



MAJOR PROJECTS DIRECTORATE

ANNEX B

AFIS REQUIREMENTS

AFIS RENEWAL

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1. INTRODUCTION

1.1 GENERAL

1. This Annex B to the Appendix A SOW describes the detailed requirements to renew AFIS, which are in addition to the high level requirements stated throughout the SOW and its accompanying documents.
2. This document identifies what the Contractor's AFIS must provide in order to satisfy the RCMP's requirements for processing prints found on criminal, refugee, immigration, civil, latent and RCMP employee submissions received by RCMP's CCRTIS. It describes the functional and technical requirements that must be provided by the Contractor's AFIS renewal solution to support the business, interfaces, capacity, security and quality requirements of the RCMP.

1.2 AFIS RENEWAL CONCEPT

1. From a high level architecture perspective, AFIS is like a replaceable black box for RTID. AFIS interfaces with NNS. NNS controls the overall flow and processing of NPS-NIST submissions. The AFIS ICD defines the interface between NNS and AFIS. Any AFIS that fully supports the AFIS ICD and supports the sequence of activities controlled by the NNS should be able to replace the existing AFIS for submissions processing. There are more AFIS requirements than submission processing; however, this explains the black box concept for the AFIS within the RTID architecture.
2. The AFIS renewal solution must support the AFIS ICD for all communications between NNS and AFIS as well as the sequence of activities for every RTID workflow. The NNS controls all RTID workflows. The AFIS renewal solution must also support the user interface (UI), the interface with the Verification Subsystem (VSS) and all other requirements stated throughout this SOW and its accompanying documents.

1.3 DOCUMENT ORGANIZATION

1. The detailed architecture within which the AFIS renewal solution must operate is explained herein along with a description of the workflow applicable to the AFIS renewal solution.
2. The workflow shows the sequence of processing that the AFIS renewal solution must support. Only a few example workflows are explained in detail to ensure an understanding of the process. It is expected that the Contractor can use the example and the AFIS ICD to understand all other workflows.
3. The detailed functional requirements that must be supported by the AFIS renewal solution are presented following the detailed architecture and workflow. These requirements are presented under various heading such as General, Ten Print (TP), Latent and Direct Filing.

4. There are technical requirements included with the functional requirements to ensure clarity concerning the requirements. However, most of the detailed technical and implementation requirements that must be supported by the AFIS renewal solution are presented following the functional requirements.

1.4 DEFINITIONS

1. An “production administrator” (prod admin) is a non-technical AFIS user who monitors the system, sets up new users, produces reports, sets configurable parameters and performs a variety of AFIS support functions. An operational administrator is not a technical support person and as such uses a GUI to carry out tasks on the system.
2. A “technician” is a fingerprint technician using the AFIS to perform specific AFIS production functions such as Ten Print Quality Control, Verification, Certification and so on. A latent technician is an experienced fingerprint technician specializing in the identification of crime scene prints. The term ‘technician’ is sometimes used within the context of the specific function they are performing (e.g., QC technician).
3. A “supervisor” is an AFIS production user who supervises a group of fingerprint technicians. Ten Print supervisors also deal with high priority searches and difficult transactions. Latent Supervisors also perform all of the latent certifications.
4. A “remote operator” is a fingerprint technician located at a remote AFIS site that is performing latent searches against the RCMP TPF and ULF. This operator has been trained and is regularly monitored by the RCMP.
5. An ‘uncertified remote operator’ is one who is going through the training period allowing the Remote Network Search Coordinator to monitor their work.
6. The “Remote Network Search Coordinator (RNSC)” is a senior latent technician located at the RCMP who is responsible for training and monitoring remote operators.
7. “Operator” and “user” are used interchangeably in these requirements and always refer to production users. The Role Based Access Controls (RBAC) defined herein provide the details for the access privileges that must be supported for each type of user.
8. “Operational Support” (OPS) is a 24/7/365 user in the RCMP/SSC data center responsible for monitoring server alarms and taking action based on predefined guidelines to recover from whatever failure might occur. Since the Contractor is responsible for AFIS support, typically, OPS simply contacts the Contractor AFIS resources to alert them of any failures and the Contractor AFIS resources resolve the issue.

2. AFIS RENEWAL ARCHITECTURE AND WORKFLOW

2.1 AFIS RENEWAL DETAILED ARCHITECTURE

- The following diagram depicts a detailed view of the current AFIS architecture. The Contractor's AFIS renewal solution must operate within this architecture and support the RTID interfaces and technical requirements that provide a secure, efficient and effective solution.

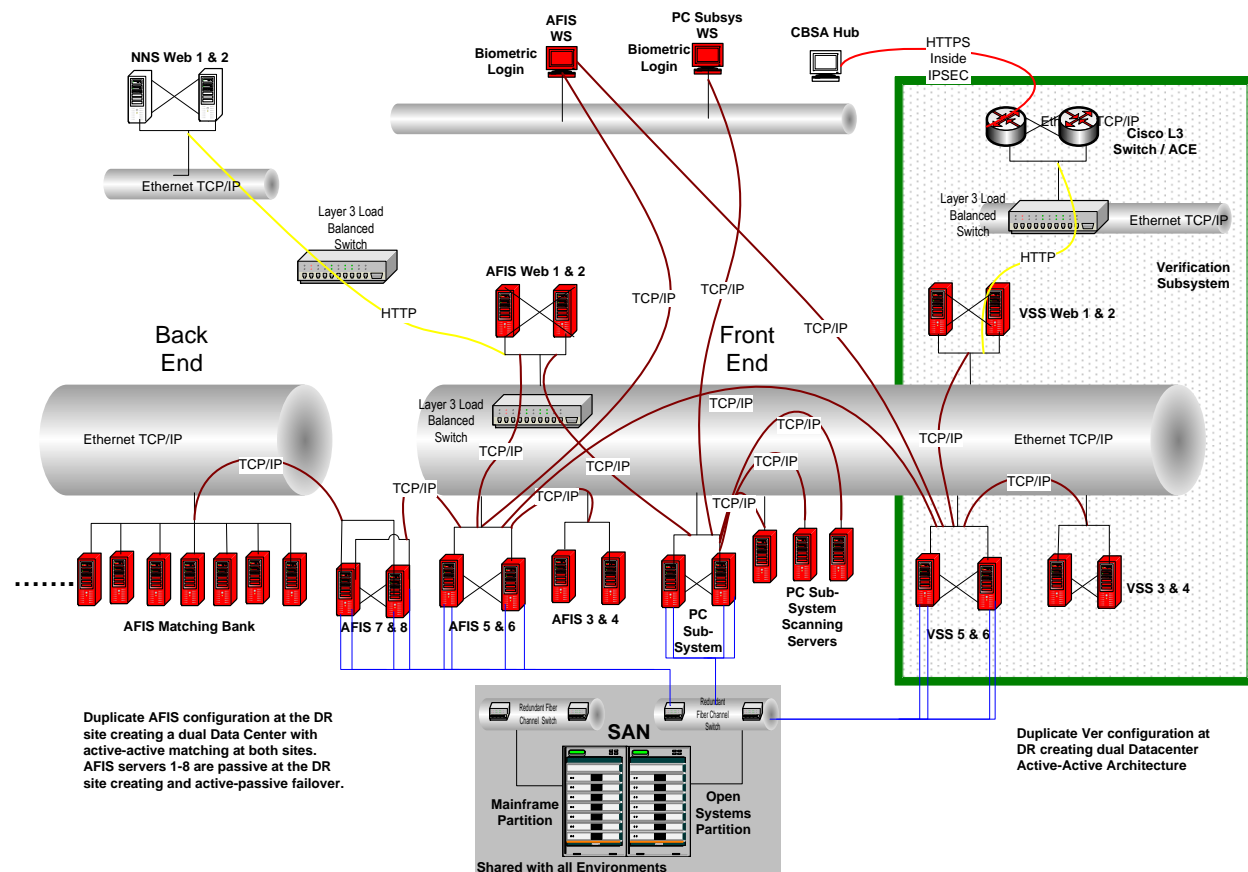


Figure 1: Current AFIS / VSS Detailed Architecture

2.1.1 NNS/AFIS INTERFACE

- The NNS/AFIS interface is an asynchronous HTTP interface which is load balanced in both directions. The Contractor's AFIS renewal solution must support this interface. This WSDL/SOAP HTTP interface is described in detail in the Web Service Transport Description document. The following describes the interaction between the NNS and AFIS that must be supported by the Contractor's AFIS renewal solution:
 - NIST packets are sent to an ACE load balanced address where the ACE provides HA capabilities for the AFIS Web servers;
 - The AFIS completes the required processing based on the NIST packet; and

- c. The AFIS sends a response NIST packet to an ACE load balanced address where the ACE provides HA capabilities for the NNS Web servers.

2.1.2 AFIS LOAD BALANCING TO FINGERPRINT SEARCH CAPABILITIES

1. The AFIS renewal solution must support load balancing to the AFIS fingerprint search capabilities. That is, the AFIS renewal solution must be architected in a manner that enables additional components to be added to increase the matching capacity. Load balancing to additional components is a common method to increase capacity without requiring replacement components. The Contractor must explain how the proposed AFIS renewal solution supports the ability to increase capacity horizontally.

2.1.3 AFIS INTERFACE TO VSS

1. The AFIS renewal solution must provide a guaranteed delivery capability that ensures transactions that must be sent to the VSS are delivered and processed. This guaranteed delivery capability must be a proven method currently operating at a least one large (over three (3) million prints on file) AFIS site that include both AFIS and VSS capabilities.
2. All TRB Immigration related transactions received by AFIS must include AFIS processing and guaranteed delivery to VSS. Refer to the AFIS ICD for the details concerning NIST packets that include Immigration related transactions.

2.1.4 AFIS WORKSTATION USER INTERFACE TO AFIS SERVERS

1. The AFIS workstations must fully support all UI capabilities required to support all requirements stated in this SOW and its accompanying documents.
2. The AFIS workstation must also support all VSS UI capabilities. These capabilities are described in VSS detailed requirements.

2.1.5 AFIS VIRTUAL LOCAL AREA NETWORK (VLAN)

1. The AFIS servers and workstations are secured in a separate VLAN. Communication into and out of this VLAN is limited to the minimum required for AFIS interaction. The AFIS renewal solution must satisfy all requirements in the SOW and its accompanying documents while operating in this environment. This minimum communication includes:
 - a. From the NNS Web servers to the load balanced Virtual IP address (VIP) for the AFIS Web servers;
 - b. From the AFIS Web servers to the load balanced VIP for the NNS Web servers;
 - c. To an FTP server where statistical reporting data is sent daily/weekly;
 - d. From WSUS updates;
 - e. From ePo updates;
 - f. From Spectrum Monitoring reading SNMP traps to monitor server and file system health
 - g. To and from AFIS workstations;
 - h. From the VSS ACE to the load balanced VIP for the VSS Web servers; and
 - i. From the VSS Web servers to the load balanced VIP for the VSS ACE

Note: The load balanced VIPs are also secured with only the designated communication being allowed. This AFIS VLAN includes the DR site servers.

2. All AFIS and VSS servers can communicate to each other within the VLAN. It is preferred that the AFIS renewal solution limits access to within the VLAN to only communications that are required. For example, a common security practice is to create non-routable segments which further secure a specific set of servers within a VLAN. The Contractor must explain how the proposed AFIS renewal solution supports security that limits access within the VLAN.
3. AFIS workstations must be limited to designated servers. This will limit the possible activities that can be performed from an AFIS workstation to only what is required by the AFIS user. The Contractor's AFIS renewal solution must explain how the proposed solution limits AFIS user access within the VLAN.
4. Any additional communication required by the Contractor's AFIS renewal solution that is required must be approved by the RCMP prior to proposal submission or the Contractor's proposal may be considered non-compliant.
5. The purpose of these security related requirements is to ensure the AFIS renewal solution is not exposed to unacceptable risk. For example, if the Contractor's proposed solution required communication to the Internet to access data required for normal operations, the solution would be unacceptable. Transcoders are part of the Entire AFIS renewal solution; however, Transcoders have no ability to directly access anything within the AFIS VLAN. Transcoders are submission devices to NNS.

2.2 AFIS RENEWAL WORKFLOW

1. This subsection presents a list that identifies an example workflow and sequence of activities that occur between NNS and AFIS to support a TP Criminal (CAR Y) submission that identifies to an existing set of prints. Since the AFIS renewal solution must support load balancing and NNS supports load balancing, the sequence of activities may not always be processed in the same order. The combination of the workflows, the AFIS ICD and the requirements stated in this SOW and its accompanying documents identify the sequence of processing that must be completed by the AFIS renewal solution.
2. Annex G includes at least one occurrence of all existing workflows that must be supported by the AFIS renewal solution. Annex G does not attempt to identify every combination and permutation that could affect the workflow. The AFIS ICD identifies every transaction that must be received and processed by the AFIS renewal solution as well as every transaction that must be created by the AFIS renewal solution while processing any workflow. The LCMC detailed requirements in Annex E identify the modified workflow that must be supported by the AFIS renewal solution. The sequences of activities in the modified workflow are expected to effectively satisfy the new requirements identified in this SOW and its accompanying document. However, if necessary and only for the modified portion of the workflows in support of the new requirements, the RCMP may allow adjustments to the workflow. It is at the sole discretion of the RCMP whether to allow any adjustment to the modified portion of the workflows required to support the new requirements.

3. There will be no changes allowed to the existing workflows, unless specifically stated in this SOW or its accompanying documents. The NNS is fully operational and already supports the workflows with a specific sequence of activities. The NNS will not be changed to adjust to the AFIS renewal solution unless specifically agreed to in writing by the RCMP.

2.2.1 CAR Y WORKFLOW

1. The following table shows the sequence of activities for an existing TP CAR Y submission. Following this table is an explanation of the activities and transactions included in the workflow related to understanding the workflow applicable to the AFIS renewal solution. The AFIS renewal solution must receive and correctly process each AFIS ICD NIST transaction sent to the AFIS renewal solution as well as respond back to NNS with the required AFIS ICD NIST transaction correctly populated with the data required by the NNS in the sequence required for each workflow.
2. Note: The generic term AFIS is used in the following workflow explanation since it is describing the existing workflow. The AFIS renewal solution must support all the processing and workflow indicated generically with the term AFIS.

Line #	Activity	Transaction	System/ Subsystem	Operator ID	Outcome
1.	Received	CARY	NNS		Passed
2.	High Level Validation	CARY	NNS		Passed
3.	ICD Validation	CARY	NNS		Passed
4.	Image Validation	CARY	NNS		Passed
5.	Business Exception Processing	CARY	NNS		No Exception
6.	Transformation	CARI	NNS		From: CAR To: CARI
7.	Query Immigration Subject Name Search	Name Search	NNS		No Candidates
8.	Created and Archived	LABI	NNS		
9.	Log DOC ID Event	LABI	CREMM,NNS		DOC_ID: #### Start tracking #####
10.	Query QCNI	Name	CPIC,NNS		Candidates

Line #	Activity	Transaction	System/ Subsystem	Operator ID	Outcome
		Search			
11.	Send to AFIS	TPRI	AFIS,NNS		
12.	Automated Ten Print QC	TPQCI	AFIS		
13.	Received	ACKI	NCNI/CREMMS		In Response to: LABI
14.	Ten Print QC Received	TPQCI	AFIS		Passed
15.	Created and Archived	ACKT	NNS		
16.	Sent	ACKT	NNS		
17.	Ten Print Search	TPREI	AFIS		1System declared hit(s) #####
18.	Automated Certification	TPREI	AFIS	AFIS System user: 99	Ident to: Criminal #####
19.	TP Enroll	TPREI	AFIS		
20.	Reverse Search	TPULI	AFIS,NNS		Result: Non- Ident
21.	Process AFIS Response	TPREI	AFIS,NNS		Ident
22.	Send M SC to CPIC	CRIFI Search	NNS		
23.	Information Fetch CPIC Information	CRIFI Search	CPIC		File Number Fetched: #####
24.	Information Fetch ADS Flags	CRIFI Search	NNS,ADS		File Number Fetched: #####
25.	Send to Subsystem (240)	FOLI	CREMM,NNS		
26.	Received	FOLRI	CREMM,NNS		
27.	Information Fetch Folio	CRIFI	CREMM,NNS		File Number

Line #	Activity	Transaction	System/ Subsystem	Operator ID	Outcome
	Docket	Search			Fetches: #####
28.	CRIFI Completed	CRIFI Search	NNS		
29.	Created and Archived	LABI	NNS		
30.	Log DOC ID Event	LABI	CREMM,NNS		DOC_ID: #### Stop tracking ##### Start tracking #####
31.	Reverse Search	TPULI	AFIS,NNS		Result: Non- Ident
32.	Received	ACKI	NCNI/CREMMS		In Response To: LABI
33.	Processed Business Rules	CARI	NNS		R#90000
34.	Generating/Populating Criminal Print Queue	CARI	NNS		C216 – Charges Overflow, C216 CARY
35.	Ready for Printing	CARI	NNS		
36.	Created and Archived	CARI	NNS		
37.	Populate CRS	CARI	CREMMS,NNS		
38.	Send to CJIM	CARI	CJIM,NNS		
39.	Created and Archived	SREI	NNS		
40.	Prepare SRE (172)	SREI	NNS		Release Rule Type: SRE
41.	Transformation	SRE	NNS		From SREI To: SRE

Line #	Activity	Transaction	System/ Subsystem	Operator ID	Outcome
42.	Created and Archived	SRE	NNS		
43.	Sent	SRE	NNS		Destination Agency: AB#####
44.	Received	ACKI	NCNI/CREMMS		In Response To: CARI
45.	TP-UL / Wait for Verify 1 st Certify	STI	AFIS		
46.	Reverse Search Verification - Fingers	TPULI	AFIS	AFIS User: 92	
47.	Criminal Forms Printed	CARI	NNS	NNS user: 1227	Product Type: C216 – CARY, C216 - Charges
48.	Completion of Service	CARI	NNS		

Table 1 : CARY Workflow

3. The above table shows all activities for a CARY submission to reflect the other non-AFIS activities that also occur throughout this process. These non-AFIS activities allow a better understanding of the overall processing, shows how the data that will be sent to the AFIS renewal solution is derived and how the data received from the AFIS renewal solution would be used. The following focusses on the activities that must be supported by the AFIS renewal solution in the above example CARY submission:
 - a. Line #11 shows NNS sending a TPRI NIST transaction to AFIS;
 - b. AFIS will process the TPRI which will include a quality check and a response to NNS concerning the quality check with the TPQCI NIST transaction;
 - c. Line #12 shows the TPQCI NIST transaction sent from AFIS to NNS;
 - d. NNS will process the TPQCI to determine if the fingerprints passed the quality check (Lines 14-16). If successful NNS will respond to the contributor with and ACKT NIST Transaction to acknowledge that the submission has been validated and can be processed;
 - e. Line #17 shows the TPREI NIST transaction sent from AFIS to NNS. Note that there must be continuous processing on AFIS from the TPRI sent earlier in the workflow;

- f. NNS will process the TPRED NIST transaction and create additional entries in the activity log, line #18 and 19, to show key information from the TPRED. Line #18 shows the AFIS operator was the AFIS system operator 99 reflecting a System Declared Hit and Line #19 shows AFIS enrolled the prints. As well, NNS shows an Ident in Line #21;
- g. Line #20 shows the TPULI Transaction sent from AFIS to NNS indicating that the reverse search for finger was submitted and awaiting processing. Again note that this must be continuous processing on AFIS from the TPRI sent earlier in the workflow. All CARY submissions automatically include a reverse search against the Unsolved Latent File (ULF) fingers. At this stage, an AFIS user must disposition the reverse search before any other AFIS communication will occur on this finger reverse search.
- h. Line #31 shows the TPULI Transaction sent from AFIS to NNS indicating that the reverse search for palm was submitted and awaiting processing. Again note that this must be continuous processing on AFIS from the TPRI sent earlier in the workflow. All CARY submissions automatically include a reverse search against the Unsolved Latent File (ULF) palms, if palms have been included in the search submission. At this stage, an AFIS user must disposition the reverse search before any other AFIS communication will occur on this palm reverse search.
- i. Line #45 shows the STI transaction from AFIS to NNS for the reverse search on fingers indicating some processing has been completed and therefore has a change in status;
- j. Line #46 shows the TPULI transaction sent from AFIS to NNS indicating that the reverse search on fingers has been dispositioned and includes the dispositioning data in the TPULI NIST packet;
- k. Line #48 shows completion of service; however, AFIS activity will still be received, processed and recorded in the NNS activity log. For example, the reverse search for palms could be processed at a later time.

3. GENERAL AFIS REQUIREMENTS

3.1 AFIS COTS COMPLIANCE

1. The AFIS renewal solution should be a Commercial Off-the-Shelf (COTS) software product to the greatest extent possible.
2. This COTS product must be customizable to modify, extend, expand and/or introduce new functionality to the COTS product to support the AFIS renewal solution.
3. This COTS product must be configurable to support changes or additions made to the base set of data values of the COTS product to reflect the requirements of the RCMP. These application configuration changes should not include modifying existing or adding new, programming code, or changing the application architecture or data structure.
4. The Contractor shall migrate RCMP-specific functionality as the AFIS COTS baseline evolves over the life of the contract. RCMP must have the ability to upgrade the COTS as upgrades become available.
5. The Contractor shall describe in detail its strategy for migrating RTID-specific functionality as the AFIS COTS baseline evolves over the life of the contract addressing the extent to which it will include custom features into its COTS product and to what extent that the Contractor's strategy will minimize disruption in terms of availability if RCMP chooses to implement an upgrade.
6. The AFIS renewal solution shall capture and store the following images:
 - a. Ten Print Card (Rolled & Plain);
 - b. Ten Print ID Flats;
 - c. Latent Fingerprints;
 - d. Palm Prints Rolled;
 - e. Latent Palm Prints;
 - f. Latent Object shots;
 - g. Photos; and
 - h. Any associated information required to support the above.
7. The AFIS renewal solution shall support the following searches:
 - a. Ten Print Card (Rolled & Plain) to Ten Print Card (Rolled & Plain);
 - b. Ten Print Plain to Ten Print Card (Rolled & Plain);
 - c. Ten Print ID Flat to Ten Print Card (Rolled & Plain);
 - d. Ten Print Card (Rolled & Plain) to Ten Print ID Flat;
 - e. Ten Print Card (Rolled & Plain) to Ten Print Plain;
 - f. Ten Print Card (Rolled & Plain) to Unsolved Latent File (ULF (Finger & Palm));

- g. Ten Print Plain to Unsolved Latent File (ULF (Finger & Palm));
- h. Ten Print ID Flat to Unsolved Latent File (ULF (Finger & Palm));
- i. Ten Print Palm to Unsolved Latent File (ULF (Finger & Palm));
- j. Latent (Finger or Palm) to Ten Print Card (Rolled, Plain & Palm);
- k. Latent (Finger or Palm) to Ten Print ID Flats;
- l. Latent (Finger or Palm) to Latent (Finger or Palm);

3.2 PAPERLESS ENVIRONMENT

1. The AFIS renewal solution is intended to be a paperless environment. There is paper processing required with Direct Filing and Direct Scanning which is described in this Annex. All other paper processing is intended to be on an exceptional basis only.
2. The AFIS renewal solution must support paper processing from an AFIS workstation to allow paper processing using either a scanner or a camera. The paper processing requirements that must be satisfied are identified throughout this Annex, this SOW and its accompanying documents.
3. Every AFIS workstation must be able to support paper processing with a scanner and/or camera.
4. The initial implementation of the AFIS renewal solution must include at least five (5) AFIS workstation configured with a scanner.
5. The initial implementation of the AFIS renewal solution must include at least five (5) AFIS workstation configured with a camera.

3.3 LOGGING OF TRANSACTION ACTIVITIES

1. The AFIS renewal solution shall, in an automated fashion, log all activity performed as a result of the receipt and processing of transactions received from the NNS as well as any activities initiated within the AFIS environment.
2. The purpose of this Transaction Log is to retain an administrative record of the complete processing history of a request for service, including each wait state, each activity, who performed the activity, and which actions were taken. The AFIS renewal solution RTID must ensure all events associated with AFIS data are recorded; and that it is verifiable that the recorded events resulted in whatever action was taken concerning an individual's prints or ULF prints. The AFIS renewal solution needs to record when, where and why, whatever happened and by whom, related to any request processed on the AFIS renewal solution.
3. For fingerprints that are processed, the AFIS renewal solution shall retain Transaction Log entries for a period of time, as indicated in the configurable parameters subsection 8.1, after the transaction has been serviced.
4. The AFIS renewal solution shall not allow modification of the information recorded in the Transaction Log, as it provides a true representation of activities that occurred at a specific point in time.

5. The AFIS renewal solution shall make the Transaction Log entries available on screen through a series of queries and/ or reports that will allow users to view and print some or all entries – based on the filters selected, the query specified and the user's security-level access profile.
6. The Transaction Log entries must be available for the authorized user to query as part of the operational data until the administrative archive period has been reached. Once the administrative archive period has been reached the data can be moved an audit log state, where only the audit log can access the Transaction Log data.
7. The AFIS renewal solution Transaction shall include, as a minimum, all the fields identified in the TP and latent reporting requirements as well as the activity/event type, associated status change caused by the activity/event (see list below #8), file numbers/subject ID/latent file number/latent image ID to which the Entry certified to and internal priority. If the activities/events have abbreviated forms, the AFIS renewal solution must allow the user to view the full list of all activities/events with a description of the abbreviated form.
8. For the purposes of logging, the following activity/event types are identified to show an example of the extent to which the AFIS renewal solution must be logging. This allows the earlier requirements, which indicate all activities must be logged (refer to #2 above), to be more clearly understood. Consequently, this list includes what must be included by AFIS renewal solution, but not be limited to, the following Activity Types:
 - a. Internal Activities:
 - i. Ten Print Certification;
 - ii. Latent Certification;
 - iii. AFIS One on One Match
 - iv. AFIS One to Many Search;
 - v. Ten Print Manual QC;
 - vi. Latent Editing;
 - vii. Ten Print Manual Verification;
 - viii. Latent Verification;
 - ix. Scanned (hardcopy or softcopy);
 - x. Text Conversion;
 - xi. QC of Scanned Document Image;
 - xii. QC of Scanned Fingerprint Image;
 - xiii. Automated Latent Encoding;
 - xiv. Raising of Error/Rejection;
 - xv. Ten Print Auto QC;
 - xvi. Ten Print Auto Verification;
 - xvii. FBI Latent Encoding;

- xviii. FBI Latent Verification;
 - xix. FBI Latent Certification;
 - xx. Reverse Search;
 - xxi. Reverse Search Verification;
 - xxii. Reverse Search Certification;
 - xxiii. Fetch TP;
 - xxiv. Fetch Latent;
 - xxv. Rescan;
 - xxvi. Latent to Latent Search;
 - xxvii. Latent to TP Search;
 - xxviii. Latent Manual Encoding;
 - xxix. TP Amend;
 - xxx. TP Purge;
 - xxxi. Print;
 - xxxii. Terminate / Cancel;
 - xxxiii. Reset; and
 - xxxiv. Change Search Parameters.
- b. Exception Processing.
 - c. Update Activities at the Subject Level, File Level, Fingerprint Set Level, Field Level: amend, creation, purge (including image adjustments); and
 - d. Update Activities for Work In Progress (WIP) at the Fingerprint Set Level, Field Level: amend, purge, status changes (including image adjustments and priority changes).

3.4 WORKFLOW MANAGEMENT AND RELATED SERVICES

3.4.1 WORK IN PROGRESS

1. The concept of Work In Progress (WIP) is applied throughout the requirements. When a fingerprint transaction arrives, the transaction logically becomes Work In Progress until such time as the Fingerprint Identification process is complete, the Subject has certified to one or more Subject Files, or it has been determined that no match has been found and that a new Subject needs to be created. The AFIS WIP is not intended to be a physical partitioning of the database. The AFIS WIP is a transaction state.

2. The AFIS renewal solution should minimize the possibility of a miss due to transactions in WIP or queued for processing. The Contractor shall describe in detail its mechanisms for preventing misses as a result of two submissions (eg. two ten print submissions or a ten print and a latent submission) for the same subject being processed within a short time of one another (e.g., a civil submission arrives shortly after a criminal submission). The Contractor shall describe how its solution manages Work In Progress. At a minimum all WIP states must be searched to ensure no misses occur and duplicate DCNs are identified.
3. The AFIS renewal solution shall enable a user to save partial work.
4. The AFIS renewal solution shall provide a user interface feature that ensures that a user is aware of partial work set aside for later.
5. When work has been set aside for later, the AFIS renewal solution shall enable the user to process other work and come back to the work set aside.
6. For example, a latent technician may wish to save a partial encoding, go on lunch break, retrieve the work, proceed to finish the encoding after lunch and submit the latent for search. The latent technician may set aside work on a routine search to complete an urgent search request.

3.4.2 WORKFLOW RULES

1. The AFIS renewal solution should be flexible enough to support different workflow instructions provided to the AFIS in the internal transactions. The NNS will set these parameters differently depending on the information received with the transaction (e.g., FPS Number) and the Type of External Transaction: Criminal with Add (CAR Ret=Y), Criminal Record Inquiry (CAR Ret=N), Immigration (IMM Ret=Y), Civil with Add (RCMP Employee), Civil without Add, Latent (Finger or Palm) Search. The internal parameters might indicate, for example, that a One to Many Search is to be performed, that a Certification is to be performed where a hit is found, that a Reverse Search is to be performed against fingers and palms, that a reverse search is to be performed against fingers only and so on. Refer to the AFIS ICD for a detailed description of transactions between the AFIS renewal solution and NNS.

3.4.3 PRIORITY OF WORK

1. The AFIS renewal solution shall use the priority setting specified in the internal transaction (AFIS ICD), to set the priority of the transaction.
2. The priority setting of 1 will be used to place emergency transactions to the top of the queue. A priority setting of 2 or 3 is for urgent transactions. A priority setting of 4 or greater is for Routine transactions.
3. Priority 1 is reserved for RCMP internal use only. Priority 1 transactions are deemed to be critical.
4. Priority 1 Turnaround Times shall be less than any other Turnaround Time available within any other given priority for that particular transaction type such that these transactions are placed at the top of the search queue.
5. The AFIS renewal solution shall enable authorized users to change the priority of any transaction within the AFIS environment.

6. The Turnaround Times required for each priority are defined for each transaction type under subsection 3.6.

3.4.4 ORDER OF PROCESSING

1. The AFIS renewal solution shall perform an automatic re-sequencing of work to ensure that all work meets its service delivery objective.
2. The Work Queues shall display the criteria used in making order of processing and routing decisions which shall include, as a minimum: Internal Priority, External TCN, DCN (for ten print) / Latent ID (for latent), Arrival Date & Time, External Transaction Type and Retention Code, Status, Role, Originating Agency ID.

3.4.5 OPERATIONAL CONTROL AND WORKLOAD MONITORING

1. The AFIS renewal solution shall provide underlying workflow management capabilities that will:
 - a. Automatically route work to the appropriate process;
 - b. Forward notifications;
 - c. Make work available to enabled users in the appropriate Role, User Profile, Service and State of Readiness;
 - d. Control the loading of the operations by monitoring and control of WIP and backlog for each external transaction type;
 - e. Track the Status of transactions;
 - f. Enable users in the authorized role to view summary statistics;
 - g. Enable users to use filters to view specific types of transaction in the work queue to monitor activities. The filters, which must include as minimum Internal Priority, External TCN, DCN (for ten print) / Latent ID (for latent), Arrival Date & Time, External Transaction Type and Retention Code, Status, Role, Originating Agency ID; must allow user to filter appropriately for their role. For example, a supervisor must be able to view filter so they see only transactions forwarded to them for review; and
 - h. Identify overdue transactions and enable users in the authorized role to view same (i.e. a transaction that is not being serviced within the turnaround time requirements described in subsection 3.6).
2. The AFIS renewal solution shall support the operational control and monitoring of workloads. The following types of capabilities must be provided within the AFIS renewal solution to further enhance control and monitoring of workloads:
 - a. Presentation of summary statistics overall and by queue (total number of transactions in queue, earliest date/time received, latest date/time received, number overdue and for each External Transaction Type: total number of transactions in queue, earliest date/time received, latest date/time received, total number overdue, total number at each priority).
 - b. Provision of monitoring work queues, view the contents of a transaction selected from the work queue list, view summary statistics.

- c. Enable printing of the above statistics.

3.4.6 WORK QUEUE FEATURES

1. For the purpose of these requirements, a Work Queue is defined as a user interface feature enabling a user to view all work in process and enabling them to initiate work on a specific item. Except where explicitly stated, these requirements apply to both Ten Print and latent.
2. The AFIS renewal solution shall enable a user to display all contents of a selected transaction, including all data in all record types, from a single user action on the work queue user interface.
3. The Work Queue capability shall enable a user to loop forward and backward through the list of outstanding transactions.
4. The work queue shall function without having to return to the Work Queue to select the next transaction to be worked on. There must be a next button to present the next transaction or if the current transaction has been completed, the next transaction must be presented automatically. The AFIS renewal solution must also allow a user to process through a filtered range. If a filter range of transactions has been selected, then the queue must function in the same manner with the filtered transaction. That is, the next button can be used to present the next transaction in the filtered list or if the current transaction has been completed, the next transaction in the filtered list must be presented automatically.
5. The Ten Print user interface and Latent user interface shall provide a Work Queue that can be filter as stated in this Annex and limit what is viewable in the work queue according to the RBAC.
6. As a minimum, the work queues shall display:
 - a. External Transaction Type and Retention Code;
 - b. Date of Arrival;
 - c. DCN (Ten print);
 - d. Latent ID, (Latent);
 - e. Agency ORI;
 - f. Status;
 - g. Internal Priority;
 - h. Reason work is on the queue (i.e., work related note);
 - i. Role Assigned to;
 - j. User ID (of user working on an item);
 - k. Transaction Attribute Codes (i.e., N – Note Attached, R - Requires Supervisor review); and
 - l. Total transactions in the queue and in the queue hierarchy. For example, total TP transactions and total transaction is a particular state:
Central Tenprint Region

- TP Transaction (500)
 - Manual QC (20)
 - Immigration Region (100)
 - Certification (10)
- 7. The AFIS renewal solution shall automatically remove Work from the Work Queues and Work In Progress (WIP) when the services requested in the internal transaction are fully delivered.
- 8. The AFIS renewal solution shall only allow users in the authorized role to delete transactions from a Work Queue and Work in Progress.
- 9. The AFIS renewal solution shall enable a user in the authorized role to change the Priority of a transaction on the work queue.
- 10. The AFIS renewal solution shall enable a user to release work back to a general pool of work or to assign a specific item of work to a supervisory role and specify the reason in a work-related note (both Latent and Ten Print).
- 11. The AFIS renewal solution shall enable a user to add a 5000 character work-related note to a transaction in WIP.
- 12. The AFIS renewal solution shall provide the following functionality pertaining to work related notes:
 - a. Retain the note and automatically record the user ID that created the note, date and time created along with the note.
 - b. Enable a user to view the notes along with user name, date and time created from the main work queue, and during the following states of processing; Verification, Certification, Manual Cut, Quality Check and Sequence Check, Latent Lasso, Latent Edit, Latent Verification, Latent Certification1, Latent Certification 2, Latent Certification 3, Latent Insert, Latent Search and UL Search.
 - c. Enable an authorized user to discard / purge a note create by the same authorized user. That is, a note created by one user cannot be deleted by a different user.
 - d. Support word wrap and carriage return within a note.
 - e. Enable a transaction to have at least 5 notes attached to it.
 - f. Support these functions from the work queue, from the TP verification, TP certification, TP manual cut, TP quality check, TP sequence check, Latent Lasso, Latent Edit, Latent Verification, Latent Certification 1, Latent Certification 2, Latent Certification 3, Latent Insert, Latent Search and UL Search user interfaces.
- 13. When a transaction is assigned to a supervisory role on the Work Queue, the AFIS renewal solution shall display a reason on the Work Queue.
- 14. In some cases, the reason why an item is identified as an exception for the supervisor will be generated by the AFIS renewal solution. In other cases, the user forwarding the external transaction will enter the reason.

15. The AFIS renewal solution shall permit an authorized user to filter the work queue to locate work in progress based on one or a combination of the following parameters, as a minimum, and to search with wildcard characters or character sub-strings:
 - a. Transaction number;
 - b. Transaction status;
 - c. Transaction creation date;
 - d. Transaction attribute;
 - e. DCN or Doc ID (TP only);
 - f. File number;
 - g. Latent File Number (Latents only);
 - h. Latent Identifier (Latents only);
 - i. Latent Image Identifier (Latents only);
 - j. Internal TCN
 - k. External TCN;
 - l. Agency ORI;
 - m. User ID;
 - n. Submission number; and
 - o. Internal priority;
16. The AFIS renewal solution response to a find query shall indicate which service/function (e.g., Ten Print QC, Ten Print Verification, Ten Print Certification, Latent Encoding) has the transaction on their queue, the status of the transaction, the date received of the transaction, the name of the individual that is presently servicing the transaction.
17. The AFIS renewal solution shall automatically make work available to the appropriate role.
18. The AFIS renewal solution shall have a trainee role, whereby the work performed by a trainee is logged and the work is re-assigned to a supervisory role upon the trainee's completion of the work. For Ten Print Training transactions the AFIS renewal solution shall not advance the transaction to the next process (where ten print processes are defined as Manual QC, Verification, and Certification) upon completion of the trainee's work without the supervisor performing the work themselves. For Latent training transactions the AFIS renewal solution shall not advance the transaction beyond the Verification process upon completion of the trainee's work without the supervisor performing the work themselves. The AFIS renewal solution shall enable the supervisor to review the work of the trainee and perform the work themselves to advance the transaction to next process.
19. The AFIS renewal solution shall provide the capability for a user to view the complete contents of a transaction, including all data in all record types, in work in progress within the AFIS renewal solution.

20. The AFIS renewal solution shall provide a view that lists the status history of a transaction that can be selected from the work queue or search function.
21. The AFIS renewal solution should provide the ability for a supervisor to view the complete history of a transaction:
 - a. The date of arrival;
 - b. All users who worked on the transaction;
 - c. Each activity performed by a specific user;
 - d. The role of the user while performing an activity;
 - e. The start and end time related to each activity that was performed;
 - f. The total actual time spent working on the transaction within a particular activity;
 - g. The status changes and priority changes of the transaction and their associated dates and time; and
 - h. The wait time in queue.
22. By default, the AFIS renewal solution shall sort the work queue by Internal Priority and Date of Arrival.
23. The work queue should be designed so that a large number of transactions in the queue can be processed in a timely manner.
24. An authorized user, such as a program analyst who has a broad set of responsibilities, should be able to view all transactions in all regions/queues at the same time.
25. As a minimum, all transactions from the TP region and TRB/IMM region must be viewable and usable for all transaction processing as stated in this SOW and its accompanying documents.

3.5 OPERATIONAL REPORTING & STATISTICS

1. The AFIS renewal solution shall enable authorized users to use reporting capabilities that must provide the ability to filter any query on all fields that are available for reporting; and be able to print the report or export the resulting report to at least PDF, CSV and XML file types. The AFIS renewal solution shall have a predefined format for these reports.
2. Any fields listed in the search criteria for any report listed herein must have a drop down pick list for any fields that have values that are available for a pick list (e.g. list of TOTs, list of ORIs, activity/event type).
3. All reports listed herein must have final row at the bottom of the report showing totals for any columns in the reports, unless totals are not applicable (e.g. a total for ORI is not applicable).
4. The AFIS renewal solution shall provide at least the following predefined reports, including but not limited to the data/fields identified herein for each report (the Contractor will determine any additional data/fields details that should be included in collaboration with RCMP after contract award):

a. Hourly Statistics Reporting

- i. Hourly Number Of Transactions Report - For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI and TOT. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by hour, agency ORI, TOT, number of transactions for each of received, processed, overdue, rejected and exceptions;
- ii. Processing Time For Hourly Transactions Reporting – For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by hour, agency ORI, TOT, average processing time, minimum processing time, maximum processing time, average exception time and total exception time.
- iii. Hourly Search Statistics Reporting – For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by hour, agency ORI, TOT, with totals for 1:1 searches, 1:N searches, TP-latent, Latent-TP, latent-latent, TP palm-TP palm, TP palm-latent palm, latent palm-TP palm and latent palm-latent palm.
- iv. Hourly Hit Statistics Reporting - For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by hour, agency ORI, TOT, with totals for the following searches and totals for identifications for each type of search: 1:1 searches, 1:N searches, TP-latent, Latent-TP, latent-latent, TP palm-TP palm, TP palm-latent palm, latent palm-TP palm and latent palm-latent palm.

b. Daily Statistics Reporting

- i. **Daily Number Of Transactions Report** - For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by day, agency ORI, TOT, number of transactions for each of received, processed, overdue, rejected and exceptions;
 - ii. **Processing Time For Daily Transactions Reporting** – For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by day, agency ORI, TOT, average processing time, minimum processing time, maximum processing time, average exception time and total exception time.
 - iii. **Daily Search Statistics Reporting** – For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by day, agency ORI, TOT, with totals for 1:1 searches, 1:N searches, TP-latent, Latent-TP, latent-latent, TP palm-TP palm, TP palm-latent palm, latent palm-TP palm and latent palm-latent palm.
 - iv. **Daily Hit Statistics Reporting** - For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by day, agency ORI, TOT, with totals for the following searches and totals for identifications for each type of search: 1:1 searches, 1:N searches, TP-latent, Latent-TP, latent-latent, TP palm-TP palm, TP palm-latent palm, latent palm-TP palm and latent palm-latent palm.
- c. **Monthly Statistics Reporting**

- i. Monthly Number Of Transactions Report - For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by month, agency ORI, TOT, number of transactions for each of received, processed, overdue, rejected and exceptions;
 - ii. Processing Time For Monthly Transactions Reporting – For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by month, agency ORI, TOT, average processing time, minimum processing time, maximum processing time, average exception time and total exception time.
 - iii. Monthly Search Statistics Reporting – For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by month, agency ORI, TOT, with totals for 1:1 searches, 1:N searches, TP-latent, Latent-TP, latent-latent, TP palm-TP palm, TP palm-latent palm, latent palm-TP palm and latent palm-latent palm.
 - iv. Monthly Hit Statistics Reporting - For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by month, agency ORI, TOT, with totals for the following searches and totals for identifications for each type of search: 1:1 searches, 1:N searches, TP-latent, Latent-TP, latent-latent, TP palm-TP palm, TP palm-latent palm, latent palm-TP palm and latent palm-latent palm.
- d. Yearly Statistics Reporting

- i. Yearly Number Of Transactions Report - For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by year, agency ORI, TOT, number of transactions for each of received, processed, overdue, rejected and exceptions;
- ii. Processing Time For Yearly Transactions Reporting – For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by year, agency ORI, TOT, average processing time, minimum processing time, maximum processing time, average exception time and total exception time.
- iii. Yearly Search Statistics Reporting – For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by year, agency ORI, TOT, with totals for 1:1 searches, 1:N searches, TP-latent, Latent-TP, latent-latent, TP palm-TP palm, TP palm-latent palm, latent palm-TP palm and latent palm-latent palm.
- iv. Yearly Hit Statistics Reporting - For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: agency ORI(s) and TOT(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT or date. The fields to be included in the report must be at least the following: date organized by year, agency ORI, TOT, with totals for the following searches and totals for identifications for each type of search: 1:1 searches, 1:N searches, TP-latent, Latent-TP, latent-latent, TP palm-TP palm, TP palm-latent palm, latent palm-TP palm and latent palm-latent palm.
- e. Repository Reports

- i. TP Repository Report - For a past period based on specified start date/time and end date/time for all TP fingerprint data within the date/time range, select transactions using at least the following search criteria: agency ORI and TOT. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, or TOT. The fields to be included in the report must be at least the following: repository number, repository name, TOT, file number prefix, number of unique subject IDs, number of unique file numbers, number of cards, number of composites; and total number of cards and composites.
 - ii. Palm Repository Report - For a past period based on specified start date/time and end date/time for all TP palm data within the date/time range, select transactions using at least the following search criteria: agency ORI and TOT. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, or TOT. The fields to be included in the report must be at least the following: agency ORI, TOT and total number of palms.
 - iii. Latent Repository Report - For a past period based on specified start date/time and end date/time for all latent finger data within the date/time range, select transactions using at least the following search criteria: agency ORI and TOT. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, or TOT. The fields to be included in the report must be at least the following: agency ORI, TOT and total number of latent fingers.
 - iv. Latent Palm Repository Report - For a past period based on specified start date/time and end date/time for all latent palm data within the date/time range, select transactions using at least the following search criteria: agency ORI and TOT. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, or TOT. The fields to be included in the report must be at least the following: agency ORI, TOT and total number of latent palms.
- f. TP Transaction Logging
- i. Transaction Summary statistics - For a past period based on specified start date/time and end date/time for all TP and latent transactions within the date/time range, select transactions using at least the following search criteria: agency ORI and TOT(s). The fields to be included in the report must be at least the following: agency ORI, TOT and total number of transactions per TOT.

- ii. Transaction Log statistics - For a past period based on specified start date/time and end date/time for all TP and latent transactions within the date/time range, select transactions using at least the following search criteria: agency ORI, TOT, transaction number, DCN, transaction status, workstation and/or user. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, DCN, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, DCN, transaction priority, transaction start time, transaction end time, transaction duration and user for each transaction.
 - iii. TP Transaction Log Detailed statistics - For a past period based on specified start date/time and end date/time for all TP transactions within the date/time range, select transactions using at least the following search criteria: agency ORI, TOT, transaction number, TCN, external TCN, DCN, file number, transaction status and/or document ID. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, TCN, external TCN, DCN, file number or document ID. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, priority, TCN, external TCN, DCN, file number, document ID, subject ID, transaction start time, transaction end time and transaction duration for each transaction.
 - iv. Latent Transaction Log Detailed statistics - For a past period based on specified start date/time and end date/time for all latent transactions within the date/time range, select transactions using at least the following search criteria: agency ORI, TOT, transaction number, external TCN, transaction status, latent file number, latent ID and/or latent image ID. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, latent file number, latent ID and/or latent image ID. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, priority, external TCN, latent file number, latent ID, latent image ID, transaction start time, transaction end time and transaction duration for each transaction.
- g. TP Transaction Event Logging
- i. TP Activity/Event Transaction statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT, transaction number, TCN, DCN, file number, activity/event, workstation and/or user. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, TCN, DCN, file number, activity/event, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, DCN, file number, activity/event, activity/event start time, activity/event end time and activity/event duration for each activity/event workstation and user for each activity/event.

- ii. Latent Activity/Event Transaction statistics - For a past period based on specified start date/time and end date/time, select latent transactions using at least the following search criteria: agency ORI, TOT, transaction number, latent file number, latent ID, latent image ID, activity/event, workstation and/or user. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, latent file number, latent ID, latent image ID, activity/event, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, latent file number, latent ID, latent image ID, activity/event, activity/event start time, activity/event end time and activity/event duration for each activity/event workstation and user for each activity/event.
- h. User Activity/Event Logging
 - i. User Activity/Event Summary statistics - For a past period based on specified start date/time and end date/time for all TP and latent transaction within the date/time range, select transactions using at least the following search criteria: user and activity/event. The fields to be included in the report must be at least the following: user, activity/event, total number of transactions processed and average time to process.
 - ii. User Activity/Event TP Detail statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, DCN, file number, activity(ies)/events, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, DCN, file number, activity/event, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, DCN, file number, activity/event, workstation, activity/event start time, activity/event end time and activity/event duration for each activity/event.
 - iii. User Activity/Event Latent Detail statistics - For a past period based on specified start date/time and end date/time, select latent transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, latent file number, latent ID, latent image ID, activity(ies)/events, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, latent file number, latent ID, latent image ID, activity/event, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, latent file number, latent ID, latent image ID, activity/event, workstation, activity/event start time, activity/event end time and activity/event duration for each activity/event.
- i. Verification Logging

- i. TP Auto Verification statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, DCN, file number, disposition, and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, DCN, file number or user. The fields to be included in the report must be at least the following: agency ORI, TOT, user, transaction number, TCN, DCN, file number, verification start time, verification end time, candidate TP card, candidate file number, score and disposition for each transaction.
- ii. TP Manual Verification statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, DCN, file number, disposition, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, DCN, file number, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, user, transaction number, TCN, DCN, file number, verification start time, verification end time, candidate TP card, candidate file number, score and disposition for each transaction.
- iii. TP Reverse Search Verification statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, DCN, file number, disposition, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, DCN, file number, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, user, transaction number, TCN, DCN, file number, verification start time, verification end time, candidate TP card, candidate file number, score and disposition for each transaction.
- iv. Latent To TP Verification statistics - For a past period based on specified start date/time and end date/time, select latent transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, latent file number, latent ID, latent image ID, disposition, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, latent file number, latent ID, latent image ID, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, user, transaction number, TCN, latent file number, latent ID, latent image ID, verification start time, verification end time, candidate TP card, candidate file number, score and disposition for each transaction.

- v. Latent To Latent Verification statistics - For a past period based on specified start date/time and end date/time, select latent transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, latent file number, latent ID, latent image ID, disposition, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, latent file number, latent ID, latent image ID, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, user, transaction number, TCN, latent file number, latent ID, latent image ID, verification start time, verification end time, candidate latent card, candidate latent image ID, score and disposition for each transaction.
- j. Certification Logging
 - i. TP To TP Certification statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT, transaction number, external TCN, external TOT, DCN, file number, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, external TOT, DCN, file number, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, external TOT, workstation, user, transaction number, retention flag, TCN, DCN, file number, certification start time and certification end time for each transaction.
 - ii. TP To Latent Certification statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, external TOT, DCN, file number, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, external TOT, DCN, file number, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, external TOT, workstation, user, transaction number, activity/event, TCN, DCN, file number, certification start time and certification end time for each transaction.

- iii. Latent To TP Certification statistics - For a past period based on specified start date/time and end date/time, select latent transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, latent file number, latent ID, latent image ID, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, latent file number, latent ID, latent image ID, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, external TOT, workstation, user, transaction number, activity/event, latent file number, latent ID, latent image ID, file number, certification start time and certification end time for each transaction.
- iv. Latent To Latent Certification statistics - For a past period based on specified start date/time and end date/time, select latent transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, latent file number, latent ID, latent image ID, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, latent file number, latent ID, latent image ID, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, external TOT, workstation, user, transaction number, activity/event, latent file number, latent ID, latent image ID, candidate latent card, candidate latent image ID, score, certification start time and certification end time for each transaction.
- v. TP To TP Certified To statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: transaction number, external TCN, DCN of the search prints, file number, submission number of search prints, subject ID, TCN of the file prints, DCN of the file prints, file number of the file prints and/or submission number of the file prints. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: transaction number, TCN, DCN of the search prints, file number or submission number of search prints. The fields to be included in the report must be at least the following: transaction number, TCN, DCN of the search prints, file number of the search prints (if available), submission number of search prints, certification date/time, candidate card ID, TCN of the candidate, DCN of the candidate, file number of the candidate and submission number of the candidate for each transaction.

- vi. Latent To TP Certified To statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: transaction number, external TCN, latent file number, latent ID, latent image ID, submission number of search print, subject ID, TCN of the file prints, DCN of the file prints, file number of the file prints and/or submission number of the file prints. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: transaction number, external TCN, latent file number, latent ID, latent image ID or submission number of search print. The fields to be included in the report must be at least the following: transaction number, TCN, latent file number, latent ID, latent image ID, submission number of search prints, certification date/time, candidate card ID, TCN of the candidate, DCN of the candidate, file number of the candidate and submission number of the candidate for each transaction.
- vii. Auto Certification statistics - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, external TOT, DCN, file number, retention code, workstation and/or user(s). As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, external TOT, DCN, file number, workstation or user. The fields to be included in the report must be at least the following: agency ORI, TOT, external TOT, workstation, user, transaction number, retention flag, TCN, DCN, file number, certification start time and certification end time for each transaction.
- k. Discrepancy logs.
 - i. TP To TP Discrepancies - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, external TOT, DCN of the search prints, file number, submission number and/or DCN of the file prints. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, DCN, file number or submission number. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, DCN, file number, submission number, candidate ID, candidate file number, candidate score, auto confirm flag, verifier user, verification status, certifier user and certification status for each transaction.

- ii. TP To Latent Discrepancies - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, external TOT, DCN of the search prints, file number, submission number and/or latent candidate ID of the file print. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, DCN, file number or submission number. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, DCN, file number, submission number, latent candidate ID, latent image ID, candidate score, auto confirm flag, verifier user, verification status, certifier user, certification status and second certifier user for each transaction.
 - iii. Latent To TP Discrepancies - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, latent file number, latent ID, latent image ID, submission number and/or latent candidate ID of the file print. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, latent file number, latent ID, latent image ID or submission number. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, latent file number, latent ID, latent image ID, submission number of search prints, candidate card ID, candidate file number, candidate score, verifier user, verification status, certifier user, certification status, second certifier user and second certification status for each transaction.
 - iv. Latent To Latent Discrepancies - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, latent file number, latent ID, latent image ID, submission number and/or latent candidate ID of the file print. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, latent file number, latent ID, latent image ID or submission number. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, latent file number, latent ID, latent image ID, submission number of search prints, latent candidate card ID, latent image ID, candidate score, verifier user, verification status, certifier user, certification status, second certifier user and second certification status for each transaction.
- I. Log of declines.

- i. TP To TP Declines - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT, transaction number, external TCN, external TOT, DCN of the search prints, file number, number and/or DCN of the file prints. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, DCN or file number. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, DCN, file number, external TCN, candidate ID, candidate file number, candidate score, auto confirm flag, verifier user, verification status, certifier user and certification status for each transaction.
- ii. TP To Latent Declines - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, external TOT, DCN of the search prints, file number, submission number and/or latent candidate ID of the file print. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, DCN, file number or submission number. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, DCN, file number, external TCN, latent candidate ID, latent image ID, candidate score, auto confirm flag, verifier user, verification status, certifier user, certification status and second certifier user for each transaction.
- iii. Latent To TP Declines - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, latent file number, latent ID, latent image ID, submission number and/or latent candidate ID of the file print. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, latent file number, latent ID, latent image ID or submission number. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, DCN of search prints, latent file number, latent ID, latent image ID, external TCN, candidate card ID, candidate file number, candidate score, verifier user, verification status, certifier user and certification status for each transaction.

- iv. Latent To Latent Declines - For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), transaction number, external TCN, latent file number, latent ID, latent image ID, submission number and/or latent candidate ID of the file print. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, external TCN, latent file number, latent ID, latent image ID or submission number. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, TCN, DCN of search prints, latent file number, latent ID, latent image ID, external TCN of search prints, latent candidate card ID, latent image ID, candidate score, verifier user, verification status, certifier user, certification status, second certifier user and second certification status for each transaction.
- m. Database activity log.
 - i. Database Summary Statistics - For a past period based on specified start date/time and end date/time for all amendments and deletions to the database within the date/time range, select transactions using at least the following search criteria: agency ORI, TOT and file number. The fields to be included in the report must be at least the following: agency ORI, TOT, file number, amendment/deletion action and total number of whatever action was taken.
 - ii. Database Amendments Statistics - For a past period based on specified start date/time and end date/time for all amendments to the database within the date/time range, select transactions using at least the following search criteria: agency ORI, TOT, file number, transaction number and/or user. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, file number, transaction number or user. The fields to be included in the report must be at least the following: agency ORI, TOT, file number, transaction number, date/time and user for each amendment.
 - iii. Database Deletion Statistics - For a past period based on specified start date/time and end date/time for all deletions to the database within the date/time range, select transactions using at least the following search criteria: agency ORI, TOT, file number, transaction number, user. TP rolled, ID flat, palm print, latent finger and/or latent palm. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, file number, transaction number or user. The fields to be included in the report must be at least the following: agency ORI, TOT, file number, transaction number, TP rolled, ID flat, palm print, latent finger, latent palm date/time and user for each deletion.
- n. AFIS Error Log Statistics

- i. AFIS Error Log Summary Statistics - For a past period based on specified start date/time and end date/time for all significant errors within the date/time range, select transactions using at least the following search criteria: server name, process name and/or process function. The fields to be included in the report must be at least the following: server name, process name, process function and total number of whatever error occurred.
 - ii. AFIS Error Log Detailed Statistics - For a past period based on specified start date/time and end date/time for all significant errors within the date/time range, select transactions using at least the following search criteria: server name, process name and/or process function. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: server name, process name, process function or time. The fields to be included in the report must be at least the following: server name, process name, process function, data/time and error message.
- o. Audit Log Statistics
 - i. Summary Audit Log Statistics - For a past period based on specified start date/time and end date/time for all logins within the date/time range, select transactions using at least the following search criteria: user and/or workstation. The fields to be included in the report must be at least the following: user, workstation, total number of logins.
 - ii. Detailed Audit Log Statistics - For a past period based on specified start date/time and end date/time for all logins within the date/time range, select transactions using at least the following search criteria: user and/or workstation. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: user, workstation or time. The fields to be included in the report must be at least the following: user, workstation, login time and logout time.
 - iii. Unsuccessful Login Statistics - For a past period based on specified start date/time and end date/time for all unsuccessful logins within the date/time range, select transactions using at least the following search criteria: user and/or workstation. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: user, workstation or time. The fields to be included in the report must be at least the following: user, workstation, login time and login error.
 - iv. Administrative Audit Log Statistics - For a past period based on specified start date/time and end date/time for login activity within the date/time range, select transactions using at least the following search criteria: user, workstation, user management activity and/or user account affected. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: user, workstation, user management activity, user account affected or time. The fields to be included in the report must be at least the following: user, workstation, time of activity, type of activity (e.g. add a user, change user privileges) and user account affected.

- v. Current User Logged In Statistics - For a past period based on specified start date/time and end date/time for all users currently logged in within the date/time range, select transactions using at least the following search criteria: user and/or workstation. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: user or workstation. The fields to be included in the report must be at least the following: user, workstation, session number and login time.
- p. Repository Reporting
 - i. TP Repository Statistics - For a past period based on specified start date/time and end date/time, select TP repository data using at least the following search criteria: agency ORI and/or external TOT. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI and external TOT. The fields to be included in the report must be at least the following: repository, repository name, agency ORI, external TOT, file number prefix, unique subjects, unique file numbers, number of cards, number of composites and total number of cards plus composites.
 - ii. Palm Print Repository Statistics - For a past period based on specified start date/time and end date/time, select TP palm data using at least the following search criteria: agency ORI and/or external TOT. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI and external TOT. The fields to be included in the report must be at least the following: agency ORI, external TOT and total number of palms.
 - iii. Latent Repository Statistics - For a past period based on specified start date/time and end date/time, select latent data using at least the following search criteria: agency ORI and/or external TOT. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI and external TOT. The fields to be included in the report must be at least the following: agency ORI, external TOT and total number of latents.
 - iv. Palm Latent Repository Statistics - For a past period based on specified start date/time and end date/time, select latent palm data using at least the following search criteria: agency ORI and/or external TOT. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI and external TOT. The fields to be included in the report must be at least the following: agency ORI, external TOT and total number of latent palms.
- q. Print Quality Logging.

- i. TP Quality statistics - For a past period based on specified start date/time and end date/time, select TP data using at least the following search criteria: agency ORI, TOT, transaction number, type of print, finger/palm id, print quality and/or minutia count. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, transaction number, type of print, finger/palm id, print quality or minutia count. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, type of print, finger/palm id, print quality and minutia count.
- ii. Latent Quality statistics - For a past period based on specified start date/time and end date/time, select latent data using at least the following search criteria: transaction number, type of print, finger/palm id, print quality and/or minutia count. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: transaction number, type of print, finger/palm id, print quality or minutia count. The fields to be included in the report must be at least the following: transaction number, type of print, finger/palm id, print quality and minutia count.
- r. "Miss" Consolidation Logging - The AFIS renewal solution shall generate a report identifying the miss that was reconciled and all steps that preceded the miss reconciliation that may have led to the generation of multiple subjects for the same individual once the reconciliation has taken place (after being authorized by a certification technician). For a past period based on specified start date/time and end date/time, select TP transactions using at least the following search criteria: agency ORI, TOT(s), DCN, old file number and/or new file number. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, TOT, DCN, old file number and/or new file number. The fields to be included in the report must be at least the following: agency ORI, TOT, transaction number, old file number, new file number transaction number, DCN of search prints, DCN of the file prints, old subject ID, new subject ID and consolidation date/time for each transaction.
- s. ULF Expiry Reporting.
 - i. ULF Expiry Summary Report – For a past period based on specified start date/time and end date/time, list a summary of the ULF entries that have expired using at least the following search criteria: agency ORI, crime type and latent type (i.e. finger, palm). The fields to be included in the report must be at least the following: agency ORI, Latent type, crime type and total per agency ORI.

- ii. ULF Expiry Detailed Report – For a past period based on specified start date/time and end date/time, list a summary of the ULF entries that have expired using at least the following search criteria: agency ORI, crime type, latent type (i.e. finger, palm), transaction number, case file number, latent file number, latent ID and latent image ID. As well, the desired sort criteria must be able to be selected by the user prior to executing the report by selecting from the following criteria: agency ORI, crime type, latent type, transaction number, expiry date, case file number, latent file number, latent ID and latent image ID. The fields to be included in the report must be at least the following: agency ORI, latent type, transaction number, expiry date, case file number, latent file number, latent ID and latent image ID, crime type and expiry date.
 - iii. Each ULF contributor will receive a monthly report of all ULF entries that their agency contributed that are about to expire (Monthly ULF Expiry Report) in the next month. For example, on Sept 1, a Police Department would receive a list of all of their latent entries on the ULF that will expire in October.
5. The AFIS renewal solution shall provide an authorized user with a COTS adhoc report preparation capability (Report Generator) so that non-standard reports can be produced (i.e. created, saved, viewed, printed and/or export the resulting report to at least PDF, CSV and XML file types) without requiring programming or SQL code. Crystal reports is the GFE Report Generator tool that is used to generate adhoc reports, which is available for the Contractor to use, or a replacement Report Generator tool that fully satisfies all the adhoc reporting requirements can be provided by the Contractor as part of the Contractor's proposal.
6. The AFIS renewal solution Report Generator shall, at a minimum, enable users to access and summarize database statistics, search results, database activity, user activity, agency activity and remote site statistics.
7. The AFIS renewal solution Report Generator shall enable an authorized user to query data in the AFIS renewal solution's database using SQL-like commands in a user-friendly GUI.
8. The AFIS renewal solution must provide a read-only database view that will be used by the Report Generator to create and print adhoc reports. This database view must include all database fields that are part of the user's operational view of AFIS renewal solution. That is, any database field that is viewable by the any user, either as part of the UI or in a report, must be available in the database view.
9. The ad hoc reporting feature shall be designed to accommodate at least ten (10) reports per day.
10. The ad hoc reporting feature shall only be available to authorized users, physically located at RCMP HQ.
11. If the GFE Crystal reports will not be used as part of the Contractor's AFIS renewal solution, then the replacement tool must provide easy to use report preparation capabilities:
 - a. Enable users to extract data from the database;

- b. Enable users to export extracted data to a spreadsheet, PDF, CSV and XML file types;
 - c. Provide summary statistics, including totals, minimums, maximums, averages and medians;
 - d. Specify the start and end periods for a specific report definition;
 - e. Specify the report format for a specific report definition;
 - f. Specify the search parameter(s) for a specific report definition;
 - g. Save report definitions;
 - h. Modify report definitions; and
 - i. Delete report definitions.
12. For the purposes of these requirements, a state refers to specific steps which correlate to an activity/event in the Ten Print or Latent process such as Ten Print QC, Ten Print Verification, Ten Print Certification, Latent Encoding, etc.
13. The AFIS renewal solution shall enable an authorized user to generate a report of all Misses that were reconciled and all steps that preceded the miss reconciliation that may have led to the generation of multiple subjects for the same individual.
14. The AFIS renewal solution should provide tools for analyzing misses.
15. The AFIS renewal solution shall automatically retain a record of all the data required to support the reporting and audit logging requirements in an efficient and effective manner. That is, the data required for the reporting must be retained in manner that allows the reports to be executed without negatively affecting the normal service delivery time for all other AFIS renewal solution processing activities.
16. The Remote Monthly Statistics Report includes for each remote site: Number of Latent identifications made, Number of individuals identified, Number of Ten Print searches performed, Number of identifications on Ten Print searches, Number of Adds to the ULF, Number of Latent Searches submitted.

3.6 VOLUMETRICS AND SERVICE DELIVERY

1. RCMP has rigorously monitored and analyzed RTID volumes over the past five (5) years. This monitoring and analysis has allowed volumes and expected service delivery to be estimated with reasonable confidence. The AFIS renewal solution must be able to support the service delivery requirements stated herein based on the 2019 volumes shown in Table 2 : AFIS Renewal Solution Sizing Design Volumes – 2019. The Contractor must explain precisely how the 2019 service delivery requirements will be met by explaining how the Contractor's design/configuration processes the volumes. The evaluation process, including benchmark testing, will be used to determine if the Contractor's AFIS renewal solution satisfies the service delivery requirement for the 2019 volume.
2. The AFIS renewal solution shall be designed to accommodate the 2019 Daily Design Volume shown in Table 2. Since RCMP will only have volumes as of 2016 when the contract is awarded, the 2016 volumes will be used to validate that AFIS renewal solution supports the service delivery times with the 2016 volumes in the production environment. The Contractor's proposal must explain how the design will be able to support the projected 2019 volumes.
3. The AFIS renewal solution shall be designed to accommodate a Peak Hourly Load as shown in Table 2.
4. The Daily Design Volume is based on the projected Annual Volume in 2019 divided by 249 working days and multiplied by three. The Peak Hourly Load is based on three times the projected daily average, divided by the 16 hours that represent the 2 daily shifts.
5. The unit of measure for the latent volumetrics is "searches". Presently there are on average two (2) set-up searches per latent image, which includes the original automatic search and one additional setup. The AFIS renewal must allow up to ninety-nine (99) set-up searches per latent.
6. The same image can presently be searched with a combination of filters: probable digit, gender, repository, case type, distortion or rotation. It is preferred that searching by filters is not required. The AFIS renewal solution should be able to search with the same accuracy to find matching candidates without requiring filters.

Type of Search	Daily Design Volume Overall (including % factor)	Priority 1 and 2 Daily Design Volume (including % factor)	Peak Hourly Load 2019

Total Ten Print One on One Searches (AFIS)	34,600 ¹	3,400	1,600
Total Ten Print One-to-Many Searches	34,600	3,400	1,600
Total Latent vs Ten Print Searches	330	330	60
Total Ten Print vs Latent (finger latent) – Reverse Search	6,600	330	800
Total Ten Print vs Latent (palm latent) – Reverse Search	4,500	225	600
Total Latent Palm vs Ten Print Palm Searches	163	163	14
Total Latent vs Latent (finger and palm latent)	34	34	4
Ten Print Fetch (does not include those performed within the AFIS locally)	1000	1000	115
Total Ten Print One on One Searches (VER)	12,000	12,000	1,000

Table 2 : AFIS Renewal Solution Sizing Design Volumes – 2019

7. The AFIS renewal solution shall include sufficient workstations to meet the volumes specified in Table 3, Workstation Design Volumes 2019. The Contractor must explain the workstation configuration that will support the workstation volumes. As well, any workstation additions or modification to the GFE workstations required to support the Contractor's AFIS renewal solution software and configuration must be explained.

Type of Search	Projected Daily Average 2019
Total Ten Print One-to-Many Searches	34,600
Total Ten Print Certifications	1,800
Total Latent vs Ten Print Searches	330
Ten Print Vs Latent (finger and palm latent*) – Reverse Search	4,500
Latent vs Searches	34

¹ On average 100% of 1:N searches also have a 1:1 search

Type of Search	Projected Daily Average 2019
Total Latent Certifications (x2 included since each is central certified twice)	40

Table 3 : Workstation Design Volumes - 2019

8. It is anticipated that a total of 150,000 transactions resulting in Ten Print Deletes will be received in the year 2019. In some cases, the whole file is purged and in other cases, only a single set of prints are purged.
9. Approximately 20,000 Unsolved Latent Delete transactions are anticipated to be received in the year 2019.
10. Approximately 130,000 new offenders will be added to the base every year. Additionally, all fingerprints associated with repeat offender charges are retained.
11. CPSIC is a special unit within the RCMP HQ to handle the 24x7x365 service delivery requirements in situations where the main Service does not have the staff on duty to do so.
12. CPSIC will be responsible for handling all ten-print submissions (excluding civil transactions) that must be serviced within 2-hours or less, 24x7x365 and that arrive during off hours. They will also handle all latent transactions that must be serviced during off hours. They will not handle civil transactions.
13. The AFIS renewal solution shall enable CPSIC to process all off-hour service delivery requests according to what is authorized for CPSIC user.
14. The AFIS renewal solution shall enable CPSIC staff to perform all of their fingerprint related tasks on a single AFIS workstation.
15. The AFIS renewal solution shall be designed to meet the Turnaround Time Requirements in Table 4 : Business Hours, Priorities and Turnaround Times for Searches for 95% of the transactions given the Daily Design Volume and the Peak Hourly Load indicated in Table 2.
16. The AFIS renewal solution shall process the required volumes for Ten Print (TP) searches within the required turnaround times whether TP Rolled, Plain, ID Flat or any mix of these are received.
17. The turnaround time is calculated starting from the point at which the transaction is received by AFIS until the point where certification is complete or a confirmation is received that no hit has been found and the reply transaction has been sent to the NNS. The AFIS renewal solution must provide turnaround times that are as fast, or faster, than Table 4 for transactions requiring no manual intervention and transactions requiring manual intervention.

18. Where hours are indicated in Table 4, this is to be interpreted as business hours when human resources are available to service a particular type of external transaction. For example, a 12 hour turnaround time combined with 16x5 business hours implies that a transaction received on Friday at 2 pm is not required to complete processing until Monday at 10am. The volumes provided in Table 4 are average annual projections for 2019. To convert these to a daily design volume, multiply by three and divide by 249.
19. The AFIS renewal solution shall achieve Peak Hourly Load and service delivery requirements. This shall be measured based on a fully populated database and a two-hour maximum peak load production sample.
20. The AFIS renewal solution shall be designed to accommodate the business hours in Table 4.
21. The two 8 hour shifts begin at 7am and end at 11pm Monday to Friday.
22. The AFIS renewal solution shall perform an image quality check with ten (10) rolled, four (4) plain and six (6) palm prints in less than 3 minutes. This shall be measured from the time the request is received by AFIS from the NPS NIST Server to the time the reply (TPQCI) is returned to the NPS NIST Server. This specific performance requirement with rolled, plains and palms is used since this represents the highest number of images included in a TP transaction. All other TP image quality checks must be as fast, or faster, than 3 minutes.
23. The AFIS renewal solution shall delete fingerprint images (Rolled & Plain, ID Flat, Palm impressions) in less than 10 seconds from the time the request is received from the NNS to the time the confirmation / reply transaction is returned to the NNS.
24. The AFIS renewal solution shall update fingerprint-related file descriptors such as File Number in less than 10 seconds from the time the request (TPAI, ULAI) is received from the NNS to the time the confirmation / reply transaction is returned to the NNS.
25. Priority one (1) transactions must be placed at the top of the queue for immediate processing and their turnaround time must not exceed the priority two (2) and priority three (3) turnaround times.
26. Regardless of priority an enrolment transaction that is not stopped for manual processing must be processed within ten (10) minutes. That is, if an enrolment is in the queue for longer than ten (10) minutes because of an increase in high priority search transactions, the enrolment must still be completed within a reasonable time period.

External Transactions	Business Hours	Annual Average Volume	Priority 1, 2, 3		Priority 4 - 10		Auto Quality & Certify
			% in Year 2019	Turn Around Time	% in Year 2019	Turn Around Time	Turn Around Time
Criminal Record Inquiry Submission (CAR N)	24x7x365	93,674 +800,000 from IIS	50% of Non-IIS	1 hour	50% of Non-IIS 50% of IIS	2 hour	2 minutes
Criminal Submission Retain (no FPS Provided) – Electronic (1:N) (CAR Y)	24x7x365	661,545 +20,000 US	2%	1 hour	98%	2 hours	2 minutes
Civil Screening Submission – Electronic (MAP N)	2 shifts of 8x5	695,319			100%	24 hours	2 minutes
Immigration Retain Add Submission – Electronic (IMM or REF)	2 shifts of 8x5	1,200,000	2%	1 hour	98%	72 hours	2 minutes
Employee Add Submission Retain – Electronic (Direct File, MAP Y)	2 shifts of 8x5	5,000			100%	12 hours	N/A
Ten Print to Latent Search (Finger & Palm reverse search) (CAR N, CAR Y)	2 shifts of 8x5	1,400,000 50% include Palms			100%	24 hours	2 minutes
Central Latent to Ten Print Search (LFS)	2 shifts of 8x5	80,000	100%	2 minutes			N/A
Central Latent Palm to Palm Search (LFS)	2 shifts of 8x5	20,000	100%	3 minutes			N/A

External Transactions	Business Hours	Annual Average Volume	Priority 1, 2, 3		Priority 4 - 10		Auto Quality & Certify
			% in Year 2019	Turn Around Time	% in Year 2019	Turn Around Time	Turn Around Time
Remote Latent to Ten Print Search (LFFS)	24x7x365	80,000	100%	5 minutes			N/A
Remote Latent Palm to Palm (LFFS)	24x7x365	20,000	100%	5 minutes			N/A
TP Image Request (IRQ)	24x7x365	100,000	10%	3 minutes	90%	5 minutes	N/A
Ten Print Fetch (ILRI)	24x7x365	16,000	80%	10 seconds	20%	1 minutes	N/A

Table 4 : Business Hours, Priorities and Turnaround Times for Searches

27. The AFIS renewal solution shall be sized to accommodate the database volumes as outlined in Table 5 : Data Volumes.

DATABASE		CONVERSION (2016)	DESIGN (2019)
Feature Sets	Ten Print Sets (Rolled & Plain, ID Flat)	6.6 Million	9 Million
	Palm DB	1.1 Million	2 Million
	Latent	204,000	240,000
	Latent Palm DB	10,000	20,000
Images	Ten Print Sets (Rolled & Plain, ID Flat)	6.6 Million	9 Million
	Palm DB	1.1 Million	2 Million
	Latent	204,000	240,000
	Palm DB	10,000	20,000
	Photos	200,000	540,000
Transaction Logs & Statistics		Est 100 Million	Est 100 Million
Subjects		5.4 Million	7.6 Million

Table 5 : Data Volumes

3.7 AFIS USER INTERFACE FEATURE

1. This section contains the AFIS User Interface features that are common to most user activities performed by fingerprint technicians.
2. All TP & Latent UI features must have the same look and feel with a Windows GUI. For example, a side-by-side view of two TP fingers should look the same as a side-by-side view of a latent finger and a TP finger.
3. A side-by-side view must use as much of the screen as possible while still providing the user the ability to use the features that must be available on the UI.
4. The AFIS renewal solution UI must allow personalized settings to be configured by each user and have those personalized settings saved and used every time the user logs in. These personalized should include as many UI features as possible from the available features. Additionally, the user must be able to temporarily toggle between these personal setting and the default setting through a single click mouse method (e.g. button).
5. All AFIS renewal solution TP and Latent features must be available for any AFIS user, on any AFIS workstation with restrictions based on Role Based Access Controls (RBAC).
6. The Ten Print user Interface shall provide the ability for a technician to perform image adjustments and views to the submitted fingerprint images and filed Ten Print images as described in Table 6 : AFIS User Interface Features. These features shall be available under all circumstances under which a fingerprint image is viewed. For example, during Ten Print QC, Verification and Certification.
7. The latent user Interface shall provide the ability for a technician to perform image adjustments and views to the submitted fingerprint images and filed latent images as described in Table 6 : AFIS User Interface Features. These features shall be available under all circumstances under which a fingerprint image is viewed. For example, Latent Encoding, Latent Verification and Latent Certification.
8. In addition, the Ten Print and latent UI should provide the ability for a technician to perform the rated features in Table 6 and other image adjustments or features to facilitate comparison.
9. The Latent User Interface shall provide the ability for a technician to perform image adjustments and apply views to the submitted fingerprint images and filed Ten Print images as per Table 6 under all circumstances under which a fingerprint image is viewed. For example, during latent encoding, latent verification and latent certification.
10. Each AFIS workstation shall provide the ability to perform all Ten Print and Latent User Interface software features and software functions. This does not imply that all workstations include each of the input devices.
11. The input devices to be provided with each workstation are specified in the Technical Requirements.
12. In addition, the AFIS UI should provide the ability to perform the rated image adjustments as described in Table 6 as well as other image adjustments or features to facilitate comparison.

Feature	Ten Print User Interface	Latent User Interface
Image Adjustments		
Adjust brightness (less or more)	M	M
Adjust contrast (less or more)	M	M
Rotate (+/- 180 Degrees)	M	M
Centre	M	M
Crop	M	M
Position	M	M
Revert to Default View	M	M
Segment/Block to ANSI NIST size	M	M
Recalibrate the size of the image based on a scale provided in the image	N/A	M
Change to Black and white reversal view. This view shows white pixels as black and black as white.	M	M
Perform Left/Right reversal of an image (Image flip). This view reverses the display of the images so that each side of the fingerprint is displayed opposite its original position.	M	M
Change to Display minutiae view. This view shows the minutiae as plotted by the technician or as saved in the database.	M	M
Display characteristics. This view shows the fingerprint characteristics.	M	M
Plot lines (charting) between matching characteristics	R	M
Hide specific charting lines on/off	R	M
Toggle display of charting features on or off	R	M
Magnification in and out (up to four times its original size)	M	M
Reset the image back to its original state prior to any image adjustments	M	M
Ability to adjust the zoom factor of both images (on a side by	M	M

Feature	Ten Print User Interface	Latent User Interface
side view) at the same time so that they are both at the same size (i.e., parallel continuous zoom).		
Draw a free hand closed figure on an image, mark that area as unusable, edit the area, adjust brightness and contrast in the area.	M	M
Control the position of the zoom and have both prints move in lock sync when viewing different areas at multiple zoom levels.	R	R
Change to Three-dimensional view. Depending on the quality of the image provided, this view gives a sense of depth to the ridge formations.	R	R
Change to Smooth Image view. This view removes the jagged edges between pixels particularly when zoom is applied.	R	R
Change to Thinned Ridge view. This view displays the ridges as thin black curves and the background including any noise in white.	R	R
Rotate both the submitted image and the candidate image in parallel as required. That is, through a single mouse click (e.g. button) turn on/off the ability to have both images adjusted by the change.	M	M
Annotate points of comparison clearly with dot or some other visual annotation	N/A	R
Erase points of comparison	N/A	R
Add drawings, notations, and marks to images	R	R
Adjust contrast and brightness to a selected part of the image (variable contrast).	R	R
Display Verification Mode. Display mated characteristics (e.g., minutiae) from the search and file print in the correct orientation with connecting lines between matching characteristics. Allow editing of this charted data with ability to print out for court	R	R

Feature	Ten Print User Interface	Latent User Interface
purposes.		
Other User Interface Features		
Enable a technician to correct fingerprint sequence (switching of rolled with rolled)	M	N/A
Enable a technician to substitute rolled with plain impressions	M	N/A
Enable a technician to define his or her own default settings for each of these image adjustments: brightness, contrast, default views, charting features on/off, verification mode on/off, display characteristics on/off.	M	M
View the transaction log for a specific transaction	M	M
Save the image in the database with the image adjustments made on the workstation and log all image adjustments performed by this change.	M	M
Fetch		
Fetch a specified search or set of searches in the ULF by Latent Image Identifier or Originating Agency ID.	N/A	M
Fetch a specified Ten Print entry or set of entries in the TPF by FPS Number, Refugee File Number, Employee File Number or DCN, or other parameters to be determined.	M	M
Fetch a specified Ten Print entry or set of entries in work in progress by TCN, DCN or other parameters to be determined.	M	M
View two fetched fingerprint images (Rolled, Plain, ID Flat) or palm images for comparison from either the fingerprint or palm (if any exist) ULF or Ten Print/Palm Collection or work in progress side by side.	M	M
View any selected finger or palm from either fetched entry at the same size and scale.	M	M

Feature	Ten Print User Interface	Latent User Interface
View the descriptors and Fingerprint Characteristics of either of the fetched entries.	M	M
Edit and resubmit a fetched Ten Print for search and return the response to the search to the same workstation / user.	M	M
View a list of prints on file for a given subject by listing the File Number, the Date Fingerprinted, the DCN, the Resolution, the Fingerprint Quality (with the best quality set visually highlighted), the Originating Agency ID, Availability of Palms in the set, and the Original Image Indicator. From this view, enable the user to select a particular set or multiple sets of fingerprints to be fetched.	M	M
Log all fetches performed by User ID, workstation ID, Subject Identifier, File Number, DCN, TCN, date and time.	M	M
Enable a certification technician to compare images from a paper set of fingerprints, using a camera to display the image from the paper, beside an image fetched from the AFIS database at a selectable rate of enlargement.	M	M
View all fingers of a fetched Ten Print on one display.	M	M
Edit and resubmit a fetched Latent for search as well as perform the following: Save this edited Latent Search as a new one Update an existing Latent image in the ULF Submit the Latent for search without saving it to the ULF Automatically add this transaction to the Latent search queue.	N/A	M
Edit fingerprint characteristics (e.g., minutiae) as well as descriptors in a search fetched from the ULF and save.	N/A	M
Perform image adjustments on the fetched images as described above and save the adjusted images in the database.	M	M
Print		
Print out a colour/greyscale screen display of comparison	M	M

Feature	Ten Print User Interface	Latent User Interface
quality at any point in time.		
Print out a colour/greyscale screen display at any point in time for informal purposes.	M	M
Back out of any operation through a cancellation feature.	M	M

Table 6 : AFIS User Interface Features

13. The AFIS renewal solution must support an ability to search any type of print against any other type of print as part of normal processing or on an exceptional basis through the UI. This will allow unusual situation such as a latent palm incorrectly saved as a finger to be searched against fingers.
14. The AFIS renewal solution shall enable an AFIS user to view the NIST Packet during any state of processing. As a minimum, this shall include, viewing the packet from the work queue, from the TP quality check UI while the transaction is open for work, and similarly from TP manual cut, TP sequence check, TP verification, TP certification, Latent Lasso, Latent Edit, Latent Verification, Latent Certification 1, Latent Certification 2, Latent Certification 3, Latent Insert, Latent Search and UL Search.

3.8 ADMINISTRATIVE CAPABILITIES

1. The AFIS renewal solution shall provide an administrative tool/capability to be used by an authorized user that shall provide, at a minimum, the following functionality:
 - a. Monitor all hardware and software;
 - b. Monitor the transactions in the AFIS workflow and give the transaction status, time in and time out;
 - c. Allow an authorized user to change the priority of a transaction or to push one or more transactions up or down the processing queue;
 - d. Give access to the error logs, and allow them to be searchable by, as a minimum: time error occurred, External TCN, DCN, and External Transaction Type;
 - e. Monitor databases and provide utilities to dump selected data, including all descriptors;
 - f. Monitor remote transactions;
 - g. Monitor all images stored in the Ten Print File, their corresponding minutiae and the descriptor data for a subject(s) to ensure that they are all correctly associated to one another;

- h. Monitor image quality and view all images stored in the Ten Print File (TPF), the Unsolved Latent File (ULF), and work in progress; view their corresponding descriptor data and feature sets;
 - i. Merge a set of ten print entries to the same Subject Identifier and File Number to reconcile misses when the consolidation of the files has not occurred, or on an as-needed basis when two subjects have been identified as a possible miss by external sources.
 - j. Provide functionality to delete entries (one by one and in batch) on the TPF, ULF and work in progress while leaving the transaction log intact and removing the entry from all work queues and candidate lists. Log all deletion activity by, as a minimum, External TCN, DCN, Subject Identifier, File Number, Latent Image Identifier (in the case of ULF only) user ID, workstation ID, date, time;
 - k. Provide access to the AFIS renewal solution statistics for reporting purposes;
 - l. Provide access to ad hoc reporting capability and predefined/canned reports as described in subsection 3.5 Operational Reporting & Statistics;
 - m. Provide the database review functionality to amend the following TPF fields directly and log all such actions by AFIS Subject Identifier, File Number, DCN, TCN, user ID, workstation ID, date/time and Gender;
 - n. Provide the database review functionality to amend the following ULF fields directly and log all such actions by AFIS Latent ID, Latent Image ID, TCN, user ID, workstation ID, date, and time: Crime Type, Offence Date, Expiry Date and Authority to Release Indicator; and
 - o. Change the Expiry Date for a specific search or group of searches saved on the ULF;
2. If there is a problem with the matching capability, then the AFIS renewal solution shall notify the administrator so that action can be taken to discontinue operations.
3. The AFIS renewal solution shall provide a function that enables an administrator to select a number of transactions for which the fingerprint identification process is to be re-initiated and to indicate the point at which these transactions are to be re-introduced into the AFIS workflow. This capability is within the AFIS renewal solution through the UI and this is not resulting from a TPWDI.
4. Failures and errors. If the AFIS renewal solution reports a Failure or error to a user or operational administrator, then the message shall include the reason why the failure or error occurred.
5. The AFIS renewal solution shall log all AFIS renewal solution Failures and errors as well as any error notifications issued and corrective actions taken.
6. The AFIS renewal solution shall enable an operational administrator to view and print a list of transactions affected by failure or error during a specified period that indicates, as a minimum, the External TCN, DCN, Originating Agency ID, a description of the failure or error, the status of the transaction at the time of the failure or error and the date/ time the failure / error occurred.

4. TEN PRINT PROCESSING

4.1 GENERAL

1. As explained in the AFIS renewal workflow subsection, NNS will send a request to AFIS to initiate a TP search based on the AFIS ICD. The Ten Print Request (TPRI) packet is used to initiate the TP search. The AFIS renewal solution must process the TP search based on the content of the TPRI and the requirements stated throughout this SOW and its accompanying documents. The AFIS ICD, the workflows (Annex G) and the requirements stated throughout this SOW and its accompanying documents explain the processing that must be supported by the AFIS renewal solution. NNS will use the response transactions from the AFIS renewal solution to take whatever action is required by the NNS such as update the NNS processing status of a submission, respond to the contributor and any other action that is part of NNS processing.
2. The AFIS renewal solution shall:
 - a. Accept requests received from the NNS;
 - b. Manage requests through the AFIS renewal solution;
 - c. Encode and verify the search requests;
 - d. Enable a technician to certify proposed identifications;
 - e. Return search results, log information and statistical information to the NNS using the internal reply transactions; and
 - f. Notify the NNS of the status of transactions.
3. Each internal Ten Print Request will have a set of parameters that must be used by the AFIS renewal solution to perform the search. Refer to the AFIS ICD for all the parameters that must be supported. For example, the parameters could indicate: Electronic Quality Check, One on One Ten Print Match, One to Many Search and/or auto certify upon system declared hit. In addition the incoming transaction will indicate which file types and special repositories to search against.
4. The workflow for fingerprint search shall be designed to supporting fully automated processing based on the parameters in the internal ten print transactions passed to the AFIS renewal solution. That is, if auto reject and auto certify parameters indicate a fully automated search, then the AFIS renewal solution must complete the processing without manual intervention.
5. The Type 14 Record may contain flat images as image records 13, 14, and 15. If the Type 14 ID Flats Record does not contain the segmentation information; the transaction shall be rejected.
6. Where the AFIS renewal solution finds that the quality of the prints requires manual intervention, then the AFIS renewal solution shall perform the search with the required level of manual intervention to assure the accuracy and reliability of the results.
7. In the case of ten print transactions, the AFIS renewal solution shall process at 500 ppi.
8. The AFIS renewal solution shall automatically take into consideration a possible +/- 5% adjustment in sizing when performing a search.

9. The AFIS renewal solution shall automatically take into consideration a MINIMUM +/- 30 degrees rotation adjustment when performing a search.
10. The AFIS renewal solution shall return an Internal Status Transaction (TOT STI) to the NNS when the transaction is queued for manual processing. The specific contents of the STI and the states are indicated in the AFIS ICD.
11. Prior to certification and while the AFIS renewal solution is waiting for the human fingerprint technician to certify a transaction, the AFIS renewal solution shall forward an internal transaction (TPCI) advising the NNS of the File Number(s) of the candidates to which the transaction is to be certified.
12. The AFIS renewal solution shall enable a technician to display any two of the ten fingers simultaneously for verification/certification purposes. The fingers displayed from the candidate shall correspond to the fingers displayed in the Submission.
13. The AFIS renewal solution shall provide the following UI capabilities during verification/certification:
 - a. The TP UI shall at all times display the TP submitted for search and the candidate TP file currently being worked on.
 - b. The TP UI shall, as a minimum, display the following fields in addition to the TP and fingerprint images while verifying/certifying the results of a TP search:
 - i. Search prints DCN;
 - ii. Candidate File Number;
 - iii. Finger number of candidate;
 - iv. Fingerprint quality of prints; and
 - v. Number of minutia.
14. The AFIS renewal solution shall enable a technician to adjust the images during the TP verification/certification process with at least the following capabilities using a variable sizing capability with a mouse controlled method such as slider to finely tune the adjustments:
 - a. Zoom in / zoom out an image;
 - b. Adjust brightness;
 - c. Adjust background brightness;
 - d. Rotate;
 - e. Adjust ridges from black to white;
15. The AFIS renewal solution shall enable a technician to adjust the images during the TP verification/certification process with at least the following capabilities using a single click mouse method (e.g. button):
 - a. Select best fit so the AFIS renewal solution determines how to display the prints;
 - b. Select actual size to display the prints in their actual size;
 - c. Size to 50% through a single mouse click;
 - d. Size to 200% through a single mouse click;
 - e. Previous pair;

- f. Next pair;
 - g. Full list (configurable parameter);
 - h. Short list (configurable parameter);
 - i. Minutia with tail;
 - j. Minutia without tail;
 - k. Hide minutia / show matching minutia;
 - l. Ridge count off/on;
 - m. Change match orientation;
 - n. White background;
 - o. Black background;
 - p. Colour background;
 - q. Highlight a portion of the print to analyze more closely through actions the same or similar to the following:
 - i. Isolate (e.g. box, lasso) a portion of a fingerprint on the search print and the candidate print;
 - ii. Change the portion of the print isolated (e.g. move around a box);
 - iii. Have the isolated portion of each print magnified (configurable parameter) for more detailed analysis;
 - iv. Be able to identify specific points in one print and move the focal point of the magnified portion of the print (i.e. move around in the magnified portion to better analyze whether the print is a match).
16. The TP UI must allow personalized settings to be configured by each user and have those personalized settings saved and used every time the user logs in to use the TP UI. These personalized settings should include as many UI features as possible from the above two requirements (14,15). Additionally, the TP technician should be able to temporarily toggle between these personal setting and the default setting through a single click mouse method (e.g. button).
17. During TP processing, the fingerprint technician must be able to switch from the normal single finger side-by-side view to a view with two fingers side-by-side or to view all 10 fingers for searched prints and the candidate fingerprints on the DB. This switch between views must be through a single mouse action (e.g. button or tab).
18. During the two fingers view or the 10 finger view, the UI must display which fingers are being viewed and related characteristics of the fingers including but not limited to quality and number of minutia.
19. During the two fingers view or the 10 finger view, the UI must allow a single finger in the view to be selected and apply the image adjusting features available during the side-by-side view.

4.2 EXTRACT & SAVE

1. Retention is normally requested in conjunction with a search. However, the AFIS renewal solution shall be capable of processing a Ten Print Request with only a Retention and no search being requested, using the Direct Filing / Direct Scanning configured workstation (section 6). This process shall include the encoding of the fingerprints and a determination by the AFIS renewal solution as to whether the feature set must be saved or not depending on the quality.
2. The AFIS renewal solution shall save every image in its original state prior to any image adjustments for retention on the Ten Print File, where retention is requested. If the image is adjusted then the image adjustment parameters shall be saved as well so they can be re-applied to the original image to display the enhanced image.
3. The AFIS renewal solution shall not save fingerprint images or their corresponding feature sets where the DCN already exist on the TPF. Where this occurs, the AFIS renewal solution shall reject the transaction with an ERRIN response. The NNS performs this validation for a duplicate DCN prior to sending a request to AFIS; however, in case there is an issue with NNS, AFIS must ensure a duplicate DCN is rejected.
4. Where the TPRI transaction has requested retention of the images, the AFIS renewal solution shall retain these images indefinitely until an explicit request to delete these images has been received or the defined retention period has been reached.
5. The AFIS renewal solution shall automatically extract fingerprint features from digitized ten-print images and, where retention is indicated and where the quality and feature set limit have been considered, save these in the TPF.
6. The AFIS renewal solution shall have the ability to extract ten-print fingerprint features with no manual intervention.
7. The AFIS renewal solution shall automatically assign a fingerprint quality measurement to each impression in each submission received including Rolled, Plain, ID Flat and Palm impressions and save this measurement in the TPF, where retention is requested in the internal TPRI transaction.
8. In the case of ten print and palm transactions, the AFIS renewal solution shall support encoding, search, and storage at the original image resolution received (500 ppi or 1000 ppi). The original image resolution shall be retained and made available for viewing.
9. The AFIS renewal solution shall extract any descriptors (i.e. from all record types) from the internal transaction needed to support the Contractor's Entire AFIS renewal solution and save these in the TPF.
10. The AFIS renewal solution must save data in the TPF with a specific set of fingerprints to ensure all requirements stated through this SOW and its accompanying documents are satisfied. For example, AFIS Subject Identifier, File Number, DCN, External TCN, File Type Code, Date Fingerprinted, Image Resolution, Image Quality Measurement, Original Image Indicator, Originating Agency ID, Date Added, Gender, and all data required to support the LCMC requirements and the subsection 3.5 Operational Reporting & Statistics requirements.
11. The AFIS renewal solution should be flexible in its ability to store and retain data in WIP and in the TPF.
12. The original TPRI NIST packet for any retained transaction must be saved by the AFIS renewal solution.

13. The AFIS renewal solution shall accept and store fingerprint images and palm print images in any valid resolution received (e.g., 500 ppi, 1000 ppi,), minimum 500 ppi as supported by the ANSI/NIST-ITL-1-2011. Currently, 100% of ten print transactions are submitted at 500 ppi.
14. The AFIS renewal solution shall store fingerprint, palm print and photo images compliant with ANSI/NIST-ITL-1-2011 image record specifications to support the requirements stated in the RTID internal and external ICDs.
15. Palm prints – The AFIS renewal solution shall retain palm print images received with ten print transactions and file these to the File Number assigned according to the results of their corresponding ten print searches.
16. The AFIS renewal solution shall allow an authorized user to perform a TP fetch, swap the palms or fingers, save the result, without affecting the original submission and then re-launch the search.

4.3 ELECTRONIC QUALITY AND SEQUENCE CHECK

1. The AFIS renewal solution must support accurate automated quality assessment of rolled fingerprint impressions, plain impressions, ID Flat impressions and palm impressions that can detect distortion, incomplete impressions (pattern area missing, roll from nail edge to nail edge), uneven impressions, impressions not positioned correctly, incorrect sequence, incorrect orientation and indistinct/insufficient characteristic detail.
2. The AFIS renewal solution shall automatically assign a fingerprint quality measurement to each impression in each submission received including Rolled, Plain, ID Flat and Palm impressions and use the quality measures to determine processing of the transaction.
3. Sequence and Upper Palm Check - The AFIS renewal solution shall automatically compare the fingerprints in the plain impression area of the form and palm area of the form (where upper palms are included) with those in the rolled impression area of the form to determine if the impressions have been provided in the same sequence and if the upper palms match the fingers. Where the sequence of the rolled impressions is not consistent with the plain impressions or the upper palms do not match the fingers, then the AFIS renewal solution shall automatically queue the transaction for manual review if the configurable parameter to force this review is set; otherwise, a quality error must be returned.
4. Fingerprint Image Quality – The AFIS renewal solution shall provide a fully automated process to determine and record the quality of scanned and electronically received fingerprint images. The quality of each fingerprint and palm image and a graded measurement of the overall quality of the transaction shall be saved in the TPF where retention is requested and returned as and when required in the AFIS ICD transactions.
5. The AFIS renewal solution shall have a configurable set of quality measures that shall be used in conjunction with automated quality checking to determine if a submission can be automatically rejected. Refer to configurable parameters subsection 8.1.

6. The AFIS renewal solution shall have a configurable parameter that is used, when set, to determine if the quality of the plain impressions exceeds the rolled impressions. If the quality of the plain impressions exceeds the rolled impressions by the value of this "Plain Quality Indicator" configurable parameter then the plain impressions should be used in the search instead of the rolled impression.
7. Where the TPRI parameters indicate that automated quality rejection is allowed and the 'automatic quality rejection' measures indicate a failure, then the AFIS renewal solution shall reject the transaction by returning a TPQCI indicating rejection and including the poor quality reasons.
8. Upon completion of quality control the AFIS renewal solution shall always return a TPQCI transaction indicating the outcome.

4.4 TEN PRINT MANUAL QUALITY CONTROL

1. Ten Print Manual Quality Control refers to the practice of having a fingerprint technician review and adjust the fingerprints for quality as part of the search process. Poor quality fingerprint handling is an important issue for RCMP because it provides flexibility for the RCMP process transactions that would otherwise be rejected. During user acceptance testing, every Ten Print Submission with fingerprints below a configurable parameter will be reviewed by a QC fingerprint technician for fingerprint quality. Once there is very high confidence in the quality processing of the AFIS renewal solution, the Ten Print Manual QC is intended to be an exception based process.
2. The AFIS renewal solution shall enable a technician to view all electronic quality and sequence assessments made by the AFIS renewal solution, assess the quality and sequence of the rolled impressions, plain impressions, ID flats and palm impressions (where palm impressions are available in the transaction), compare the rolled fingerprint impressions to the plain impressions, and the plain impressions to the palm impressions, assess the ability to search with the plain impressions and either: reject the transaction with selected reasons, accept the transaction, accept the transaction with refinement to the search method or accept the transaction for search but partial/no retention of the fingerprint characteristics.
 - a. For further clarity while performing QC (including sequence correction), the AFIS renewal solution shall enable a technician to select the fingers/plains/palms/ID Flat images for potential swap, view them side by side, and enlarge the images at the same zoom level.
 - b. If the plain impressions have been changed as part of the manual QC process such that the segmentation would no longer be valid, the AFIS renewal solution shall recreate the segmentation and restart the processing.
3. The AFIS renewal solution shall enable the technician to undo any sequence corrections made by the AFIS renewal solution using a single / double user interface action.
4. The AFIS renewal solution shall provide a mechanism for searching and handling of poor quality prints.
5. The AFIS renewal solution shall return the technician's assessment of quality, or the AFIS renewal solution assessment of quality if auto reject is indicated, in the internal reply (TPQCI) transaction. Upon completion of quality control the AFIS renewal solution shall always return a TPQCI transaction indicating the outcome.

6. The technician's assessment of quality shall include, but is not limited to: indication of transaction rejection, indication of rescan required, a selection of one or more poor quality reasons, a free text comment.
7. The AFIS renewal solution shall enable the technician to select Unsuitable/Rejection Reasons from a selection list and have the selection(s) automatically appended to the reply transaction.
8. The AFIS renewal solution shall, on an exception basis, enable a specialized and "authorized" technician to perform QC on extracted fingerprint features such as editing of Minutiae with option to save or not, correct Fingerprint characteristics.
9. The AFIS renewal solution shall, where the encoding has been manually altered, log an indication of the alteration, by whom and when.
10. The AFIS renewal solution shall, when out of sequence has been identified, enable an authorized user to adjust the fingerprint sequence of the Rolled Impressions and Plain Impressions.
11. The AFIS renewal solution shall, where the sequence of fingerprints has been manually altered by a technician, perform a sequence check and enable a technician to override the outcome.
12. The AFIS renewal solution shall log all Ten Print QC activity including the nature of any adjustments performed (e.g., minutiae editing, image rotation, sequence correction) by whom and when.
13. The AFIS renewal solution shall, on an exception basis, enable a technician to copy any Finger Impression from the Plain Impressions and affix these into the Rolled Impression blocks or to segment the Plain Impressions for search against the Ten Print File Rolled Impressions. This may be required where two identical fingerprint impressions have been provided in the rolled. In this instance, one of the rolled could be removed and replaced by a plain impression for the correct finger.
14. The AFIS renewal solution shall display the following information during Ten Print Manual QC in support of the rejection decisions:
 - a. The Type of External Transaction;
 - b. The External Retention Code;
 - c. An indication of whether the external transaction was originally received on paper or electronically;
 - d. The Fingerprint Quality Overrides (tag 2.893); and
 - e. The Missing Fingerprint Reasons (tag 2.8084).
15. When in Manual QC, the box sizes, or equivalent method, must be dynamic for plain prints. This feature shall allow different size plain fingerprints to be completely included within the box and therefore, included in the search.
16. The AFIS renewal solution shall, where the Manual QC is being performed on a Ten-Print request that was originally submitted electronically, not allow the technician to indicate that a "Rescan" is required.

4.5 ONE ON ONE TEN PRINT SEARCH

1. The One on One Ten Print Search refers to the fully automated process of scoring an incoming set of prints against the prints on file for the specified File Numbers and determining if any of these File Numbers are worthy of consideration as a potential identification. The One on One Ten Print Search could be used in several situations: Submission arrives with FPS and identification needs to be confirmed prior to proceeding to certification, a Name Search candidate list (performed by NNS) needs to be filtered to determine if any name search candidates are worthy candidates for verification/certification. The Internal Ten Print Search transaction will provide a candidate list of one or more File Numbers for which a One on One Ten Print Search is required.
2. The AFIS renewal solution shall provide the capability to automatically match fingerprint features in a new submission with fingerprint features contained in a specific RCMP ten print file based on a specified File Number or DCN.
3. The AFIS renewal solution shall have a configurable One on One Hit Threshold or other "System Declared Hit" parameters to meet the accuracy requirements.
4. The AFIS renewal solution shall give each One on One match a score and an assessment as a "System Declared Hit", candidate for verification or no hit.
5. The AFIS renewal solution One on One Ten Print Search shall search against all sets on File within the same Subject File, unless configured to search the best "x" number of sets of prints based on a configurable parameter, plus the composites. Where "x" will be agreed to with the Contractor during the implementation.
6. The AFIS renewal solution shall retain a record of all One on One scores and the AFIS renewal solution's assessment as a "System Declared Hit", candidate or negative for each File Number specified in the Internal Ten Print Request transaction.
7. Where a list of multiple File Numbers (candidates) are provided, the AFIS renewal solution shall automatically filter (score and reduce) the candidate list using a One on One Ten Print Search with a One on One Threshold to create a short list and long list for review purposes.
8. If there is more than one candidate left after filtering, then the AFIS renewal solution shall consider these candidates as candidates for Verification.
9. If there is only one candidate left and the AFIS renewal solution has determined that this candidate is a hit and automatic certify has been indicated in the Internal Ten Print Request, then the ten print search shall be considered complete and the results of the search returned in the internal reply transaction.
10. Where a File Number provided in the TPRI Candidate List cannot be found in the TPF, then the specific File Number shall be ignored. This situation shall not generate an error condition. For example this is possible if a purge occurred before the search completed.
11. On a One on One Search, where either the search set or the file set is below a configurable quality level, then the match shall be forwarded to manual verification even if the score is below the grey area threshold limit.

4.6 ONE TO MANY TEN PRINT SEARCH

1. A One to Many Ten Print Search refers to the automated process of searching an incoming ten print against a specified subset or all of the TPF and any special ten print repositories.
2. The AFIS renewal solution shall perform a fully automated One to Many Ten Print Search and reply with the result where the Internal Ten Print Request parameters indicate that an automatic search it to be performed.
3. The AFIS renewal solution shall search and score the incoming Fingerprints against the subset of the Ten Print File and special repositories, as specified by the Ten Print Request parameters (target set), in a fully automated fashion.
4. The Ten Print Request will indicate which files and special repositories to search against.
5. The AFIS renewal solution should search with the required accuracy and reliability as stated in 3.6 Volumetrics and Service Delivery using as few descriptors as necessary.
6. The "File/File Number" terminology used within the AFIS context is not intended to imply a physical partition of data in the AFIS renewal solution. A subject will have a potential Criminal File Number (FPS Number), an Refugee File Number, an Immigration Number and/or an Employee File Number linked together via a unique Subject Identifier.
7. The AFIS renewal solution shall search against all composite feature sets on the TPF for the same subject. For example, if the subject is both a criminal and refugee then it shall search both the criminal composite and the refugee composite for the subject.
8. The AFIS renewal solution shall have a configurable One to Many Hit Thresholds for "System Declared Hit" and any other parameters proposed by the Bidder to meet the accuracy requirements.

4.7 TEN PRINT VERIFICATION

1. Verification refers to the practice of having a fingerprint technician review a list of candidates to find a matching set of fingerprints.
2. The AFIS renewal solution shall perform verification with manual intervention where the AFIS renewal solution has automatically determined that there are multiple candidates worthy of consideration.
3. The AFIS renewal solution must have configurable parameters to adjust the AFIS threshold parameters and the Default Minimum Number of ULF Candidates to be examined for mandatory verification.
4. The AFIS renewal solution shall use the search thresholds to limit the number of candidates for TP-TP WIP searches. For example, if the number of candidates returned by the application of the thresholds is three (3), then the number of candidates to be produced for the TP -TP WIP view is three (3) candidates. When these three (3) candidates are completed searching and enrolled (when enrolment is requested) then the submission shall move out of Wait 4 WIP view and proceed to the next workflow step.

5. The candidate list shall include the File Numbers associated to a candidate subject (e.g. FPS Number, Employee File Number, Refugee File Number, Immigration number), the digit to be displayed and all other data identified in section 3 general AFIS requirements.
6. Where a subject has more than one File Number (e.g., both a Refugee File Number and a Criminal File Number) then all shall be displayed at time of verification even though they are considered as one candidate.
7. To ensure that verification is performed without bias, the AFIS score shall not be visible on the verification user interface, unless the user is authorized to view the score.
8. The AFIS renewal solution shall display the candidates in descending order of probability.
9. The AFIS renewal solution shall only display the highest scoring candidate for the same Subject on the Candidate List even though there are multiple set of prints on file or the subject has both a refugee file and a criminal file.
10. The AFIS renewal solution shall present fingerprint images from a ten-print Submission and Fingerprint Images of corresponding digits from a selected candidate side by side at the same size.
11. The AFIS renewal solution shall present the best matching fingerprint images for verification from a ten-print Submission search. As well, the AFIS Renewal solution shall enable the technician to select a specific finger for comparison and/or toggle to the next pair.
12. Once verification is completed for a candidate, the AFIS renewal solution shall proceed to the next candidate without delay. UI response times are described in the Technical Requirements.
13. The AFIS renewal solution shall automatically display the next submission from a technician's filtered view of the ten print work queue when the technician requests the next submission.
14. The AFIS renewal solution shall enable a technician to loop forward and backward through a list of candidates and to select a specific candidate for display from the Candidate List without delay. UI response times are described in the Technical Requirements.
15. The AFIS renewal solution shall provide a visual indication in the Candidate List of which candidates have already been verified.
16. The AFIS renewal solution shall enable the technician to view the Rolled Impression or the corresponding Plain Impression, or ID Flat impression of the candidate in the Ten Print comparison window without delay. UI response times are described in the Technical Requirements.
17. The AFIS renewal solution shall provide a visual indication to the technician of the other sets of fingerprints on file for the same subject including their resolutions, overall quality, availability of palms, indication of which sets have already been viewed and enable the technician to view any of these other sets of images (rolled & plain and palm, or ID Flat).
18. The AFIS renewal solution shall enable a technician to disposition with confirmation a Submission as either ident to a candidate or non-ident.

19. The AFIS renewal solution shall enable a technician to assign a transaction to a supervisory role with work a related note if they are having difficulty verifying the identification.
20. If a verification technician does not confirm an AFIS renewal solution System Declared Hit above the Absolute Hit threshold, then the AFIS renewal solution shall assign the submission to a supervisory role to confirm the verification by setting a flag in the queue which shows the transaction that the supervisor is to work on. If the supervisor and AFIS renewal solution assessments are not the same, then the AFIS renewal solution shall update the Discrepancy Report with the supervisor's certification results, which the AFIS Program Analyst will review for further analysis.
21. The AFIS renewal solution shall record a Discrepancy Log of all identifications (System Declared Hits) that were overturned by a verification technician.
22. The AFIS renewal solution shall merge the verification candidates from 1:1 Match and 1:N such that only a single candidate list is presented for manual verification.
23. The AFIS renewal solution shall enable a technician to filter the ten print work queue by transaction status. Depending upon the technician's role, the technician will be able to view transactions of a given status.

4.8 TEN PRINT CERTIFICATION

1. Manual certification at the RCMP refers to the practice of having a senior fingerprint technician confirm a proposed identification. Certification may be performed as part of the routine workflow.
2. The AFIS renewal solution shall automatically forward all manual identifications proposed by a verification technician to Certification, where the Ten Print Request indicates that manual certification is mandatory.
3. If verification is not mandatory for a particular transaction and the AFIS renewal solution has proposed a hit, then the AFIS renewal solution shall automatically forward the System Declared Hit to Certification where the Ten Print Request parameters indicate that Certification is mandatory(TPRI Certification Indicator).
4. The AFIS renewal solution shall provide the capability to auto certify based on a certification request received directly from the NNS as a TPRI. In this case the certification result is automatically returned to the NNS without manual intervention, unless stated in this SOW or its accompanying documents.
5. In support of the historical paper based certification, the AFIS renewal solution shall enable a Certification technician to initiate a Certification by scanning the unique barcode that was affixed to the paper fingerprint form at paper conversion.
6. In support of the paperless environment, the AFIS renewal solution shall have the ability to initiate Certification electronically by retrieving the next certification request from a work queue.

7. The AFIS renewal solution shall provide the capability for a fingerprint technician to certify fingerprints by enabling the certification technician to view a selected finger image from a proposed identification or specified File Number beside the corresponding finger image from the new transaction at the same size. In this case, referred to as a 'cold certify', the AFIS renewal solution shall enable the certifier to enter / scan from a barcode the File Number or DCN/Doc ID to fetch and the File Number to certify. Alternatively, the certifier must be able to view a print using the camera to determine if it can be certified.
8. The AFIS renewal solution shall enable a certification technician to view complete images of any of the fingers, plain impressions, ID Flats or palm impressions of the candidate (including all sets on file for the candidate) beside the corresponding print image for the new submission without delay. UI response times are described in the Technical Requirements.
9. The AFIS renewal solution shall provide a visual indication to the technician of the other sets of fingerprints on file for the same subject including their resolutions, quality, palm availability and enable the technician to view any of these other sets of impressions.
10. The AFIS score shall not be visible on the certification user interface.
11. The AFIS renewal solution shall provide a means for the technician to indicate "certify" or "fail to certify" and should provide a means to indicate "unsuitable for certification" of the Submission to an existing File by an explicit single user interface action (e.g., Certify button) with confirmation (e.g., Are you sure?).
12. The AFIS renewal solution shall automatically retain in the Transaction Log a record of the certifier's User ID, the date and time of certification and the score of matching candidates.
13. The AFIS renewal solution shall automatically determine and display the best matching fingers for certification.
14. The AFIS renewal solution shall retain the technician preferences such that the technician does not have to set them each time they log on.
15. If a proposed identification is not certified, then the AFIS renewal solution shall retain a Certification Declined Log of the following, as a minimum: the User ID of the technicians involved, the User ID of the verification technician(s) (if verification was performed), the verification technician proposal, the System proposal, the AFIS Score, the File Number, DCN and TCN of the proposed ident, the External TCN and DCN of the Submission, the date and time that the certifiers' decision was made. Refer to the 3.5 Operational Reporting & Statistics for additional details.
16. If a certification decision overturns a verification decision, then the AFIS renewal solution shall notify a supervisor in the verification area with the same information recorded in the Certification Declined Log.
17. A "System Declared Hit" decision is an identification that has been determined by the AFIS renewal solution with no manual intervention.
18. If a certification decision overturns a System Declared Hit decision, then the AFIS renewal solution shall:

- a. Notify the AFIS Program Analysts immediately with the following information, as a minimum: Activity, User ID of the certification technician, the AFIS Score, the FPS File Number and DCN of the proposed ident, the TCN and DCN of the Submission, the date and time that the certification decision was made.
 - b. Automatically log this information for monitoring purposes in the Discrepancy Log.
19. The AFIS Program Analysts will monitor the AFIS renewal solution's matching accuracy, contributor quality, trouble shoot misses and so on.
20. The AFIS renewal solution shall enable a technician to assign a certification request with work related note to a supervisory role when the certification technician is "Unable to Certify".
21. While certifying the search results of a Ten Print search, the AFIS renewal solution shall display the fingerprint images, as a minimum, external TCN, file Number of the candidate, finger number and all other data as described the general AFIS requirements (section 3).
22. The AFIS renewal solution shall enable the Certification Technician to view the new submission in its entirety, including all data in all record types. A NIST packet viewer which must be available anytime to view the submission, would be used to view the data.
23. When certifying, the AFIS renewal solution should allow the technician to see the best quality fingers. They should have the ability to view other rolled, plain or ID Flat impressions, for any finger and for all cards stored in AFIS as part of the process of certifying. Once they hit the Certify button, then the next dialogue should display all fingerprint impressions from the submission and the file print. The user should have the ability to also select rolled, plain or ID Flat impressions from each available card stored in AFIS. If a problem is observed, then the technician should have the ability to take appropriate action (Cancel or Decline) before Ident Search Conclusion takes place. Ident Search Conclusion should only occur once the Conclude (or equivalent) button is hit.
24. Where fingertips are received with upper palm impressions, the AFIS renewal solution shall automatically perform a 1:1 match of the fingertips of the palms against the rolled / plain impressions in the same submission. Where a match is found, the AFIS renewal solution shall indicate that the palms have been "associated" to the file. If the AFIS renewal solution is unable to determine a match, the AFIS renewal solution shall enable a certification technician to "certify" the palms to the file and where the certification fails the palms shall not be retained.
25. The AFIS renewal solution shall provide a visual indication to show if palm prints have been associated to the file.
26. If a palm print submission is received electronically with rolled impressions, plain impressions or both as part of the same submission then the AFIS renewal solution will not require explicit certification to the palm on a routine basis.
27. Where a certification technician determines that a candidate forwarded to certification is not identical, then the technician shall have the ability to review the verification candidate list, perform verification and, if a new hit is found, perform certification.

28. In the case of a 'cold certify', the AFIS renewal solution shall log the following information: File Number fetched, File Number to certify, Operator ID of certification technician, Workstation ID on which certification took place, start time of certification, end time of certification.
29. If the manual certification flag is turned off (AFIS renewal solution is allowed to auto certify) and if the AFIS renewal solution makes a hit in the grey zone (below the hit threshold and above the no-hit threshold), then the AFIS renewal solution shall forward the submission for manual verification and if a hit is confirmed then the submission shall be forwarded to manual certification. In addition, if the manual certification flag is turned off and the AFIS renewal solution makes multiple hits that are confirmed by a verification technician then the AFIS renewal solution shall forward the submission for manual certification. That is, auto certification cannot occur if either grey zone hits are made or multiple hits are made.

4.9 SEARCH CONCLUSION

1. If no identification is made under any of the above circumstances, then:
 - a. If the internal TPRI transaction requested that the AFIS save the prints, then the AFIS renewal solution shall automatically assign a new Subject Identifier.
 - b. If the internal TPRI transaction requested that the AFIS save the prints, then the AFIS renewal solution shall automatically save the fingerprint images, photos and palm print images in the TPF with necessary descriptors and feature sets (as determined by the AFIS renewal solution) associated to the newly assigned Subject Identifier.
 - c. The AFIS renewal solution shall automatically return a negative response in the internal reply transaction along with the newly assigned Subject Identifier and all other information as required by the AFIS ICD.
2. When the NNS receives the internal reply transaction from AFIS, it will obtain the File Number references to be added to the TPF. The NNS will return to the AFIS with an internal Ten Print Amend (TPAI) transaction to add the external File Number reference to the TPF entry. An FPS Number will be assigned for criminals, an Immigration File Number for Refugee subjects, an Employee File Number for RCMP Employees or an Immigration File Number for Immigration subjects. Each of these numbers are mutually exclusive, of the same format and only one of these is assigned to any given set of fingerprints, up to 6 to any one subject.
3. RCMP will assign the File Numbers using a 12 digit numbering convention that clearly distinguishes criminal files, refugee files, employee files and immigration files. For example, criminal files will use a 20,000 prefix and refugee files will use a 50,000 prefix plus a unique seven digit number within each file type.

4. Once a File Number is assigned, it is generally assigned for the lifetime of the individual. The exception to this rule is the cases in which a file is fully purged and a subsequent Submission is received for the same individual. Misses also result in changes to File Numbers over time. Multiple submissions filed on the base can be associated to the same File Number over time (e.g., repeat offenders can have several sets of fingerprints stored on the base). If an individual has both a criminal file and a refugee file, then both File Numbers will be associated to the same Subject via the internal Subject Identifier. A Subject can have up to six (6) File Numbers. For identification processing purposes, these associated files for the same subject will be treated as a single Subject File.
5. If there are no rolled or plain fingerprint impressions on the submission with retention requested, then the AFIS renewal solution will include palm prints being used under exceptional circumstances (e.g., the subject has no fingers) to open a new File and search the TP palm database. If an identification is made under these circumstances then:
 - a. If the internal TPRI transaction requested that the AFIS save the prints, then the AFIS renewal solution shall automatically assign the same Subject Identifier as the prints certified to.
 - b. If the internal TPRI transaction requested that the AFIS save the prints, then the AFIS renewal solution shall automatically save the fingerprint images, photos and palm print images, necessary descriptors and features sets in the TPF associated to the Subject Identifier certified to.
 - c. The AFIS renewal solution shall automatically return a positive response in the internal reply transaction along with the Subject Identifier, all File Number references associated with the Subject Identifier, an indication that the search is complete and all other information as required by the AFIS ICD.
6. The AFIS renewal solution shall automatically flag a Submission as a "Mix-up" if the ident was made as a result of an AFIS One to Many Search and the One on One Match of the name search candidate list failed to produce the same candidate. The "Mix-up" shall be indicated in manner that allows this issue to be resolved through the data returned to the NNS in the TPRI.
7. The AFIS renewal solution shall automatically remove all information pertaining to a transaction with the exception of the logs and stats when the transaction has completed processing and retention is NOT indicated in the internal TPRI.
8. The AFIS renewal solution shall include in the reply to the TPRI all parameters needed to generate the Ten Print Match Report. A list of these parameters is detailed in the AFIS ICD.
9. Where a Ten Print submission hits to two or more Subject identifiers, the AFIS renewal solution shall return a Ten Print Consolidation internal transaction (TPCNI) to the NNS after certification, prior to consolidation and enrollment.
10. Where consolidation is indicated in the TPCNRI, the AFIS renewal solution shall consolidate each of the files as per the following rules:
 - a. The logic to consolidate more than one refugee is as follows: When 2 or more Refugee File Numbers are being consolidated, and one or more has the prefix 330001 and one or more has the prefix 330008 then consolidate to the smallest File Number with prefix 330008. In all other circumstances, consolidate to the smallest of the Refugee File Numbers.

- b. The logic to consolidate more than one criminal is as follows:
 - i. If there is no long version Criminal FPS with a '9' in the 6th position then sort all numbers to be consolidated using the long format FPS Number. The oldest FPS Number is the smallest Number. The '9' number represents pre letter suffixes currently used by the RCMP.
 - ii. If there is a single FPS Number with a '9' in the sixth position, then this one is the oldest.
 - iii. If there is more than one FPS with a '9' in the 6th position then sort only those with a '9' in the sixth position. The smallest number in this sort is the oldest FPS Number.
 - c. In all other cases, the AFIS renewal solution shall consolidate files of the same file type to the smallest/oldest file number.
 - d. Refer to the Database conversion section in the SOW and the ICDs for additional clarification concerning file number processing.
11. The AFIS renewal solution shall store all consolidated fingerprints under the Subject Identifier associated with the file number that was determined to be the smallest/oldest.
 12. Where consolidation is not indicated in the TPCNI, the AFIS renewal solution shall not consolidate any of the files identified under the original Ten Print Consolidation internal transaction (TPCNI).
 13. Where the Ten Print Retention Code is set to "Y", the AFIS renewal solution shall add the new prints to the file identified under the file number identified through the AFIS ICD transactions.
 14. The AFIS renewal solution shall provide a standalone process that will permit an authorized user to consolidate multiple ten print entries directly on AFIS. This feature will allow users to consolidate files that have been identified as potential duplicates by some external source – without the need for an NNS interface.

4.10 TEN PRINT AMEND

1. The Ten Print Amend (TPAI) transaction will be used on a routine basis to forward File Number assignments to be added against specific fingerprint sets and Subjects on the TPF. It will also be used to alter the priority of a transaction in WIP. When the AFIS renewal solution receives a Ten Print Amend (TPAI) request from the NNS, the AFIS renewal solution shall automatically change the ten print entry or the ten print transaction in WIP (e.g., file references numbers, priority) as indicated.
2. The AFIS renewal solution shall log all changes made to the TPF as a result of an internal Ten Print Amend transaction and also log all priority changes to the WIP initiated from within the AFIS environment.
3. The AFIS renewal solution shall return a reply to the NNS acknowledging the completion of the Ten Print Amend transaction.
4. This transaction is part of the normal TP search workflow when a new file number needs to be created. NNS will provide the new file number for AFIS to save with the new file created by AFIS.

4.11 TEN PRINT DELETE

1. When the AFIS renewal solution receives a Ten Print Delete (TPDI) request from the NNS, the AFIS renewal solution shall automatically delete the complete ten print entry(ies) associated to the specific File Number and/or DCN and make any other necessary database changes as a result of the deletion (e.g., removing a file number reference at the Subject level).
2. The complete ten print entry shall include the rolled, plain, ID Flat and palms print images and feature sets, descriptors, file reference numbers, photos and any other Type 2 data retained on the File for that particular set of fingerprints.
3. If only a File Number is specified and no DCN is specified, then all ten print entries corresponding to that File Number shall be deleted with the exception of the Transaction log and statistics.
4. If only a DCN is specified in the internal Ten Print Delete, then only the specific ten print entry corresponding to the DCN shall be deleted. The corresponding transaction log, statistics shall not be deleted.
5. The AFIS renewal solution shall log all changes made to the TPF as a result of an internal Ten Print Delete transaction and also those made internally within the AFIS environment.
6. The AFIS renewal solution shall return a reply to the NNS acknowledging the completion of the Ten Print Delete transaction.
7. If the File Number purged corresponds to a transaction pending certification to that purged File Number (i.e., all fingerprints associated to the file are being purged), then the AFIS renewal solution shall not permit the certification to complete to that File Number, notify the Certification Technician of the purged File Number, enable the certification technician to conclude the transaction without carrying out the certification to the purged File Number, and indicate that this has occurred in the TPRED transaction. If there are other certifications required on the same submission then these will be permitted to proceed.
8. The AFIS renewal solution should ensure that purges do not disrupt the workflow.
9. This transaction will be used on a routine basis in conjunction with legislated purges.
10. If the AFIS renewal solution receives a TPWDI, then the AFIS renewal solution shall cancel all further processing on the specified DCN in all WIP regions, remove the submission from AFIS queues in all regions, add a record of the delete in the transaction log and leave all previous entries in the transaction log intact. The normal use of the TPWDI transaction is to delete a transaction so it can be resent by NNS. This approach is used by NNS to resolve processing issues resulting from unforeseen failures.
11. The AFIS renewal solution must reply to the NNS with the results of the TPWDI in the TPWDRI.
12. The AFIS renewal solution shall provide a standalone process that will permit an authorized user to manually delete ten print entries directly from AFIS. This feature will allow authorized users to delete through the AFIS renewal solution without the need for an NNS interface.

4.12 FINGERPRINT IMAGE REQUEST

1. Fingerprint Image Retrieval Request (IRQI) transactions will be used by the NNS to fetch images (herein referred to as an “image fetch”) from AFIS. Image List Retrieval transactions (ILRI) will be used to return the list of prints available on the file (herein referred to as a “list fetch”).
2. When the AFIS renewal solution receives an IRQ image fetch, then the AFIS renewal solution shall automatically return the images requested, if any, associated to the specific File Number and/or DCN.
 - a. The AFIS renewal solution shall return the adjusted images in response to an IRQI. That is, if a fingerprint technician has previously made image adjustments and these image adjustments were saved then the images returned in the IRRI shall include the application of these saved image adjustments.
3. The images requested may include: the fingerprints, the palm prints and/or the photos.
4. In the case of an image fetch, if only a File Number is specified, then the composite set of requested images corresponding to that File Number shall be fetched and returned along with the file descriptors.
5. In the case of an image fetch, if a DCN is specified, then the Fingerprint Image Request shall return the specific set of images requested along with the file descriptors associated with that DCN.
6. In the case of a list fetch (ILRI), the AFIS renewal solution shall return a list of available sets of prints on file.
7. The AFIS renewal solution shall perform fetches within the AFIS environment as stated throughout this SOW and its accompanying documents.

4.13 SPECIAL SEARCH AND FILE REQUESTS

1. The AFIS renewal solution shall process special low volume “search only” or “search and file” requests.
2. These are typically very urgent requests handled by exception. The request may be received on paper.
3. The Direct File/Scan services may be used for the conversion of these requests.
4. For sensitive requests, the AFIS renewal solution shall limit physical handling and access to the electronic information including the logs to specific users with designated privileges.
5. The AFIS renewal solution shall enable an authorized technician to file a new or existing set of fingerprints with a new File Number or a reactivated File Number as a new Subject without performing a search.
6. The AFIS renewal solution shall enable a user to initiate a TP to TP search from a single fingerprint or whole set of fingerprints captured from a camera or scanner within the AFIS environment.
7. The AFIS renewal solution shall allow a limited set of users with the appropriate authority and privileges to file a set of fingerprint images to a reopened or new FPS number.

4.14 RETENTION OF FINGERPRINTS AND PHOTOS

1. For those transactions where retention is indicated, the AFIS renewal solution shall retain all fingerprint images, photos and palm images until an explicit request to purge has been received from the NNS or an authorized AFIS user.
2. For latent to TP searches, the AFIS renewal solution shall be capable of searching all ten print feature sets from rolled impressions, all ten print feature sets from plain impressions, all ten print feature sets from ID flat impressions and all ten print feature sets from palm impressions per subject.
3. For TP to TP searches, the AFIS renewal solution shall be capable of searching the composite rolled or composite ID flats depending on what type of fingerprints have been retained for a specific subject. In those situations where there are rolled and plains and the overall quality of the plain impressions exceeds the overall quality of the rolled impressions; then the plain impressions will be added to the search engine, along with the composite rolled set for future searching purposes.
4. The AFIS renewal solution shall automatically prepare a composite best set from all rolled impressions received and a composite best set from all ID Flat impressions received for a subject file type. If the quality of the plain impressions exceeds the rolled impressions by the value of this "Plain Quality Indicator" configurable parameter then the plain impressions should be used in the composite instead of the rolled impression. If a subject file has a combination of the rolled, plains and ID flats (e.g. Immigration) then two composites shall be created, one rolled, with better quality plain impressions replacing rolled if necessary, and an ID flat composite.
5. The projected size of the feature set file is provided in section 3.6.
6. The AFIS renewal solution must maintain the composite feature sets automatically based on the sets of fingerprints retained for each subject. That is, no manual intervention shall be required to constitute the best set of prints in the composite feature set.
7. If a criminal file is purged or particular submissions are purged, then the AFIS renewal solution shall automatically purge all data associated with the purged submissions by file number and DCN including: the fingerprint images, photos, palm images, minutiae and other fingerprint features. All log file entries must not be affected by purging the fingerprint files.
8. The Composite Set prepared by the AFIS renewal solution shall not at any time include a fingerprint from a submission that has been purged. When a set of fingerprints is purged, the composite set must be updated to remove any purged fingerprints included in the composite set and replace them with the next best fingerprint for any finger purges from the composite.
9. The definition of purge is as follows: "To remove from the operational system in a manner that ensures the fingerprints cannot be recovered". This excludes log file data and data retained in RCMP backups. Log files are retained indefinitely for audit purposes and backup files will eventually be rolled over; therefore, permanently removing the data.
10. The AFIS renewal solution shall be capable of searching up to 6 composite rolled and/or 6 composite ID flats per subject, one of rolled and one of ID flat for each file type that might exist for the same subject.

4.15 FINGERPRINT ENDORSEMENT

1. The use of a "Biometric Endorsement" in lieu of a signature will be used as an electronic means of capturing an applicant's approval for such things as releasing criminal record search results to a 3rd party (3rd Party Waiver) and consent to disclose pardoned offences for applicants to positions in the vulnerable sector. In order to provide automatic verification of the consent, the AFIS renewal solution must compare the endorsement fingerprint to the fingerprints provided for identification. The AFIS renewal solution will report the results of the comparison of the endorsement fingerprint to the identification fingerprint(s) back to the NNS in the TPQCI reply transaction.
2. The AFIS renewal solution shall perform a comparison between the fingerprint image identified in the TPRI as the endorsement fingerprint (Type-14 identified by the Type-2 tag - Biometric Consent Image Designator) to the corresponding (same finger) provided for AFIS searching purposes (Type-4 record or Type-14 record) and provide indication of the results of the comparison to the NNS in the TPQCI transaction. The Type 14 Record may contain flat images as image records 13, 14, and 15. If the Type 14 ID Flats Record does not contain the segmentation information; the transaction shall be rejected.
3. If the AFIS renewal solution determines that the endorsement fingerprint does not match the corresponding fingerprint provided in the identification set, the AFIS renewal solution shall compare the endorsement fingerprint to each of the other fingers provided in the identification set.
4. A failure to match the endorsement fingerprint to a fingerprint provided for identification purposes must stop AFIS fingerprint processing unless the Manual Biometric Consent configurable parameter is set. The result of the endorsement fingerprint match will be returned to the NNS in the TPQCI.
5. If the Manual Biometric Consent configurable parameter is set any endorsement fingerprint that does not match, must go to manual certification.
6. If the AFIS renewal solution confirms that the endorsement fingerprint matches a fingerprint in the identification set, the AFIS renewal solution shall indicate this result in the TPQCI.

5. LATENT FINGERPRINT PROCESSING

5.1 LATENT WORKFLOWS

1. There are two different latent workflows, referred to as central latent and remote latent. Central latent processing starts with a Central Latent Client (CLC) site collecting the latent prints and submitting them to RTID through an LFS transaction. Each CLC submission can have up to ten (10) latent images. Through NNS processing, each latent image is submitted to AFIS individually. These individual latents are processed by RCMP fingerprint technicians at RCMP HQ.
2. Each remote site collects their own latents and submits them to RTID using a Transcoder, one latent at a time through the LFFS transaction. Each remote site has fingerprint technicians that process each latent. RCMP HQ has a group called Remote Network Search Coordinators that provide assistance as required for the remote latent technicians; otherwise, these remote latent technicians process their latents without assistance from RCMP HQ.
3. Electronic Latent Management Operations (ELMO) is the RCMP's present Latent Case Management System that was custom-developed in 2002. The AFIS renewal solution LCMC will replace ELMO. This replacement will be completed as a second stage in the AFIS renewal implementation. To minimize the risk on the AFIS renewal, the first stage will include the AFIS renewal using ELMO for latent case management. After transition to the renewed AFIS, the second stage will include the conversion of ELMO data and implementation of LCMC. Refer to the implementation plan concerning these details.
4. The AFIS renewal solution must support latent processing with ELMO in the first stage of the implementation. Since the AFIS renewal solution has no direct communication with ELMO, this support means that the existing workflow must be supported in the first stage of implementation. This also means that the LCMC requirements identified herein and throughout this SOW and its accompanying documents must be implemented in stage two (2).
5. All central latent and remote latent activity must be recorded automatically in the LCMC. The LCMC detailed requirements are identified in a separate Annex within this SOW; however, it is mentioned herein to reflect the relationship between the latent processing and LCMC. For example, any identification to a TP or latent must be recorded automatically and viewable in the LCMC when a user is reviewing the case where the identification was made. As well, all data required for the LCMC, provided to the AFIS renewal solution by NNS through the various latent transactions must be recorded in the LCMC in a manner that can be effectively and efficiently used by the AFIS renewal solution users.
6. The LCMC must provide the ability to launch a search directly from the LCMC. This is simply a continuation of the processing of a case at a date well beyond the initial analysis (eg. cold case); therefore, the AFIS renewal solution must support all the requirement stated throughout this SOW and its accompanying documents for these searches initiated from the LCMC. For example, the latent image ID numbering requirement for any latent must always be maintained by the AFIS renewal solution. The latent image ID is a unique value that is used by NNS, LCMC and the AFIS renewal solution.

7. In stage one (1) of the AFIS renewal solution implementation an ELMO user will initiate a research using an existing latent case. Since ELMO interfaces with NNS, this will result in an LFSI transaction being sent to the AFIS renewal solution which is part of the existing workflow.
8. CLC is used to submit Latent Fingerprint Search (LFS) and Fingerprint Image Requests (IRQ) transactions to NNS. The LFS submission is processed through an NNS workflow that interfaces repeatedly with AFIS to process all the latent images included in the LFS. Refer to the central latent workflow below for further details on what the AFIS renewal solution must support for LFS processing. The IRQ submission is transformed into the IRQI AFIS ICD transaction. Refer to the AFIS ICD for details concerning the processing of the IRQI.
9. CLC is also an interactive UI for users at these sites that collect and submit latents. CLC will be used to manage the latent portion of their police incident investigation. Consequently, the AFIS renewal solution must provide a read only database view that will allow a portion of the LCMC data to be displayed to the CLC user in order to satisfy the UI response times for CLC users. The Contractor can propose an alternate approach; however, this alternate approach must support a response time that is comparable to a direct database query. The AFIS ICD asynchronous interface is not considered acceptable for the CLC UI.
10. Note that the central latent workflow changes required for the LCMC implementation including this read only database view are included in a separate Annex with the detailed requirements for LCMC.
11. The AFIS renewal solution shall process all internal latent AFIS transactions as specified in the AFIS ICD.
12. The AFIS renewal solution shall:
 - a. Accept requests received from NNS;
 - b. Manage requests through the AFIS renewal solution;
 - c. Automatically encode and process latent search requests that generate a search result which can be reviewed by a latent technician;
 - d. Facilitate the manual encoding of latent search requests which will then be processed, generating a search result which can be reviewed by a latent technician;
 - e. Enable a fingerprint technician to verify the latent search candidates;
 - f. Enable a fingerprint technician to certify proposed identifications;
 - g. Enable a supervisor or senior fingerprint technician to second certify the proposed identifications;
 - h. Return search results, log information and statistical information to NNS using the internal reply transactions;
 - i. Notify the NNS of the status of LFSI transactions;
 - j. Create US EBTS-compliant Latent Fingerprint Feature Search (TOT US LFFS) transactions, provide the capability to verify and disposition the results (US SRL) and return the search results to NNS using the LSRFI transaction; and

- k. Notify the NNS when a latent image has been committed (TOT LTCI). This will either happen after a re-launch of a previously submitted search or when the original image is adjusted OR when an existing image is duplicated. A latent image may be duplicated on AFIS so that the rotation, lasso or size can be adjusted OR so that a new minutiae set or descriptor set (e.g., finger number, fingerprint classification) can be searched and/or added to the ULF for the same image.
13. The AFIS renewal solution must provide a latent queue capability that allows latent users to pull work from and/or return work to depending on their specific role.
14. The AFIS renewal solution shall accept and store fingerprint images in any valid resolution (e.g., 500 ppi, 1000 ppi) as supported by the *ANSI/NIST-ITL-1-2011* or a later version.
15. The minimum resolution for latent images (fingerprints and palms) shall be 1000 ppi.
16. Fifty (50) percent of the latent transactions are central transactions. The fingerprint images found in these central latent transactions are stored at 1000 ppi. The other fifty 50% are remote latent transactions.
17. The AFIS renewal solution shall allow encoding and search of legacy latent images at 500 ppi and shall allow encoding and search at 1000 ppi if received at 1000 ppi.
18. In the case of latents received at resolutions above 1000 ppi, the AFIS renewal solution shall support the ability for the latent examiner to rescale the image to 1000 ppi.
19. The AFIS renewal solution shall return an Internal Status Transaction (STI) to the NNS when the transaction is queued for manual processing, when a latent image transaction is committed, and when a latent image transaction is ended. The specific contents of the STI and the states are indicated in the AFIS ICD.
20. The following two subsections present example workflows for central latent and remote latent submissions.
21. Note: The generic term AFIS is used in the following workflow explanations since it is describing the existing workflow. The AFIS renewal solution must support all the processing and workflow indicated generically with the term AFIS.

5.1.1 CENTRAL LATENT WORKFLOW

1. The following table shows the sequence of activities for an existing central latent submission. Following this table is an explanation of each activity and transaction included in the workflow related to understanding the workflow applicable to the AFIS renewal solution. The AFIS renewal solution must receive and correctly process each AFIS ICD NIST transaction sent to the AFIS renewal solution as well as respond back to NNS with the required AFIS ICD NIST transaction correctly populated with the data required by the NNS in the sequence required for each workflow.
2. Note: The following example is an existing flow; therefore, there are references to ELMO.

Line #	Activity	Txn	System/ Subsystem	Latent Image ID	Operator ID	Outcome
1.	Received	LFS	NNS			Passed
2.	Decrypt NIST File	LFS	NNS			Passed
3.	High Level Validation	LFS	NNS			Passed
4.	ICD Validation	LFS	NNS			Passed
5.	Image Validation	LFS	NNS			Passed
6.	Transformation	LFSNS	NNS			From: LFS To: LFSNS
7.	Created and Archived	ACKL Email	NNS			
8.	Sent	ACKL Email	NNS			
9.	Created and Archived	LFSI	NNS			
10.	Send to AFIS	LFSI	AFIS,NNS			
11.	Created and Archived	LFSI	NNS			
12.	Send to AFIS	LFSI	AFIS,NNS			
13.	Wait for Lasso	STI	AFIS	ON10814-2015-TESTCASE-001-00		
14.	Wait for Lasso	STI	AFIS	ON10814-2015-TESTCASE-002-00		
15.	Lasso	LSRI	AFIS	ON10814-2015-TESTCASE-002-01	User: 01	
16.	Latent Review	LSRI	AFIS	ON10814-2015-TESTCASE-002-	User: 01	

Line #	Activity	Txn	System/ Subsystem	Latent Image ID	Operator ID	Outcome
				01		
17.	Latent Automated Encoding	LSRI	AFIS	ON10814-2015-TESTCASE-002-01	AFIS System user: 99	
18.	LT Commit Received	LTCI	AFIS,NNS	ON10814-2015-TESTCASE-002-01		
19.	LT-TP Search	LSRI	AFIS	ON10814-2015-TESTCASE-002-01	AFIS System user: 99	
20.	Wait for Lasso	STI	AFIS	ON10814-2015-TESTCASE-002-00		
21.	LT-TP/Wait for Verify 1 st Certify	STI	AFIS	ON10814-2015-TESTCASE-002-01		
22.	LT-TP Search Result Received	LSRI	AFIS,NNS	ON10814-2015-TESTCASE-002-01		Result: Non Disposition
23.	Save Search Result to ELMO	LSRI	NNS,ELMO	ON10814-2015-TESTCASE-002-01		
24.	Latent Verification	LSRI	NNS	ON10814-2015-TESTCASE-002-01	User: 01	Number of candidates to verify: 49
25.	Latent Manual Encoding	LSRI	AFIS	ON10814-2015-TESTCASE-002-01	User: 01	
26.	Latent Review	LSRI	AFIS	ON10814-2015-TESTCASE-002-01	User: 01	
27.	Wait for Latent Edit	STI	AFIS	ON10814-2015-TESTCASE-002-01		
28.	LT-TP Search	LSRI	AFIS	ON10814-2015-	User: 01	

Line #	Activity	Txn	System/ Subsystem	Latent Image ID	Operator ID	Outcome
				TESTCASE-002-01		
29.	LT-TP / Wait for Verify 1 st Certify	STI	AFIS	ON10814-2015-TESTCASE-002-01		
30.	LT-TP Search Result Received	LSRI	AFIS,NNS	ON10814-2015-TESTCASE-002-01		Result: Non Disposition
31.	Save Search Result to ELMO	LSRI	NNS,ELMO	ON10814-2015-TESTCASE-002-01		
32.	Latent Verification	LSRI	NNS	ON10814-2015-TESTCASE-002-01	User: 01	Number of candidates to verify: 49
33.	Wait for UL Search	STI	AFIS	ON10814-2015-TESTCASE-002-01		
34.	LT-TP Search Result Received	LSRI	AFIS,NNS	ON10814-2015-TESTCASE-002-01		Result: Non-Ident
35.	Save Search Result to ELMO	LSRI	NNS,ELMO	ON10814-2015-TESTCASE-002-01		
36.	Lasso	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	User: 01	
37.	Latent Review	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	User: 01	
38.	Latent Automated Encoding	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	AFIS System user: 99	
39.	LT Commit Received	LTCI	AFIS,NNS	ON10814-2015-TESTCASE-001-01		

Line #	Activity	Txn	System/ Subsystem	Latent Image ID	Operator ID	Outcome
40.	LT-TP Search	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	AFIS System user: 99	
41.	Wait for Lasso	STI	AFIS	ON10814-2015-TESTCASE-001-00		
42.	LT-TP/Wait for Verify 1 st Certify	STI	AFIS	ON10814-2015-TESTCASE-001-01		
43.	LT-TP Search Result Received	LSRI	AFIS,NNS	ON10814-2015-TESTCASE-001-01		Result: Non Disposition
44.	Save Search Result to ELMO	LSRI	NNS,ELMO	ON10814-2015-TESTCASE-001-01		
45.	Latent Verification	LSRI	NNS	ON10814-2015-TESTCASE-001-01	User: 01	Number of candidates to verify: 50
46.	Latent Manual Encoding	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	User: 01	
47.	Latent Review	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	User: 01	
48.	Wait for Latent Edit	STI	AFIS	ON10814-2015-TESTCASE-001-01		
49.	LT-TP Search	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	User: 01	
50.	LT-TP / Wait for Verify 1 st Certify	STI	AFIS	ON10814-2015-TESTCASE-001-01		
51.	LT-TP Search Result Received	LSRI	AFIS,NNS	ON10814-2015-TESTCASE-001-		Result: Non Disposition

Line #	Activity	Txn	System/ Subsystem	Latent Image ID	Operator ID	Outcome
				01		
52.	Save Search Result to ELMO	LSRI	NNS,ELMO	ON10814-2015-TESTCASE-001-01		
53.	Latent Verification	LSRI	NNS	ON10814-2015-TESTCASE-001-01	User: 01	Number of candidates to verify: 50
54.	Wait for UL Search	STI	AFIS	ON10814-2015-TESTCASE-001-01		
55.	LT-TP Search Result Received	LSRI	AFIS,NNS	ON10814-2015-TESTCASE-001-01		Result: Non-Ident
56.	Save Search Result to ELMO	LSRI	NNS,ELMO	ON10814-2015-TESTCASE-001-01		
57.	Wait for Insert	STI	AFIS	ON10814-2015-TESTCASE-001-01		
58.	Latent Manual Encoding	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	User: 02	
59.	Latent Review	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	User: 02	
60.	Wait for Latent Edit	STI	AFIS	ON10814-2015-TESTCASE-001-01		
61.	LT-TP Search	LSRI	AFIS	ON10814-2015-TESTCASE-001-01	User: 02	
62.	Wait for Insert	STI	AFIS	ON10814-2015-TESTCASE-002-01		
63.	LT-TP / Wait for	STI	AFIS	ON10814-2015-		

Line #	Activity	Txn	System/ Subsystem	Latent Image ID	Operator ID	Outcome
	Verify 1 st Certify			TESTCASE-001-01		
64.	LT-TP Search Result Received	LSRI	AFIS,NNS	ON10814-2015-TESTCASE-001-01		Result: Non Disposition
65.	Save Search Result to ELMO	LSRI	NNS,ELMO	ON10814-2015-TESTCASE-001-01		
66.	Wait for Latent Edit	STI	AFIS	ON10814-2015-TESTCASE-002-01		
67.	Wait for UL Search	STI	AFIS	ON10814-2015-TESTCASE-002-01		
68.	Wait for Insert	STI	AFIS	ON10814-2015-TESTCASE-002-01		
69.	Latent Verification	LSRI	NNS	ON10814-2015-TESTCASE-001-01	User: 02	Number of candidates to verify: 50
70.	LT-TP / Wait for Verify 1 st Certify	STI	AFIS	ON10814-2015-TESTCASE-001-01		
71.	Saved to ULF	STI	AFIS	ON10814-2015-TESTCASE-002-01		
72.	Latent Image Transaction End(11)	STI	AFIS,NNS	ON10814-2015-TESTCASE-002-01		
73.	Latent Verification	LSRI	NNS	ON10814-2015-TESTCASE-001-01	User: 02	Number of candidates to verify: 50
74.	Wait for UL Search	STI	AFIS	ON10814-2015-TESTCASE-001-01		

Line #	Activity	Txn	System/ Subsystem	Latent Image ID	Operator ID	Outcome
75.	LT-TP Search Result Received	LSRI	AFIS,NNS	ON10814-2015-TESTCASE-001-01		Result: Non-Ident
76.	Save Search Result to ELMO	LSRI	NNS,ELMO	ON10814-2015-TESTCASE-001-01		
77.	Wait for Insert	STI	AFIS	ON10814-2015-TESTCASE-001-01		
78.	Wait for Latent Edit	STI	AFIS	ON10814-2015-TESTCASE-001-01		
79.	Wait for UL Search	STI	AFIS	ON10814-2015-TESTCASE-001-01		
80.	Wait for Insert	STI	AFIS	ON10814-2015-TESTCASE-001-01		
81.	Saved to ULF	STI	AFIS	ON10814-2015-TESTCASE-001-01		
82.	Latent Image Transaction End(11)	STI	AFIS,NNS	ON10814-2015-TESTCASE-001-01		
83.	Created and Archived	LSR Email	NNS			
84.	Sent	LSR Email	NNS			

Table 7 : Central Latent Workflow

3. The above table shows all activities for a LFS submission to reflect the other non-AFIS activities that also occur throughout this process. These non-AFIS activities allow a better understanding of the overall processing, shows how the data that will be sent to the AFIS renewal solution is derived and how the data received from the AFIS renewal solution would be used. The following focusses on the activities that must be supported by the AFIS renewal solution in the above example LFS submission:
- a. Line #1 shows the LFS received, which has two (2) latent images in the LFS;
 - b. Line #9 shows NNS creating an LFSI using the first latent image and assigning it a "-001" suffix to the case file name provided by the contributor. The Latent ID created by NNS is ON10814-2015-TESTCASE-001;
 - c. Line #10 shows NNS sending the LFSI to AFIS for processing;
 - d. Line #11 shows NNS creating an LFSI using the second latent image and assigning it a "-002" suffix to the case file name provided by the contributor. The Latent ID created is ON10814-2015-TESTCASE-002;
 - e. Line #12 shows NNS sending the LFSI to AFIS for processing;
 - f. Line #13 shows NNS receiving a STI from AFIS indicating the receipt of the first image with the "-00" suffix for the first latent resulting in the Latent Image ID ON10814-2015-TESTCASE-001-00. The AFIS renewal solution must ensure a duplicate Latent Image ID is never created. If a duplicate is detected the AFIS renewal solution must respond with an ERRIN;
 - g. Line #14 shows NNS receiving a STI from AFIS indicating the receipt of the first image with the "-00" suffix for the second latent resulting in the Latent Image ID ON10814-2015-TESTCASE-002-00;
 - h. Line #15 shows NNS receiving a LSRI from AFIS indicating the User: 01 has lasso the second latent image and the AFIS renewal solution has created Latent Image ID ON10814-2015-TESTCASE-002-01. The AFIS renewal solution must increment the image id number every time the image is duplicated;
 - i. Lines #17-#19 show the NNS receiving the LSRI, LTCI and LSRI from AFIS indicating automatic encoding, commit and search by the AFIS system;
 - j. Lines #22-#23 show NNS receiving the LSRI from AFIS and recording the disposition in ELMO;
 - k. Lines #24-#34 show NNS receiving LSRI and STIs from AFIS indicating the AFIS activity by User: 01 on the Latent Image ID ON10814-2015-TESTCASE-002-01;
 - l. Line #35 show NNS recording the non-ident result in ELMO;
 - m. Lines #36-#65 show NNS receiving various transactions from AFIS by User: 02 for processing on the Latent Image ID ON10814-2015-TESTCASE-001-01 which is virtually the same activity for Latent Image ID ON10814-2015-TESTCASE-002-01. Included in this list of activities is line #56 which indicates an non-ident received from AFIS which is recorded in ELMO by NNS;
 - n. Lines #71-#72 show NNS receiving a STI indicating the Latent Image ID ON10814-2015-TESTCASE-002-01 has been saved to the ULF which ends the processing for this particular image;

- o. Lines #81-#82 show NNS receiving a STI indicating the Latent Image ID ON10814-2015-TESTCASE-001-01 has been saved to the ULF which ends the processing for this particular image; and
- p. Lines #83-#84 shows NNS using message text received from ELMO to create and send a response email to contributor concerning this submission for this file.

5.1.2 REMOTE LATENT WORKFLOW

1. The following table shows the sequence of activities for an existing remote latent submission. Following this table is an explanation of each activity and transaction included in the workflow related to understanding the workflow applicable to the AFIS renewal solution. The AFIS renewal solution must receive and correctly process each AFIS ICD NIST transaction sent to the AFIS renewal solution as well as respond back to NNS with the required AFIS ICD NIST transaction correctly populated with the data required by the NNS in the sequence required for each workflow.

Line #	Activity	Transaction	System/ Subsystem	Latent Image ID	Operator ID	Outcome
1.	Received	LFFS	NNS	BC30330-Test-R5-01		Passed
2.	High Level Validation	LFFS	NNS	BC30330-Test-R5-01		Passed
3.	ICD Validation	LFFS	NNS	BC30330-Test-R5-01		Passed
4.	Image Validation	LFFS	NNS	BC30330-Test-R5-01		Passed
5.	Transformation	LFFSI	NNS	BC30330-Test-R5-01	Remote1	From: LFFS To: LFFSI
6.	Created and Archived	ACKL(LFFS)	NNS			
7.	Sent	ACKL(LFFS)	NNS			
8.	Send to AFIS	LFFSI	AFIS,NNS	BC30330-Test-R5-01		
9.	Process AFIS Response	SRLI	AFIS,NNS	BC30330-Test-R5-01		

Line #	Activity	Transaction	System/ Subsystem	Latent Image ID	Operator ID	Outcome
10.	Transformation	SRL	NNS	BC30330- Test-R5-01	Remote1	From: SRLI To: SRL
11.	Created and Archived	SRL	NNS	BC30330- Test-R5-01		
12.	Sent	SRL	NNS	BC30330- Test-R5-01		
13.	Received	LFFS	NNS	BC30330- Test-R5-01		Passed
14.	High Level Validation	LFFS	NNS	BC30330- Test-R5-01		Passed
15.	ICD Validation	LFFS	NNS	BC30330- Test-R5-01		Passed
16.	Image Validation	LFFS	NNS	BC30330- Test-R5-01		Passed
17.	Transformation	LFFSI	NNS	BC30330- Test-R5-01	Remote1	From: LFFS To: LFFSI
18.	Created and Archived	ACKL(LFFS)	NNS			
19.	Sent	ACKL(LFFS)	NNS			
20.	Send to AFIS	LFFSI	AFIS,NNS	BC30330- Test-R5-01		
21.	Process AFIS Response	SRLI	AFIS,NNS	BC30330- Test-R5-01		
22.	Transformation	SRL	NNS	BC30330- Test-R5-01	Remote1	From: SRLI To: SRL
23.	Created and Archived	SRL	NNS	BC30330- Test-R5-01		
24.	Sent	SRL	NNS	BC30330- Test-R5-01		

Line #	Activity	Transaction	System/ Subsystem	Latent Image ID	Operator ID	Outcome
25.	Received	LFSRD	NNS	BC30330-Test-R5-01		Passed
26.	High Level Validation	LFSRD	NNS	BC30330-Test-R5-01		Passed
27.	ICD Validation	LFSRD	NNS	BC30330-Test-R5-01		Passed
28.	Transformation	LFSRDI	NNS	BC30330-Test-R5-01	Remote1	From: LFSRD To: LFSRDI
29.	Created and Archived	ACKL (LFSRD)	NNS			
30.	Sent	ACKL (LFSRD)	NNS			
31.	Send to AFIS	LFSRDI	AFIS,NNS	BC30330-Test-R5-01		
32.	Received	LCLO	NNS	BC30330-Test-R5-01		Passed
33.	High Level Validation	LCLO	NNS	BC30330-Test-R5-01		Passed
34.	ICD Validation	LCLO	NNS	BC30330-Test-R5-01		Passed
35.	Transformation	LCLOI	NNS	BC30330-Test-R5-01	Remote1	From: LCLO To: LCLOI
36.	Created and Archived	ACKL(LCLO)	NNS			
37.	Sent	ACKL(LCLO)	NNS			

Table 8 : Remote Latent Workflow

2. The above table shows all activities for a LFFS submission to reflect the other non-AFIS activities that also occur throughout this process. These non-AFIS activities allow a better understanding of the overall processing, shows how the data that will be sent to the AFIS renewal solution is derived and how the data received from the AFIS renewal solution would be used. The following focusses on the activities that must be supported by the AFIS renewal solution in the above example LFFS submission:
 - a. Line #8 shows NNS sending a LFFSI NIST transaction to AFIS. The Transcoder is responsible for creating the unique Latent Image ID; however, the AFIS renewal solution must ensure a duplicate Latent Image ID is never created. If a duplicate is detected the AFIS renewal solution must respond with an ERRIN;
 - b. AFIS will process the LFFSI and respond back through the NNS to the Transcoder;
 - c. Line #9 shows the SRLI NIST transaction sent from AFIS to NNS;
 - d. NNS will transform the SRLI to an SRL and send the SRL to the Transcoder (Lines #10-#12). If successful NNS will respond to the contributor with an ACKT NIST Transaction to acknowledge that the submission has been validated and can be processed;
 - e. Line #13 shows another LFFS received from the Transcoder. This implies that the Transcoder took some action on the latent and sent it again for search. Lines 13-24 are virtually a duplicate of lines #1-12 since it is showing the LFFS transaction being processed.
 - f. Line #25 shows NNS receiving the disposition NIST transaction (LFSRD) for the latent that was being processed by the Transcoder user.
 - g. Line #31 shows NNS sending a LFSRDI NIST transaction to AFIS. From an AFIS perspective this disposes the latent being processed and no further activity will occur against this latent by the Transcoder users unless the Transcoder initiates a new submission;
 - h. Line #32 shows NNS receiving the LCLO indicating the Transcoder user has finished with processing this submission. As noted in the AFIS ICD the LCLOI is not communicated to AFIS since this processing is all within the NNS.
 - i. Note: The Contractor is also responsible for providing the Transcoder renewal solution from which the LFFS and related NPS-NIST ICD transaction originate in the above example workflow. However, the Transcoder detailed requirements are described in a separate Annex within this SOW.

5.2 LATENT FINGERPRINT SEARCH REQUEST

1. The AFIS renewal solution shall process Latent Search Requests for Latent vs Ten Print searches and Latent vs Latent searches.

2. The term “Latent Search” refers to a single set-up of a latent image. The typical terminology used by RCMP is as follows. A police occurrence results in one or more latent submissions that may be comprised of several fingerprint impressions. This is referred to as a file. The Latent File Number is associated to the set of submissions corresponding to one police occurrence. For a single submission, there may be several Latent Searches prepared as a result of multiple latent images in the submission or as a result of different set-ups (e.g. lasso). The ULF holds individual Latent Images. The same image may occur multiple times on the ULF if it was adjusted or encoded differently. The LSRI holds a single set-up search performed for a single image.
3. The AFIS renewal solution shall automatically assign a Search Creation Date equal to the present date to each Latent Search.
4. The AFIS renewal solution shall augment a unique identifier (Latent Image Identifier) for each latent image committed by using the Latent Identifier submitted in the LFSI transaction and adding a two digit suffix that is incremented by one every time the same image is committed starting at '01'. (e.g., <Latent Identifier><2 digit image instance>) If an instance of an image is retained on the ULF, then the Latent Image Identifier shall be retained with it. There can be up to 99 images for one Latent Identifier.
5. The Latent Identifier passed to the AFIS in the LFSI transaction will have a 7 digit ORI prefix added by the NNS.

5.3 ENCODING & LATENT SEARCHING

1. The AFIS renewal solution shall allow for automatic and manual extraction of fingerprint features.
2. The AFIS renewal solution shall enable a user to filter the work queue by Latent File Number and by Latent Identifier, thereby enabling a single user to process through all searches pertaining to the same image or the same latent file. The AFIS renewal solution shall enable the user to perform the encoding, verification and certification of the same image on the same workstation.
3. The AFIS renewal solution shall provide the ability to save Fingerprint features of a latent image.
4. The AFIS renewal solution shall enable a technician to change the encoding of an image, the search criteria for an image (i.e., set-up of a search), add a new Search for a specific image, delete a specific Search and delete a specific image or image duplicate.
5. The AFIS renewal solution shall provide a single entry screen to support modification of descriptors, data fields from set-up and parameters for search.
6. The AFIS renewal solution shall enable a user to edit and delete automatically extracted features from latent images.
7. The AFIS renewal solution shall enable a technician to delete all minutiae within a selected area, after identifying the area with a lasso like action.
8. On Latent to Ten Print searches, the AFIS renewal solution shall search the TPF including, but not limited to, the Criminal Files, Refugee Files, Immigration files and Special Repositories as specified in the Internal Latent Fingerprint Search (LFSI); or as specified by an AFIS latent technician from within the AFIS when processing images created from the original latent included in the LFSI.

9. The AFIS renewal solution shall return the search results automatically to a central work queue.
10. The AFIS renewal solution shall enable a user to view and select the search results from a central queue based on user defined filters.
11. The AFIS renewal solution shall enable a technician to save a Latent Image or one of its duplicates to the ULF.
12. The ULF will also be used by Latent Operations to file unidentified prints so that these can be searched as part of the reverse search.
13. The AFIS renewal solution must save data in the ULF with a specific print to ensure all requirements stated through this SOW and its accompanying documents are satisfied. For example, Latent File Number, Ident Section File Number, Latent Image ID, Latent ID, Image Data, Finger Number(s), Palm Position(s), Fingerprint Features/Characteristics, Crime Type, Offence Date, Creation Date, Expiry Date, Originating Agency ID, Palm Indicator, Operator ID (of operator that last encoded the entry), Authority to Release Indicator and all data required to support the LCMC requirements and the subsection 3.5 Operational Reporting & Statistics requirements.
14. In addition, the ULF shall distinguish between finger latents and palm latents.
15. Latent search must be full penetration searches that search all TPF finger and palm prints. Since RCMP saves multiple sets of prints for a file number, this means that all sets of prints for all subjects must be included in the latent searches.
16. The AFIS renewal solution must enable a user to increase or reduce the size of the print to search by a percentage. The AFIS renewal should have a button that allows a specific configurable percentage adjustment based on the most common percentage change.

5.4 GENERAL LATENT USER INTERFACE FEATURES

1. Latent Search List
 - a. The Latent Work Queue is a list of work that must be performed by latent technicians. The Latent Technician shall be able to filter the contents of the work queue so that it includes only outstanding searches and completed searches do not appear on the list.
 - b. The Latent User Interface shall provide a work queue that can be sorted ascending / descending.
 - c. By default, the Latent User Interface (UI) shall list the searches for verification/certification in the order specified by the sequential search numbering such that all searches pertaining to the same image are grouped together on the work queue.
 - d. The UI shall enable a technician to loop forward and backward through the list of outstanding searches.
 - e. The latent UI shall automatically refresh the search list at timed intervals.
 - f. The AFIS renewal solution shall enable a user to process through a range or the entire search list without having to return to the search list to select the next search to be worked on by automatically bringing up the next search in the range or search list upon disposition of the current one.

- g. The Latent UI shall enable a technician to remove (purge) a search from the search list. If a search is pending completion of the AFIS search, then this shall cancel the AFIS search.
 - h. The Latent UI shall allow a technician to view the outstanding searches on the work queue and filter all of the searches based on the image (Latent Identifier) they are working on. When they request additional work, the AFIS renewal solution will automatically bring forward the next item from the filtered work queue.
 2. The AFIS renewal solution shall display at least the following data during the verification/certification process:
 - a. The Latent UI shall at all times display the Latent Image Identifier (unique identifier associated to an image instance) currently being worked on.
 - b. The Latent UI shall, as a minimum, display the following fields in addition to the latent and fingerprint images while verifying/certifying the results of a latent search:
 - i. Transaction number;
 - ii. Agency ORI;
 - iii. Latent File Number;
 - iv. Latent Identifier;
 - v. Latent Image Identifier;
 - vi. Candidate File Number;
 - vii. Candidate DCN;
 - viii. Candidate agency ORI;
 - ix. External TCN
 - x. Date received;
 - xi. Finger number of candidate;
 - xii. Fingerprint quality of prints; and
 - xiii. Number of minutia.
 3. The AFIS renewal solution shall enable a technician to adjust the images during the verification/certification process with at least the following capabilities using a variable sizing capability with a mouse controlled method such as slider to finely tune the adjustments:
 - a. Zoom in / zoom out an image;
 - b. Adjust brightness;
 - c. Adjust background brightness;
 - d. Rotate;
 - e. Adjust ridges from black to white;
 4. The AFIS renewal solution shall enable a technician to adjust the images during the verification/certification process with at least the following capabilities using a single click mouse method (e.g. button):
 - a. Select best fit so the AFIS renewal solution determines how to display the prints;

- b. Select actual size to display the prints in their actual size;
- c. Size to 50% through a single mouse click;
- d. Size to 200% through a single mouse click;
- e. Previous pair;
- f. Next pair;
- g. Full list (configurable parameter);
- h. Short list (configurable parameter);
- i. Minutia with tail;
- j. Minutia without tail;
- k. Hide minutia / show matching minutia;
- l. Ridge count off/on;
- m. Change match orientation;
- n. White background;
- o. Black background;
- p. Colour background;
- q. Highlight a portion of the print to analyze more closely through actions the same or similar to the following:
 - i. Isolate (e.g. box, lasso) a portion of a fingerprint on the search print and the candidate print;
 - ii. Change the portion of the print isolated (e.g. move around a box);
 - iii. Have the isolated portion of each print magnified (configurable parameter) for more detailed analysis;
 - iv. Be able to identify specific points in one print and move the focal point of the magnified portion of the print (i.e. move around in the magnified portion to better analyze whether the print is a match).
- 5. The latent UI should allow personalized settings to be configured by each user and have those personalized settings saved and used every time the user logs in to use the latent UI. These personalized should include as many UI features as possible from the above two requirements (3, 4). Additionally, the latent technician should be able to temporarily toggle between these personal setting and the default setting through a single click mouse method (e.g. button).

5.5 LATENT VERIFICATION

1. The AFIS renewal solution shall rank the candidates list in the order of most likely to least likely match and enable a technician to view the candidate list.

2. The AFIS renewal solution shall provide only a single candidate for a given Subject. That is, if a subject is both a criminal and a refugee then only one candidate is required to represent both. The AFIS renewal solution shall indicate the number of sets of fingerprints on file, including their resolutions, palm availability and quality, and enable the technician to view any of these other sets of impressions for each candidate subject.
3. If a subject has multiple sets of fingerprints on File or has both a Refugee File and a Criminal File, then only the best matching fingerprint impression identified by the search will be used for comparison. The technician will have the option of viewing other impressions from different sets on file for the same subject.
4. When viewing a palm image, the AFIS renewal solution shall visually indicate whether the palm has been certified to the file.
5. For finger latent, the AFIS renewal solution shall include on the candidate list, as a minimum:
 - a. All File Numbers pertaining to the subject (FPS Number, Employee file number, Refugee File Number, Immigration number); and
 - b. Matching Finger Number.
6. The AFIS renewal solution shall not display the AFIS score on the verification user interface, unless the user is configured to view the score.
7. The AFIS renewal solution shall enable a system administrator to configure the AFIS renewal solution hit threshold and the default number of top ranked candidates for latent to ten print searches. Refer to configurable parameters subsection for additional information.
8. The AFIS renewal solution shall enable a technician to loop forward and backward through the list of candidates and to select a specific candidate for display from the candidate list.
9. The AFIS renewal solution shall provide a side-by-side view of the Latent fingerprint or palm image along with the corresponding single finger or palm in the matching Ten Print to support verification.
10. The AFIS renewal solution shall display the unsolved latent beside the candidate ten print at the same size and scale, even if the resolutions differ.
11. The AFIS renewal solution shall enable a technician to view complete images of any of the fingers, plain impressions, ID Flat impressions or palm impressions of the candidate (including images from any sets on file for the candidate) sized and rotated accordingly beside the latent image.
12. Latent technicians generally move through the candidate list top to bottom. The AFIS renewal solution shall provide a visual indication in the Candidate List of which candidates have already been verified.
13. The AFIS renewal solution shall enable a technician to disposition with confirmation each Latent Search as either ident to a candidate or non-ident. For any ident, the AFIS renewal solution shall include a type-16 record with the screen image of the identification.

5.6 UNSUITABLE HANDLING

1. The AFIS renewal solution shall enable a technician to identify an Image as Unsuitable at the Lasso and Adjust Image stage of latent processing. Unsuitables identified while processing (after Lasso step) in the AFIS will first be reviewed by a Supervisor and, if dispositioned as Unsuitable, will result in the transaction deleted within the AFIS, and the response sent to the NNS and forwarded to ELMO indicating an unsuitable print.
2. The AFIS renewal solution shall enable a technician to identify an image as unsuitable for search and specify the reasons why.
3. The AFIS renewal solution shall enable a technician to assign a latent search to a supervisory role with work related note.
4. If an image is considered Unsuitable during processing within the AFIS, then the AFIS renewal solution shall allow the user to cancel (e.g. button) the search, include that the image is Unsuitable and the reasons why in the internal reply (LCANI), and forward this transaction to the NPS NIST Server.
5. The final consideration as to whether an image is unsuitable for search is made only by an authorized user (e.g. latent supervisor).
6. When an image is identified as Unsuitable and after notifying the NNS that this is the case, the AFIS renewal solution shall remove any transactions within the AFIS renewal solution pertaining to the unsuitable image. Any AFIS log files must remain unchanged and include a record of all activities/events related to the cancelling of the latent search.
7. The AFIS renewal solution shall provide a pick list of configurable unsuitable reasons that can be selected for inclusion in the internal reply transaction (LCANI). Refer to the AFIS ICD for a list of possible reasons that must be available in the pick list.

5.7 LATENT CERTIFICATION

1. The AFIS renewal solution shall provide the capability for a senior fingerprint technician to certify every latent identification.
2. The AFIS renewal solution shall perform certification by enabling a latent technician to view the certification finger image of the candidate beside the latent search image.
3. The AFIS renewal solution shall automatically ensure that a configurable number of two (2) senior latent technicians certify each latent identification.
4. The AFIS renewal solution shall enable a technician to display any of the fingers, the plain impressions, ID Flat impressions or palm impressions as well as any of these from any other submission on File for the candidate subject, for certification without delay. The UI response time requirements are described in the Technical requirements.
5. The AFIS renewal solution shall enable a technician to view a list of sets of prints on file including, as a minimum: Resolution, Quality, Indication of which sets on file have already been viewed, Indication of which sets on file have palms, and which of these palms are certified to the file.
6. The AFIS renewal solution shall provide a means for the technician to indicate certification of the Submission to an existing File by a single user interface action (eg. on screen button) with confirmation.

7. The AFIS renewal solution shall automatically retain a record of the certifier's identity, the finger(s) used for certification, Candidate File Number, Device ID, the date and time of certification, the Latent File Number, the Latent Identifier, the Latent Image Identifier and the AFIS Score in the Transaction Log.
8. Upon certification, the AFIS renewal solution shall automatically create a "screen image" as a locked comparison quality image that combines the submission latent search image and the image on the Ten Print File as viewed at the time of certification, containing the following information: the user ID of the latent certifier, Device ID on which Certification took place, Ten Print File Number certified to, Subject Identifier certified to, Latent File Number, Finger Number, submission latent image, Ten Print File fingerprint image, Latent Identifier as well as date and time that certification took place. The "screen image" format (JPEG or PDF) that best meets the requirement will be agreed to with the Contractor prior to implementation.
9. This "screen image" shall be created and returned to NNS, in the type-16 record, for each certification against the same latent image (i.e., where two certifications are performed on one latent image then two images shall be created; where more than two certifications are required, then each certification shall have a screen image created).
10. The AFIS renewal solution shall enable a user to print out a comparison quality hard copy of the certification screen image.
11. If an identification is not certified, then the AFIS renewal solution shall retain a Certification Declined Log of the following, as a minimum: the User ID of each latent certifier, the User ID of the verification technician(s) (if verification was performed), the verification technician recommendation, the AFIS Score, the Latent File Number and Subject Identifier of the proposed ident, the Latent Image Identifier, and the date and time that the certifier's decision was made. Refer to subsection 3.5 Operational Reporting & Statistics for the full set of data that must be recorded when a certification is declined.
12. If a certification decision overturns a verification decision, then the AFIS renewal solution shall notify the supervisor of latent operations using the same information as recorded in the Certification Declined Log.
13. The AFIS renewal solution shall enable a technician to assign a certification request to a supervisory role when the certification cannot be confirmed.
14. When the second certification results are negative, the AFIS renewal solution shall enable the technician to assign the certification request to a supervisory role for a third certification.
15. Where a certification technician determines that a candidate forwarded to certification is not identical, then the Latent technician shall have the ability to review the verification candidate list, perform the verification and, if a new hit is found, perform the certification.

5.8 SEARCH CONCLUSION

1. If the last Latent Search associated to an image is dispositioned as negative or the image is fully certified, then the technician shall conclude the search by ending the transaction.
2. The Internal Latent Search Response (TOT LSRI, LSRLI) shall include a subset of the transaction log information as defined in the AFIS ICD.

3. The AFIS renewal solution shall create and forward the Latent Fingerprint Search Response (TOT LSRI, LSRLI) to the NNS at the conclusion of a single search associated to one image.
4. Where no match is found and the technician has indicated retention of the image on the ULF, then the AFIS renewal solution shall automatically retain the Search on the ULF with Expiry Date as specified in the LFSI.
5. The AFIS renewal solution shall include in the LSRI and LSRLI all parameters needed to generate the Latent Print Match Report. A list of these parameters are detailed in the AFIS ICD.

5.9 REVERSE SEARCH

1. The Unsolved Latent File (ULF) retains all cases for which an identification could not be found. Reverse Searching refers to the practice of searching new ten prints against the ULF and any other special repositories containing latent fingerprints.
2. The Internal Ten Print Request will indicate whether a Reverse search is to be performed and which unsolved latent repositories to search against.
3. Where the Internal Ten Print Request indicates that a reverse search is to be performed, then the AFIS renewal solution shall automatically initiate a Ten Print to Latent Search, (including Palm Print to Latent Palm – if requested in the TPRI) against the latent repositories specified.
4. The AFIS renewal solution shall perform the verification of reverse search candidates above a configurable reverse search threshold score.
5. The AFIS renewal solution shall enable a technician to view candidates above the reverse search “Potential Hit” threshold and candidates that fall within the “Potential Hit” and “No Hit” threshold; and are ranked within a configurable Number of Candidates to review. The candidates that are above this “Potential Hit” Threshold must be easily distinguished from the other transaction in the reverse search queue. For example, they could be highlighted in colour at the top of the queue to alert the fingerprint technician of the “Potential Hit”.
6. The AFIS renewal solution shall forward proposed identifications to a latent certifier. Certification to reverse searches shall be carried out as per Latent Certification above.
7. The AFIS renewal solution shall not release a reverse search result without intervention by an authorized user.
8. There may be multiple identifications made on a reverse search because the ULF may hold latent impressions of the same subject active at more than one crime scene.
9. Where multiple identifications are made on a reverse search, then the Ten Print to Unsolved Latent response (TPULI) shall include all of the Latent File Numbers to which the ten print transaction identified.
10. Where the reverse search is complete, then the AFIS shall return the results to the NPS NIST Server in the Ten Print to Unsolved Latent response transaction (TPULI).
11. The AFIS renewal solution shall include in the TPULI all parameters needed to generate the Reverse Search match Report. A list of these parameters are detailed in the AFIS ICD.

12. The AFIS renewal solution shall forward proposed identifications to a latent certifier. Verification to reverse searches shall be carried out as per Latent Certification above.

5.10 UNSOLVED LATENT DELETE/AMENDMENT

1. **This section will need to be re-examined after the LCMC requirements have been developed. Please do not review. It still includes the old process herein so I can assess the impact of LCMC on this process.**
2. Users can notify RCMP NPS of a cancellation of a latent submission or an image by a telephone call, e-mail message or fax. The details of the cancellation must be added to the Latent File in the LCMC. The Cancellation Request will be performed in LCMC and the result of the cancellation and sent to the NNS. The AFIS renewal solution will cancel the search request and delete the details from the AFIS renewal solution.
3. The AFIS renewal solution shall receive and process cancellation/deletion requests (TOT ULDI) from ELMO and the remote sites via the NNS.
4. Upon receipt of a cancellation request (TOT ULDI), the AFIS renewal solution shall cancel the search request and delete the details from the AFIS renewal solution.
5. The AFIS renewal solution shall create the Cancellation Confirmation (TOT ULTRI) and send it to ELMO or the remote site via the NNS.
6. Users can notify RCMP NPS of an Expiry date amendment by a telephone call, e-mail message or fax. The details of the expiry date amendment will be added to the Latent File in ELMO. The Unsolved Latent Amend (TOT ULAI) will be created to notify the AFIS to amend the expiry date on the ULF.
7. The AFIS renewal solution shall accept and process Unsolved Latent Amendments (TOT ULAI) received from the NNS.
8. The AFIS renewal solution shall create the Unsolved Latent Amend Reply (TOT ULARI) and send it to the NNS.
9. The AFIS renewal solution shall purge/amend at all three levels: Latent File Number, Latent Identifier and Latent Image Identifier.
10. If only a Latent File Number is specified, then the AFIS renewal solution shall amend/purge all searches on the ULF associated to that Latent File Number.
11. If a Latent Identifier and Latent File Number are specified then all entries on the ULF pertaining to the particular image and file shall be amended/purged.
12. If a Latent Image Identifier is specified then only this particular Latent Image instance in the ULF will be amended/purged.
13. If the Expiry Date precedes the present date, then the AFIS renewal solution shall remove the search from the ULF.
14. If a remote AFIS site is purging a ULF entry associated with a specific latent image and there are other entries on the ULF for that same image (same Latent File Number, same Latent Identifier, same Originating Agency ID), then the AFIS renewal solution shall automatically return a warning to the remote AFIS site advising them that they may wish to purge all entries associated with the same image. The wording of this message is to be as follows: "Please ensure that you have deleted all instances of the same image <Latent Identifier> from the RCMP ULF if the latent has been identified."

15. The AFIS renewal solution shall return this notification/warning as a Narrative Message with the acknowledgement of the purge (TOT ULDRI).

5.11 ULF PURGE AND RETENTION

1. Each Internal Latent Search Request (TOT LFSI) will be received with an Expiry Date.
2. The AFIS renewal solution shall use the OSR to determine the Expiry Date to indicate the date when the entry will be purged automatically.
3. For example, murders and other serious crimes have an Expiry Period of 99 years, B&Es might have a default expiry period of 8 years, sexual assaults 20 years and so on.
4. When an entry in the ULF reaches its Expiry Date, then the AFIS renewal solution shall automatically purge the entry.

5.12 INTERNATIONAL LATENT FINGERPRINT FEATURES SEARCH REQUESTS

1. The AFIS renewal solution shall prepare US EBTS-compliant Latent Fingerprint Feature Search Transactions (TOT US LFFS) and forward these to the NNS for issuance to the FBI AFIS, in the US.
2. The AFIS renewal solution shall enable a latent technician to initiate the preparation of a US EBTS Latent Fingerprint Feature Search Transaction (TOT US LFFS).
3. The NNS supports the interface between the RCMP and FBI in the same manner as all other contributors. The key exception with the FBI is that NNS also supports sending search requests to the FBI AFIS and receiving response results automatically.
4. The FBI has a limit on the number of transactions per type that it will accept per day. Latent searches are especially limited and may be subject to search penetration limits as well. Latent transactions above this penetration level will be rejected and will require additional filters.
5. The AFIS renewal solution should provide the ability to automatically encode, translate or both (as required) to create a US EBTS EFS compliant transaction (TOT US LFFS) with as little additional effort over and above the encoding done for the Canadian search as possible on the part of the latent technician (e.g. adding text for fields required for the FBI search).
6. The AFIS renewal solution shall receive the FBI Latent Search Results (TOT USSRL) from the NNS and forward to a latent work queue for verification.
7. The AFIS renewal solution shall enable a user to view the verification packet received from the FBI (TOT USSRL), perform the comparisons and disposition in a similar fashion as those searched against the Canadian database.
8. The AFIS renewal solution shall record the disposition results from the foreign verification packet in LCMC and shall send the Internal Latent Foreign Search Reply Transaction (TOT LSRFI) the NNS.
9. The AFIS renewal solution shall automatically log the activities performed to carry out latent international exchanges and update the Transaction Log accordingly.

5.13 SPECIAL SEARCH AND FILE REQUESTS

1. The AFIS renewal solution shall enable a user to initiate a Latent to TP search from a single latent fingerprint captured from a latent workstation peripheral (camera or scanner) within the AFIS environment.
2. The Latent User Interface features will be used to adjust these images captured directly into the AFIS renewal solution and use the normal latent workflow. Note: This is to be examined more closely with LCMC requirements.

5.14 MANAGEMENT OF REMOTE SITES

1. The RTID Remote Transcoder will enable remote AFIS users to search on the national Ten Print File and ULF directly through NIST transactions, verify their search results, submit searches to be added to the RCMP ULF, disposition their latent searches, fetch Ten Prints or latents and purge their searches added to the RCMP ULF.
2. The AFIS renewal solution shall process and prepare replies for the following remote site transactions in a fully automated manner based on the AFIS ICD and workflow described in this SOW and its accompanying documents.
 - a. Latent Fingerprint Feature Search (TOT LFFSI), its reply (TOT SRLI) and corresponding search disposition (TOT LFSRDI);
 - b. Unsolved Latent Delete and its reply (TOT ULDI, ULDRDI);
 - c. Unsolved Latent Retrieve and its reply (TOT ULRI, ULRRI); and
 - d. Fingerprint Image Request and its reply (TOT IRQI, IRRDI).
 - e. ULF Enroll and its reply Internal transaction (TOT ULEI, ULERI)
3. The AFIS renewal solution shall receive fingerprint search disposition information (TOT LFSRDI) from remote AFIS sites via the NNS to support central reporting and monitoring.
4. The AFIS renewal solution shall forward the Disposition response (TOT LFSRDI) to the Remote Network Search Coordinator (RNSC) when the LFSRDI indicates that the transaction should be forwarded to the RNSC (Forward to RNSC Reason Code).
5. Note that the NNS will add the 'Forward to RNSC Indicator' to the Disposition response (LFSRDI) based on the CPIC File Status and File Type.
6. The AFIS renewal solution shall only allow remote AFIS sites to have the ability to enrol/delete ULF entries that belong to their agency.
7. The AFIS renewal solution must provide the ability to limit the activities of an uncertified remote latent user, where the RNSC can monitor and certify any work completed by the uncertified remote latent user.
8. The AFIS renewal solution shall enable the RNSC to monitor remote AFIS site activity by providing the following capabilities on the ULF and using the 'remote transaction queue':
 - a. The ability to purge remote AFIS site searches on the ULF one at a time or by Latent File Number on the RNSC's Latent Workstation at RCMP HQ.

- b. The ability to re-encode or edit remote AFIS site searches on the RNSC Latent Workstation at RCMP HQ and either amend the existing search or create a new search.
 - c. The ability to amend the Expiry Date of a remote AFIS site search on the ULF.
 - d. The ability to amend the data descriptors of a remote AFIS site search on the ULF.
 - e. The ability for the RNSC to resubmit remote AFIS site Latent Searches for search against the national Ten Print File and selected special repositories.
9. The AFIS renewal solution shall enable the RNSC to obtain comparison quality hard copy images of the display screen. That is, the RNSC must be able to certify latent matches using the print out of the screen display.
10. Where a latent enrolment transaction is received with requirement to save to the ULF and no Expiry Date is specified then the AFIS renewal solution default shall apply.
11. The AFIS renewal solution shall automatically record in LCMC when an identification is made at a remote AFIS site by an uncertified remote operator and notify the RNSC.
12. PC Duo is the remote software used by RNSC to support the remote site Transcoder users. The AFIS renewal solution must support the ability for the RNSC to be able to continue to provide this support for remote sites.
13. The AFIS renewal solution shall enable the RNSC to perform the same functions on the RNSC Latent Workstation as in Encoding & Latent Searching, Verification & Search Conclusion above.
14. The AFIS renewal solution should enable the RNSC at RCMP HQ to effectively monitor remote activity on the ULF using the RTID Latent Workstation.
15. The AFIS renewal solution shall retain, in a 'remote transaction queue', all remote latent search disposition transactions (LFSRDI) that have a "Forward to RNSC Reason Code".
16. The "Forward to RNSC Reason Code" transactions shall remain in a WIP queue (remote transaction queue) until the Remote Network Search Coordinator has explicitly deleted them from the queue or has concluded the review of the transaction.
17. The 'remote transaction queue' shall enable the RNSC to select an item from a filtered list of items from the queue. In addition, the RNSC shall have the ability to filter the remote transaction queue by Forward to RNSC Reason Code, operator id, Latent Image Identifier, and Latent File Number.
18. The 'remote transaction queue' shall enable the RNSC to "force close" one, a selection of items, or all filtered items from the queue. The AFIS renewal solution shall return a latent cancel (TOT LCANI) indicating the Final Search Result Code as Cancelled and the Cancelled Reason Code as 'Cancelled by RNSC'.
19. The AFIS renewal solution shall delete transactions that are complete from the 'remote transaction queue' after a configurable period of time. In this case an LCANI is not required.
20. If the RNSC authorized user deletes a latent transaction from the work queue and indicates that the AFIS renewal solution is not required to send a notification to the NNS to indicate the action, then no notification will be sent to the NNS.

21. The AFIS renewal solution shall enable a technician to cancel a latent transaction on the work queue, at any stage of processing. As part of this cancellation process the AFIS renewal solution shall allow the technician to select a cancellation reason. The AFIS renewal solution shall return a latent cancel (TOT LCANI) to the NNS.

6. AFIS DIRECT FILING/SCANNING REQUIREMENTS

6.1 GENERAL

1. The AFIS renewal solution must provide a direct file and direct scan capability to support special scanning services.
2. These special scanning services (direct file, direct scan) can be provided on the same workstation; however, the separate functions must be clearly identified.
3. These special scanning services must be limited to authorized personnel. The minimum of two (2) workstations (redundant in case of temporary failure of one workstation) will be located in a physically separate area within RCMP HQ. As with all AFIS workstation access the special scanning services must be controlled by two factor authentication (i.e. biometric and password).
4. These special scanning services shall be used for specialized situations such as Foreign Fingerprint Submissions, exceptional requests, and information considered sensitive.
5. These special scanning services shall include image scanning and association of these images, where possible, to a specific File Number, and DCN. Two (2) GFE flatbed image scanners are already allocated to the special scanning services. If the Contractor chooses to provide a separate scanning solution, at the Contractor's expense, then the scanner must be FBI certified and support the scanning requirements identified herein.
6. The AFIS renewal solution shall enable an operator to attach a work related note to these scanned images.
7. The AFIS renewal solution shall make documents scanned at special scanning available for viewing immediately in the region for which these activities are assigned.
8. The special scanning services shall also handle the conversion of paper (i.e. paper C216 form) or electronic document images to internal NIST transactions. These images may be received as e-mail attachments, an image collection on CD, and so on. They are received in various image formats and compressions (typically JPEG, bitmap or .TIF files).
9. The special scanning services shall be designed to handle 10,000 transactions per year.
10. There is no interaction with NNS for direct filing/scanning.

6.1.1 UNIQUE IDENTIFIERS AND LOGGING

1. The special scanning services shall maintain a log of assigned identifiers such that no two submissions and no two documents to be scanned have the same identifier.
2. The special scanning services shall use the unique identifiers to create a NIST packet (TPSEI, TPRI) that is submitted directly to the AFIS renewal solution. Direct file/scan NIST packet do not get submitted to NNS. This NIST packet approach allows consistency with all other transactions and awareness of the process by RCMP for audit purposes. The Contractor can propose an alternate approach that provides the same or better level of security and process; however, this alternate approach must be approved in writing by the RCMP prior to the proposal being submitted by the Contractor.

3. The special scanning services shall log all activities performed during processing.

6.1.2 FORMATS AND SCANNING

1. The special scanning services shall be capable of converting the C-216 fingerprint form formats into an electronic NIST packet.
2. The scanning equipment shall be designed and configured in such a way that documents are protected from damage, loss or marking.
3. The special scanning services shall capture the document image, fingerprint images, palm images in a single pass at varying resolutions.
4. The fingerprint areas of fingerprint forms are particularly sensitive to damage or unnecessary marking. The Contractor's solution must ensure there is no damage to the forms.
5. The scanning process and equipment shall be designed such that there is no loss of document integrity (e.g., scanning part of one document to another).
6. The scanning equipment shall not alter the information provided on the original submission.
7. The special scanning services and its processes shall not damage or obscure information on the fingerprint form, in particular fingerprint impressions with any marking/label affixed or printed on the fingerprint forms.
8. The special scanning services shall provide whatever features are provided to adjust and capture the fingerprints regardless of their placement on the form, on the front side of the document or the back side of the document as well.
9. The scanned fingerprint images and palm images shall conform to the scanned fingerprint form and not exceed the ANSI NIST-ITL-1-2011 maximum size dimensions.
10. The scanners should support operator adjustment of brightness and contrast and be able to display the scanner settings.

6.1.3 RESOLUTION

1. The special scanning services shall apply the standard compression for fingerprint images WSQ nominal 15:1.
2. The special scanning services shall capture (i.e., "scan") rolled and plain fingerprint impressions as well as palm impressions at 256 levels of greyscale (eight bits/pixel) and at a minimum of 500 +/- five pixels/inch, and record the resultant images at 500 +/- five pixels/inch as defined for Type-4 or Type-14 records in the NPS-NIST External ICD and ANSI/NIST standard ANSI/NIST-ITL-1-2011, Data Format for the Interchange of Fingerprint Information. If a scanning resolution greater than 500 pixels/inch is used, it shall have a tolerance of +/- one percent of the scanning resolution.

6.1.4 SEGMENTATION

1. For rolled/plain impressions, the special scanning services shall capture and segment up to 14 fingerprint impressions from each fingerprint Submission, including, as a minimum, all 10 rolled impressions, both thumbs from the plain impressions and the two four-finger plain impressions.

2. When a fingerprint form is prepared in the field, the correct fingerprint will be inked in each of 14 designated fingerprint blocks. The primary exception to this rule is a subject who is missing one or more fingers, or is unable to support the fingerprinting of one or more fingers for another sufficient reason (e.g., bandaged). In this case, the fingerprint form blocks corresponding to the missing finger(s) are marked ("Amp" for amputation, or other reason) by the preparer. In the rare event that a subject has more than 10 fingers, then the technician will select 10 fingers to be used in the NIST blocks and the entire form will be scanned at 500 ppi for preservation of the complete set.
3. The special scanning services shall capture images of all the fingerprint blocks present on the fingerprint form. This includes those that contain an impression, those that do not but are marked by the preparer accordingly missing, with an appropriate reason (e.g.: as "Amp" or "Bandaged"). The special scanning services shall report the missing digit(s), (amputated, bandaged or otherwise missing impressions) appropriately in the corresponding electronic Type 2 record, in accordance with the NPS-NIST External ICD.
4. The special scanning services shall provide for the capture of fingerprint blocks on the front of the form as well as the back.
5. Based on the ten-print fingerprint form dimensions from the C216 and C216C sample fingerprint forms, the special scanning services shall provide default positions for each of the fingerprint segmentation blocks as follows:
 - a. Rolled blocks shall coincide with the pre-printed fingerprint form blocks;
 - b. The left and lower margins of the left plain four finger block shall coincide with the left and lower margins of the pre-printed block;
 - c. The right and lower margins of the right plain four finger block shall coincide with the right and lower margins of the pre-printed block;
 - d. The lower margin of each plain thumb impression block shall coincide with the lower margin of each pre-printed block;
 - e. Each block shall be centered horizontally over its corresponding pre-printed block;
 - f. The same default block positioning approach shall apply to fingerprint form types that are not covered by the referenced specification;
 - g. File number barcode; and
 - h. DCN / Doc ID.
6. The special scanning services shall provide a means of shifting images that are partially out of the pre-printed block to place the segments within the image of the fingerprint area of the fingerprint form to capture as much fingerprint data as possible, even if some overlap with other blocks occurs.

6.1.5 USER INTERFACE

1. The special scanning services shall capture and segment up to 14 fingerprint impressions from each fingerprint Submission, including, as a minimum, all 10 rolled impressions, both thumbs from the plain impressions and the two four-finger plain impressions.

2. The special scanning services must be configurable in the same or a similar manner as the AFIS workstation. The configurability can be limited to only the fields being processed by direct filing/scanning.
3. After all fields have been entered in the UI, the special scanning services must allow a review before committing the transaction.

6.2 DIRECT FILING

1. The direct filing process must allow all the fields on the form to be captured and/or filled; and submitted in the TPRI NIST packet with the prints. The following are the minimum fields:
 - a. File number;
 - b. File type;
 - c. DCN / Doc ID;
 - d. Sex;
 - e. TOT;
 - f. Indicate whether a search should be performed;
 - g. Select the list of repositories to search;
 - h. Indicate whether a manual certification is required;
 - i. Indicate whether auto reject is allowed;
 - j. Indicate whether paper certification is required;
 - k. Transaction date;
 - l. Provide fingerprint quality override reasons, if necessary;
 - m. Provide fingerprint missing reasons, if necessary;
 - n. Indicate whether the transaction should be retained; and
 - o. Date fingerprinted.
2. The Contractor will determine the default settings, for the above fields, with the RCMP prior to implementation.

6.3 DIRECT SCANNING

1. The direct scanning process only requires DCN/Doc ID and file number to be captured and submitted in the TPSEI NIST packet with the prints. The mandatory fields are identified in the TPSEI in the AFIS ICD.
2. User activity/event logging must be recorded to allow reporting in the various AFIS renewal reports (refer to section 3.5 for reporting details).

7. AFIS ADDITIONAL REQUIREMENTS

7.1 PALM PRINT SEARCHING

1. The AFIS renewal solution must retain palm prints received as part of a Submission where the Retain flag is positive.
2. Refer to 3.6 Volumetrics and Service Delivery for the palm prints capacity requirements that must be satisfied by the AFIS renewal solution.
3. The Contractor shall provide for palm print searching as stated in this SOW and its accompanying documents.
4. The AFIS renewal solution shall perform the automatic segmentation and feature extraction of the palm print images.
5. The AFIS renewal solution shall permit a fingerprint technician to edit the automatically extracted features, rotation, segmentation and perform image adjustments as part of Ten Print Manual QC.
6. The AFIS renewal solution shall perform the searching of palm prints against the existing collection of palm or finger prints, where requested.
7. The AFIS renewal solution shall perform the searching and comparison of latent prints to the palm print collection, where requested (Latent Palm to Palm).
8. The AFIS renewal solution shall allow the latent user to identify which palm position to search. Refer to AFIS ICD tag 15.013 for details.
9. The AFIS renewal solution shall perform reverse search of palm prints to unsolved latent impressions for new fingerprint submissions including palms (Palm to Latent Palm). All applicable submissions (i.e. those subject to reverse search as per AFIS ICD processing) shall have the palm impressions searched against the ULF.
10. The AFIS renewal solution shall store latent palm impressions with a NIST-compliant Position (tag 15.013) as a descriptor.
11. The AFIS renewal solution shall search every palm-only submission against the Ten Print File. A palm-only submission is one that is not accompanied by a full set of rolled or plain impressions
12. The AFIS renewal solution shall enable a certifier to certify the palms on a submission to palms on file for the same subject. This will result in the palms being “certified” to the file. This feature is required in cases where the subject has no fingers or the fingers are unsuitable for search.
13. The AFIS renewal solution shall support the search of palm latents against a Special Repository and of palm impressions against a Special Repository.
14. Where an electronic submission is received with a palm print, and the prints are to be stored on AFIS, the AFIS renewal solution shall indicate that the palms have been “associated” to the file.
15. For clarity, the complete set of palm images shall be retained on AFIS and be searchable. This shall include the upper, lower and writer’s palms. Where a full palm is provided, the full palm images and the writer’s palms shall be retained.

7.2 AFIS DATA EXTRACTION FOR REPORTING

1. The AFIS renewal solution shall make data available for Extract, Transform and Load (ETL) to the RCMP's Cognos Reporting process. The RCMP in collaboration with the Contractor will determine the data to be extracted prior to implementation.
2. The AFIS renewal solution process that prepares the data for extraction must assure that only data for transactions which have been completed are prepared for extraction.
3. The AFIS renewal solution must identify transactions for which no response was issued and the transaction is in a state that prevents any further processing.
 - a. Any transaction in this category shall also be included in the data for extraction to the RCMP's Cognos reporting system.
5. The AFIS renewal solution shall "push" a text file extract of the required data elements to a predetermined RCMP network area directory (location of directory shall be configurable). The text file extract must be a Comma-separated values (CSV) file. The reporting system is already designed to support a CSV file. The Secure File Transfer method identified by the RCMP (refer to compliancy documents) or equivalent secure method approved by DSB must be used.
6. The AFIS renewal solution must support at least one extract per day without affecting the performance and SLA requirements. The extract time period must be configurable.
7. A process running remotely (within the RCMP/AFIS renewal solution infrastructure) shall access the data source (extract) to feed the RCMP's Reporting infrastructure.
 - a. The data source access is expected to occur daily;
 - b. The AFIS renewal solution must ensure the ETL files are uniquely named and ordered to ensure each file can be retrieved in order. This is to ensure files are retrievable, in order, in case they are not retrieved before the next file is created; and
 - c. The AFIS renewal solution must provide the filename structure that supports the requirement, which will be approved during implementation stage.
8. The AFIS renewal solution shall explain how this ETL requirement will be satisfied in the Contractor's proposal including at least the following:
 - a. Any negative impact to the Contractor's proposal solution by the use of an ETL strategy; and
 - b. Any impact to data retention on the AFIS renewal solution.

8. AFIS TECHNICAL REQUIREMENTS

8.1 CONFIGURABLE PARAMETERS

1. The AFIS renewal solution must be designed with an emphasis on configurable parameters to maximize the flexibility to change the solution without requiring a code change. As well, to the greatest extent possible, these configuration parameters must be modifiable without requiring a server restart to complete the change; therefore, the change can be effected automatically or within a thirty (30) minute outage where specific process restarts will restart using the change. The following subsections identify configurable parameters that must be supported by the AFIS renewal solution at a minimum. With assistance from RCMP if necessary, the Contractor is responsible for identifying the value of all configurable parameters as part of the evaluation process. That is, it is the Contractor's responsibility to assign values for the configurable parameters that provide the Contractor with the best opportunity to pass the benchmark testing which is part of the bid evaluation process.
2. The AFIS renewal solution must effectively support all the functionality associated with the configurable parameters. For example, the time for UI inactivity before screen is locked configurable parameter requires the AFIS renewal solution to be monitoring the user activity and when the time threshold has been met, the AFIS renewal solution must locked the user's AFIS workstation. Once locked the user must login again to access the AFIS workstation.

8.1.1 THRESHOLDS

1. The following are the minimum thresholds parameters that must be configurable by the AFIS renewal solution
 - a. TP Match 1:N Thresholds – The AFIS renewal solution must provide a score threshold for a System Declared Hit and a No-Hit; where:
 - i. Any score above the System Declared Hit value indicates an ident by the AFIS renewal solution;
 - ii. Any score below the No-Hit value indicates an non-ident by the AFIS renewal solution; and
 - iii. A score between the System Declared Hit value and the No-Hit value is considered a grey area where there are candidates worthy of consideration for verification and manual intervention is required to determine whether an ident can be proposed.
 - b. TP Match 1:1 Thresholds – The AFIS renewal solution must provide a score threshold for a System Declared Hit and a No-Hit; where:
 - i. Any score above the System Declared Hit value indicates an ident by the AFIS renewal solution for the candidate;
 - ii. Any score below the No-Hit value indicates an non-ident by the AFIS renewal solution for the candidate; and

- iii. A score between the System Declared Hit value and the No-Hit value is considered a grey area where there are candidates worthy of consideration for verification and manual intervention is required to determine whether an ident can be proposed for the candidate.
- c. Latent Search Thresholds – The AFIS renewal solution must provide a score threshold for a System Declared Hit and an unlikely Hit; where:
 - i. Any score above the Potential Hit value indicates a potential ident by the AFIS renewal solution which must be highlighted;
 - ii. Any score below the Latent Low value indicates a likely non-ident by the AFIS renewal solution; and
 - iii. A score between the Potential Hit value and the Latent Low value is considered a grey area where there are candidates worthy of consideration a Latent fingerprint technician to determine whether an ident can be proposed.
- d. Reverse Search Thresholds – The AFIS renewal solution must provide a score threshold for a Potential Hit and an unlikely Hit; where:
 - i. Any score above the Potential Hit value indicates a potential ident by the AFIS renewal solution;
 - ii. Any score below the Reverse Low value indicates unlikely non-ident by the AFIS renewal solution; and
 - iii. A score between the Potential Hit value and the Reverse Low value is considered a grey area where there are candidates worthy of consideration for verification and manual intervention is required to determine whether an ident can be proposed.

8.1.2 QUALITY MEASURE

1. The following are the minimum quality measure parameters that must be configurable by the AFIS renewal solution
 - a. Quality threshold – The AFIS renewal solution must automatically determine a quality measure for fingerprints received for search. This quality threshold must be able to consistently determine the quality of any fingerprint and assign as quality score for the fingerprint based on NIST Fingerprint Image Quality (NFIQ2). The AFIS renewal solution must be able to use this quality score to compare against the quality threshold to determine if the finger meets the minimum quality for search.
 - b. Number of Quality Fingers – The AFIS renewal solution must provide the ability to identify how many fingers must meet the minimum quality threshold to be considered for search. For example, if the quality fingers number is three (3) fingers, then at least three (3) fingers of the prints submitted for search must meet the minimum quality threshold. If the minimum number of fingers has not been met and the Allowed to Auto Reject Indicator is “Yes”, then the transaction will be rejected as poor quality.
 - c. The above two (2) configurable parameters must be considered together by the AFIS renewal solution to determine whether a set of fingerprint meets the minimum quality for search.

- d. If Auto Reject Indicator is “No” and the fingerprints do not meet the minimum quality for search, then the transaction must go to a Wait for Quality Check state requiring manual intervention by a fingerprint technician.
- e. The “Plain Quality Indicator” identifies the quality value by which the plain impressions must exceed the rolled impression before the plain impressions will be used in the search instead of the rolled impressions. The result of the processing by the AFIS renewal solution using this configurable parameter could have a mix of rolled and plain impressions used in the search.
- f. Any size limitations (e.g. minimum size for finger) that affect the AFIS renewal solution processing must be clearly indicated in the Contractor’s proposal, as well, as the impact of changing the size. For example, a quality check fails resulting from a print being too small. These box sizes must be configurable.

8.1.3 OUT OF SEQUENCE

- 1. The AFIS renewal solution must have a configurable parameter that allows out of sequence errors to go to Wait for Manual Cut regardless of whether or not the Allowed to Auto Reject Indicator is “Yes”. This allows RCMP to correct out of sequence error if desired.

8.1.4 LIST LIMIT PARAMETERS

- 1. The following are the minimum quality measure parameters that must be configurable by the AFIS renewal solution
 - a. Default Minimum Number of TP candidates - The AFIS renewal solution must have a configurable parameter that identifies the minimum number of TP candidates that will be presented to the user;
 - b. Default Maximum Number of TP Candidates - The AFIS renewal solution must have a configurable parameter that identifies the maximum number of TP candidates that will be presented to the user;
 - c. Default Minimum Number of ULF Candidates - The AFIS renewal solution must have a configurable parameter that identifies the minimum number of ULF candidates that will be presented to the user;
 - d. Default Maximum Number of ULF Candidates - The AFIS renewal solution must have a configurable parameter that identifies the maximum number of ULF candidates that will be presented to the user;
 - e. Default Minimum Number of TP Candidates To Review - The AFIS renewal solution must have a configurable parameter that identifies the minimum number of TP candidates that the user must review before the transaction can be dispositioned;
 - f. Default Minimum Number of ULF Candidates To Review - The AFIS renewal solution must have a configurable parameter that identifies the minimum number of TP (ULF-TP) or ULF (ULF-ULF) candidates that the user must review before the transaction can be dispositioned;
 - g. Default Minimum Number of Reverse Search Candidates To Review - The AFIS renewal solution must have a configurable parameter that identifies the minimum number of reverse search ULF candidates that the user must review before the transaction can be dispositioned;

- h. Default Minimum Number of Latent Certifiers - The AFIS renewal solution must have a configurable parameter that identifies the minimum number of latent certifiers (initial value = two (2)); and
- i. Default Minimum Number of Finger to be Examined - The AFIS renewal solution must have a configurable parameter that identifies the minimum number of fingers to be examined to consider a transaction reviewed (initial value = one (1)).

8.1.5 REGIONS

1. The AFIS renewal solution must be configurable with a concept of regions, where a region is defined as an area within which a set of transactions will be processed. The AFIS renewal solution must allow each region to have separate configurable parameters that allow the thresholds, quality measures and other configurable parameters to be applied per region.
2. The AFIS renewal solution must be initially configured with at least the following regions and they must process the transactions specified in each region:
 - a. TP region, supporting all TP transactions, except IMM and REF;
 - b. TRB region supporting IMM and REF transactions;
 - c. Latent region supporting all central latent and reverse search transactions;
 - d. RNSC region supporting all remote latent transactions; and
 - e. Direct Filing region supporting Direct Filing and Direct Scanning transactions.
3. The AFIS renewal solution must also support the creation of at least 5 additional regions without affecting the overall performance requirements stated in this SOW and its accompanying documents.
4. Each AFIS user must be able to select the region within which they want to work as part of their login process. AFIS users normally work in either TP or Latent at one time depending on their role. Since the TRB region includes special TP transactions, with different thresholds and quality measures, the AFIS renewal solution must allow an AFIS user to select a combined region within which they want to work as part of the login process that will allow them to work on TP transactions from the TP region and the TRB region.
5. The AFIS renewal solution must support adding regions, deleting regions and changing which type of transactions are processed in a specific region with minimal effort.
6. As with all requirements in this SOW and its accompanying documents, each region must be available in French. The AFIS user must be able to select the French version of the region within which to login or the French version of the region must be presented to the user based on their language preference identified in the User Management Function of the AFIS renewal solution.
7. There must be a correlation between regions and work queues. This correlation and the queues will be determined through a collaborative effort between the RCMP and the Contractor. The Contractor must present a proposed approach for queues that best supports the requirements stated in this SOW and its accompanying documents.

8.1.6 REPOSITORIES

1. The AFIS renewal solution must be configurable with a concept of repositories, where a repository is used to retain specific sets of prints under a file type.
2. The AFIS renewal solution must be initially configured with at least the following repositories:
 - a. TP Repositories
 - i. Criminal;
 - ii. Refugee;
 - iii. Employee;
 - iv. Immigration (TRB files); and
 - v. Two (2) additional special TP repositories for special purposes.
 - b. Latent Repositories
 - i. ULF (finger & palm); and
 - ii. Five (5) additional special latent repositories for special purposes.
3. The AFIS renewal solution must also support the creation of at least six (6) additional TP repositories and six (6) additional latent repositories, of varying sizes at any given time, without affecting the overall performance requirements stated in this SOW and its accompanying documents.
4. The AFIS renewal solution shall enable an AFIS users to file and search against these repositories only apart from the routine workload.
5. The AFIS renewal solution shall also enable these repositories to be targeted for search as part of the routine workload.
6. If used for routine processing, the Internal Ten Print Request will indicate which of these repositories to search against.
7. The AFIS renewal solution shall assign a Logical Name (File Type Code) to each Special Repository. This code shall be used to indicate which repository to target for search, deletion, amend, file to or other applicable functions.
8. Special repositories may also be set up for testing program effectiveness.
9. The AFIS renewal solution shall enable the entries in these Special Repositories to be searched against the TPF and the ULF.
10. The AFIS renewal solution shall provide the ability to selectively manage, backup and delete a special repository database and a special repository definition.
11. The AFIS renewal solution shall perform all searches available for other repositories. Refer to subsection 3.1, item 7 for the list of searches that must be supported.

8.1.7 TIME RELATE PARAMETERS

1. The AFIS renewal solution must have configurable parameters for at least the following time related parameters:
 - a. Time after a transaction has been completed that is stays in the queue (initial value = 24 hours);

- b. The frequency that reports are automatically generated (initial value = 24 hours);
- c. Retention period before data, transactions and transaction log automatically move to an administrative archive for audit purposes (initial value 2 years);
- d. Retention period for maintaining the Audit Log (initial = indefinite);
- e. Time AFIS UI is refreshed automatically (initial = 30 seconds);
- f. Time for UI inactivity before screen is locked (initial = 30 minutes); and
- g. Time for UI inactivity, after the screen has been locked, before a user is automatically logged off (initial 30 minutes).
- h. Note: The Contractor's Entire AFIS renewal solution must require a user login after the screen has been locked.

8.1.8 TOGGLE/ATTEMPTS RELATED PARAMETERS

1. The AFIS renewal solution must have configurable parameters for at least the following toggle related parameters:
 - a. Toggle to turn on auto segmentation;
 - b. Threshold for number of unsuccessful login attempts before a user account is locked out (initial value = three (3)); and
 - c. Toggle to turn on Manual Biometric Consent.

8.1.9 SIZE BASED PARAMETERS

1. The AFIS renewal solution must have configurable parameters for at least the following size related parameters:
 - a. Magnification size for prints.

8.1.10 TABLE BASED PARAMETERS

1. The AFIS renewal solution must have configurable tables, with unlimited expansion, that an authorized user can add, change or delete, where separate tables are available for at least the following:
 - a. Agency ORI table (list of all ORIs);
 - b. Authorized Agency ORI table (list of ORIs authorized to submit AFIS transactions);
 - c. Civil application types and sub types;
 - d. Missing fingerprint reason codes and descriptions;
 - e. Sex selection options;
 - f. Province codes and description;
 - g. Complexion codes and descriptions;
 - h. Hair colour;
 - i. Eye colour;
 - j. Scars, marks and tattoo codes and descriptions;
 - k. Race codes and descriptions;

- l. Next of kin codes and descriptions;
- m. Country codes and descriptions;
- n. Vulnerable sector codes and descriptions;
- o. Language codes and descriptions;
- p. Province of birth codes and descriptions;
- q. Fingerprint quality reasons codes and descriptions;
- r. Authority to release codes and descriptions;
- s. Fingerprint codes and descriptions;
- t. Internal priority codes and descriptions;
- u. File number prefixes codes and descriptions;
- v. Crime type codes and descriptions;
- w. Repository codes and descriptions; and
- x. Internal TOT codes and descriptions.

8.2 USER MANAGEMENT AND ROLE BASED ACCESS CONTROLS (RBAC)

1. The AFIS renewal solution must support user management through a Windows based intuitive, easy to use UI for the production administrators and any other user authorized to use the user management capabilities. The UI must allow the data identified herein to be easily managed (i.e. add, change, delete, disable, enable).
2. The AFIS renewal solution must support the Role Based Access Controls (RBAC) requirements stated herein and throughout this SOW and its accompanying documents.
3. This one user management UI must also support all user management capabilities required for the Verification Subsystem (VSS). Refer to Annex D for detailed requirements concerning VSS.
4. The System shall include application-specific user IDs and passwords.
5. The passwords shall not be hard-coded and must be stored in an encrypted form that satisfies Government of Canada requirements (i.e. Communication Security Establishment (CSE) standards ISA-11(b) or later)
6. AFIS users shall only be presented with options and resources for which they have authorized access, based on their user profile and group membership.
7. The System shall uniquely identify and authenticate all users and resources that require access to AFIS resources.
8. The System shall not store or cache I&A information on platforms other than those explicitly sanctioned by RCMP Security Infrastructure Services.
9. The System shall not cache sensitive information after use.
10. The System shall provide auto-alarming of unauthorized access attempts to designated roles, such as the System Administration subsystem operating under the root password.

11. Any fields listed in the user management UI that have a list to choose from should be presented in the UI through a drop down pick list, or similar user friendly method, for any fields that have values that available for a pick list.
12. The user management UI must allow the authorized user to add, change or delete at least the following data in support of managing access to the AFIS renewal solution :
 - a. Roles;
 - b. Groups;
 - c. User ID;
 - d. User name;
 - e. Change password;
 - f. Language of work;
 - g. Trainee designation; and
 - h. Permissions - work specialties, type of work, functions (e.g., Ten Print QC, Ten Print Verification, Ten Print Certification, Ten Print Exception Handler, Ten Print Supervisor). These permissions will be based on the functions identified in the RBAC subsection herein;
13. The AFIS renewal solution's admin function shall enable an authorized user to release locked transactions, which will be returned to the queue.
14. The Contractor shall determine which user profile items are configurable at the user level or at the group level in collaboration with RCMP.

8.2.1 ROLE BASED ACCESS CONTROLS

1. For purpose of explaining the access control requirements stated herein and throughout the AFIS renewal SOW and its accompanying documents, the following definition for access control is used:
 2. Access Control is any mechanism by which a system grants or revokes the right to access some data, or perform some action.
 3. The approach to providing AFIS renewal solution access control requirements that the AFIS renewal solution must provide are in accordance with the NIST Role-Based Access Control (RBAC) Standard². Central to this standard is the concept of assigning a role to a user. This is a fundamental mechanism that must be employed by the AFIS renewal solution to ensure that the relevant policies, operating procedures, and overall transaction security are enforced.
 4. These requirements that must be satisfied by the AFIS renewal solution have been developed with reference to the NIST Core RBAC Model as shown in Figure 2. This model provides the key semantic concepts on the subject of access control, is the conceptual basis for the NIST standard, and has been largely adopted and implemented by many different vendor communities. These reasons illustrate why the Core RBAC model is considered to be an excellent starting point for developing a concise set of access control requirements to serve the present business requirements.
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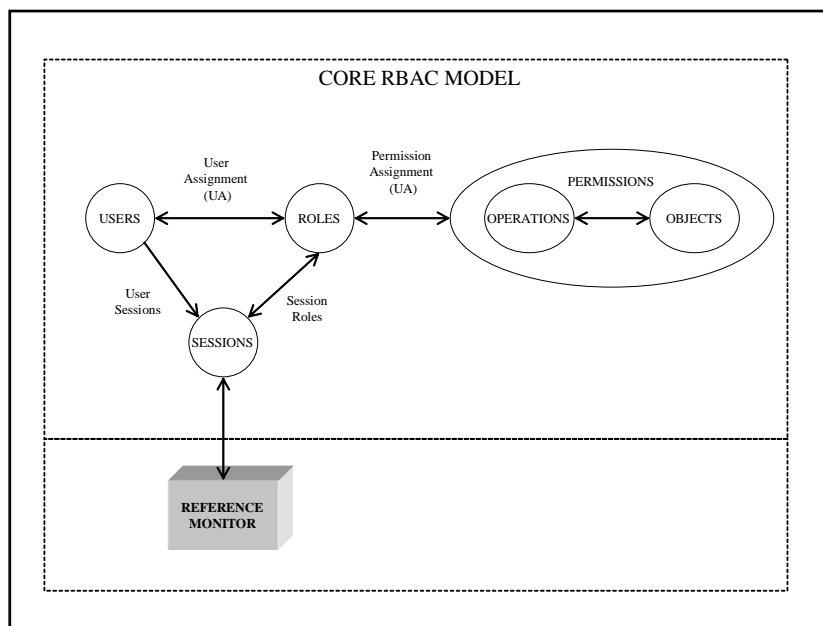


Figure 2: Core RBAC Model Concepts

5. The following is a description of the key elements and relationships within the model:
 - a. **USER** – a user (in the majority of cases) is an individual who is an employee of Canadian Criminal Real Time Identification Services (CCRTIS). However, in certain cases, where automated processes transact across several systems, a user may also be an automated system agent that has been granted a user account;
 - b. **ROLE** – a role is a job function within the context of an organization where authorities and responsibilities have been conferred to the user assigned to the role. Groups are expected to exist for larger systems where multiple roles will be contained within a group. This concept of a group is simply a mechanism to organize multiple roles to ease the overall user management;
 - c. **SESSION** – the active system context in which the user is requesting and executing transactions;
 - d. **OBJECT** – an object is anything that must be protected by the system. A protected object may be any system resource, personal and sensitive information (e.g., file, attribute, image) or parts thereof. Objects may vary in granularity; an object may range from being considered as an entire system component, an entire record, or a specific attribute or flag within a record;
 - e. **OPERATION** – an operation is any function that may be performed upon an object (e.g., read, write, delete, append); and

- f. PERMISSION – can be viewed as a composite of operation and object. An assignment of permissions to a role implies the approval of this role to perform this operation on an object.

8.2.2 ROLES, GROUPS AND OBJECTS

1. The following identifies the roles, groups and objects that must be supported by the AFIS renewal solution within the RBAC model. Most of the objects are identified within the context of a role function whereby the function is controlling access to the object.
2. The user ID must be definable by the user management user. Typically this will be an RCMP assigned number for the user.
3. The following are the minimum role functions (privileges) that must be available in the AFIS renewal solution. This list implicitly identifies the objects and the level of granularity that must be managed/controlled by the AFIS renewal solution:
 - a. AFIS Related:
 - i. Work queue access (queue view only),
 - ii. Work queue management (transaction processing),
 - iii. Queue transaction reset,
 - iv. Manual QC and Manual Cut),
 - v. TP quality check,
 - vi. TP duplicate check and process during quality check,
 - vii. TP sequence check and process during quality check,
 - viii. TP verification,
 - ix. TP certification,
 - x. Latent verification,
 - xi. Latent 1st certification,
 - xii. Latent 2nd certification,
 - xiii. Latent data entry,
 - xiv. Latent edit,
 - xv. Latent insert,
 - xvi. TP database access/view,
 - xvii. TP database update and reprocess,
 - xviii. TP database delete
 - xix. Latent database access/view,
 - xx. Latent database update,
 - xxi. TP Palm database access/view,
 - xxii. TP Palm database update,

- xxiii. Latent Palm database access/view,
 - xxiv. Latent Palm database update,
 - xxv. Sensitive access/view (i.e. allowed to view sensitive subject data),
 - xxvi. Trainee,
 - xxvii. Supervisor,
 - xxviii. TP to Latent verification,
 - xxix. TP to Latent 1st certification,
 - xxx. TP to Latent 2nd certification,
 - xxxi. Manual consolidation,
 - xxxii. Work queue delete,
 - xxxiii. Work In Progress verification,
 - xxxiv. View match score in UI; and
 - xxxv. LCMC contributor data update;
 - xxxvi. Assign transactions; and
 - xxxvii. Post response.
- b. Verification Subsystem Related:
- i. VSS monitoring;
 - ii. VSS audit log access;
 - iii. VSS post match analysis;
 - iv. VSS operations table configuration/access/update;
 - v. VSS system table configuration/access/update;
- c. Direct File/Scan Related:
- i. Process transactions,
 - ii. Delete transactions,
 - iii. Transaction reset,
 - iv. Query transactions;
- d. User Management Related
- i. User management view,
 - ii. User management access (add, change, delete, enable, disable), and
 - iii. Group management access (add, change, delete);
- e. Table configuration access (add, change, delete); and
- f. Operational reporting and statistics – each level of reporting must be separately controlled based on the report grouping identified in 3.5 Operational Reporting & Statistics. (i.e. hourly statistics reporting, daily statistics reporting, TP transaction logging).

4. The above role functions must be used to select from to create specific roles. The following are examples of existing roles that must continue to be available in the AFIS renewal solution that have one or more role functions (privileges) assigned to them. It is understood and expected that some vendors may represent these functions in a more granular manner. It would still satisfy the requirements if multiple role functions had to be selected to achieve the higher level granularity identified herein. The Contractor must explain how the AFIS renewal solution supports these requirements.
 - a. Employee File Analyst;
 - b. Employee File Manager;
 - c. Production administrator;
 - d. AFIS Program analysts;
 - e. TP Verification Technician;
 - f. TP Certification Technician;
 - g. TP Verification Technician Trainee;
 - h. TP Certification Technician Trainee;
 - i. TP supervisor;
 - j. Latent analyst;
 - k. Latent Checker;
 - l. Latent supervisor;
 - m. Direct file/scan user;
 - n. RNSC coordinator
 - o. Report manager
 - p. User manager; and
 - q. CPSIC user;
5. The roles created from the above function must be able to be organized into groups that allow a specific user to be in a group where access to multiple roles is granted through that group. For example, a user can be assigned to the senior analyst group which includes the following roles: senior fingerprint technician (including all fingerprint functions), supervisor, report manager (including access to all operational reporting and statistics).
6. The final roles, groups and objects will be finalized in consultation with RCMP prior to implementation.

8.2.3 USER MANAGEMENT DATA CONVERSION

1. The existing user management data must be converted to the AFIS renewal solution in a form usable by the AFIS renewal solution. The existing AFIS supports the RBAC model identified herein. Since it is a requirement to support this model, it is expected that this required conversion would be able to use virtually all of the data from the existing AFIS. Any data that cannot be converted automatically must be converted by the Contractor manually in a manner that ensures all the access controls required throughout this SOW and its accompanying documents are satisfied. The Contractor's proposal must explain how the RBAC data will be converted to the proposed AFIS renewal solution and satisfy the requirements stated in this SOW and its accompanying documents. Refer to Annex H for more detailed database conversion requirements.

8.3 SUBJECT WITH MULTIPLE FILES AND COMPOSITES

1. The AFIS renewal solution must support the structure of a unique identifier for a subject; where the subject can have multiple files associated with the same subject. As indicated in the AFIS ICD, the AFIS renewal solution must initially support six (6) different file types for any subject. Refer to the AFIS ICD for the list of initial file types or subsection 8.1.6.
2. The AFIS renewal solution must be able to support at least twelve (12) different file types without affecting the overall performance requirements stated in this SOW and its accompanying documents.
3. The AFIS renewal solution must support a set of composite fingerprints for each type of file associated with a subject. This set of composite prints must be the best quality prints from all the prints recorded under each type of file. For example, for three (3) file types, there would be three sets of composites.
4. Additionally, for young offenders an additional set of composite fingerprints and palms for criminal and refugee file types should be created with a growth factor of fifteen percent (15%). This requirement is to improve the hit percentage when the same individual's prints are searched as an adult.
5. Refer to the AFIS ICD for an explanation of when composites must be used, when a specific set of prints must be used and when all sets of prints must be used.
6. When a subject has many sets of prints (e.g. six (6)) under a specific file type and a TP search request requires all files to be searched, the AFIS renewal solution should only search the top best sets of prints (e.g. six (6)) for the specific file type based on a configurable parameter. The precise number will be determined in consultation with the RCMP prior to implementation.

8.4 NIST PACKET VIEWER

1. The AFIS renewal solution must provide a NIST packet viewer which can be used at any time during the processing of TP or Latent transactions. This NIST viewer must allow all NIST packet data to be viewed.

8.5 AVAILABILITY / RELIABILITY

1. Availability, as outlined in this document, will be measured once Site Acceptance has taken place and the AFIS is deemed to be Ready for Production. It is included herein as part of the performance criteria that the AFIS renewal solution will be designed to fulfill. The performance of the AFIS renewal solution will be tested as part of the benchmark testing and again as part of the site acceptance.
2. Availability, in the context of the AFIS, is defined as both user and system-driven functions (versus user-initiated) having the ability to perform add, change, delete and enquire functions on AFIS data. If any of the core equipment, system software, database software, COTS software or application software necessary for the user to perform these functions fails, then the AFIS renewal solution is deemed to be unavailable until such time as these functions are fully restored.
3. Planned service outages agreed upon between the Contractor and RCMP do not constitute unavailability of the AFIS renewal solution .
4. Network security and data communications services will be furnished by RCMP, and any failure in these security and/or communications components directly causing the AFIS to be "Unavailable" or "Operate in Reduced Capacity" will not be the responsibility of the Contractor, nor will it be considered in calculating incident based or monthly totals.
5. Failure of individual workstations, printers, scanners and like peripheral devices will not be considered as required for availability, as there is more than one such peripheral device in the configuration of the AFIS renewal solution. In the event that there is only one such device, then the device will be considered as core equipment.
6. The AFIS renewal solution shall be a high availability system that operates on a twenty-four hours per day, seven days per week, 365 days per year basis (24 x 7 x 365). The AFIS renewal solution shall meet, at a minimum, 99.5% availability on a monthly basis. That is, for a 30-day month, it will not be unavailable on an unplanned basis for more than a cumulative maximum of 3.6 hours in the month. On a daily basis, the AFIS renewal solution unavailability shall not exceed two (2) hours. Within a given month, the maximum number of periods of unavailability permitted is two (2), with a total cumulative duration between them not to exceed 3.6 hours (for a 30-day month).
7. Mathematically, availability is calculated as:

$$\text{Availability} = \frac{\text{Available Time in Month} - \text{Total Downtime in Month}}{\text{Available Time in Month}}$$

where:

$$\text{Available time in month} = \text{Number of days in month} * 24 \text{ hours, less any periods of planned downtime}$$

$$\text{Total Downtime in Month} = \text{Total amount of hours system was unavailable during the month}$$

8. System availability is measured on a monthly basis, starting at 00:00 Eastern Standard Time (EST) on the first day of each month. Note that allowable downtime does not accumulate from month to month, but is reset at the beginning of each month.

Cumulative Maximum AFIS renewal solution Downtime Permitted		
24 hour Period	Calendar Month (30 Day)	Frequency of Downtime
2 hours	3.6 hours	Twice per Month

Table 9 : Unplanned System Outages

9. The AFIS renewal solution may occasionally operate in a reduced capacity mode on an unplanned basis. Reduced Capacity is defined as: a slower performing system whose functions and data are still available to the users. An example of Reduced Capacity is when one of several processors in a server fails, no data is lost or corrupted, the users can perform all system functions but user response times may be slower.
10. In a Reduced Capacity mode, at a minimum, 50% of the total volume of transactions, including 100% of the Priority 1 and Priority 2 transactions, shall be processed within their normal response time. If the AFIS renewal solution fails to meet these minimum requirements, it shall be deemed Unavailable.
11. At a minimum, the AFIS renewal solution shall only function in a Reduced Capacity mode for a cumulative maximum of 43.8 hours per year, for a duration not to exceed 12 hours in peak operating hours or 24 hours in off-peak, within one month. Peak operating hours for the AFIS are from 07:00 – 23:00 EST (Ottawa Time). Off-peak hours are from 23:00 – 07:00 EST. This is summarized in Table 5-2 below.

Cumulative Maximum Time AFIS renewal solution Can Operate in a Reduced Capacity Mode		
Operating Period (Eastern Standard Time)	Within a Calendar Month	Within a Calendar Year
Peak Operating Hours 07:00 – 23:00	12 Hours	43.8 Hours
Off-Peak Operating Hours 23:00 – 07:00	24 hours	43.8 Hours

Table 10 : Reduced System Capacity

12. The AFIS renewal solution must support the supply of statistics to RCMP's reporting service. At a minimum, the following must be supported:

- a. Transaction number;
 - b. File number;
 - c. DCN;
 - d. Transaction start date/time; and
 - e. Transaction end date/time.
 - f. Note: other fields to be included will be identified during implementation.
13. Availability and Reduced Capacity times are mutually exclusive. That is, time that the AFIS renewal solution is unavailable is not included in the calculation of time in Reduced Capacity mode, and vice-versa. Further, Reduced Capacity or complete Unavailability will be recorded independently and associated only with the actual system status. For example, a problem causing two (2) hours of Reduced Capacity leading to a system failure resulting in a subsequent one (1) hour of unavailability would be recorded as two (2) hours of reduced capacity and one (1) hour of unavailability.
14. The AFIS renewal solution must be fully operational within at least one (1) hour period after a power restoration. From an operational view, the time from when power was lost (at no fault of the Contractor) to when it is fully restored will not be counted in determining system availability. The RCMP will inform the Contractor when power has been restored. The restoration start time will be measured based on the Contractor being on-site at RCMP HQ and being informed of the power restoration. Any time the AFIS renewal solution is not fully operational beyond this period shall count as the system being unavailable.
15. The Contractor's on-call support resource must be able to arrive at RCMP HQ within at least thirty (30) minutes after being notified of a requirement for support. Consequently, if the Contractor on-call support resource is contacted thirty (30) minutes before the power is restored, then the restoration time should be one (1) hour.

8.6 SYSTEM RESPONSE TIMES FOR LOCAL WORKSTATIONS

1. This section deals with response time specifications for workstations operating at RCMP HQ. Refer to Annex A for a description of the existing environment within which the AFIS renewal solution must operate.
2. Response times will be measured from the instant of the request to the moment the data is displayed, or the instant the cursor moves to the next field, whichever is applicable.
3. The fingerprint-related functions listed in Table 5.3 below identify graphical user interface (GUI) required response time in displaying data.
4. All GUI fingerprint and palm related functions must be, at a minimum, as fast in the AFIS renewal solution. These apply to both ten print and latent functions.

Function	Required Response Time
Selection of a single ten print/latent print from the verification candidate list	3.0 second or less to present to verifier (instantaneous)

Function	Required Response Time
Selection of a range of latent prints from the menu	3.0 second or less to present the first case to verifier (instantaneous)
Browsing from one candidate to the next	3.0 second or less (instantaneous)
Presentation of next verification in range after disposition	3.0 second or less between dispositioning of cases (instantaneous)
Upon barcode scan, display of the certification request	3.0 second or less
In certification paperless environment, upon completion of one certification, display of the next certification request	3.0 second or less
Upon completion of QC of one transaction, display of the next transaction to be QC'd	3.0 second or less
Save of image adjustments, edited features, edited descriptors	Shall not tie up the user workstation features for more than 3.0 second
Local workstation features (such as image adjustments, feature editing, cutting plains into rolled segments, viewing lists of TP sets on file, match reports, transaction log)	3.0 second or less

Table 11 : GUI Response Times for Select User Functions

5. The system shall perform a local internal fetch of a set of ten print images from the TPF, or of a latent image on the ULF, for a specified File Number and DCN or Latent Image Identifier within a 4.0 second or less response time 95% of the time.
6. The response times in this section are response times that *include* the Local Area Network (LAN) response time. In case of dispute, the Contractor shall be required to demonstrate user response times matching the requirements, less 0.1 seconds (100 milliseconds) exclusive of the LAN response time. For example, the Contractor would demonstrate 2.9 seconds (2900 milliseconds) response time or less instead of 3.0 seconds.
7. Response times in this section will be measured with a one-day (16 hours) maximum peak load sample based on the Peak Hourly Load as found in subsection 3.5 Operational Reporting & Statistics. This testing will be done in during benchmark testing and again during Site Acceptance Testing.

8.7 NPSNET NETWORK ARCHITECTURAL CONSTRAINTS

1. This subsection details a number of specific constraints that the Contractor must adhere to.
2. The Contractor's System shall conform to the following NPSNet Network Architecture constraints for all data communications:
 - a. The System shall use the Transmission Control Protocol/Internet Protocol (TCP/IP) suite of protocols for data communications.
 - b. The System must use static destination TCP/UDP ports, which must be well defined. For example, dynamic port allocation such as is done by Remote Procedure Calls (RPC) is difficult to filter on firewalls, thus RPC-based solutions are not permitted.
 - c. Note: In some cases RCMP will require the Contractor to use specific port number not typically used for certain protocols for security reasons. These port numbers will be provided upon request.
 - d. The use of IP Multicast protocols such as Internet Group Management Protocol (IGMP) or Multicast OSPF (MOSPF) is only permitted between servers that are located on the same physical LAN segment. The use of these protocols outside of the LAN segment assigned to the AFIS renewal solution is not permitted.
 - e. IP addresses shall not be hard-coded in any applications or scripts, either client or server.
3. Additionally, the Contractor's System should conform to the following network architecture constraints:
 - a. The System should use Domain Name Services (DNS) to identify system components on the network infrastructure. Should the IP address of any system component need to be changed, only the RCMP's corporate Domain Name Server should require updating. If the Contractor uses the RCMP DNS, the Contractor is still responsible for satisfying all the requirements in this SOW and its accompanying documents.
 - b. Interactive and batch traffic should be assigned different port numbers to ensure the impact of batch activity does not affect interactive performance. It is the Contractor's responsibility to ensure the performance requirements in this SOW and its accompanying documents regardless of whether there is batch processing occurring.
4. The NPSNet Technical Authority maintains a list of port numbers in use and assigns new ports as required.
5. The assignment of IP addresses for all network elements connected to the NPSNet is controlled by the NPSNet Technical Authority within the RCMP.
6. All data communications destined to traverse the NPSNet/NSP/SCNet shall function seamlessly within secure MPLS or an IPsec tunnel.
7. The AFIS renewal solution cannot rely on an Internet Control Message Protocol (ICMP) message, because of the possibility of a firewall or other security device blocking the ICMP message.

8. Current RCMP security policy does not allow for connection(s) between the Contractor's data network and any network either owned or managed by the RCMP, including, but not limited to the NPSNet, RCMP Campus or in-building networks. Refer to the SOW for a description of a potential ability to temporarily connect to the RCMP network from the Contractor's site for very restrictive access for urgent support reasons. The Contractor may be required to make changes to their networking infrastructure and/or practices to meet RCMP's security requirements that enable this temporary connection. If approved, any costs associated with either changes to the Contractor's network or connection to RCMP-owned or managed network(s) will be at the expense of the Contractor.
9. The Contractor's solution shall not employ any wireless communications devices for workstation-to-server, server-to-server, or any other communication between devices.

8.7.1 LOCAL AREA NETWORK CONNECTIVITY

1. The AFIS renewal solution servers, workstations, scanners and printers will be implemented in three separate buildings, two buildings at the primary site and at the DR site. Refer to Annex A for additional details.
2. The AFIS workstation LAN connections are industry standard 10/100/1000 Mbps, capable of Full Duplex and Half Duplex Ethernet, and compatible with the IEEE 802.3 Ethernet standard.
 - a. 10/100/1000 Mbps LAN connections provided by the RCMP utilize unshielded twisted pair (UTP) Category 5e cabling as physical media.
 - b. Workstations connectivity to the LAN is via an RJ45 outlet at the workspace with 1,000 Mbps (Gigabit) Ethernet connections.
3. The AFIS renewal solution server connections to the LAN shall employ 1,000 Mbps (Gigabit) Ethernet connections. Any new server provided in the Contractor's proposed solution must include Gbps NICs capable of auto-sensing redundantly configured to support the HA requirements stated in this SOW and its accompanying documents.
4. The physical media for Gigabit Ethernet (1,000 Mbps) connections are unshielded twisted pair (UTP) Category 5e cabling.

8.8 CONFIDENTIALITY AND INTEGRITY

1. The AFIS renewal solution must ensure the confidentiality and integrity of the RCMP fingerprint and fingerprint related data. Confidentiality and integrity are key elements of RCMP operations.
2. Through a combination of RCMP provided security architecture and security processes combined with authorization and authentication requirements that must be provided by the AFIS renewal solution, the confidentiality is expected to be effective. The Contractor is encouraged to identify any aspects of their solution which could improve the confidentiality of the solution.
3. The Contractor must explain all aspects of their AFIS renewal solution that ensures the integrity of the RCMP fingerprint and fingerprint related data to justify that the integrity of the data will be maintained. This must include at least the following:
 - a. Transaction processing with units of work and phased commits;
 - b. Managing concurrent processing;

- c. Error recovery;
- d. Any aspects of the database design that ensures data integrity. For example, to ensure no duplicates are recorded for a field, the database field would be define as unique;
- e. Any aspects of the design that ensure referential integrity. For example, if minutia is recorded separately from fingerprint images, how both are maintained to ensure searches are against all valid sets of fingerprints must be explained;
- f. Discrepancy reporting frequency and use; and
- g. Tools, utilities and/or monitoring used to ensure any data integrity issues are identified and resolved as soon as possible with at least the following:
 - i. Daily completed searches run against the AFIS renewal solution to identify potential misses (reviewed by a program analyst),
 - ii. Daily report to identify any duplicate DCNs. The AFIS renewal solution must include design and/or processing that ensure duplicate DCNs are not created; however, since the DCN is so critical the RCMP want to ensure there is a regular check for duplicate DCNs,
 - iii. Weekly report to identify if the same file number is filed under more than one Subject ID, and
 - iv. Monthly report to verify file number prefixes correctly match the file record type (e.g. all criminal record file types have a prefix of 20000).

8.9 AUDITING

1. The AFIS renewal solution shall record when, where and why, whatever happened and by whom, related to any request processed on the AFIS renewal solution.
2. The AFIS renewal solution shall implement audit trails for all successful and unsuccessful access logins.
3. The AFIS renewal solution shall have the capability of auditing the following resources:
 - a. Application;
 - b. File;
 - c. Database;
 - d. Field within a database;
 - e. Table within a database;
 - f. System accessed; and
 - g. System interfaces.
4. The AFIS renewal solution shall have user authorization for controlling access to the following resources:
 - a. Programs;
 - b. Data;
 - c. Functions;

- d. Options; and
 - e. Parameters.
5. The AFIS renewal solution shall have configurable auditing capabilities, whereby the accesses, resources, and users that will be included in the audit trail can be specified by the RCMP. Refer to subsection 3.5 Operational Reporting & Statistics for examples of reporting that is used for audit purposes.
 6. The AFIS renewal solution shall have an audit trail, for each user, that identifies the following:
 - a. User;
 - b. Resource that was accessed by the user;
 - c. Date, time and type of access to the resource; and
 - d. Whether the access to the resource was successful or unsuccessful.
 7. The AFIS renewal solution shall have an audit trail, for each resource, that identifies the following:
 - a. Resource ID;
 - b. User or role that accessed the resource;
 - c. Date, time and type of access requested; and
 - d. Whether the access was successful or unsuccessful.
 8. The AFIS renewal solution shall have an audit trail, for each subsystem accessed, that identifies the following:
 - a. Subsystem;
 - b. User, role or resource that accessed the subsystem;
 - c. Date, time and type of access requested; and
 - d. Whether the access was successful or unsuccessful.
 9. The Contractor shall describe how it plans to implement security measures on all audit trails generated by the AFIS renewal solution in accordance with the Protected B designation.
 10. The AFIS renewal solution shall implement security measures on all audit trails generated by the System in accordance with the Protected B designation. The audit trail logs shall be tamperproof.
 11. The audit trail is considered tamperproof if the System includes the following three key elements:
 - a. The System has the application writing to the audit log(s) in a verifiable manner.
 - b. The System has access to the audit log(s) restricted to an authorized trusted person (i.e. Administrator or Security Officer). Access to audit logs will be configured at the operating system level for the following policy: Access by an Administrator operating under super user rights, limited to read only for the audit.
 - c. The System includes protection of the electronic log file by storing it in a secure repository on the source server.

8.10 HARDWARE AND SOFTWARE

1. All non-GFE hardware proposed by the Contractor must satisfy the requirements stated in this subsection, its subsections and all the other requirements stated throughout this SOW and its accompanying documents.
2. This hardware subsection is broken down into the following subcategories:
 - a. Servers;
 - b. Scanners;
 - c. Printers; and
 - d. SAN Storage.
3. To substantiate the hardware and software requirements below, the Contractor shall provide in its solution a description of the hardware and software and their interrelationship within each environment (production and test environments) including, as a minimum, for each COTS hardware and software component included as part of the technical design:
 - a. Item make, model and version number;
 - b. The ANSI/NIST compliance and other standards met;
 - c. Certifications and ratings achieved;
 - d. Number of each required;
 - e. Customization required;
 - f. Recommended and minimum performance criteria and capacities;
 - g. The internal/external electronic interfaces; and
 - h. The security services implemented.
4. All Contractor proposed hardware must satisfy RCMP electrical specifications, including the voltage, amperage, electrical receptacle, and Underwriters' Laboratories (UL) or Canadian Standards Association (CSA) certification.

8.10.1 SERVERS

1. The Contractor's AFIS renewal solution shall comply with the following hardware requirements and policies currently implemented within the RCMP:
 - a. All AFIS renewal solution servers shall be configurable to operate in a high availability (HA) clustered environment.
 - b. All AFIS renewal solution servers shall support graceful shutdown, such that all "inflight" transactions can be completed or re-started automatically upon server re-start with no loss of data.
 - c. All AFIS renewal solution servers shall support automatic restart.
2. The AFIS renewal solution server hardware shall include the following:
 - a. Support for multiple CPU engines;
 - b. Support for 1 Gbps Ethernet connections according to the specifications in subsection 8.7.1;

- c. Support for server temperature sensor and alarm capability when the temperature of the server becomes too high; and
 - d. Support for electrical power sensor and alarm capability when the power signature becomes out of specification.
3. All AFIS renewal solution servers requiring access to the RCMP SAN shall be configured to interface to the SAN using multiple Host Bus Adapters (HBAs) each capable of 4 Gbps. Fiber channel connections are limited and expensive; therefore, the preferred AFIS renewal solution would satisfy all the requirements stated in this SOW and its accompanying documents with a minimum number of fiber channel connections. A Contractor proposal that includes more than twelve (12) fiber channel connections (i.e. six (6) servers each with two (2) fiber channel connections each) will be considered non-compliant unless approved by the RCMP in writing prior to proposal submission.
4. AFIS renewal solution servers to be installed at the RCMP Data Centre or DR site should be compatible with the 19" rack standard (EIA 310-D). If the Contractor provides equipment compatible with the 19" rack standard, then the Contractor is not required to supply racks. RCMP-supplied racks or cabinets will be used. If the Contractor is not proposing standard 19" racks, the Contractor must provide racks at the Contractor's expense which must be included in the Contractor's proposal and must be approved by the RCMP in writing prior to the proposal submission.

8.10.2 SCANNERS

1. Scanners provided with the AFIS renewal solution shall meet, at a minimum, the Image Quality Specification (IQS) of Appendix F in the *Electronic Biometric Transmission Specification* (EBTS) Version 7.1 or later (for latent/ten print printers, latent/ten print display stations and latent and ten print scanners).
2. The AFIS renewal solution scanners must support all the scanning related requirements stated throughout this SOW and its accompanying documents.

8.10.3 PRINTERS

1. Printers provided with the AFIS renewal solution shall meet, at a minimum, the Image Quality Specification (IQS) of Appendix F in the *Electronic Biometric Transmission Specification* (EBTS) Version 7.1 or later (for latent/ten print printers, latent/ten print display stations and latent and ten print scanners).
2. Printers supplied with the AFIS shall include a calibration feature.
3. The AFIS renewal solution printers must support all the printing related requirements stated throughout this SOW and its accompanying documents.

8.10.4 SAN STORAGE

1. The amount of on-line storage space for the new solution will be highly dependent upon the Contractor's physical implementation of the functional requirements. A table of today's storage requirements, together with the estimated increase in transaction volumes is provided to aid the Contractor in estimating the overall storage requirements for the AFIS renewal solution. The Contractor shall specify the on-line storage capacity required on the RCMP SAN for its AFIS renewal solution (Primary site, DR site and backup).

2. The RCMP recognizes that on-line storage to accommodate temporary files will be required for the conversion of today's information prior to its incorporation in the AFIS renewal Solution. The Contractor shall specify the storage capacity required on the RCMP SAN for the conversion activities. This space shall be freed up upon completion of the conversion.

8.11 SOFTWARE

1. The RCMP has a comprehensive suite of software products for which it has negotiated licences and support agreements. However, RCMP understands that the AFIS renewal solution may include additional software products for which licences and support agreements will be required. The Contractor is responsible for providing licenses and support for all non-GFE software products. The Contractor's proposal must explain how each software product is used by the AFIS renewal solution to satisfy the requirements stated throughout this SOW and its accompanying documents.
2. COTS software provided as part of the AFIS renewal solution is expected to be specific to the solution. In other words, the Contractor is not expected to provide any standard Office Automation (OA) products (e.g., e-mail, word processing, and spreadsheet) as the RCMP currently have negotiated licences for its standard suite of OA products.
3. Additionally, the RCMP has license to other software used as part of the current solution which has been identified throughout this SOW and its accompanying documents.