for details) bbbbbbbbbb File ID .XML Is a mandatory file type suffix
B2	File ID shall be a minimum of 1 character and a maximum of 10 characters and must be unique in a processing day for a given bank.

Appx 4.1.2 File Structure

A1	The Capture eXchange file structure shall be:
	<FileHeader … *>* 　　　*<Item …　>* 　　　　*<AddendA …　　/>* 　　　　*<MICRDS …　/>* 　　　　*<ImageViewDetail …　>* 　　　　　　*<ImageViewData …　/>* 　　　　　　*<ImageDS … />* 　　　　　　*<ImageViewAnalysis …　/>* 　　　*</ImageViewDetail>* 　　　　*:* 　　*</item>* 　*<FileSummary …　/>* 　*</FileHeader>*
A2	Elements "FileHeader", "Item", "MICRDS", "AddendA", "ImageViewDetail", "ImageViewData", "ImageDS", "ImageViewAnalysis" and "FileSummary" are mandatory
A3	Ordering of tags is critical, to avoid penalty of additional SQL update for every image view for every item.

A sample Capture eXchange File is shown in (Appendix AA)

Appx 4.1.3 Elements and Attributes

FileHeader *Must be greater than*

Appx 4.1.3.1 FileHeader

Attributes of FileHeader

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size		Usage
				Min	Max	
Xmlns	Schema definition	For CXF, must be for SHA256 algorithm support urn:schemas-ncr-com:ECPIX:CXF:FileStructure:010005 For RRF, must be for SHA256 algorithm support urn:schemas-ncr-com:ECPIX:RRF:FileStructure:010004 For RF, must be urn:schemas-ncr-com:ECPIX:RF:FileStructure:010001 For ERF, must be urn:schemas-ncr-com:ECPIX:ERF:FileStructure:010002 For EF, must	ANS	48	50	M

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size		Usage
				Min	*Max*	
		be urn:schemas-ncr-com:ECPIX:EF:FileStructure:010001				
		For DREF, must be urn:schemas-ncr-com:ECPIX:DREF:FileStructure:010001				
VersionNumber	Version of this Interface definition–	Xxyyyy xx = country (01=RBI/NPCI) yyyy = version 0005	NS	6	6	M
TestFileIndicator	P (Production	Must be **P**	A	1	1	M
CreationDate	File creation date Should be same as in the filename.	*Date should be in DDMMYYYY format*	DATE	8	8	M
CreationTime	File creation time Should be same as in the filename.	*Time should be HH24MISS format*	TIME	6	6	M
FileID	A number that uniquely identifies the items in this file. Should be same as in the file name.	*Must be greater than 0*	AN	1	10	M

** When CHI detects CXF version 010005, those items will be validated as per version 010005

Appx 4.1.3.2 FileSummary

Attributes of FileSummary

Attribute Name	Description/ Format	Value (default) Special Condition	Type	Size		Usage
				Min	*Max*	
TotalItemCount	Total number of items in file	*Must be greater than 0.*	N	1	8	M
TotalAmount	Total amount of items in the file	*Must be greater than 0.*	N	1	18	M

Appx 4.1.3.3 Item

Note: The fields with * in item table form the Unique Document Key (UDK) for that item and consists of:
 <PresentmentDate>< PresentingBankRoutNo>< CycleNo>< ItemSeqNo>

It is capture system's responsibility to ensure these fields give uniqueness over a day for a given bank. Items that fail this constraint are considered duplicates and will be rejected/returned to the capture system.

Attributes of Item

Attribute Name	Description/ Format	Value (default) Special Condition	Type	Size		Usage
				Min	*Max*	
ItemSeqNo*	This is a unique identifier for the bank for a "PresentmentDate" **Suggested combination**: <SorterID(6)><Run No(2)><Sequence No(6)>	*Must be greater than 0.*	NS	14	14	M
PayorBankRoutNo	Drawee Bank Routing number	*Must be greater than 0*	NS	9	9	M
Amount	Check amount	*Must be greater than 0*	N	1	18	M
AccountNo[8]	Drawee account number		NS	6	7	M[12]

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[12] *NPCI will inform the effective date for mandatory*

[8] The capture system must consider special case for Short Account Number (SAN). They are:
- Account Number value shall be mandatory 6 digits for 2 digits Transcode. Example SAN 123456 and Transcode 78 is valid scenario.
- Account Number value shall be mandatory 7 digits for 3 digits Transcode. Example SAN 1234567 and Transcode 890 is valid scenario.
- If SAN is "1"for a particular account number then banks are expected to give AccountNo as "000001" i.e. 1 is padded with 5 times zero.

Attribute Name	Description/ Format	Value (default) Special Condition	Type	Size Min	Max	Usage
SerialNo	Check number	*Must be greater than 0*	NS	6	6	M
TransCode (see also footnote for AccountNo)	Transaction code	*Must be greater than 0*	NS	1	3	M
PresentingBankRoutNo*	Routing number of the presenting bank	*Must be greater than 0*	NS	9	9	M
PresentmentDate*	Date of capture of checks	*Date should be in DDMMYYYY format*	DATE	8	8	M
CycleNo*	Capture cycle number.	*Must be greater than 0*	NS	2	2	M
NumOfImageViews	Number of image views for an item	(3)	N	1	1	M
ClearingType	See Appendix CC for details	*Must be greater than 0*	NS	2	2	M
DocType	The documentation type indicates the electronic versus physical cheque. **A** – ECP with Paper to Follow (no images) **B** – Image to Follow without paper **C** – Image to Follow with Paper to Follow**–D** - Image Presentment**–E** - Image Presentment with Paper to Follow. **F** – ECP	A|B|C|D|E|F (B)	A	1	1	M

- If SAN is not present, banks must capture default value as "000000".

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size		Usage
				Min	*Max*	
MICRRepairFlags[9]	Flags to be set if the read code line has been corrected. 'xxxx**y1**': if any field of the code line is corrected. 'xxxx**9**x': if account is new. 'xxxx**5**x': if account is old. 'xxx**1**y**1**': if transaction code is repaired 'xx**1**xy**1**': if account code is repaired 'x**1**xxy**1**': if sort code is repaired '**1**xxxy**1**': if serial number is repaired x: could be '0' or '1' y: could be '0' or '9' or '5'	(000000)	NS	6	6	M
SpecialHandling	SpecialHandling indicator is reserved for future use.	0 = Normal (0)	N	1	2	O
TruncatingRTNo	RT number of the truncating branch		NS	9	9	O
UserField	RBI/NPCI requested for use by the banks	String validation is as per RBI Guidelines.	ANS	1	25	M
IQAIgnoreInd[10]	To allow capture system to send bad image when image cannot be improved.	0 – perform IQA to detect bad images. 1 – Accept the image irrespective of its quality. (0)	N	1	1	O

---

[9] Validations for MICR flag - If the last digit is '0', then none of the preceding first 4 digits should be '1' and If the last digit is '1', then at least one or more value of 1st to 4th digit should have value '1'. Value of the 5th digit should have value '0' or '9' or '5'.
For e.g:
Valid values - 010001 000101 001001 100001 000191 010091 001091 100091 000090 000000 000050 111051
Invalid values - 000001 100000 001000 000100 000010 000091 100090 001090 000190 100010 010000 010090 000150 000051

| Attribute Name | Description/ Format | Value (default) | Type | Size | | Usage |
		Special Condition		*Min*	*Max*	
CurrencyInd	To indicate the currency of the item. See ISO standa– -- ref[3] CAD: is for Canadian Dollar USD: is for US Dollar INR: is for Indian Rupee	(INR)	AN	3	3	O

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[10] CHI performs IQA on every image. An item is rejected if the image is detected to be bad. Normally capture should attempt to re-scan the item to get a better image. But if capture cannot provide a better image that will pass IQA, then capture must use this flag along with a DocType that requires 'paper to follow' and resubmit the item to the CHI where it will then be processed.

Appx 4.1.3.4   MICRDS

It is mandatory for capture to provide a MICR digital signature for every item in the CXF file.

The source attribute in the MICRDS tag supplied in CXF file should have the value set as "Capture" e.g.Source="Capture".

Attributes of MICRDS

Attribute Name	Description/ Format	Value (default)	Type	Size		Usage
				Min	*Max*	
Source	Indicates if digital signature is coming from the capture system or from the CHI (or from Drawee in the case of RRF).	Capture | ECP.PBCC | Drawee	ANS	6	16	M
DigitalSignatureMethod	DSA_with_SHA1 RSA_with_MD5 RSA_with_MDC2 RSA_with_SHA1 ECDSA_with_SHA1 RSA_with_SHA256	**RBI/NPCI requires** 'RSA_with_SHA256'	ANS	15	15	M
SecurityKeySize	1024 2048	**RBI/NPCI requires** '2048'	N	4	4	M

| Attribute Name | Description/ Format | Value (default) | Type | Size | | Usage |
				Min	Max	
MICRFingerPrint	Indicates the combination of fields from item tag which is used to create Digital Signature If "source" is "Capture" then this field is capture defined and should cover a minimum of the following fields from the MICR line SerialNo;PayorBankRoutNo;TransCode;Amount. If "source" is ECP.PBCC then the format is: "PresentmentDate;PresentingBankRoutNo;CycleNo;ItemSeqNo;Amount;SerialNo;Transcode" See NOTE: at end of section.		ANS	1	256	M
DigitalSignatureLength		*Must be greater than 0.* For 2048 Bit Key size =344	N	3	3	M
SignatureData[11]	Base 64 encoded MICR digital signature		ANS	1	350	M

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[11] RSA digital signatures result in largest SignatureData size. RSA at 1024 bits, then base64 encoded results in 172 characters of data. RSA at 2048 bits, then base64 encoded results in 344 characters of data. The size is set to 350 for safety.

Attribute Name	Description/ Format	Value (default)	Type	Size		Usage
				Min	Max	
SecurityOriginatorName	If "source" is Capture this must be the common name of the certificate / key used. (unique designation of the entity that created the digital signature) If "source" is ECP.PBCC this will be the common name of the certificate / key used. (unique designation of the entity that created the digital signature)		ANS	1	16	M
SecurityAuthenticatorName	If "source" is Capture this must be set to provide additional uniqueness of Originator/KeyName e. (unique designation of the entity that authenticates the digital signature) If "source" is ECP.PBCC this will be set to provide additional uniqueness of Originator/KeyName e. (unique designation of the entity that authenticates the digital signature)		ANS	1	16	M

| Attribute Name | Description/ Format | Value (default) | Type | Size | | Usage |
				Min	Max	e
SecurityKeyName	If "source" is Capture this must be the serial number of the certificate / key used. If "source" is ECP.PBCC this will be the serial number of the certificate / key used.		ANS	1	16	M

NOTE: The MICRFingerPrint attribute identifies the fields that are used in the creation of a digitally signed MICR Fingerprint. As an illustrative example, the MICRFingerPrint could be "TransCode;Amount".

ECPIX will use the values of the identified fields in order to create and then digitally sign the MICR FingerPrint. Again, as an illustrative example, assume that the TransCode for the item is "35" and the Amount is "24680". The steps taken in creating the digitally signed MICR FingerPrint are:

- make a message using the values for the identified fields, in order. The values for each field are terminated by a semicolon. Thus the message in the example is: "35;24680;"
- perform a digital signature on this message, from the first character (the '3') for the whole length of the message (which is a length of 9 and includes the final ';')
- store the resulting digital signature and relevant data in the remaining attributes of the MICRDS element.

Appx 4.1.3.5   AddendA

AddendA is a Bank Of First Deposit (BOFD) record.

Attributes of AddendA

| Attribute Name | Description/ Format | Value (default) | Type | Size | | Usage |
				Min	Max	e
BOFDRoutNo	Bank of First Deposit RT number	*Must be greater than 0*	NS	9	9	M
BOFDBusDate	Endorsement Date when check was received at BOFD	*Date should be in DDMMYYYY format*	DATE	8	8	M
DepositorAcct	Depositor account number		NS	1	25	O
IFSC	Indian Financial System Code		AN	11	11	M

Appx 4.1.3.6   ImageViewDetail

Attributes of ImageViewDetail

Attribute Name	Description/ Format	Value (default)	Type	Size		Usage
				Min	*Max*	
ViewFormat	The image format used in the related ImageViewData element	TIFF|JFIF	ANS	4	4	M
CompressionType	The image compression algorithm used in the related ImageViewData element	None | G4 | JPEG	ANS	2	4	M
ViewSideIndicator	The image view conveyed in the related ImageViewData element	Front BW| Back BW | Front Gray	ANS	4	10	M
ViewDescriptor	The nature of the image view conveyed in the related ImageViewData element	(Full)	ANS	1	16	M
ImageAvailable	Indicates an image available in the related ImageViewData element	Y | N (Y)	A	1	1	M
ImageReproducable	Indicates the sender has the ability to recreate the image view	Y | N (Y)	A	1	1	O
ReplacementDocIndicator	Indicates if the image is of the original (N) or is a substitute (Y)	Y | N (N)	A	1	1	O
ImageCreatorRoutNo	Indicates the financial institution that created the image.		NS	9	9	O
ImageCreationDate	Date assigned by the financial institution when creating the image.	*Date should be in DDMMYYYY format*	DATE	8	8	O
UserField			ANS	1	256	O

Appx 4.1.3.7   ImageDS

It is mandatory for capture to provide digital signature for each image view in the CXF file.

The source attribute in the ImageDS tag supplied by capture should have the value set as "Capture" e.g.Source="Capture".

Attributes of ImageDS

| Attribute Name | Description/ Format | Value (default) | Type | Size | | Usage |
		Special Condition		Min	max	
Source	Indicates if digital signature coming from capture system or from the CHI.	Capture | ECP.PBCC	ANS	7	8	M
DigitalSignatureMethod	DSA_with_SHA1 RSA_with_MD5 RSA_with_MDC2 RSA_with_SHA1 ECDSA_with_SHA1 RSA_with_SHA256	**RBI/NPCI requires** 'RSA_with_SHA256'- v0004	ANS	15	15	M
SecurityKeySize	1024 2048	**RBI/NPCI requires** '2048'- v0004 *Must be greater than 0*	N	4	4	M
StartOfProtectedData	offset in bytes from the first byte (counted as byte 1) of the protected data that is signed	*Must be greater than 0*	N	8	8	M
ProtectedDataLength	Length of the data that is signed.	*Must be greater than 0*	N	1	8	M
DigitalSignatureDataOffset	Offset of the digital signature in the file	*Must be greater than 0*	N	1	10	M
DigitalSignatureLength	Length of digital signature. It is assumed that the digital signature is stored in binary form in the file; it is not encoded.	*Must be greater than 0* For 2048 Bit Key size =256	N	3	3	M
FileName	File name where signature is stored. This is the same file where the image data is stored.		ANS	1	256	M
SecurityOriginatorName	If "source" is Capture this will be the common name of the certificate / key used. (unique designation of the entity that created the digital signature) If "source" is ECP.PBCC this will be the common name of the certificate / key used. (unique designation of		ANS	1	16	M

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size		Usage
				Min	max	
	the entity that created the digital signature)					
SecurityAuthenticatorName	If "source" is Capture this will be set to provide additional uniqueness of Originator/KeyName. (unique designation of the entity that authenticates the digital signature)

If "source" is ECP.PBCC this will be set to provide additional uniqueness of Originator/KeyName. (unique designation of the entity that authenticates the digital signature) | | ANS | 1 | 16 | M |
| SecurityKeyName | If "source" is Capture this will be the serial number of the certificate / key used.

If "source" is ECP.PBCC this will be the serial number of the certificate / key used. | | ANS | 1 | 16 | M |

- Note: The Digital Signatures of the image view are part of the image binary data files and not this tag.

Appx 4.1.3.8   ImageViewData

Attributes of ImageViewData

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size		Usage
				Min	Max	
ImageDataLength	Length of the image	*Must be greater than 0*	N	1	10	M
ImageDataOffset	Offset for the image data		N	1	10	M

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size Min	Size Max	Usage e
FileName	Image file name		ANS	1	256	M
ImageReferenceKeyLength	The number of characters in the associated ImageReferenceData.		N	4	4	O
ImageReferenceData	Designator assigned by the presenting bank that uniquely identifies the item image		ANS	1	256	O
ClippingOrigin	Indicator if image is clipped. For full image this is "0"	0	N	1	1	M

Appx 4.1.3.9   ImageViewAnalysis

It is mandatory for capture to perform IQA for each image view in the CXF file.

The source attribute in the ImageViewAnalysis tag supplied by capture should have the value set as "Capture"e.g.Source="Capture".

Attributes of ImageViewAnalysis

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size Man	Size Max	Usage e
Source	Indicates if IQA is from capture system or from the CHI.	Capture | ECP.PBCC	ANS	7	8	M
ImageQuality	A 'global' indicator for the individual ImageQuality tests. '0' == The image was not tested for any of the the image defect conditions '1' == The image was tested and one-or-more image defect conditions were reported '2' == The image was tested and no image defect conditions were reported	0 | 1 | 2	N	1	1	M

| Attribute Name | Description/ Format | Value (default) *Special Condition* | Type | Size | | Usage |
				Man	Max	
ImageUsability	A 'global' indicator for the individual ImageUsability tests. '0' == The image was not tested for any of the the image usability conditions '1' == The image was tested and one-or-more image quality conditions were reported '2' == The image was tested and no image quality conditions were reported		N	1	1	M
ImagingBankSpecificTest	A 'global' indicator for the individual Bank Specific Image tests. '0' == The image was not tested for any of the the image defect conditions '1' == The image was tested and one-or-more image defect conditions were reported '2' == The image was tested and no image defect conditions were reported	0 | 1 | 2 (0)	N	1	1	M
PartialImage	A specific ImageQuality test -1 – Test configured but could not be performed (Test Failure scenario) 0 – Test not configured hence not performed 1 – Test performed but failed.(Test failure scenario) 2 – Test performed and passed.	-1 | 0 | 1 | 2 (0)	N	1	1	O

Attribute Name	Description/ Format	Value (default) Special Condition	Type	Size Man	Max	Usage
ExcessiveImageSkew	A specific ImageQuality test. -1 – Test configured but could not be performed (Test Failure scenario) 0 – Test not configured hence not performed 1 – Test performed but failed.(Test failure scenario) 2 – Test performed and passed.	-1 | 0 | 1 | 2 (0)	N	1	1	O
PiggybackImage	A specific ImageQuality test. -1 – Test configured but could not be performed (Test Failure scenario) 0 – Test not configured hence not performed 1 – Test performed but failed.(Test failure Scenario) 2 – Test performed and passed.	-1 | 0 | 1 | 2 (0)	N	1	1	O
LightOrDark	A specific ImageQuality test -1 – Test configured but could not be performed (Test Failure scenario) 0 – Test not configured hence not performed 1 – Test performed but failed.(Test failure scenario) 2 – Test performed and passed.	-1 | 0 | 1 | 2 (0)	N	1	1	O

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size		Usage
				Man	*Max*	
Streaks-Bands	A specific ImageQuality test. -1 – Test configured but could not be performed (Test Failure scenario) 0 – Test not configured hence not performed 1 – Test performed but failed.(Test failure scenario) 2 – Test performed and passed.	-1 | 0 | 1 | 2 (0)	N	1	1	O
BelowMinimumImageSize	A specific ImageQuality test. -1 – Test configured but could not be performed (Test Failure scenario) 0 – Test not configured hence not performed 1 – Test performed but failed.(Test failure scenario) 2 – Test performed and passed.	-1 | 0 | 1 | 2 (0)	N	1	1	O
ExceedsMaximumImageSize	A specific ImageQuality test. -1 – Test configured but could not be performed (Test Failure scenario) 0 – Test not configured hence not performed 1 – Test performed but failed.(Test failure scenario) 2 – Test performed and passed.	-1 | 0 | 1 | 2 (0)	N	1	1	O
ImageEnabledPOD	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
SourceDocumentBad	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size		Usage
				Man	*Max*	
DateUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
PayeeUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
ConvenienceAmountUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
LegalAmountUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
SignatureUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
PayorNameAndAddressUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
MICRLineUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
MemoLineUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
PayorBankNameAnd AddressUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
PayeeEndorsementUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
BOFDEndorsementUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
TransitEndorsementUsability	A specific ImageUsability test	0 | 1 | 2 (0)	N	1	1	O
ImageAnalysisUserInformation	Not required – the UserField will contain an encoded string		N	1	1	O
UserField	An encoded string conveying the results of individual Bank Specific Image tests.		ANS	1	24	O

For any of the individual tests performed, there can be a resulting code of -1|0|1|2. These codes are interpreted as follows:

'-1'= Test configured but could not be performed (e.g fail)

'0' = The image was not tested for the conditions

'1' = The image was tested and the condition is present (e.g fail)

'2' = The image was tested and the condition is not present (e.g. pass)

For any of the 'global' indicators (ImageQuality, ImageUsability, ImagingBankSpecificTest) the following table shows the resulting code (0|1|2) for a number of scenarios of individual tests.

Note that this table is intentionally generic – you should extend the concept for all applicable tests for the 'global' flag of interest to your application.

Individual test #1	Individual test #2	Individual test #3	Individual test #4	Global Result
0	0	0	0	**0**

2	2	2	2	**2**
2	1	1	1	**1**
2	2	2	1	**1**
2	2	1	0	**1**
1	1	1	0	**1**
1	0	0	0	**1**
2	2	2	0	**2**
2	0	0	0	**2**

For the IQA tests mandated by RBI/NPCI, the specific ImageQuality tests cannot convey all the tests being performed in the solution. Therefore the ImagingBankSpecificTest is the global indicator, and the UserField conveys the full set of test results. The UserField is encoded with a very simple structure as follows:

"mmm:ABCDEFGHIJLKMNOPQ where
- 'mmm' is a marker to indicate how the remaining chars A…Q are interpreted
- ':' is fixed to separate the marker from the results
- 'A'…'Q' take the values '0', '1', '2' for their individual tests

For example, the UserField might have the following value:
"BS1:20000222222222202" where

'BS1:' is the marker string and separator for BankSpecific testset #1
A: is the Partial Image test (-1|0|1|2)
B: is the Excessive Image Skew test (-1|0|1|2)
C: is the Piggyback Image test (-1|0|1|2)
D: is the Streaks and|or Banks test (-1|0|1|2)
E: is the Bent Corners test (0|1|2)
F: is the Below Minimum Image Size test (-1|0|1|2)
G: is the Exceeds Maximum Image Size test (-1|0|1|2)
H: is the Binary Too Light test (-1|0|1|2)
I: is the Binary Too Dark test (-1|0|1|2)
J: is the Image Height Mismatch test (0|1|2)
K: is the Image Length Mismatch test (0|1|2)
L: is the Below Minimum Image Length test (0|1|2)
M: is the Exceeds Maximum Image Length test (0|1|2)
N: is the Below Minimum Image Height test (0|1|2)
O: is the Exceeds Maximum Image Height test (0|1|2)
P: is the Torn Corner test (0|1|2)
Q: is the ImageFormat test (note: this is a bank specific test that the image format must meet certain specifications as defined by the bank – e.g. JFIF 100dpi) (0|1|2)

Appx 4.2   CAPTURE IMAGE BINARY FILE (CIBF)

Appx 4.2.1 File Name Convention

A1	Capture image binary files shall follow the same naming convention as its corresponding Capture eXchange file , except that the prefix "CXF_" shall be replaced with the "CIBF_" followed by rest of the text and then appended by unique modifier. The unique modifier can be text indicating anything (e.g. sequence number), **provided this makes the filename unique for the given business day**. The extension shall be ".img" CIBF_ nnnnnnnnn_ddmmyyyy_hhmmss_xx_bbbbbbbbbb _nn.img Where: CIBF Capture Image Binary File nnnnnnnnn from capture exchange file (CXF) ddmmyyyy from capture exchange file (CXF) hhmmss from capture exchange file (CXF) xx from capture exchange file (CXF) bbbbbbbbbb from capture exchange file (CXF) nn Unique modifier (e.g. "01" then "02" etc) .img Is a mandatory file type suffix

Appx 4.2.2 File Structure

The binary image file contains concatenated single page images.   The required image parameters and format is covered in Appendix EE: Image Detail Specification.

For RBI/NPCI, each item will have three image views, two B/W CCITT G4 TIFF images for front and back and a single Grayscale image compressed in JPEG for front. Each Image is referenced by its offset in the corresponding XML file. The order of items in the image binary file (CIBF) should match the order in the capture file (CXF). It is capture's responsibility to match the information of image views in capture file (CXF) to the contents in capture image binary file (CIBF)

The layout of the binary image file is given below.

The digital signature is stored as a part of the image file.
The image file layout with digital signatures:

DS Offset Item1 front →	Dig-Sign for Item1 Front
Offset Item1 front →	TIFF Image Item 1 (Front, B/W)
DS Offset Item1 back →	Dig-Sign for Item1 Back
Offset Item1 back →	TIFF Image Item 1 (Back, B/W)
DS Offset Item1 front →	Dig-Sign for Item1 Front
Offset Item1 front →	JPEG Image Item 1 (Front, Gray)
DS Offset Item2 front →	Dig-Sign for Item2 Front
Offset Item1 front →	TIFF Image Item 2 (Front, B/W)
DS Offset Item2 back →	Dig-Sign for Item2 Back
Offset Item1 front →	TIFF Image Item 2 (Back, B/W)
DS Offset Item2 front →	Dig-Sign for Item2 Front:
Offset Item1 front →	JPEG Image Item 2 (Front, Gray)
	:
	:
DS Offset Item"n" front →	
	:
	:

Appx 4.3   POSTING EXCHANGE FILE (PXF)

The Posting eXchange files are created by the CHI as inward presentment to the bank. The posting files can be generated either as:

1) Master Posting eXchange File that includes items for all banks associated with that CHI

2) Bank Posting eXchange File containing only the items presented to the specific bank

3) BRanch Posting eXchange File containing only the items presented to the specific branches. Within branches, files can be generated per transcode. In case the CHI is configured city wise, the branch folder (in which the branch posting file is generated) will be located in the respective city folder within the bank folder.

4) All Other Posting eXchange File containing all other items.

It is mandatory that the capture and the Presenting CHI will perform IQA on each image view, and will digitally sign the MICR and each image view. This means that there will be multiple MICRDS, IMAGEDS and ImageViewAnalysis elements for each item. Therefore the items in posting files will:

- always have digital signatures for MICR data and each image view from capture.
- always have digital signatures for MICR data and each image view from Presenting CHI.
- always have IQA for each image view from capture.
- always have IQA for each image view from Presenting CHI.

Appx 4.3.1 File Name Convention

A1	The Posting eXchange File name shall use the following naming convention: wPXF_nnnnnnnnn_<session_nos>_<session_date>_ddmmyyyy_hhmmss_xxxxxxx xxx.XML Where: w Type –M - Master (all banks using CHI) –B - Bank (one bank) –BR - Branch of a bank –O - Any Other items PXF Posting eXchange File nnnnnnnnn CHI / Payor Bank / Payor Branch Routing Number (depending upon value of w) <session_nos> The clearing session number <session_date> The clearing session date ddmmyyyy File Creation Date hhmmss File Creation Time xxxxxxxxxx File ID Modifier .XML Is a mandatory file type suffix
A2	The value for the File Creation Date, File Creation Time and File ID Modifier in the file name shall be the same as in the File Header.

B3	The All Other Posting eXchange File (AOPXF) shall be used for items that cannot be assigned to a Branch Posting file. These items may have an invalid or non-configured drawee bank sort code.
	AOPXF will not be needed under RBI/NPCIs processing rules.
A4	For the Payor Bank Routing Number, PXF file will contain:
	CHI routing number (of the receiving CHI) for Master Posting eXchange File
	Receiving Bank routing number for Bank and All Other Posting eXchange File.
	Payor Bank routing number for Branch Posting File.

Appx 4.3.2 Master/Bank Posting eXchange File Structure

Master/Bank Posting eXchange File Structure

C1	The Master and Bank Posting eXchange file structure shall be:
	
	<**FileHeader** … >
	    <**Item …** >
	      <**AddendA …** />
	      <**MICRDS Source="Capture" …** />
	      <**MICRDS Source="ECP.PBCC" …** />
	      <**ImageViewDetail …** >
	        <**ImageViewData …** />
	        <**ImageDS Source="Capture" …** />
	        <**ImageDS Source="ECP.PBCC" …** />
	        <**ImageViewAnalysis Source="Capture" …** />
	        <**ImageViewAnalysis Source="ECP.PBCC" …**
	/>
	      <**/ImageViewDetail**>
	      :
	    <**/item**>
	  <**FileSummary …** />
	  <**/FileHeader**>

B2	Elements "FileHeader", "Item", "AddendA", "ImageViewDetail", "ImageViewData", "FileSummary", "MICRDS", "ImageDS" and "ImageViewAnalysis" are mandatory

Appx 4.3.3 Branch/Trancode/AO Posting File Structure

Branch/Tr/AO Posting File Structure

| C1 | The Branch/Trancode/AO Posting eXchange file structure shall be:

    <*FileHeader* … >
        <*Item …* >
           <AddendA …   />
             <MICRDS Source="Capture" … />
             <MICRDS Source="ECP.PBCC" … />
             <ImageViewDetail … >
                  <ImageViewData … />
                   <ImageDS Source="Capture" … />
                   <ImageDS Source="ECP.PBCC" … />
                   <ImageViewAnalysis Source="Capture" …
/>
                   <ImageViewAnalysis Source="ECP.PBCC"
… />
             </ImageViewDetail>
               :
        </item>
     <FileSummary … />
     </FileHeader> |
| C2 | Elements "FileHeader", "Item", "AddendA", "ImageViewDetail", "ImageViewData", "FileSummary", "MICRDS", "ImageDS" and "ImageViewAnalysis" are mandatory |

Appx 4.3.4 Elements and Attributes

Appx 4.3.4.1 FileHeader

Attributes of FileHeader

Attribute Name	Description/ Format	Value (default)	Type	Size		Usage
				Min	Max	
Xmlns	Schema definition	For PXF, must be urn:schemas-ncr-com:ECPIX:PXF:FileStructure:010001	ANS		256	M

| Attribute Name | Description/ Format | Value (default) | Type | Size | | Usage |
				Min	Max	
VersionNumber	Version of this Interface definition	xxyyyy xx = country (01=RBI/NPCI) yyyy = version (0001)	NS	4	6	M
TestFileIndicator	P --> Production	Must be **P**	A	1	1	M
CreationDate	File Creation Date Shall be same as in the filename	*Date should be in DDMMYYYY format*	DATE	8	8	M
CreationTime	File Creation Time Shall be same as in the filename	*Time should be HH24MISS format*	TIME	6	6	M
FileID	File ID A number that uniquely identifies the items in this file. Shall be same as in the filename.		AN	1	10	M
SessionNumber	Session number to which the items were available. Shall be same as in the filename.		N	1	2	M
SessionDate	Date of the session to which the items were available. Shall be same as in the filename	*Date should be in DDMMYYYY format*	DATE	8	8	M
SettlementDate	Value Date – Date on which the Items shall be posted in books of account.	*Date should be in DDMMYYYY format*	DATE	8	8	M
SessionExtensionHrs	Default Extension Hours Granted at CH.	0	N	1	2	M

NOTE: Drawee Module shall use SessionDate, CLOSE_RECEIVING_TIME of the Session and SessionExtensionHrs for the session, to determine extension and return lengths for items in the session.

Appx 4.3.4.1.1   FileSummary

Same as in section 4.1.3.2

Appx 4.3.4.1.2 ~~*CashLetterHeader*~~

Appx 4.3.4.1.3 ~~*CashLetterSummary*~~

Appx 4.3.4.1.4 ~~*BundleHeader*~~

Appx 4.3.4.1.5 ~~*BundleSummary*~~

Appx 4.3.4.1.6   Item

NOTE: These fields come from the capture data. All fields marked * represent the UDK for each item.

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size Min	Size Max	Usage
ItemSeqNo*	This is a unique identifier for the bank for a "PresentmentDate"	Same as in CXF file Appx 4.1.3.3	NS	14	14	M
PayorBankRoutNo	Drawee Bank Routing number	*Must be greater than 0*	NS	9	9	M
Amount	Check amount	*Must be greater than 0*	N	18	18	M
AccountNo	Drawee account number		NS	1	25	O
SerialNo	Check number	*Must be greater than 0*	NS	6	6	M
TransCode	Transaction code		NS	1	3	M
PresentingBankRoutNo*	Routing number of the presenting bank	*Must be greater than 0*	NS	9	9	M
PresentmentDate*	Date of capture of checks	*Date should be in DDMMYYYY format*	DATE	8	8	M
CycleNo*	Capture cycle number	*Must be greater than 0*	NS	2	2	M
NumOfImageViews	Number of image views for an item	(3)	N	1	1	M
ClearingType	See Appendix CC for details.	*Must be greater than 0*	NS	2	2	M
DocType	From Capture file		A	1	1	M
MICRRepairFlags	From Capture file		NS	6	6	M
SpecialHandling	From capture file	0 = Normal (0)	N	1	2	O

Attribute Name	Description/ Format	Value (default) Special Condition	Type	Size Min	Size Max	Usage e
TruncatingRTNo	RT number of the truncating bank		NS	9	9	O
UserField	From Capture file		ANS	1	25	O
IQAIgnoreInd	From Capture file.	0 – Ignore this field 1 – Accept the image irrespective of its quality.	N	1	1	O
CurrencyInd	From Capture file		AN	3	3	O
ItemStatus	**CH will set this field**. Used to indicate to the drawee bank the status of the item being presented.	For list of status codes see section 4.3.4.7.1 (0)	N	1	2	M

Appx 4.3.4.1.6.1   **ItemStatus**

ItemStatus Codes

Status Code	Description
0	Cleared by CH
8	Failed Digital Signature validation. The failure could have resulted in any of the MICRDS or the individual IMAGEDS's.
9	Detected as Duplicate MICR Fields (SerialNo, TransCode, PayorBankRoutNo)

Appx 4.3.4.1.7   MICRDS

Attributes of MICRDS are same as in section 4.1.3.4

Appx 4.3.4.1.8   **AddendA**

Same as in section 4.1.3.5

Appx 4.3.4.1.9   **ImageViewDetail**

Same as in section 4.1.3.6

Appx 4.3.4.1.10   **ImageDS**

Attributes of ImageDS are same as in section 4.1.3.7

Appx 4.3.4.1.11   **ImageViewData**

Same as in section 4.1.3.8

Appx 4.3.4.1.12 **ImageViewAnalysis**

Attributes of ImageViewAnalysis are same as in section 4.1.3.9

Appx 4.3.5 POSTING IMAGE BINARY FILE (PIBF)

Appx 4.3.5.1 File Name Convention

A1	Posting binary image files shall follow the same naming convention as the posting exchange file except that the prefix "wPXF" shall be replaced with the "wPIBF" followed by rest of the text and then appended by unique modifier. The unique modifier can be text indicating view, data format or just a sequence number, **provided this makes the filename unique for the given business day**. The extension shall be ".img"
	
	wPIBF_<filestring>_nn.img
	
	  Where:
	
	    wPIBF Posting Image Binary File
	    <filestring> This is acquired from the master posting file
	    nn Unique modifier
	       (e.g. if one bundle has 2 associated image files then nn is "01" and "02")
	    .img Is a mandatory file type suffix

Appx 4.3.5.2 File Structure

The image file layout will look like:
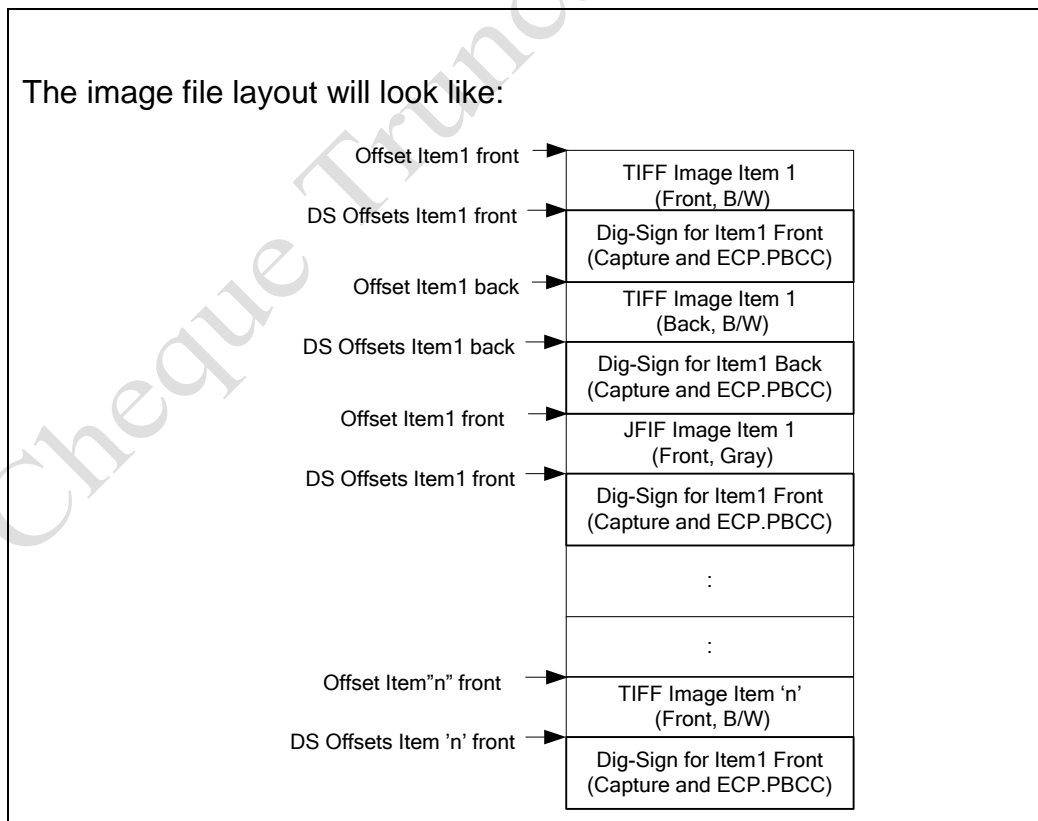
The order of items in the image binary file (PIBF) will match the order in the posting file (wPXF).

The order and information of image views of an item in PXF and PIBF will be same as received from capture file.

Appx 4.3.6 RETURN REQUEST FILE (RRF)

The Return Request files are provided to the CHI system by the Bank's Return Processing system. The Return Request file consists of a list of all items that are to be returned unpaid by the receiving bank, with a return reason for each item. The items in the return request file do not need to be sorted by Presenting Bank or by clearing type.

The contents of an RRF file does not have to correspond to any one PXF file.

Appx 4.3.6.1 File Name Convention

A1	The Return Request file name shall use the following naming convention:
	RRF_ nnnnnnnnn _ddmmyyyy_hhmmss_xxxxxxxxxx.XML
	Where:
	RRF Return Request File
	nnnnnnnnn CHI / Payor Bank / Payor Branch Routing Number
	ddmmyyyy File Creation Date
	hhmmss File Creation Time
	xxxxxxxxxx FileID
	.XML is a mandatory file type suffix

Appx 4.3.6.2 File Structure

Return Request File Structure

FileHeader   FileSummary

Item

AddendA   MICRDS

Mandatory Element

Multiple Elements

Optional Element

C1	The Return Request file structure shall be:
	
	    <FileHeader … >
	        <Item … >
	            <AddendA … />
	             <MICRDS … />
	        </item>
	     <FileSummary … />
	     </FileHeader>

C2	Elements "FileHeader", "Item", "AddendA", "FileSummary" are mandatory

Note: Bank's system can digitally sign the MICR data in return request file. If so, the MICRDS will be passed thru CH to the presenting bank. CHI will NOT digitally sign MICR data for returns.

Appx 4.3.6.3 Elements and Attributes

Appx 4.3.6.3.1 FileHeader

Attributes of FileHeader are same as in section 4.1.3.1

Appx 4.3.6.3.2 FileSummary

Same as in section 4.1.3.2

Appx 4.3.6.3.3 Item

NOTE: All fields marked ***** must be the exact same as were given in the PXF. These fields are used to find the corresponding item and apply the status.

Attribute Name	Description/ Format	Value (default) *Special Condition*	Type	Size Min	Max	Usage
ItemSeqNo*	This is a unique identifier for the bank for a "PresentmentDate"	**Same as in posting file**	NS	14	14	M
PayorBankRoutNo	Drawee Bank Routing number	**Same as in posting file**	NS	9	9	M
Amount	Check amount	**Same as in posting file**	N	1	18	M
AccountNo	Drawee account number	**Same as in posting file**	NS	1	25	O
SerialNo	Check number	**Same as in posting file**	NS	6	6	M

| Attribute Name | Description/ Format | Value (default) Special Condition | Type | Size | | Usage |
				Min	Max	
TransCode	Transaction code	**Same as in posting file**	NS	1	3	M
PresentingBankRoutNo*	Routing number of the presenting bank	**Same as in posting file**	NS	9	9	M
PresentmentDate*	Date of capture of checks	**Same as in posting file**	DATE	8	8	M
CycleNo*	Capture cycle number	**Same as in posting file**	NS	1	2	M
ClearingType	See Appendix CC		NS	2	2	M
ReturnReason	For return files A code that indicates the reason for non-payment. Codes and reasons should be established as part of the clearing rules. For list of reason codes see section 4.5.3.3.1		NS	2	3	M
ReturnReasonComment	Free format, for use by drawee		ANS	1	25	O

Appx 4.3.6.3.3.1   Return Reason

The following are a core set of Return Reason codes. Additional codes (if necessary) will be added by RBI/NPCI in Appendix DD and communicated to the banks.

Code No.   **Reason for Return**

Funds

Funds insufficient
- 01   Exceeds arrangement
- 02   Effects not cleared, present again.

Reference to Drawer
- 03   Refer to drawer

(10-19)   Signature
- 10   Drawer's signature incomplete
- 11   Drawer's signature illegible
- 12   Drawer's signature differs
- 13   Drawer's signature required
- 14   Drawer's signature not as per mandate
- 15   Drawer's signature to operate account not received
- 16   Drawer's authority to operate account not received
- 17   Alteration require drawer's authentication

(20-29)   Stop Payment
- 20   Payment stopped by drawer
- 21   Payment stopped by attachment order
- 22   Payment stopped by court order
- 23   Withdrawal stopped owing to death of account holder
- 24   Withdrawal stopped owing to lunacy of account holder
- 25   Withdrawal stopped owing to insolvency of account holder

(30-49)   Instrument
- 30   Instrument post dated
- 31   Instrument out dated / stale
- 32   Instrument undated / without proper date
- *33   Instrument mutilated; requires Bank's guarantee*

Cheque irregularly drawn / **amount in words and figures differ**

Clearing House stamp/ date required
- 34   *Wrongly delivered*/ Not drawn on us
- 35   Present in proper zone
- *36   Instrument contains extraneous matter*
- 37   Image not clear, present again with paper
- 38   Present with document

(50-59)   Account
- 50   Account closed
- 51   Account transferred to another branch
- 52   No such account
- 53   Title of account required
- 54   Title of account wrong/ incomplete
- 55   Account blocked (situation covered in 21-25)

(60-69)   Crossing/ Endorsement
- 60   Crossed to two banks
- 61   Crossing stamp not cancelled
- 62   Clearing stamp not cancelled
- 63   Instrument specially crossed to another bank
- 64   Amount in protective crossing incorrect
- 65   Amount in protective crossing required/ illegible
- 66   Payee's endorsement required
- 67   Payee's endorsement irregular / requires collecting bank's confirmation
- 68   Endorsement by mark/ thumb impression requires attestation by Magistrate with seal.
- 69   Advice not received

(70-79)   RBI/ Government
- 70   Amount / Name differs on advice
- 71   Drawee bank's funds with sponsor bank insufficient
- 72   Payee's separate discharge to bank required

| 73 | Not payable till 1st proximo |
| 74 | Pay order/ cheque requires counter signature |

(80-89)   Miscellaneous

Bank's certificate ambiguous / incomplete/ required

| 80 | Draft lost by issuing office / confirmation required from issuing office |
| 81 | Bank / Branch Blocked |

Appx 4.3.6.3.4   MICRDS

In the event that the drawee bank choses to sign MICR data in the RRF file, attributes of MICRDS are same as in section 4.1.3.4. The drawee bank shall set source = "Drawee".

Appx 4.3.6.3.5   AddendA

This should be same as in the posting file.

Same as in section 4.1.3.5

Appx 4.3.7 RETURN FILE (RF)

The Return Files are created by the CHI as inward returns to the bank. The return files can be generated either as:

1) Master return file that includes items from all banks associated with that CHI

2) Bank return files containing only the data for items presented by the specific banks (as defined by CHI option)

3) Branch return files containing only the data for items presented by the specific branches (as defined by CHI option).

4) All Other Return File containing all other items.

Appx 4.3.7.1 File Name Convention

A1	The Return File name shall use the following naming convention:
	
	 wRF_nnnnnnnnn_ddmmyyyy_hhmmss_xxxxxxxxxx.XML
	
	 Where:
	 w Type
	 – M - Master (all banks using CHI)
	 – B - Bank (one bank)
	     –BR - Branch of a bank
	     –AO - Any Other items
	
	 RF Return File
	 nnnnnnnnn CHI / Bank / Branch Routing Number (depending upon value of w)
	
	 ddmmyyyy File Creation Date
	 hhmmss File Creation Time
	 xxxxxxxxxx File ID Modifier
	 .XML Mandatory file type suffix

A2	The value for the File Creation Date, File Creation Time and File ID Modifier in the file name shall be the same as the in the File Header.

A3	For the Routing Number, RF file will contain use:
	
	     CHI routing number (of the receiving CHI) for Master Return File
	     Bank routing number for Bank Return File.
	     Branch routing number for Branch Return File.

Appx 4.3.7.2 Master and Bank Return File Structure

Master/Bank Return File Structure

A1	The Master and Bank Return file structure shall be:

	<FileHeader … >
	    <Item … >
	        <AddendA … />
	          <MICRDS … />
	      </item>
	  <FileSummary … />
	  </FileHeader>

B2	Elements "FileHeader", "Item", "AddendA" and "FileSummary" tags are mandatory

Appx 4.3.7.3 Branch and AO Return File Structure
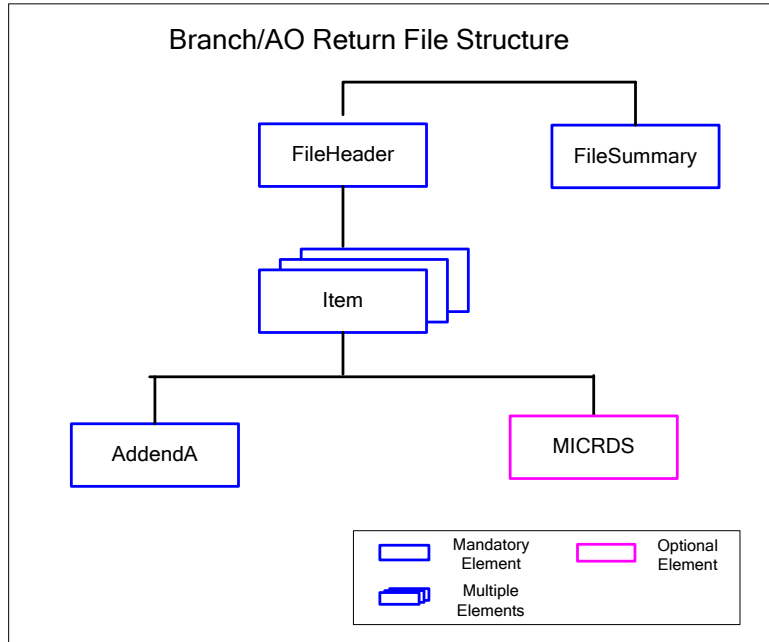
A1	The Branch and All Other Return file structure shall be: ***<FileHeader*** … **>** *<***Item …** **>** **<AddendA …** **/>** **<MICRDS …** **/>** **</item>** **<FileSummary …** **/>** **</FileHeader>**
C2	Elements "FileHeader", "Item", "AddendA" and "FileSummary" tags are mandatory

Appx 4.3.7.4 Elements and Attributes

Appx 4.3.7.4.1   ***FileHeader***

Xmlns="urn:schemas-ncr-com:ECPIX:RF:FileStructure:010001"

Other attributes of FileHeader are same as in section 4.1.3.1

Appx 4.3.7.4.2 **FileSummary**
Same as in section 4.1.3.2

Appx 4.3.7.4.3 ***CashLetterHeader***

Appx 4.3.7.4.4 ***CashLetterSummary***

Appx 4.3.7.4.5 ***BundleHeader***

Appx 4.3.7.4.6 ***BundleSummary***

Appx 4.3.7.4.7 ***AddendA***
Same as in section 4.1.3.5

Appx 4.3.7.4.8 **MICRDS**
If the drawee bank has signed the MICR data, attributes of MICRDS are same as in section 4.1.3.4.

Appx 4.3.7.4.9 **Item**
Same as in section 4.5.3.3

Appx 4.3.8 EXTENSION REQUEST FILE (ERF)

Drawee CHI can request for extension for items drawn on it. The extension request will include the extension period required and the reason for extension. This file can also be used to make paper requests if images are bad or not sufficient for processing.

The extension required could be a result of :

1) bank/branch is on holiday

2) bad image need paper, (to be handled as per established clearing house guidelines)

The extension request has to be made within "x" hrs (configurable as per clearing rules, typically 24 hrs) of the inward presentment. If paper is requested, then the presenting bank is expected to send the paper item within "x" hrs (configurable as per clearing rules, typically 24 hrs) of the request received. The extension request will extend the return cycle period based on the clearing rules and the holiday calendar.

The extension request file is in XML format and contains list of items for which extension is desired. The extension request file does not affect the settlement.

Extension request files will be approved by CH based on the RBI/NPCI set rules.

Appx 4.3.8.1 File Name Convention

A1	The Extension Request File shall use the following naming convention:
	ERF_nnnnnnnnnn_ddmmyyyy_hhmmss_xxxxxxxxxx.XML
	Where: ERF Extension Request File nnnnnnnnnn CHI / Payor Bank / Payor Branch Routing Number ddmmyyyy File Creation Date hhmmss File Creation Time xxxxxxxxxx FileID .XML Is a mandatory file type suffix

Appx 4.3.8.2 File Structure

Extension Request File Structure

C1	The Extension Request file structure shall be: *<FileHeader … >* *<Item … />* *<Item … />* *<FileSummary … />* *</FileHeader>*
C2	Elements "FileHeader", "Item" and "FileSummary" tags are mandatory

Appx 4.3.8.3 Elements and Attributes

Appx 4.3.8.3.1   FileHeader

Xmlns="urn:schemas-ncr-com:ECPIX:ERF:FileStructure:010002"

Other attributes of FileHeader are same as in section 4.1.3.1

Appx 4.3.8.3.2   FileSummary

Same as in section 4.1.3.2

Appx 4.3.8.3.3   Item

NOTE: All fields marked * must be the exact same as were given in the PXF. These fields are used to find the corresponding item and apply the status.

Attribute Name	*Description/ Format*	*Value (default)*	*Type*	*Size*		*Usage*
				Min	*Max*	

| Attribute Name | Description/ Format | Value (default) | Type | Size | | Usage |
				Min	Max	
ItemSeqNo*	This is a unique identifier for the bank for a "PresentmentDate"	**Same as in posting file**	NS	14	14	M
PayorBankRoutNo	Drawee Bank Routing number		NS	9	9	M
Amount	Check amount		N	1	18	M
AccountNo	Drawee account number		NS	1	25	O
SerialNo	Check number		NS	6	6	M
TransCode	Transaction code		NS	1	3	M
PresentingBankRoutNo*	Routing number of the presenting bank	**Same as in posting file**	NS	9	9	M
PresentmentDate*	Date of capture of checks	**Same as in posting file**	DATE	8	8	M
CycleNo*	Capture cycle number.	**Same as in posting file**	NS	1	2	M
ExtensionPeriod	Extension required in hrs	*Must be greater than 0*	N	1	3	M
ExtensionReason	The reason for requesting extension. See section 4.7.3.3.1		NS	2	2	M

Appx 4.3.8.3.3.1   Extension Reason
Extension Reason Codes

Extension Reason	Description
01	Funds insufficient
02	Exceeds arrangement
03	Effects not cleared, present again
04	Bad image, paper requested
05	Item a suspect, paper is requested
06	Branch not in operation
07	Extensions Orginated from CH due Blockage

Appx 4.3.9 EXTENSION FILE (EF)

Extension file informs the bank/branch of items that have been allowed extensions for the return period, so the bank can use the information to hold credit on those customer accounts. Drawee Extension file informs the Drawee bank module of items that have been extended at the CH on behalf of the CHI. The file includes the extension period and the extension reason. Extension files can be generated either as:

1) Master Extension File that includes items for all banks associated with the CHI

 2) Bank Extension File containing only the items associated with the specific bank

3) BRanch Extension File containing only the items associated with the specific branch.

Appx 4.3.9.1 File Name Convention

C1	The Extension File or Drawee Extension File shall use the following naming convention: wEF_nnnnnnnnn_ddmmyyyy_hhmmss_xxxxxxxxxx.XML (for Presenting module) wDREF_nnnnnnnnn_ddmmyyyy_hhmmss_xxxxxxxxxx.XML (for Drawee module) Where: w Type – M - Master (all banks using CHI) - B - Bank (one bank) - BR - Branch of a bank – AO - Any Other items EF or DREF Extension File or Drawee Extension File nnnnnnnnn CHI / Bank / Branch Routing Number (depending upon value of w) ddmmyyyy File Creation Date hhmmss File Creation Time xxxxxxxxxx File ID .XML Is a mandatory file suffix
A2	The value for the File Creation Date, File Creation Time and File ID in the file name shall be the same as the in the File Header.
C3	For the Routing Number, EF or DREF file will contain: CHI routing number (of the receiving CHI) for Master Extension File Bank routing number for Bank Extension File. Branch routing number for Branch Extension File.

Appx 4.3.9.2 File Structure

Extension File Structure

A1	The Extension file structure shall be: *<FileHeader* … >* *<Item* … />* *<Item* … />* *<FileSummary* … />* *</FileHeader>*
B2	Elements "FileHeader", "Item" and "FileSummary" tags are mandatory

Appx 4.3.9.3 Elements and Attributes

Appx 4.3.9.3.1 FileHeader
XmIns="urn:schemas-ncr-com:ECPIX:EF:FileStructure:010001"

Other attributes of FileHeader are same as in section 4.1.3.1

Appx 4.3.9.3.2 FileSummary

Same as in section 4.1.3.2

Appx 4.3.9.3.3 Item

NOTE: All fields marked ***** must be the exact same as were given in the PXF. These fields are used to find the corresponding item and apply the status.

Attribute Name	*Description/ Format*	*Value (default)*	*Type*	*Size*		*Usage*
				Min	*Max*	

Attribute Name	Description/ Format	Value (default)	Type	Size		Usage
				Min	Max	
ItemSeqNo*	This is a unique identifier for the bank for a "PresentmentDate"	Same as in extension request file	NS	14	14	M
PayorBankRoutNo	Drawee Bank Routing number		NS	9	9	M
Amount	Check amount		N	1	18	M
AccountNo	Drawee account number		NS	1	25	O
SerialNo	Check number		NS	6	6	M
TransCode	Transaction code		NS	1	3	M
PresentingBankRoutNo*	Routing number of the presenting bank	Same as in extension request file	NS	9	9	M
PresentmentDate*	Date of capture of checks	Same as in extension request file	DATE	8	8	M
CycleNo*	Capture cycle number.	Same as in extension request file	NS	1	2	M
ExtensionPeriod	Extension period requested in hours		N	1	3	M
ExtensionReasonCode	The reason for requesting extension. See section 4.7.3.3.1		NS	2	2	M

Appx 4.3.10   RESPONSE FILE (.RES)

When CHI detects invalid files, invalid MICR data, any syntax error at item level or bad images, it creates Response file for the received file.

- If the file is invalid then whole file is rejected.
- If items are invalid then only those items are rejected.
- A Response file with no items included and FileStatus set to indicate success is a positive acknowledgement that the file is successfully processed by CHI.

The Response file is in XML format and consists of a list of all items that are returned by the CHI with reject reason. These items are not included in the clearing or settlement. Response files are generated for capture file (CXF), Return Request File (RRF), and Extension Request File (ERF). CHI can send multiple response files for a single CXF, RRF, or ERF file.

Appx 4.3.10.1　　　**File Name Convention**

C1	The Response file name shall use the following naming convention: 　　w_<filestring>.XML.<f>.RES 　　　Where: 　　　w is: 　　　　CXF for Capture file reject 　　　　RRF for Return Request file rejects 　　　　ERF for Extension Request file rejects and 　　　<filestring>　　　is same as in the received file 　　　.XML　　　　is a mandatory file suffix 　　　<f>　　　　is file id of the Response file. This is unique for a particular 　　　　　　　　CXF/RRF/ERF file as there can be multiple Response files 　　　　　　　　for a single CXF/RRF/ERF file. 　　　. RES　　　　is a mandatory file suffix for the Response file

Appx 4.3.10.2　　　**File Structure**
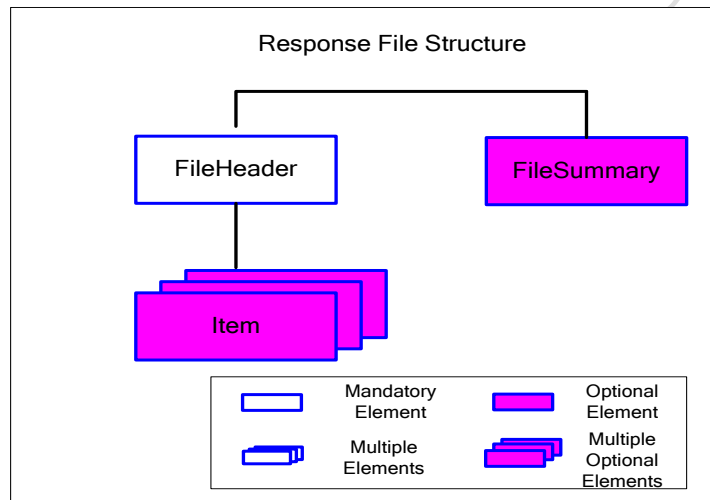
Response File Structure

A1	The response file structure shall be: 　　*<FileHeader* … *>* 　　　*<Item* … */>* 　　　*<Item* … */>* 　　*<FileSummary* … */>* 　　*</FileHeader>*
C2	Element "FileHeader" is mandatory. NOTE: FileSummary element is mandatory only if Item element is present in the response file.

Appx 4.3.10.3   Elements and Attributes

Appx 4.3.10.3.1   FileHeader

Attributes of FileHeader

Attribute Name	*Description/ Format*	*Value (default)*	*Type*	*Size*		*Usage*
				Min	*Max*	
Xmlns	Schema definition	Must be urn:schemas-ncr-com:ECPIX:RES:FileStructure:010001	ANS	48	256	M
VersionNumber	Version of this Interface definition–	xxyyyy xx=country (01=RBI/NPCI) yyyy=version (0001)	NS	4	6	M
TestFileIndicator	P --> Production	Must be **P**	A	1	1	M
CreationDate	Response File creation date	*Date should be in DDMMYYYY format*	DATE	8	8	M
CreationTime	Response File creation time	*Time should be HH24MISS format*	TIME	6	6	M
FileID	A number that uniquely identifies the items in this file. Should be same as in the file name.	*Must be greater than 0*	AN	1	10	M
FileStatus	Indicate file loading status. 0 – File loaded successfully and all items pass validation 1 – File loaded successfully but some items failed validation 2 – File Header invalid 3 – File format incorrect See sect 4.3.10.3.3.1	(0)	N	1	2	M

Appx 4.3.10.3.2   FileSummary

Attributes of FileSummary

| Attribute Name | Description/ Format | Value (default) | Type | Size | | Usage |
				Min	Max	
TotalItemCount	Total number of items in file		N	1	8	M
TotalAmount	Total amount in the file		N	1	18	M

Appx 4.3.10.3.3   Item

NOTE: All fields marked * must be the exact same as were given in the PXF. These fields are used to find the corresponding item and apply the status.

| Attribute Name | Description/ Format | Value (default) | Type | Size | | Usage |
				Min	Max	
ItemSeqNo*	This is a unique identifier for the bank for a "PresentmentDate"	*Special Condition*	NS	14	14	M
PayorBankRoutNo	Drawee Bank Routing number		NS	9	9	M
Amount	Check amount		N	1	18	M
AccountNo	Drawee account number		NS	1	25	O
SerialNo	Check number		NS	6	6	M
TransCode	Transaction code		NS	1	3	M
PresentingBankRoutNo*	Routing number of the presenting bank		NS	9	9	M
PresentmentDate*	Date of capture of checks		DATE	8	8	M
CycleNo*	Capture cycle number.		NS	1	2	M
RejectReason	For rejected files A code that indicates the reason for rejecting an item or a file. See sect 4.3.10.3.3.1		NS	1	2	M

Appx 4.3.10.3.3.1   Reject Reason

The following chart provides StatusCode and Reject Reasons along with the suggested resolution for the error.

FILE STATUS (CODE)	FILESTATUS (DESCRIPTION)	REJECT REASON (CODE)	REJECT REASON (DESCRIPTION)	CXF	RRF	ERF	Error Resolution to be done by Presenting / Drawee Bank Module
0	File Loaded successfully and All items passed validation at CHI	N.A.	N.A.	√	√	√	
1	Invalid file name	N.A.	N.A.	√	√	√	Rectify file naming convention as per IFS and resubmit the file with a new file name
2	Invalid file format	N.A.	N.A.	√	√	√	Rectify File format as per IFS and resubmit the file with a new file name. Possible errors include: - content failures as a result of XSD validation - items with ClearingType other than stated in filename
3	Invalid total item count	N.A.	N.A.	√	√	√	Rectify TotalItemCount field in FileSummary so that it matches with the total count of all items in the file and resubmit the file with a new file name
4	Invalid total amount	N.A.	N.A.	√	√	√	Rectify TotalItemAmount field in FileSummary so that it matches with the total amount of all items in the file and resubmit the file with a new file name
5	Invalid total number of item image elements	N.A.	N.A.	√	X	X	Rectify number of ImageViewDetail element tags so that there are 3 image views as mandated per item and it matches with the field NumOfImageViews in item tag and resubmit the file with a new file name
6	Invalid image file name	N.A.	N.A.	√	X	X	Rectify the value of FileName field of ImageViewData tag so that it matches with the CXF file name and resubmit the file with a new file name
7	Items Rejected	1	Items rejected by CHI Operator/Supervisor user post intimation by bank	√	√	X	Recapture the items after confirming with CHI Supervisor and resubmit the deleted items in a new file
7	Items Rejected	2	Item failed city validation	√	X	X	These items were rejected as BOFD city does not fall within city master for intercity clearing or drawee city does not fall within city master for intercity clearing or drawee city does

								not fall within city master for local clearing or BOFD city equals drawee city for intercity clearing. Please refer the latest version of CH Master file.
7	Items Rejected	3	PresentingBankRoutNo for item not found under this CHI	√	X	X	Recapture the rejected items and resubmit them in a new file at the correct CHI after referring to the latest version of CH Master file.
7	Items Rejected	4	PresentingBankRoutNo for Item is in not-clearing mode or has been blocked or suspended	√	√	√	These items were rejected as the Presenting bank was put in NOT CLEARING mode or has been blocked or has been suspended at the Clearing House. Please refer the latest version of CH Master file.
7	Items Rejected	5	Drawee Branch has been blocked	√	√	√	These items were rejected as the drawee branch was blocked / suspended at the Clearing House. Please refer the latest version of CH Master file.
7	Items Rejected	6	Bank or CHI does not allow ON US items	√	X	X	These items were rejected as the Bank or CHI was set as not to send ON US items at the Clearing House. Please refer the latest version of CH Master file.
7	Items Rejected	7	Wrongly Presented item	√	X	X	These items were rejected as they were wrongly Presented. Please refer the latest version of CH Master file.
7	Items Rejected	8	Drawee bank for Item is in not-clearing mode or has been blocked or suspended	√	√	√	These items were rejected as the Drawee bank was put in NOT CLEARING mode or has been blocked or has been suspended at the Clearing House. Please refer the latest version of CH Master file.
7	Items Rejected	9	Returns Rejected at CH due to Bank Exclusion / Unwinding	X	√	X	These returns were rejected due to Bank Exclusion / Unwinding at the CH.
7	Items Rejected	10	Extension Period of Item falls beyond CH permissible period	X	X	√	These items were rejected as their Extension Period falls outside of the Max ExtensionPeriod set at the CH. Please refer the latest version of CH Master file.
7	Items Rejected	11	Return Period of item has expired	X	√	√	These returns / extension request were rejected as their Return Period falls outside of the Max Return Period set at the CH. Please refer the latest version of CH Master file.
7	Items Rejected	12	Extension Reason code not valid	X	X	√	These items were rejected as their Extension Reason code is invalid. Please refer the latest version of CH Master file.
7	Items Rejected	13	Return Reason code not valid	X	√	X	These items were rejected as their Return Reason code is invalid. Please refer the latest version of CH Master file.

7	Items Rejected	14	Item can not be attached to any Payment Type	√	X	X	These items were rejected as there is no Payment Type defined with the given combination of item details. Please refer the latest version of CH Master file.
7	Items Rejected	15	Item failed Short Account Number validation.	√	X	X	These items were rejected as Account Number is Invalid or Invalid Documentation Type for government cheque
7	Items Rejected	16	IQA validation failure	√	X	X	These items were rejected as the image view(s) of item failed IQA validations specified. Please re-present the item by correcting the IQA failure(s) mentioned in the exception report.
7	Items Rejected	17	Invalid Transaction Code	√	X	X	These items were rejected as their Transaction Code does not match with the clearing type. Please refer the latest version of CH Master file.
7	Items Rejected	18	Capture Date not valid for Presentment	√	X	X	These items were rejected as the presentment date of the items were older than permissable backward window set in the system or the presentment date of the items had a value greater than clearing date.
7	Items Rejected	19	Item was duplicate	√	X	X	These items were rejected as an item with the same UDK value is already present.
7	Items Rejected	20	Item has duplicate views	√	X	X	These items were rejected as there were more than one view having same ImageViewIndicator.
7	Items Rejected	21	Original item not found	X	√	√	The original item was not found in the system
7	Items Rejected	22	Extension requested outside CH configured period	X	X	√	Request for extension can be sought only within "x" hrs configured by CH. Please refer the latest version of CH Master file.
7	Items Rejected	23	Invalid Documentation Type for IQAIgnoreInd=1	√	X	X	These items were rejected as the Documentation Type should be Image-to-follow-with-Paper-to-Follow when IQAIgnoreInd = 1. Please re-present the cheque with a proper documentation type as prescribed in the CHI IFS.
7	Items Rejected	24	Item already extended	X	X	√	These extension requests were rejected as an extension request has already been done on this item previously.
7	Items Rejected	25	Items already returned	X	√	√	These return request (in case of RRF) or extension request (in case of ERF) were rejected as the original item has already

7	Items Rejected			been returned.			
7	Items Rejected	26	Item failed AT-PAR Validation	√	X	X	These items were rejected as they failed At-Par validation. Please refer the latest version of CH Master file.
7	Items Rejected	27	Item Failed Government Cheque Validation	√	X	X	These items were rejected as they failed Government Cheque validation. Please refer the latest version of CH Master file and CHI Specification for details.
7	Items Rejected	28	Item Failed Paper to Follow city validation	√	X	X	These items were rejected as the BOFD city does not equal drawee city for Paper to Follow cheques.
7	Items Rejected	34	Payor Branch not available in BOFD city for P2F instruments	√	X	X	Payor branch not available in the BOFD city, please process this cheque from the Payor branch city only so that the P2F instrument will be exchanged for processing.
7	Items Rejected	35	Item failed with return reason comment validation	X	√	X	These items with return reason '88' were rejected as the return reason comment is either empty or does not match with validation criteria

Appx 4.3.11   OUTWARD ACKNOWLEDGEMENT FILE (.OACK)

When the CHI gets end of session information from CH it generates an Outward Acknowledgement File.

The Outward Acknowledgement File is in XML format and consists of a list of all items that were successfully settled in a session at the CH. Outward Acknowledgement Files are generated for all outward files that affect the settlement of a session i.e. capture file (CXF) and Return Request File (RRF).

Capture shall use SessionDate, CLOSE_RECEIVING_TIME of the Session and SessionExtensionHrs for the Session to calculate the maximum return period.

Appx 4.3.11.1   File Name Convention

B1	The Outward Acknowledgement file name shall use the following naming convention:
	w.\<SessionNumber\>.\<SessionDate\>.OACK
	Where:
	W is — name of the original outward file (CXF or RRF)
	.\<SessionNumber\> is — Session number to which the items were added.
	.\<SessionDate\> is — Date of the session to which the items were added.
	.OACK is — a mandatory file suffix for the outward acknowledgment file

Appx 4.3.11.2   File Structure

Outward Acknowledgement File Structure

B1	The outward acknowledgement file structure shall be:
	\<FileHeader … \>
	\<Item … /\>
	\<Item … /\>
	\<FileSummary … /\>
	\</FileHeader\>
C2	Elements "FileHeader", "Item" and "FileSummary" tags are mandatory

Appx 4.3.11.3 Elements and Attributes

Appx 4.3.11.3.1 FileHeader
Attributes of FileHeader

Attribute Name	Description/ Format	Value (default)	Type	Size Min	Max	Usage
Xmlns	Schema definition	Must be urn:schemas-ncr-com:ECPIX:OACK:FileStructure:010001	ANS	52	256	M
VersionNumber	Version of this Interface definition	xxyyyy xx=country (01=RBI/NPCI) yyyy=version (0001)	NS	4	6	M
TestFileIndicator	P --> PRODUCTION	Must be **P**	A	1	1	M
CreationDate	File creation date. Note: This is the creation date of this OACK file, and is not the session date as given in the filename.	*Date should be in DDMMYYYY format*	DATE	8	8	M
CreationTime	File creation time. Note: This is the creation time of this OACK file.	*Time should be HH24MISS format*	TIME	6	6	M
SessionNumber	Session number to which the items were added. Shall be same as in the filename.		N	1	2	M
SessionDate	Date of the session to which the items were added. Shall be same as in the filename.	*Date should be in DDMMYYYY format*	DATE	8	8	M
SettlementDate	Value Date – Date on which the Items shall be posted in books of account.	*Date should be in DDMMYYYY format*	DATE	8	8	M

Attribute Name	Description/ Format	Value (default)	Type	Size		Usage
				Min	Max	e
SessionExtensionHrs	Default Extension Hours Granted at CH.	0	N	1	2	M

Appx 4.3.11.3.2 FileSummary
Attributes of FileSummary

Attribute Name	Description/ Format	Value (default)	Type	Size		Usage
				Min	Max	e
TotalItemCount	Total number of items in file	*Must be greater than 0*	N	1	8	M

Appx 4.3.11.3.3 Item

Attribute Name	Description/ Format	Value (default)	Type	Size		Usage
				Min	Max	e
ItemSeqNo	This is a unique identifier for the bank for a PresentmentDate.		NS	14	14	M
PresentingBankRoutNo	Routing number of the presenting bank		NS	9	9	M
PresentmentDate	Date of capture of checks		DATE	8	8	M
CycleNo	Capture cycle number.		NS	1	2	M
ItemStatus	**CH will set this field**. Used to indicate to the drawee bank the status of the item being presented.	For list of status codes see section 4.10.3.3.1 (0)	N	1	2	M

Appx 4.3.11.3.3.1 **ItemStatus**
ItemStatus Codes

Status Code	Description
0	Cleared by CH
9	Detected as Duplicate MICR Fields (SerialNo, TransCode, PayorBankRoutNo)

Appx 4.3.12 CH MASTER DATA FILE

The following Clearing House Master data shall be available for use by the capture systems.

- Clearing House and Clearing Center, including Bank/Branch and blockages
- Item Return Reason
- Calendar
- Bundle Collection
- Session Definition and Collection Type
- Clearing Type and DocType definitions
- Item Extension Reason
- Translation Rules
- Transaction Codes
- City Master

Appx 4.3.12.1 File Name Convention

A1	The CHMaster Data file name shall use the following naming convention: CHM_ddmmyyyy_hhmmss_<SeqNo>.xml Where: ddmmyyyy is the creation date (same as in the CHMasterHeader) hhmmss is the creation time (same as in the CHMasterHeader) SeqNo is a file sequence number (same as in the CHMaster element) . xml is a mandatory file suffix for the file

Note: to determine the 'latest' instance of the file, use the combination of creation date, creation time and sequence_number. Capture Systems (Presenting and Drawee) Modules could detect if they have the 'latest' instance of the file as a start-of-day activity, or they could be directed manually to get the 'latest' as a result of message, phone call etc by the CHI Supervisor.

Appx 4.3.12.2 File Structure

CHMaster
- CHMasterHeader
- CHMasterBody
  - ClearingHouse
    - ClearingHouseInterface
      - Blockage
      - Bank
        - Blockage
        - DesignatedBranchForBank
        - Branch
          - Blockage
  - ItemReturnReason
  - Calendar
    - CalendarDetail
  - BundleCollectionType
  - SessionDefinition
    - SessionDefnCollectionType
  - ItemExtensionReason
  - TranslationRule
  - TransactionCode
  - CityMaster
  - At...
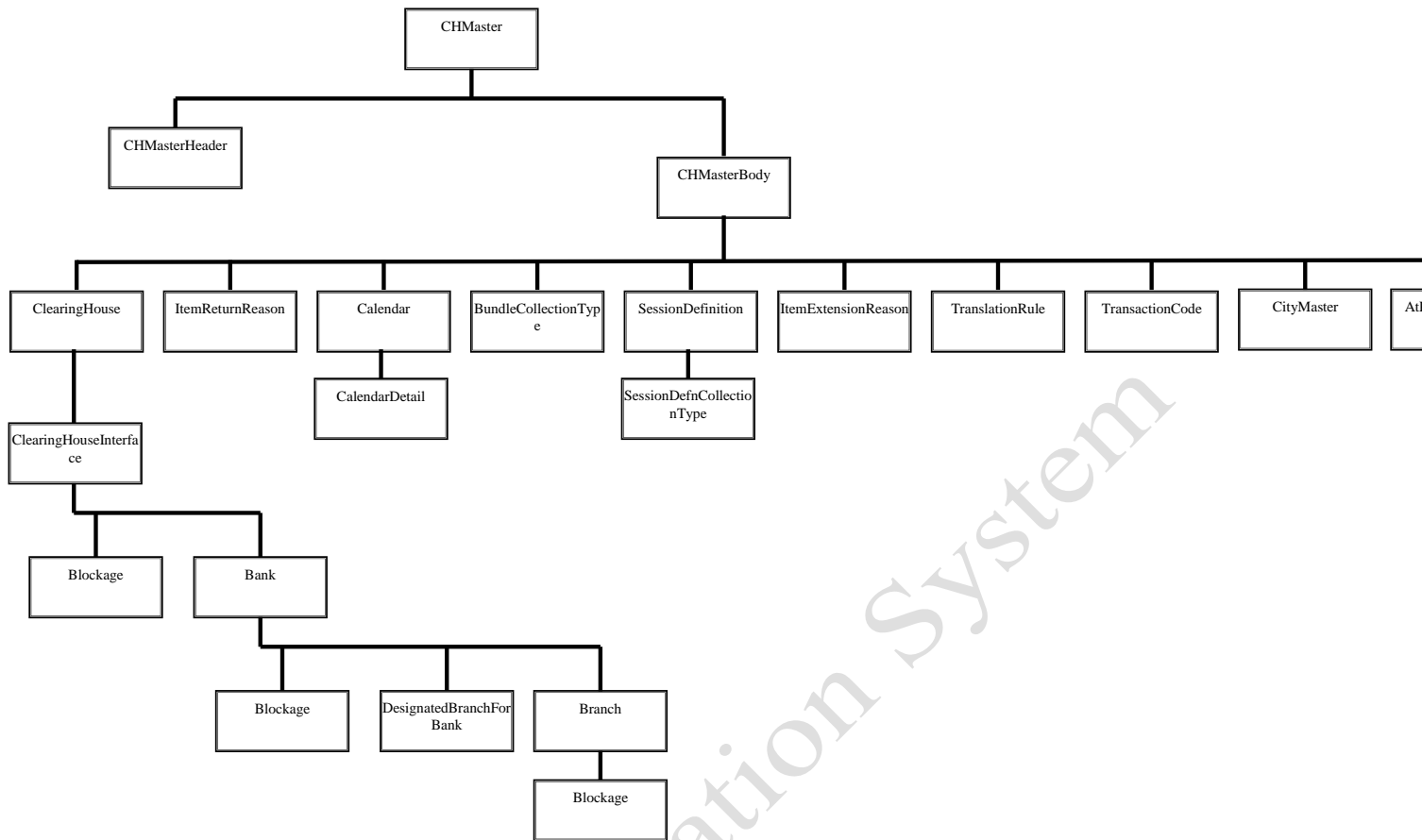
The CH Master Data File holds all the clearing house master elements, **which are arranged in a specific order, and must be loaded in that order** into the bank's capture and drawee modules.

A1	The Clearing House Master structure shall be:
	
	<**CHMaster**… >
	    <**CHMasterHeader…** />
	    <**CHMasterBody**… >
	      <**ClearingHouse...** >
	        <**ClearingHouseInterface…** >
	          <**Blockage …** />
	          <**Bank**… >
	            <**Blockage …** />
	            <**DesignatedBranchforTransCode …** />
	            <**Branch**… >
	              <**Blockage...** />
	            <**/Branch**>
	          <**/Bank**>
	        <**/ClearingHouseInterface**>
	      <**/ClearingHouse**>
	      <**ItemReturnReason…** />
	      <**ItemExtensionReason…** />
	      <**Calendar…** >
	        <**CalendarDetail…** />
	      <**Calendar/**>
	      <**BundleCollectionType…** />
	      <**SessionDefinition**
	        <**SessionDefnCollectionType…** />
	      <**/SessionDefinition**>
	      <**TranslationRule…** />
	      <**TransactionCode…** />
	      <**CityMaster…** />
	      <**AtParBankMaster …** />
	    <**/CHMasterBody**>
	  <**/CHMaster**>

Appx 4.3.12.3   Elements and Attributes

Appx 4.3.12.3.1   CHMaster element

The CH Master Element is the root element of the CH Master XML Document.

It contains its own attributes and one CHMasterHeader Element and one CHMasterBody Element. Its attributes are defined as follows:

Element Name: CHMaster

Attribute	Data Type	Size	Usage	Value/Format	Description
xmlns	ANS	256	Not Null	Urn:schemas-ncr-com:ECPIX:CHM:File Structure:010001	Schema Definition
SeqNo	ANS	6	Not Null	'000001'~'999999'	Document Sequence Number that is equal to the File Sequence Number defined in the File Name.
Version	ANS	6	Not Null	'4.0'	The NCR ECPIX Master File layout/structure version.

Appx 4.3.12.3.2   CHMasterHeader element

The CHMasterHeader Element is a required element and generated per CH Master File (document).

It contains information about the sender and file creation details. Its attributes are defined as follows:

Element Name: CHMasterHeader

Attribute	Data Type	Size	Usage	Value/Format	Description
ClearingHouseRoutNo	NS	9	Not Null		The routing number of Clearing House wherein the data in the CHMaster file originated.
TestInd	A	1	Not Null	'P': Production 'T': Test **MUST BE "P"**	An indicator of whether the file being transmitted is a test file or a production file.
CreationDate	DATE	8	Not Null		The file creation date.
CreationTime	TIME	6	Not Null		The file creation time.

Appx 4.3.12.3.3   CHMasterBody element

The CHMasterBody Element is a required element and generated by the Clearing House. This element holds all the clearing house master elements, **which are arranged in a specific order, and must be loaded in that order** into the bank's capture and drawee modules.

Element Name: **CHMasterBody**

This element doesn't have any attributes but contains child elements arranged in the following order:

- **one ClearingHouse Element**
    - **zero or more ClearingHouseInterface Elements**
        - **zero or more blockage elements**
        - **zero or more Bank Elements**
            - **zero or more DesignatedBranchforTransCode**
            - **zero or more blockage elements**
            - **zero or more Branch Elements**
                - **zero or more blockage elements**

- **one or more ItemReturnReason Elements**
- **one or more Calendar Elements**
    - **zero or more CalendarDetail Elements**
- **one or more BundleCollectionType Elements**
- **one or more SessionDefinition Elements**
    - **one or more SessionDefnCollectionType Elements**
- **one or more ItemExtensionReason Elements**
- **one or more TranslationRule Elements**
- **one or more TransactionCode Elements**
- **one or more CityMaster Elements**
- **one or more AtParBankMaster Elements**

Appx 4.3.12.3.4   ClearingHouse element

ClearingHouse Element describes the routing information of the clearing house(s). It is a required element.

Each ClearingHouse element may contain one or more child elements—ClearingHouseInterface elements. Its attributes are defined as follows:

Element Name: ClearingHouse

Attribute	Data Type	Size	Usage	Value/Format	Description
CH_ROUTING_NBR	NS	9	NOT NULL		Routing number of the clearing house.

Appx 4.3.12.3.5   ClearingHouseInterface element

ClearingHouseInterface Element describes the routing and address information of clearing house interface institutions belonging to a particular clearing house. It is required element and a child of ClearingHouse element.

ClearingHouseInterface element may contain zero or more child elements—Bank elements and Blockage elements. Its attributes are defined as follows:

Element Name: ClearingHouseInterface

Attribute	Data Type	Size	Usage	Value/Format	Description
CC_ROUTING_NBR	NS	9	NOT NULL		Routing number of the clearing house interface.
NAME	ANS	50	NOT NULL		Name of the clearing house interface. (used in reports)
STREET_ADDRESS	ANS	50			Street address of a location or mailing address.
CITY	ANS	50			City in which the clearing house interface is located.
STATE_PROVINCE	ANS	50			State in which the clearing house interface is located.
COUNTRY	ANS	10			Country in which the clearing house interface is located.
POSTAL_ZIP_CODE	ANS	10			Postal authority location address or identifier for mailing purposes.
CLEARING_STATUS_CODE	ANS	10	NOT NULL		Code that uniquely identifies the clearing state or status of this clearing house interface. The possible values are CLEARING & NOT_CLEARING.
NOTE	ANS	1000			Miscellaneous details or notes as added by the CH Superintendant. Free format text.

Appx 4.3.12.3.6   Bank element

Bank Element describes the attributes of banks belonging to a particular clearing house interface. It is a required element and a child of the ClearingHouseInterface element.

The Bank element contains zero or more child elements—Branch elements, Blockage elements and DesignatedBranchforTransCode elements. Its attributes are defined as follows:

Element Name: Bank

Attribute	Data Type	Size	Usage	Value/Format	Description
BANK_ROUTING_NBR	NS	9	NOT NULL		Routing number of the bank.

NAME	ANS	50	NOT NULL		Name of the bank. (used in reports)
STREET_ADDRESS	ANS	50			Street address of a location or mailing address.
CITY	ANS	50			City in which the bank is located.
STATE_PROVINCE	ANS	50			State in which the bank is located.
COUNTRY	ANS	10			Country in which the bank is located.
POSTAL_ZIP_CODE	ANS	10			Postal authority location address or identifier for mailing purposes.
CLEARING_STATUS _CODE	ANS	10	NOT NULL		Code that uniquely identifies a bank clearing state or status. The possible values are CLEARING, NOT_CLEARING and SUSPENDED
SERVICE_BRANCH_ ROUTING_NBR	NS	9			Service Branch for this bank.
DESIGNATED_BRAN CH_ROUTING_NBR	NS	9			Designated Branch for this bank.
NOTE	ANS	100 0			Miscellaneous details or notes as added by the CH Superintendant. Free format text.
CBS ENABLED	N	1	Not Null	'1' (Bank supports Speed Clearing) or '0' (Bank does not support Speed Clearing)	Identifies whether the bank can clear Inter-regional items locally (a.k.a "Speed Clearing"). Banks may use this field for speed clearing validations in their Capture Systems or may choose to ignore this field.

Appx 4.3.12.3.7   DesignatedBranchForTransCode element

DesignatedBranchforTransCode Element describes a bank's branch designated to receive wrongly presented cheques for a particular combination of clearing type and transaction code.

It is a child element of the Bank element. Its attributes are defined as follows:

Element Name: DesignatedBranchforTransCode

Attribute	Data	Siz	Usage	Value/Format	Description

	Type	e			
CLEARING_TYPE_CODE	NS	9	NOT NULL		Code that uniquely identifies the clearing type to which this designated branch belongs.

See Appendix C for applicable values. |
| DESIGNATED_BRANCH_ROUTING_NBR | NS | 9 | NOT NULL | | Routing Number of the branch that is designated to receive wrongly presented cheques for this particular combination of clearing type and transcode |
| TRANSCODE | NS | 3 | NOT NULL | | Transaction Code No. |

Appx 4.3.12.3.8   Branch element

Branch Element describes the information of branches belonging to a particular bank.

It is a required element and is a child element of a Bank element.

The Branch element contains zero or more Blockage elements. Its attributes are defined as follows:

Element Name: Branch

Attribute	Data Type	Size e	Usage	Value/Format	Description
BRANCH_ROUTING_NBR	NS	9	NOT NULL		Routing number of the branch.
NAME	ANS	50	NOT NULL		Name of the branch. (used in reports)
STREET_ADDRESS	ANS	50			Street address of a location or mailing address.
CITY	ANS	50			City in which the branch is located.
STATE_PROVINCE	ANS	50			State in which the branch is located.
COUNTRY	ANS	10			Country in which the branch is located.
POSTAL_ZIP_CODE	ANS	10			Postal authority location address or identifier for mailing purposes.
BRANCH_NUMBER	ANS	10	NOT NULL		Number uniquely identifying a branch.
NOTE	ANS				Miscellaneous details or notes

		100 0			as added by the CH Superintendant. Free format text.

Appx 4.3.12.3.9   ItemReturnReason element

ItemReturnReason Element describes return code and reason for the returned items.
It is a required element, and its attributes are described as follows:

Element Name: ItemReturnReason

Attribute	Data Type	Size	Usage	Value/Format	Description
RETURN_REASON _CODE	NS	10	NOT NULL		Code that uniquely identifies an item return reason.
DESCRIPTION	ANS	100			Free format text describing an item return reason code.

Appx 4.3.12.3.10   Calendar element

The Calendar Element shall be a required element.
It describes a new type of calendar and shall contain one or more child elements--CalendarDetail elements. Its attributes are defined as follows:

Element Name: Calendar

Attribute	Data Type	Size	Usage	Value/Format	Description
CALENDAR_CODE	ANS	10	NOT NULL		Code that uniquely identifies a calendar
DESCRIPTION	ANS	50			Text description or name of a particular calendar, such as "Local" or "National".

Appx 4.3.12.3.11   CalendarDetail element

The CalendarDetail Element shall be a required element.
It describes all the business / working days and non-business / non-working days for a particular calendar. Its attributes are defined as follows:

Element Name: CalendarDetail

Attribute	Data Type	Size	Usage	Value/Format	Description
CALENDAR_ID	ANS	10	NOT NULL		Unique identifier of this detail for the particular calendar.
DESCRIPTION	ANS	50			Text description or name of a particular calendar day, such

					as Christmas or Easter.
VALID_WORK_DAY	N	1	NOT NULL		Indicates whether a calendar day is a valid business working day or non-business working day

Appx 4.3.12.3.12 BundleCollectionType element

A BundleCollectionType is synonymous with a PaymentType within the Indian Cheque Processing scenario. For consistency, this CHI Specification will describe the solution using the term "PaymentTypes".

The BundleCollectionType element contains the various attributes that describe a specific "payment type" that is supported by the ECPIX system. Several different BundleCollectionType elements allow the definition of all possible 'PaymentTypes' that are processed by the system. Some examples of payment types are "Local-Paper to Follow", "Local-No Paper to Follow", "High Value-Paper to Follow", "High Value-No Paper to Follow", "Intercity-Paper to Follow" and "Intercity-No Paper to Follow".

Each item in the CXF file sent to the CHI must correspond to a payment type that is supported by the system.

The following checks are done by the CHI to verify whether an item corresponds to a payment type:
- Amount of the item should fall between "ITEM_AMOUNT_UPPER_LIMIT" and "ITEM_AMOUNT_LOWER_LIMIT" of the payment type
- "ClearingType" of the item should be equal to the "CLEARING_TYPE_CODE" of the payment type
- "DocType" of the item should be equal to the "DOCN_TYPE_IND_CODE" of the payment type

When requesting an extension for an item, the CHI verifies that the extension duration requested for the item falls within "MAX_ITEM_EXTENSION_DURATION" period defined for the payment type.

When an item is returned, the CHI verifies that the return has been made within the "CLEARING_CYCLE_DURATION" period defined for the payment type.

Payment Types can be used to identify the session an item will get attached to. Please refer Appx 4.11.3.13 to understand session definition and Appx 4.11.3.14 to understand payment types associated with a session.

The attributes of BundleCollectionType Element are described as follows.

Element Name: BundleCollectionType

Attribute	Data Type	Size	Usage	Value/Format	Description
BUNDLE_COLLECTION_TYPE_CD	ANS	10	NOT NULL		Code that uniquely identifies this payment type
DESCRIPTION	ANS	50			Free format text describing this payment type
DISPLAY_NAME	ANS	15	NOT NULL		Short name (abbreviation), for display purposes, of this payment type.

CLEARING_CYCLE_DURATION	N	10	NOT NULL		Cycle Length or Duration of time (in hours) in which an item corresponding to this payment type must be returned back to the presenting financial institution.
MAX_ITEM_EXTENSION_DURATION	N	10	NOT NULL		Maximum Duration of time (in hours) beyond which an item corresponding to this payment type cannot be extended.
MAX_DURATION_FOR_SNDNG_EXTNSN	N	10	NOT NULL		Maximum duration of time (in hours) within which extension for an item should be requested by Drawee Bank module
RTN_BUNDLE_COLLECTION_TYPE_CD	ANS	10			If this payment type is "Presentment", this field will contain the "BUNDLE_COLLECTION_TYPE_CD" of its corresponding Return Payment type. Note: Every Presentment payment type will be linked to a Return payment type
ITEM_AMOUNT_UPPER_LIMIT	N	18	NOT NULL		Maximum amount value of an item corresponding to this payment type
ITEM_AMOUNT_LOWER_LIMIT	N	18	NOT NULL		Minimum amount value of an item corresponding to this payment type
CLEARING_TYPE_CODE	ANS	10	NOT NULL		Code that uniquely identifies the "ClearingType" attribute of an item corresponding to this payment type See See Appendix C for the list of values applicable for this column

CORE_COLLECTION_TYPE_CD	ANS	10	NOT NULL		Code that uniquely identifies whether the item corresponding to this payment type should be a debit / credit instrument. The following values shall be applicable to this column: "DR" => DEBIT "CR" => CREDIT
DOCN_TYPE_IND_CODE	ANS	10	NOT NULL		Code that uniquely identifies the " DocType" attribute of an item corresponding to this payment type The possible values for this column are: "B" – Image to Follow without paper "C" – Image to Follow with Paper to Follow

Appx 4.3.12.3.13 SessionDefinition element

SessionDefinition Element describes the various sessions defined and supported by the system. There will be a session definition element for every session defined in the system.It shall be a required element.

SessionDefinition contains one or more child elements--SessionDefnCollectionType elements. Its attribute are described as follows:

Element Name: SessionDefinition

Attribute	Data Type	Size	Usage	Value/Format	Description
SESSION_NBR	N	5	NOT NULL		Unique identifier (primary key) of a session
DESCRIPTION	ANS	50			Free format text describing the session.
VALID_MON	N	1	NOT NULL		Indicates whether the session operates on Monday.
VALID_TUE	N	1	NOT NULL		Indicates whether the session operates on Tuesday.
VALID_WED	N	1	NOT NULL		Indicates whether the session operates on Wednesday.

VALID_THU	N	1	NOT NULL		Indicates whether the session operates on Thursday.
VALID_FRI	N	1	NOT NULL		Indicates whether the session operates on Friday.
VALID_SAT	N	1	NOT NULL		Indicates whether the session operates on Saturday.
VALID_SUN	N	1	NOT NULL		Indicates whether the session operates on Sunday.
OPEN_RECEIVING_ TIME	Time	4	NOT NULL		Time of day that the session opens to receive items (24-hour clock).
OPEN_RECEIVING_ OFFSET_DAYS	N	1			Offset in days from session date when the session will open and receive data.
CLOSE_RECEIVING _TIME	N	4	NOT NULL		Time of day that the session closes receiving window for Presentment (24-hour clock)
CALENDAR_CODE	ANS	10	NOT NULL		Code that identifies the calendar as per which this session will operate. Refer Appx 4.12.3.10 for calendars definition
SESSION_OPERATI ON_MODE_CODE	ANS	1	NOT NULL		Defines whether the session is operating in TEST / PRODUCTION mode. T => TEST P => PRODUCTION
CURRENCY_CODE	ANS	10	NOT NULL		ISO code of the currency associated with the session

Appx 4.3.12.3.14   SessionDefnCollectionType element

SessionDefnCollectionType Element describes the payment types associated with a clearing session. It links the item processing attributes that are specified by the BundleCollectionType (e.g. min & max amount) to a specific session.
It is a required element and is a child of Session Definition Element. Its attribute are described as follows:

Element Name: SessionDefnCollectionType

Attribute	Data Type	Size	Usage	Value/Format	Description
SESSION_NBR	N	5	NOT NULL		Unique identifier (primary key) of a session definition record.
BUNDLE_COLLEC TION_TYPE_CD	ANS	10	NOT NULL		Code that uniquely identifies a (financial data) bundle type.

Appx 4.3.12.3.15   ItemExtensionReason element

ItemExtensionReason Element describes extension codes and reasons for extending items.

It is a required element, and its attributes are described as follows:

Element Name: ItemExtensionReason

Attribute	Data Type	Size	Usage	Value/Format	Description
EXTENSION_REAS ON_CODE	ANS	10	NOT NULL		Code that uniquely identifies an item extension reason.
DESCRIPTION	ANS	100			Free format text describing an item extension reason code.

Appx 4.3.12.3.16   TranslationRule element

TranslationRule Element describes the various translation rules for bank merger and sub-member bank movement. It is a required element, and its attributes are described as follows:

Element Name: TranslationRule

Attribute	Data Type	Size	Usage	Value/Format	Description
PAYOR_BANK_RO UTING_NBR	N	9	NOT NULL		The Routing Number located on cheque that is supposed to be translated
LOGICAL_ROUTING _NBR	N	9	NOT NULL		The Routing Number to which the cheque is supposed to be routed
FROM_DATE	Date	8	NOT NULL		The start date from which this translation rule is applicable
TO_DATE	Date	8			The end date to which this translation rule is applicable
DESCRIPTION	ANS	250			Free format text describing the translation rule

Appx 4.3.12.3.17   Blockage element

Blockage element allows a Clearing Center / Bank / Branch to be blocked for a defined period of time so as to take care of situations like strikes, natural disasters or any other reason deemed suitable by the central bank. It is a required element, can be a child of Clearing House Interface, Bank and Branch Element and its attributes are described as follows:

Element Name: Blockage

Attribute	Data Type	Size	Usage	Value/Format	Description
FROM_DATE	Date	8	NOT NULL		The start date from which this blockage is applicable Note – This is Value Date and not System Date.
TO_DATE	Date	8	NOT NULL		The end date to which this blockage rule is applicable Note – This is Value Date and not System Date.
DESCRIPTION	ANS	250			Free format text describing the blockage

Appx 4.3.12.3.18   TransactionCode element

TransactionCode Element describes the valid Transaction Codes that the CHI will accept. It is a required element, and its attributes are described as follows:

Attribute	Data Type	Size	Usage	Value/Format	Description
CODE	NS	3	NOT NULL		Code No.
DESCRIPTION	ANS	100	NOT NULL		Description of Code

Appx 4.3.12.3.19   CityMaster element

CityMaster Element describes the valid city codes for every clearingtype. It is a required element, and its attributes are described as follows:

Attribute	Data Type	Size	Usage	Value/Format	Description
CITYCODE	NS	3	NOT NULL		3 digit City code

| CITYNAME | ANS | 25 | NOT NULL | | Name of the city |
| CLEARINGTYPE | NS | 2 | NOT NULL | | See Appendix C for details |

Appx 4.3.12.3.20   AtParBankMaster element

AtParBankMaster Element designates the clearing types to which AtPar cheques for a bank can be attached. It is a required element, and its attributes are described as follows:

Attribute	Data Type	Size	Usage	Value/Format	Description
BANKCODE	NS	3	NOT NULL		3 digit Bank code
CLEARINGTYPE	NS	2	NOT NULL		See Appendix C for details

Note - AtParBankMaster Element designates the clearing types (LOCAL / HIGHVALUE / INTERCITY) to which AtPar cheques belonging (drawn) to a bank non-participating in CTS can be attached to. Such banks should have a correspondent relationship with a bank participating in CTS. Additionally a translation rule needs to be added to direct AtPar cheques of non-participating bank to participating bank's branch. AtPar cheques belonging (drawn) to a bank participating in CTS can presented only using LOCAL / HIGHVALUE clearing types.

Appx 4.3.13   UNWOUND ITEM(S) FILE

Unwound item(s) file notifies the bank of items that have been unwound at the CH due to a Clearing House Notification. This file will be generated and given to each affected bank directly by the CH.
► **Unlike other interface files, this file will not be created at the CHI, and is not a part of the normal CHI interface.**

Unwound Item(s) File will be a comma separated value (csv) file with the following naming convention:

Appx 4.3.13.1   **File Name Convention**

| B1 | The Unwound Item(s) file name shall use the following naming convention:

      UIF_nnnnnnnnn_<session_nos>_<session_date>_ddmmyyyy_hhmmss.CSV

Where:

    UIF   Unwind Item(s) File
    nnnnnnnnn   Bank Routing Number (same as in File Summary Record)
    <session_nos> The clearing session number
    <session_date> The clearing session date
    ddmmyyyy   Creation Date (same as in File Summary Record)
    hhmmss   Creation Time (same as in File Summary Record)
    .CSV   Is a mandatory file type suffix |

B2	The value for the Bank Routing Number, Creation Date and Creation Time in the file name shall be the same as the contents of the File Summary record within the file.

Appx 4.3.13.2   File Structure

B1	The Unwound Item(s) file shall contain one File Summary Record followed by one or more item detail Record.
B2	The structure of the file shall be: File Summary Record Item Record (for item 1) Item Record (for item 2) . . Item Record (for item n)
B3	Each record in the file shall contain alphanumeric data and will be terminated by a carriage return and line feed.
B4	The first line of the Unwound Item(s) file shall always be the File Summary Record.
B5	The File Summary Record shall consist of data fields related to the entire Unwound Item(s) file separated by commas. The data fields of File Summary Record are defined in Section 1.1.3.1.
B6	Item Records shall follow the File Summary Record.
B7	The Item Record shall consist of the data fields related to one item, separated by commas. All data fields of the Item Record are defined in Section 1.1.3.2.

Appx 4.3.13.3   Record Formats

Appx 4.3.13.3.1   File Summary Record

B1	Data fields of the File Summary Record shall be as described in the following table:

Data Field Name	*Description/ Format*	*Value (default)* *Special Condition*	*Type*	*Size*		*Usage*
				Min	*Max*	
Record type	File Summary	Shall be 'FS'	A	2	2	M
Creation date	File creation date	*Date should be in DDMMYYYY format*	DATE	8	8	M
Creation time	File creation time	*Time should be HH24MISS format*	TIME	6	6	M

Data Field Name	Description/ Format	Value (default) Special Condition	Type	Size Min	Max	Usage
SessionNumber	Session number in which the items were cleared. Shall be same as in the filename.		N	1	2	M
SessionDate	Date of the session in which the items were cleared. Shall be same as in the filename	*Date should be in DDMMYYYY format*	DATE	8	8	M
Total Items	The total number of items within the file		N	1	8	M
Total Amount	The sum of the value of all items within the file.		N	1	18	M

Appx 4.3.13.3.2   Item Record

Data Field Name	Description/ Format	Value (default)	Type	Size Min	Max	Usage
Record type	Item Record	Shall be 'PI' to indicate Presentment Item Shall be "RI" to indicate Return Item	A	2	2	M
ItemSeqNo*	This is a unique identifier for the bank for a "PresentmentDate"		NS	14	14	M
PayorBankRoutNo	Drawee Bank Routing number		NS	9	9	M
Amount	Check amount		N	1	18	M
AccountNo	Drawee account number		NS	1	25	O
SerialNo	Check number		NS	6	6	M
TransCode	Transaction code		NS	1	3	M

Data Field Name	Description/ Format	Value (default)	Type	Size		Usage
				Min	Max	
PresentingBankRoutNo*	Routing number of the presenting bank		NS	8	9	M
PresentmentDate*	Date of capture of checks	*Date should be in DDMMYYYY format*	DATE	8	8	M
CycleNo*	Capture cycle number.		NS	1	2	M

Appx 4.4   CHI BRANCH INTERFACE MODULE'S BULK SEARCH INPUT FILE

User provides the file containing inward items serial numbers to CHI Branch interface module. The CHI Branch interface module searches the specified item Serial numbers and displays it on screen. This allows multiple items to be returned manually after verification by operator.

Appx 4.4.1 File Name Convention

A1	The Item bulk search file name shall use the following naming convention:

	<File Name>.CSV
	   Where:
	      <File Name> Name of the file. It should not execced 30 characters.
	                  File name should not contain any special character except "_".
	      .CSV Is a mandatory file type suffix.

Appx 4.4.2 Elements

A1	The Item bulk search file structure shall contain "," separated serial number in single line.
A2	All serial numbers shall be 6 digits Alpha Numeric.
A3	Serial number shall not contain any alaphabates and special charater.
A4	File shall not contain " " in between serial number.
A5	File shall not contain new multiple characters.
A6	File shall not contain not more than 250 Serial Number.

Appx 5   Appendix AA - ECPIX File Examples

This appendix contains a number of sample files used in the normal Clearing and Exchange processing.

Appx 5.1   Capture Exchange File Example

Capture digitally signing MICR and images and with IQA tests.

File name: CXF_110002001_01042006_160000_02_5.XML

```
<?xml version="1.0" encoding="UTF-8"?>
<FileHeader xmlns="urn:schemas-ncr-com:ECPIX:CXF:FileStructure:010005" VersionNumber="010005"
TestFileIndicator="P" CreationDate="01042006" CreationTime="160000" FileID="5">
<Item ItemSeqNo="00000101123456" PayorBankRoutNo="110229001" Amount="10000"
AccountNo="123456" SerialNo="123456" TransCode="10" PresentingBankRoutNo="110002000"
PresentmentDate="01042006" CycleNo="1" NumOfImageViews="3" ClearingType="02" DocType="C"
MICRRepairFlags="000000" SpecialHandling="0" TruncatingRTNo="110002001" UserField="For My
Use" IQAIgnoreInd="0" CurrencyInd="INR">
<AddendA BOFDRoutNo="110002001" BOFDBusDate="01042006" DepositorAcct="987654321"
IFSC="xxxxxxxxxxx" />
<MICRDS Source="Capture" DigitalSignatureMethod="RSA_with_SHA256" SecurityKeySize="2048"
MICRFingerPrint="PresentmentDate;PresentingBankRoutNo;CycleNo;ItemSeqNo;Amount;SerialNo;Tran
scode" DigitalSignatureLength="344"
SignatureData="shdgskhfidsfidfifdsshgsgdklsksdfihydshvkjhvdkjdshkjdshkfdhkdshffdhydhdsfhkduyhuskh
gjgulukyuklliuy" SecurityOriginatorName="CaptureCert1" SecurityAuthenticatorName="CaptureCert1"
SecurityKeyName="127f" />
        <ImageViewDetail ViewFormat="TIFF" CompressionType="G4" ViewSideIndicator="Front BW"
ViewDescriptor="Full" ImageAvailable="Y" ImageReproducable="Y" ReplacementDocIndicator="N">
<ImageViewData ImageDataLength="6400" ImageDataOffset="156780" FileName="
CIBF_110002001_01042006_160000_02_5_00.img" ClippingOrigin="0" />
<ImageDS Source="Capture" DigitalSignatureMethod="RSA_with_SHA256" SecurityKeySize="2048"
StartOfProtectedData="1" ProtectedDataLength="6400" DigitalSignatureLength="256"
DigitalSignatureDataOffset="156280" FileName=" CIBF_110002001_01042006_160000_02_5_00.img"
SecurityOriginatorName="CaptureCert1" SecurityAuthenticatorName="CaptureCert1"
SecurityKeyName="127f"/>
<ImageViewAnalysis Source="Capture" ImageQuality="2" ImageUsability="2"
ImagingBankSpecificTest="0" PartialImage="2" ExcessiveImageSkew="2" PiggybackImage="2"
LightOrDark="2" Streaks-Bands="2" BelowMinimumImageSize="2" ExceedsMaximumImageSize="2"
ImageEnabledPOD="2" SourceDocumentBad="2" DateUsability="2" PayeeUsability="2"
ConvenienceAmountUsability="2" LegalAmountUsability="2"
 SignatureUsability="2" PayorNameAndAddressUsability="2" MICRLineUsability="2"
MemoLineUsability="2" PayorBankNameAndAddressUsability="2" PayeeEndorsementUsability="2"
BOFDEndorsementUsability="2" TransitEndorsementUsability="2" ImageAnalysisUserInformation="2"
UserField="string"/>
        </ImageViewDetail>
<ImageViewDetail ViewFormat="TIFF" CompressionType="G4" ViewSideIndicator="Back BW"
ViewDescriptor="Full" ImageAvailable="Y" ImageReproducable="Y" ReplacementDocIndicator="N">
<ImageViewData ImageDataLength="6400" ImageDataOffset="256780"
FileName="CIBF_110002001_01042006_160000_02_5_00.img" ClippingOrigin="0" />
<ImageDS Source="Capture" DigitalSignatureMethod="RSA_with_SHA256" SecurityKeySize="2048"
StartOfProtectedData="1" ProtectedDataLength="6400" DigitalSignatureLength="256"
DigitalSignatureDataOffset="256280" FileName="CIBF_110002001_01042006_160000_02_5_00.img"
```

SecurityOriginatorName="CaptureCert1" SecurityAuthenticatorName="CaptureCert1"
SecurityKeyName="127f" />
<ImageViewAnalysis Source="Capture " ImageQuality="2" ImageUsability="2"
ImagingBankSpecificTest="0" PartialImage="2" ExcessiveImageSkew="2" PiggybackImage="2"
LightOrDark="2" Streaks-Bands="2" BelowMinimumImageSize="2" ExceedsMaximumImageSize="2"
ImageEnabledPOD="2" SourceDocumentBad="2" DateUsability="2" PayeeUsability="2"
ConvenienceAmountUsability="2" LegalAmountUsability="2" SignatureUsability="2"
PayorNameAndAddressUsability="2" MICRLineUsability="2" MemoLineUsability="2"
PayorBankNameAndAddressUsability="2" PayeeEndorsementUsability="2"
BOFDEndorsementUsability="2" TransitEndorsementUsability="2" ImageAnalysisUserInformation="2"
UserField="string"/>
</ImageViewDetail>
<ImageViewDetail ViewFormat="JFIF" CompressionType="JPEG" ViewSideIndicator="Front Gray"
ViewDescriptor="Full" ImageAvailable="Y" ImageReproducable="Y" ReplacementDocIndicator="N">
<ImageViewData ImageDataLength="6400" ImageDataOffset="356780"
FileName="CIBF_110002001_01042006_160000_02_5_00.img" ClippingOrigin="0" />
<ImageDS Source="Capture" DigitalSignatureMethod="RSA_with_SHA256" SecurityKeySize="2048"
StartOfProtectedData="1" ProtectedDataLength="26400" DigitalSignatureLength="256"
DigitalSignatureDataOffset="356280" FileName="CIBF_110002001_01042006_160000_02_5_00.img"
SecurityOriginatorName="CaptureCert1" SecurityAuthenticatorName="CaptureCert1"
SecurityKeyName="127f"/>
<ImageViewAnalysis Source="Capture" ImageQuality="2" ImageUsability="2"
ImagingBankSpecificTest="0" PartialImage="2" ExcessiveImageSkew="2" PiggybackImage="2"
LightOrDark="2" Streaks-Bands="2" BelowMinimumImageSize="2" ExceedsMaximumImageSize="2"
ImageEnabledPOD="2" SourceDocumentBad="2" DateUsability="2" PayeeUsability="2"
ConvenienceAmountUsability="2" LegalAmountUsability="2" SignatureUsability="2"
PayorNameAndAddressUsability="2" MICRLineUsability="2" MemoLineUsability="2"
PayorBankNameAndAddressUsability="2" PayeeEndorsementUsability="2"
BOFDEndorsementUsability="2" TransitEndorsementUsability="2" ImageAnalysisUserInformation="2"
UserField="string"/>
    </ImageViewDetail>
</Item>
<FileSummary TotalItemCount="1" TotalAmount="10000"/>
</FileHeader>

Appx 5.2 Posting Exchange File Example

File name: BPXF_110229001_01_01042006_01042006_200000_23.XML

```
<?xml version="1.0" encoding="UTF-8"?>
<FileHeader xmlns="urn:schemas-ncr-com:ECPIX:PXF:FileStructure:010001" VersionNumber="010001"
TestFileIndicator="P" CreationDate="01042006" CreationTime="200000"  FileID="23"
SessionNumber="01" SessionDate="01042006" SettlementDate="01042006" SessionExtensionHrs="0"
>
    <Item ItemSeqNo="00000101123456" PayorBankRoutNo="110229001" Amount="10000"
AccountNo="123456" SerialNo="123456" TransCode="10" PresentingBankRoutNo="110002000"
PresentmentDate="01042006" CycleNo="1" NumOfImageViews="3" ClearingType="02" DocType="C"
MICRRepairFlags="000000" SpecialHandling="0" TruncatingRTNo="110002001" UserField=""
IQAIgnoreInd="0" CurrencyInd="INR" ItemStatus="0">
     <MICRDS Source="Capture" DigitalSignatureMethod="RSA_with_SHA256" SecurityKeySize="2048"
MICRFingerPrint="PresentmentDate;PresentingBankRoutNo;CycleNo;ItemSeqNo;Amount;SerialNo;Tran
scode" DigitalSignatureLength="344"
SignatureData="shdgskhfidsfidfifdsshgsgdklsksdfihydshvkjhvdkjdshkjdshkfdhkdshffdhydhdsfhkduyhuskh
gjgulukliyuklliuy" SecurityOriginatorName="CaptureCert1" SecurityAuthenticatorName="CaptureCert1"
SecurityKeyName="127f" />
    <MICRDS Source="ECP.PBCC" DigitalSignatureMethod="RSA_with_SHA256"
SecurityKeySize="2048"
MICRFingerPrint="PresentmentDate;PresentingBankRoutNo;CycleNo;ItemSeqNo;Amount;SerialNo;Tran
scode" DigitalSignatureLength="344"
SignatureData="shdgskhfidsfidfifdsshgsgdklsksdfihydshvkjhvdkjdshkjdshkfdhkdshffdhydhdsfhkduyhuskh
gjgulukliyuklliuy" SecurityOriginatorName="ECPIXCert1" SecurityAuthenticatorName="ECPIXCert1"
SecurityKeyName="9887" />
    <AddendA BOFDRoutNo="110002001" BOFDBusDate="01042006" DepositorAcct="987654321"
IFSC="xxxxxxxxxxx"/>
    <ImageViewDetail ViewFormat="TIFF" CompressionType="G4" ViewSideIndicator="Front BW"
ViewDescriptor="Full" ImageAvailable="Y" ImageReproducable="Y" ReplacementDocIndicator="N">
     <ImageViewData ImageDataLength="6400" ImageDataOffset="156780" FileName="
BPIBF_110229001_01042006_200000_00_23_00.img" ClippingOrigin="0" />
     <ImageDS Source="Capture" DigitalSignatureMethod="RSA_with_SHA256"
SecurityKeySize="2048" StartOfProtectedData="1" ProtectedDataLength="6400"
DigitalSignatureLength="256" DigitalSignatureDataOffset="156280" FileName="
BPIBF_110229001_01042006_200000_00_23_00.img"
SecurityOriginatorName="CaptureCert1" SecurityAuthenticatorName="CaptureCert1"
SecurityKeyName="127f" />
     <ImageDS Source="ECP.PBCC" DigitalSignatureMethod="RSA_with_SHA256"
SecurityKeySize="2048" StartOfProtectedData="1" ProtectedDataLength="6400"
DigitalSignatureLength="256" DigitalSignatureDataOffset="156280" FileName="
BPIBF_110229001_01042006_200000_00_23_00.img"
SecurityOriginatorName="ECPIX_Cert1" SecurityAuthenticatorName="ECPIX_Cert1"
SecurityKeyName="9887" />
     <ImageViewAnalysis Source="Capture" ImageQuality="2" ImageUsability="2"
ImagingBankSpecificTest="0" PartialImage="2" ExcessiveImageSkew="2" PiggybackImage="2"
LightOrDark="2" Streaks-Bands="2" BelowMinimumImageSize="2" ExceedsMaximumImageSize="2"
ImageEnabledPOD="2" SourceDocumentBad="2" DateUsability="2" PayeeUsability="2"
ConvenienceAmountUsability="2" LegalAmountUsability="2" SignatureUsability="2"
PayorNameAndAddressUsability="2" MICRLineUsability="2" MemoLineUsability="2"
```

PayorBankNameAndAddressUsability="2" PayeeEndorsementUsability="2"
BOFDEndorsementUsability="2" TransitEndorsementUsability="2" ImageAnalysisUserInformation="2"
UserField="string"/>
      <ImageViewAnalysis Source="ECP.PBCC" ImageQuality="2" ImageUsability="0"
ImagingBankSpecificTest="2" PartialImage="2" ExcessiveImageSkew="2" PiggybackImage="0"
LightOrDark="0" Streaks-Bands="0" BelowMinimumImageSize="0" ExceedsMaximumImageSize="0"
ImageEnabledPOD="0" SourceDocumentBad="0" DateUsability="0" PayeeUsability="0"
ConvenienceAmountUsability="0" LegalAmountUsability="0" SignatureUsability="0"
PayorNameAndAddressUsability="0" MICRLineUsability="0" MemoLineUsability="0"
PayorBankNameAndAddressUsability="0" PayeeEndorsementUsability="0"
BOFDEndorsementUsability="0" TransitEndorsementUsability="0" ImageAnalysisUserInformation="0"
UserField="BS1:20000222222222202"/>
      </ImageViewDetail>
       <ImageViewDetail ViewFormat="TIFF" CompressionType="G4" ViewSideIndicator="Back BW"
ViewDescriptor="Full" ImageAvailable="Y" ImageReproducable="Y" ReplacementDocIndicator="N">
      <ImageViewData ImageDataLength="6400" ImageDataOffset="256780" FileName="
BPIBF_110002001_01042006_160000_00_5_00.img" ClippingOrigin="0" />
        <ImageDS Source="Capture" DigitalSignatureMethod="RSA_with_SHA256"
SecurityKeySize="2048" StartOfProtectedData="1" ProtectedDataLength="6400"
DigitalSignatureLength="256" DigitalSignatureDataOffset="256280" FileName="
BPIBF_110002001_01042006_160000_00_5_00.img"
SecurityOriginatorName="CaptureCert1" SecurityAuthenticatorName="CaptureCert1"
SecurityKeyName="127f" />
      <ImageDS Source="ECP.PBCC" DigitalSignatureMethod="RSA_with_SHA256"
SecurityKeySize="2048" StartOfProtectedData="1" ProtectedDataLength="6400"
DigitalSignatureLength="256" DigitalSignatureDataOffset="256280" FileName="
BPIBF_110002001_01042006_160000_00_5_00.img"
SecurityOriginatorName="ECPIX_Cert1" SecurityAuthenticatorName="ECPIX_Cert1"
SecurityKeyName="9887" />
      <ImageViewAnalysis Source="Capture" ImageQuality="2" ImageUsability="2"
ImagingBankSpecificTest="0" PartialImage="2" ExcessiveImageSkew="2" PiggybackImage="2"
LightOrDark="2" Streaks-Bands="2" BelowMinimumImageSize="2" ExceedsMaximumImageSize="2"
ImageEnabledPOD="2" SourceDocumentBad="2" DateUsability="2" PayeeUsability="2"
ConvenienceAmountUsability="2" LegalAmountUsability="2" SignatureUsability="2"
PayorNameAndAddressUsability="2" MICRLineUsability="2" MemoLineUsability="2"
PayorBankNameAndAddressUsability="2" PayeeEndorsementUsability="2"
BOFDEndorsementUsability="2" TransitEndorsementUsability="2" ImageAnalysisUserInformation="2"
UserField="string"/>
      <ImageViewAnalysis Source="ECP.PBCC" ImageQuality="2" ImageUsability="0"
ImagingBankSpecificTest="2" PartialImage="2" ExcessiveImageSkew="2" PiggybackImage="0"
LightOrDark="0" Streaks-Bands="0" BelowMinimumImageSize="0" ExceedsMaximumImageSize="0"
ImageEnabledPOD="0" SourceDocumentBad="0" DateUsability="0" PayeeUsability="0"
ConvenienceAmountUsability="0" LegalAmountUsability="0" SignatureUsability="0"
PayorNameAndAddressUsability="0" MICRLineUsability="0" MemoLineUsability="0"
PayorBankNameAndAddressUsability="0" PayeeEndorsementUsability="0"
BOFDEndorsementUsability="0" TransitEndorsementUsability="0" ImageAnalysisUserInformation="0"
UserField="BS1:20000222222222202"/>
      </ImageViewDetail>
<ImageViewDetail ViewFormat="JFIF" CompressionType="JPEG" ViewSideIndicator="Front Gray"
ViewDescriptor="Full" ImageAvailable="Y" ImageReproducable="Y" ReplacementDocIndicator="N">
      <ImageViewData ImageDataLength="6400" ImageDataOffset="356780" FileName="
BPIBF_110002001_01042006_160000_00_5_00.img" ClippingOrigin="0" />
      <ImageDS Source="Capture" DigitalSignatureMethod="RSA_with_SHA256"
SecurityKeySize="2048" StartOfProtectedData="1" ProtectedDataLength="26400"
DigitalSignatureLength="256" DigitalSignatureDataOffset="356280" FileName="

BPIBF_110002001_01042006_160000_00_5_00.img" SecurityOriginatorName="CaptureCert1" SecurityAuthenticatorName="CaptureCert1" SecurityKeyName="127f" />
    <ImageDS Source="ECP.PBCC" DigitalSignatureMethod="RSA_with_SHA256" SecurityKeySize="2048" StartOfProtectedData="1" ProtectedDataLength="26400" DigitalSignatureLength="256" DigitalSignatureDataOffset="356280" FileName=" BPIBF_110002001_01042006_160000_00_5_00.img" SecurityOriginatorName="ECPIX_Cert1" SecurityAuthenticatorName="ECPIX_Cert1" SecurityKeyName="9887" />
    <ImageViewAnalysis Source="Capture" ImageQuality="2" ImageUsability="2" ImagingBankSpecificTest="0" PartialImage="2" ExcessiveImageSkew="2" PiggybackImage="2" LightOrDark="2" Streaks-Bands="2" BelowMinimumImageSize="2" ExceedsMaximumImageSize="2" ImageEnabledPOD="2" SourceDocumentBad="2" DateUsability="2" PayeeUsability="2" ConvenienceAmountUsability="2" LegalAmountUsability="2" SignatureUsability="2" PayorNameAndAddressUsability="2" MICRLineUsability="2" MemoLineUsability="2" PayorBankNameAndAddressUsability="2" PayeeEndorsementUsability="2" BOFDEndorsementUsability="2" TransitEndorsementUsability="2" ImageAnalysisUserInformation="2" UserField="string"/>
    <ImageViewAnalysis Source="ECP.PBCC" ImageQuality="2" ImageUsability="0" ImagingBankSpecificTest="2" PartialImage="2" ExcessiveImageSkew="2" PiggybackImage="0" LightOrDark="0" Streaks-Bands="0" BelowMinimumImageSize="0" ExceedsMaximumImageSize="0" ImageEnabledPOD="0" SourceDocumentBad="0" DateUsability="0" PayeeUsability="0" ConvenienceAmountUsability="0" LegalAmountUsability="0" SignatureUsability="0" PayorNameAndAddressUsability="0" MICRLineUsability="0" MemoLineUsability="0" PayorBankNameAndAddressUsability="0" PayeeEndorsementUsability="0" BOFDEndorsementUsability="0" TransitEndorsementUsability="0" ImageAnalysisUserInformation="0" UserField="BS1:20000222222222202"/>
    </ImageViewDetail>
</Item>
<FileSummary TotalItemCount="1" TotalAmount="10000"/>
</FileHeader>

Appx 5.3   Return Request File Example

File name: RRF_110229001_01042006_180922_234.XML

```xml
<?xml version="1.0" encoding="UTF-8"?>
<FileHeader  xmlns="urn:schemas-ncr-com:ECPIX:RRF:FileStructure:010004"
VersionNumber="010004" TestFileIndicator="P" CreationDate="01042006" CreationTime="180922"
FileID="234" >
   <Item ItemSeqNo="00000101123456" PayorBankRoutNo="110229001" Amount="10000"
AccountNo="123456" SerialNo="123456" TransCode="10" PresentingBankRoutNo="110002000"
PresentmentDate="01042006" CycleNo="1" ClearingType="02" ReturnReason="01"
ReturnReasonComment="A/c not under operation">
     <AddendA BOFDRoutNo="110002001" BOFDBusDate="01042006" DepositorAcct="987654321"
IFSC="xxxxxxxxxxx"/>
<MICRDS Source="Drawee" DigitalSignatureMethod="RSA_with_SHA256" SecurityKeySize="2048"
MICRFingerPrint="PresentmentDate;PresentingBankRoutNo;CycleNo;ItemSeqNo;Amount;SerialNo;Tran
scode"  DigitalSignatureLength="344"
SignatureData="shdgskhfidsfidfifdsshgsgdklsksdfihydshvkjhvdkjdshkjdshkfdhkdshffdhydhdsfhkduyhushgj
guluklyuklliuy" SecurityOriginatorName="DraweeCert1" SecurityAuthenticatorName="DraweeCert1"
SecurityKeyName="127f" />
   </Item>
<FileSummary TotalItemCount="1" TotalAmount="10000"/>
</FileHeader>
```

Appx 5.4   Return File Example

File name: MRF_110002001_01042006_190922_245.XML

```xml
<?xml version="1.0" encoding="UTF-8"?>
<FileHeader  xmlns="urn:schemas-ncr-com:ECPIX:RF:FileStructure:010001" VersionNumber="010001"
TestFileIndicator="P" CreationDate="01042006" CreationTime="190922"  FileID="245">
    <Item ItemSeqNo="00000101123456" PayorBankRoutNo="110229001" Amount="10000"
AccountNo="123456" SerialNo="123456" TransCode="10" PresentingBankRoutNo="110002000"
PresentmentDate="01042006" CycleNo="1" ClearingType="02" ReturnReason="01"
ReturnReasonComment="A/c not under operation">
    <AddendA BOFDRoutNo="110002001" BOFDBusDate="01042006" DepositorAcct="987654321"
IFSC="xxxxxxxxxxx"/>
    <MICRDS Source="Drawee" DigitalSignatureMethod="RSA_with_SHA256" SecurityKeySize="2048"
MICRFingerPrint="PresentmentDate;PresentingBankRoutNo;CycleNo;ItemSeqNo;Amount;SerialNo;Tran
scode"  DigitalSignatureLength="344"
SignatureData="shdgskhfidsfidfifdsshgsgdklsksdfihydshvkjhvdkjdshkjdshkfdhkdshffdhydhdsfhkduyhushgj
guluklyuklliuy" SecurityOriginatorName="DraweeCert1" SecurityAuthenticatorName="DraweeCert1"
SecurityKeyName="127f"  />
    </Item>
<FileSummary TotalItemCount="1" TotalAmount="10000"/>
</FileHeader>
```

Appx 5.5   Extension Request File Example

File name: ERF_110229001_01042006_190922_454.XML

```xml
<?xml version="1.0" encoding="UTF-8"?>
<FileHeader xmlns="urn:schemas-ncr-com:ECPIX:ERF:FileStructure:010002" VersionNumber="010002"
TestFileIndicator="P" CreationDate="01042006" CreationTime="190922" FileID="454"  >
    <Item ItemSeqNo="00000101123456" PayorBankRoutNo="110229001" Amount="10000"
AccountNo="123456789" SerialNo="123456" TransCode="10" PresentingBankRoutNo="110002000"
PresentmentDate="01042006" CycleNo="1" ExtensionPeriod="24" ExtensionReason="04"/>
<FileSummary TotalItemCount="1" TotalAmount="10000"/>
</FileHeader>
```

Appx 5.6   Extension File Example

File name: MEF_110229001_01042006_204034_545.XML

```xml
<?xml version="1.0" encoding="UTF-8"?>
<FileHeader xmlns="urn:schemas-ncr-com:ECPIX:EF:FileStructure:010001" VersionNumber="010001"
TestFileIndicator="P" CreationDate="01042006" CreationTime="204034"  FileID="545">
    <Item ItemSeqNo="00000101123456" PayorBankRoutNo="110229001" Amount="10000"
AccountNo="123456" SerialNo="123456" TransCode="10" PresentingBankRoutNo="110002000"
PresentmentDate="01042006" CycleNo="1" ExtensionPeriod="24" ExtensionReasonCode="04"/>
<FileSummary TotalItemCount="1" TotalAmount="10000"/>
</FileHeader>
```

Appx 5.7 Response File Example

File name: CXF_110002001_01042006_160000_02_5.XML.1.RES

```
<?xml version="1.0" encoding="UTF-8"?>
<FileHeader xmlns="urn:schemas-ncr-com:ECPIX:RES:FileStructure:010001" VersionNumber="010001"
TestFileIndicator="P" CreationDate="01042006" CreationTime="160000" FileID="02" FileStatus="0">
<FileSummary TotalItemCount="1" TotalAmount="10000"/>
</FileHeader>
```

Appx 5.8   Outward Acknowledgement File Example

File Name: CXF_110002001_09072007_223122_1_57.XML.1.09072007.OACK

```
<?xml version="1.0" encoding="UTF-8"?>
<FileHeader xmlns="urn:schemas-ncr-com:ECPIX:OACK:FileStructure:010001"
VersionNumber="010001" TestFileIndicator="P" CreationDate="09072007" CreationTime="214322"
SessionNumber="1" SessionDate="09072007" SettlementDate="09072007" SessionExtensionHrs="0">
<Item ItemSeqNo="00000101000000" PresentingBankRoutNo="110002001"
PresentmentDate="09072007" CycleNo="1" ItemStatus="0"/>
<FileSummary TotalItemCount="1"/>
</FileHeader>
```

Appx 5.9   Unwound Item File Example

File name: UIF_110002000_1_21102007_22102007_201133.CSV

```
FS,22102007,201133,1,21102007,2,2500000
PI,1982,110287007,1500000,00987667,0014567,11,110002000,21102007,01
PI,56789,110287082,1000000,567009,0897609,11,110002000,21102007,01
```

Appx 5.10 Example of FILE for CHI Branch interface module's bulk search
File name: BULK_SERACH_ITEM_12_June_2013.CSV

```
020302,020303,020304,020305,020306,020307,020308,020309,020310,020311,020312,020313,02031
4,020315,020316
```

Appx 6 Appendix BB – CH Master Data File Example

```xml
<?xml version="1.0" encoding = "UTF-8"?>
<CHMaster xmlns="urn:schemas-ncr-comECPIX:CHM:FileStructure:010001" SeqNo="01" Version="4.0">
<CHMasterHeader ClearingHouseRoutNo="110999999" TestInd="P" CreationDate="06302006"
CreationTime="132555" />
<CHMasterBody>
<ClearingHouse CH_ROUTING_NBR="110999999">
<ClearingHouseInterface CC_ROUTING_NBR="110029000" NAME=" Punjab National Bank CHI"
STREET_ADDRESS="Janpath" CITY="NEW DELHI" STATE_PROVINCE ="DELHI" COUNTRY=" INDIA"
POSTAL_ZIP_CODE="110002" CLEARING_STATUS_CODE="CLEARING" NOTE="">
<Bank BANK_ROUTING_NBR="110029001" NAME="Punjab National Bank" STREET_ADDRESS="Janpath"
CITY="NEW DELHI" STATE_PROVINCE ="DELHI" COUNTRY ="INDIA" POSTAL_ZIP_CODE="110002"
CLEARING_STATUS_CODE="CLEARING" NOTE="" SPEED_CLEARING="0" >
        <DesignatedBranchforTransCode CLEARING_TYPE_CODE="01"
DESIGNATED_BRANCH_ROUTING_NBR="110029099" TRANSCODE="11"/>
        <Branch BRANCH_ROUTING_NBR="110029099" NAME="PNB Janpath Branch"
STREET_ADDRESS="Janpath" CITY="NEW DELHI" STATE_PROVINCE ="DELHI" COUNTRY ="INDIA"
POSTAL_ZIP_CODE="110002" BRANCH_NUMBER="099" NOTE="">
        <Blockage FROM_DATE="09072006" TO_DATE="10072006" DESCRIPTION="Branch blocked due to
system up-gradation" />
        </Branch>
</Bank>
</ClearingHouseInterface >
</ClearingHouse>
<ItemReturnReason RETURN_REASON_CODE="01" DESCRIPTION="In-sufficient Funds"/>
<ItemExtensionReason EXTENSION_REASON_CODE="04" DESCRIPTION="Bad image, paper requested"/>
<Calendar CALENDAR_CODE="01" DESCRIPTION="Local Calendar">
        <CalendarDetail CALENDAR_ID="23062006" DESCRIPTION="" VALID_WORK_DAY="0"/>
</Calendar>
<BundleCollectionType BUNDLE_COLLECTION_TYPE_CD="72" DESCRIPTION="Local Presentment Items"
DISPLAY_NAME="LOCAL_PRESENTMENT" CLEARING_CYCLE_DURATION="1"
MAX_ITEM_EXTENSION_DURATION="1" RTN_BUNDLE_COLLECTION_TYPE_CD="82"
ITEM_AMOUNT_UPPER_LIMIT="999999999999999" ITEM_AMOUNT_LOWER_LIMIT="0"
CLEARING_TYPE_CODE="02" CORE_COLLECTION_TYPE_CD="DR" DOCN_TYPE_IND_CODE="B"/>
<SessionDefinition SESSION_NBR="1" DESCRIPTION="Local Session" VALID_MON="1" VALID_TUE="0"
VALID_WED="0" VALID_THU="0" VALID_FRI="0" VALID_SAT="0" VALID_SUN="0"
OPEN_RECEIVING_TIME="915" OPEN_RECEIVING_OFFSET_DAYS="0" CLOSE_RECEIVING_TIME="915"
SESSION_OPERATION_MODE_CODE="P" CALENDAR_CODE="01"
CLOSE_RECEIVING_RETURNS_OFFSET_DAYS="3" CLOSE_RECEIVING_RETURNS_TIME="2030"
CURRENCY_CODE="SR" DO_SAME_SESSION_RETURNS ="1">
<SessionDefnCollectionType SESSION_NBR="1" BUNDLE_COLLECTION_TYPE_CD="72"/>
</SessionDefinition>
<TranslationRule PAYOR_BANK_ROUTING_NBR="110879" LOGICAL_ROUTING_NBR="110002987"
FROM_DATE="20062006" TO_DATE="20082006" DESCRIPTION="ABC bank has been merged with SBI and all
branches of ABC shall clear as SBI Branch No. 987"/>
<TransactionCode CODE="10" DESCRIPTION="Savings Bank Account Cheque"/>
<TransactionCode CODE="11" DESCRIPTION="Current Account cheque"/>
<CityMaster CITYCODE="110" CITYNAME="DELHI" CLEARINGTYPE="01"/>
<CityMaster CITYCODE="400" CITYNAME="MUMBAI" CLEARINGTYPE="03"/>
<AtParBankMaster BANKCODE="002" CLEARINGTYPE="01"/>
<AtParBankMaster BANKCODE="003" CLEARINGTYPE="01"/>
</CHMasterBody>
</CHMaster>
```

Appx 7   Appendix CC – ClearingType

The clearing types identified for the RBI/NPCI are as follows:
NOTE: The ClearingTypes are set by the capture systems, along with the DocType to indicate the handling of the paper documents.

Clearing Type	Description	DocType
00	Clearing Type is Unknown. This value is applicable for filename only (Appx 4.1.1), indicating, the file has mixed items with more than one clearing type in it. This value cannot be used at item level.	

LOCAL CHEQUES

01	Local Debit presentment – GOOD IQA	"B" – Image To Follow without paper
	Local Debit presentment – BAD IQA	"C" – Image To Follow with Paper To Follow
	Government debit presentment – GOOD IQA	"B" – Image To Follow without Paper
	Government debit presentment – BAD IQA	"C" – Image To Follow with Paper To Follow

NON CTS 2010 CHEQUES

11	Local (NON CTS 2010 CHEQUES) Debit presentment – GOOD IQA	"B" – Image To Follow without paper
	Local (NON CTS 2010 CHEQUES) Debit presentment – BAD IQA	"C" – Image To Follow with Paper To Follow
	Government debit presentment – GOOD IQA	"B" – Image To Follow without paper
	Government debit presentment – BAD IQA	"C" – Image To Follow with Paper To Follow

LOCAL HIGH VALUE CHEQUES

02	Local High Value Debit presentment – GOOD IQA	"B" – Image To Follow without paper
	Local High value Debit presentment – BAD IQA	"C" – Image To Follow with Paper To Follow
	High Value Government debit presentment – GOOD IQA	"B" – Image To Follow without paper
	High Value Government debit presentment – BAD IQA	"C" – Image To Follow with Paper To Follow

INTERCITY CHEQUES

03	InterCity Debit presentment – GOOD IQA	"B" – Image To Follow without paper
	InterCity Debit presentment – BAD IQA	"C" – Image To Follow with Paper To Follow
	InterCity Government Debit presentment –	"B" – Image To Follow

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| GOOD IQA | without paper |
| InterCity Government Debit presentment – BAD IQA | "C" – Image To Follow with Paper To Follow |

Capture system has to identify the clearing type for each item in the capture file.

Clearing type is also used in the capture exchange file name. If capture sorts items by clearing type, then it will use clearing type from the above table. If items are unsorted in capture then the value of clearing type in the filename is "00".

The capture system must ensure that items presented with a DocType of "C – Image To Follow with Paper to Follow" mode also follow the RBI/NPCI clearing house procedures for presenting and routing the physical cheque.

Appx 8   Appendix DD – Return Reason Codes

For RBI/NPCI, the return reason codes defined in section 4.6.3.3.1 are used.
There are no additional RBI/NPCI specific return reason codes defined at this time.

Appx 9   Appendix EE – IMAGE DETAIL SPECIFICATIONS

RBI/NPCI has set their detailed image requirements that are necessary for smooth operation of all parties participating in the Clearing House.

A1   Each item shall have exactly three image views, as follows:

- B/W CCITT G4 TIFF images for front

- B/W CCITT G4 TIFF images for back

- Grayscale JPEG image compressed in JPEG format for front.

B2   The B/W TIFF images shall:

- be at 200 dpi

- follow the TIFF 6.0 standard.

B3   The grayscale images shall:

- JPEG images compressed in JPEG format (aka JFIF files)

- be a single frame, 8 bit Grayscale image (256 level) at 100 dpi

The following subsections provide any necessary further clarifications and requirements for the image standards supported by the Clearing House System.

Appx 9.1 Required TIFF Tags for Black/White G4 Images

	Required Tags	Tag Number	Write Required Value(s)	Comment
A3	ImageWidth	256	Note 2	
A4	ImageLength	257	Note 2	Note 1
A5	Compression	259	4	4 = Group 4 Fax (T.6)
A6	Photometric Interpretation	262	0	0 = White is zero
A7	StripOffsets	273	Note 2	This array has only 1 entry (for single-strip images)
A8	Orientation	274	1 (new) 3 and 4 (grandfathered)	Tag may be absent if value = 1 (default). Transports are required to write images in orientation 1 (front and back) except for older transports that do not support orientation 1.
A9	RowsPerStrip	278	Note 2	Note 1
A10	StripByteCounts	279	Note 2	This array will have only one entry (for single-strip images).
C11	XResolution	282	200 dpi 240 dpi	XResolution value shall equal YResolution value.
A12	YResolution	283	200 dpi 240 dpi	Same comments as for XResolution
The following tags need not be present since the default value equals the required value; However, if present, they shall have the default value.				
A13	NewSubfileType	254	0	0 = full resolution, single image per TIFF file
A14	BitsPerSample	258	1	
A15	Thresholding	263	1	1 = no dithering or halftoning has been applied to the image data
A16	FillOrder	266	1	1 = pixels with lower column values are stored in the higher-order bits of the byte
A17	SamplesPerPixel	277	1	
A18	MinSampleValue	280	0	
A19	MaxSampleValue	281	1	
A20	PlanarConfiguration	284	1	1 = chunky format. The component values for each pixel are stored contiguously.
A21	T6 Options	293	0	0 = no T6 options
C22	ResolutionUnit	296	2	2 = inch

A23   **Note 1**   This specification supports "single strip" images only which requires that the value of the "RowsPerStrip" tag is equal to the value of the "ImageLength" tag.

A24   **Note 2**   This tag shall have a value that is valid for the associated image data.

Appx 9.2   Required TIFF Tags for Grayscale JPEG Images

THIS IS NO LONGER PROVIDED. RBI/NPCI DOES NOT SUPPORT JPEG IMAGES IN TIFF FILES.

Appx 9.3   Extra TIFF Tags

A1   Extra tags are valid tags that are present in TIFF files and not included in the tables contained in sections 5.1.1 and 5.1.2.

C2   TIFF writers that create new TIFF images may create extra tags where there is a business reason to do so.

A3   If a TIFF writer inserts extra tags, it must make them syntactically correct and cannot demand that any other TIFF reader processes these extra tags.

Appx 9.4   Private TIFF Tags

A1   Private tags are TIFF tags numbered 32768 or higher that are assigned to organizations that might wish to store information meaningful only to that organization.

C2   DELETED.

A3   If a TIFF writer inserts private tags, it must make them syntactically correct and cannot demand that any other TIFF reader processes these private tags.

Appx 9.5   Support for other TIFF Parameters

C1   *DELETED*

	Parameter Name	NCR Required Value (WRITE)	Comment
A3	Byte Order	Little-endian (II)	Byte Order is defined in TIFF file bytes 0-1
A4	Sort Order	The entries in an IFD must be sorted in ascending order by Tag. The Values to which directory entries point need not be in any particular order in the file.	

Appx 9.6   Required JFIF Markers and tags for Grayscale JFIF Images

C1   JFIF image shall contain the JPEG Baseline Sequential Process

C2   JPEGs are assumed to be Orientation '1' (left-to-right, top-to-bottom)

C3   JFIF requires the mandatory presence of the APP0 marker immediately after the SOI marker. The JFIF APP0 marker is identified by the zero terminated string "JFIF"

C4   JFIF APP0 marker provides the following information about the JPEG stream:

- 'version' shall be '0101' or '0102'

- 'units' for the X and Y pixel density, shall be either '1' for dots-per-inch, or '2' for dots-per-cm

- 'Xdensity' shall equal 'Ydensity'

- In the event that the APP0 'units' or 'density' were not specified then the usual assumption by an application reading the JFIF will be 200dpiX200dpi

- Thumbnails are not mandatory, but if present are to be ignored

Appx 9.7   Note - Calculation of Extensions and Returns

Note   Maximum duration for sending extensions denoted by
MAX_DURATION_FOR_SNDNG_EXTNSN in BundleCollectionType element will start from
Session Close time (SessionDefinition.CLOSE_RECEIVING_TIME) and will also include
SessionExtensionHrs provided in PXF file.

For example: Lets say for July 1 Session that closes at 1:00 PM if
MAX_DURATION_FOR_SNDNG_EXTNSN is set as 2 hours and SessionExtensionHrs is 1
hour, Drawee bank module has time till 1:00 PM + 2 hours + 1 hour i.e. 4:00 PM to send
extensions to CHI.

Note   The calculation for maximum period for sending returns starts from Session Close time
(SessionDefinition.CLOSE_RECEIVING_TIME) and will include SessionExtensionHrs and
CLEARING_CYCLE_DURATION defined in BundleCollectionType element

For example: Lets say for July 1 Session that closes at 1:00 PM if
MAX_DURATION_FOR_SNDNG_EXTNSN is set as 3 hours and SessionExtensionHrs is 1
hour, Drawee bank module has time till 1:00 PM + 3 hours + 1 hour i.e. 5:00 PM to send returns
to CHI.

Appx 10   List of Paper to Follow (P2F) Items

P2F Item(s) file notifies the bank of Paper to Follow items that have been processed at CHI and settled at CH on a business date. This file will be a comma separated value (csv) file generated at CHI by execution of a script. The file will be in the ascending order of Itemsequencenumber (ItemSeqNo).

P2F Item(s) File will have the following naming convention:

Appx 10.1 File Name Convention

B1	The P2F Item(s) file name shall use the following naming convention:
	
	      P2F_nnnnnnnn_<business_date>_ddmmyyyy_hhmmss.CSV
	
	Where:
	
	    P2F Paper to Follow Item(s) File
	    nnnnnnnn Bank Routing Number (same as in File Summary Record)
	    <business_date> The business date for which the file is generated
	    ddmmyyyy Creation Date (same as in File Summary Record)
	    hhmmss Creation Time (same as in File Summary Record)
	    .CSV Is a mandatory file type suffix

B2	The value for the Bank Routing Number, Creation Date and Creation Time in the file name shall be the same as the contents of the File Summary record within the file.

Appx 10.2   File Structure

B1	The P2F Item(s) file shall contain one File Summary Record followed by one or more item detail Record.

B2	The structure of the file shall be:
	
	    File Summary Record
	        Item Record (for item 1)
	        Item Record (for item 2)
	        .
	        .
	        Item Record (for item n)

B3	Each record in the file shall contain alphanumeric data and will be terminated by a carriage return and line feed.
B4	The first line of the P2F Item(s) file shall always be the File Summary Record.
B5	The File Summary Record shall consist of data fields related to the entire P2F Item(s) file separated by commas. The data fields of File Summary Record are defined in Section 1.1.3.1.
B6	Item Records shall follow the File Summary Record.
B7	The Item Record shall consist of the data fields related to one item, separated by commas. All data fields of the Item Record are defined in Section 1.1.3.2.

Appx 10.3 Record Formats

Appx 10.3.1   File Summary Record

B1	Data fields of the File Summary Record shall be as described in the following table:

Data Field Name	*Description/ Format*	*Value (default)*	*Type*	*Size*	*Usage*
Record type	File Summary	Shall be 'FS'	A	2	M
Creation date	File creation date		DATE	8	M
Creation time	File creation time		TIME	6	M
BusinessDate	Business Date for which the list of items were generated. Shall be same as in the filename		DATE	8	M
Total Items	The total number of items within the file		N	8	M
Total Amount	The sum of the value of all items within the file.		N	18	M

Appx 10.3.2   Item Record

Data Field Name	*Description/ Format*	*Value (default)*	*Type*	*Size*	*Usage*
Record type	Item Record	Shall be 'I' to indicate Item	A	2	M
ItemSeqNo*	This is a unique identifier for the bank for a "PresentmentDate"		NS	14	M
PayorBankRoutNo	Drawee Bank Routing number		NS	9	M

Data Field Name	Description/ Format	Value (default)	Type	Size	Usage
Amount	Check amount		N	18	M
AccountNo	Drawee account number		NS	25	O
SerialNo	Check number		NS	6	M
TransCode	Transaction code		NS	3	M
PresentingBankRoutNo*	Routing number of the presenting bank		NS	9	M
PresentmentDate*	Date of capture of checks		DATE	8	M
CycleNo*	Capture cycle number.		NS	2	M
ItemType	Indicates whether the item is outward(O) or inward(I)		A	1	M