

Statewide Voter Registration System Project

California Secretary of State

**III.3 – Acceptance Test Plan for Certification of EMS Data Integration and Compliance**

FINAL v1.4

October 16, 2015

**REVISION SUMMARY**

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**Document Approval**

Signatures below indicate approval of the attached document.

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# Introduction

The *Deliverable III.3, Acceptance Test Plan for Certification of EMS Data Integration and Compliance* (CETP) describes activities to test the integration of each Election Management System (EMS) with VoteCal as specified by *II.4 – VoteCal System EMS Integration and Data Exchange Specifications Document* (EMSIS) and *II.8 – VoteCal System Data Integration Plan* (DIP).

The EMSIS defines the methods and mechanisms for integrating an EMS with VoteCal. The DIP defines the process by which those EMSIS methods and mechanisms are utilized to perform the integration of an EMS and county data with VoteCal. The CETP certifies compliance with the methods and mechanisms of the EMSIS and the data used in those methods and mechanisms. Therefore, by using the processes defined in the DIP to perform the integration and testing, certification of the DIP processes is covered under the EMSIS compliance testing umbrella.

## Purpose

The primary purpose of the CETP is to describe the strategic plan for certifying the compliance of data integration services for each EMS and county data with VoteCal including preparing and executing testing, logging, and tracking defects found during the testing. The CETP is a companion document to the *III.2 – VoteCal System Test Plan* (STP). The STP addresses hardware and software testing, including methodology, test procedures, test scenarios and data development, roles, responsibilities, and environments for the totality of VoteCal. Driven by the EMSISand the DIP, the CETP establishes the strategic design for testing the EMS and county data integration and validating the EMS compliance with specifications and standards established by VoteCal.

## Scope

The scope of testing addressed by the CETP incorporates Team CGI certification of EMS integration services, data integration, and data compliance, including adherence to standardized data values. The scope of the activities addressed by the CETP spans the Pre-VoteCal Segment for each county, Conversion Segment, and Data Readiness Segment of the data integration life cycle as defined in the DIP, and includes the following:

* Identification of what is tested and the order of testing
* Test scenarios and a description of test data to be used that validate single county business functions and data, as well as processes and data that involve multiple counties
* Roles and responsibilities of the county elections officials and their staff, the EMS Remediation Services contractors and Team CGI staff
* Test preparation and test timing
* Validation of test results
* How test results, errors, and corrections are recorded
* Process for regression testing
* How version control is managed so as to ensure corrections and regression testing apply to the appropriate instance of the application
* How load balancing and stress testing is incorporated
* How impacts of backup and restore processes on EMS data are tested

## Security Requirements

The VoteCal project considers the CETP a non-confidential project document; no special security considerations are required to protect the content of this document in its present form.

## Intended Use and Audience

The intended audience for the CETP is the VoteCal Project Team. The VoteCal Project Team uses the document as described in Table 1 – VoteCal Project Team Use of the CETP.

Table – VoteCal Project Team Use of the CETP

| Team | Document Use |
| --- | --- |
| **Team CGI** |
| Infrastructure | Uses the CETP to validate components are defined to provide integration with an EMS, and update the *I.6 – VoteCal System Technical Architecture Documentation* (TAD) as necessary. |
| Architecture/ Development | Uses the CETP to validate systems are defined and designed to provide integration with an EMS, and update the TAD and *II.3 – VoteCal System Detailed System Design Specifications* (DSD) as necessary. |
| Test | Uses the CETP as a reference to develop system functional, integration, regression, and performance test cases. |
| Operation Change Management (OCM) | Uses the CETP to identify anticipated business process changes necessitated by the implementation of VoteCal. |
| Project Management | Uses the CETP to verify that the VoteCal solution satisfies the requirements. |
| **Secretary of State (SOS) VoteCal Project Team** |
| Business Subject Matter Expert (SME) | Uses the CETP to verify that VoteCal business requirements are satisfied. |
| Technical | Uses the CETP to verify that VoteCal technical requirements are met. |
| Test | Uses the CETP to begin developing user acceptance test cases to validate VoteCal. |
| Project Management | Uses the CETP to verify the VoteCal solution meets the overall requirements. |
| Independent Verification and Validation (IV&V) | Uses the CETP to cross-check and verify known requirements are included in the VoteCal solution. |
| OCM | Uses the CETP to identify anticipated business process changes necessitated by the implementation of the VoteCal system. |
| **EMS Remediation Services Contractors** |
| EMS Remediation Services Contractor | Uses the CETP to support remediation, data integration, testing, and implementation activities for the VoteCal solution. |

Resources involved in the development, review, and approval of the CETP are required to have knowledge and experience with the VoteCal EMS integration requirements and VoteCal EMS data integration processes. Resources should have a good general knowledge of and experience with software quality and testing methodologies and practices and their relationship to the software requirements, specifications, technical architecture, physical and logical environment specifications, and interface requirements that are required by VoteCal.

## Document Overview

The CETP describes the strategic plan for certifying the compliance of EMS data integration with VoteCal including preparing and executing testing, logging, and tracking defects found during the testing.

The CETP is organized into the following sections:

* **Section 1: Introduction –** This section describes the purpose, document scope, security requirements, intended audience, document overview, definitions and acronyms, referenced documents, related Deliverables and work products, document maintenance procedures, and assumptions, dependencies, and constraints related to this Deliverable.
* **Section 2: Testing Approach and Development of Test Cases –** This section describes the approach for data integration testing for the execution of county data integration. Included in this section are references to testing scenarios, and testing priority order to validate single county business functions and processes that involve multiple counties. This section also includes test data approach, test scenarios, test case development timelines, and reference to a discussion on traceability to VoteCal EMS requirements. During test preparation for system integration test, Team CGI documents the detailed test cases and manual steps for test execution within Microsoft Team Foundation Server (TFS) as work products.
* **Section 3: Roles and Responsibilities –** This section describes the roles and responsibilities of the county elections officials and their staff, SOS Elections Division, SOS Information Technology Division (ITD), EMS Remediation Services contractors, SOS IV&V Services contractor, and Team CGI staff.
* **Section 4: Test Execution Strategy –** This section describes the process for test preparation including obtaining test data and timing for the execution of the county data integration test.
* **Section 5: Validation and Exit Criteria –** This section describes the test data and validation that occurs to measure the compliance of the EMS integration specifications and data integration processes. The section includes post conditions (exit criteria) necessary to certify the readiness of the county to move to deployment activities.
* **Section 6: Problem/Defect Management –** This section provides the approach to managing defects found throughout the testing cycle, including how TFS is used to log, track, assign, report, and monitor defects related to EMS and county data integration testing.
* **Section 7: Version Control and Regression Testing –** This section describes the process for regression testing and how version control is managed to ensure corrections and regression testing apply to the appropriate instance of both the VoteCal and EMS software versions.
* **Section 8: Load Balance and Stress Test –** This section describes the process for testing and validating load balance and stress testing the EMS data integration process.
* **Section 9: Backup, Restore, and Roll Back –** This section describes how backup and restore processes on EMS data are tested.
* **Appendix A – Definitions and Acronyms –** This appendix provides a detailed list of the definitions and acronyms used in the CETP, which the *VoteCal Project Glossary* does not contain.
* **Appendix B – STP Support for CETP –** This appendix details the testing activities described in the STP in support of and prior to the execution of the CETP.
* **Appendix C – Test Scenarios, Cases, and Scripts –** This appendix contains work products for test scenarios, test cases, test scripts, and other TFS artifacts identified as of the date of submission of the CETP. Test scenarios, cases, and scripts are developed following the acceptance of the CETP through the delivery of *III.6 – VoteCal System Code and System Documentation*. The work products in Appendix C are updated during test execution, CETP execution for each county, and *V.2 – Conduct Pilot Testing and Provide Pilot Results Report* (CPTR) execution.
* **Appendix D – Sample Defect Log –** This appendix contains a sample defect log.

## Definitions and Acronyms

The CETP includes definitions and acronyms as cited in the *VoteCal Project Glossary*. Appendix A – Definitions and Acronyms lists additional definitions and acronyms specifically related to this Deliverable.

## Assumptions, Dependencies, and Constraints

The following are the known assumptions for the CETP:

* At the VoteCal Project Team’s discretion, the CETP may be conditionally accepted with outstanding deficiencies, if these deficiencies do not have any material impact on the content or applicability of the CETP.
* Before beginning certification activities as defined in this plan, EMS Remediation Services contractors have completed EMS remediation, including successfully passing testing as defined by *EMS Deliverable III.1 – EMS Remediation Test Planning* and *EMS Deliverable IV.1 – EMS Internal Testing*.
* The use of the defect management tool is documented in the STP.
* During STP execution, Team CGI performs integration testing to simulate all business functions that occur in an election cycle, as defined in the STP.
* The SOS IV&V Services contractor observe and review test development, test execution, and test reporting applicable to the CETP.

There are no other known dependencies, assumptions, or constraints at the time this document was submitted.

## Referenced Documents

The documents, excluding Team CGI Deliverables or work products, were used in the creation of the CETP or referenced in subsequent sections of the CETP include:

* *SOS System Integration (SI) – VoteCal Contract 12S10048* (SI Contract)
* *VoteCal Change Control Plan (Version 3.0)*
* *VoteCal Document Management Plan* *(Version 1.0)* (DMP)
* *VoteCal Logical Roles (Version 3.0)*
* *VoteCal Project Glossary (Version 3.0)*

## Related Deliverables

Table 2 – Related Deliverables lists the primary VoteCal Project Team Deliverables that are either used to develop the content of the CETP, or the CETP is used in their development.

Table – Related Deliverables

| Deliverable/Work Product | Relationship | Status | Version # and Date |
| --- | --- | --- | --- |
| II.3 –DSD | The DSD details the technical design for VoteCal. This document provides the specifications for database design, messaging, security, and network connectivity in the CETP. | Accepted | v3.006/03/2015 |
| II.4 *–* EMSIS | The EMSIS describes the integration specifications between VoteCal and the EMS deployed within each California county. The CETP describes activities to test the integration of each county EMS with VoteCal based on the EMSIS. | Accepted | v4.006/03/2015 |
| *II.5 – VoteCal System Detailed Requirements Traceability Matrix* (RTM) | The RTM defines the Requirements Traceability Matrix report(s) that are provided for VoteCal. Requirements from the functional specifications are included as part of the RTM for traceability to project artifacts. This document provides cross-referencing used in the testing content of the CETP. | Accepted | v3.008/07/2015 |
| II.6 – TAD | The TAD describes the logical, physical, and implementation details of the entire VoteCal solution. This document provides the specifications for database design, messaging, security, and network connectivity for the CETP. | Accepted | v3.006/03/2015 |
| II.8 – DIP | The DIP describes the sequence of steps in data integration, including the integration of multiple records from different counties into a single record for each voter. The CETP describes activities to test the data integration of each EMS with VoteCal based on the DIP. | Accepted | v2.105/15/2014 |
| III.2 – STP | The STP addresses hardware and software testing, including methodology, test procedures, test case and data development, roles, responsibilities, and environments. The STP defines test criteria that the CETP uses as a reference for EMS integration certification test planning and execution. | Accepted | v1.107/16/2014 |
| *III.5 – VoteCal System Implementation and Deployment Plan* (IDP) | The IDP details the transition from the legacy CalVoter system to VoteCal and addresses how the new solution is deployed to the SOS business users, county users, other stakeholders, and external users. Timing of execution of the CETP for each county is defined in the IDP. | Accepted | v1.106/24/2015 |
| *IV.1 – VoteCal System Pilot County Data Integration Completion and Report* (PDIR) | The PDIR executes data integration tasks for those counties that have been chosen for the pilot activities. The CETP provides details for these tasks. | Accepted | v1.209/30/2015 |
| *IV.2 – VoteCal System Acceptance Test Completion, Results and Defect Resolution Report* | The *VoteCal Acceptance Test Completion, Results and Defect Resolution Report* documents VoteCal executed test cases, test activities, the results of those activities, identified issues, resolution actions taken, and the status of outstanding deficiencies identified during acceptance testing of EMS remediation. The CETP is a guiding document to conduct integration testing. | To be delivered in Phase IV – Testing | N/A |
| V.2 – CPTR | The CPTR documents pilot testing for the selected pilot counties to appraise the data integration, training, help desk support, prepared system documentation, and deployment and operation processes and procedures.The CETP is a guiding document to conduct integration testing. The CETPis updated as appropriate based on the contents of the CPTR. | To be delivered in Phase V – Pilot Deployment and Testing | N/A |
| *VI.4 – VoteCal System Remaining County Data Integration Completed and Tested for Compliance and Successful Integration* (RCDI) | The RCDI documents the initiation and completion of data clean-up and uploading of EMS data for counties that did not participate in the pilot in accordance with the DIP. The CETP is a guiding document to conduct integration testing. | To be delivered in Phase VI – Deployment and Cutover | N/A |
| *SOS VoteCal User Acceptance Test Plan* | The *SOS VoteCal User Acceptance Test Plan* is the responsibility of the SOS. The *SOS VoteCal Acceptance Test Plan* relies on the CETP as a guiding document to conduct integration testing. | SOS has responsibility for the content and schedule of this plan | N/A |
| (EMS) *III.1 – EMS Remediation Test Planning* | The *EMS Remediation Test Planning* includes comprehensive EMS remediation test cases in coverage of remediated EMS functionality and confirmation from the EMS Remediation Service contractors that test cases have been successfully executed internally within the remediated EMS. The CETP is a guiding document to conduct integration testing. | The EMS Remediation Services contractors have responsibility for the content of this plan. | N/A |
| (EMS) *IV.1 – EMS Internal Testing* | The *EMS Internal Testing* provides an EMS Internal Test Completion Report upon completion of system, integration, and stress/load testing. The CETP is a guiding document to conduct integration testing. | The EMS Remediation Services contractors have responsibility for the content of this plan. | N/A |
| (EMS) *IV.2 – Collaborative End-to-End Test Support* | The *Collaborative End-to-End Test Support* documents the EMS Remediation Services contractors’ support of Team CGI’s end-to-end testing of EMS functions and interfaces with VoteCal. The CETP is a guiding document to conduct integration testing. | The EMS Remediation Services contractors have responsibility for the content of this plan. | N/A |
| (EMS) *IV.3 – VoteCal/EMS User Acceptance Testing (UAT) Support* | The *VoteCal/EMS User Acceptance Testing (UAT) Support* documents the EMS Remediation Services contractors’ support of SOS’s Stage 2 UAT of the integrated VoteCal solution The CETP is a guiding document to conduct integration testing. | The EMS Remediation Services contractors have responsibility for the content of this plan. | N/A |
| (EMS) *IV.5 – EMS Final Cutover Testing for Pilot Counties* | The *EMS Final Cutover Testing for Pilot Counties* documents the EMS test results for each pilot county supported by the EMS prior to cutover. The CETP is a guiding document to conduct integration testing. | The EMS Remediation Services contractors have responsibility for the content of this plan. | N/A |
| (EMS) *V.2 – Participation in Data Integration and Cutover for Pilot Counties* | The *Participation in Data Integration and Cutover for Pilot Counties* provides all support required to ensure successful data integration for pilot counties, including but not limited to the iterative work required to clean, standardize, extract, and transform data at each pilot county; make load-ready data available to the SOS for loading into the VoteCal solution at pilot deployment as indicated in the *Integrated Project Schedule* (IPS); and analyze and correct errors identified during data integration. The CETP is a guiding document to conduct integration testing. | The EMS Remediation Services contractors have responsibility for the content of this plan. | N/A |
| (EMS) *VI.1 – EMS Final Cutover Testing for Statewide Deployment Groups* | The *EMS Final Cutover Testing for Statewide Deployment Groups* documents the EMS test results for each county supported by the EMS prior to cutover. The CETP is a guiding document to conduct integration testing. | The EMS Remediation Services contractors have responsibility for the content of this plan. | N/A |
| (EMS) *VI.3 – Participation in Data Integration and Cutover for Statewide Deployment* | The *Participation in Data Integration and Cutover for Statewide Deployment* provides support required to ensure successful data integration for counties not identified as pilot counties, including but not limited to the following:* Iterative work required to clean, standardize, extract and transform data at each county
* Make load-ready data available to the SOS for loading into VoteCal at deployment as indicated in the IPS
* Analyze and correct errors identified during data integration

The CETP provides details for these activities. | The EMS Remediation Services contractors have responsibility for the content of this plan. | N/A |

## Document Maintenance

Team CGI reviews and updates the CETP using the “Deliverable Management” process defined in the *VoteCal Project Management Plan*, as needed and in accordance with the IPS.

Because of dependencies upon the STP referenced in the CETP, Team CGI updates the CETP as necessary during STP development and collaboration.

The CETP is formally updated with the CPTR. When Team CGI changes the document, the author updates the revision history with a brief description of the change, the date of the change, and updated version number. The VoteCal Project Team maintains versions of the CETP throughout the life of the project in the VoteCal Project Library.

# Testing Approach and Development of Test Cases

This section describes the approach for data integration testing for the execution of county data integration. Included in this section are references to testing scenarios, and testing priority order to validate single county business functions and processes that involve multiple counties. This section also includes test data approach, test scenarios, test case development timelines, and reference to a discussion on traceability to VoteCal EMS requirements. During test preparation for system integration test, Team CGI documents the detailed test cases and manual steps for test execution within TFS as work products.

Reference the STP for an overview of the VoteCal testing approach. The *I.6 – VoteCal Requirements Traceability Matrix Plan* (RTMP) describes the process for providing bi-directional traceability between requirements and test scenarios in TFS, including EMS Remediation Services contractors’ requirements as applicable to VoteCal.

Test types are defined as test plans in TFS terminology. Each certification testing of an EMS version and each county’s data integration certification testing are represented by separate test types in TFS, and therefore can be managed individually for each county. Execution of the CETP for each county is tracked in TFS as an individual VoteCal test type. Therefore, at least 60 instances of the CETP exist in TFS as test plans to facilitate management and reporting of each instance of execution of the CETP.

The CETP test types are among many VoteCal testing activities defined across multiple deliverables and work products. Table 3 – Test Activities by Deliverable shows test activities described in each deliverable or work product.

Table – Test Activities by Deliverable

| Deliverable/Work Product | Test Activities |
| --- | --- |
| STP | * System integration
* Data integration/interface (limited county test data)
* System
* Security
* End-to-end (including mock election cycle)
* Performance (including stress and load)
* Backup and restore
* Performance
* Regression
* DIP and CETP processes
 |
| UAT Stage 1 | * VoteCal system end-to-end (county demarcation to the VoteCal System to Department of Motor Vehicles [DMV] and vice versa)
* External interfaces (California Department of Corrections and Rehabilitation [CDCR], California Department of Public Health [CDPH], DMV, California Employment Development Department [EDD])
 |
| CETP | * System integration and integration services compliance with two EMSs
* Data integration compliance with data from 58 counties
 |
| UAT Stage 2 | * VoteCal system end-to-end (incorporating EMS functions along with scope of UAT Stage 1)
* External interfaces (CDCR, CDPH, DMV, EDD, and CalVoter)
 |

## Approach for Data Integration Testing

The CETP identifies what is tested and the order of testing to provide a mechanism for acceptance of certification of EMS and county data integration and compliance with integration specifications as defined in the EMSIS. Development and testing of system interfaces and integration specifications occur prior to execution and implementation of the CETP. Development of interfaces and integration processes occurs separately for Team CGI and the EMS Remediation Services contractors within their individual development locations and environments. Both teams likewise separately test interfaces and integration processes in isolated environments. Development and testing are governed by separate Deliverables for which Team CGI and the EMS Remediation Services contractors are individually responsible. Team CGI’s testing prior to execution of the CETP is defined by the STP.

After development and internal testing is complete within VoteCal and EMS system demarcation, integration certification testing is performed. The CETP defines the integration certification testing of the two EMSs and county data. The CETP validates that county EMSs and VoteCal interface and integrate according to the EMSIS and DIP. Team CGI certifies that the VoteCal-remediated EMSs successfully comply with the EMSIS, including integration services and data standards. Team CGI also certifies that county data successfully integrates into VoteCal. The CETP provides the reports and mechanism for the SOS to accept Team CGI’s certification of the EMSs and county data integration and compliance.

## Testing Scope and Order of Testing

The STP describes the testing of each of the EMS integration services and their associated operations and payloads. These tests are reused for testing integration services, including rules and data, for connected VoteCal system partners: the internal SOS VoteCal web application and database, DIMS DIMS.net application and database, and DFM EIMS application and database.

As shown in Table 3 – Test Activities by Deliverable, the STP describes system, end-to-end, system integration, and data integration/interface testing. Appendix B – STP Support for CETP details the testing activities described in the STP in support of and prior to the execution of the CETP.

### Testing Scope

The CETP includes testing for the EMS integration services defined in the EMSIS in Appendix D – VoteCal EMS Requirements. Each EMS integration service and its operations are tested according to the STP. While the CETP does describe testing of the EMS integration services, focus and priority on services used for data integration is extended. EMS integration services used in loading county data are detailed in the DIP in Section 4.4.5.1 – Full Mode Table 6 – EMS Specification for Automated Load. The CETP includes testing record counts and representative data samples for each category of data defined in the DIP in Section 2 – Integration Scope as follows:

* Blank affidavit tracking information
* Precincts
* Districts
* Election definitions
* Voter registration information
* Voter activity history
* Voter participation history
* Voter ballot information, including ballot processing data but not tabulation data
* Voter images

Table 4 – CETP Testing Scope describes the certification tests within the scope of the CETP. The tests are executed during Phase V – Pilot Deployment and Testing and Phase VI – Deployment and Cutover.

Table – CETP Testing Scope

| Test | Scope | Objective | Recurrence |
| --- | --- | --- | --- |
| Certification of EMS compliance | EMS version | To prove compliance by an EMS with VoteCal according to the EMSIS | Once per released version of an EMS during implementation (Phase V – Pilot Deployment and Testing and Phase VI – Deployment and Cutover) |
| Certification of EMS (county) data integration | County production data | To prove compliance by county data with VoteCal data standards and business rules | Once per county during implementation (Phase V – Pilot Deployment and Testing and Phase VI – Deployment and Cutover) |

### Order of Testing

Table 5 – CETP Order of Testing defines the sequence of test activities for CETP components.

Table – CETP Order of Testing

| Sequence | Test Category | Objective | Component |
| --- | --- | --- | --- |
| 1 | System integration | To prove successful communication between the EMSs and VoteCal | Inbound and outbound messaging |
| 2 | Integration services | To prove successful compliance with the EMSIS | EMS integration services |
| 3 | Data integration | To prove successful integration of county data into VoteCal, and VoteCal data into the EMSs | County and VoteCal test data |

Two of the VoteCal EMS integration services, the VoteCal EMS integration services for inbound and outbound messages, are tested as the first priority. Receipt by VoteCal of a message from an EMS carrying a payload, and receipt by VoteCal of an acknowledgement message from an EMS that it received a message are evidence of successful system integration of an EMS and VoteCal. This first step in the order of testing proves that the two systems can communicate with one another.

The remaining VoteCal EMS integration services and associated data portion of the payload are tested as second priority. The integration services are tested for both single and multiple county scenarios. This second step in the order of testing proves that an EMS is successfully remediated to integrate with VoteCal.

Test sequences one and two in Table 5 – CETP Order of Testing provide for certification of the EMSs’ compliance with regard to implementation of integration services, data, and VoteCal data standards.

For test sequence three in Table 5 – CETP Order of Testing, Team CGI and EMS Remediation Services contractors create count sets for comparisons of data and statistics before and after integration activities. The comparisons and companion reconciliation reports support the certification process. A count set is a single grouping of data according to selected criteria. For example, one count set is “voter count by active status for a county,” according to the first bullet in the above list (“Voter counts by status (active, inactive, pending underage, and cancelled)”). These counts are the final priority for testing.

To support the EMSs’ compliance with the scope of data to be integrated as defined in the DIP in Section 2 – Integration Scope, Team CGI and EMS Remediation Services contractors jointly create and compare counts and listings of records according to the following categories:

* Voter counts by status (e.g., active, inactive, pending underage, and cancelled)
* Voter counts by precinct by status (e.g., active, inactive, pending underage, and cancelled)
* Voter counts by district by status (e.g., active, inactive, pending underage, and cancelled)
* Voter counts by age range (e.g., under 18, 18, over 18) by status (e.g., active, inactive, pending underage, and cancelled)
* Voter counts by confidential status by status (e.g., active, inactive, pending underage, and cancelled)
* Voter counts by political party preference by status (e.g., active, inactive, pending underage, and cancelled)
* District listing
* Precinct listing
* Listing for active districts within precincts
* Listing for active precincts within districts
* Listing for elections with voting history
* Counts by table (e.g., voters, precincts, districts, activity history, participation history, images, elections)
* Voter listings using the official list file layout defined in the DSD
* Active voter count by county (e.g., Report of Registration [ROR] statistic)
* Active voter count by county by political party – qualified, other, no political party preference (e.g., ROR statistic)
* Active voter count by county by political party attempting to qualify (e.g., ROR statistic)
* Active voter count by county by congressional district (e.g., ROR statistic)
* Active voter count by county by congressional district by political party – qualified, other, no political party preference (e.g., ROR statistic)
* Active voter count by county by senate district (e.g., ROR statistic)
* Active voter count by county by senate district by political party – qualified, other, no political party preference (e.g., ROR statistic)
* Active voter count by county by assembly district (e.g., ROR statistic)
* Active voter count by county by assembly district by political party – qualified, other, no political party preference (e.g., ROR statistic)
* Active voter count by county by BOE district (e.g., ROR statistic)
* Active voter count by county by BOE district by political party – qualified, other, no political party preference (e.g., ROR statistic)
* Active voter count by county by county supervisorial district (e.g., ROR statistic)
* Active voter count by county by county supervisorial district by political party – qualified, other, no political party preference (e.g., ROR statistic)
* Active voter count by county by district type by district (e.g., ROR statistic)
* Active voter count by county by district type by district by political party – qualified, other, no political party preference (e.g., ROR statistic)
* Voter count by language
* Voter count by non-standard address

Code to create these counts and listings in VoteCal is provided in Appendix C – Test Scenarios, Cases, and Scripts.

## Scenarios and Test Data

Scenarios and test cases are provided in Appendix C – Test Scenarios, Cases, and Scripts.

As shown in Table 3 – Test Activities by Deliverable, the STP describes integration testing (VoteCal EMS integration services) and data integration testing (county data). Reference the STP for descriptions, details, and definitions of test environments, test data, and test scenario/case creation, including a discussion of:

* Focus Areas
* Testing Components and Configurations
* Testing Schedule
* Test Case creation and maintenance
* Test Condition creation and maintenance
* Testing Assumptions/Exceptions
* Test Entry/Exit Criteria
* Test Metrics and Measurements
* Test Environments
* Test Data creation and maintenance

Test scenarios, cases, and scripts developed to support system integration and data integration are reused for CETP testing to support certification for EMS compliance and county data compliance.

## Traceability to VoteCal EMS Requirements

VoteCal EMS requirements are documented in the EMSIS in Appendix D – VoteCal EMS Requirements. The VoteCal EMS requirements are included as part of the RTM for traceability to project artifacts. The RTM reports provide cross-referencing used in the testing content of the CETP.

The CETP test cases are tracked to requirements using the *II.5 – VoteCal System Detailed Requirements Traceability Matrix* (RTM).

# Roles and Responsibilities

This section describes the roles and responsibilities of the county elections officials and their staff, SOS Project Team, SOS Elections Division staff, SOS ITD staff, EMS Remediation Services contractors, SOS IV&V Services contractor, and Team CGI staff.

## STP-related Tasks

STP-related testing activities and tasks are presented in Appendix B – STP Support for CETP.

Refer to the STP for test execution roles and responsibilities, including the reuse of test cases during execution of the CETP in the county data integration test environment.

## CETP-related Tasks

Table 6 – Roles and Responsibilities lists roles and responsibilities at a high level for project partners involved in execution of the CETP for each county.

Table – Roles and Responsibilities

| Role | Responsibility (Actions) | Frequency |
| --- | --- | --- |
| County Elections Officials | Review delivered reports to prepare for data integration | Once during the Data Readiness Segment of the DIP as scheduled in the IDP for the county |
| Provide to the VoteCal project through the EMS Remediation Services contractor access to a copy of production data which is used in execution of the CETP | Once prior to the EMS VoteCal Release Milestone defined in the DIP and as scheduled in the IDP for a county |
| SOS Project Director | Provide approval for commencement of Phase V – Pilot Deployment and Testing and Phase VI – Deployment and Cutover based in part upon the results of CETP for each applicable county | Once at Pilot Wave EMS Deployment Milestone defined in the DIP and IDP; once at completion of Phase V – Pilot Deployment and Testing |
| SOS Project Team | Observes testing activities for the CETP | Once per county during the Data Readiness Segment of the DIP as scheduled in the IDP for the county |
| Analyzes CETP results and reports, and provides recommendations to SOS Project Director |
| Develops user acceptance test cases | Once during Phase III – Development |
| SOS IV&V Services Contractor | Participates in execution of CETP testing, observe testing activities for the CETP, and review and validate delivered reports | Once per county during the Data Readiness Segment of the DIP as scheduled in the IDP for the county |
| EMS Remediation Services Contractors | Deliver (complete development and internal testing) the VoteCal-remediated EMS application to be tested | Once during Phase III – Development |
| Develop the reporting queries used in the CETP |
| Participate in execution of CETP testing, observe testing activities for the CETP, and review and validate delivered reports | Once per client county during the Data Readiness Segment of the DIP as scheduled in the IDP for the county |
| Execute the EMS-related tasks of the CETP |
| Team CGI | Delivers the VoteCal application to be tested (Developer) | Once during Phase III – Development  |
| Develops the reporting queries used in the CETP (Developer) |
| Participates in execution of CETP testing, observe testing activities for the CETP, and review and validate delivered reports (Project Manager) | Once per county during the Data Readiness Segment of the DIP as scheduled in the IDP for the county |
| Certifies EMS compliance (Project Manager) |
| Oversees execution of CETP testing, observe testing activities for the CETP, and review and validate delivered reports (Data Integration Lead) |
| Leads execution of CETP testing, observe testing activities for the CETP, and review and validate delivered reports (Test Lead) |
| Executes the VoteCal-related tasks of the CETP (Tester) |

# Test Execution Strategy

This section describes the process for test preparation including obtaining test data and timing for the execution of the data integration testing for each county.

Test scenarios, cases, and scripts are developed following the acceptance of the CETP through the delivery of *III.6 – VoteCal System Code and System Documentation*. The scenarios, cases, and scripts are updated at test execution, CETP execution for each county, and delivery of the CPTR. Execution of the CETP is scheduled according to the IPS. More details on the overall test schedule are included in the STP.

Figure 1 – Verification and Validation Overview provides an overview of CETP preparation and execution for a county within the DIP integration cycle.

Figure – Verification and Validation Overview



## Test Preparation

According to the DIP in Section 4.4 – Process and Procedure, iterative testing of data integration occurs in each county during the Data Readiness Segment of the data integration cycle prior to initiating the certification process described in the CETP. The testing prescribed for the CETP is executed in each county for as many iterations as necessary to complete data readiness in preparation for certification. When Team CGI and the EMS Remediation Services contractors have completed data readiness and expect certification testing to pass, they begin the certification process. Certification is completed prior to the Pre-load Segment of the data integration cycle as defined in the DIP.

## Obtaining Test Data

At the initiation of the execution of the CETP for a county, the EMS Remediation Services contractors obtain a full copy of county production data and load it into the county data integration test environment.

To prepare VoteCal test data for Phase V – Pilot Deployment and Testing, Team CGI loads standard values in the VoteCal test/UAT environment defined in the STP. EMS Remediation Services contractors load pilot counties’ data into this VoteCal test/UAT environment as integration testing proceeds.

Certified county data loaded into VoteCal in a wave is retained and included in subsequent implementation waves, and is used as test data in the VoteCal test/UAT environment.

## Execution Timing

As defined in Section 2.2.2 – Order of Testing, integration service testing is performed to load data into VoteCal. Once the data is successfully loaded into VoteCal, EMS Remediation Services contractors and Team CGI run count and listing queries identified above to generate results. The results of the queries are imported into Excel for comparison. Results of the queries are provided to the EMS Remediation Services contractors in a comma-separated value (CSV) formatted file, and similarly the EMS Remediation Services contractors provide their results to Team CGI. The EMS Remediation Services contractors and Team CGI run automated comparisons and create reports including the results of comparisons, reconciliation statistics, and exceptions. The reports prove expected records are loaded and automatic merges are correct. Reports and supporting documents are delivered to the project team. The SOS, SOS IV&V Services contractor, and county elections officials verify the reports.

When an EMS attempts to load a record into VoteCal, the result is one of the three following outcomes:

* The transaction is successful
* The transaction is accepted with deficiencies
* The transaction fails as a critical deficiency

Critical deficiencies preventing a record from being loaded into VoteCal must be accounted for after integration tests are complete. An extract of records is created from the county EMS database by EMS ID and compared to an extract of records in the VoteCal database by EMS ID for the county. Records in the county EMS database and not in the VoteCal database must reconcile with a critical deficiency resulting from integration test. The cause for missing a record must be acknowledged as a legitimate reason for the failed load. Cancelled voter registrations are expected to be among the highest percentage of critically deficient records. Because of record matching and merging in VoteCal, direct comparison of number of records is not a valid method of reconciliation. In VoteCal, a single voter record is potentially a composite of many sub-records. Therefore, custom queries or ad hoc reports are used in place of standard VoteCal reports.

The validation iterations are executed on a regular basis during each wave of data validation. To distribute the workload for operations staff as well as functional staff reviewing error reports, these deployments are scheduled so that integration jobs for selected counties are not run together. This avoids overwhelming staff, which could otherwise occur if integration jobs for multiple counties were run simultaneously.

Team CGI creates exception reports based on VoteCal messages which are stored in the ServiceBusMessage table, and provides the exception reports to the counties and EMS Remediation Services contractors. The exception reports detail the data elements flagged during the validation process for transactions with non-critical deficiencies. These reports must be reviewed and the flagged issues mitigated for successful compliance and prior to final integration with VoteCal. Team CGI performs the initial review of exception reports to search for error patterns that might be based on faulty integration logic or system configuration issues. Next, the EMS Remediation Services contractors review the error reports to identify data issues arising from the EMS. Finally, the sources of errors must be identified and corrections or adjustments made as required on a case-by-case basis.

After analysis, the results are exported into a reconciliation report for distribution to project partners for use in certifying the data integration using the CETP.

The SOS and SOS IV&V Services contractor have access to observe and review all tasks in the CETP execution process.

Table 7 – CETP Execution Process lists the process to execute the CETP in a single county.

Table – CETP Execution Process

| Sequence | Step | Owner |
| --- | --- | --- |
| 1 | Create listing of EMS IDs for each count set in Section 2.2.2 – Order of Testing | EMS Remediation Services contractors |
| 2 | Provide EMS IDs to Team CGI | EMS Remediation Services contractors |
| 3 | Execute test cases for system integration | Team CGI |
| 4 | Execute test cases for integration services | Team CGI |
| 5 | Execute test cases for data integration | Team CGI |
| 6 | Export EMS count set results and provide to Team CGI | EMS Remediation Services contractors |
| 7 | Import EMS count set results into Excel comparison tool and provide to EMS Remediation Services contractors | Team CGI |
| 8 | Create reconciliation reports | Team CGI |
| 9 | Review and validate reports | Team CGI and EMS Remediation Services contractors |
| 10 | Certify EMS compliance and report to the SOS | Team CGI |

# Validation and Exit Criteria

This section describes the test data and validation that occurs to measure the compliance of the VoteCal EMS integration specifications and data integration processes. The section includes post conditions (exit criteria) necessary to certify the readiness of the county to move to deployment activities. Reference the DIP Section 7 – Verification and Validation for additional information regarding reconciliation processes used in validation during the integration cycle for a county. Representative sampling and the volume of test data are defined in a work product listed in Appendix C – Test Scenarios, Cases, and Scripts.

Various count sets are used as defined in Section 2.2.2 – Order of Testing.

## Test Data and Validation for EMSIS Compliance

Test data for validation of compliance by an EMS with the EMSIS integration services includes the following representative sample of all county production data:

* All county precinct records
* All county district records
* All county election records for which voter participation history exists
* Available blank affidavit tracking records
* Voter registration records in each count set by oldest by registration date
* Voter registration records in each count set by most recent by registration date
* Voter registration records in each count set by representative sample using cluster methodology

Cluster sampling is a sampling technique used when relatively homogeneous groupings are evident in a statistical population. In this technique, the total population is divided into these groups (or clusters) and a simple random sample of the groups is selected.

For voter registration records, the data sampling identifies EMS Voter ID numbers for exercising the integration services. In counties where sample maximums are greater than the actual record population, the entire county record set is the representative sample.

For this test category, integration services test cases in Appendix C – Test Scenarios, Cases, and Scripts are executed, exercising EMSIS integration services, operations, message types, and payloads. Defects are documented as the appropriate severity in TFS.

All test cases are executed and are required to be successful as passed. For a given test case, there is no designation of required versus not required. If the EMS uses the integration service, or any operation provided by the integration service, then the associated test cases need to pass. If an EMS participates in any action that is a VoteCal requirement, then associated test cases need to pass.

## Test Data and Validation for Data Integration Compliance

Test data for validation of EMS county data compliance includes the following representative sample of all county production data:

* All county precinct records
* All county district records
* All county election records for which voter participation history exists
* Available blank affidavit tracking records
* Voter registration records in each count set by oldest by registration date
* Voter registration records in each count set by most recent by registration date
* Voter registration records in each count set by representative sample using cluster methodology

Team CGI and EMS Remediation Services contractors create counts before load activity begins and after load activity ends. In counties where sample maximums are greater than the actual record population, the entire county record set is the representative sample.

Results of counts by table are generated for the following table categories:

* Voters
* Precincts
* Districts
* Activity history
* Participation history
* Images
* Elections
* Affidavit ranges
* VBM applications and ballots

Pre-test counts in VoteCal are expected to be zero for all count sets for the county being certified.

For this test category, data integration test cases in Appendix C – Test Scenarios, Cases, and Scripts are executed, exercising data categories defined in the DIP in Section 2 – Integration Scope. Deficiencies of the reconciliation process are documented as Severity 3 defects in TFS.

## Exit Criteria

The compliance verification exit criteria must be established for each testing category to serve as a checkpoint for validating that test objectives have been met, and testing can be concluded. At successful conclusion, Team CGI certifies EMS compliance with the EMSIS and with the integration of county data. At that checkpoint, a report of certification for each county is created to be included in the appropriate phase Deliverables.

### Exit Criteria for EMSIS Compliance

Testing for EMSIS compliance is complete according to the following criteria:

* All planned test cases for the test category have been executed, noting passed/failed, and defects have been logged
* There are no outstanding Severity 1 or Severity 2 defects as described in the STP
* Severity 3 and Severity 4 defects are documented with a mutually agreed-upon plan for resolution
* The Test Summary Report, including test scenario and test case pass/fail status, defects open/closed status (with severity levels), and any deviations from the original plan, has been completed and shared with project partners
* Applicable EMS requirements in the EMSIS have been tested and confirmed
* Test artifacts are complete and stored in TFS

### Exit Criteria for Data Integration Compliance

Testing for data integration compliance is complete according to the following criteria:

* All planned test cases for the test category have been executed, noting passed/failed, and defects have been logged
* All count sets and listings reconcile between EMS county data and VoteCal data
* There are no outstanding Severity 1 or Severity 2 defects as described in the STP
* Severity 3 and Severity 4 defects are documented with a mutually agreed-upon plan for resolution
* The Test Summary Report, including test scenario and test case pass/fail status, defects open/closed status (with severity levels), and any deviations from the original plan, has been completed and shared with project partners
* Applicable VoteCal data standards requirements in the EMSIS have been tested and confirmed
* Test artifacts are complete and stored in TFS

# Problem/Defect Management

This section provides the approach to managing defects found throughout the testing cycle, including how TFS is used to log, track, assign, report, and monitor defects related to EMS and county data integration testing.

Problem and defect management is defined and described in the STP, including the steps used to manage defects between VoteCal and the EMS Remediation Services contractors. Problems or defects in the county data integration environment are documented and logged in TFS, analyzed to determine validity, severity and priority, and a course of action is established.

Defects that are identified in execution of the CETP are identified in TFS by the execution for each county. Each county’s CETP is a separate test type in TFS, and therefore can be managed individually for each county. This process allows for individual county reporting in the *IV.2 – VoteCal Acceptance Test Completion, Results and Defect Resolution Report*, PDIR, and RCDI.

# Version Control and Regression Testing

This section describes the process for regression testing and how version control is managed to ensure corrections and regression testing apply to the appropriate instance of both the VoteCal and EMS software versions.

The processes for regression testing and version control management for VoteCal are defined and described in the STP and in the *I.4 – VoteCal Software Version Control and System Configuration Management Plan* respectively.

Regression testing and version control management for EMS software versions are outside the scope of the CETP and are governed by EMS Remediation Services contractors’ contracts with the SOS. Team CGI remains in close and constant communication with the EMS Remediation Services contractors throughout the data integration test cycle to identify potential situations which could be caused by discrepancies in versions.

Code and test cases are configurable items. Therefore, Team CGI changes to code and test cases are analyzed for potential impact, regression testing, and notification requirements.

With regard to one of the EMSIS requirements, Team CGI provides test cases with the CETP. The EMSIS requirement is stated as follows: “The Deliverable shall also include mechanisms and procedures (including Test Cases where appropriate) for the SOS to use on an ongoing basis to ensure continuing EMS compliance with VoteCal data requirements after deployment, as well as training for SOS staff in the use of those mechanisms and procedures.” Qualifying test cases provided with the CETP are identified and marked as appropriate for continuing compliance. Those qualifying test cases are used when regression testing is required when an EMS update is planned, and the update includes changes to VoteCal-specific processing as defined in and bound by the EMSIS. The appropriate test cases are executed against the updated EMS to validate that compliance persists.

Actions that trigger and require regression and re-certification testing:

* Change in VoteCal database schema for objects related to EMS integration
* Change in EMS database schema for objects related to VoteCal integration
* Change in a VoteCal data contract used within an EMS integration service
* Change in a VoteCal integration service related to EMS integration
* Change in Election Code, regulation or law related to EMS integration
* Change in platform or technology used by VoteCal or an EMS
* EMS request for re-certification

The scope of re-certification testing and test case selection is based upon the scope of the change, and the number and type of database objects, data contracts, services, and/or operations involved.

# Load Balance and Stress Test

This section describes the process for testing and validating load balance and stress testing the EMS data integration process.

Load balancing and stress testing is executed as defined and described in the STP. Test cases documented for system test execution are reused during execution of the CETP for each county to validate load balance and stress performance in the county data integration environment. Team CGI coordinates with the EMS Remediation Services contractors during execution of the STP to test load balancing and stress mitigation processes related to the EMS.

# Backup, Restore, and Roll Back

This section describes how backup, restore, and roll back processes on EMS data are tested. Execution of the CETP is not affected by VoteCal backup and restore, either locally or from the SOS Backup, Restore and Disaster Recovery Services vendor.

## EMS Backup and Restore

Team CGI coordinates with the EMS Remediation Services contractors during execution of the STP to test backup and restore processes related to the EMS. During execution of the CETP, EMS data affected by backup and restoration is test data in the county data integration test environment. Microsoft SQL Server tools are used to backup and restore the county test databases.

## Roll Back

According to the DIP, Section 6.6.3 – Contingency Plan, database backups of county production data are scheduled at the initiation and completion of each segment of the data integration cycle. This process allows for a roll back of county data to a previously successful point of the integration cycle to restart data integration after the cause of the issue is resolved. This process is specifically tested during execution of the STP.

During the execution of the CETP for a county, if a condition presents that requires a reset and restart of the CETP, both Team CGI and the appropriate EMS Remediation Services contractor restore a database backup that was created at the initiation of testing during the Data Readiness segment of the DIP, according to the cutover schedule for the county. If the condition involves a data deficiency, the backup is restored and the deficiency resolved prior to the execution of the CETP. Following the data issue resolution but prior to CETP execution, another backup is produced for each database (VoteCal and county) to be used as a roll back point for subsequent restarts.

A single county can be removed from the VoteCal database at any time prior to execution of a Duplicate Identification Check. The script to perform the deletion is included in Appendix C – Test Scenarios, Cases, and Scripts.

# Appendix A – Definitions and Acronyms

Table 8 – Definitions and Acronyms provides terms and descriptions of unique definitions and acronyms used in the CETP.

Table – Definitions and Acronyms

| Term | Acronym | Definition |
| --- | --- | --- |
| Count Set | N/A | A single grouping of data according to selected criteria |
| Comma-separated value | CSV | A file format used for data tables that are in list form to organize and collect data |

# Appendix B – STP Support for CETP

Table 9 – STP Support for CETP details the testing activities performed in the STP in support of and prior to the execution of the CETP.

Table – STP Support for CETP

| Component | Component Type | Test Type in STP |
| --- | --- | --- |
| FileSystemWatcher | Service | Data integration/interface |
| FileWatcherComnSvc | Service | Data integration/interface |
| VoterRegistrationIntgSvc.RegisterVoter() | Service and Operation | System, end-to-end |
| VoterRegistrationBusnSvc.RegisterVoter() | Service and Operation | System, end-to-end |
| MatchingComnSvc.MatchVoterToVoters() | Service and Operation | System, end-to-end |
| VoterDataSvc.MatchVotertoVoters() | Service and Operation | System, end-to-end |
| FileProcessorIntgSvc.ProcessFile() | Service and Operation | System, end-to-end |
| ListOfValuesProcSvc.UpdateDataFieldValue() | Service and Operation | System, end-to-end |
| AffidavitTrackingIntgSvc.ProcessBlankAffidavit() | Service and Operation | System, end-to-end |
| DistrictPrecinctIntgSvc.CreateDistrictPrecinct() | Service and Operation | System, end-to-end |
| DefineElectionIntgSvc.CreateElection() | Service and Operation | System, end-to-end |
| DistrictPrecinctIntgSvc.AssignVoterPrecinctToElection() | Service and Operation | System, end-to-end |
| VoteByMailIntgSvc.CreateVoteByMail() | Service and Operation | System, end-to-end |
| ProvisionalBallotIntgSvc.CreateProvisionalBallot() | Service and Operation | System, end-to-end |
| VoterActivityLogIntgSvc.CreateVoterActivityLogs() | Service and Operation | System, end-to-end |
| VtrParticipationHistIntgSvc.CreateVoterParticipation() | Service and Operation | System, end-to-end |
| DocumentsIntgSvc.AddDocumentImg() | Service and Operation | System, end-to-end |
| DMVVerificationBusnSvc.VerifyId() | Service and Operation | System, end-to-end |
| Standard code export | Process | Data integration/interface |
| Blank affidavit tracking import | Process | Data integration/interface |
| Blank affidavit tracking data entry functions | Process | Data integration/interface |
| External agency interfaces | Process | Data integration/interface |
| End-to-end data integration cycle | Process | End-to-end |
| Defining match criteria screen/functions | Process | System |
| Search screen/functions | Process | System |
| Create/update election screen/functions | Process | System |
| Standard value screen/functions | Process | System |
| Report screens/functions/generation | Process | System |
| Integration service rules | Process | System, system integration |
| CETP execution processes | Process | Data integration/interface |
| Messaging integration services (inbound/outbound) | Process | Data integration/interface |
| Exclude ID verification | Process | Data integration/interface |
| Backup/restore DBs for rollback in a segment | Process | Backup and restore |
| Rollback for a county within VoteCal database | Process | Backup and restore |
| Bulk load voter registrations, including export of new VoteCal voter IDs mapped to EMS voter IDs | Process | Data integration/interface |
| Bulk load images | Process | Data integration/interface |
| Reconciliation report queries | Process | Data integration/interface |
| Message reports | Process | Data integration/interface |
| Message exception report | Process | Data integration/interface |
| Microsoft Excel (Excel) comparison tool | Process | Data integration/interface |

# Appendix C – Test Scenarios, Cases, and Scripts

Appendix C is a set of work products for test scenarios, test cases, test scripts, and other TFS artifacts identified as of the date of the update of the CETP. Test scenarios, cases, and scripts are developed following the acceptance of the CETP through the delivery of *III.6 – VoteCal System Code and System Documentation*. The work products in Appendix C are updated at test execution, CETP execution for each county, and delivery of the CPTR.

During compilation of lessons learned after each deployment wave, or at the request of the SOS, IV&V, EMS Remediation Services contractors, and Team CGI, test cases for the CETP are reviewed, updated, and approved by the SOS, as necessary, for regression testing of an EMS application or a county’s data, to ensure compliance with the specifications and requirements of the EMSIS. Collaboration sessions to determine possible changes to CETP test cases will be conducted with the SOS, IV&V, EMS Remediation Services contractors, and Team CGI. Any changes to test cases will be noted and updated to the CETP test cases maintained in MTM. Any CETP test case can be modified on an individual step, where appropriate and agreed-upon. The CETP test cases can also be viewed through TFS.

Once VoteCal becomes the system of record, the SOS and EMS Remediation Services contractors will continue to collaboratively work to identify, modify, or add test cases and steps, where appropriate, to the CETP test scenarios should a change to an integration service/operation occurs that triggers a re-certification of the EMS.

The CETP test cases are tracked to requirements using the RTM.

The test scenario work product is an Excel spreadsheet named “vc-cetp-test-scenarios-v9.99-mmddyyyy.xlsx” that serves as an import mechanism for TFS work items. After importing these work items into TFS, TFS becomes the source for test artifacts in support of the CETP. In addition to the test scenario work product, an Excel spreadsheet is included named “vc-cetp-ems-data-elements-v9.99-mmddyyyy.xlsx” to provide the representative sampling techniques for the volume of test data to support test scenarios, cases, and scripts for the CETP. Additional files provide support for testing, and include the following:

* vc-cetp-reconciliation-counts-v9.99-mmddyyyy.zip
* vc-cetp-master-compare-v9.99-mmddyyyy.xlsx

Within the name of the work product files, “v9.99” refers to the reversion number of the work product, and “mmddyyyy” refers to the revision date (month, day, and year) of the work product.

# Appendix D – Sample Defect Log

The description of the use of TFS to manage defects identified during the execution of the CETP is available in the STP. The following images are presented in the CETP as examples of features available in TFS to track defects. Figure 2 – Defect Log Summary shows a sample defect log summary listing from TFS (web client presentation). Figure 3 – Defect Log Detail shows a sample defect log detail form from TFS (web client presentation).

Figure – Defect Log Summary



Figure – Defect Log Detail

