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Democracy Suite® EMS Results Tally & Reporting User Guide

Version: 5.2-CO::84

February 16, 2017

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Revision History

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Allowed Authors

subversionID	Firstname Lastname	TitlePosition
brian.fitzsimmons	Brian Fitzsimmons	Documentation Manager
peter	Peter Androutsos	Director, PLM
root	root	system
tijana.todorovic	Tijana Todorovic	Documentation Manager

RELEVANT DISCLAIMERS

The final list of items to be disclaimed in this release is to be confirmed.
Please be advised that this document may make reference to the following Democracy Suite® functionalities:

- AIMS Data Translator
- Avalue tablets
- EMS Enterprise configuration
- Election Data Exchange Station (EDES)
- ImageCast® Evolution
- ImageCast® Evolution Dual Monitor functionality
- ImageCast® Listener
- ImageCast® Precinct
- ImageCast® Precinct Audio
- ImageCast® Precinct Ballot Marking Device (BMD)
- ImageCast® Precinct BMD Audio
- Rank Choice Voting (RCV)
- Recall Issues
- Mode 2 asymmetric cryptography
- Mode 3 asymmetric cryptography
- NYS General and Primary Ballot Template
- Modem and transmission functionality
- WinEDS Importer

These functionalities are not components of the current Democracy Suite® 5.2-CO certification campaign, and should be disregarded throughout the document.

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Chapter 1

Introduction

This User Guide outlines use procedures for the EMS Results Tally & Reporting client application. It is intended for EMS administrators, operators and endusers, and can be regarded as a tutorial and reference manual for using the application when processing election results acquired from Dominion Voting Systems' ImageCast® series of optical tabulators.

1.1 User Guide Organization and Use

This document is intended for use with the Democracy Suite® 5.2 platform.

This document provides a wide variety of information about the Results Tally & Reporting application by deploying a number of different methods. These include background information on problem domains, procedures for executing functions in the application, images, and illustrations/diagrams.

Topics are grouped according to the intended functionality flow when processing election results. Most topics have sub-topics. These sub-topics are then further broken down into logical units.

1.2 Initial System Settings

Trained technical personnel are responsible for installing and configuring hardware and prerequisite software for the EMS Data Center back-end and EMS Workstation components. Your system is pre-configured for full operation and use with this document. See Appendix A for the detailed manual set-up information. This appendix provides detailed instructions on how to define basic configurations of both the EMS Result Tally & Reporting client application and database settings.

Chapter 2

EMS Results Tally & Reporting Installation

To install the EMS Results Tally & Reporting client application, perform the following steps:

1. If you are installing the EMS Results Tally & Reporting application for the first time, skip to step 7.
2. If you have already installed the EMS Results Tally & Reporting software, uninstall the previous version by performing the following steps:
3. Open **Start/Control Panel/Programs and Features**
4. Find the EMS Results Tally & Reporting on the list of installed software applications and click **Uninstall**.
5. Click **Yes** to confirm the uninstall process.
6. Once the previous version is removed, close all opened windows and continue to the next step.
7. Insert the EMS Installation DVD into the CD/DVD ROM drive. The DVD media contains all client EMS application setup files.
8. Navigate to the CD/DVD ROM drive by double-clicking on **Computer** and navigating to the file named **EMSInstallation** to start the installation process.

Figure 2.1: RTR Installation - EMS Installation Screen

9. The screen depicted in Figure 2.1 appears when the software installation application starts.
10. Click on the **Install** tab. Click on the arrow near the **EMS Client Applications**. Choose **EMS Results Tally & Reporting**. Then click on the arrow near Result Tally and Reporting.
11. Double click on the 64-bit version.

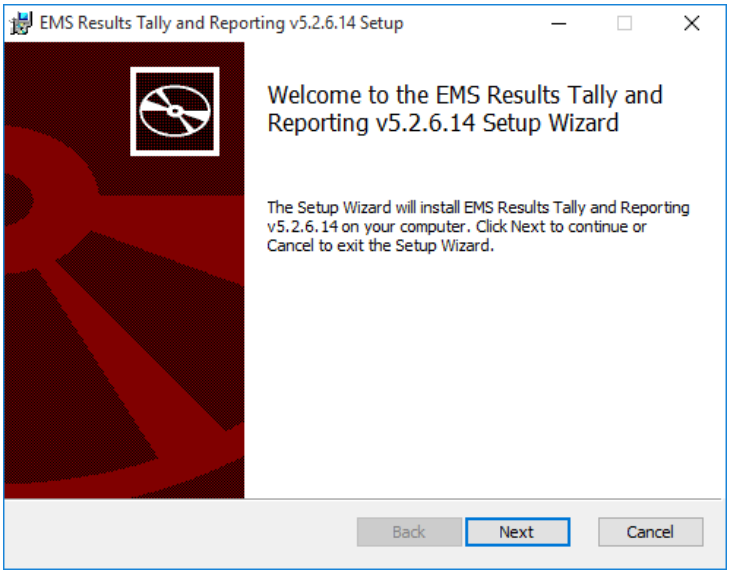


Figure 2.2: RTR Installation - Welcome Screen

12. Depending on your security settings, a *User Account Control* (UAC) screen may appear. If so, click **Yes** to proceed with installation.
13. The screen shown in Figure 2.2 appears.
14. Click **Next**.

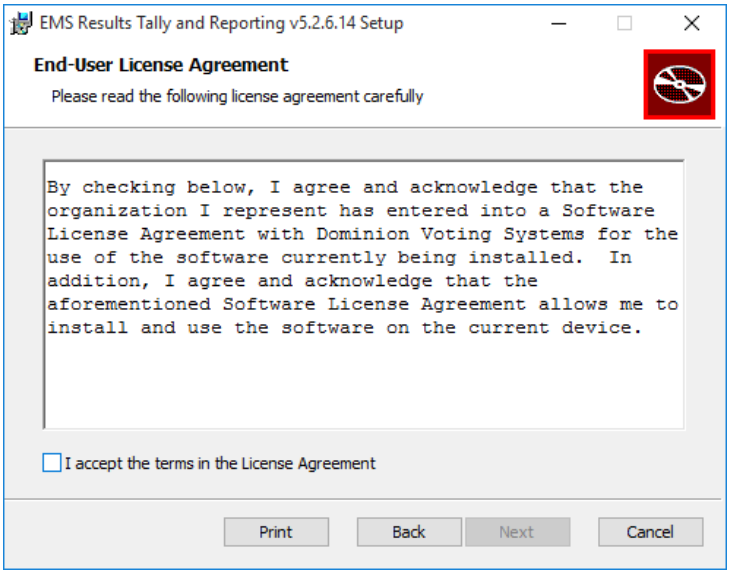
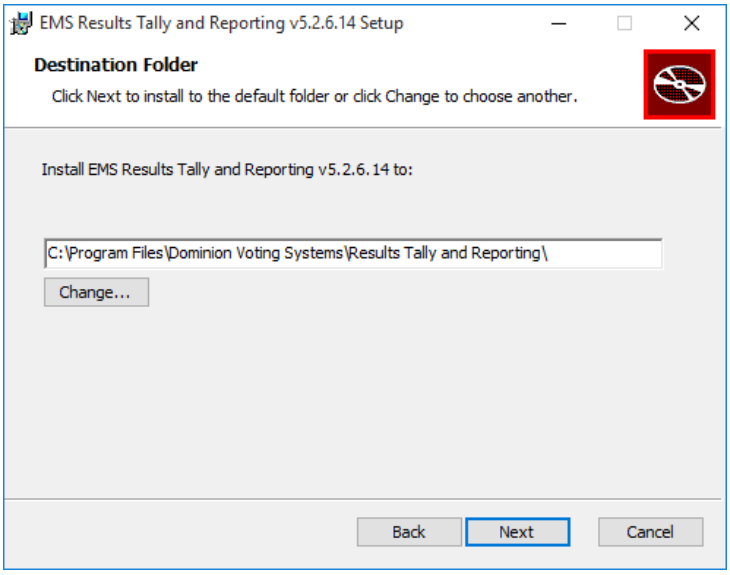


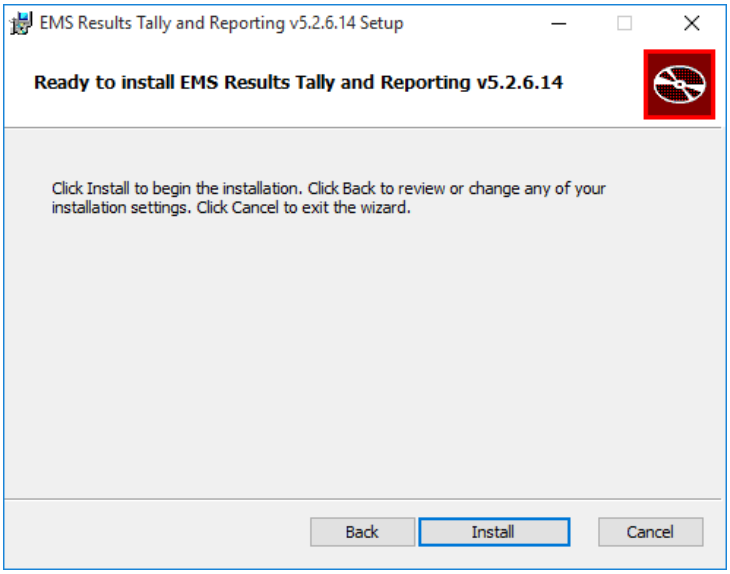
Figure 2.3: RTR Installation - License Agreement Screen

15. The *License Agreement* screen, as depicted in Figure 2.3 appears. Read the License Agreement.
16. If you understand and agree to all the terms contained within the License Agreement, select the **I Agree** option and click **Next**.
    NOTE: *You cannot proceed with the installation if you do not agree to the terms and conditions outlined in the 'License Agreement'.*



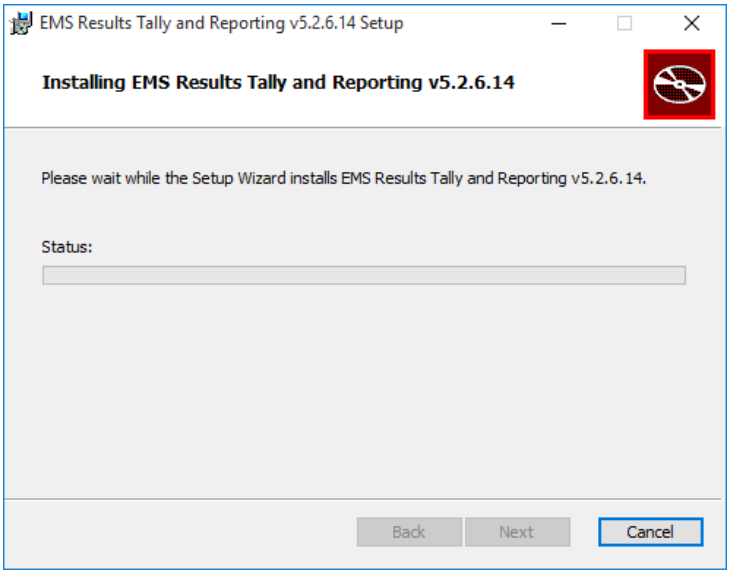
17. *Destination Folder* screen appears, click **Next**.

Figure 2.4: RTR Installation - Destination Folder Screen



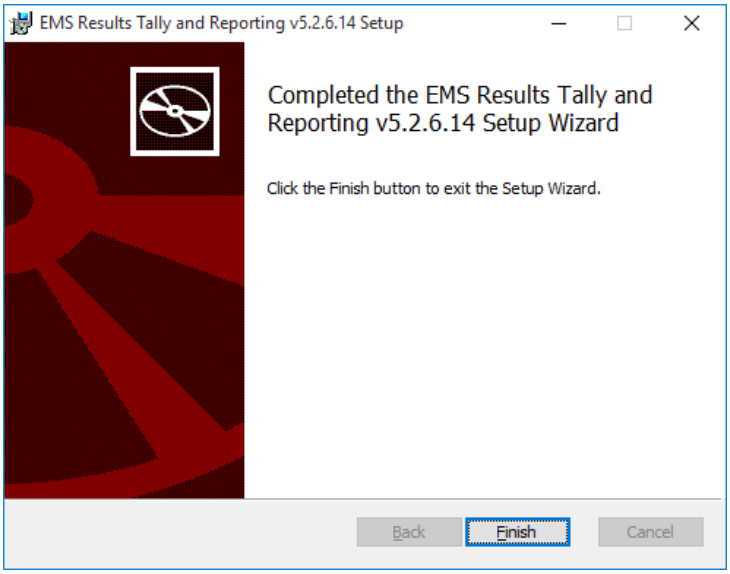
18. Click **Install** as seen in Figure 2.5 to start the installation.

Figure 2.5: RTR Installation - Ready to install Screen



19. The Result Tally and Reporting will begin to install.

Figure 2.6: RTR Installation - Installation progress Screen



20. You will receive confirmation once the installation has completed.
21. Click **Finish** to exit the *Result Tally and Reporting Installation Wizard*.
22. The Result Tally and Reporting is now installed on your workstation.
23. If this is your first time installing the Result Tally and Reporting on your workstation, you may need to restart your computer. When prompted, click **Yes** to restart the computer immediately, or **No** to restart manually at a later time and proceed to the next step.
24. Click **Close** to exit the Result Tally and Reporting Setup Wizard.

Figure 2.7: RTR Installation - Installation Complete Screen

Chapter 3

Getting to Know Results Tally & Reporting

This chapter defines the terminology used throughout the remainder of this document and provides background information necessary to understanding the application.

3.1 Glossary of Terms

- **iButton Security Key**: A secure iButton key programmed by the EMS platform and utilized by the administrative pollworker to perform administrative actions on the ImageCast® Precinct (ICP) and ImageCast® Evolution (ICE) devices. iButton security keys are unique for each instance of the ICP and ICE device.
- **AS**: Dominion Voting Systems' Audio Studio client software application.
- **Asymmetric Key Cryptography**: Also known as Public-Key Cryptography, this group of cryptographic algorithms uses a combination of sender-receiver key pairs to perform data encryption and signing.
- **Ballot**: Represents a domain entity, which is an instance or representation of the ballot to be used during the election event. Ballot headers, contests, and options, including layout, content, and language profiles, characterize the ballot.
- **Ballot Manifestation**: A manifestation of a ballot representing a single ballot, complete with a unique barcode. Examples of ballot artifacts are PDF, PNG, and XML files.
- **Choice**: Represents a candidate (person, party or proposition option) in a contest.
- **Choice Manifestation**: Represents an instance of the candidate within the contest manifestation for a given ballot manifestation.
- **Communication Channel**: Represents a physical process that is not based on any networked data communication technology (LAN, WAN, etc.). This term represents an exchange of information that occurs using memory cards and/or iButton security keys.
- **Contest**: Represents an instance of the office with a unique list of candidates or parties. Contests are derived from offices based on elector groups and the geopolitical divisioning of the jurisdiction organizing an election event.

- **Contest Manifestation**: Represents a manifestation of a contest on a ballot. Due to rotations, there can be multiple contest manifestations per contest.
- **Counting Group**: Represents a grouping of categories and an indirect grouping of results from an associated set of tabulators, such as the absentee counting group, the provisional ballots counting group, and the election day counting group.
- **Cryptographic Hash Function**: A cryptographic algorithm that creates a distinct, fixed-length representation of digital records of messages that vary in length. Such a representation cannot be used to generate the original message from which it was created, nor can it ever be the same for two different messages.
- **Digital Signature**: According to the National Institute of Standards and Technology (NIST), a digital signature is defined as a bitstream "using a set of rules and a set of parameters such that the identity of the signatory and identity of the data can be verified". The creation of a digital signature employs a hashing function "to obtain a condensed version of the data called a message digest", which is asymmetrically encrypted using the signatory's private key, thus signing the message. Within the context of this document, the SHA256 algorithm is used to perform this hashing function, and a 2048-bit private-public key pair is used for signing and verification.
- **EED**: Election Event Designer client software application.
- **Election Day Memory Card**: A memory card which carries voting domain-related information. This information includes data such as election definition files, device configuration files, ballot information, audio files, scanned ballot images, and results files, as well as audit and log reports. This memory card is utilized during an election day voting session based on the bidirectional communication channel between the EMS platform and ImageCast® Precinct (s).
- **Election Definition Cycles**: Represents a sequence of transitions that occur within the election project. The project begins at the Project Definition state, transitions to the generation of election files, and ends with the voting session itself. In subsequent election definition cycles, the system has to preserve enough information from the previous election definition cycle so that subsequent voting sessions can handle election project artifacts from all election definition cycles. A new election definition cycle should not be initiated if the previous cycle did not conclude with the voting session. If the previous cycle did not conclude with the voting session, regular election project backward transition should be used.
- **Election Project**: Represents a collection of election domain objects, and their associations and artifacts for a given election event. Domain objects and their associations are stored on the EMS Database server, while election project artifacts are stored on the EMS NAS server. As a result, the election project is partially represented on the EMS Database server with file structures on the EMS NAS server
- **Election Project State**: Represents a state of the election project with an associated set of permissible actions that can be performed within that state. The transition from a lower to an upper election project state is caused by certain user actions, such as generation of official ballots, while the transition from an upper to a lower election project state must be initiated by the user.
- **Ballot Groups**: Voters can be divided into several elector groups as described previously. However, at the same time, a single voter can belong to more than one elector group. For example, a voter can be a member of the Democratic elector group and the Absentee group at the same time, and be allowed to vote on the Democratic ballot as an absentee voter. This association between the voter and multiple elector groups is called the "ballot groups". Based on elector groups and ballot groups, the system creates all possible (allowed and required) ballot combinations.

- **Elector Groups Types and Elector Groups**: Represents a grouping of electors (voters) within an election in a non-geographical manner. This grouping can be based on different classification criteria, including political party membership, school board support, early voters, absentee voters, election day voters, etc. Within the election domain model, there should always be one default election group entity which encompasses all eligible voters (default election group). In instances where different groups of electors are only allowed to vote in certain contests for certain offices, a separate elector group instance should be created. Each elector group is characterized by its type and instance. Some of the elector group types include political party, school board, absentee, etc.
- **EMS Database**: Components within the EMS Data Center that are responsible for storing election data for a given election project in the form of a Relational Database Management System.
- **EMS Platform**: The Democracy Suite® platform with all of its components, except for its counting systems. The platform consists of EMS Data Center and EMS Workstation components. There is only one instance of the EMS platform within any election project.
- **Key Exchange Memory Card**: A memory card not carrying any voting domain-related information. This memory card is utilized in the process of key exchange between the EMS platform and ICP instances using the aforementioned physical communication channel.
- **Office**: Represents a set of positions for which people or political parties are elected. Offices are closely related to subdivisions and elector groups. An office is applicable to a certain subdivision which represents an administrative or geographical grouping of electors who can vote and elect members to an office. Offices can also be applicable to elector groups which group electors in a non-geographical manner so that only members of the given elector group can vote for that office. Sometimes there is a need to group offices into office groups, which are used to collect and present related offices on a ballot (i.e. state offices, the judicial office, etc.)
- **Private Key Encryption**: Within the scope of Public Key Cryptography, the integrity of a transmitted message is achieved when a sender encrypts the data with their Private Key. When using the Private Key for encryption, messages can only be decrypted through the use of the associated Public Key, which may or may not accompany the message. Because a Private Key is known and used exclusively by its owner, any parties that receive the transmitted data can successfully read the message but cannot add a file or change a file decrypted by the same Public Key. This is done to ensure data integrity. Election files must be signed using this method to allow for independent audits (the data is visible after decryption but cannot be changed).
- **Public Key Encryption**: Within the scope of Public Key Cryptography, confidentiality of a transmitted message is achieved when a sender encrypts data with the intended receiver's Public Key. Use of the Public Key for encryption means that messages can only be decrypted through the use of the associated Private Key. Because a Private Key is known and used exclusively by its owner, any parties that intercept the transmitted data cannot successfully decrypt the message. This is done to ensure obfuscation (achieving confidentiality) and data protection. More importantly, election files cannot be signed using this method because it is impossible to perform an independent audit, but it should be used in cases where information should not be visible (e.g. encryption of passcodes during transmission).
- **RTR**: Results Tally & Reporting client software application
- **Session Key**: Although Public Key encryption technologies provide additional security simply due to the nature of their operation, this improvement comes at the cost of drastically increased computational complexity. This complexity often results in lengthy time delays when a large amount of data must be encrypted. To combat this, session keys are used to perform comparatively fast encryptions of the data itself, while smaller sized unidirectional hashes are encrypted with asymmetric techniques. Typically, session keys are communicated to the participants through the

use of asymmetric encryption and can change as often needed by the specific system topology, designer, or security needs at hand. Usually the session key changes as often as possible in order to limit the amount of data that is encrypted using a specific cipher, thus decreasing the possibility of it breaking. The EMS platform implements three types of interchangeable election data protection to maintain confidentiality and integrity: Mode 1 is based on symmetric cryptography, while Mode 2 and 3 are based on a combination of symmetric and asymmetric cryptography (digital signatures)

- **Symmetric-Key Cryptography**: A method of performing data obfuscation (for the purpose of protecting confidentiality) through the use of a shared, Symmetric Key used by both the sender (for encryption) and the receiver (for decryption). Within the context of this document, only 128-bit or higher AES encryption algorithms are considered.
- **Tabulator**: Represents a single instance of an ImageCast® Precinct , ImageCast® Evolution , ImageCast® Central or Ballot Marking Device utilized during the election cycle for ballot counting or ballot marking. Multiple instances of the ICP platform can exist within any election project.

3.2 Results Tally & Reporting's Place in the EMS System

The Democracy Suite® EMS platform is primarily used by election authorities to define and organize elections. A variety of EMS functions can be grouped into two main sets of activities with RTR helping to manage the Post-Voting functions.

3.2.1 Pre-Voting Activities

- Defining (or importing) the political divisioning of the jurisdiction organizing the election, including its hierarchical structure, attributes and associations.
- Defining (or importing) Election Events with attributes, such as the election name, date and type, contests, candidates, referendum questions,and voting locations and their attributes.
- Designing, preparing and producing paper and AVS ballots for polling place and absentee voting.
- Configuring and programming Dominion Voting Systems' ImageCast® series of precinct and central ballot counters.
- Defining and executing Logic & Accuracy tests as part of readiness testing procedures.
- Producing election definition and auditing reports. Providing administrative management functions for user, database, networking, and system management.

3.2.2 Post-Voting Activities

- Acquiring, importing or manually entering Election Results from the ImageCast® series of tabulation devices.
- Previewing and validating the Election Results.
- Publishing the unofficial Election Results for further processing or reporting (i.e. by news and media feeds).
- Producing a variety of Election Results Reports in the desired format.
- Auditing Election Results, including ballot images and log files.

The pre-voting and post-voting groups of activities, in the process of defining and managing elections, are integrated within the Democracy Suite® EMS domain model and implemented in the two main end-user software applications:

- Democracy Suite® EMS Election Event Designer (EED)
- Democracy Suite® EMS Results Tally & Reporting (RTR)

Both applications are architecturally designed as rich-client applications for intranet deployment or, optionally, distributed for Internet deployment using VPN connections. This means that in addition to these client applications, the system integrates associated server platforms (the EMS Data Center back-end system) with required services and data repositories. Democracy Suite® provides the ImageCast® series of precinct and centralized tabulation devices for the full election cycle (pre-voting, voting, post-voting phases).

In addition to the EMS Election Event Designer and Results Tally & Reporting client applications, you can use EMS Audio Studio, Mobile Ballot Production, Election Data Translator, Synergy Mapping module, helper client applications, as part of the pre-voting process.

3.3 EMS Results Tally & Reporting Overview

EMS Results Tally & Reporting (RTR) is an end-user application within the Democracy Suite® EMS system. RTR can only be used if it is part of the overall EMS system, which consists of the following server components:

- EMS Application (EMS APPS)
- Database (EMS DB)
- EMS Data Center Manager (DCM)
- EMS Network Attached Storage (NAS)

The Democracy Suite® EMS Results Tally & Reporting application is responsible for post-voting activities. The application is used to collect result files from ImageCast® optical ballot scan tabulators.

The ImageCast® Precinct and ImageCast® Central platforms produce Election Results.

The EMS Election Event Designer application is used to define Results Tally & Reporting users and associated roles.

3.4 RTR Functional Flow

3.4.1 Election Results Acquisition

After opening the election project in RTR the user can import results directly either from memory cards or from the local file system, as well having the option to automatically bring in results that are placed on a configurable location on the NAS. Election officials also have the option to manually enter results for any of the defined tabulators in the system.

NOTE: *The memory cards are originally prepared in the EMS Election Event Designer application, as part of pre-voting activities.*

3.4.2 Results Review and Validation

Once election results have been brought into RTR they, you can review each individual result file, which can be shown in summarized or detailed breakdown. The user can also at this point resolve votes that were assigned to write-in positions to qualified write-in candidates. Result files have an associated result state that can be modified. Results start out in Initial state, and can move to Validated state (indicating that they have been reviewed), and finally to Published state, which means those results will be included in any reports or exports. There is also a Rejected state that can be used to indicate that results should not be included. You can also delete result files from RTR if they are in Initial or Rejected state.

3.4.3 Results Tally and Publishing

Publishing is the next step in the processing of Election Results. Once you are satisfied that result files contain correct/acceptable data, proceed with publishing the results. Results publishing is used to publish unofficial election results to interested parties, and can be used to notify the media about current unofficial results, or to present real-time dynamic public results.

EMS only provides aggregate results and does not provide information about individual ballots. Unofficial electronic reports and files may not access the storage devices of official data. When broadcasting unofficial results, the unofficial result publishing presentations clearly indicate that results are unofficial. During publication, XML representations of the Election Results are created according to pre-defined XML Schema and XSLT transformations. These results are uploaded to a pre-defined set of 'transfer points' - locations that can be accessed by networks and places authorized for results publication. Transfer points are defined in the Results Tally & Reporting application.

3.4.4 Results Reporting

The EMS Results Tally & Reporting provides a variety of reports that can be used to produce overviews of results on both a summary as well as a detailed level. Reports are configurable to suit the needs of the user and can be produced in various formats including:

- Microsoft Excel Sheet (.xlsx)
- PDF
- HTML

EMS is designed to prevent data from being altered or destroyed in the generation of reports.

The Summary Report is a generic Election Results Report which collects the complete set of election results. In turn, this type of report can be used to produce an initial zero report of the election results, as well as a cumulative representation of the election results for a given Election Event. In addition to the Summary Report, available within the system by default, you can create other types of reports by selecting the desired report type(s) and triggering the report generation process.

3.4.5 Results Auditing

In most cases, after Election Results are processed, an audit is initiated to examine the system operation in more detail. The first step when performing an audit is to look up the list of scanned ballot images

and the log files based on specific criteria.

All audit record entries include a time-and-date stamp. The generation of audit record entries will not be terminated or altered by program control or the intervention of any person. The physical security and integrity of the record are maintained at all times.

3.5 User Interface Introduction

This section describes the main sections and features of the application's user interface.

NOTE: *Each area logically groups and organizes the activities and functionalities that can be performed. The four main screen areas listed above are identified in the following image and described in the following sections.*

3.6 Main Screen

The main application screen can be divided into four areas as seen in Figure 3.6:

- Main Menu
- Activities Navigation Panel
- Status Bar
- Context Sensitive Screen Area

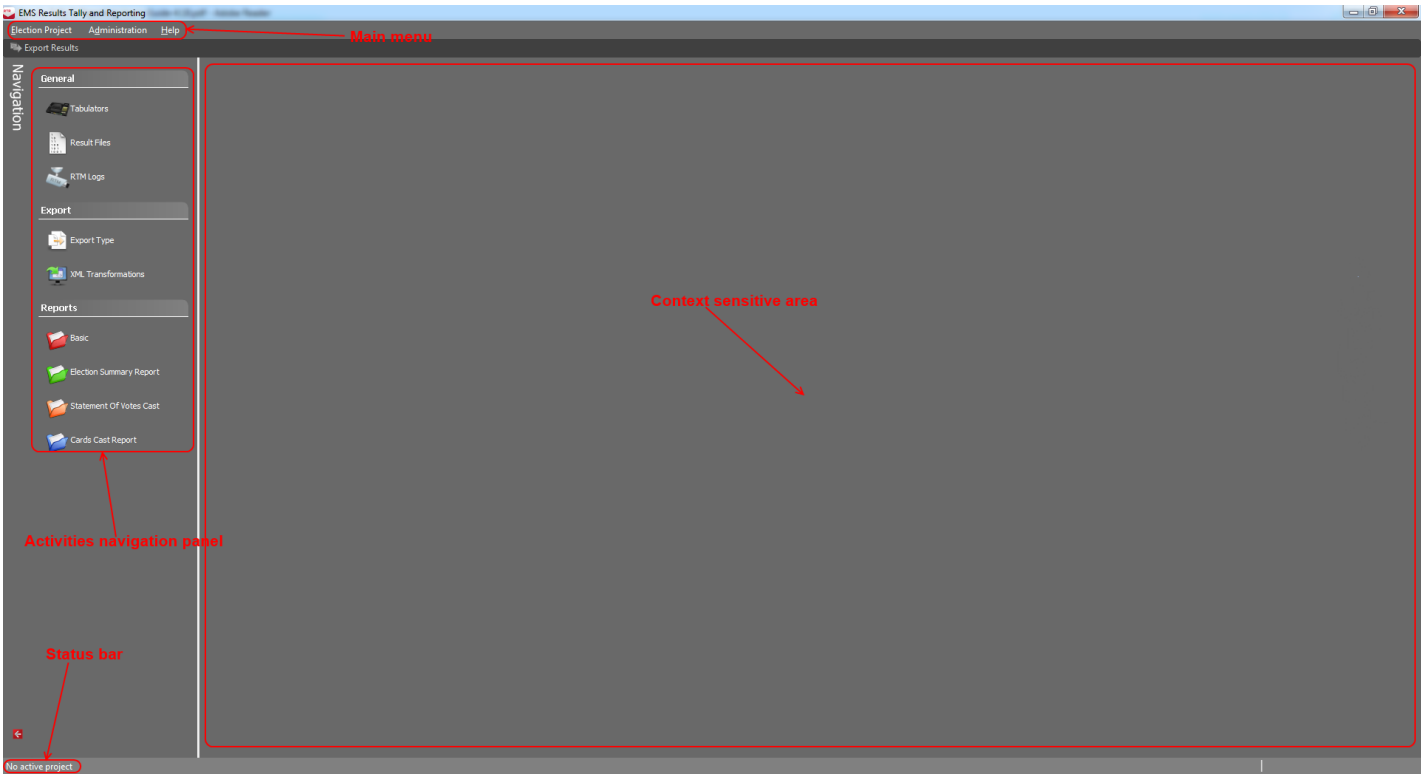


Figure 3.1: RTR Main Areas Screen

3.6.1 Context Sensitive Screens

Selecting any option in the Activities Navigation Panel causes the Context Sensitive Screen to appear in the middle. This screen differs depending on the activity selected. For example, if you click on the General, Result Files option in the Activities Navigation Panel, the Result Files screen appears. This screen is used to perform all activities related to Results Management (manual entry, validating, publishing, etc.).

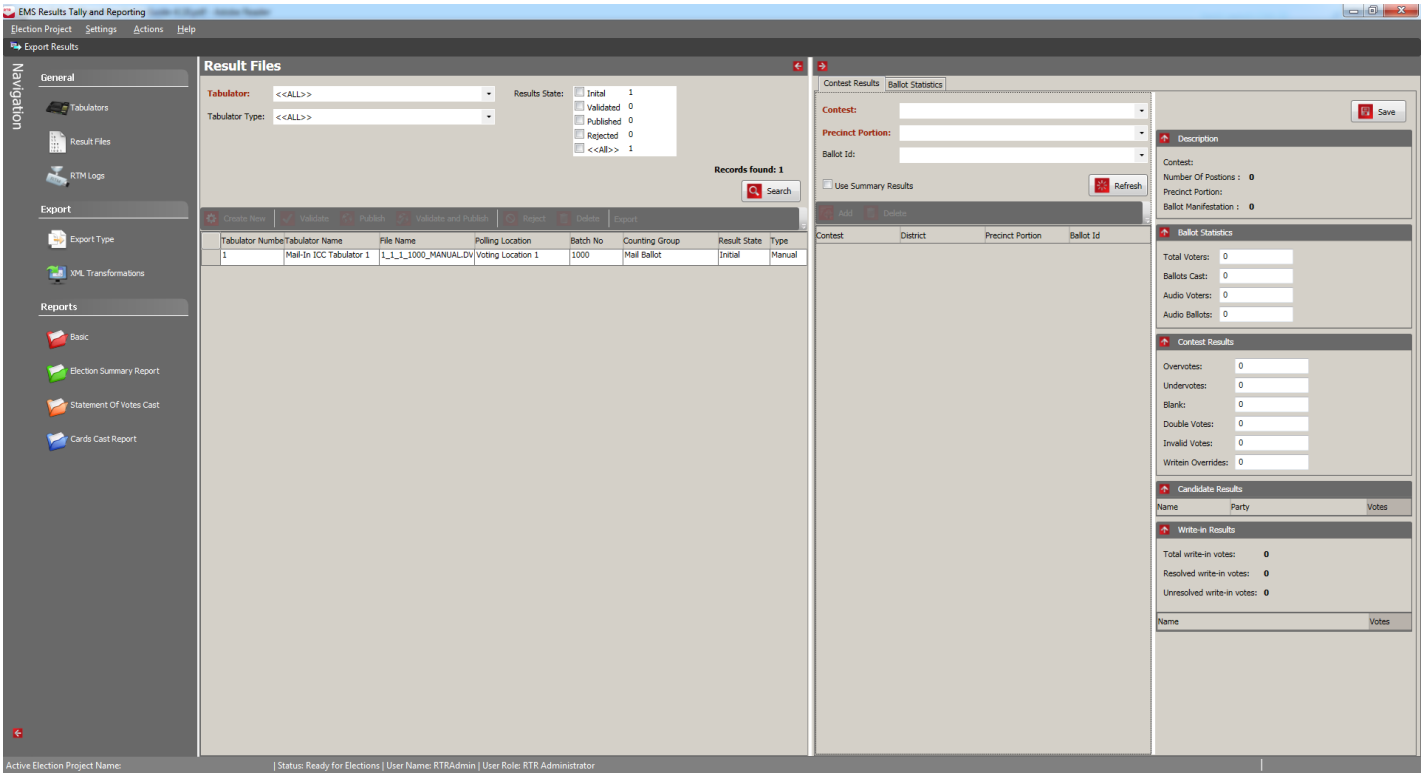


Figure 3.2: Context Sensitive Screen

Chapter 4

Application Activities Panel

This section introduces common actions that appear throughout the application's user interfaces and some specific actions that appear in most dialog windows. In addition, this section describes main application activities and keyboard shortcuts.

Tasks covered in this section:

- Common Actions
- List of Useful Keyboard Shortcuts
- Main Menu
- Activities Navigation Panel
- Status and Progress Bar

4.1 Common Actions

This section lists and describes common actions that appear throughout the Results Tally & Reporting application user interface. These actions mainly appear in the context sensitive screen area (such as Delete or Sort) or in the dialog windows that appear throughout the application (such as Save or Cancel). Some of the actions described below contain prerequisites and cannot be performed prior to executing other actions. For example, the Subdivision Type and Parent Subdivision must be selected before creating a new division object. See individual sections for further details. Some actions require you to select the object on which you wish to perform the desired action. For example, to Delete an object, first select/highlight it and then click on the **Delete** button.

- **Create New**: Click **Create New** to create a new object in the database. This action is available in the context sensitive screen "XML Transformations". Note that this button is called **Create Report** in the Reports section. Choose the report criteria from the combo box lists and click on the **Create Report** button to create the desired report.
- **Delete**: Select an object from the list and click **Delete** to delete the object.
- **Move Up**: Select an object from the list and click **Move Up** to move the object up on the list.
- **Move Down**: Select an object from the list and click **Move Down** to move the object down on the list.

- **Sort**: Click **Search** to list all objects and then click **Sort** to display the Advance Sorting dialog window. This window contains a list of Available Attributes that can be used to sort objects. Select the attribute(s) you wish to sort the objects by and click **Add**. The selected attributes are added to the Selected Attributes list. Use the **Move Up** and **Move Down** buttons to rearrange the order of Selected Attributes. Click **OK** to apply advanced sorting or **Cancel** to exit the dialog.
- **Preview**: Click **Search** to display all available records. Select the record from the list and click on the **Preview** button to open the dialog window allowing the preview/edit of the object. The preview option is available in the following context sensitive screens:
    1. "Tabulators"
    2. "Result Files"
- **Search**: Click **Search** to display all records. Alternatively, narrow down search results by selecting specific search criteria from the list of available search options. The available search criteria will differ depending on the context sensitive screen (or dialog window) where the action is performed.
- **Save**: Click **Save** to save the changes made to the object and to leave the dialog open for the active object.
- **Save and Close**: Click **Save and Close** to save the changes made to the object and to close the active object dialog.
- **Apply**: Click **Apply** to save the changes made to the object. This action commits the set of entered changes but does not close the dialog. Use this action with the **OK** action.
- **OK**: Click **OK** to save the changes made to the object and to close the object dialog window. This action saves the changes and closes the dialog.

4.2 List of Useful Keyboard Shortcuts

- **F1**: Open the Help document
- **Ctrl + Click**: Select multiple objects in a list of objects
- **Ctrl + A**: Select all objects in a list
- **Ctrl + O**: Open the Election Project
- **Ctrl + P**: Open the Transfer Points dialog window
- **Ctrl + M**: Open Card Management
- **CTRL + D**: Open the Document Management viewer
- **CTRL + L**: Open the Load Results from Directory dialog window

4.3 Main Menu

The Main Menu contains various key application functionalities, some of which require other actions to be completed before they can be used. For example, the **Create Ballots** action cannot be employed until all election event properties have been defined and ballot content has been created. Application actions are summarized in the list below.

- **Election Project Menu:**
  - **Open Project**: Open an existing Election Project.
  - **Close Project**: Close an active Election Project.
  - **Exit**: Exit the EMS Results Tally & Reporting application.

- **Settings:**
  - **Transfer Points**: Open dialog to create/edit/delete transfer points.
  - **Configuration Results Export** : Configure parameters associated with results export.
  - **Project Properties**: Open Project Properties dialog.
- **Actions:**
  - **Open Card Management**: Open dialog that allows user to retrieve information from memory cards. Automatic Result Loading should have description Opens dialog that allows user to configure automatic results loading.
  - **Load Results From Directory**: Generate ballot content.
  - **Automatic Result Loading**
  - **Open Document Management**: Open EMS NAS viewer.
- **Results**:
  - **Validate All**: Validate all result files.
  - **Validate and Publish All**: Validate and publish all result files.
  - **Reject All**: Reject all result files.
  - **Purge Results**: Purge/delete all result files.
- **Export**:
  - **Export Results**: Export results to defined transfer points.
  - **Export Audit File**: Export audit report files to the Results directory on NAS.
  - **Export Audit Images**: Export audit images to the Results directory on NAS.
  - **Show Export Log**: Show log on export activity in Notepad format.
- **Import Report Profile**: Allows user to import Report Profile files that contain configuration for reporting.
- **Help**:
  - **Help Documentation**: Open Democracy Suite® EMS Results Tally & Reporting User Guide.
  - **About**: Open the EMS Results Tally & Reporting application version information.
  - **Localization Settings**: Open the Localization Settings dialog.

4.4 Activities Navigation Panel

The Activities Navigation Panel groups the majority of activities used in election project definition and management as listed below.

- **General:**
  - **Tabulators**: Opens the “Tabulators” context sensitive screen. Used to manage tabulators.
  - **Result Pair Resolution**: Opens the “Result Pair Resolution” context sensitive screen. Used to manage result pairs.
  - **Result Files**: Opens the “‘Result Files” context sensitive screen. Used to manage result files.

- RTM logs: Opens the “RTM Logs” context sensitive screen. Used to monitor result files transfer trough RTM.

- **Export:**
  - **Export Type**: Opens the “Export Data” context sensitive screen. Used to manage data exports.
  - **XML Transformations**: Opens the “XML Transformations” context sensitive screen. Used to manage XML transformations.

- **Reports**
  - **Basic**: Opens the “Report Group - Basic” context sensitive screen.
  - **Election Summary Report**: Opens the “Report Group - Election Summary Report” context sensitive screen.
  - **Statement of votes Cast**: Opens the “Report Group - Statement of votes Cast” context sensitive screen.
  - **Card cast Report**: Opens the “Report Group - Card cast Report” context sensitive screen.
  - **Result Pair Report**: Opens the “Report Group - Result Pair Report” context

4.5 Status and Progress Bar

- **Status Bar Elements**
  - **Active Election Project Name**: Displays the name of the currently active/open election project.
  - **Status**: Displays the status/state of the currently open election project.
  - **User Name**: Displays the user name of the user that opened the election project.
  - **User Role**: Displays the role of the user that opened the election project.

Chapter 5

Opening and Closing Results Tally & Reporting

5.1 Starting the Application

1. Double-click on the **Results Tally and Reporting** icon on the Desktop.

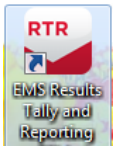


Figure 5.1: Starting RTR - RTR Icon

2. In the *Localization Settings* screen, select the language option from the combo box and click **OK**.
3. The **Default** profile is English language.

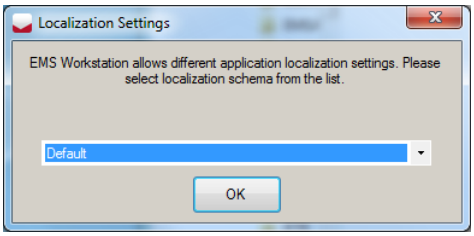


Figure 5.2: Starting RTR - Localization Setting Screen

4. The following application introduction screen appears.

Figure 5.3: Starting RTR - Splash Screen

5. The EMS Results Tally & Reporting application main screen opens.
6. Alternatively, open the application from the Windows Start menu:
   a Expand the Windows **Start** menu.
   b Click **All Programs**.
   c Find and expand the DVS application group item.
   d Click **Results Tally & Reporting** and click on the **Results Tally & Reporting** application item.
   e Application introduction screen appears.
   f The application main screen appears.

NOTE: *By default, EMS applications are installed under the following Windows file system folder: C:\Program Files\Dominion Voting Systems*

5.2 Exiting the Application

1. To exit the application, click on the **Election Project** menu item and click **Exit** (see Election Project Menu).
2. The screen in Figure 5.4 appears.

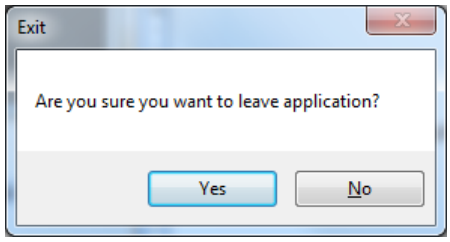


Figure 5.4: Exiting RTR - Exit Screen

3. Click **Yes** to exit the application.
4. Alternatively, you can close the application by clicking on the **X**-shaped button in the top right corner of the screen.

Chapter 6

Election Project Basic Functions

This Chapter describes the basic functionality of the EMS Results Tally & Reporting application. Tasks covered in this Chapter include:

- Opening an Election Project
- Closing an Election Project

6.1 Opening an Election Project

1. Start the EMS Results Tally & Reporting application.
2. Expand the **Election Project** item from the Main Menu and click on the **Open Project** option.

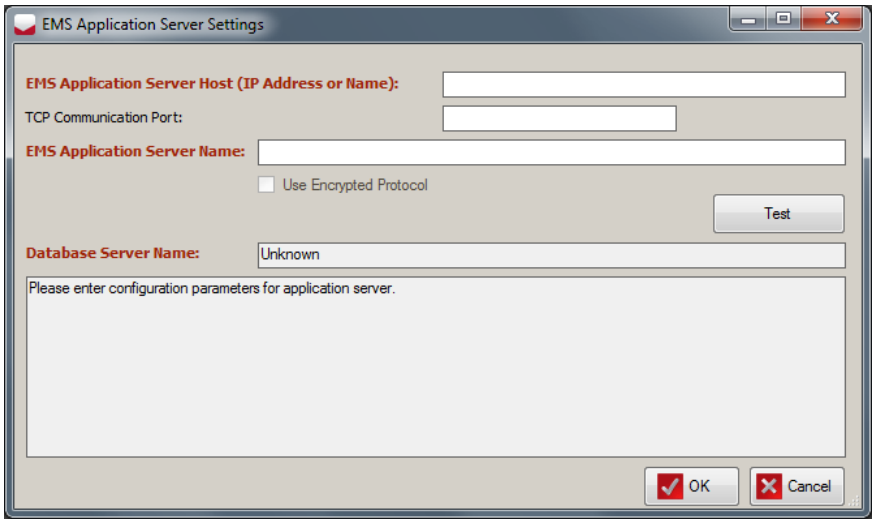


Figure 6.1: EMS Application Server Settings Screen

NOTE: *If you are creating the project for the first time you must set the network parameters. Enter all data required.*

- EMS Application Server Host (IP Address or Name): Type in the name of the EMS application server host. If using EMS Express, type localhost.
- TCP Communication Port: 80 is the default TCP communication port.
- EMS Application Server Name: Type in emsapplicationserver

3. Once all data is entered, click the **Test** button. If the settings are correct, you will receive confirmation in the grey dialog box. If you do not receive a confirmation, correct your settings, or contact your IT personnel for the proper credentials. Click the **OK** button to continue.

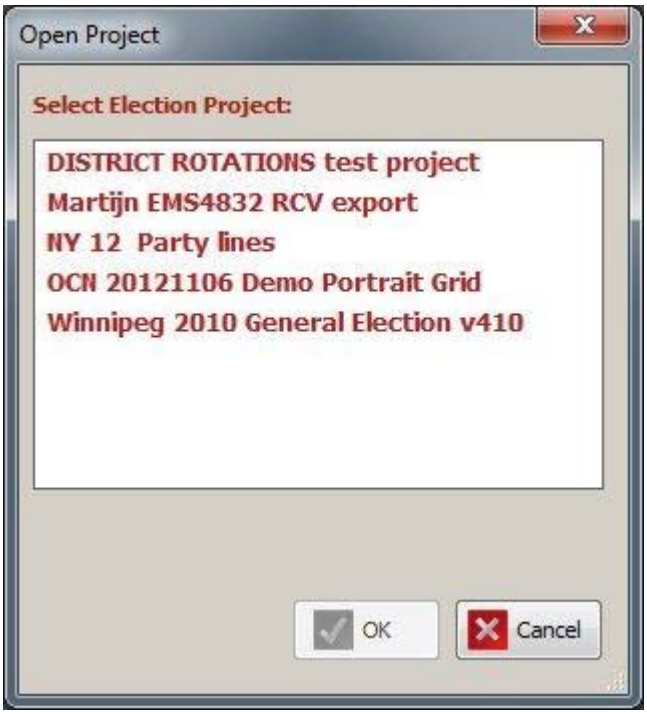


Figure 6.2: Open Project Screen

4. The **Open Project** screen appears. Click on the desired project to select it, and click on the **OK** button.
NOTE: *Only election projects with a Ready for Election status can be opened in the Results Tally & Reporting application. If an election project is not in the Ready for Election status, the election files have not yet been created for that project, and election result files cannot be processed for that project.*
NOTE: *The EMS Results Tally & Reporting Application User's status must be activated in the EMS Election Event Designer application.*

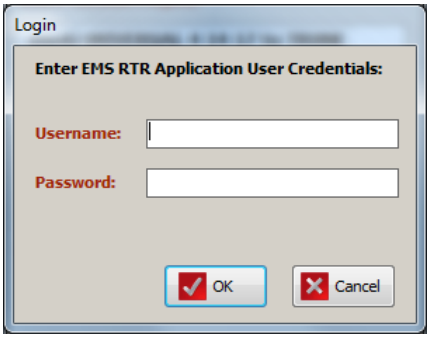


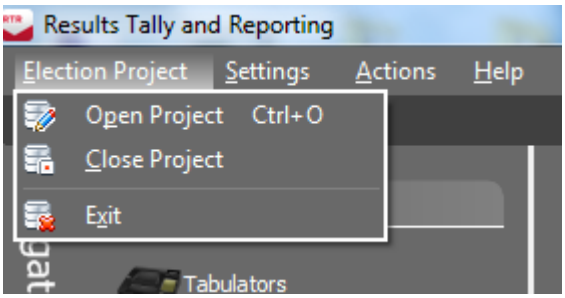
Figure 6.3: Login Screen

5. In the election project **Login** dialog window, type in the credentials for the Results Tally & Reporting Administrator and click on the **OK** button. If you do not have the credentials, contact your supervisor.

6. After successfully logging into the EMS Results Tally & Reporting application, the application expands to include new menu items and the status bar is updated to contain project and user details.

Figure 6.4: Election Project Opened in EMS Results Tally & Reporting Application

6.2 Closing Election Project



1. Expand the **Election Project** item from the Main Menu and click on the **Close Project** option.

Figure 6.5: Close Project Screen

2. The project is closed, and the Status Bar now reads as “No active project”.

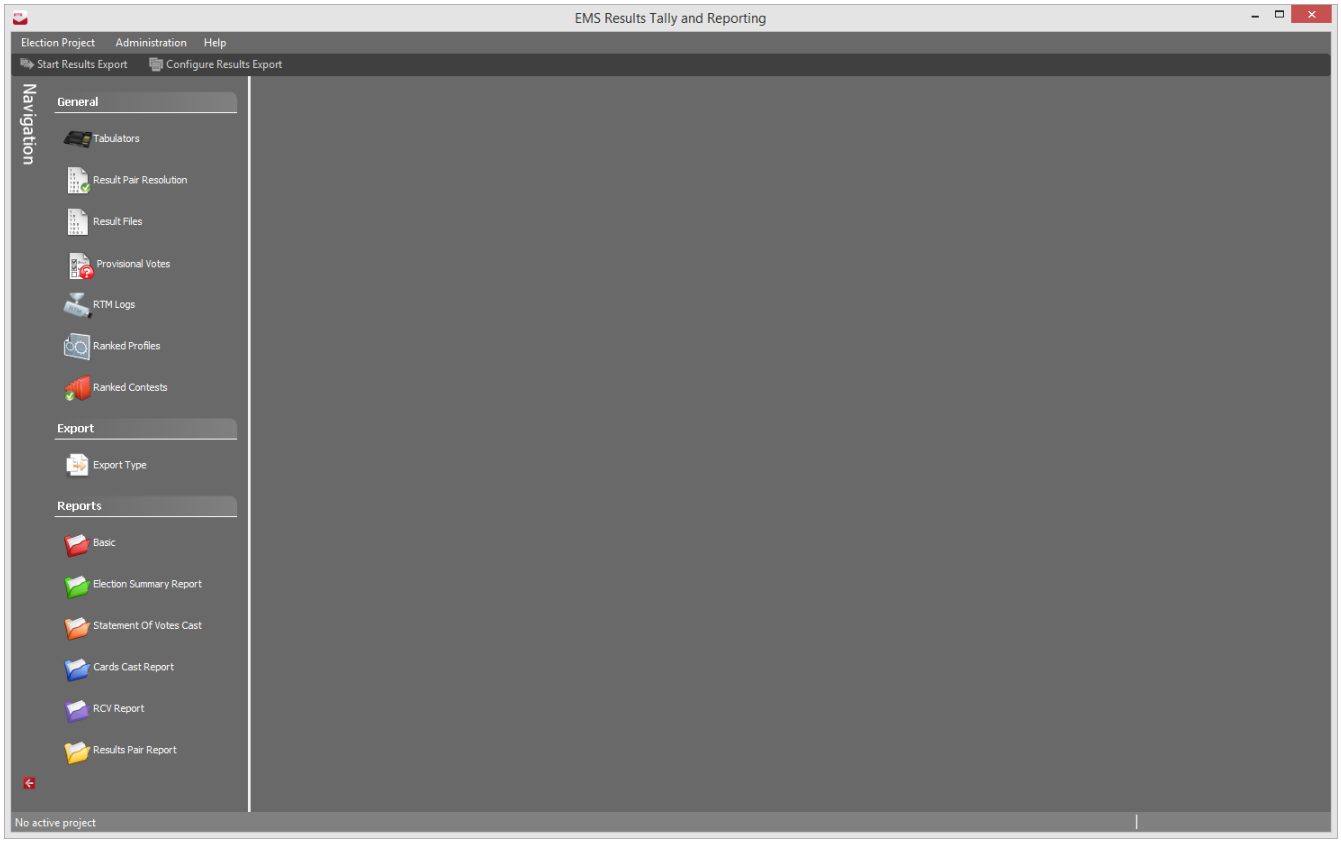


Figure 6.6: Election Project Closed-Status Closed Screen

6.3 Project Settings- Project Parameters

Expand the **Settings** menu and click on the **Project Properties** menu item. The **Project Settings** dialog appears. The following parameters can be configured:

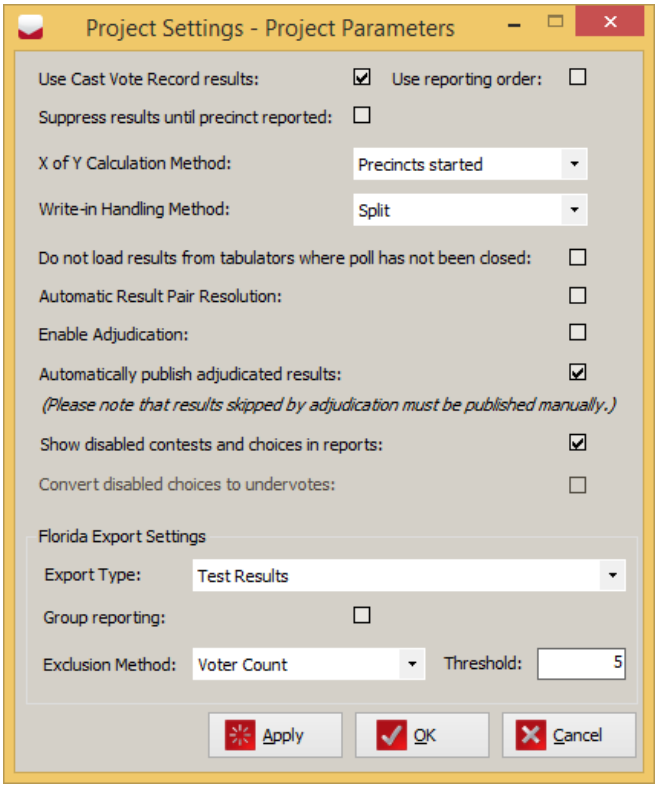


Figure 6.7: Project Settings - Project Parameters Screen

1. **Use Raw Results**: The ImageCast® tabulators generate result files in two different formats: The raw results file format contains complete information about every voter mark detected on each ballot cast on a given tabulator. The total results file format is more compact and provides only totals. When the "Use Raw Results" checkbox is selected, Results Tally & Reporting loads the raw results files instead of the total results files.

   NOTE: *This only applies to the ImageCast® Precinct tabulator. Results Tally & Reporting will always use the total results files produced by the ImageCast® Evolution when loading results regardless whether the checkbox is checked or not. The raw result files are used from both tabulators when the "Export Audit Images" functionality is employed.*

2. **Suppress results until precinct reported**: If you select the checkbox, the system has the ability to suppress results for a precinct based on the X of Y progress. This setting allows you to have more control over the X of Y progress reporting. The Y refers to the total number of precincts in a jurisdiction that participate in the progress reporting. The X refers to the number of precincts that are either started or completely finished (which one depends on the configuration). X of Y reporting is the optional ability of the system to suppress results (including votes, number of ballots cast, and turnout) for precincts included in the Y count but not yet part of the X count.

3. **X of Y Calculation Method**: This setting controls how the X is calculated; the X counts the number of reported precincts. There are two methods: *Completed by Precinct*: a precinct is

considered reported if all tabulators handling that precinct are closed. *Precincts started*: a precinct is considered reported if there is a result file published referring to this precinct. If option *precinct started* is selected, results are not suppressed.

4. **Write-in Handling Method**: Within this combo box, you can select whether to present the write-in results as one consolidated (combined) number. Alternately, you can choose to tally and report the write in votes separately.

5. **Do not load results from tabulators where poll has not been closed**: Prior to removing the Compact Flash cards from the ImageCast® tabulators, the poll must be closed. In some cases, operators may remove the cards without closing the polls. Selecting this feature prevents the results on cards from open tabulators from being added to the tally within the Results Tally & Reporting application.

6. **Automatic Result Pair Resolution**: Checking this item will ensure that result pairs are automatically resolved i.e. if the results within the pair are matching, the resolution process will automatically pick the machine results as the chosen result set from the pair. For more information about result pairs, please refer to the **Result Pair Resolution** chapter 12 in this document.

7. **Enable Adjudication**: Checking this item will ensure that the Adjudication process is included in the workflow when managing result files. For more information about results states, please refer to the Result State Management section 9.3 in this document.

8. **Automatically publish adjudicated results**: Checking this item will ensure that any results that undergo the adjudication process will be automatically published. **NOTE**: *Results that are skipped by Adjudication will have to be published manually by the application user.*

9. **Show disabled contests and choices in reports**: When this option is selected, any contests or candidates that were disabled will be shown in the Election Summary and the Statement of Votes Cast reports.

10. **Convert disabled choices to undervotes**: This option is only enabled if disabled contests and candidates are not set to be displayed in the reports. When this option is selected, votes recorded for any of the disabled candidates will be converted to Undervotes in the Election Summary and the Statement of Votes Cast reports.

Chapter 7

Importing Election Results

Election results (including the scanned ballot images and log files) are stored on the compact flash memory cards and can be stored on local file system or on the NAS. Each file type (result files, ballot images and log files) may be imported together or separately. This allows for the flexible management of results after the election occurs. Since ballot images take a significant amount of time to import, your jurisdiction may decide that they are imported after the results have been completely tallied. Result and log files, however, take only a few seconds to load.

Tasks covered in this section:

- Connecting the Card Reader/Writer
- Loading Results From Memory Card
- Resetting Memory Card
- Loading Results From Directory

7.1 Connecting the Card Reader/Writer

Three components are necessary in connecting the card reader/writer to the EMS Results Tally & Reporting workstation:

- A USB type adapter between component card reader/writer and EMS Results Tally & Reporting workstation
- Memory card reader/writer
- Memory card

NOTE: *If the computer you are using already has a Compact Flash card reader/writer, skip this section.*

To connect the card reader/writer, please perform the following steps:

1. Connect the USB type adapter and the card reader/writer together.
2. Plug the USB type adapter into the USB port of the EMS Results Tally & Reporting workstation.

3. To prepare the memory card containing the election files for reading/writing, insert it into the memory card reader/writer's card slot. Ensure the card is completely inserted.

4. The content from a Compact Flash card can now be viewed.

5. When the reader/writer is actively reading/writing to a card, a lighted indicator appears. When the process finishes, the lighted indicator goes out, and you can remove the memory card from the card reader/writer. Every time you want to read or write data to the memory card, repeat the steps above.

NOTE: *The card reader/writer and/or memory card design can vary depending on the vendor of the device. Never insert or remove a Compact Flash card while the indicator is lighted.*

7.2 Loading Results from Memory Card

1. Connect the card reader/writer to the EMS Results Tally & Reporting workstation as described in section 7.1.

2. Expand the **Actions** menu and click on the **Open Card Management** menu item.

3. **Waiting for CF Card** dialog will appear.

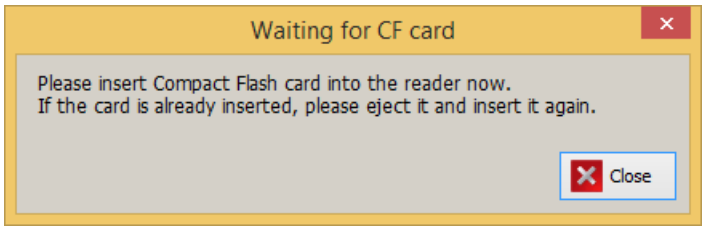


Figure 7.1: Waiting for CF Card dialog

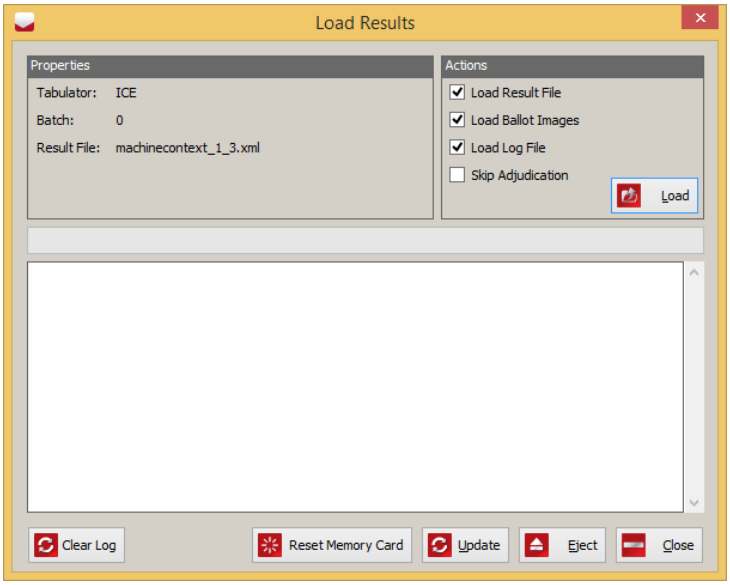


Figure 7.2: Load Results dialog

4. Insert CF Card into card reader and **Load Results** dialog appears. Select the following options from the **Actions** field: **Load Results file**, **Load Ballot Images** or **Load Log File**.
5. Click the **Load** button to import selected type of file.

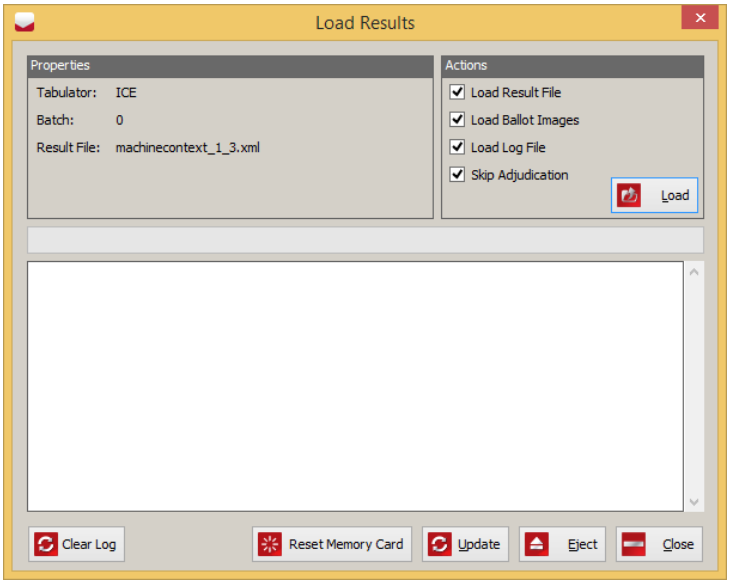


Figure 7.3: Load Results dialog

6. If you do not want loaded results to be available for Adjudication, check the **Skip Adjudication** check box.

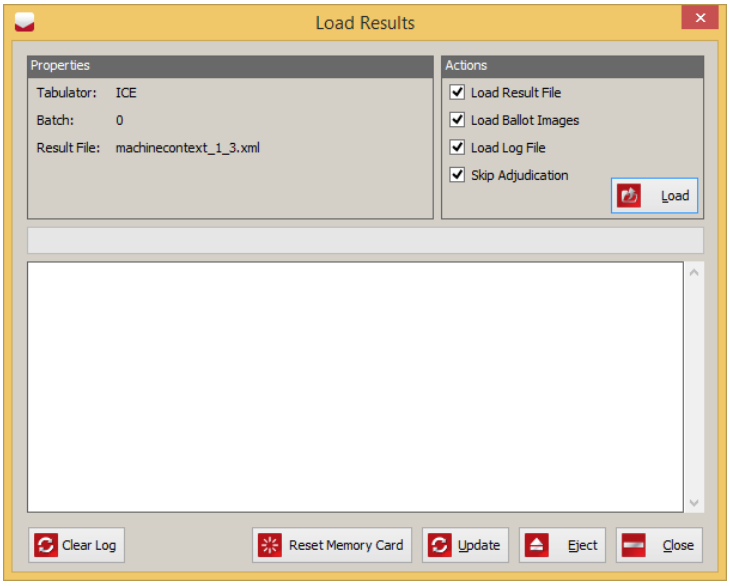


Figure 7.4: Load Results dialog

7. The Process window tracks the loading progress for the selected file type.

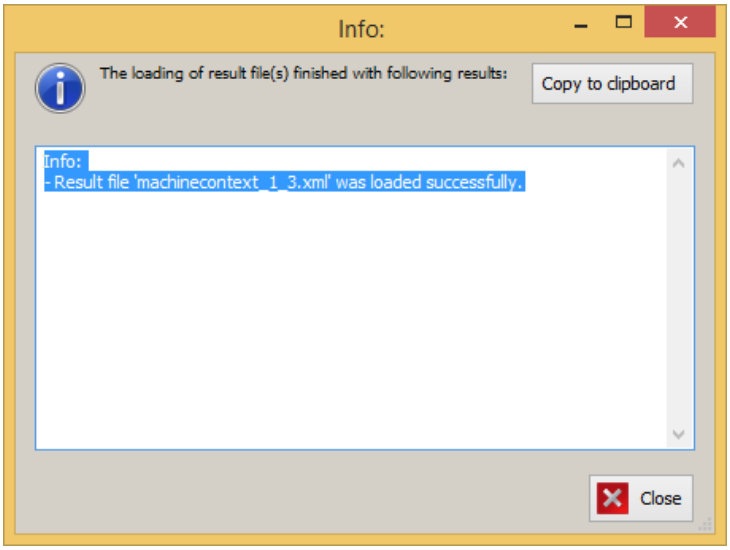


Figure 7.5: Question dialog

8. Info screen appears. Click **Close**.

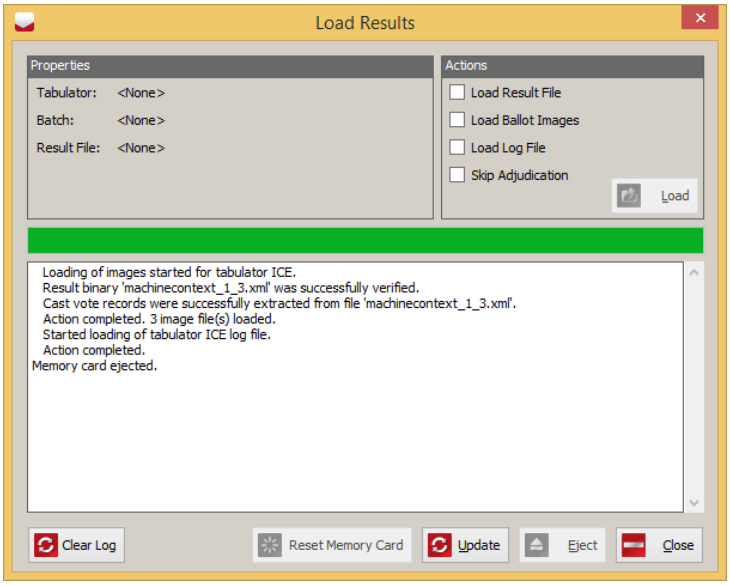


Figure 7.6: Question dialog

9. The Load Result dialog contains a record of the completed action.

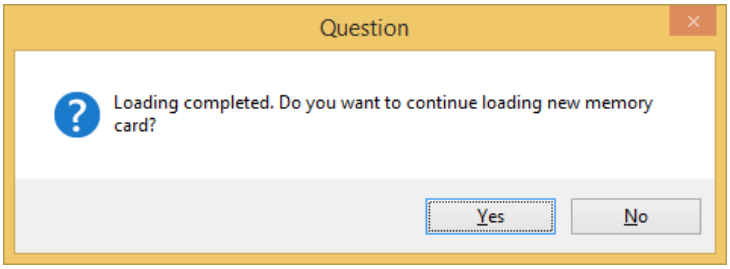


Figure 7.7: Question dialog

10. The Question dialog “Do you want to continue loading new memory card ?” appears. Click the **Yes** button to continue. Click the **No** button to close the dialog.

11. It is possible to load the result files, ballot images, and log files separately.

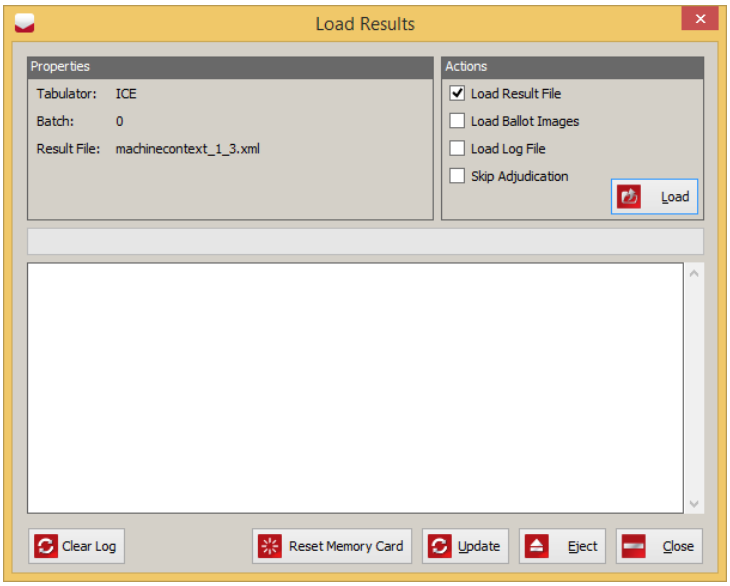


Figure 7.8: Load Results File Progress

12. Check the **Load Results file** option and click the **Load** button.
13. The Process window tracks the loading progress for the selected file type.

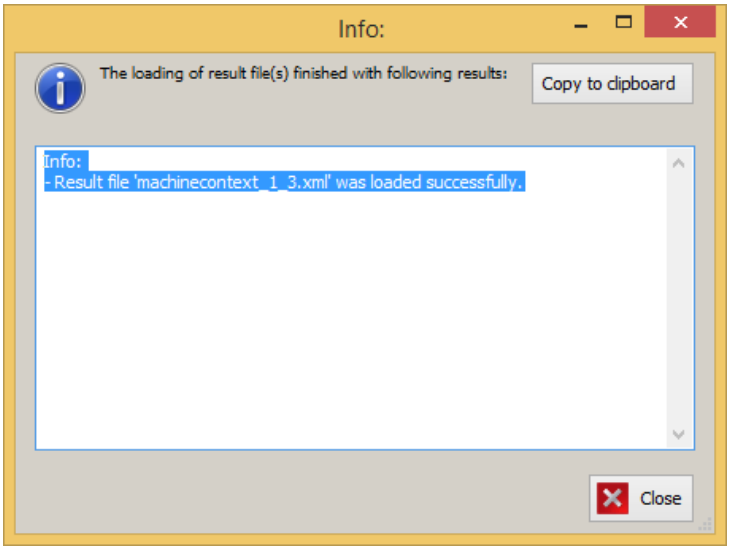
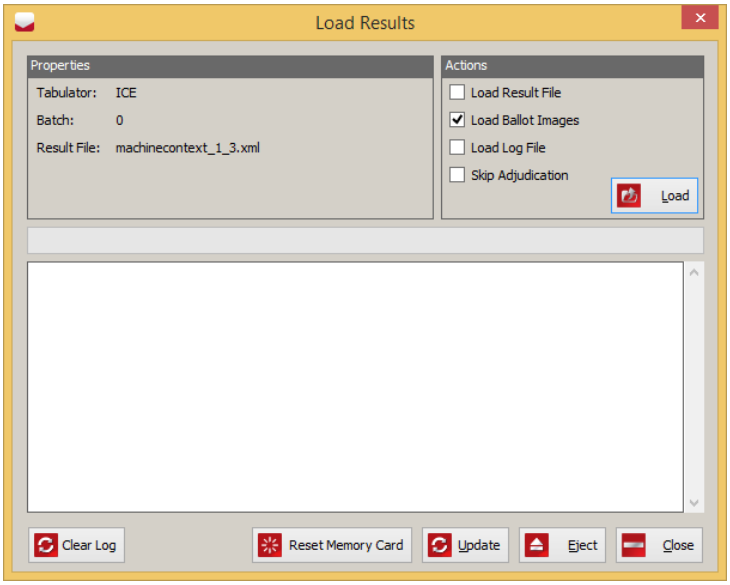


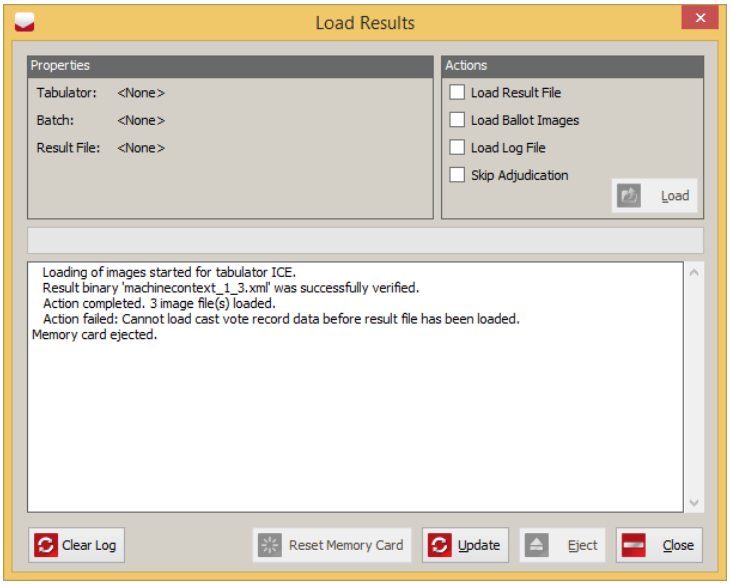
Figure 7.9: Load Results File - Action Completed

14. The **Info** dialog contains a record of the completed action.



15. To load the ballot images, select the "Load Ballot Images" option from the **Actions** field in the **Load Results** dialog, and click the **Load** button.

Figure 7.10: Question dialog



16. The **Process** dialog appears detailing the status of ballot image loading, as seen in the figure below. This process may take a number of minutes to complete.
17. The **Load Results** dialog contains a record of the completed action.

Figure 7.11: Question dialog

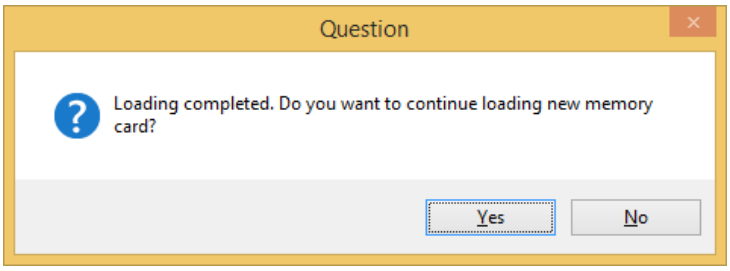


Figure 7.12: Question dialog

18. Question dialog "Do you want to continue loading new memory card?" appears. Click the **Yes** button to continue. Click the **NO** button to close the dialog.

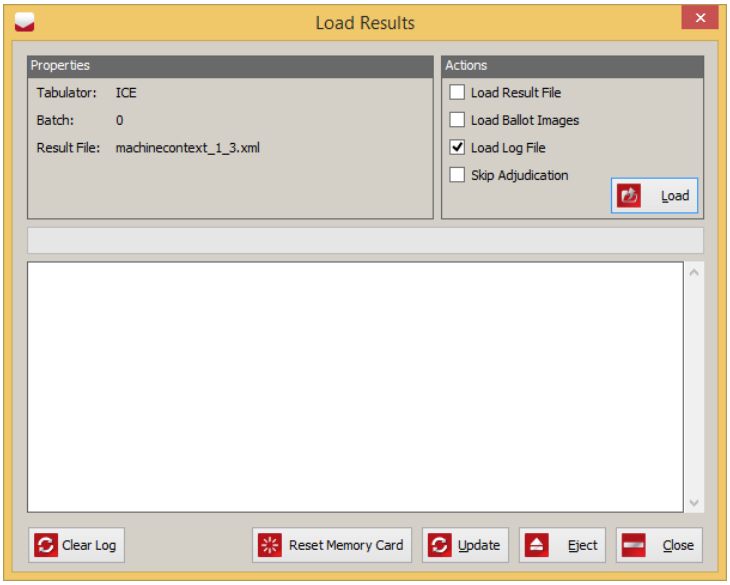


Figure 7.13: Load Ballot Images

19. To load the tabulator log file,in the Load Result dialog, select the Load "Log File" option from the **Actions** field, then click the **Load** button.
20. The **Process** dialog window appears detailing the status of the loading log file loading, as seen in the figure below.

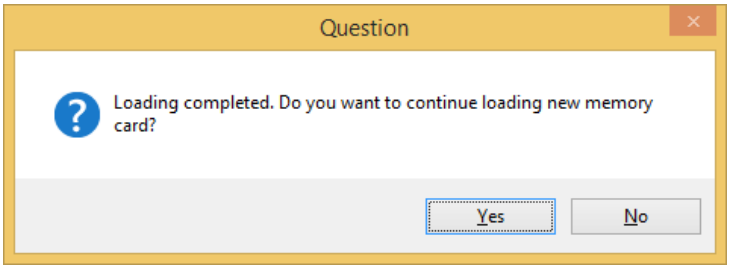


Figure 7.14: Question dialog

21. The Question dialog "Do you want to continue loading new memory card?" appears. Click the **Yes** button to continue. Click the **NO** button to close the dialog.

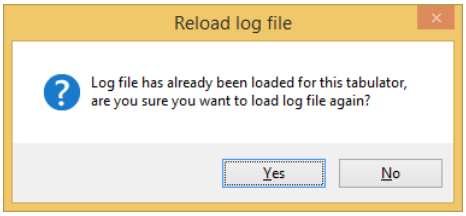


Figure 7.15: Load Log File Process Progress

Reload Log File screen appears. Log File

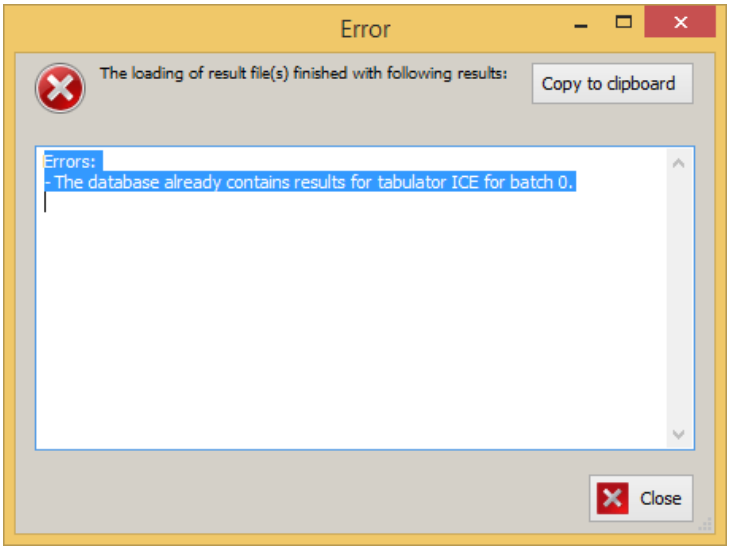


Figure 7.16: Question dialog

22. The Question dialog "Do you want to continue loading new memory card?" appears. Click the **Yes** button to continue. Click the **NO** button to close the dialog.

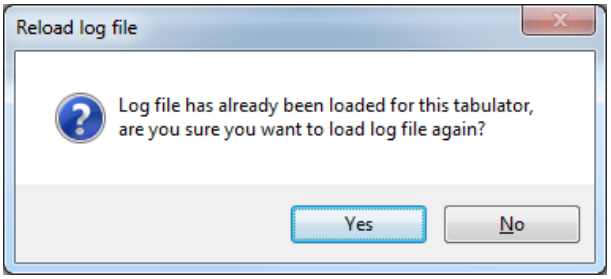
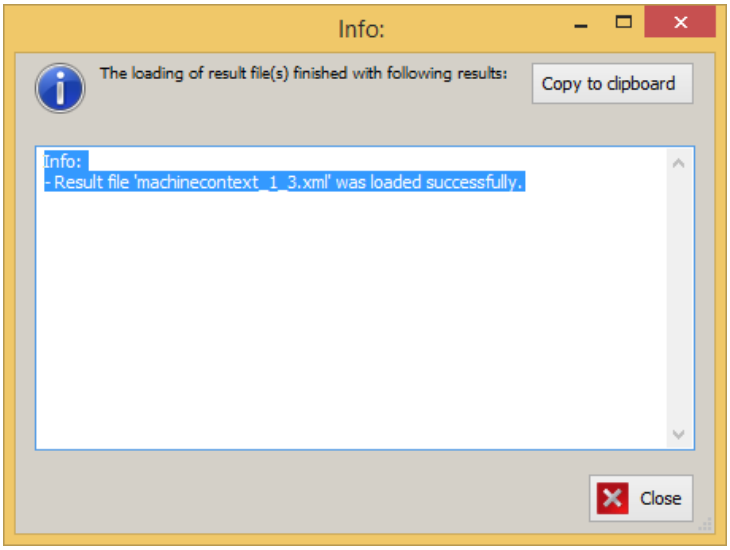


Figure 7.17: Reload Log File dialog

23. If the ballot images or log file you are trying to load have already been loaded into the EMS Results Tally & Reporting application, the Reload message box will appears to inform you that the file has already been loaded for that tabulator (see the Reload Log file example image below). Click on the **No** button to stop reloading the file, or click on the Yes button to continue reloading the file.



24. If the result file you are trying to load has already been loaded into the EMS Results Tally & Reporting application, Load Results dialog appears to notify you that the result for that tabulator has already been loaded, as seen in Figure 7.18.

Figure 7.18: Tabulator Message

If you want to load new result files for the same tabulator, delete the previous result file. This can be done in two ways as described in 9 of this document:

- Delete Result Files
- Purge Results

7.3 Resetting the Memory Card

In some cases, it is useful to reset the contents of a memory card.
NOTE: *When a memory card is reset, the contents on the card are cleared and the memory card can be used for something else.*

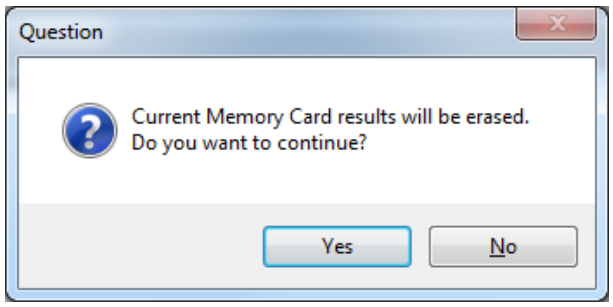


Figure 7.19: Reset Memory Card

1. To reset the memory card, click on the **Reset Memory Card** button in the Load dialog window.
2. The Question dialog appears. To continue, click the **Yes** button.

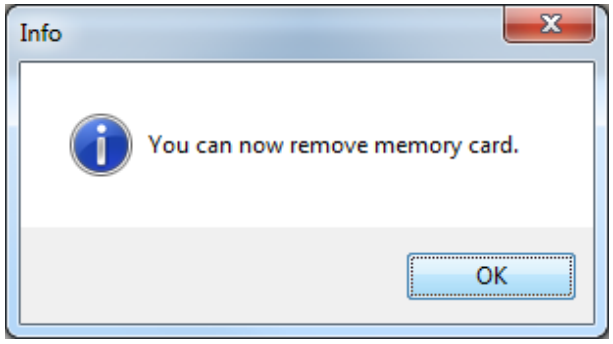


Figure 7.20: Remove Memory Card

3. After the memory card is cleared, you are presented with the information message shown in Figure 7.20.
4. Click the **Eject** button in the **Load Results** dialog to safely remove the memory card from the Compact Flash reader. After doing so, the Load Result dialog resets all the values and you can safely remove the card. Insert a new card without closing the Load Results dialog window. Click the **Update** button to refresh the screen.

7.4 Loading Results From Directory

1. Select **Actions** from the menu and click the **Load Results From Directory** option.
2. In the "Load" dialog window, select the File Type you wish to load **(Results Logs or Images)** from the combo box. Click **Browse**.
3. In the "Browse for Folder" window, select the directory that contains the results. Click **OK**. The system provides information about the source tabulator for each of the listed files. In the case of Result files it will also show if any results have already been loaded into the system, in which state they are as well as information about paired results.
4. Select the files you wish to load. If you do not want loaded results to be available for Adjudication, check the **Skip Adjudication** check box. Click **Load**.
5. Once results have been loaded, the result file will appear in the "Load" dialog window. At this point you can continue uploading the results (images or logs) by repeating steps two to four three above, or close the **Load** dialog window by clicking **Close**.

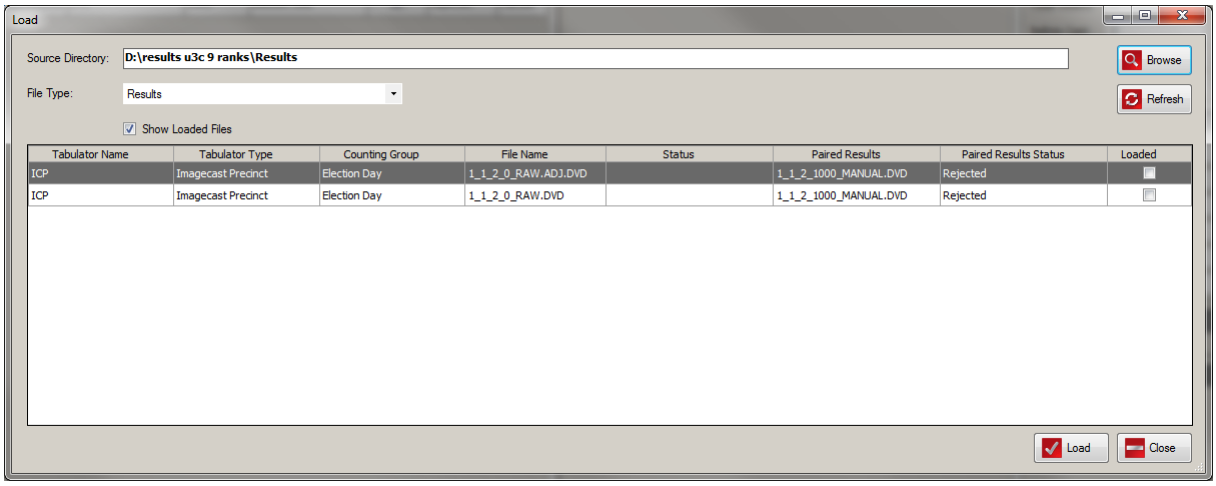
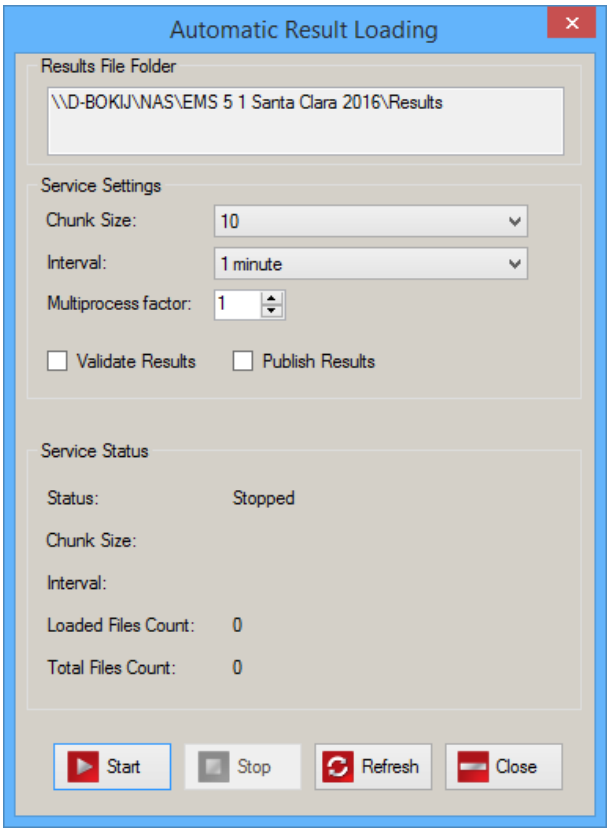


Figure 7.21: Loading Results from Directory

7.5 Automatic Result Loading

RTR can automatically load results from predefined location. That location is the **Results** folder: D:\NAS\Project Name\Results

1. Select **Actions** from the menu and click on the **Automatic Result Loading** option.



2. The **Automatic Result Loading** dialog appears. Note that it is divided into two sections: "Service Settings" and "Service Status".

Figure 7.22: Automatic Result Loading Dialog

3. It is possible to change the location (directory) from which the results are loaded by editing the **Web.config** (EMS Application Server configuration) file which is located at the following location on the server, regardless of the configuration:

   C:\VirtualDirectories\EMSApplicationServer

   In order to change the location, enter the relative path into the value field for the "AutomaticLoadingResultFilesFolder" configuration item:

   ```
   <add key="AutomaticLoadingResultFilesFolder" value="Results" />
   ```

   The default location is the **Results** folder inside the project directory on the NAS.
   Please Note: *It is strongly recommended not to change this setting.*

4. In the "Service Settings" section, **Chunk size** defines the number of result files loaded from one iteration. **Interval** defines the interval of repeating loading results. **Multiprocess factor** should

be used to indicate the number of CPU cores that can be used for simultaneous loading of result files, in order to optimize the performance. The default value is 1, which indicates sequential loading of result files.

5. After results are loaded by checking *Validate Results* and *Publish Results* checkboxes, result files will automatically change the status.

6. Click on the **Start** button.

7. Once the **Start** button is selected, "Service Status" displays the status (started or stopped), chunk size, interval, loaded files count (number of result files loaded), total files count(number of result files present in Uploaded Result Folder).

8. Click on the **Stop** button to stop automatic result loading and click on the **Refresh** button to refresh service status information.

9. Click on the **Close** button to close the dialog.

Chapter 8

Manage Tabulators

You can preview the list of defined ImageCast® series of tabulators in the EMS Results Tally & Reporting client application. Tabulators may be previewed based on their name and type, polling place, and associated voting location.

This chapter covers tabulator related functionality, which includes the following tasks:

- Searching for Tabulators
- Previewing Tabulator Properties
- Closing Tabulator for Results Processing
- Re-Opening Tabulator for Results Processing

8.1 Searching for Tabulators

1. Expand the **General** navigation group in the Activities Navigation Panel and click on the **Tabulators** option.

2. To search for a tabulator, enter the tabulator name and/or select other filtering options as shown in Figure 8.1.

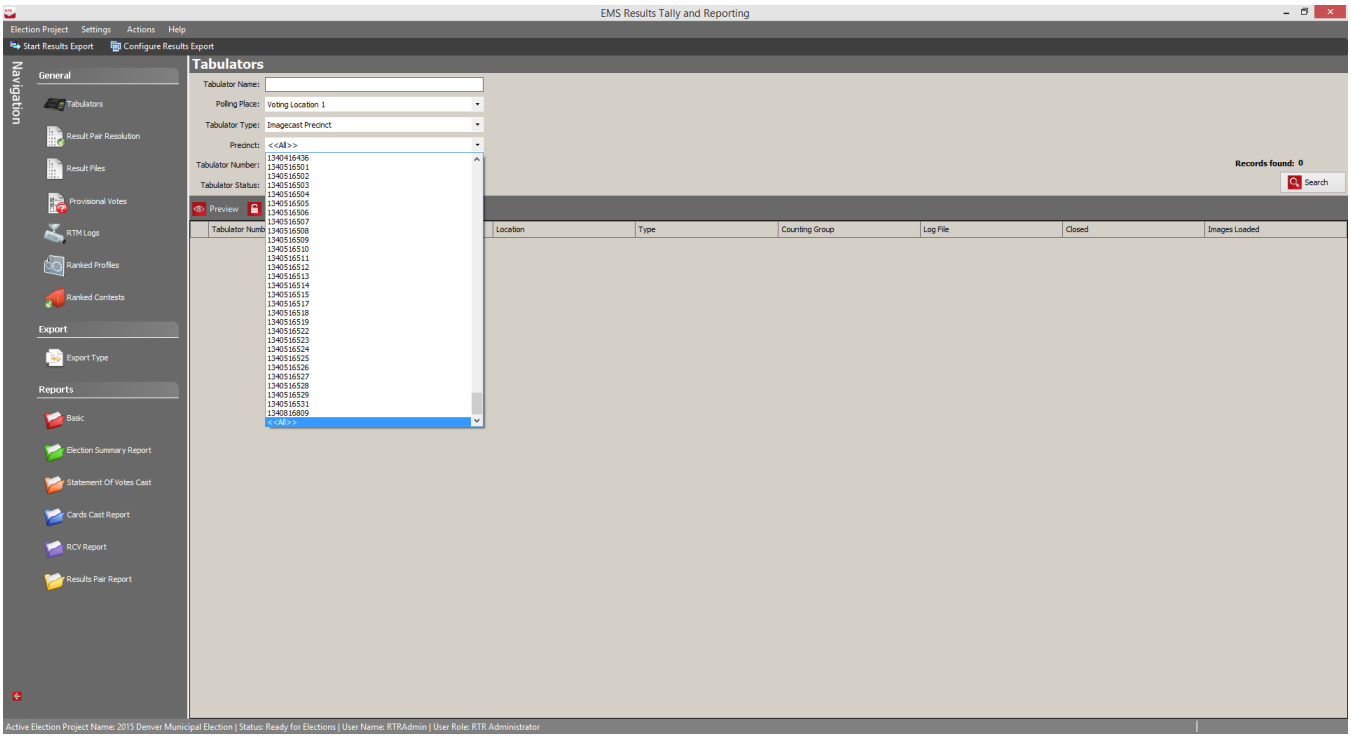


Figure 8.1: Searching-Filtering Tabulators Screen

3. Click **Search**. A list of tabulators matching the entered criteria is presented.

4. If you click on the Search button without entering any search criteria, a list of all defined tabulators for the active election project will be displayed.

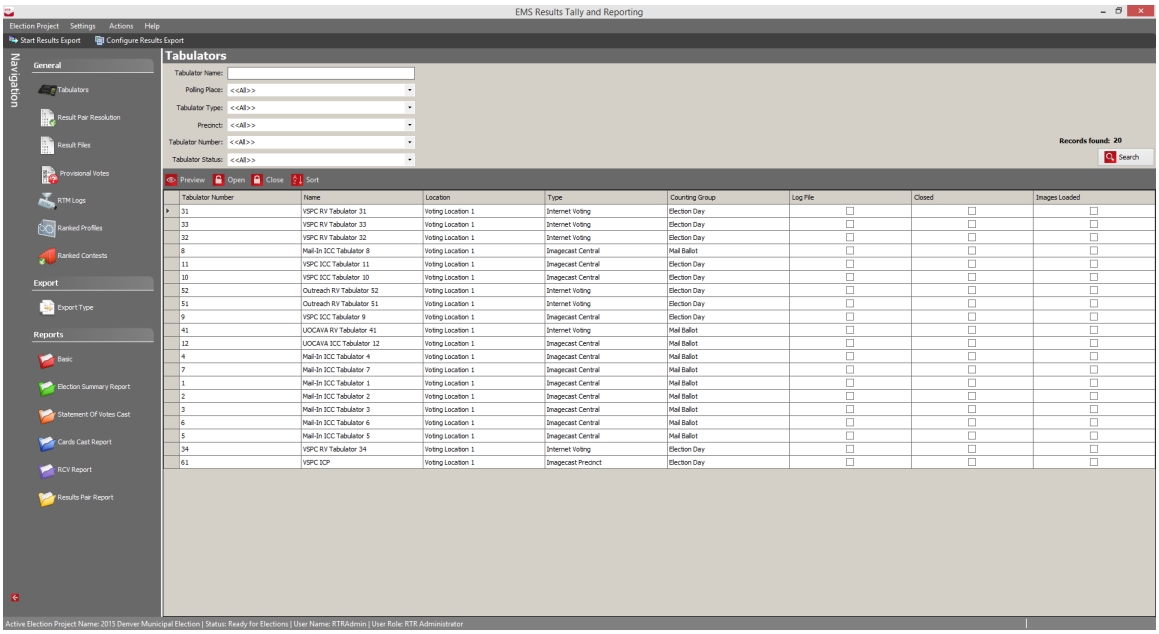


Figure 8.2: List of Tabulators Filtered by Voting Location and Tabulator Type Screen

8.2 Previewing Tabulator Properties

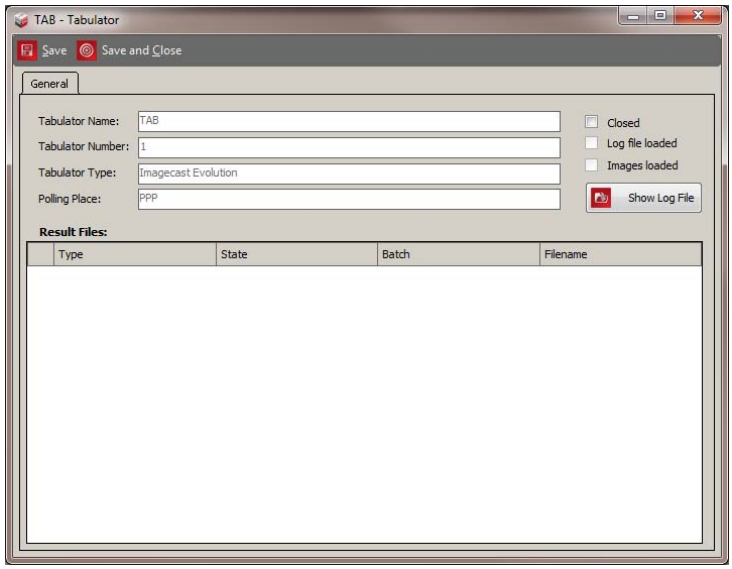


Figure 8.3: Empty Tabulator Screen

1. To preview tabulator properties, expand the **General** navigation group in the Activities Navigation Panel and click on the **Tabulators** option.
2. Search for tabulators to display results in the list. Select the tabulator record(s) and click on the **Preview** button from the toolbar.
3. The **Tabulator** preview screen appears, displaying general tabulator attributes such as tabulator name, tabulator ID, tabulator type and voting location.
4. If the result files have not been loaded for the chosen tabulator, the *Result Files* section will be empty as shown in the following image.

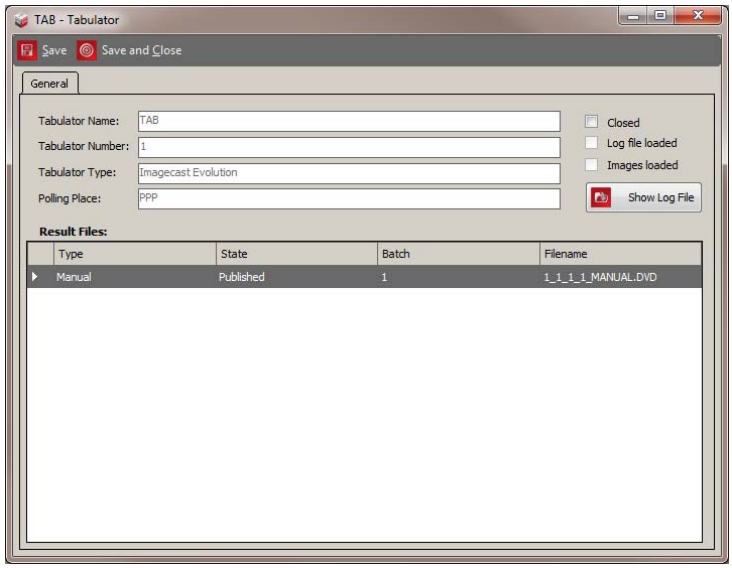


Figure 8.4: Tabulator Screen - Listed Tabulators

5. If the result file(s) for the tabulator have been loaded they will be listed in the *Result Files* section of the Tabulator preview screen.

8.3 Closing Tabulator for Results Processing

Each tabulator has a **Closed** property which indicates whether all results for that tabulator are final. Poll-level tabulators will automatically be set to Closed state if associated results are in Published state. For central scanning tabulator the RTR user must explicitly close the tabulator. The closed state affects the X of Y precincts report indicator present in some of the reports. See Section 6.3 Project Settings - Project Parameters.

Certain reports in the application provide the ability to display the X of Y statistic. See Chapter 15 Reporting for more information.

1. To declare a specific tabulator closed for results processing, expand the **General** navigation group in the **Activities Navigation Panel** and click on the **Tabulators** option.

2. Search for tabulators to display results. Select the tabulator record(s) and click **Close** from the toolbar. The tabulator status is now set to Closed. The checkbox in the **Closed** column confirms the new tabulator status.

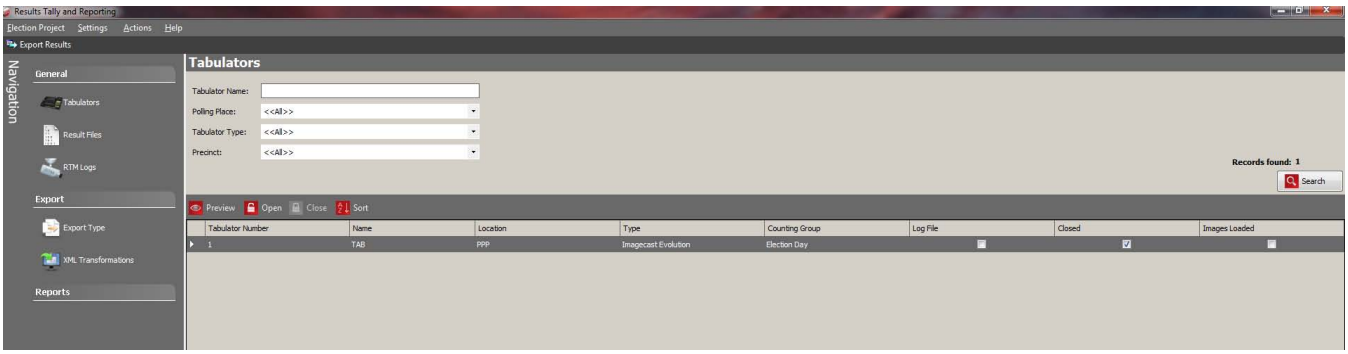


Figure 8.5: Tabulator Status Set to Closed Screen

8.4 Re-Opening Tabulator for Results Processing

1. To reopen the tabulator, expand the **General** navigation group in the **Activities Navigation Panel** and click on the **Tabulators** option.

2. Search for tabulators to display results. Select the tabulator record(s) and click **Open** from the toolbar.

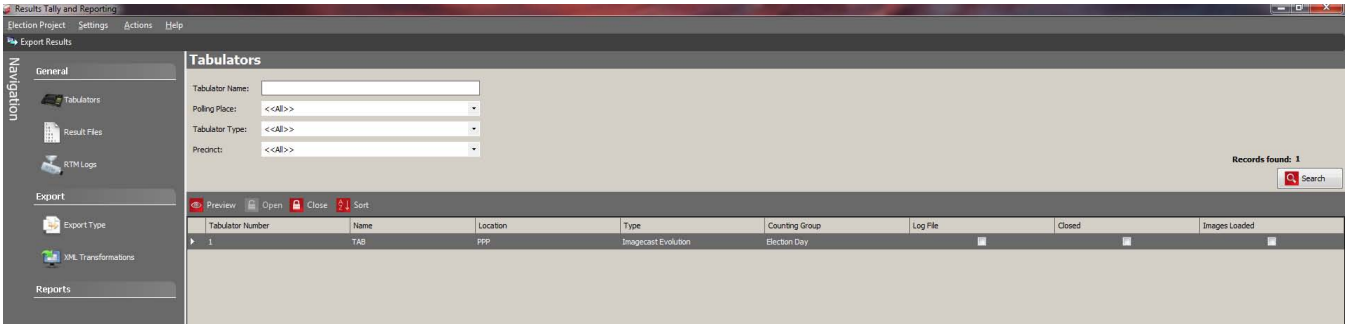


Figure 8.6: Tabulator Status Set to Open Screen

Chapter 9

Manage Result Files

This Chapter covers all functionalities related to election results processing, including inspection/review, validation, and tallying and publishing results files for interested third parties. The flow of functions when processing election results follows the result life cycle enforced by the EMS Results Tally & Reporting application. This result life cycle is explained in Section 3.4 RTR Functional Flow. This Chapter covers the following tasks:

- Previewing Result Files Record
- Validating Result Files
- Publishing Result Files
- Manual Data Entry
- Write-In Resolutions
- Purging Election Results
- Deleting Result Files

9.1 Result files review and write-in resolution

1. To see a list of loaded results files currently, click on the **Result Files** option in the Activities Navigation Panel (General Group). The Result Files main activity screen appears.

2. Use the **Tabulator**, **Tabulator Type** and **Replaceable** combo boxes as well as the **Result State** checkbox list to filter the search results. To list all results, omit the search criteria and click **Search**. To sort result files by a specific column, click that column in the grid header.

3. By selecting a single result file from the list that particular result file will be displayed in the right side panel.

4. Each of the panels can be expanded and contracted by using the red arrow buttons to adjust the space in a way that suits the user.

5. The right side panel showing the currently selected result file has two tabs: **Contest Results** and **Ballot Statistics**.

6. In the Contest Results tab you can see a list of all Contest results shown broken down per precinct portion and ballot manifestation by default. For consolidated ballots, results can be tracked by precinct for paper ballots as described in the following voting cases, when raw results are imported:

   - Ballot scanned on ImageCast Central:
     - Using key-in for batches, consolidated by Ballot Type (with common cards)
     - Ballots onsolidated by Precinct (For portions, first available based on precinct and ballot manifestation is used)
       * For consolidated cards, there is no portion breakdown
   - Ballot scanned on ImageCast Evolution (handing one precinct only):
     - Ballots consolidated by Ballot Type (For portions, first available based on precinct and ballot manifestation is used)
   - Ballot scanned on ImageCast Evolution (handing multiple precincts):
     - Ballots consolidated by Precinct (For portions, first available based on precinct and ballot manifestation is used
       * For consolidated cards, there is no portion breakdown
     - Voting Sessions with Smart Cards
   - Ballot scanned on ImageCast Precinct (handing one precinct only):
     - Ballots consolidated by Ballot Type (For portions, first available based on precinct and ballot manifestation is used)
   - Ballot scanned on ImageCast Precinct (handing multiple precincts):
     - Ballots consolidated by Precinct (For portions, first available based on precinct and ballot manifestation is used)
       * For consolidated cards, there is no portion breakdown

   Scanned QR Ballots will also produce results that can be tracked by precinct.

7. At the top of the Contest Result list you can use the **Contest**, **Precinct Portion** and **Ballot Id** combo boxes to filter the search results, as well as the **Use Summary Results** checkbox that will force results to be shown in summarized form.

8. When selecting a single Contest Result row from the list all relevant information for that contest result appears on the right of the contest result list:

- Information about the selected contest result
- Ballot level statistics including: number of voters, cast ballots, audio voters and audio ballots.
- Contest level statistics including: overvotes, undervotes, blanks, double votes, invalid votes, write-in overrides.
- Votes per candidates and party affiliation.
- Write-in resolutions showing how votes for write-in positions were resolved to qualified write-in names as well as showing how many votes are left unresolved. To resolve votes to qualified write-ins simply enter the correct votes per name per contest in the current precinct portion. Once qualified write-in votes are entered correctly click **Save** at the top of the screen.

NOTE: *To resolve write-ins the* ***Use Summary Results*** *checkbox must be unchecked to ensure that all write-in resolutions are linked to specific precinct portions. Write-ins can only be resolved if the containing result file is either in Initial or Rejected state.*

NOTE: *Qualified write-in names can be entered through the EED application even when the project is Ready for Election state.*

9. In the Ballot Statistics tab a list of ballot level statistics broken down per precinct portion and ballot manifestation are shown by default. Individual rows in the list include information on: number of voters, cast ballot, audio voters and audio ballots.

10. At the top of the Ballot Statistics list a **Use summary results** checkbox can be selected to force ballot statistics to be shown in summarized form.

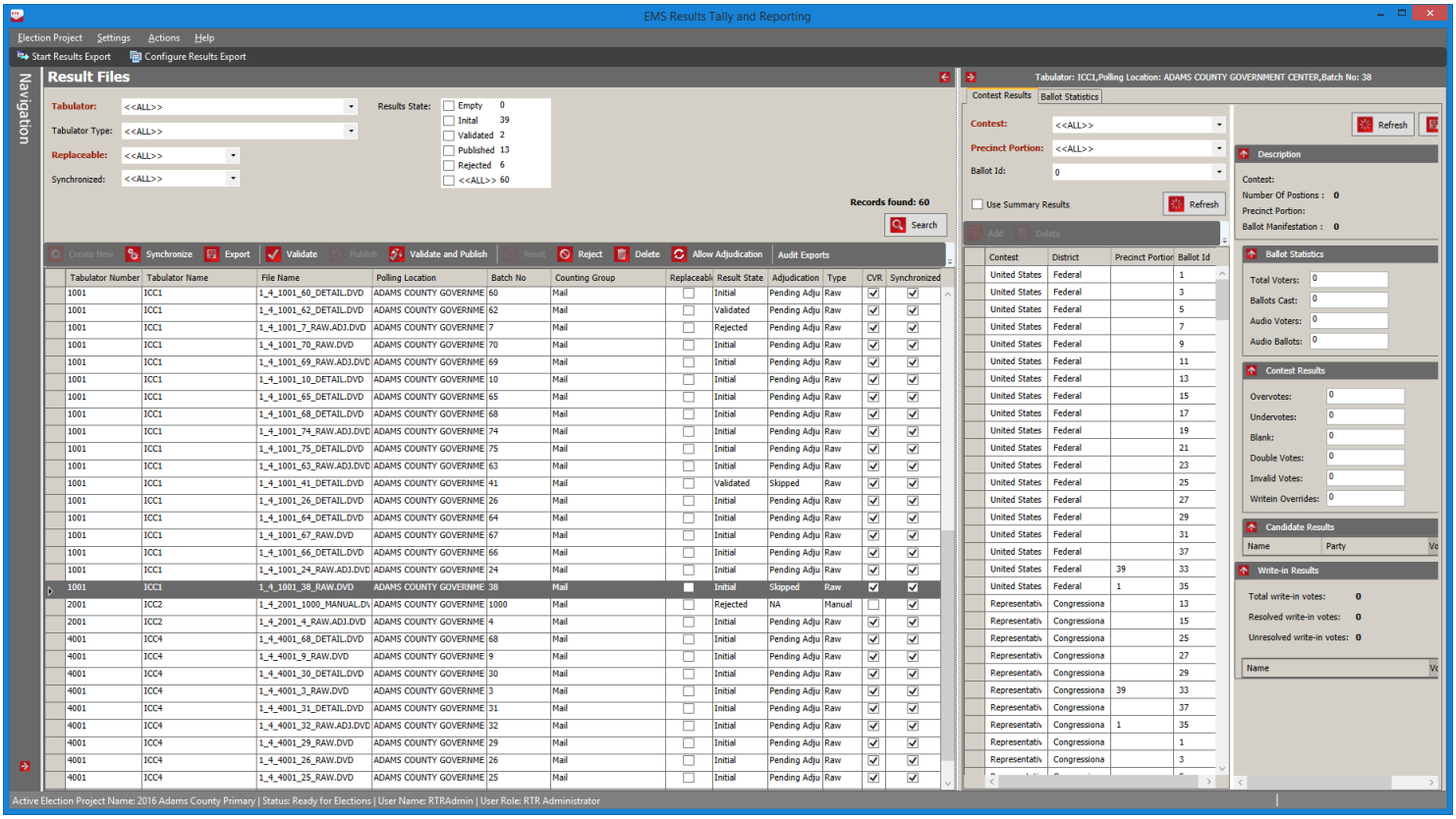


Figure 9.1: Result Files screen

9.2 Manual Entry of Results

1. Manually entry of results can be performed from the Result Files screen, which can be reached by clicking on the **Result Files** option in the Activities Navigation Panel (General Group). The Result Files main activity screen appears.

2. Before any results can be entered a Result File of type Manual must be created by selecting the tabulator for which results must be entered from the Tabulator combo box and pressing the **Create New** button.

3. An additional option that can be selected before pressing the **Create New** button is to select the **Replaceable** option from the **Replaceable** combo box to indicate that the manual results are temporary results which will be replaced by actual tabulator results files loaded into the system (see Result Pair resolution). **NOTE**: *Only one replaceable result file can be created per tabulator.*

4. Once the Manual Result File has been created the user can enter result in the right hand panel, which has two tabs: Contest Results and Ballot Statistics.

5. For each contest for each precinct portion the user must first add a Contest Result row by selecting the relevant values from the Contest, Precinct Portion (and optionally the Ballot Id) combo boxes and press **Add** button.

6. Once a Contest Result object has been created and selected from the list below the user can enter data on the right side of the contest result list. The following items can be edited:

   - Ballot level statistics including: number of voters, cast ballots, audio voters and audio ballots.
   - Contest level statistics including: overvotes, undervotes, blanks, double votes, invalid votes, write-in overrides.
   - Votes per candidates and party affiliation
   - Write-in resolution is also possible for manually entered write-in votes in the same way as for regular result files.

7. Once the data is correctly entered for a single Contest Result the **Save** button must be clicked to persist the data. At this point the entered data will undergo some basic validation rules to ensure that entered information is meaningful (for example the sum of the votes, undervotes, overvotes cannot exceed the number of ballots cast for that contest multiplied with the Vote For number for that contest).

8. For each contest result that is created the user must indicate at least the Precinct Portion from where the results originated, and optionally the Ballot Manifestation by identifier. The system will automatically create Ballot Statistic level rows for indicated Precinct Portion and Ballot Manifestation in the Ballot Statistics tab. These rows have the following editable fields: Total Voters, Ballots Cast, Audio Voters and Audio Ballots.

   NOTE: *Only manual results that are in Initial result state (and are not part of a Result Pair, see chapter X) can be edited.*

9.3 Result State Management

Result Files have an associated Results State which can change during the Result File lifetime and have effect on what operations are allowed on the Result Files, and on what results are included in reports. The Result State is visible per Result File in the Result Files screen, which can be reached by clicking on the **Result Files** option in the Activities Navigation Panel (General Group). The following Result States exist:

- **Initial**: this is the first Result State that is assigned once a Result File is loaded or manually entered into the system. In this state Write-in resolution is allowed. If the result file is manually entered, the result data is still editable. Result files in this state can be deleted by the user.
- **Validated**: this state indicates that a user has reviewed the results and the result file can be moved to the Published state by a more senior election official. Manual results in this state are no longer editable.
- **Published**: this state indicates that the results will be included in reports and exports.
- **Rejected**: this state indicates that the Result File should not be included at a later point in the set of Published results. Result files in this state can be deleted by the user.

Each result file has an additional status associated with it, to reflect any lower-level changes of state to the results in the system:

- **Pending Adjudication**: The following actions will cause a result file to be in the Original status:
  - Any cast vote level result file loaded or reloaded into the system while Adjudication support is enabled. Additionally, if conditional voting mode is set to **Provisional**, only batches consisting of regular votes will be assigned this status (batches without any without Provisional votes)
- **Skipped Adjudication**: The following actions will cause a result file to be in the Skipped Adjudication status:
  - Loading results from memory card or directory with Skip Adjudication checked
  - Loading a batch containing provisional votes when adjudication support is enabled, and conditional voting mode is set to **Provisional**.
- **In Adjudication**: The following actions will cause a result file to be in the In Adjudication status:
  - When the Adjudication application retrieves batches that in the Original status
- **Adjudicated**: The following actions will cause a result file to be in the Adjudicated status:
  - When the Adjudication application submits a batch
- **NA**: The following actions will cause a result file to be in the NA status:
  - Any cast-vote-level result file loaded while adjudication support is disabled
  - Any non-cast-vote-level result file loaded into the system
  - Any Manual Entry

From the Result File screen one or more Result File rows can be selected and moved to another Result State by using one of the following available buttons:

- **Validate**: this will move a result file to Validated state, this is only allowed for result files in either Initial or Rejected state with Status NA or Adjudicated
- **Publish**: this will move a result file to Published state, this is only allowed for result files in Validated state with Status NA or Adjudicated
- **Validate and Publish**: this will move result files to Published state, this is allowed only for Result files in Initial state with Status NA or Adjudicated
- **Reject**: this will move result files to Rejected state; this is allowed for all result files in Initial, Validated or Published state. Rejecting result files will also spoil the batch(es) for Adjudication.
- **Reset**: This will move result files back into Initial state and this is only allowed for Rejected files. Status will remain the same as before the file was rejected.
- **Allow Adjudication**: This will move result file from Skipped state to Pending Adjudication state. Note that this could be done only in Initial state.

The RTR system will disable **Result State** buttons to prevent invalid state transitions, depending on the state of the selected result files. Once the Result State action is initiated the system will ask the user to confirm the action. Afterwards the list of Result Files will refresh to show the updated Result State.

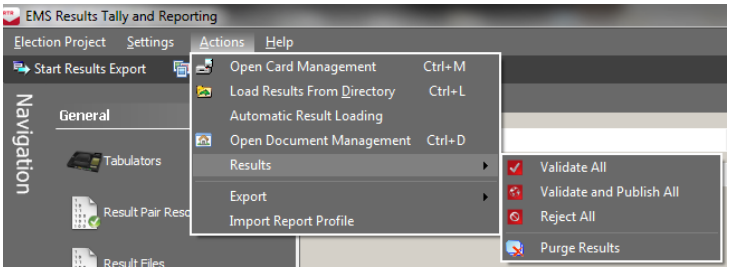


Figure 9.2: Results options Screen

From the main menu there are three options available to change the result files for all result files that apply at once by clicking the **Actions** menu, Results and selecting one of the following options:

- **Validate All**: all result files that are in Initial or Rejected state will be set to Validated state.
- **Validate and Publish All**: all result files that are in Initial state will be set to Published state.
- **Reject All**: all result files will be set to Rejected state

9.4 Deleting of Results

1. Individual or selections of Result Files can be deleted from the Result File screen, which can be reached by clicking on the **Result Files** option in the Activities Navigation Panel (General Group).
2. Select those result files that should be deleted click **Delete**.

   NOTE: *The **Delete** button will only be enabled if all selected result files are in Initial or Rejected state.*

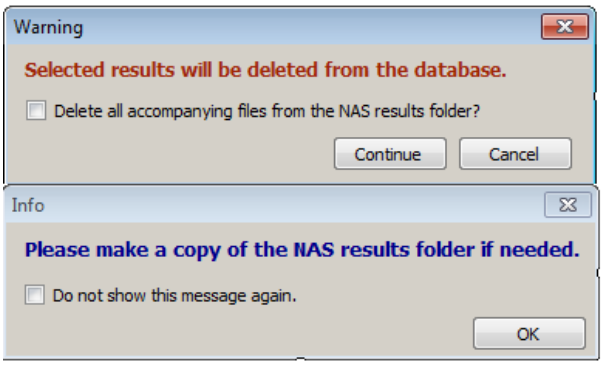


Figure 9.3: Confirm Dialog

3. Once the delete action is initiated the system will ask the user to confirm the action. The confirmation dialog contains a checkbox that when checked will delete associated result file and images from the NAS. If checked a secondary confirmation dialog will appear to give the opportunity to the user to manually copy files from NAS to another location.
4. If you chose to confirm the action the Result File will be removed as well as any images that were loaded to the NAS associated with that Result File.
5. Afterwards the list of Result Files will be refreshed.

9.5 Purging of Results

The purpose of purging election results is to reset the results database before starting the election.

1. In the **Main Menu**, click on **Actions**, **Results** and click the **Purge Results** option.
2. The *Confirm Purging* screen appears.
3. In the *Confirm Purging* screen, enter the text sequence that appears on the screen and click **OK** to confirm purging.

9.6 Transferring Results From One RTR Instance to Another

In specific cases, jurisdictions may choose to install and run more than one instance of the RTR application. An example of such scenario is a central office with a warehouse setup, with an RTR instance running at both locations. Consider the following:

- At the warehouse, RTR runs alongside the ImageCast Central tabulator, and the Adjudication application. In this setting, RTR is loading results from ICC, making them available for Adjudication.
- In the central office, RTR runs as part of the main central EMS, and is used for collecting results from the ImageCast Evolution tabulators. This instance is also tasked with exporting results in the given jurisdictions format.

In the above situation, in order to have complete and accurate results, it is necessary to transfer results, from one instance to the other; in the above case, that would be from the warehouse to the central location.

9.6.1 Exporting Results from RTR

There are two ways to export results:

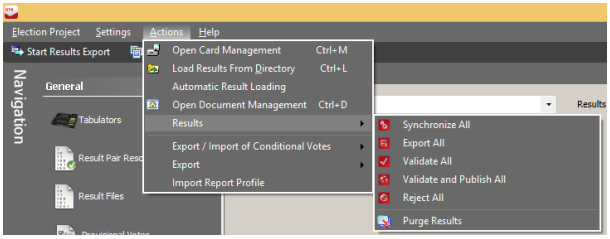


Figure 9.4: Actions menu

1. Navigate to the **Actions** menu, select the **Results** menu item, and click **Export All**.

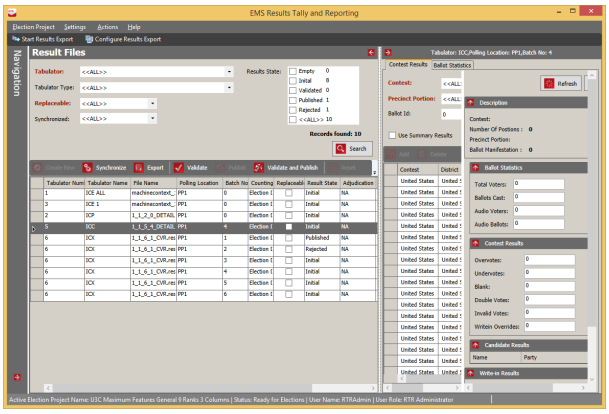


Figure 9.5: Result Files screen

2. In the *Result Files* screen, select the file(s) you wish to export results for and click **Export** in the toolbar.

Files will be exported to the **ResultsExport** folder inside the project folder on the NAS. Each export will create a timestamped directory containing the files selected for the export.

Important notes about result export:

- It is not possible to export result files that in **Rejected** state.
- It is not possible to export Total or Manual results without cast vote record level results already loaded.
- Only files with Adjudication state **NA** or **Adjudicated** can be exported.

9.6.2 Importing Results into RTR

Before importing results, ensure that the exported files are located on the local drive of the machine where you wish to import the results into RTR. To import the results, simply use the **Load Results from Directory** feature See section 7.4 **Loading Results from Directory**.

Chapter 10

Resolving Conditional Votes

10.1 Introduction

Conditional Votes is a generic way of discussing Provisional or Challenged Votes. EMS supports both the *Provisional* and *Challenged* modes of Conditional Voting. Different jurisdictions count conditional votes based on different criteria, hence the two prevailing approaches, as described here:

- **Provisional Votes** - Voters are given the opportunity to cast their ballot; however their vote is not counted until it is proven that it is valid. For example, this may be due to arriving at their polling location without appropriate identification, or by voting in a different precinct from where they are registered. At a later time or date, if the voters details are cleared and it is determined that their vote is valid, only then can votes from their ballot be included in the official tally.
- **Challenged Votes** - This is a variation of Provisional Voting, however, all votes are deemed valid until proven otherwise. This requires the ability to remove the voters ballot and votes from the official results.

Some jurisdictions choose to handle this situation manually, by simply not casting paper ballot and keeping it aside until it is proven to be valid.

In the RTR application, all incoming conditional votes will initially be assigned the **Pending** status. Each vote in the Pending state is yet to be resolved by the RTR user. There are two possible outcomes of resolving a conditional vote:

- **Accepted** - In all cases, a vote that is accepted is confirmed to be valid, and will in any case be included in the official results. The RTR application provides the ability for the user to duplicate the vote, and transfer the valid contests and choices to the appropriate ballot type and precinct, in case the voter cast an incorrect ballot and/or voted in the wrong precinct.
- **Rejected** - In all cases, a vote that is rejected is confirmed to be valued, and will in any case be excluded from the official results. The RTR application mandates the user to state the reason for rejection, which can be useful information later during auditing.

Cast vote records which remain in the **Pending** state will be handled differently depending on the mode of conditional voting in the election project:

- Pending provisional votes will not be included in the official results, despite not being explicitly

- Pending challenged votes will be included in the official results

There are two methods of resolving conditional votes:

- **Manual Resolution** - The user can browse all conditional cast vote records in the RTR application and accept or reject them one by one.
- **Bulk Resolution** - The user can export a list of all conditional votes into a comma-separated-values file. This file can be opened in a spreadsheet application such as Microsoft Excel, where cast vote records can have their status modified (resolved). The updated file can then be imported back into RTR, which will result in changes being applied from the input file straight to the results in the project database.

At any given time, the user can generate a report which includes some basic statistics related to conditional votes. Please refer to the *Conditional Voting Statistics Report* section 15.6 in the *Reporting* chapter 15 of this document.

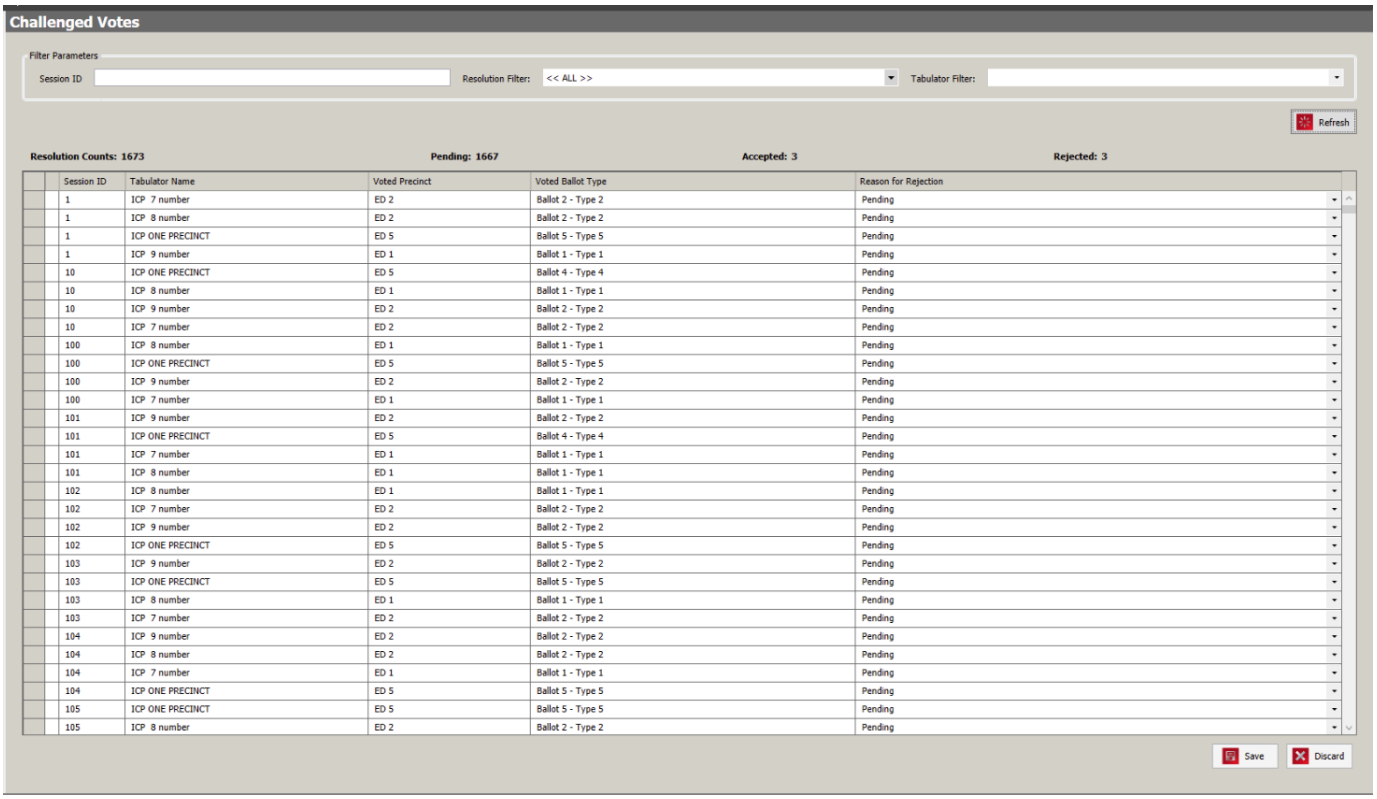


Figure 10.1: Challenged VotesScreen

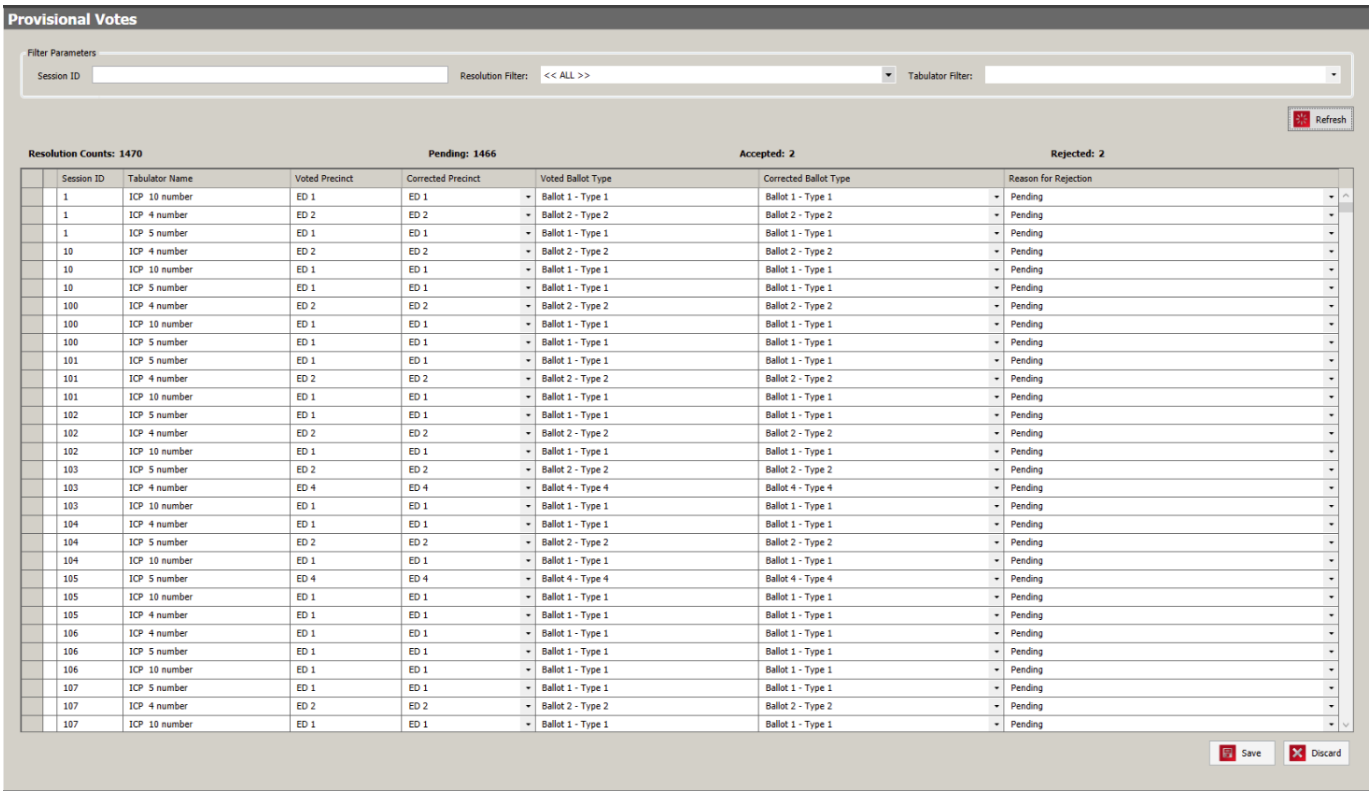


Figure 10.2: Provisional Votes Screen

10.2 Conditional Voting Settings

The user can make certain adjustments that affect the behaviour of the application when dealing with Conditional Votes. The settings can be accessed by clicking the **Settings** menu in the RTR application, and selecting the **Challenge / Provisional Voting Settings**. The following settings are available:

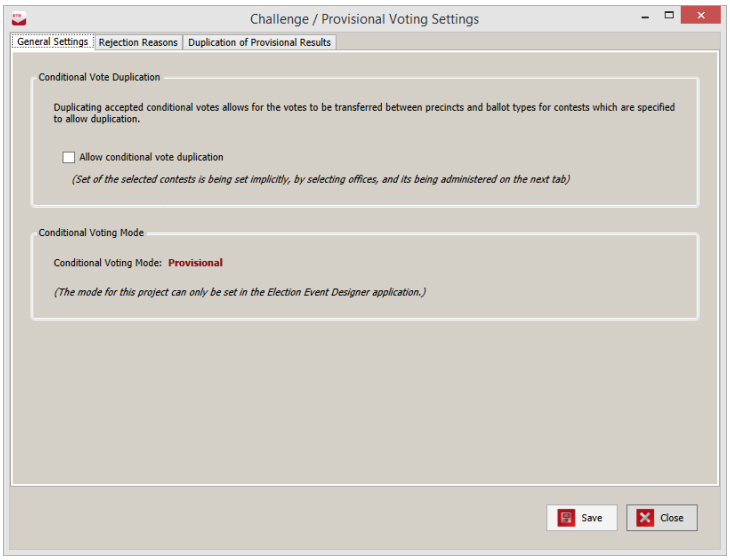


Figure 10.3: General Settings Screen

- **General Settings** - In this screen, the user is able to:
  - Indicate whether duplication can be performed on any provisional records in the project (See the *Duplication of Provisional Votes* section 10.4) in this chapter. for more info)
  - See the mode of Conditional Voting supported in this project this mode is only editable in the EED application.

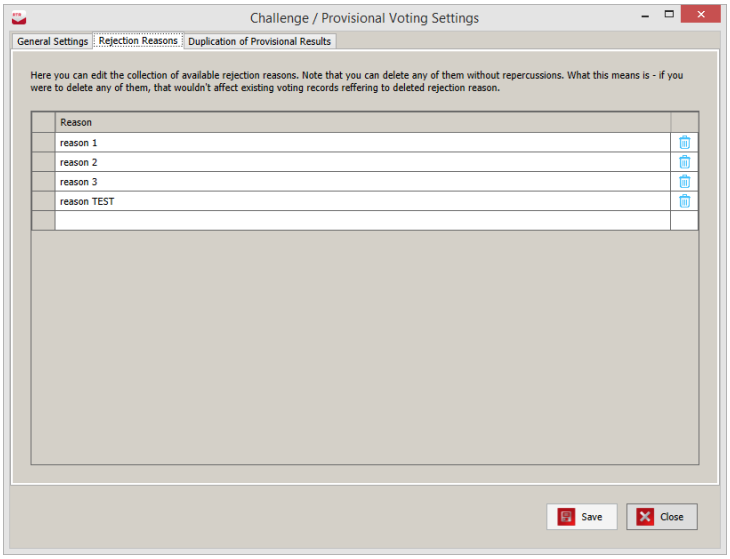


Figure 10.4: Rejection Reasons Screen

- **Rejection Reasons** - In this screen, the user can manage rejection reasons available for the resolution process these are required for any rejected conditional record. Rejection reasons will automatically be presented to the user while they are resolving records.

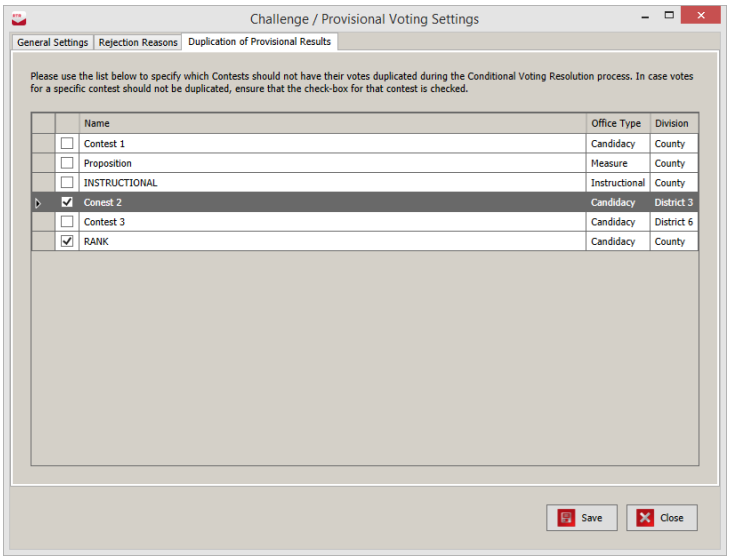


Figure 10.5: Duplication of Provisional Results Screen

- **Duplication of Provisional Results** - If duplication of provisional votes is enabled in the election project, this screen allows the user to identify a subset of contests where the votes are not eligible for duplication.

10.3 Manual Resolution of Conditional Votes

To accept or reject any provisional or challenged votes (depending on the project mode), open **Provisional Votes** or **Challenged Votes** (the name of the section will depend on the mode which has been set for the project in EED) from the General section of the left-hand navigation menu. Some basic information is presented to the user for each applicable cast vote record that is listed in the screen:

- Session ID
- Tabulator
- Voted Precinct
- Corrected Precinct (only in Provisional mode)
- Voted Ballot Type
- Corrected Ballot Type (only in Provisional mode)
- Reason for Rejection

The user can also search or filter for specific records by using the following fields and subsequently clicking **Refresh**:

- Session ID
- Resolution (Status)
- Tabulator

When the user has identified a conditional session in the list that they wish to modify, the next step is to click the corresponding *Pending* cell in the Rejection Reason column and select the appropriate value from the presented choices. The user can:

- **Accept** the session
- **Reject** the session (with a given Rejection Reason)
- Leave the session as **Pending** until a later time

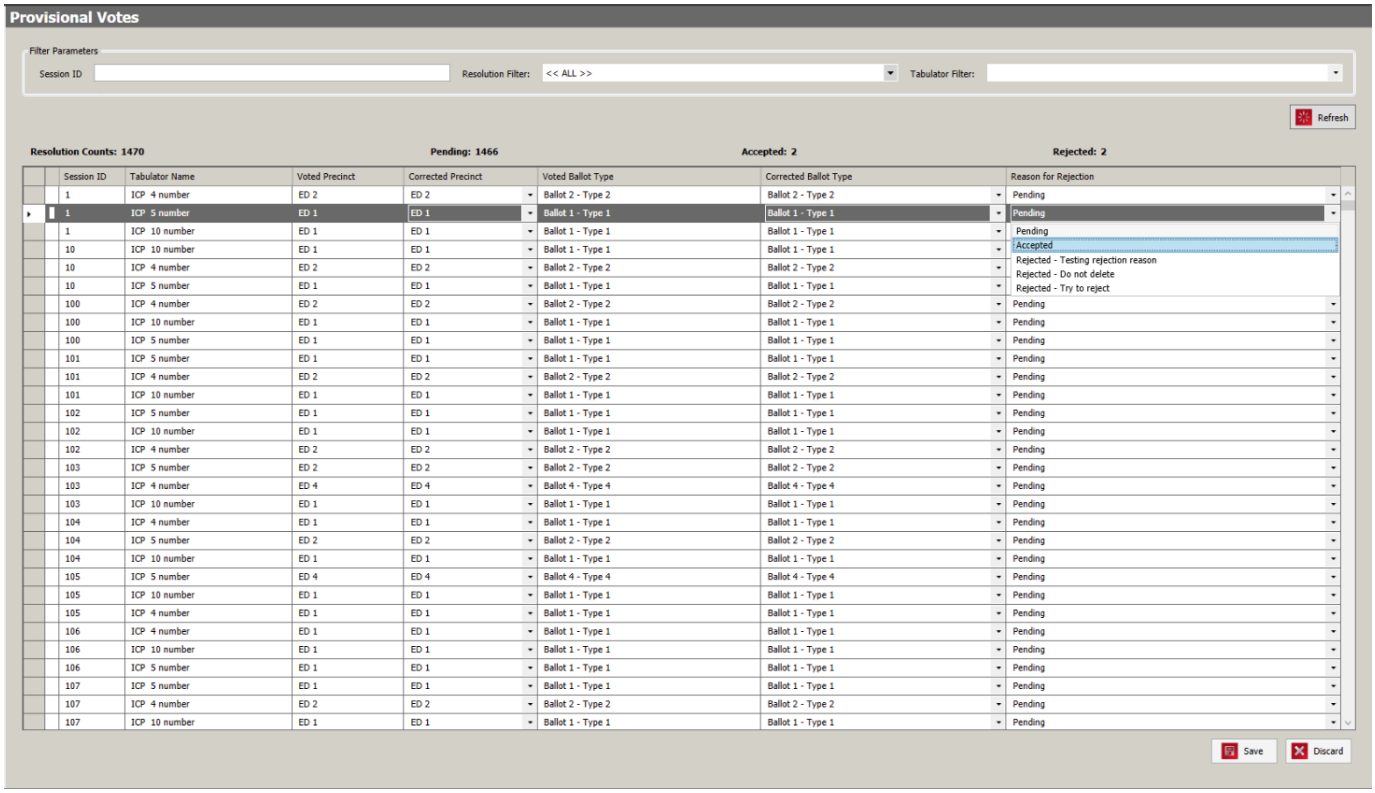


Figure 10.6: Manual Resolution of Conditional Votes Screen

10.4 Duplication of Provisional Votes

In the context of Provisional Voting, if duplication is enabled in the project, the term *Duplication* actually means to transfer any valid votes from an accepted Provisional Ballot, and assign them to the correct Precinct and Ballot Type for the voter.

Duplication is performed during resolution of conditional votes in the RTR application, and is only activated when accepting a provisional record. Where appropriate:

- Click the cell containing the Precinct value in the **Corrected Precinct** column for the corresponding session, and select the appropriate value for the new, corrected Precinct.
- Click the cell containing the Ballot Type value in the **Corrected Ballot Type** column for the corresponding session, and select the appropriate value for the new, corrected Ballot Type.

Following that, the user must **Accept** the provisional session, if votes are to be transferred for any contests where duplication is permitted. While duplication may also be achieved through bulk resolution, it is currently not supported as special care would have to be taken to ensure correct values are entered by the user into the input file.

Duplication is not permitted for challenged votes.

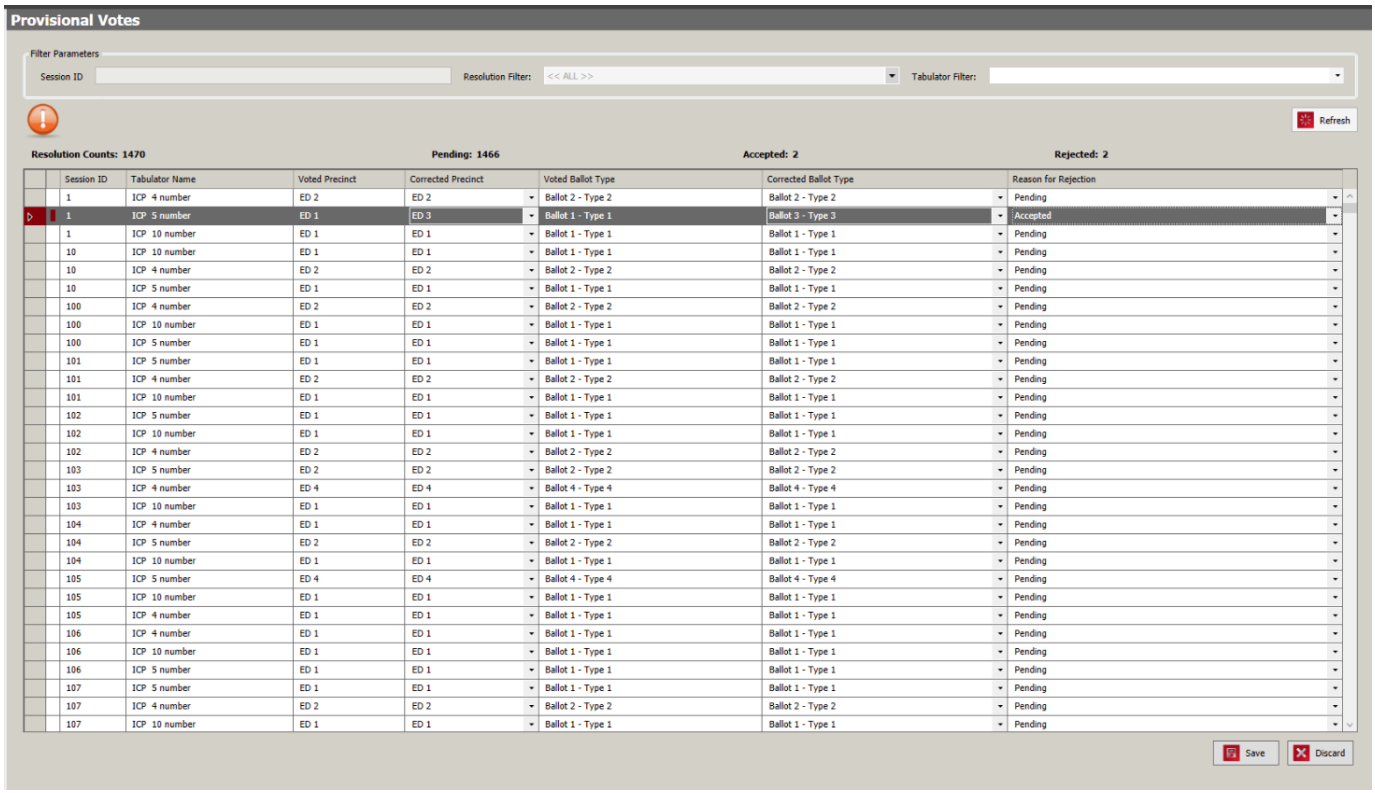


Figure 10.7: Duplication of Provisional Votes Screen

10.5 Bulk Resolution of Conditional Votes

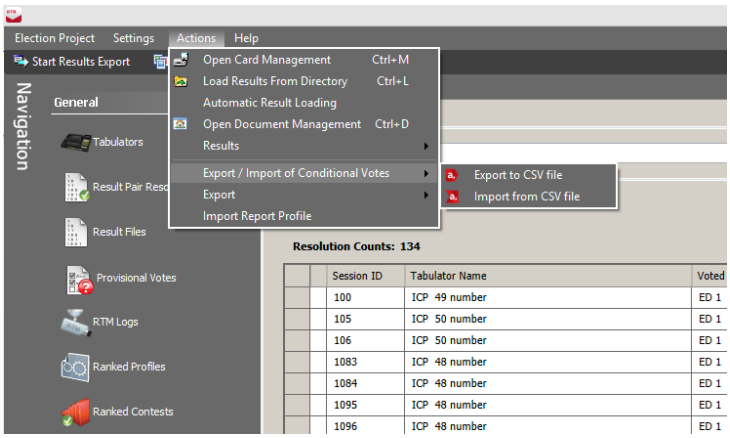


Figure 10.8: Export-Import of Conditional Votes Screen

This feature is aimed at allowing for the process of resolving a large number of conditional votes away from the EMS system, by using a file which contains conditional session records, and their details in the context of conditional voting. The RTR application exports the data into a Comma Separated Values (CSV) file, which can then have modifications made to it (currently only the status of a record is updated it is set to accepted or rejected). The file is then imported back by RTR and the records are automatically updated.

10.5.1 Exporting Conditional Votes

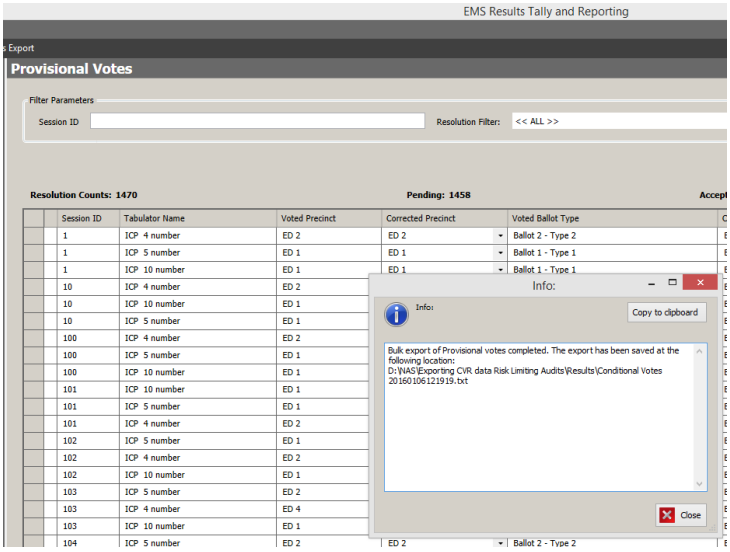
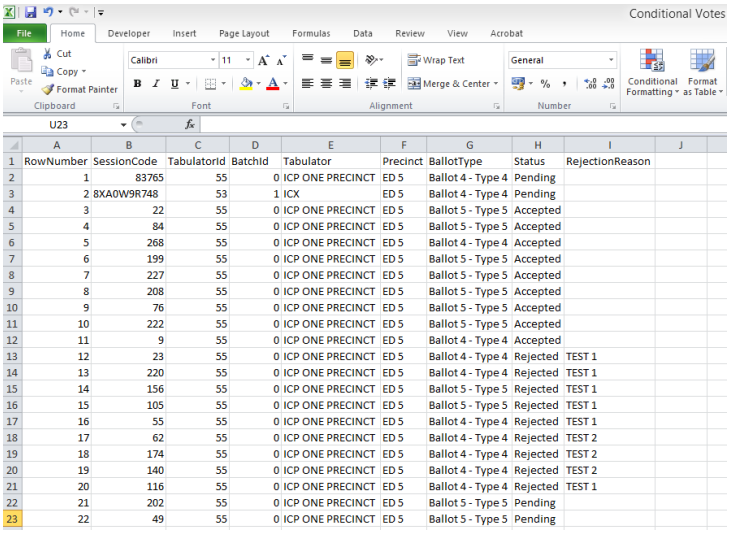


Figure 10.9: Completed Bulk Export Screen

In order to perform bulk resolution of conditional votes, the user must first export conditional votes from the RTR application. To run the export, open the Actions menu from the top of the screen, click **Export / Import of Conditional Votes** and select **Export to CSV file**. When the export process has completed, a dialog will appear displaying information on where the exported data was saved.

10.5.2 Resolving Conditional Votes in the Exported File



	A	B	C	D	E	F	G	H	I	J
1	RowNumber	SessionCode	TabulatorId	BatchId	Tabulator	Precinct	BallotType	Status	RejectionReason	
2	1	83765	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Pending		
3	2	8XA0W9R748	53	1	ICX	ED 5	Ballot 4 - Type 4	Pending		
4	3	22	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Accepted		
5	4	84	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Accepted		
6	5	268	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Accepted		
7	6	199	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Accepted		
8	7	227	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Accepted		
9	8	208	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Accepted		
10	9	76	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Accepted		
11	10	222	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Accepted		
12	11	9	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Accepted		
13	12	23	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Rejected	TEST 1	
14	13	220	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Rejected	TEST 1	
15	14	156	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Rejected	TEST 1	
16	15	105	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Rejected	TEST 1	
17	16	55	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Rejected	TEST 1	
18	17	62	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Rejected	TEST 2	
19	18	174	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Rejected	TEST 2	
20	19	140	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Rejected	TEST 2	
21	20	116	55	0	ICP ONE PRECINCT	ED 5	Ballot 4 - Type 4	Rejected	TEST 1	
22	21	202	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Pending		
23	22	49	55	0	ICP ONE PRECINCT	ED 5	Ballot 5 - Type 5	Pending		

Figure 10.10: CSV file opened in MS Excel Screen

Once the file has been exported, the user can open it in a spreadsheet application such as Microsoft Excel, and modify the **Status** field and the **Rejection Reason** fields (only in case the record is being rejected). When finished with updating records, the file should be saved in preparation for the import of data back into RTR.

10.5.3 Importing Resolved Conditional Votes

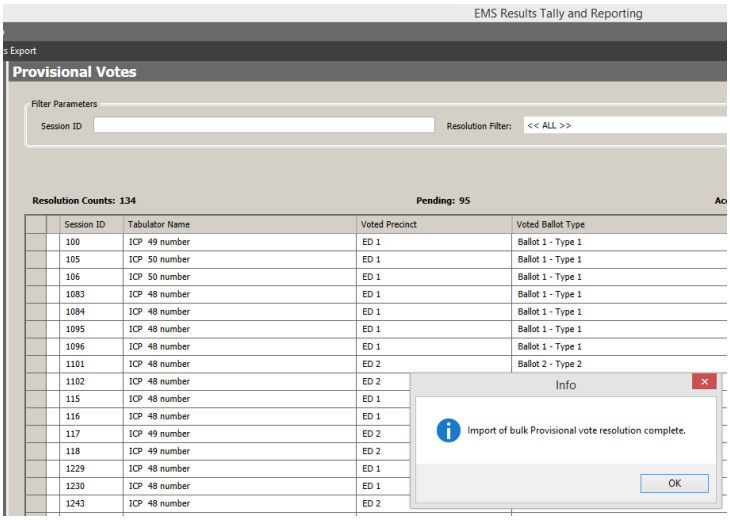


Figure 10.11: Completed Bulk Export Screen

The final step is to import any changes that were performed to the conditional cast vote records. To run the import, open the **Actions** menu from the top of the screen, click **Export / Import of Conditional Votes** and select **Import from CSV file**. A Browse dialog will appear prompting the user to select a file to import. When the file is selected, the process will run, attempting to update records for all sessions that can be matched between the import CSV file and the results in the EMS database. When the import process has completed, a dialog will appear informing the user that the process has finished. In case any issues were encountered with the incoming data, the user will be presented with a list of issues and corresponding line numbers in the input CSV file.

Chapter 11

Ranked Choice Voting

11.1 Introduction

Ranked choice voting (RCV) allows voters to rank their candidates in order of preference from first to last ranking, which is different compared to traditional forms of voting where the voter can only express equal preference for one or more candidates by marking their voting box. This additional information that the ranking provides can be processed using different ways to declare one or more winner in a way to ensure elected candidates receive a majority of the vote. What most of these methods have in common is that they process the results in rounds. In the initial round only the first ranked candidates are evaluated, if any candidate achieves the majority of the votes these are elected. Otherwise, another round starts and candidates with the lowest amount of votes are eliminated. Those ballots get redistributed according to their subsequent rankings, and votes are evaluated to determine winners. This process avoids the need to do run-off elections, while still ensuring candidates receive a majority of the vote.

There are various forms of RCV supported in EMS and each variation has a number of settings which are managed through Ranked Profiles.

11.2 RCV Profile

11.2.1 General Management of Profiles and Purpose

Settings that control Ranked Choice Voting (RCV) tabulation are managed through RCV profiles from the Ranked Profiles screen in Result Tally and Reporting (RTR). You can view existing profiles by clicking **Search** and edit them by selecting a profile and clicking the **Edit** button or by double clicking a profile. You can delete existing profiles or create new ones.

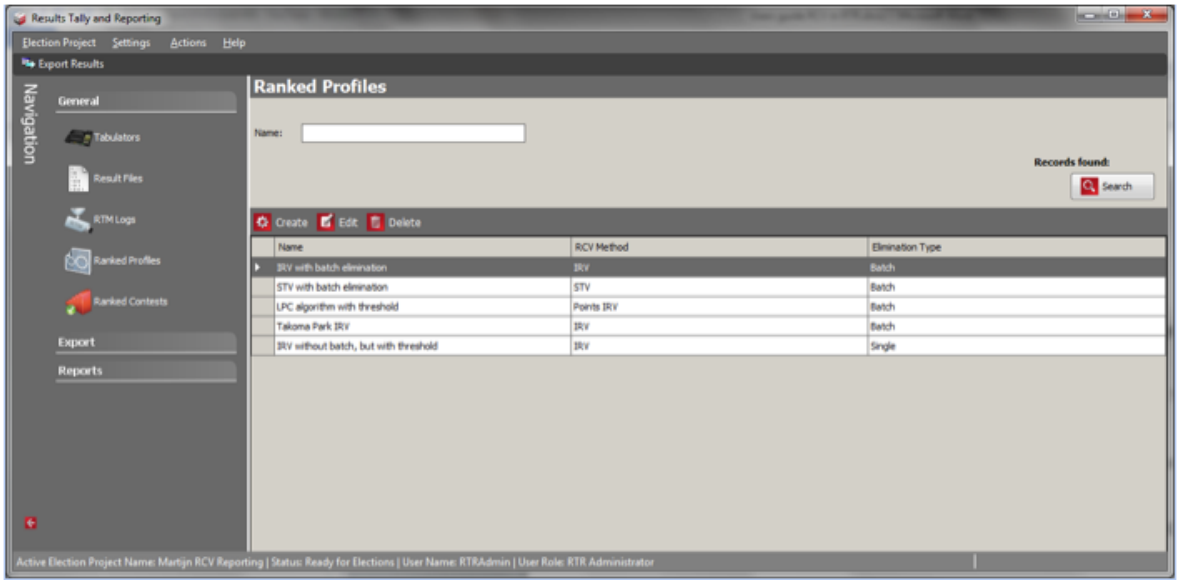


Figure 11.1: Ranked Profiles main screen

11.2.2 Settings

The RCV profile screen shows all settings associated with RCV tabulation.

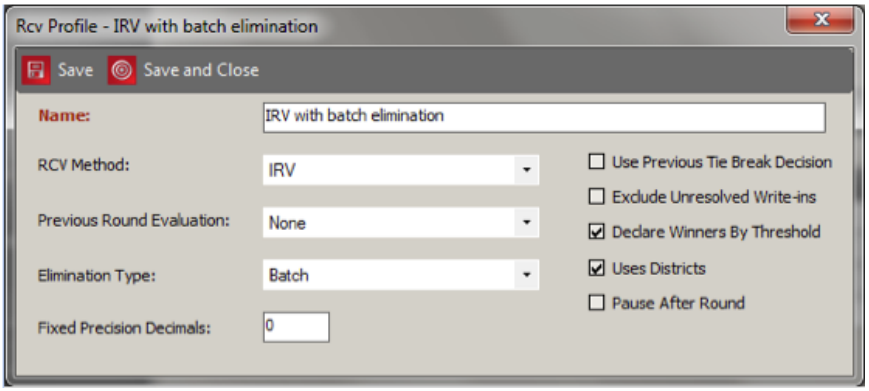


Figure 11.2: RCV Profile screen

1. **Name**: Each profile can be named descriptively, so it can be quickly selected at the start of a tabulation session from a list.
2. **RCV Method**: This will select the specific method of tabulating RCV votes to elect a winner, the following methods are supported:
   - **IRV**: Instant Runoff-Voting.
   - **STV**: Single Transferable Voting, more specifically the Weighted Inclusive Gregory Method, which implements fractional surplus transfer of elected candidates.
   - **Points IRV**: a modified form of Instant Run-off Voting where ranked choice voting results are evaluated on a district per district basis and each district has a set number of points (100). Elimination and declaration of winners is done on basis of points, not votes.

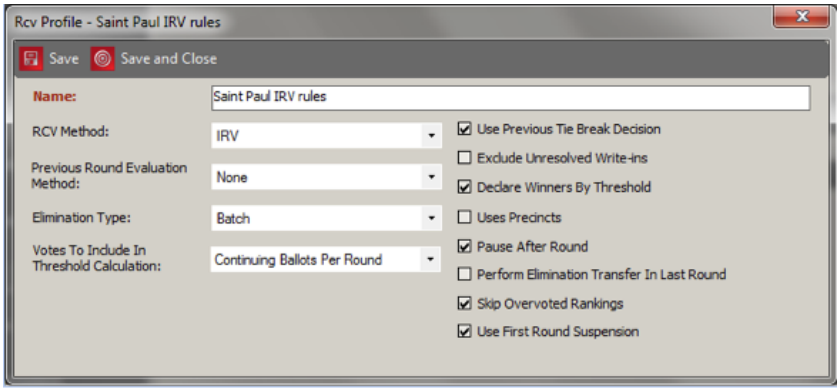


Figure 11.3: RCV Profile screen

3. **Previous Round Evaluation Method**: The system has the option to try and break a tie by looking at the vote totals in previous rounds. The following options are available:
   - **None**: ties are broken manually.

- **Backwards**: the system attempts to break ties using vote totals in previous rounds going backwards from round preceding the current round to the first round.
- **Forwards**: the system will attempt to break ties using vote totals in previous rounds going forward from first round to the round preceding the current round.

Previous Rounds Evaluation Method example:

The example below demonstrates how different previous round evaluation methods affect the handling of ties

Candidates	Vote Totals in Round 1	Vote Totals in Round 2	Vote Totals in Round 3
A	4	6	6 (Tied)
B	5	5	6 (Tied)
C	6	6	8
D	3	3 (Eliminated)	0
E	2 (Eliminated)	0	0

Candidates A and B are tied for elimination in round 3, below each method treats the tie break differently:

- **None**: The system would require the tie to be broken manually by the user.
- **Backwards**: The system looks at the votes for candidate A and B in round 2, and picks candidate B for elimination, since candidate B has less votes than candidate A in that round. If the votes would have been tied as well in round 2 for those candidates, the system would go another round backwards, until the tie is resolved, or until it runs out of rounds, in which case it will resolve the tie manually.
- **Forwards**: The system looks at the votes for candidate A and B in round 1, and picks candidate A for elimination, since that candidate has less votes than candidate B in that round. If the votes would have been tied as well in round 1, the system would go a round forwards, until the tie is resolved, or until the current round is reached, in which case the tie will be resolved manually.

4. **Elimination Type**: The system can be configured to eliminate single candidates or multiple candidate each round through the Elimination type setting, the following options are available:

   - **Single**: only one candidate per round is eliminated.
   - **Single and Tied**: the candidate with the lowest vote total and any candidates tied with that candidate is eliminated. This only occurs if the following conditions apply, otherwise it will fall back to single elimination type behavior:
     - The vote total sum for all the tied candidates is less than the vote total for the next continuing candidate with the fewest votes.
     - The number of continuing candidates is at least one more than the remaining number of positions to elect.
   - **Batch**: all candidates that are certain to be eliminated in subsequent rounds are eliminated in a single round. Batch elimination will try to eliminate the largest possible amount of candidates from the list of remaining candidates ordered by vote total in ascending order for which the following conditions apply.
     - The vote total sum for all candidates to be eliminated is less than the vote total for the next continuing candidate with the fewest votes.

– The number of continuing candidates should be at least one more than the remaining number of positions to elect.

If the number of candidates that would be eliminated due to batch elimination is less than two the system will fall back to single elimination type behavior.

Note: *All forms of candidate elimination including batch elimination take place after all surplus has been transferred. This means that at the moment of batch elimination, the surplus has already been transferred, and is already included in the vote totals used for determining batch elimination.*

Elimination Type example 1:

The example below shows the vote totals for a single seat contest per candidate in ascending order (the candidates names follow that order alphabetically). The maximum column contains the maximum number of votes a specific candidate would receive if the votes of candidates with less votes are transferred to that specific candidate.

Candidates	Vote Totals	Maximum Possible
A	10	10
B	10	20
C	30	50
D	40	90
E	400	490
F	600	1090
G	800	1890

- **Single**: the system will detect that candidates A and B are tied for elimination and it will have to be resolved through previous round evaluation or through manual tie breaking.
- **Single and Tied**: the system will detect that candidate A and B are tied for last place and that their vote total sum of 20 is less than the vote total of the subsequent continuing candidate with 30 votes. Also at least two candidates are left to continue (there are five continuing candidates). So candidates A and B will be eliminated.
- **Batch Elimination**: the largest set of candidates for which the summed vote total is smaller than the next continuing candidate, and which still leave at least two candidates to continue in the next round, is the set of candidates A, B, C, D and E (maximum possible is 490 for this set, and next vote total is 600), so these candidates will be eliminated.

Elimination Type example 2:

The example below shows the vote totals for a single seat contest per candidate ordered in ascending order (the candidates names follow that order alphabetically for simplicitys sake). The maximum column contains the maximum number of votes a specific candidate would receive if the votes of candidates with less votes are transferred to that specific candidate.

Candidates	Vote Totals	Maximum Possible
A	15	15
B	10	30
C	30	60
D	40	100
E	400	500
F	600	1100
G	800	1900

- **Single**: the system will detect that candidates A and B are tied for elimination and will resolve this through previous round evaluation or through manual tie breaking.
- **Single and Tied**: the system will detect that candidate A and B are tied for last place and that their vote total sum of 30 is equal to the vote total of the subsequent continuing candidate with 30 votes. This means that it cannot eliminate these candidates together, so it will fall back to Single elimination logic that requires a manual tie break.
- **Batch Elimination**: the largest set of candidates for which the summed vote total is smaller than the next continuing candidate, and which still leaves at least two candidates to continue in the next round, is the set of candidates A, B, C, D and E (maximum possible is 500 for this set, and next vote total is 600), so these candidates will be eliminated.

5. **Use previous tie break decision**: If this option has been checked, the system will remember any manual tie breaks that were resolved for contests tabulated under this profile. The next time that you tabulate this contest with the same option selected, the system automatically resolves the ties in the same manner.

6. **Exclude Unresolved Write-Ins**: If this option has been selected, any rankings for write-ins that were left unresolved will be ignored. If the ranking containing an unresolved write-in was over-voted because of that unresolved write-in, the ranking will still be considered over-voted even with when this option is used.

7. **Declare Winner by Threshold**: If this option has been selected, the system will declare winners by threshold. The threshold is the number of votes sufficient for a candidate to be elected. The threshold is calculated in each round by taking the number of continuing ballots (see 8), divided by the number of positions to elect plus one, then adding one to the quotient, disregarding any fractions. If this option is left unselected the system will not use the threshold to elect candidates but will continue eliminating candidates each round until the number of continuing candidates is equal to the number of positions left to be elected plus one. It will then eliminate the candidate with the least amount of votes and declare the remaining candidates as elected.

8. **Votes to include in threshold calculation**: This option will determine the number of ballots used in the threshold calculation. Continuing ballots per round: Each round the threshold will be re-calculated using the number of continuing ballots in that round; this is the sum of all candidate vote totals for that round. Continuing ballots 1st round: the threshold will be based on the number of continuing ballots in the first round; this is the sum of all candidate vote totals for that round. The same threshold will apply to all rounds. **Note**: *If first round suspension option is used, the suspended will not be included in the threshold calculation.*

9. **Uses Districts/Precinct**: If this option is checked, the system will perform all calculations per precinct and allow for reporting to report each precinct separately. By leaving it unchecked all results will not be separated per precinct. This option is relevant for STV, because calculating surplus transfer for each precinct separately will create a higher total surplus transfer remainder than when surplus transfer is not separated per precinct.

10. **Pause After Round**: When this option is selected the tabulation session will pause the tabulation session after each round. If it is not selected the session will continue until the end or until a manual tie break is required.

11. **Fixed Precision Decimals**: This option allows you to specify how many decimals the votes should be represented during calculation, this is relevant only for the STV and Points IRV methods where votes and points are expressed as fractional values.

12. **Skip Overvoted Rankings**: This option allows the algorithm to skip over-voted rankings and proceed to the next ranking. No over-votes will be recorded if this option is used and consequently not be shown in RCV reports.

13. **Votes to include in threshold calculation**:

    The user has the option between two variations of calculating the threshold value used to elect candidates:

    - **Continuing Ballots Per Round**: Each round the total number of ballots assigned to candidates is calculated and used in the division that calculates the threshold. This means the threshold will lower as an increasing amount of ballots are exhausted in subsequent rounds.
    - **Continuing Ballots 1st round**: Each round will re-use the total number of ballots assigned to candidates in the first round for each subsequent round. Therefore the threshold will remain the same throughout the tabulation.

14. **Perform Elimination Transfer in Last round**: The tabulation system will stop early if it detects that the number of continuing candidates is equal to the number of positions left to be elected plus one. For example, if the number of positions to elect is one, and if the system detects that only two candidates remain at the start of the round, the candidate with the least amount of votes is eliminated and the remaining candidate is elected without going into another round. This option allows the algorithm to perform the elimination transfer for the elimination transfer to the winning candidate if that winning candidate did not yet reach the threshold. **Note**: *This option only applies the IRV or Points IRV methods.*

15. **Use First Round Suspension**: This option adds one more round at the start of results tabulation where only 1st rankings are evaluated in the algorithm. All the other results are suspended until the start of the second round. Using this option automatically adds a suspended category in the RCV reporting.

11.3 Ranked Contests

Ranked Contests functionality is used to export results for ranked choice contests.

11.3.1 Export Ranked Results

Result Tally and Reporting (RTR) has the ability to export ranked results to a simple text format which can be used to tabulate the results independently from the RTR application. This functionality existed in previous versions of RTR, but the file format has been modified to include district information for all results.

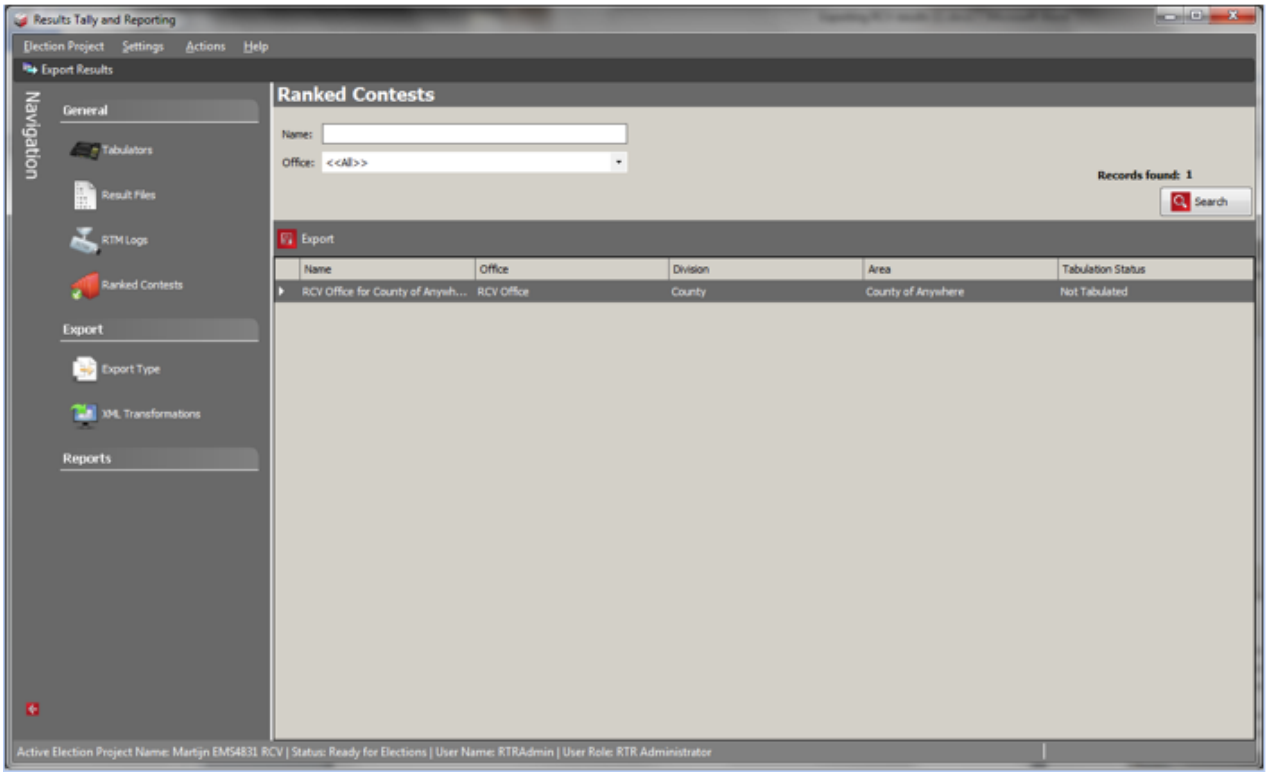


Figure 11.4: Ranked Contests main screen

11.3.1.1 Export Dialog

1. In the **Ranked Contests** screen, the user can select any ranked contest (in this project only one contest can be selected).
2. The **Export** button opens the **Export Ranked Results** dialog.

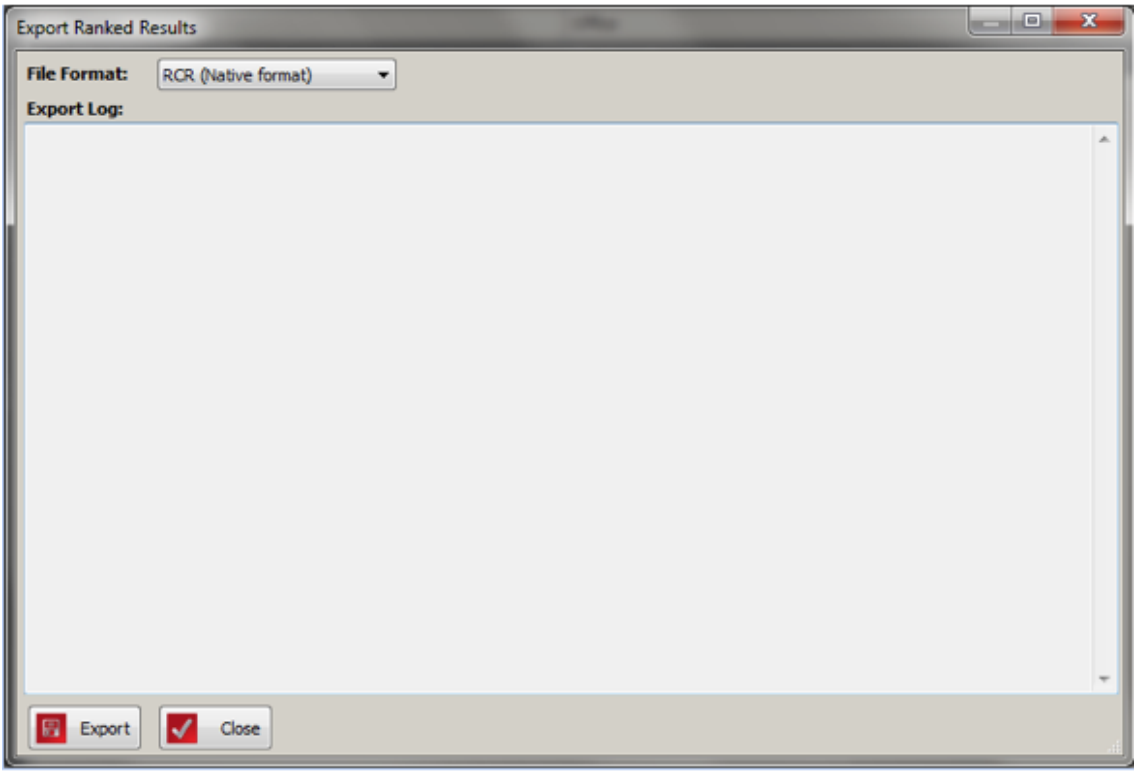


Figure 11.5: Export Ranked Results screen

You must first select the export format to be used:

- RCR format which includes breakdown per precinct and counting group
- BLT format which is compatible with OpenSTV 2.1 and higher.

3. You can initiate the export by pressing the Export button. This opens a dialog where the user has to select a local folder to store the export file.

4. The export contains any resolved write-ins that were entered by the user, but if combinations remain that are unresolved, the export will keep include a Write-in X candidate for each write-in position in the contest (our example has two). These two Write-in placeholders only appear if there are unresolved combinations in the export.

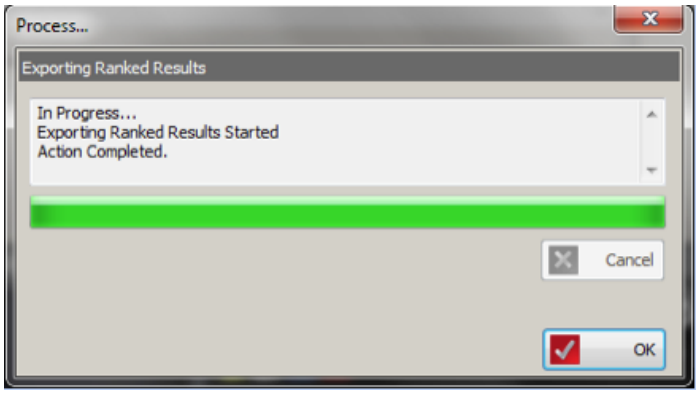


Figure 11.6: Exporting Ranked Results...

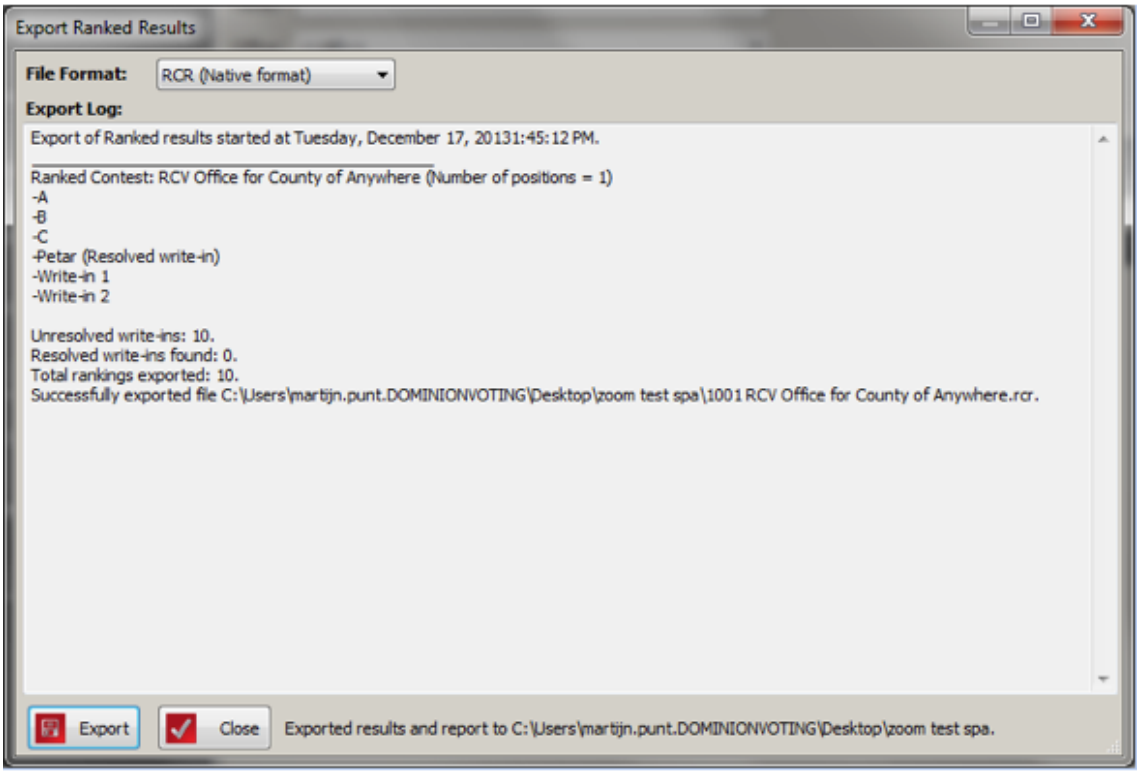


Figure 11.7: Export Ranked Results screen

5. The system indicates where the file was stored and provides some basic statistics in the log.

11.3.1.2 RCV Export File Formats

This documents explains the two export formats available in RTR for exporting ranked choice voting results. The two formats supported are the Dominion RCV format and the Open STV BLT format.

11.3.1.3 RCR File Format

This is the Dominion native results format for Ranked Choice Results

```
1	4	2	2
LPC Leadership contest
Anne A
Patrick B
Pascale C
Marc D
1	Election Day
2	Absentee
1	Electoral District A
2	Electoral District B
1	1	39	1	2	3	4
1	1	12	2	1	4	3
1	1	7	3	2	4	1
1	2	30	4	3	1	2
1	2	12	3	1	4	2
2	1	350	4	1	2	3
2	1	600	3	4	2	1
2	1	1950	2	1	4	3
2	2	1500	1	3	4	2
2	2	600	4	2	3	1
```

Figure 11.8: Dominion native results format for Ranked Choice Voting

1. The first line contains three numbers separated by a tab character:
   - Number of seats to elect.
   - Number of candidates in the file
   - Number of precincts
   - Number of counting groups
2. The second line contains the contest name.
3. In the candidate name lines bellow, note the number of candidate lines must match the specified number of candidates.
4. Bellow, note that the number of precinct lines must match the specified number of precincts. Each precinct line contains two values separated by a tab character:
   - Precinct number
   - Precinct name
5. Next in the counting group lines, note that the number of counting group lines must match the specified number of counting groups. Each counting group line contains two values separated by a tab character:

- Counting group number
- Counting group name

6. All the other lines are showing rankings and their count per precinct. Each line contains a list of number separated by a tab character:
   - Precinct number (the same number used in the precinct lines). If precinct is unknown the precinct value will be -1.
   - Counting group number (the same number used in the counting group lines).
   - Ballot count: the number of times the ranking get cast in this precinct and counting group
   - The remaining numbers are ranked candidates. Each number refers to a candidate in the order that they are defined in the list. If empty it means a blank ballot.

11.3.1.4 BLT File Format

The BLT file format is used by the Electoral Reform Society and the OpenSTV application.

1. The first line contains three numbers separated by a space character:
   - Number of candidates in the file
   - Number of seats to elect
2. The following lines contain the ranked results in the following
3. Each line in the ranking section has three parts (separated by spaces):
   - Ballot count: indicates the number of times the ranking was cast.
   - Ranking: for each rank, the set of candidates that were ranked are referred to by a candidate index (starting from 1 and following the order of candidates defined at the bottom of the file). An empty rank is indicated by the '-' character. An overvoted ranking will include all ranked candidates separated with the '=' character.
   - '0' character that terminates the line.
4. The end of the rankings section is signaled by a line containing a single '0' character.
5. Then the candidate names are listed in the order which corresponds with the candidate index references in the rankings themselves. Each candidate name is surrounded by "" characters. The number of candidate lines must correspond with the number of candidates indicated at the start of the file.
6. The last line in the file is the name of the contest surrounded by "" characters.

11.3.2 Tabulate

You can start a tabulation session by clicking the **Tabulate** button once a contest has been selected. This will open the **Tabulate Ranked Results** screen.

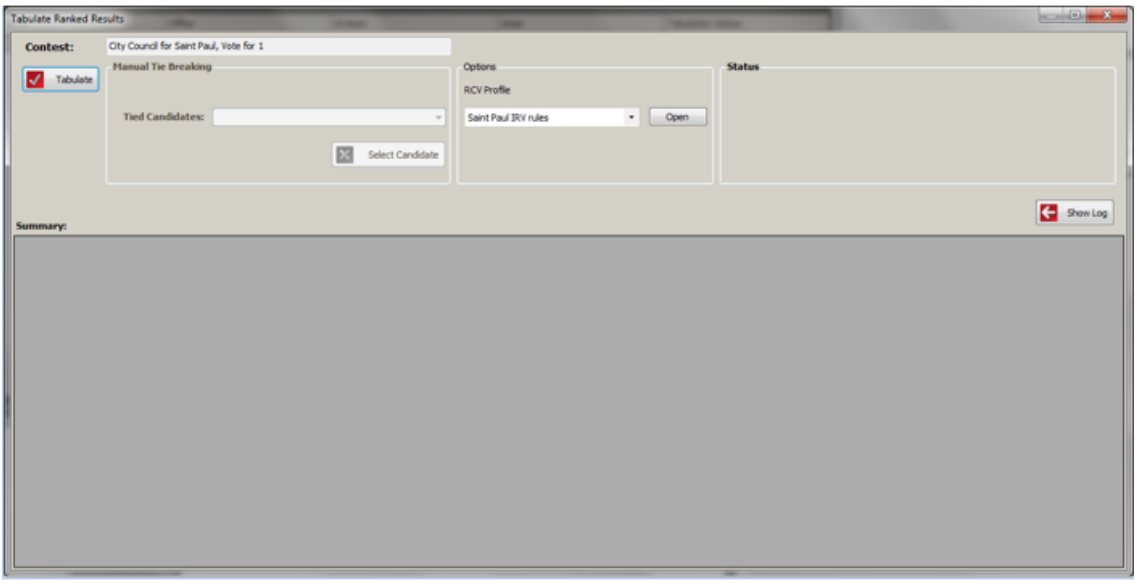


Figure 11.9: Tabulate Ranked Contests screen

1. Select RCV profile to be used for tabulation. The user can press **Open** to verify that the settings are correctly set-up.

2. The tabulation can be started by pressing **Tabulate** button, the system will proceed to collect all results for this contest and start the tabulation algorithm. **Note**: *If the **Pause After Round** setting is enabled in the selected RCV profile, the tabulation will proceed round by round and the user must click **Tabulate** to proceed to the next round. Otherwise, the tabulation will proceed until the end of tabulation process or until the user must resolve a tie.*

3. If the algorithm detects a tie between two or more candidates the system has the ability to pick a single candidate from a list of multiple candidates. The system will indicate the reason a tie occurred and what will happen to the selected candidate. **Note**: *If the selected RCV profile has the Use previous tie break decision setting enabled the tie break decisions will be re-used if the contest is tabulated a subsequent time.*

4. The system shows the round by round summary in the **Summary** grid at the bottom of the screen. It will indicate eliminated candidates in red and elected candidates in green color.

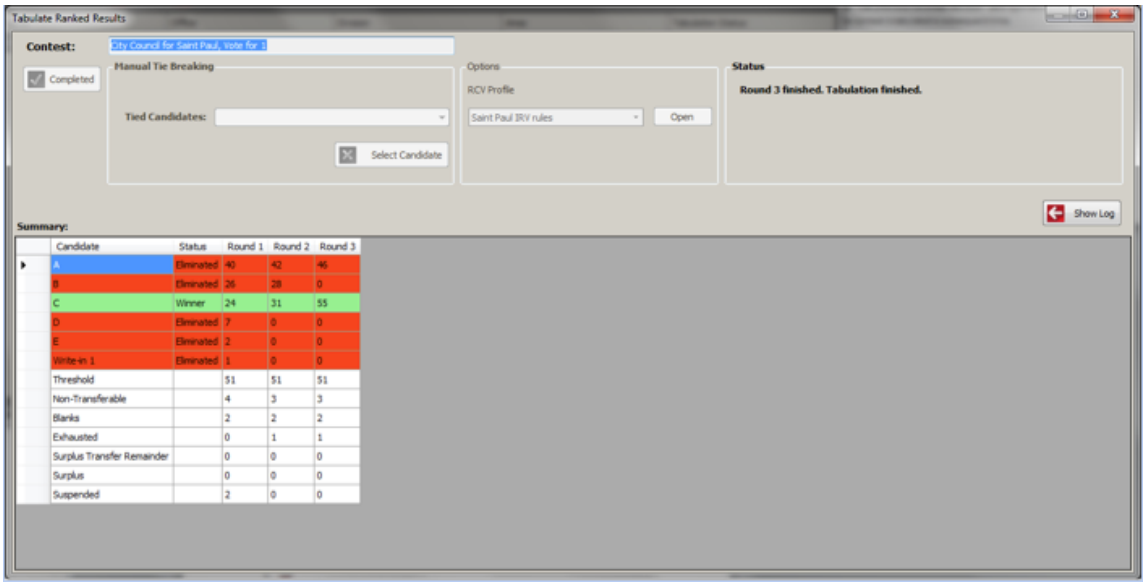


Figure 11.10: Tabulate Ranked Contests screen

5. The user can also see the tabulation log by clicking **Show Log**, this will allow the user to see a detailed round by round explanation of the actions taken by the algorithm. The user can select **Summary** or **Detailed**. **Summary** displays results per round, while **Detailed** displays results per round broken down per precinct.

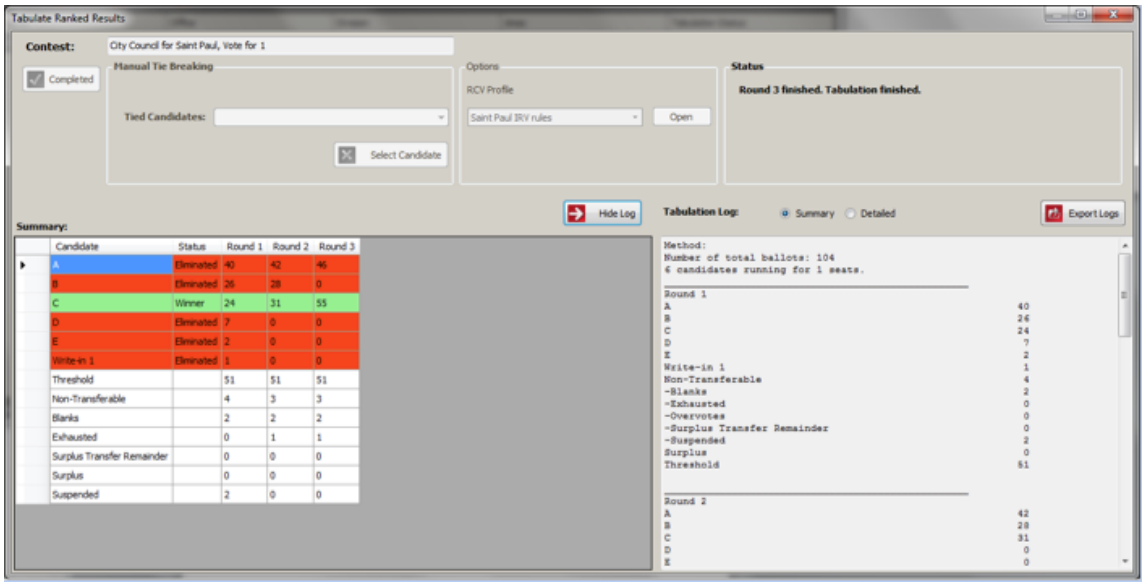


Figure 11.11: Tabulate Ranked Contests screen

6. Both the Summary and Detailed log can be exported by pressing the Export Logs button, which will present the user with a folder browser dialog that selects the directory to where the logs will be written. These logs are simple text files.

7. The user can make more space for the Summary grid by hiding the log by clicking **Hide Log**.

11.3.3 Write-In Handling for Regular Contests

1. Once a regular contest is selected in the result file screen, the user can click **Write Ins**.

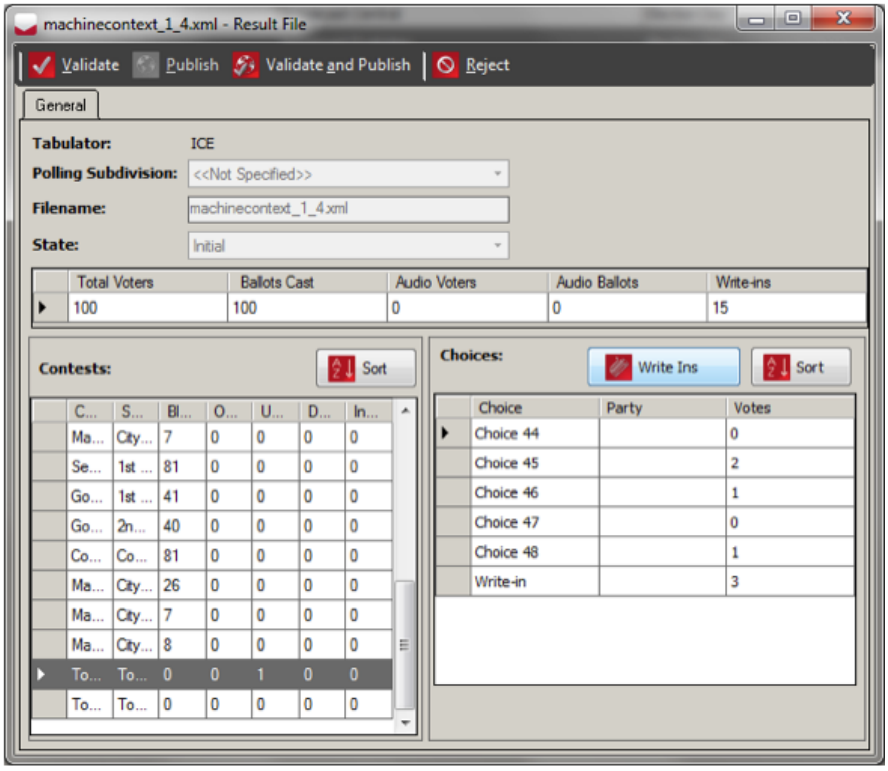


Figure 11.12: Result Files Screen

2. The user can add new write-in names to the contest using **Add**, or delete previously added write-in names if these names do not contain votes in any of the result files.

3. The user can then enter the number of votes for write-in names as long as it does not exceed the number of write-ins votes for the current contest in the current result file.

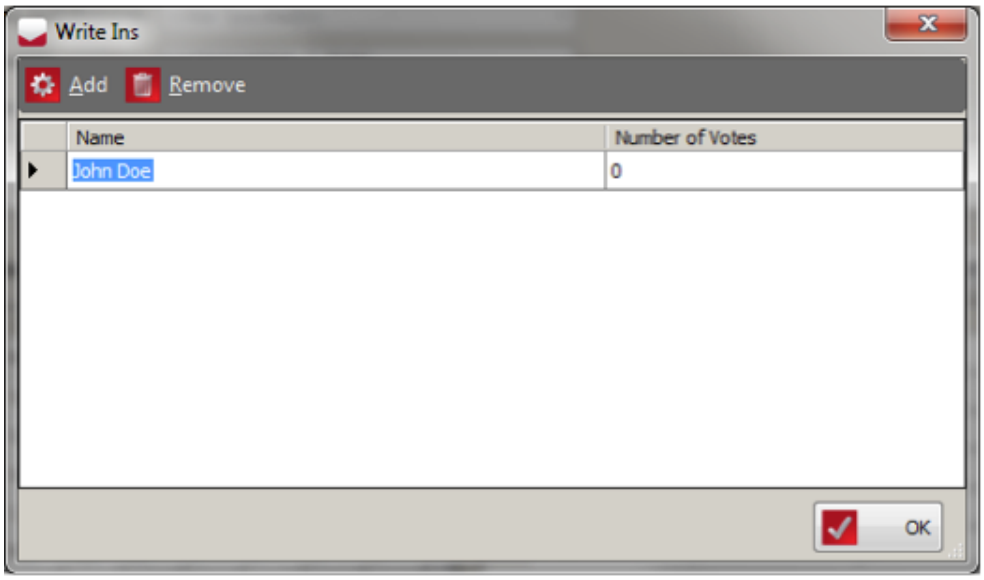


Figure 11.13: Tabulate Ranked Contests screen

11.3.4 Write-In Handling for RCV Contests

1. Once a RCV contest is selected in the result file screen, the user can click **Write Ins**. This opens a dialog where each row represents a single cast ballot in which the selected RCV contest has one or more write-ins ranked.

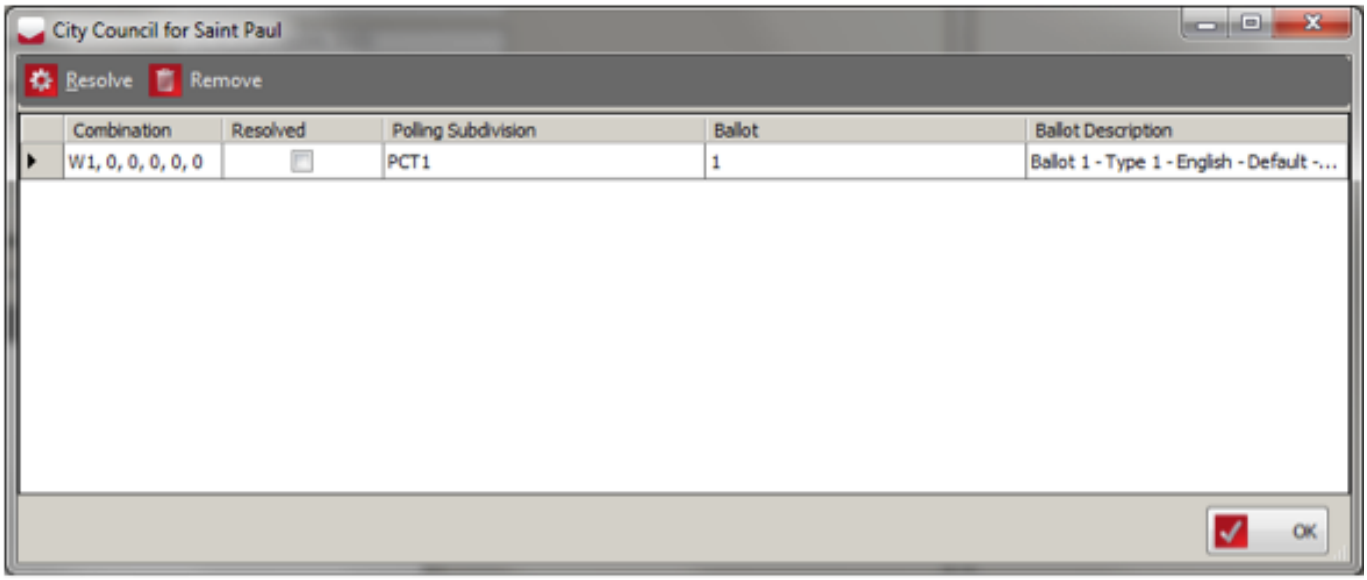


Figure 11.14: RCV contest has one or more write-ins ranked Screen

2. The combination column shows how the contest was ranked. Each rank is separated by a comma,and each ranking is indicated by their candidate position in the contest. For example the first candidate in the contest is encoded as 1, the second candidate is encoded as 2. Each unique write-in position is indicated in the combination by the 'W' character followed by the position index. For example, W1 for the first write-in position, W2 for the second position, etc. If a ranking is left empty, it will be encoded with a 0. If multiple rankings were made in a single rank the selected candidates will be separate by '=' character. For example 1=2 means that in the same rank both the first and second candidate were marked.

3. The resolved checkbox indicates whether the write-in positions referred to in the combination have been resolved. To assist the user to find the ballot with the write-ins, the row also includes information on the precinct in which the ballot was cast.

4. To resolve write-in positions in the combination, select the row and click Resolve.

5. This opens a dialog that displays all referred write-in positions in the combinations. It allows you to select the write-in position from the list and to either resolve the combination to an existing candidate, to a newly entered write-in name, or to resolve as blank (meaning that the ranking for the write-in position will be considered empty).

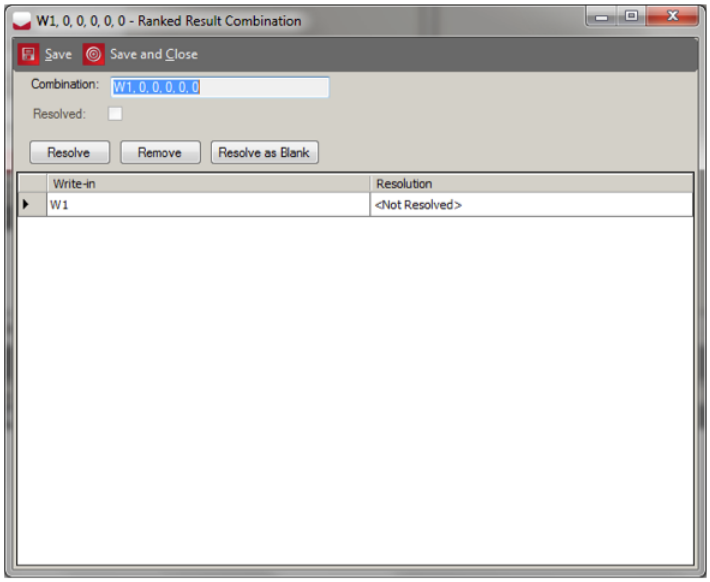


Figure 11.15: Ranked Result Combination Screen

6. If the user selects a write-in position and clicks **Resolve** button another dialog opens where the list of regular candidates and resolved write-in names are presented the user.

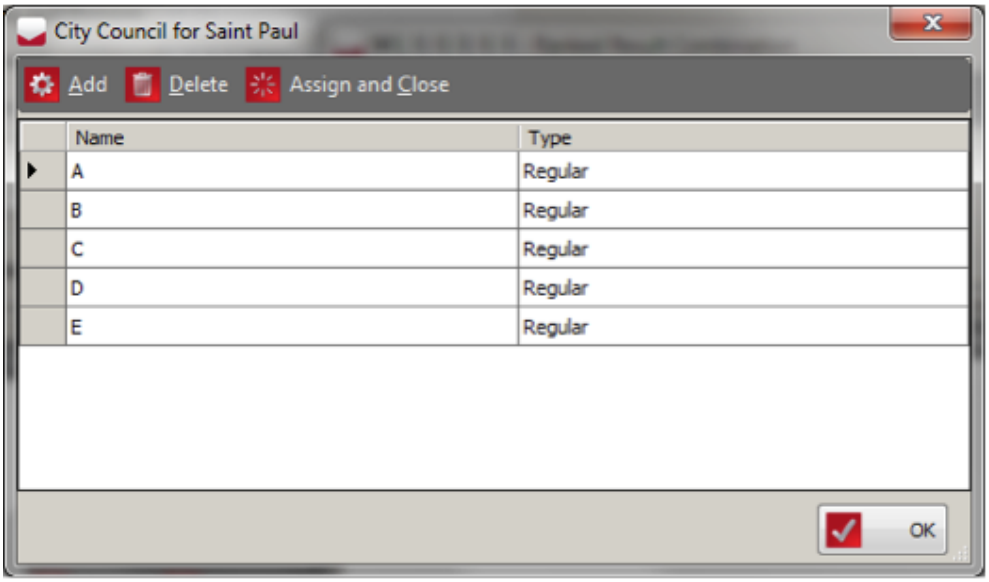


Figure 11.16: The list of regular candidates and resolved write-in names Screen

7. You can add new resolved write-in names and delete write-in names (if they are not used in any resolution).

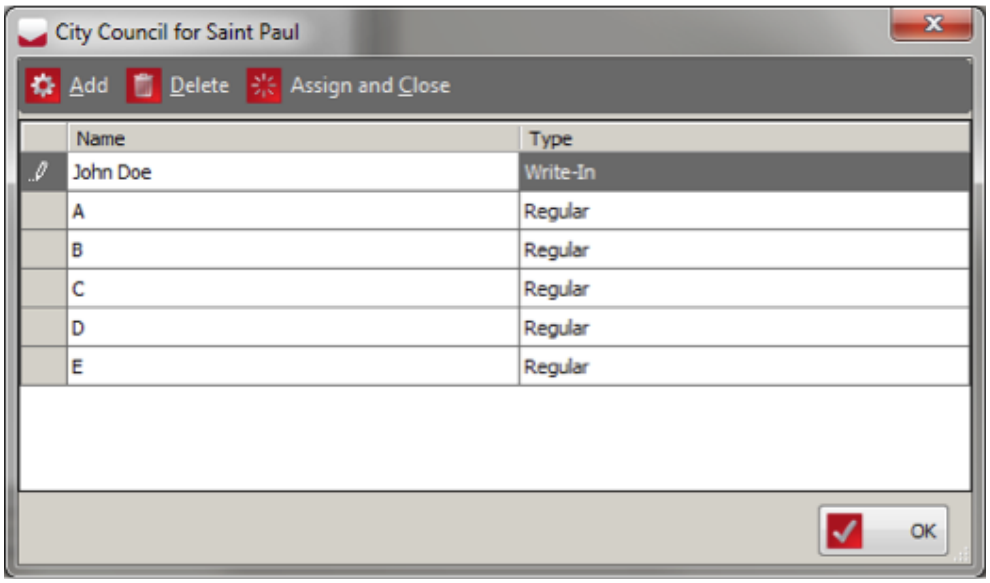


Figure 11.17: Add new resolved write-in names or delete write-in names Screen

8. You can select the candidate and press Assign and Close to use that candidate in the resolution.

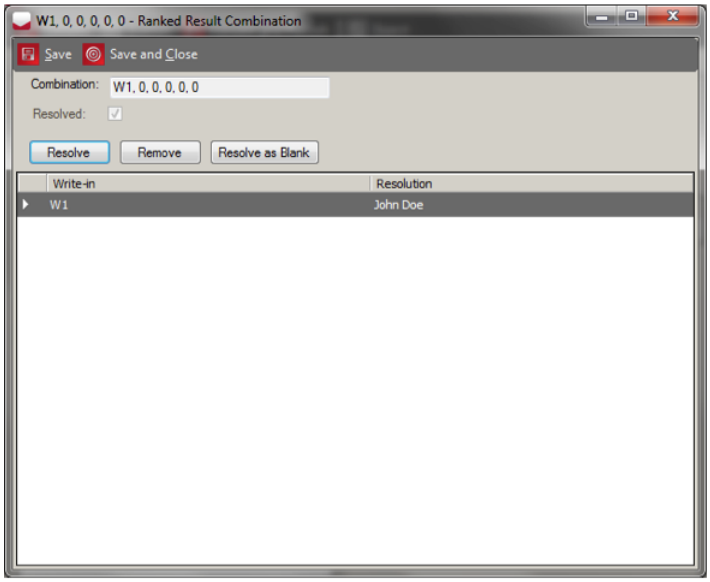


Figure 11.18: Ranked Result Combination - write-in positions have been resolved Screen

9. Once all write-in positions have been resolved, click **Save and Close**. The Resolved checkbox will be selected.

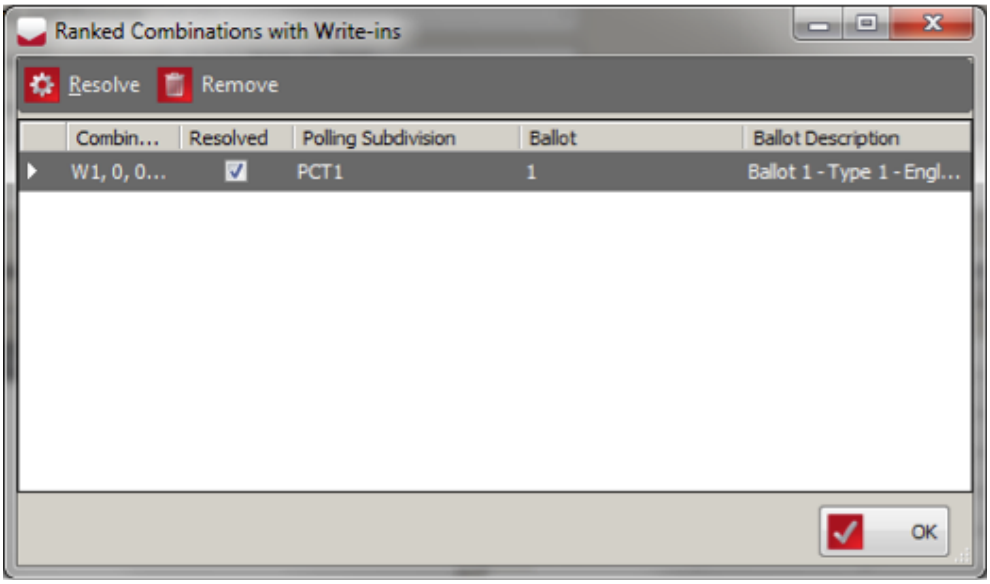


Figure 11.19: Ranked Combinations with Write-Ins Screen

10. The user can Remove resolutions by pressing the **Remove**.

Chapter 12

Result Pair Resolution

Result Tally & Reporting allows manual entry of results that can be marked as replaceable indicating that those results are temporary. The temporary results are replaced as soon as official result files are loaded into RTR, at this point the system will automatically create a Result Pair object, which will also store whether the two sets of results are matched in terms of summary votes per candidate per contest.

1. **Result Pairs** can be seen and interacted with from the *Result Pair Resolution* screen, which can be reached by clicking on the **Result Pair Resolution** option in the Activities Navigation Panel (General Group).
2. Use the **Tabulator**, **Tabulator Type** and **Matched** combo boxes as well as the **Status** checkbox list to filter the search results. To list all Result Pairs, omit the search criteria and click **Search**. To sort Result Pairs by a specific column, click that column in the grid header.
3. Each listed Result Pair will indicate its associated tabulator and list both the temporary manually entered results and the results loaded from tabulator, each pair shows whether it is matched and its status.
4. By selecting a single result pair from the list that particular result pair will be displayed in the right side panel, which can be expanded or contracted to by using the red arrows on either side of the panel separator.
5. The right side panel will display all contests handled by the tabulator associated with the result pair. The contest row can be expanded by clicking them to reveal its choices and show the votes from the temporary results compared to those from the tabulator result file. Contest and choice rows are marked red if they are not matching.
6. Contest row can be contracted by holding the **Ctrl** key while clicking the row.
7. Once a result pair is created its status will be set to *Pending* to indicate that an election official must perform result pair resolution, meaning that only the user must pick which result of the pair will be used for reporting, the other will be placed in *Rejected* result state.
8. Once a Result Pair is reviewed the user can indicate which result is preferred by using one of two buttons:
    - **Resolve to Tabulator** button: by clicking this button the tabulator results will take on the result state of the temporary result file, and it will also place the temporary result file in rejected state.

NOTE: *If the **Automatic Result Pair Resolution** option is checked in Project Parameters (see X) the system will automatically execute the Resolve to Tabulator action if the Result Pair is matching.*

- **Resolve to Temporary** button: by clicking this button the tabulator result will be placed in *Rejected* state. The result state of the temporary result file will remain unchanged.

NOTE: *Both actions present the user with a dialog that requires them to confirm the action.*

9. Although you cannot delete a Result Pair directly, it can be automatically deleted if one of its constituent Result Files is deleted in the *Result Files* screen.

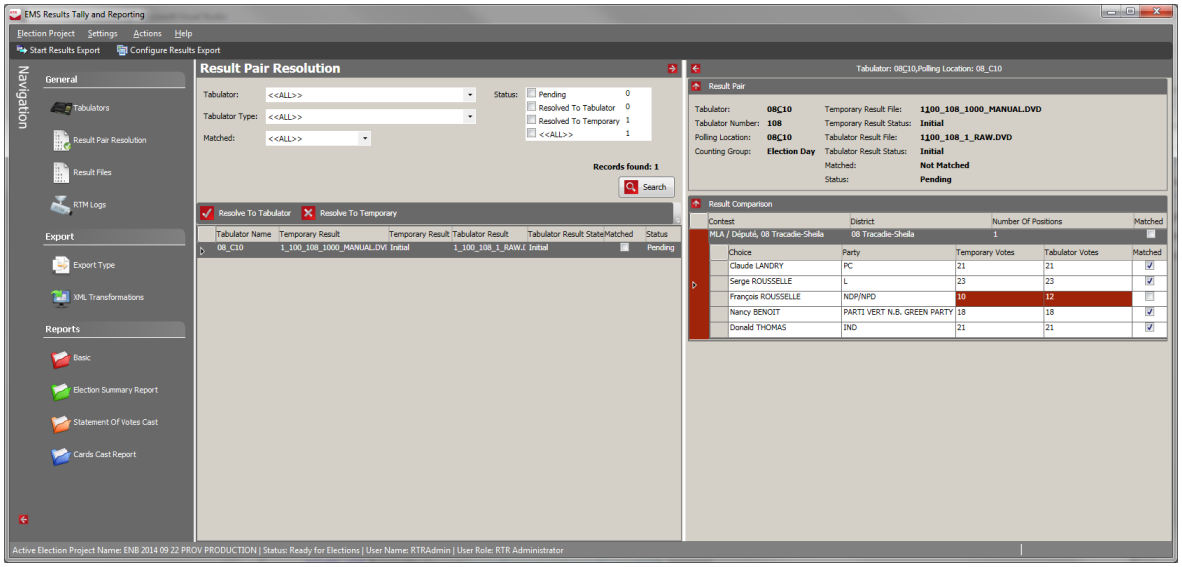


Figure 12.1: Result Pair Resolution Screen

Chapter 13

Results Export

13.1 Export Types

Once the transfer points are defined, the user can configure how the results should be exported:

- Either by using any of the available export formats
- Or, by importing an export package which allows users to export data in a new format

To manually activate one or more export types, select them from the list and click the **Active** button in the toolbar. Similarly, deactivating export types can be achieved using the **Inactive** button in the toolbar. Active export types are indicated by checkboxes in the *Active* column in the list.

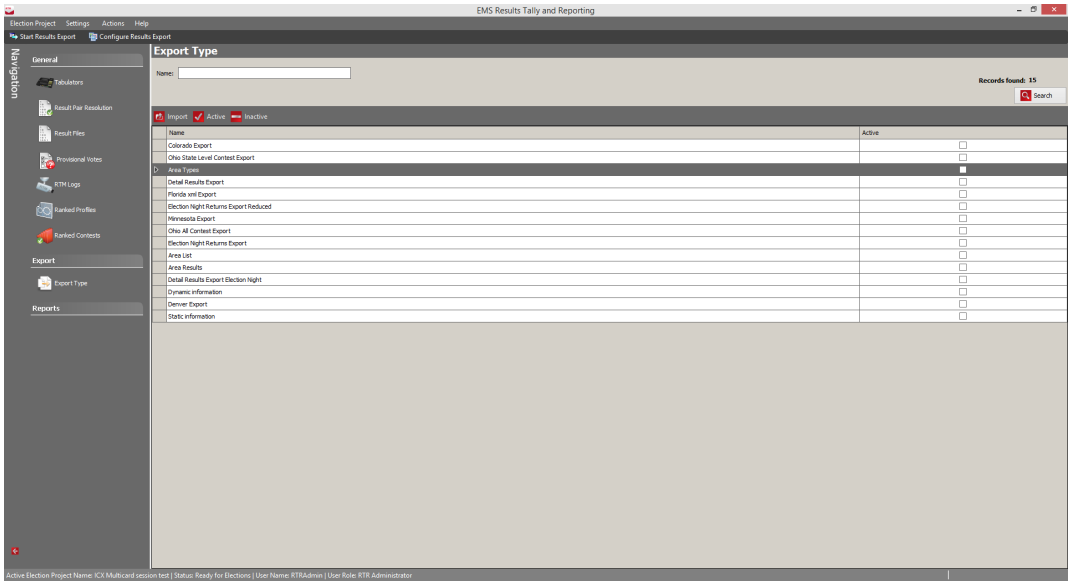


Figure 13.1: Export Type Screen

To import a custom export package:

1. Click **Import** in the toolbar.
2. Browse to find and select the package you wish to use for your export.
3. Click **Open**. The package will be imported into the application, and it will be shown in the *Export Types* screen.
4. If you wish to use this export package, you must activate it.

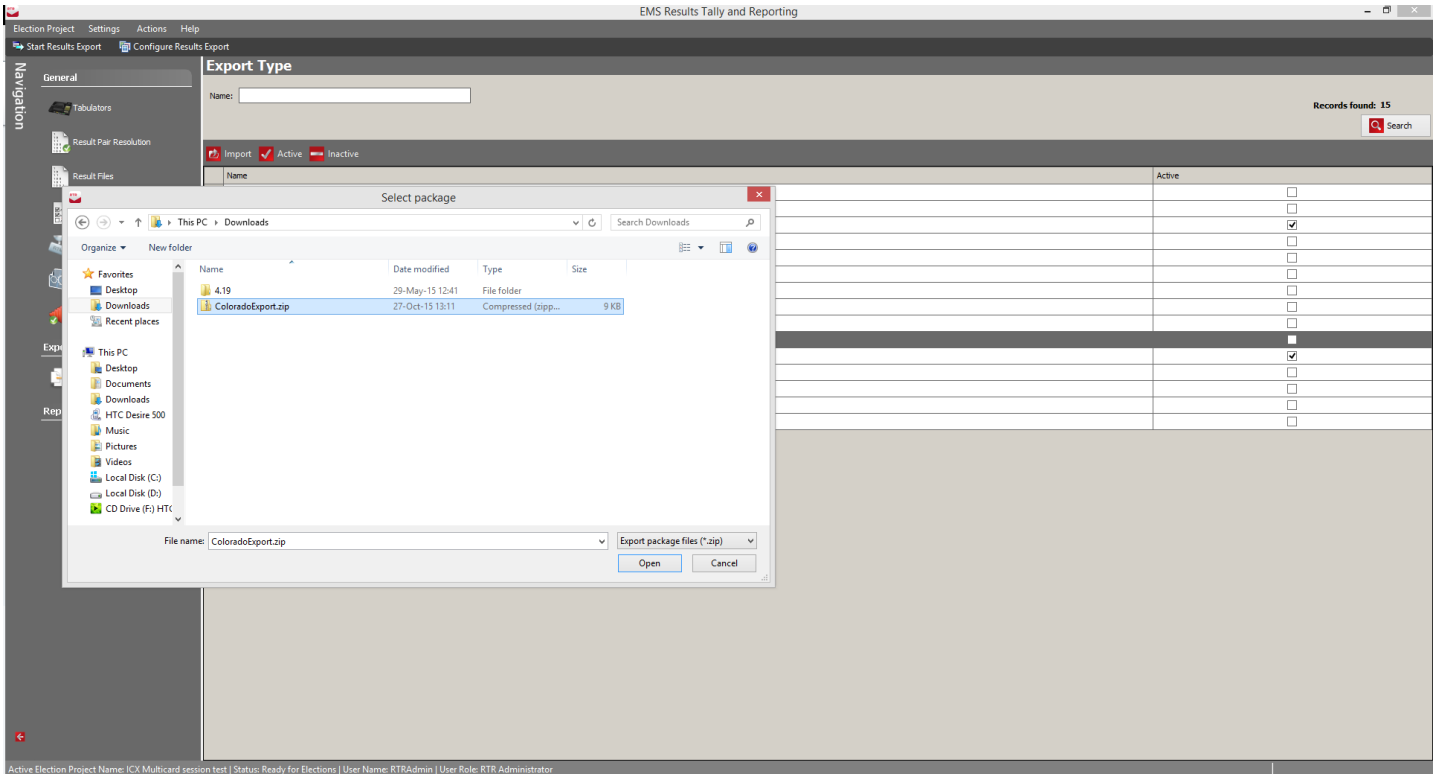


Figure 13.2: Export Type - Import export package Screen

13.2 XML Transformations

The EMS Results Tally & Reporting application exports election results in XML format by default. EMS Results Tally & Reporting can also define XML transformations, allowing election results to be presented in any format. XSL (XML Style-sheet Language) transformations make this function possible because XSLT is structured around the W3C standards for transformation. W3C defines a language that transforms XML files into more readable formats, such as clear text files, HTML, XHTML, other XML formats, SVGPDF, etc.

Any number of XSLT transformations can be defined. When an XSLT transformation is created, it is automatically attached to all transfer points set within the system. This means that, in addition to the

XML results file, the system will create other output file formats defined by the XSLT transformations.

To define and manage XSLT transformations, perform the following actions:

1. Click on the **XML Transformations** option in the Activities Navigation Panel (Export group).
2. Enter search criteria (type-in the XML Transformation name) and click **Search** . A list of previously defined transformations appears.
3. To define a new XSLT results transformation, click **Create New** from the toolbar.

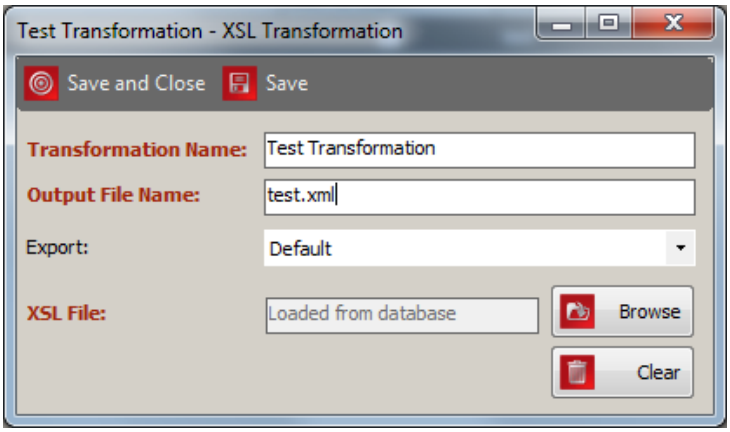


Figure 13.3: Empty Tabulator Screen

4. The *XSL Transformation* screen appears.
5. In the *XSL Transformation* screen, shown in Figure 13.3, enter the the transformation and the output file names.
6. Click **Browse** to find and select the XSL transformation file you wish to use. The **Export** option is used to connect the transformation to the existing export.
7. Click **Save and Close**, or click **Save**. The *XML Transformation* screen now contains a newly defined transformation.
8. To delete an XSLT file, select the XSLT record and click **Delete** from the toolbar.

13.3 Defining Transfer Points and Exporting Results

Transfer points represent locations accessible via the network. Accumulated election results can be transferred to these locations and used for presentations and reporting. This feature not only presents results, but it also provides detailed reporting and analysis of these results. Election results appear in XML or XSLT transformed data formats (HTML, TXT, XHTML, SVG, etc.) that are created by using Election Results Transformation functionality in EMS Results Tally & Reporting to transform the election results data.

1. Expand the **Settings** menu and click the **Transfer points** menu item.
2. The *Transfer Points List* screen appears.
3. To add a new transfer point, click **Add**.
4. The Transfer Point Editor screen appears allowing you to define the **Local** and **Global** locations where you wish to send the results.
5. The Local refers to the location on the local drive, whereas the Global transfer point is defined within the EMS Database and is applicable for all EMS Results Tally & Reporting installations for a given election project.
6. In the Browse for Folder screen, click **Browse** to select the location of the Local folder.
7. To set the **Global** folder location, type in the full path of the target folder on the network.

   NOTE: *If some mandatory fields are empty, an error message will appear, reading, "Not all mandatory fields are set". Click* ***OK*** *and enter all necessary information.*
8. In the *Transfer Point Editor* click **OK** to save the changes.

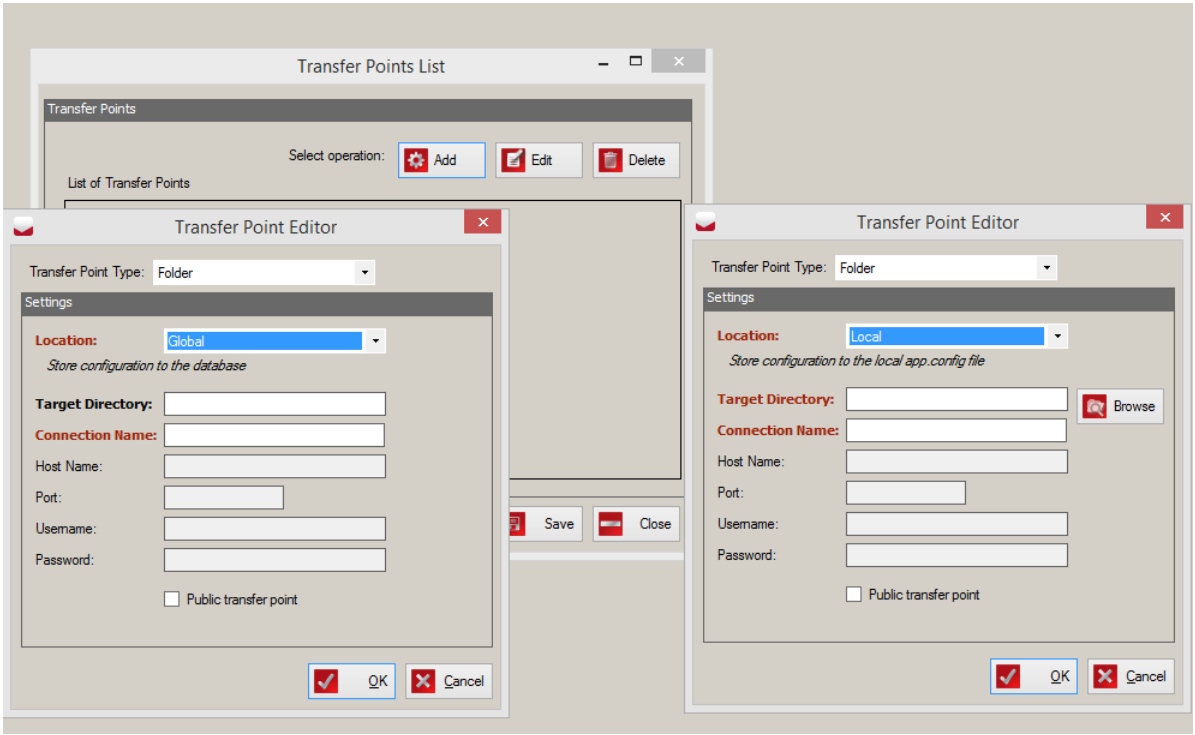


Figure 13.4: Setting Local and Global Transfer Points

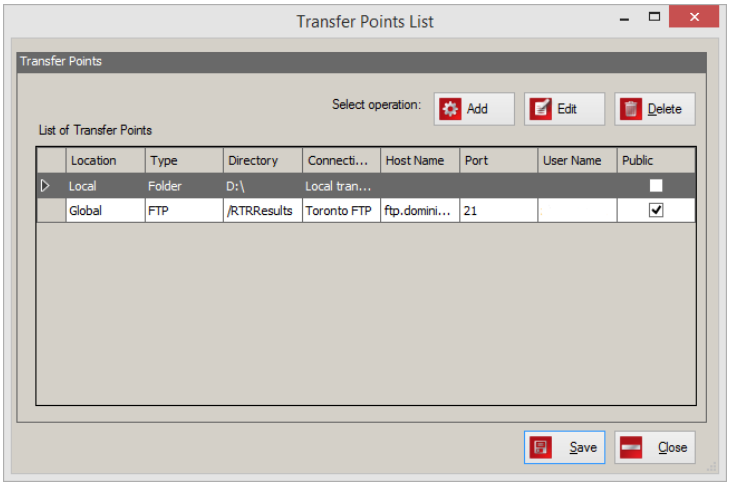


Figure 13.5: Transfer Points Dialog Listing Saved Transfer Points Record Screen

9. The saved transfer point records will be listed in the *Transfer Points* screen.
10. If you wish to remove a transfer point, click on the record you want to remove and click the **Delete**.

11. When the transfer points have been defined, the user can configure how they want the results to be exported. Click **Configure Results Export** in the Results Export toolbar at the top (see Figure 13.6).

Figure 13.6: Configuring Results Export Screen

12. The **Configure Results Export** screen appears. See Figure 13.6).

    In this dialog, the user can:

    - Indicate whether the export should run automatically
    - Specify the interval at which automatic exports are running
    - Indicate whether results should be exported to transfer points marked as public

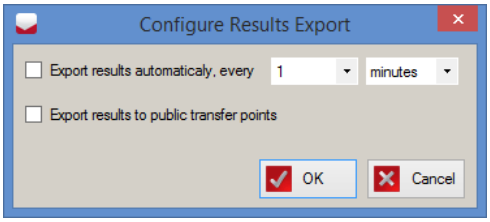


Figure 13.7: Configuring Results Export Screen

13. Once configured, the user can export results by clicking **Start result export**, in the Result Export toolbar. The Result Export toolbar also displays a status message, which will in this case state Result export in progress. The system will begin transferring the XML and any other XSTL transformed election results from the EMS system to all of the specified transfer points.

14. The user can also stop the export by clicking on the same button, which now has the label **Stop result export** (See Figure 13.8). In this instance, the application will complete whatever sub-process is running, and will then stop the overall process (The status message will state Stopping result export - see Figure 13.9). The user can stop both the manual and automated result export processes.

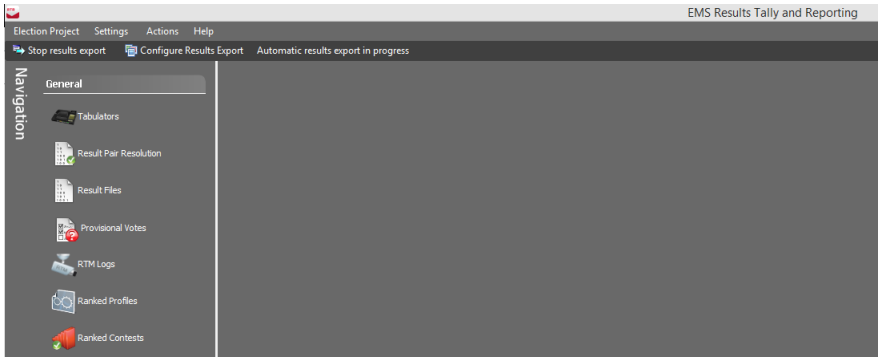


Figure 13.8: Stop Results Export Screen

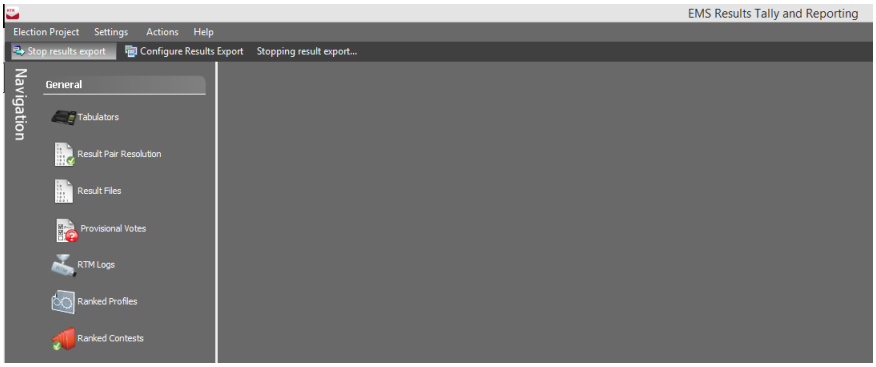


Figure 13.9: "Stopping results export..." Status Screen

15. When the export process is completed, the status message will display information about the last successful export (See Figure 13.10).

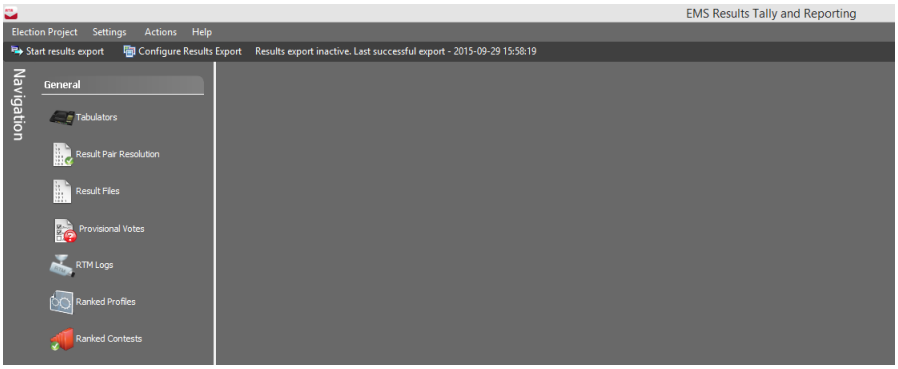


Figure 13.10: Result export inactive Screen

16. To view the election results transfer log,expand the **Actions** menu, select the **Export** menu item, and click the **Show Export Log** option to open the *Transfer Log* in Notepad.

17. To view exported results, navigate to the transfer point location you defined in the previous steps. You should find the XML and any other XSLT transformed election result files.

Chapter 14

Auditing

14.1 Exporting Cast Vote Record Data

This feature is designed to be used in auditing scenarios such as the Risk Limiting Audits, or other auditing of cast vote level records. The user can choose to export a set of cast vote level data (entire set or filtered), into one of two distinct formats:

1. A set of well-defined JSON files packaged together in a zip file.
2. A tabular tab-separated format, which can be opened in Excel for easy viewing.

The exported data conforms to the following:

- No compromise of voter privacy:
  - Session Code is excluded
  - Out-stack conditions are excluded
- The user can choose to export data for all results, or only results in the published batches
- Data can be filtered by the following prior to export:
  - Batch
  - Tabulator
  - Precinct
  - Ballot Type
  - Contest
- Each record in the export can be matched with a physical ballot or a VVPAT (Voter-Verified Paper Audit Trail).

The JSON format has two additional features not supported in the tabular format:

- Any modified data (e.g. post-adjudication or conditional vote resolution) is included alongside the original capture of the cast vote level record.
- Export can be split into different files for each batch.

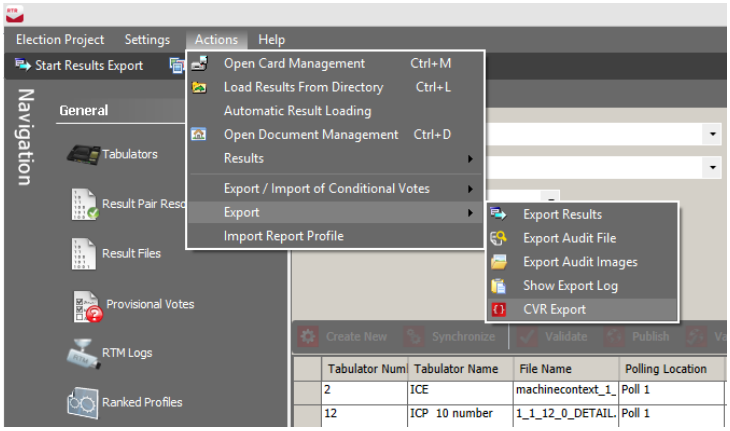


Figure 14.1: Export Data Screen

1. Navigate to the **Actions** menu, click the **Export** menu item and click the **CVR Export** sub-menu item.
2. The *CVR Export* screen will appear.

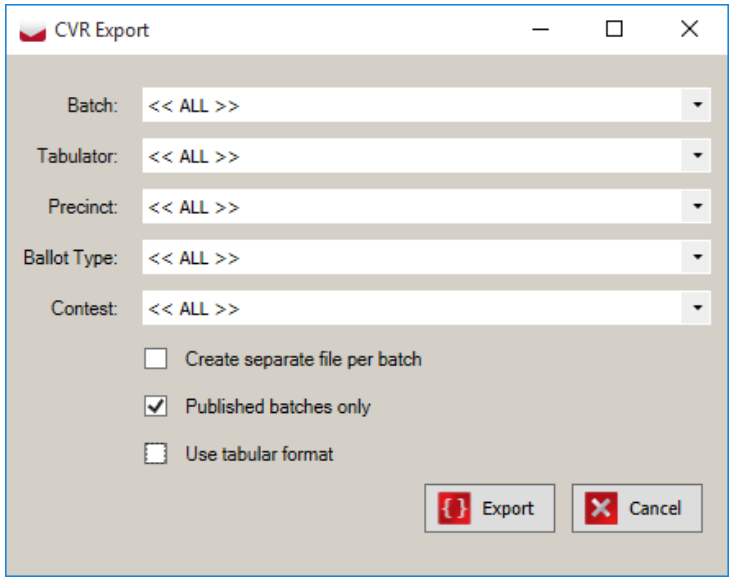


Figure 14.2: CVR Export Screen

3. Select criteria for filters if applicable, or leave as **ALL** in case no filter is required.
4. Perform additional settings, if applicable:
   - Create separate file per batch check this if the export should create a separate export file for each results batch being exported.
   - Published batches only check this if the export should only contain data from published result batches.
   - Use tabular format - If this option is selected the export will be in the form of a tabular text file format, which can be opened in Excel instead of the default JSON format.
5. Click **Export**.

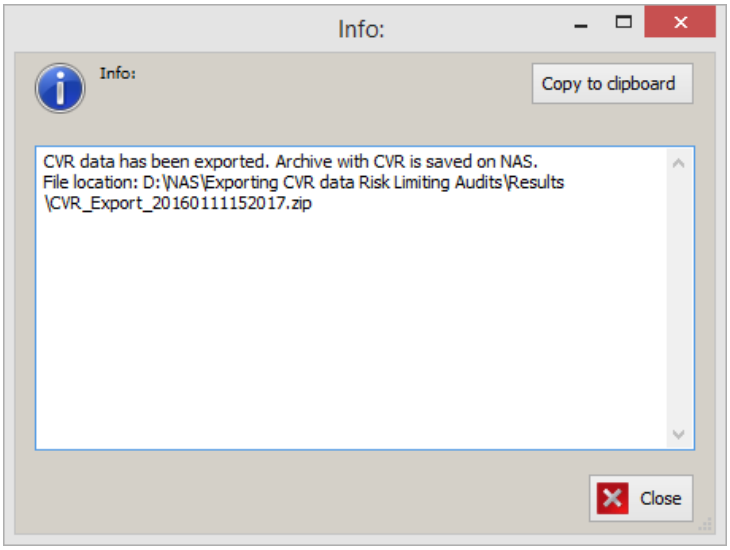


Figure 14.3: CVR Export Completed Screen

6. When the process has completed:

    - An *Information* dialog will appear indicating where the exported data is located. Click **Close**.

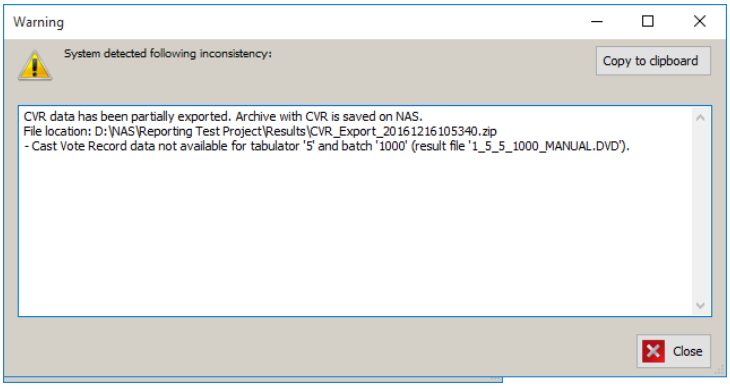


Figure 14.4: Completed CVR export where no data matches filter Screen

- The system will indicate if batches were encountered during the export that did not have associated cast vote record data (for example: manually entered results). The system will indicate which batches were not included in the CVR export due to this reason. See figure partial export.png.

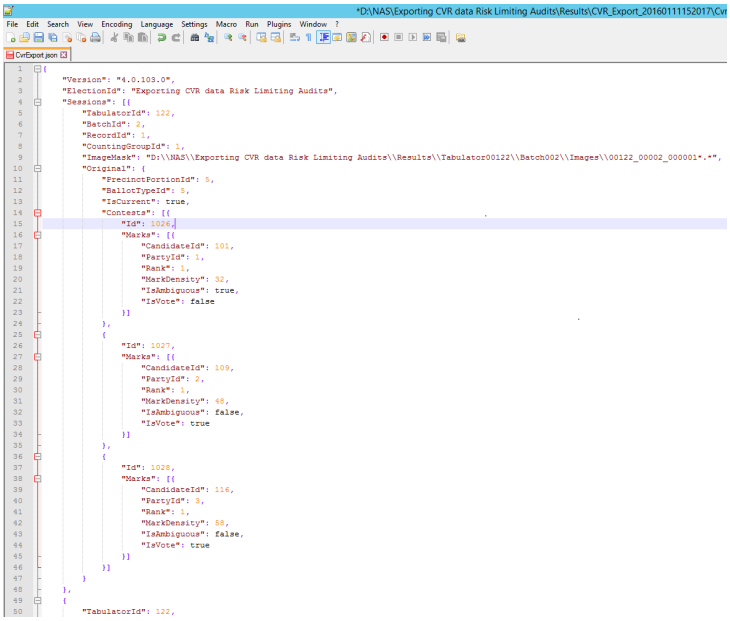


Figure 14.5: Exported data opened in Notepad Screen

7. The exported data in the JSON format is then usually analyzed using a third-party tool which can parse the format However, the user can still inspect the contests of the exported files in a third-party editor with a plug-in which performs the parsing.

    - A tool which can be used to inspect the content of the file is Notepad++ which can be downloaded and installed along with the default set of plug-ins.
    - The JSON Viewer plug-in should be enabled in the Plug-In Manager section of Notepad++.
    - The exported data simply needs to be opened in the Notepad++ application, and the JSON Viewer plug-in needs to be activated in order for the data to be presented in a readable format. See figure 14.5 for an example.

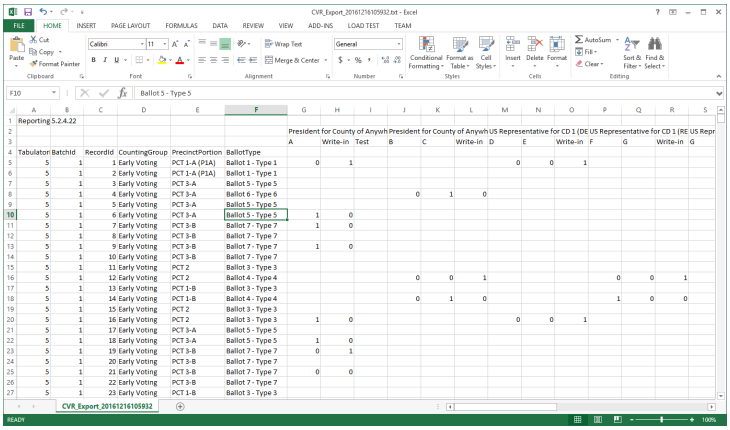


Figure 14.6: Tabulat Export Format Screen

8. The tabular format text file can simply be dragged and dropped in Excel. This will open Excel and present the user with all cast vote records that were part in the export. See figure 14.6 for an example. Cast vote records are placed vertically with every row representing a single cast vote record. Horizontally all contests and their containing choices are placed. If a column contains a 1 that means that there was a vote for a choice. A 0 means that this choice was no vote was made for that choice (or that it was part of an overvoted selection). An empty cell means that the contest/choice was not part of the current ballot style.

NOTE: *In elections where paper ballots are made up of more than one card, the export will list each card as an individual session, unless the tabulator that produced the cast vote record has a session control mechanism such as smart cards.*

14.2 Exporting Audit Files

This functionality allows the user to export results audit reports for a subset of or all result files. Each result file will have its own report in simple text file format. Each report contains a list of all individually cast ballots (if this information is available). For manually entered data, the list only displays totals for that result file. Each report lists the number of ballots cast in the result file and displays how many of those were cast within an audio and/or provisional session. If the result file contains information for individually cast ballots, each cast ballot is listed in random order.

Each ballot will have a reference to its image file, status and ballot manifestation ID. All contests on the ballot are listed showing name of contest, number of positions,and number of valid votes, undervotes, and overvotes. Subsequently, each contest also displays a list of all marked voting boxes and whether or not they are valid votes.

1. To display a list of loaded results, click on the **Result Files** option in the **Activities Navigation Panel** (General group).
2. The **Result Files** main activity screen appears.
3. Use the **Tabulator**, **Tabulator Type** and **Result State** combo boxes to filter the search results.
4. Click **Search**.
5. Omit the search criteria and click **Search** to list all imported results.
6. Use the **Sort** functionality to list all imported results.

7. Select the desired result files from the list, and click **Export Audit File** or click on**Actions**, **Export**. See Figure 14.7.

8. Click on the **Export Audit File** option.

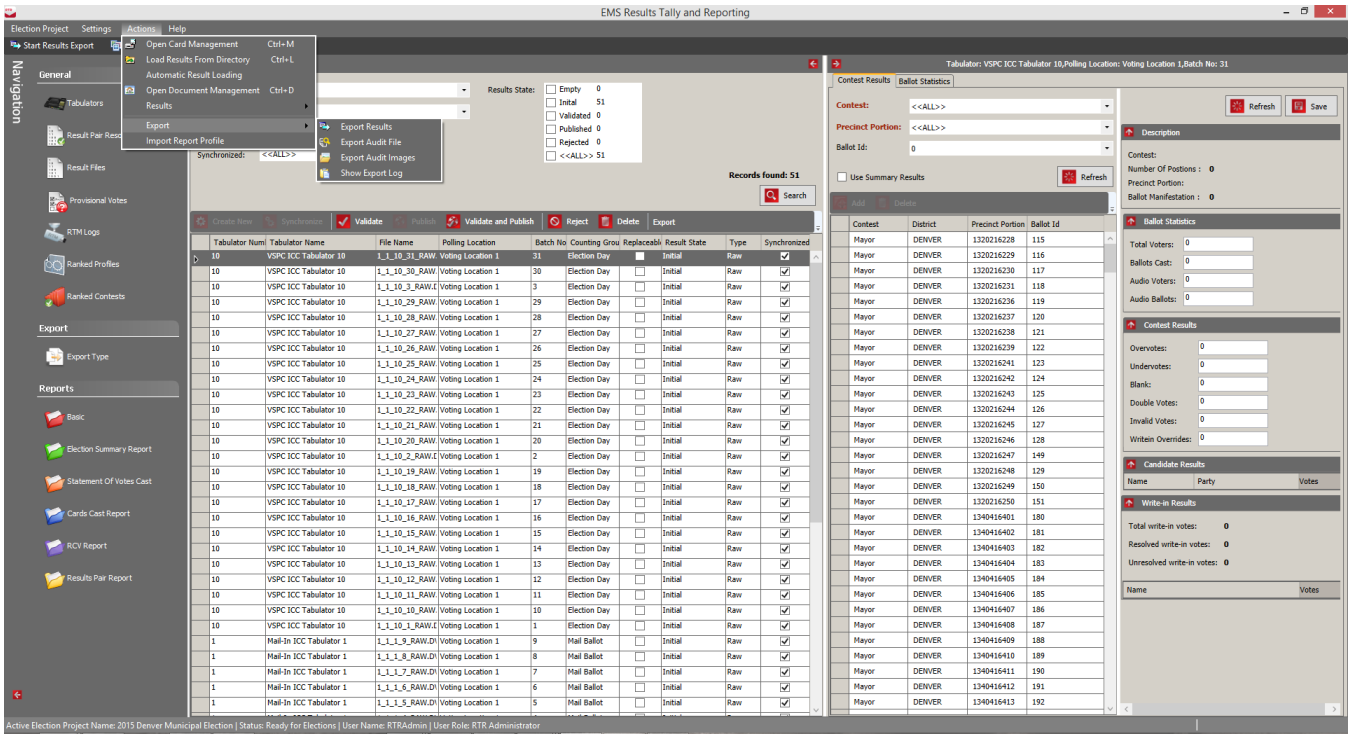


Figure 14.7: Export Results Audit File Screen

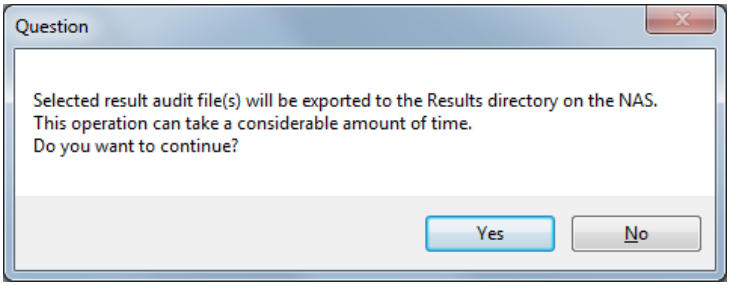


Figure 14.8: Question Screen - Confirmation for the Audit Export

9. In the *Question* message box, click **Yes** to confirm the action.

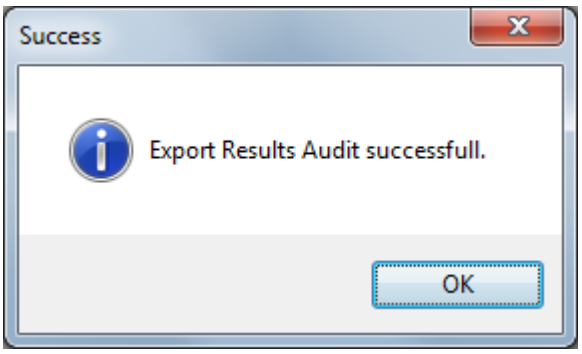


Figure 14.9: sUCCESS sCREEN - Successful Export Audit File

10. Once exporting is complete, the Success screen appears.

11. To open **Document Management**, go to the Main Menu, click **Actions**, and click the **Open Document Management** option.

12. The**Document Management** screen opens.

13. Select EMS NAS from the **Target** combo box and double-click on the **Results** directory to open it.

14. In the **Results** directory, navigate to the individual batch/result file directory to locate the .txt file (Results Audit File).

15. Select the audit file and click **Copy** to copy it to the local directory.

16. Navigate to the local directory where **the Results Audit File** has been copied, and open the file. The **Result Audit File** opens in **Notepad** as shown in Figure 14.10.

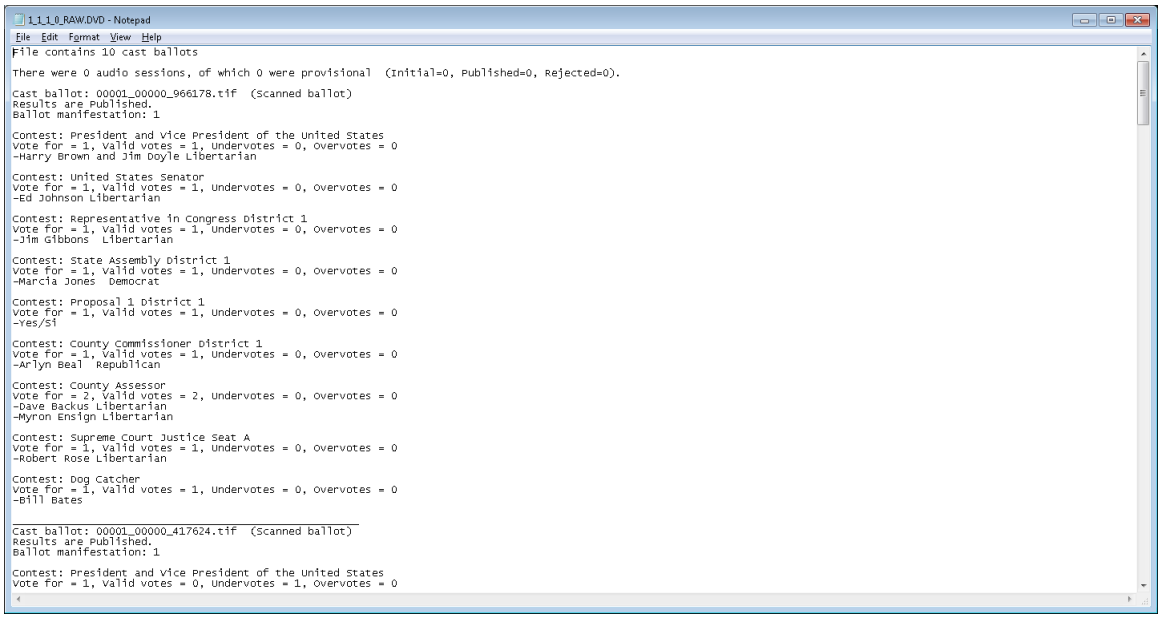


Figure 14.10: The Result Audit File opened in Notepad Screen

14.3 Exporting Audit Images

The **Export audit images** functionality will go through each scanned ballot image that was extracted previously from the tabulators and will categorize each image and export them into separate subfolders per category. For each export a separate subfolder will be created.

The export audit images screen either applies to all result files or to the currently selected result file.

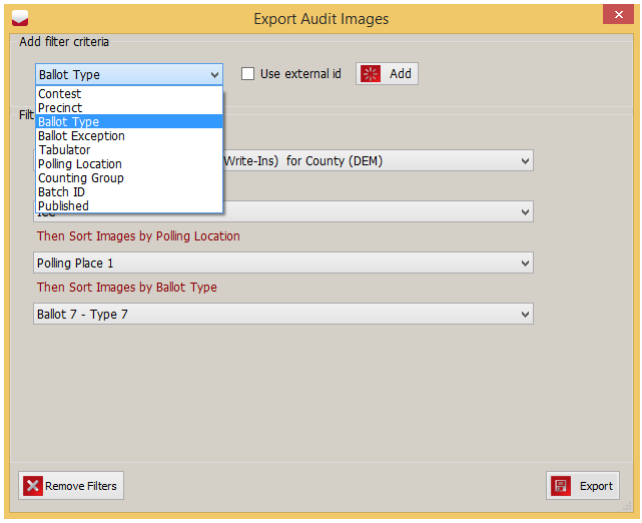


Figure 14.11: Export Audit Images Screen

The user can define which images to export and how they should be exported by adding and selecting filter criteria. The following lists the different filter criteria, some of which allow sub selection:

- **Contest**: adding this filter criterion splits images per contest in separate subdirectories prefixed with "Contest_"and followed by contest name. The filter allows the user to select a specific contest, resulting in an export where only images for ballots containing that contest are included.
- **Precinct**: adding this filter criterion splits images per precinct in separate subdirectories prefixed with "Precinct_" followed by precinct name. The filter allows the user to select a specific precinct, resulting in an export where only images for ballots cast in that precinct are included.
- **Ballot Type**: adding this filter criterion splits images per Ballot Type in separate subdirectories prefixed with "BT" and followed by the name of the Ballot Type. The filter allows the user to select a specific Ballot Type, resulting in an export where only the images of ballots that belong to the specified Ballot Type are included.
- **Ballot Exception**: adding this filter criterion splits images per ballot exception in separate subdirectories prefixed with "BallotException_" followed by each of the following categories:
  - **Blank Ballot**: no marks were detected for any of the contests.
  - **Blank**: no marks were detected for the current contest, or if no contest criterion was added, no marks were detected for at least one contest.
  - **UndervotedNotBlank**: the current contest was undervoted, but not blank, or if no contest criterion was added, undervoted contest detected was not blank.
  - **Regular**: current contest was marked equal to the vote for, or if no contest criterion was added, all contests were marked equal to their vote for.

– **Writein**: current contest had one of the write-in positions marked, or if no contest criterion was added, a contest had one of their write-in positions marked.
– **Overvoted**: current contest was overvoted, or if not contest criterion was added, a contest was overvoted.

- **Tabulator**: adding this filter criterion splits images per tabulator in separate subdirectories prefixed with "Tabulator_" and followed by tabulator name. The filter allows the user to select a specific tabulator, resulting in an export where only images of ballots cast in that tabulator are included.
- **Polling Location**: adding this filter criterion splits images per polling location in separate subdirectories prefixed with "PollingLocation_" and followed by polling location name. The filter allows the user to select a specific polling location, resulting in an export where only images of ballots cast at that polling location are included.
- **Counting Group**: adding this filter criterion splits images per counting group in separate subdirectories prefixed with "CountingGroup_", followed by the counting group name. The filter allows the user to select a specific counting group, resulting in an export where only images of ballots cast in that counting group are included.
- **Batch ID**: adding this filter criterion splits images per batch in separate subdirectories prefixed with "BatchId_", followed by the batch id.
- **Published**: adding this filter criterion separates images depending on if an image has been published. The subdirectories will be prefixed with "Published_" followed by either "notpublished" or "published".

The user can add each filter criterion once. The order in which they are added determines the folder structure that is created on export. Once the export is started using the Export button the system will create an "AuditImages" directory in the project's "Results" subfolder. Within that directory a subfolder named "Audit" is created named followed by a timestamp (for example: Audit2013_12_17_13_58_00). Within that subfolder a hierarchy of subfolders are created matching the order of the filter criteria added by the user. The user can clear all filter criteria by pressing the **Remove Filter** button.

14.4 RTM Logs

RTR has exposed services through which remote clients can communicate with server and transfer result files (if proper protocol is implemented). These client activities can be tracked in RTR RTM Logs view control.

1. Click **Search**.
2. Remote Clients are listed.

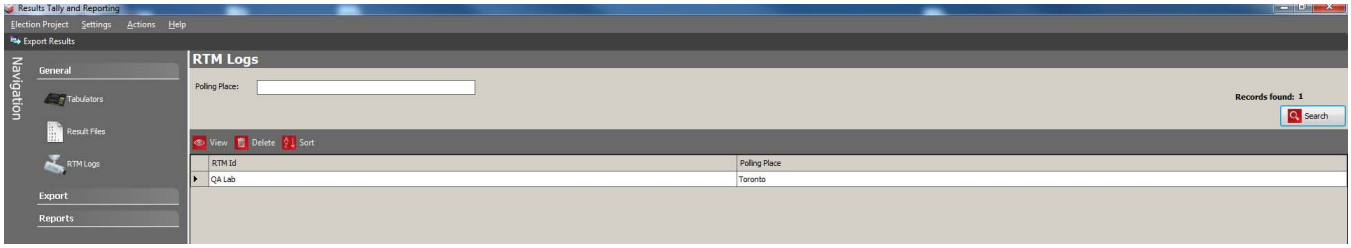


Figure 14.12: RTM Logs - Main Screen

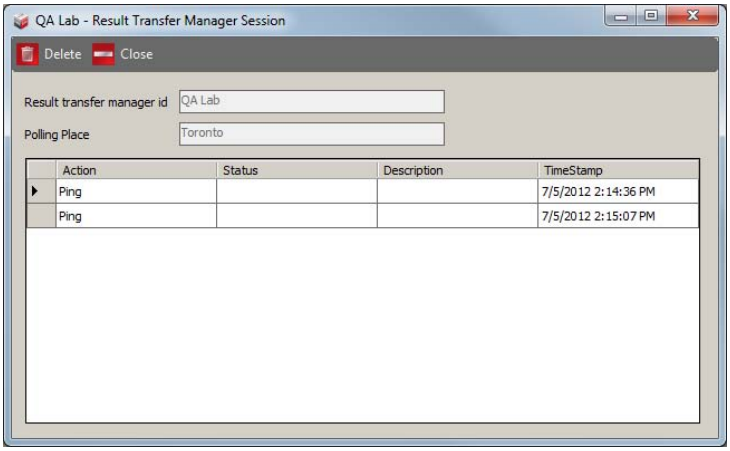


Figure 14.13: Result Transfer Manager Session Screen

3. Double-click on the **Remote Client**,and **Result Manager Transfer Session** screen appears.
4. There are **Result Transfer Manager Id** field and **Polling Place** field.

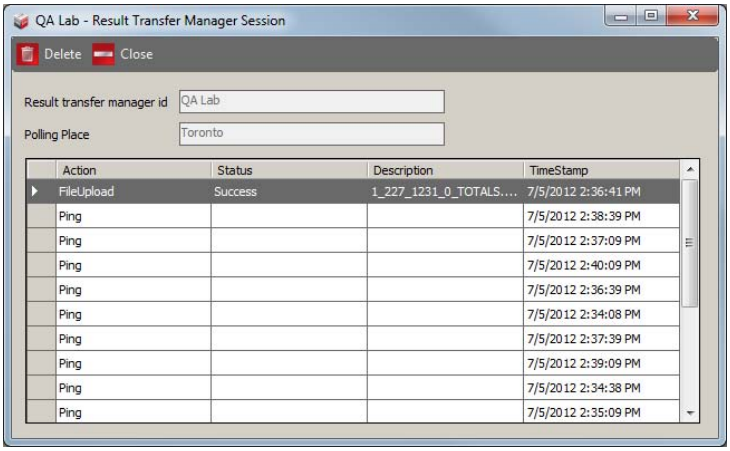


Figure 14.14: Result File Successfully Uploaded Screen

5. Different actions in this screen can be monitored. The **Ping** action ensures that remote client is accessible. Logs also display the status of uploaded files.

14.5 Obtain User‘s Audit Log

An Audit Report of user activity can be produced in the EMS EED application. For more details, see the *Democracy Suite® EMS Election Event Designer User Guide* or Help.

Chapter 15

Reporting

The EMS Results Tally & Reporting application integrates several election results reports. Additional reports can be defined using XSLT transformations.

The report tool is integrated within the EMS Results Tally & Reporting client application and contains XSLT (XSL transformations). If using EMS Express Configuration, this tool allows the report to be exported as a PDF, Excel, or Word file. If using EMS Standard Enterprise Configurations, this tool allows the report to be exported as a PDF, Excel, Word, XML file with Report data, CSV (Comma delimited), MHTML (web archive), or TIFF.

All reports contain the Election Project and Report Name, the Report Creation Date, and a Note.

NOTE: *Report names are determined by the localization settings. For example, generic name* ***Report per Polling Subdivision*** *is replaced with* ***Results per Precinct*** *or* ***Result Per ED****. The end-user the has the EMS Results Tally & Reporting interface tailored to fit their election terminology.*

Tasks covered in this section:

- **Basic Report**
- **Election Summary Report**
- **Statement of Votes Cast**
- **Card Cast Report**
- **Result Pair Report**
- **Conditional Voting Statistics Report**
- **Previewing and Printing Reports**
- **Generating Election Summary, Statement of Votes Cast and Cards Cast Reports**

15.1 Report Group - Basic

The basic reports contain a set of filtering parameters. If you select a value from the filtering options, a report is created for these exact parameters.

- **Results per Precinct**: This report presents the overall number of votes received per precinct as well as the number of votes received for each choice per Precinct.

  1. To create the **Results per Precinct** report, expand the **Reports** menu and click on the **Basic** option in the **Activities Navigation Panel**.
  2. *The Report Group Basic* context sensitive screen appears.
     NOTE: *Some options are enabled and other are not.*
     - **Canvass** and **Provisional or Challenged Status** reports do not have any filtering options.
     - **Contest Overview Data and Results per Precinct** have all options enabled. The filtering options are: **Counting Group**, **Tabulator**, **Polling Location**, **Contest**, **Subdivision Type**, **Parent Subdivision** and **Subdivision**.
  3. Next, select the **Report Name** and the **Transformation Name**, and click **Create Report**.
  4. The progress bar shows the progress of report creation.
  5. To convert an existing report created without any transformations (i.e. it is in HTML format) into an Excel file, select the report from the list, choose the **Report Name** and the **Transformation Name**,and click **Apply**.
  6. The transformed report opens in the default viewer.
  7. To open created reports, execute the search function.
  8. Double-click on the desired report from the list, or select the report in the list and click **Open**.
  9. To save the report on your local drive, select the report from the list and click **Save**.
  10. Navigate to the folder where you want to save the report.
  11. Click **Open**.

- **Batches Containing Precincts**: This report presents presents a list of precincts, and for each precinct in the list, displays all the result batches that contain results for that precinct. There are no filter options - the user can only specify the format of the report (Excel or HTML), and adjust the custom title of the report.

- **The Contest Overview Data**: This report presents the subdivision name and number of closed precincts (out of the total number of precincts in the project), the number of candidate positions (vote for number), the total number of cast ballots, and the number of undervoted and overvoted ballots. The report also specifies if a contest is acclaimed or disabled. In addition, the report presents the number of votes for each candidate, including a political party breakdown of these votes.

- **Canvass**: This report represents the turnout number. It lists the number of ballots cast, the total number of eligible voters, and the number of electors that voted per precinct with a breakdown of the counting and elector groups.

- **Provisional or Challenged status**: This report presents Tabulator Id, Batch Id, Record Id, and Result State.

- **Locate Scanned Ballots**: This report presents located scanned ballots.

- **Number of Write in on Ballot**: This report presents location name, location number, tabulator, and write-in number.
- **Registration and Turnout**: This report presents reported and not reported precincts, registration, ballot cast and turnout.
- **Contests on Margin**: This report lists the contest where the difference between the first and the chosen candidate next below it is less than or equal to a given margin of votes.
- **Tabulator Status**: This report presents tabulator id, name, load status, and total ballots cast.

NOTE: *All created reports are stored on the* ***EMS NAS*** *Server. To open and preview a report, use* ***Document Management*** *repository.*

Reports are saved under the **Results/Reports** folder and stored in the **Filtered** sub-folder.

15.1.1 Previewing and Printing Basic Reports

1. Expand the **Reports** section and click on the **Basic** option in the **Activities Navigation Panel**.
2. *The Report Group Basic context* sensitive screen appears.
3. Execute the search function to list all available reports.
4. Right-click on the report from the list. The context menu with **Print** and **Print Preview** options appears.
5. Click on **Print Preview** to preview the printed report.
6. The *Choose Columns* screen is displayed.
7. Select the desired option(s) and click **Continue**.
8. The *Print* screen appears. It contains common Windows printing options.
9. Click **Print**.
10. The *Print Preview* screen appears.
11. Click the magnifying glass to zoom in. You can control the layout of the report (determine if you want it printed on one, two, three or six pages) by selecting one, two, three, or six pages.
12. Click **Print** (printer image) to print the report. If you have a printer connected, the report prints.
13. Click **Close** to close the report screen.

15.2 Election Summary Report

The **Election Summary Report** displays election results by race, and is summarized across the jurisdiction. The information on these reports include the number of ballots cast, and the number of undervotes, overvotes, blank votes, and double votes.

The following are user-controlled parameters that the application uses to generate the report:

Parameters

- Report Title
  - The title can be multi-line.
  - The user can indicate if they wish to have the Standard Title displayed.
  - The user can indicate if they wish to have the report filters displayed.
- The user is able to select one or more of the following Contest Statistics for inclusion in the report:
  - Times Cast
  - Undervotes
  - Overvotes
  - Combine Overvotes and Undervotes as "Blanks"
  - Double votes
  - Total votes
  - Counting Group Totals Only
  - Writein Overrides
  - Vote For
  - X of Y
- Candidate Statistics:
  - Party affiliation
  - If candidates are cross-endorsed, the user can break down results per party affiliation by leaving the item unchecked.
  - Highlight Winners
  - The user can show remaining Unresolved Write-in row or to hide that row
  - The user can choose to count unresolved write-ins as undervotes
  - The user can choose how percentages are calculated:
    - No percentages
    - Divided by Votes Cast
    - Divided by Ballots Cast
  - The user can choose how Write-Ins are represented:
    - No Write-ins
    - Combine - show single Write-In
    - Split - show individual Write-In positions in the contest

- Additional Sorting/Splits
  - The user can indicate if the results should be broken down or not. Results can be broken down by:
    - Tabulator - Results are grouped per tabulator
    - Batch - Results are grouped per batch
  - The user can choose how to sort candidates by the following criteria:
    - Global Order
    - Number Votes in descending order
- The Filters for Report
  - Filter for Contests - The user can choose to display all contests, or, by clicking the **filter** radio button, the user can select one or more contests to be displayed in the report, from the list provided on the form.
  - Filter for Districts or Precincts - The user can select to display the results by districts or by precincts. For either selection, the user can display all districts/precincts, or, by clicking the **filter** radio button, the user can display one or more districts/precincts in the report, from the list provided on the form.
  - Filter for Polling Location - From the combo box on the form, the user can filter the report results by polling location.
  - Filter for Tabulator - The user can choose to include results for all tabulators, or, by clicking the "filter" radio button, the user can select one or more tabulators to be included in the report, from the list provided on the form.
  - Filter for Counting Group - From the combo box on the form, the user can filter report results by counting groups.
- For Report Profiles, see section 15.7.

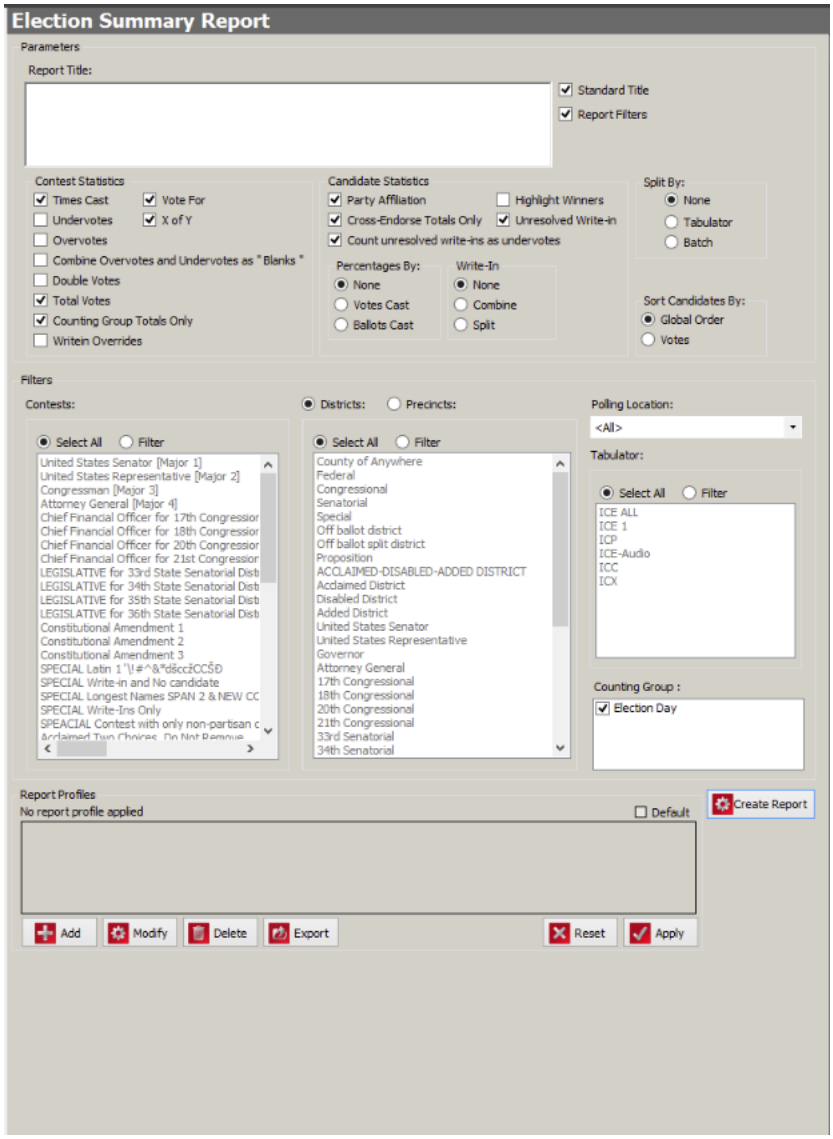
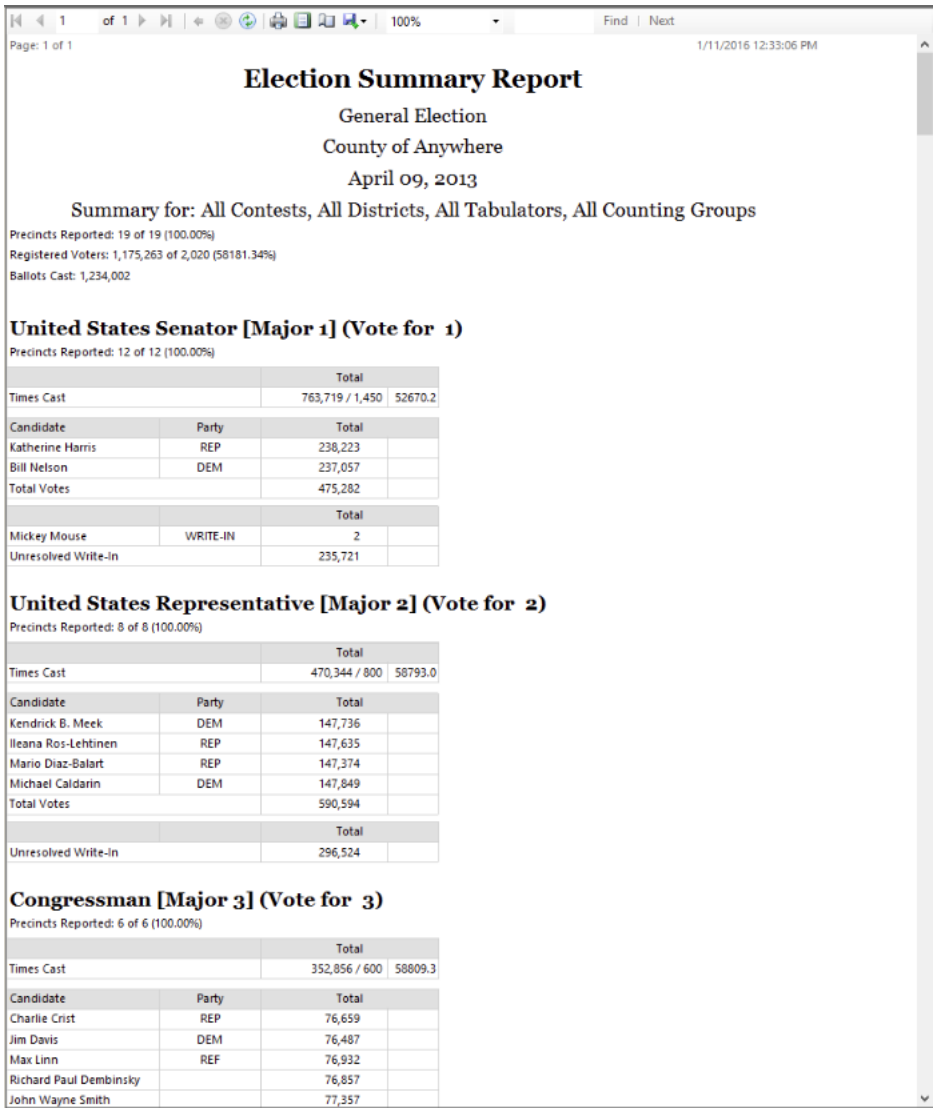


Figure 15.1: Election Summary Report Screen



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Election Summary Report

General Election

County of Anywhere

April 09, 2013

Summary for: All Contests, All Districts, All Tabulators, All Counting Groups

Precincts Reported: 19 of 19 (100.00%)

Registered Voters: 1,175,263 of 2,020 (58181.34%)

Ballots Cast: 1,234,002

United States Senator [Major 1] (Vote for 1)

Precincts Reported: 12 of 12 (100.00%)

		Total	
Times Cast		763,719 / 1,450	52670.2

Candidate	Party	Total	
Katherine Harris	REP	238,223	
Bill Nelson	DEM	237,057	
Total Votes		475,282	

		Total	
Mickey Mouse	WRITE-IN	2	
Unresolved Write-In		235,721	

United States Representative [Major 2] (Vote for 2)

Precincts Reported: 8 of 8 (100.00%)

		Total	
Times Cast		470,344 / 800	58793.0

Candidate	Party	Total	
Kendrick B. Meek	DEM	147,736	
Ileana Ros-Lehtinen	REP	147,635	
Mario Diaz-Balart	REP	147,374	
Michael Caldarin	DEM	147,849	
Total Votes		590,594	

		Total	
Unresolved Write-In		296,524	

Congressman [Major 3] (Vote for 3)

Precincts Reported: 6 of 6 (100.00%)

		Total	
Times Cast		352,856 / 600	58809.3

Candidate	Party	Total	
Charlie Crist	REP	76,659	
Jim Davis	DEM	76,487	
Max Linn	REF	76,932	
Richard Paul Dembinsky		76,857	
John Wayne Smith		77,357	

Figure 15.2: Election Summary Output Screen

15.3 Statement of Votes Cast

The **Statement of Votes Cast** report provides election officials with the detailed results of an election. The report is divided into two sections: the first section is an overview of the cards cast and eligible voters broken down per precinct, district, and district type. The second section shows the election results on a contest-by-contest basis and includes the number of ballots cast, the vote totals for each candidate, and the number of write-ins, undervotes, and overvotes.

The following are user-controlled parameters that the application uses for generating the report:

Parameters

- Report Title
  - The title can be multi-line
  - The user can indicate if they wish to have the Standard Title displayed
  - The user can indicate if they wish to have the report filters displayed
- The user is able to select one or more of the following Contest Statistics for inclusion in the report:
  - Times Cast
  - Undervotes
  - Overvotes
  - Double votes
  - Total votes
  - Counting Group Totals Only
  - Writein Overrides
  - Vote For
- Candidate Statistics:
  - The user can break down results per party affiliation in the case that candidates are cross-endorsed by leaving the item unchecked
  - The user can display remaining Unresolved Write-in column or to hide that column
  - The user can choose to count unresolved write-ins as undervotes.
  - The user can select how percentages are calculated:
    - No percentages
    - Divided by Votes Cast
    - Divided by Ballots Cast
  - The user can select how Write-Ins are represented:
    - No Write-ins
    - Combine - show single Write-In
    - Split - show individual Write-In positions in the contest
  - The user can choose how to split the data:
    - By Precinct
    - By District

    * Precinct Portion
    * By Ballot Type

- The Filters for Report
  - Filter for Contests - The user can choose to display all contests, or, by clicking the **filter** radio button, the user can select one or more contests to be displayed in the report from the list provided on the form. **Note**: *This filter does not affect the first report section, if the user wishes to narrow the first section of the report the Filter for Districts or Precincts must be used.*
  - Filter for Districts or Precincts - The user can select if they wish to display the results by districts or by precincts. For either selection, the user can display all districts/precincts, or, by clicking the **Filter** radio button, the user can display one or more districts/precincts in the report from the list provided on the form.
  - Filter for Polling Location - From the combo box on the form, the user can filter the report results by polling location.
  - Filter for Tabulator - In the combo box on the form, the user can filter the report results by tabulator. the form by which to filter results in the report.
  - Filter for Counting Group - From the combo box on the form, the user can filter report results by counting groups.
  - Filter for District Type - In the combo box on the form, the user can filter the report results by district.
- For Report Profiles, see section 15.7.

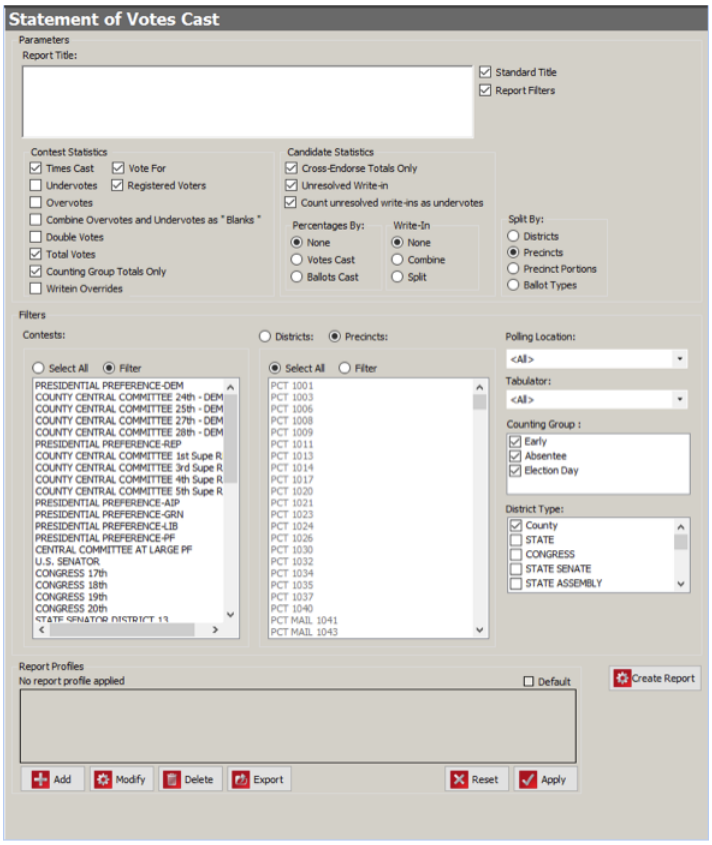
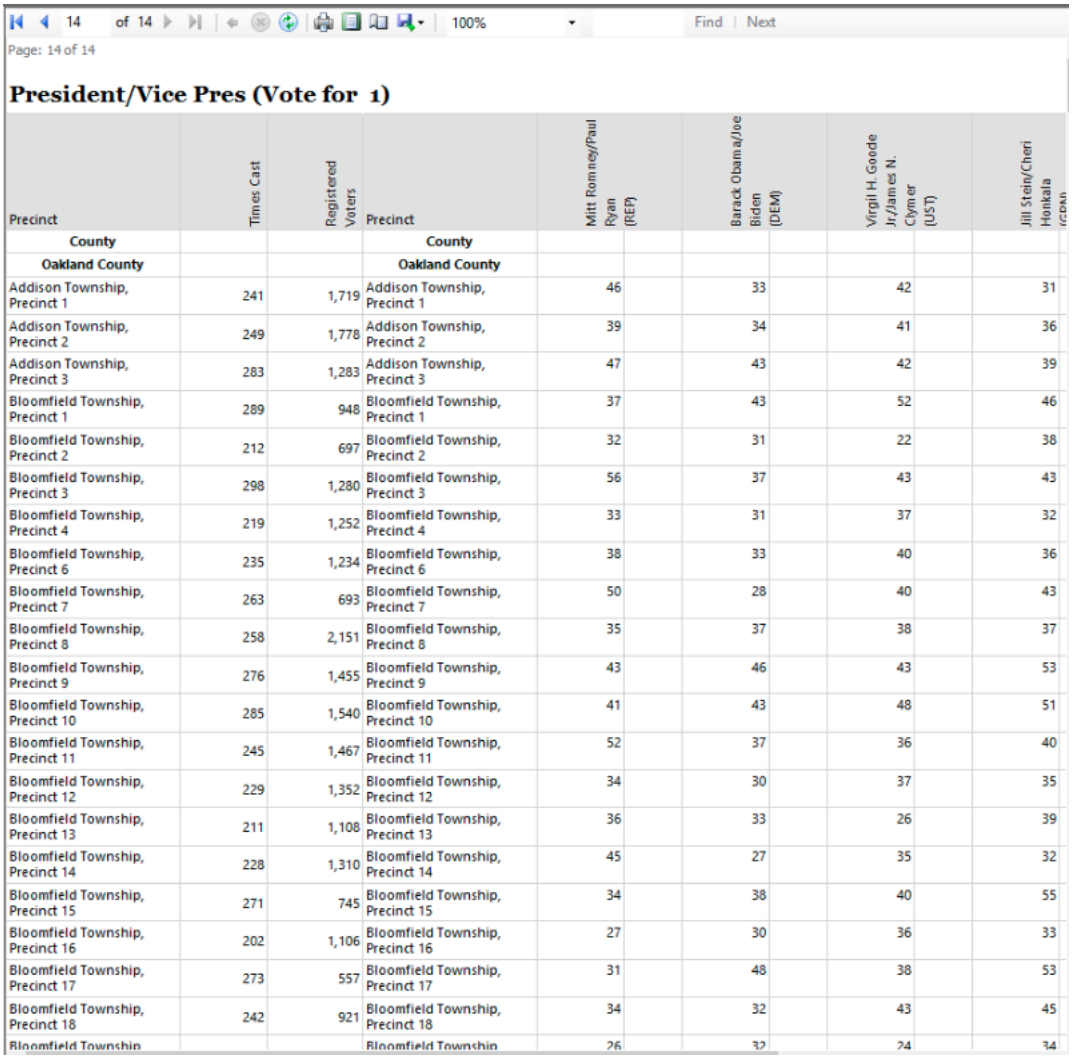


Figure 15.3: Statement of Votes Cast Report Screen



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President/Vice Pres (Vote for 1)

Precinct	Times Cast	Registered Voters	Precinct	Mitt Romney/Paul Ryan (REP)	Barack Obama/Joe Biden (DEM)	Virgil H. Goode Jr/James N. Clymer (UST)	Jill Stein/Cheri Honkala (GRN)
County			**County**				
Oakland County			**Oakland County**				
Addison Township, Precinct 1	241	1,719	Addison Township, Precinct 1	46	33	42	31
Addison Township, Precinct 2	249	1,778	Addison Township, Precinct 2	39	34	41	36
Addison Township, Precinct 3	283	1,283	Addison Township, Precinct 3	47	43	42	39
Bloomfield Township, Precinct 1	289	948	Bloomfield Township, Precinct 1	37	43	52	46
Bloomfield Township, Precinct 2	212	697	Bloomfield Township, Precinct 2	32	31	22	38
Bloomfield Township, Precinct 3	298	1,280	Bloomfield Township, Precinct 3	56	37	43	43
Bloomfield Township, Precinct 4	219	1,252	Bloomfield Township, Precinct 4	33	31	37	32
Bloomfield Township, Precinct 6	235	1,234	Bloomfield Township, Precinct 6	38	33	40	36
Bloomfield Township, Precinct 7	263	693	Bloomfield Township, Precinct 7	50	28	40	43
Bloomfield Township, Precinct 8	258	2,151	Bloomfield Township, Precinct 8	35	37	38	37
Bloomfield Township, Precinct 9	276	1,455	Bloomfield Township, Precinct 9	43	46	43	53
Bloomfield Township, Precinct 10	285	1,540	Bloomfield Township, Precinct 10	41	43	48	51
Bloomfield Township, Precinct 11	245	1,467	Bloomfield Township, Precinct 11	52	37	36	40
Bloomfield Township, Precinct 12	229	1,352	Bloomfield Township, Precinct 12	34	30	37	35
Bloomfield Township, Precinct 13	211	1,108	Bloomfield Township, Precinct 13	36	33	26	39
Bloomfield Township, Precinct 14	228	1,310	Bloomfield Township, Precinct 14	45	27	35	32
Bloomfield Township, Precinct 15	271	745	Bloomfield Township, Precinct 15	34	38	40	55
Bloomfield Township, Precinct 16	202	1,106	Bloomfield Township, Precinct 16	27	30	36	33
Bloomfield Township, Precinct 17	273	557	Bloomfield Township, Precinct 17	31	48	38	53
Bloomfield Township, Precinct 18	242	921	Bloomfield Township, Precinct 18	34	32	43	45
Bloomfield Township			Bloomfield Township	26	32	24	34

Figure 15.4: Statement of Votes Cast Output Screen

15.4 Card Cast Report

The **Cards Cast Report** displays the number of ballots cast in the election by both report precinct and voter group. The report also contains information regarding registered voters and voter turnout. Information on these reports include the vote center ID, vote center export ID, vote center label, report precinct ID, report precinct export ID, report precinct label, card number, and the card count.

The following are user-controlled parameters that the application uses for generating the report:

Parameters

- Report Title
  - The title can be multi-line
  - The user can indicate if they wish to have the Standard Title displayed
  - The user can indicate if they wish to have the report filters displayed
- Statistics
  - The user can indicate if they wish to have Counting Group Totals Only displayed.
  - The user can indicate how they wish to split the data:
    - By Precinct
    - By District
    - Precinct Portion
- The Filters for Report
  - Filter for Districts or Precincts - The user can select if they wish to display the results by districts or by precincts. For either selection, the user can choose to display all districts/precincts, or, by clicking the **filter** radio button, the user can choose one or more districts/precincts to be displayed in the report from the list provided on the form.
  - Filter for Polling Location - The user can specify a polling location from the combo box on the form by which to filter results in the report.
  - Filter for Tabulator - The user can specify a tabulator from the combo box list on the form by which to filter results in the report.
  - Filter for Counting Group - The user can select one or more (or all) counting groups from a list provided on the form by which to filter results in the report.
  - Filter for District Type - The user can select one or more (or all) district types from a list provided on the form by which to filter results in the report.
- For Report Profiles see section 15.7.

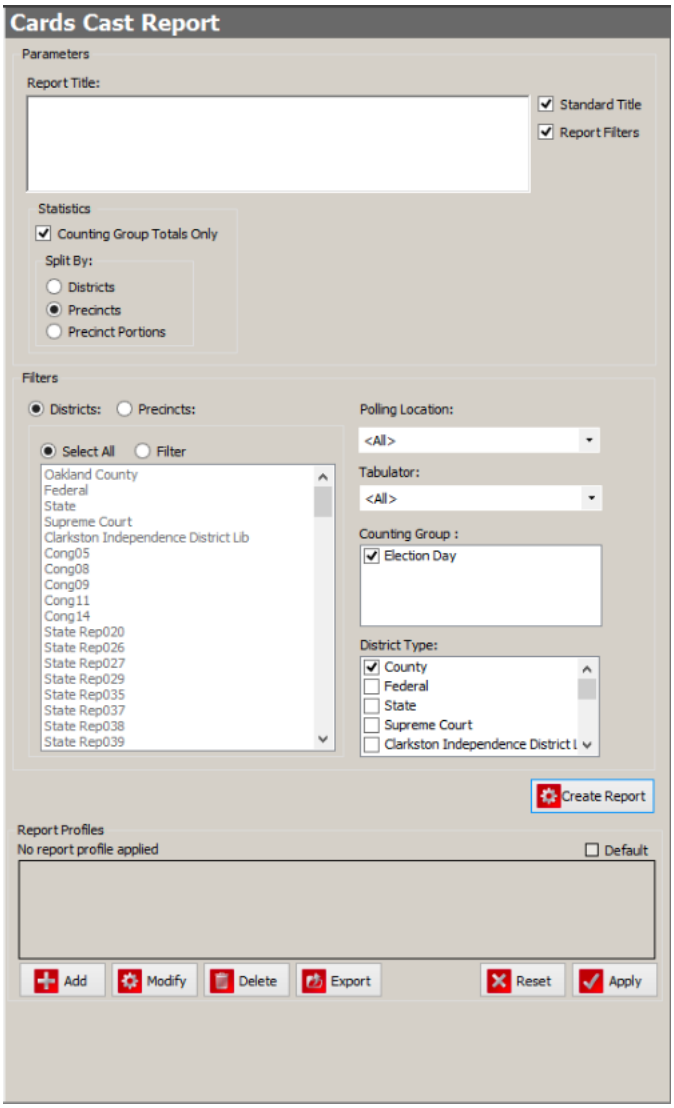
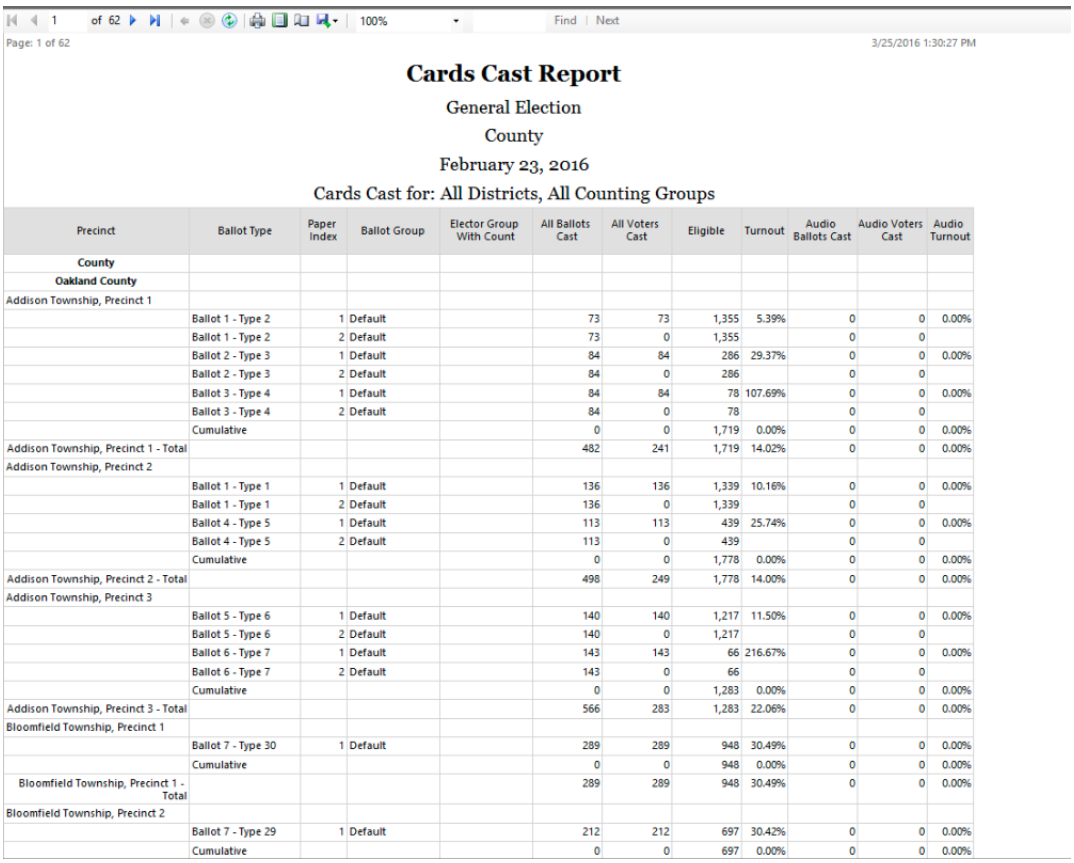


Figure 15.5: Card Cast Report Screen



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Cards Cast Report

General Election

County

February 23, 2016

Cards Cast for: All Districts, All Counting Groups

Precinct	Ballot Type	Paper Index	Ballot Group	Elector Group With Count	All Ballots Cast	All Voters Cast	Eligible	Turnout	Audio Ballots Cast	Audio Voters Cast	Audio Turnout
County											
Oakland County											
Addison Township, Precinct 1											
	Ballot 1 - Type 2	1	Default		73	73	1,355	5.39%	0	0	0.00%
	Ballot 1 - Type 2	2	Default		73	0	1,355		0	0	
	Ballot 2 - Type 3	1	Default		84	84	286	29.37%	0	0	0.00%
	Ballot 2 - Type 3	2	Default		84	0	286		0	0	
	Ballot 3 - Type 4	1	Default		84	84	78	107.69%	0	0	0.00%
	Ballot 3 - Type 4	2	Default		84	0	78		0	0	
	Cumulative				0	0	1,719	0.00%	0	0	0.00%
Addison Township, Precinct 1 - Total					482	241	1,719	14.02%	0	0	0.00%
Addison Township, Precinct 2											
	Ballot 1 - Type 1	1	Default		136	136	1,339	10.16%	0	0	0.00%
	Ballot 1 - Type 1	2	Default		136	0	1,339		0	0	
	Ballot 4 - Type 5	1	Default		113	113	439	25.74%	0	0	0.00%
	Ballot 4 - Type 5	2	Default		113	0	439		0	0	
	Cumulative				0	0	1,778	0.00%	0	0	0.00%
Addison Township, Precinct 2 - Total					498	249	1,778	14.00%	0	0	0.00%
Addison Township, Precinct 3											
	Ballot 5 - Type 6	1	Default		140	140	1,217	11.50%	0	0	0.00%
	Ballot 5 - Type 6	2	Default		140	0	1,217		0	0	
	Ballot 6 - Type 7	1	Default		143	143	66	216.67%	0	0	0.00%
	Ballot 6 - Type 7	2	Default		143	0	66		0	0	
	Cumulative				0	0	1,283	0.00%	0	0	0.00%
Addison Township, Precinct 3 - Total					566	283	1,283	22.06%	0	0	0.00%
Bloomfield Township, Precinct 1											
	Ballot 7 - Type 30	1	Default		289	289	948	30.49%	0	0	0.00%
	Cumulative				0	0	948	0.00%	0	0	0.00%
Bloomfield Township, Precinct 1 - Total					289	289	948	30.49%	0	0	0.00%
Bloomfield Township, Precinct 2											
	Ballot 7 - Type 29	1	Default		212	212	697	30.42%	0	0	0.00%
	Cumulative				0	0	697	0.00%	0	0	0.00%

Figure 15.6: Card Cast Report Screen

15.5 Results Pair Report

Results Pair Report allows the user to perform comparison of contests and choices loaded from manually entered and machine results for the same tabulator respectively. When the manually entered and machine results do not match, they are marked with red color. In addition to that, an "**x**" appears in the **Difference** column for such mismatched results (See Figure 15.7).

The following are user-controlled parameters that the application uses to generate the report:

Parameters

- Report Title
  - The title can be multi-line.
  - The user can indicate if they wish to have the Standard Title displayed.
  - The user can indicate if they wish to have the report filters displayed.
- Two additional filtering options are added:
  1. Show only mismatched pairs - this option will list only pairs of manually entered and machine results which do not match
  2. Show only mismatched contest - this option will list only contests where a difference in votes exists between the manually entered and machine results. Selecting this check box will automatically select **Show only mismatched pairs** check box.
- The Standard Report Filters:
  - Filter for Contests - The user can choose to display all contests, or, by clicking the **filter** radio button, the user can select one or more contests to be displayed in the report, from the list provided on the form.
  - Filter for Districts or Precincts - The user can select to display the results by districts or by precincts. For either selection, the user can display all districts/precincts, or, by clicking the **filter** radio button, the user can display one or more districts/precincts in the report, from the list provided on the form.
  - Filter for Polling Location - the user can filter the report results by polling location from the combo box.
  - Filter for Tabulator - In the combo box on the form, the user can filter the report results by tabulator. The form by which to filter results in the report.
- For Report Profiles see section 15.7.

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Results Pair Report

General Election

County

January 12, 2015

Results Pair for: All Contests, All Districts

Voting Location	Tabulator	Manual Result	Manual State	Machine Result	Machine State	Pair Status	Contest	Candidate	Party	Manual Results	Machine Results	Difference
Poll 1	ICP 18 number	1_1_20_1000_MANUAL.DVD	Initial	1_1_20_0_DETAIL.DVD	Initial	Pending	President and Vice President - contest 2 markers	Rochelle Pierce and Kerry Porter	Democratic	541	541	
Poll 1	ICP 18 number	1_1_20_1000_MANUAL.DVD	Initial	1_1_20_0_DETAIL.DVD	Initial	Pending	President and Vice President - contest 2 markers	Warren Padilla and Salvador Sutton	Republican	511	511	
Poll 1	ICP 18 number	1_1_20_1000_MANUAL.DVD	Initial	1_1_20_0_DETAIL.DVD	Initial	Pending	President and Vice President - contest 2 markers	Willie Tyler and Gilbert Chapman	Green	522	523	x
Poll 1	ICP 18 number	1_1_20_1000_MANUAL.DVD	Initial	1_1_20_0_DETAIL.DVD	Initial	Pending	President and Vice President - contest 2 markers	Alvin Floyd and Alma Welch	Independent	519	518	x
Poll 1	ICP 18 number						President and Vice President - contest 2 markers	QW 1		0	0	
Poll 1	ICP 18 number						President and Vice President - contest 2 markers	QW 2		0	0	
Poll 1	ICP 18 number	1_1_20_1000_MANUAL.DVD	Initial	1_1_20_0_DETAIL.DVD	Initial	Pending	President and Vice President - contest 2 markers	Write-in		424	566	x

Figure 15.7: Result Pair Report Screen

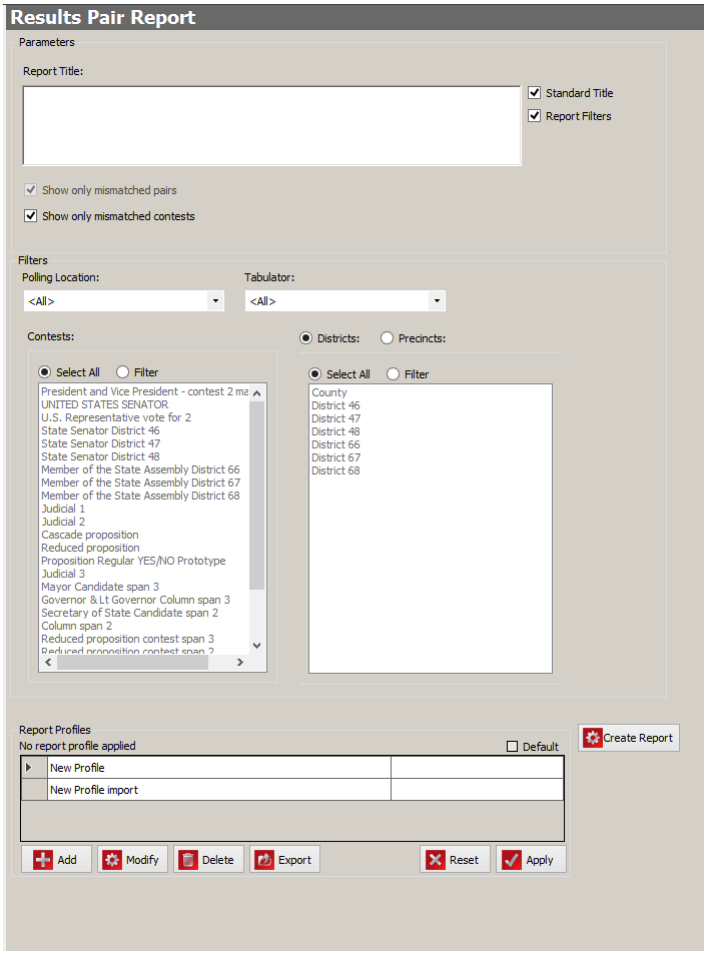

Figure 15.8: Result Pair Report Screen

15.6 Conditional Voting Statistics Report

The Conditional Voting Statistics Report allows the user to generate a basic set of statistics in the context of any conditional results in the election project. It provides information about the number of conditional sessions and their states and resolutions. Please note that the report will display the appropriate label depending on the mode in the project, i.e. Challenge or Provisional.

The following are user-controlled parameters that the application uses to generate the report:

- Report Title
  - The title can be multi-line
  - The user can indicate if they wish to have the Standard Title displayed.
  - The user can indicate if they wish to have the report filters displayed
- The user can indicate if they wish the result to be split by:
  - Precinct and Ballot Type
  - Precinct only
  - Ballot Type only
- For Report Profiles see section 15.7.

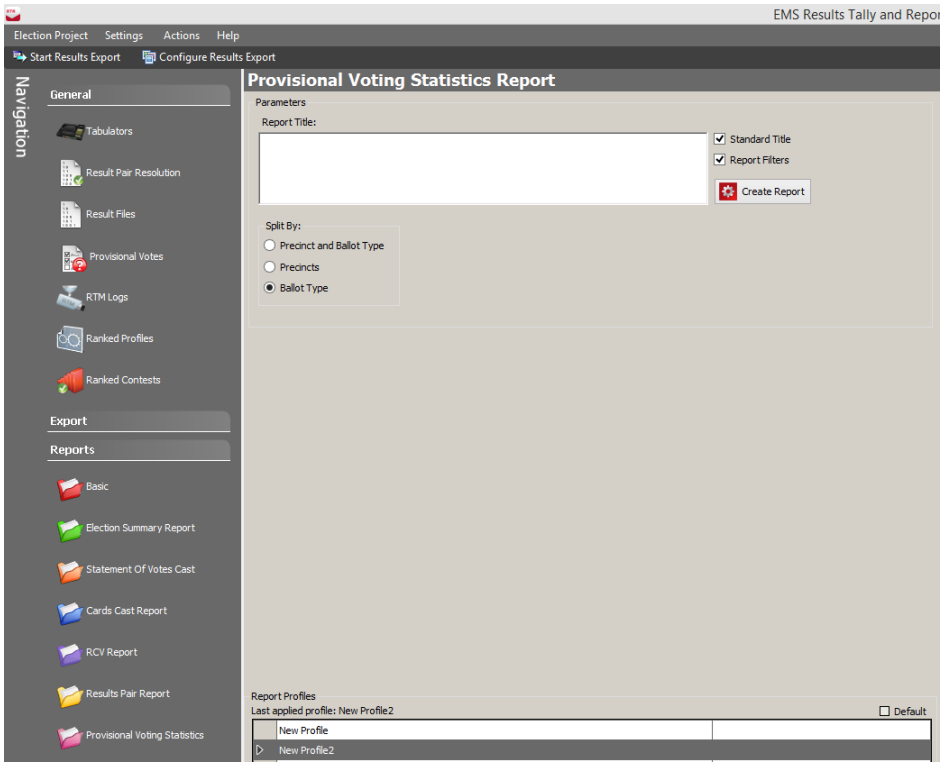

Figure 15.9: Conditional Voting Statistics Report Screen

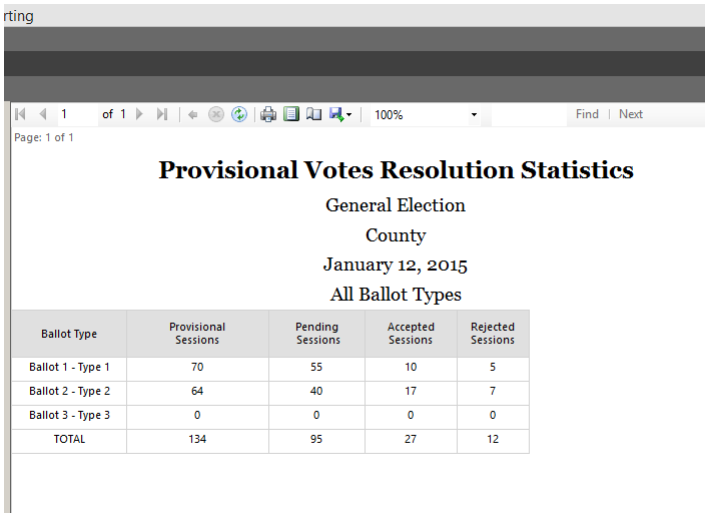

Figure 15.10: Conditional Voting Statistics Report Screen

15.7 Ability to Manage Reporting Profiles on Card Cast, Election Summary, and Statement of Votes Cast reports

This feature allows the user to define various filters for reports, store them, and reuse them later (especially throughout the election night). In combination with the "Import Report Profile" functionality, existing filters can be imported to other election projects. Profiles are applied to the Statement of Votes Cast, the Election Summary Report, and the Cards Cast Report. This section uses SOVC as example (the application of profiles is identical to other cases).

The profiles are managed by a separate control, which is part of each report.

Figure 15.11: Report Profiles Screen

Elements of control:

- *Title*: Report Profiles
- *Last applied profile* label: This label informs the user about the currently applied profile. It also indicates which profile will be affected by the *Modify* action.
- *Default check box*: This indicates a profile which has been designated the *default* profile. Toggling the control affects the state of the profile. In case no profile is selected, or multiple profiles are selected, the control is disabled.
- *Grid with list of available profiles for the selected report*: The grid presents a list of profiles for the current profile, identified by name. The list is refreshed and updated automatically after each user action and sorted by profile name. Double-clicking a profile applies the contained parameters to the current report (identical to the *Apply* action).
- *Add*: Takes current report parameters, and initiates the process of saving them to a new profile. The *Profile name* screen appears.

Maintenance buttons:

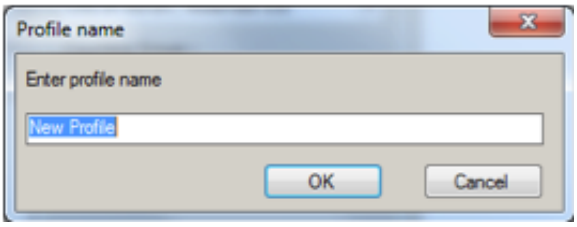

Figure 15.12: Profile Name Screen

- **Add**: Takes the current report parameters, and initiates the process of saving them to a new profile. The *Profile name* screen appears.
- If you enter a name and click **OK**, the system stores data to the database, and the newly created profile appears on the list of existing profiles. If you click **Cancel**, the operation will not be completed.

- *Modify*: This action updates the parameters of the selected profile(s) with the current states and values of the filters and selections on the report. In case no profiles are selected, **Modify** acts as the **Add** button.

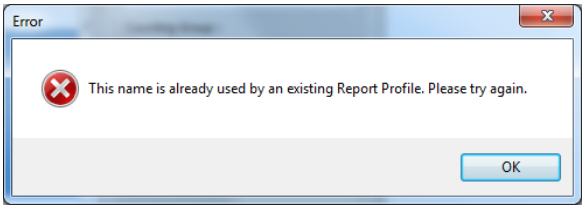

Figure 15.13: Error message Screen

- The name of the profile must be unique per report type. In case the entered name is not unique, an error message appears as seen in figure 15.13, and the operation is canceled.

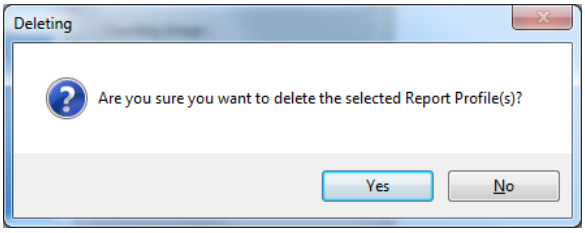

Figure 15.14: Deleting Screen

- **Delete**: This action removes all selected profiles from the database. If the user confirms the action, the selected profiles are permanently removed.

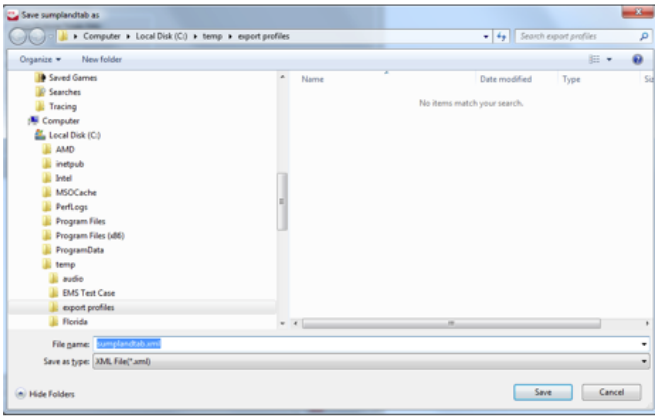

Figure 15.15: Save As Screen

- **Export**: This action saves the selected Report Profile(s) as separate XML file(s) that can be imported into another election project (See section 15.8 Import Report Profile). If a single profile is selected, a *Save As* screen appears.

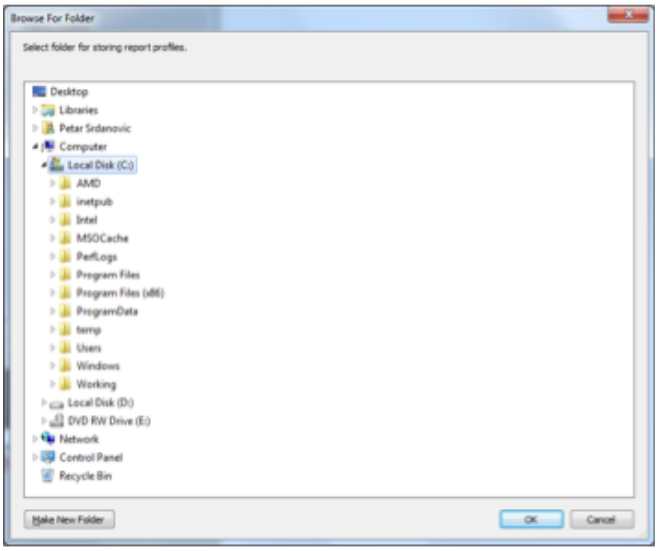

Figure 15.16: Browse for folder Screen

- In case multiple profiles are selected for export, the *Select Folder* form appears, and the profiles are saved with the names as defined in the list.

- **Reset**:This action resets all the filters and selections on the report control to the initial state.
- **Apply**: This action takes the data from the selected profile and applies it to the report filter parameters. In case more than one profile is selected, an error appears. The same action can be achieved by double-clicking the desired profile in the list.

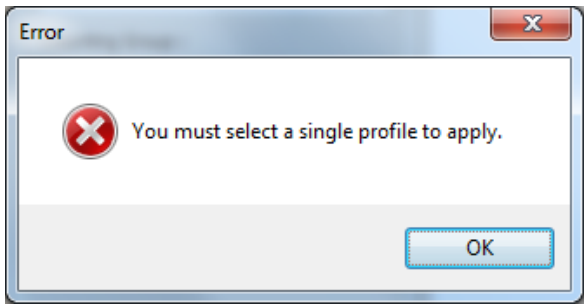

Figure 15.17: Error message Screen

15.8 Import Report Profile

To import Report Profile:

1. Expand the **Actions** item from the Main Menu and click on the **Import Report Profile** option.

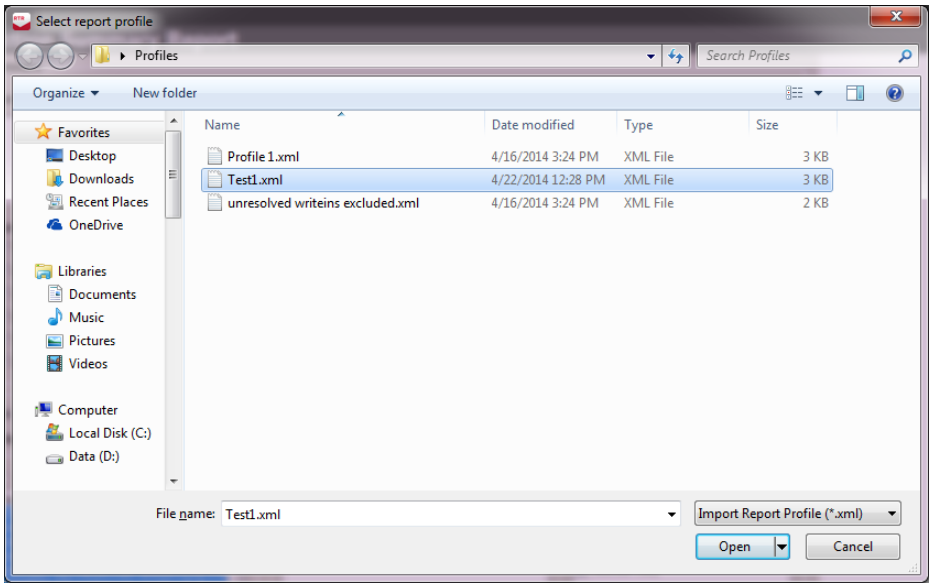

Figure 15.18: Select Report Profile Screen

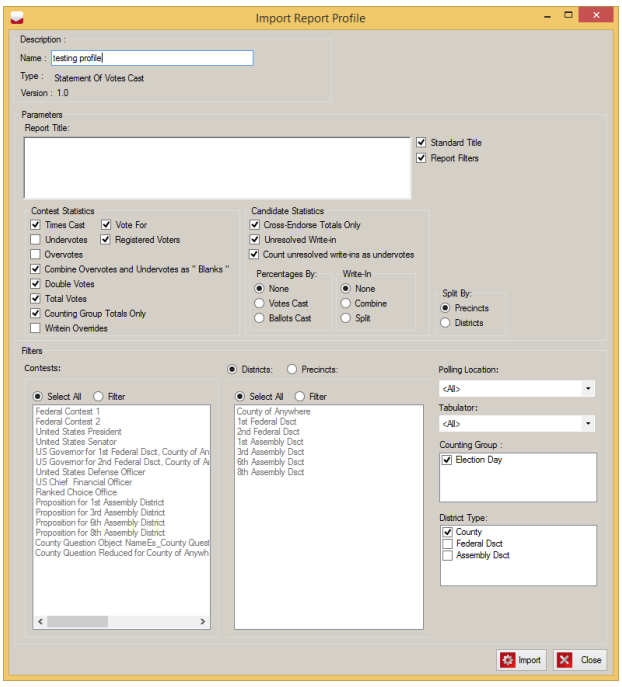

Figure 15.19: Import Report Profile Screen

2. The *Import Report Profile* screen appears. Before clicking **Import**, you can change parameters and filters in this verification status.
3. Click **Import**. Once the completed, the *Import Finished* screen appears.
4. Click **Close** to exit the *Import Report Profile* screen.

15.9 Generating Election Summary, Statement of Votes Cast and Cards Cast Reports

1. Expand the **Reports** section and click on the appropriate option in the **Activities Navigation Panel** depending on the type of report you wish to preview or print.
2. The screen containing the user interface for the chosen report appears.
3. Perform all the selections and filtering desired for generating the report.
4. Click **Create Report**.

Chapter 16

Operations Support

For any technical support issues related to the Dominion Democracy Suite system, please contact the Dominion Voting Systems helpline at 1-866-564-VOTE (8683) or contact our head office directly at:

Dominion Voting Systems

Email: `help@dominionvoting.com`

Website: `http://www.dominionvoting.com`

Appendices

Appendix A

System Settings

Trained technical personnel are responsible for installing and configuring hardware and prerequisite software for the EMS Data Center back-end and EMS Workstation components. Your system is pre-configured for full operation and use with this document. For comprehensiveness, this Chapter provides detailed instructions on how to define basic configurations of both the Result Tally & Reporting client application, and database settings.

A.0.1 EMS Access Control

The access control policy defines important aspects of the access control mechanism. The two main aspects are the business requirements for access control, which are defined by the jurisdiction within the access policy statement, and the access control rules, which should clearly state which rules are mandatory, optional, or conditional.

The Democracy Suite® EMS platform implements role-based user management for the provisioning of the access control mechanisms. Each user accessing the system using one of the two client applications (Election Event Designer or Results Tally & Reporting) is a member of one of the pre-defined or custom-made roles.

Each role contains its own set of permissions or actions under which users of that role operate.

The management of access control policies is integrated within the User Management activity of the Election Event Designer client application.

This activity is only available to users with administrative privileges. Mapping of users to pre-defined system roles, or to custom created roles, is dependent on the defined business access control policy which is specific to each jurisdiction that defines and manages election projects.

Users of pre-defined administrative roles can create custom-made roles in order to establish customized permissions for users.

A.0.2 EMS Election Project Access Controls

The Democracy Suite® EMS platform implements role-based user management for provisioning access control mechanisms on each election project. Each user accessing the system is the member of one of the

predefined or custom-made roles. Each role has its own set of permissions, or actions that users of that role are allowed to perform. Managing access control policies is integrated within the User Management activity of the EMS EED client application. This activity is permitted only for users with administrative privileges. Table A.1 shows user roles that are defined in the system:[1]

Role	Level	Configurability	Application
EMS EED Administrator	Administrative	System Default	EED
EMS EED Operator	Operator	System Default	EED
EMS EED Technical Advisor	Administrative	System Default	EED
EMS EED Languages Operator	Operator	System Default	EED
EMS EED Custom	Operator	Configurable	EED
EMS RTR Administrator	Administrative	System Default	RTR
EMS RTR Operator	Operator	System Default	RTR
EMS RTR Technical Advisor	Administrative	System Default	RTR
EMS RTR Auditing Operator	Operator	System Default	RTR
EMS RTR Custom	Operator	Configurable	RTR

Table A.1: Summary of EMS Roles

- **Democracy Suite® EMS EED Administrator**: An electoral officer role with a full set of supervisory permissions and rights in using the EMS EED application for a single election project. This role has an administrative set of rights in defining an election project domain entity with all of the associated domain sub-entities, implying a deep knowledge and understanding of the EMS system. Additionally, this role has permissions to create and configure all other users of the system for both EMS EED and RTR. This role also acts as the principal to the Dominion Voting technical and project management team. One or more users with this role can be defined within the system. However, the system is delivered, installed, and configured with only one EMS EED administrative user by default.
- **Democracy Suite® EMS EED Operator**: A member of the electoral office team, but with a limited set of permissions in using the EMS EED application. This role is defined for overseeing such time-consuming tasks as defining contests, candidates, creating ballot samples and running unofficial reports. One or more users of the EMS EED operator role can be defined within the system.
- **Democracy Suite® EMS EED Technical Advisor**: A member of the Dominion Voting technical team with a deep knowledge of every aspect of the EMS EED system. This role mediates between Dominion Voting the electoral office administrator.
- **Democracy Suite® EMS EED Languages Operator**: A special non-administrative role for operators who define different language translations within the system. This is primarily used for the translation of ballot elements and tabulator display messages.

[1] Note that the EMS election project access control mechanism functions with logic that, if a permission does not appear in the list of permissions, all users have permission to perform it. Be aware that all permissions for actions that could endanger the security of the EMS are included in the permission list.

- **Democracy Suite® EMS RTR Administrator**: An electoral officer role with a full set of supervisory permissions and rights in using the EMS RTR application. This role has a full set of rights in acquiring, validating, publishing, reporting and auditing election results. One or more users with this role can be defined within the system, but there are no users of this role created by default, which means that the EMS EED administrator has to create a user for this role.
- **Democracy Suite® EMS RTR Operator**: A member of the electoral office team, but with a limited set of permissions when using the EMS RTR application. Users of this role can acquire election results and create reports, but cannot validate, publish or audit election results.
- **Democracy Suite® EMS RTR Auditor**: A member of the electoral office team who has the permission to audit election results.
- **Democracy Suite® EMS RTR Technical Advisor**: A member of the Dominion Voting technical team with a deep knowledge of every aspect of the EMS RTR system. This role acts as a primary interface from Dominion Voting to the electoral office administrators.

In addition to aforementioned pre-defined roles, the system provides the option to define custom roles that contain desired sets of permissions. This activity is performed from the EMS EED client application and it is available only to users with administrative rights. The EMS roles and the associated users are all in the EMS client applications scope. In sum, these users do not have any direct access rights to the EMS Application and Database Server components except by using the EMS EED or EMS RTR client applications. These roles and users should not be mistaken for operating system roles or users, which are defined separately during the overall system installation and setup.

For each user requiring access to the EMS system, user accounts must be established. This action is performed by a user in the administrative role and should be a first step in configuring the system after the election project is created. The system does not impose any limits in the number of users that can be created within the system. When defining a new user, a set of security credentials is assigned. This set includes a unique user ID and case-sensitive password. This User ID is typed in by the administrative user creating a new user account, while the case-sensitive password is automatically created by the system, according to the role and the corresponding pre-defined and case-sensitive password strength policy (see Table A.2).

This approach is followed with the aim of achieving a satisfactory level of entropy of case-sensitive user passwords and to eliminate the possibility of dictionary attacks on the system. Created case-sensitive passwords are not stored within the EMS EED (nor RTR) client applications, but in a cryptographically protected format in the EMS Database (using one-way hash functions).

Password Strength	Length	Type	Character set
Weak	6	String	Lower and upper case letters
Default	8	String	Lower and upper case letter and digits
Strong	10	String	Lower and upper case letter, digits and special characters

Table A.2: The EMS Case-Sensitive Password Strength Profiles.

The system does not allow the deletion of user accounts. This constraint is imposed because of the integrity of the audit logs kept by the system. However, users have assigned account status flags of *initial*, *active*, *inactive*, *Locked*. Only the users with an *active* account status can use the system. When a user account becomes obsolete, it is not deleted, but its status is changed to *inactive*. After a user account has been created, the system creates a new user account with an *initial* status flag and produces a record statement that can be printed. *Locked* means it was active, but was disabled due to too many unsuccessful tries to log in.

Optionally, the jurisdiction can require that the user sign the password confidentiality statement. Upon signing the statement, the new user account can be activated (the user account status then changes from the *initial* to *active* state).

A.0.3 Define EMS Application Server Settings

NOTE: *Contact the technical support or system maintenance person (EMS system administrator) whenever you need to set/change the system parameters (i.e. enter the printer name, Cepstral program location, application, and/or database server name or IP address) in any of the EMS client applications.*

To change or define the EMS application server settings, perform the following steps:

1. Expand the **Administration** item in the main menu and click **EMS Application Server Settings**.
2. The **Network Settings** screen appears. See Section 6.1 for more information on which parameters need to be added when changing the **EMS Application Server Settings**.