ITF Update on LIPA's IV&V of OMS 6.7.X Implementation

September 28, 2022

STATUS OF PSEG LONG ISLAND OMS REDEPLOYMENT

PSEG Long Island redeployed CGI Outage Management System (OMS) v6.7.8 into production on February 6, 2022

- OMS v6.7 failed during Tropical Storm Isaias in August 2020

- Re-deployment of OMS v6.7 occurred in February 2022

- Smart meter integration into OMS was deployed in June 2022. Performance (stress) testing on OMS-AMI integration was completed in September 2022

- **PSEG Long Island reports that the system is functioning as expected**

KEY ELEMENTS OF LIPA'S IV&V OF OMS 6.7X

The overall objective of LIPA's Independent Verification and Validation (IV&V) is to reduce risk to LIPA and its customers

- **Functional Testing**
  This category of IV&V testing ensures that the systems functional requirements are being satisfied. This consists of regression testing, testing of new functionality, and edge-case testing

- **Document Reviews**
  Document reviews ensure that key artifacts such as requirements, design specifications, test plans, test scripts, and test cases are properly constructed and of good quality

- **Code Reviews**
  Code reviews involve detailed review of programming code to ensure correctness of implementation. This applies especially to new code implemented
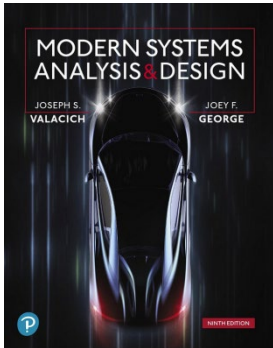
- **Performance (Stress) Testing**
  Performance testing ensures that the system behaves robustly during high load as one would expect during severe storms

IV&V: FUNCTIONAL TESTS

- In September, PSEG Long Island resubmitted 92 scripts of the original 129 scripts that failed to run* as reported to the Board at the July meeting. LIPA is engaged in re-testing the revised scripts

- LIPA has submitted an additional 200 test scripts to PSEG Long Island to correct and resubmit since the July meeting

- PSEG Long Island has committed to review all defective scripts and correct them so that they can be executed in a documented, repeatable manner

- LIPA will be working through each of the failed test scripts with PSEG Long Island until all issues are resolved

*Failed to run refers to tests which either did not behave as expected due to difference in system response, due to test script being inconsistent with the system interface, due to missing steps in the test cases, or due to mismatch in the expected and the actual user role associated with the tester.

The Testing Process

Up to this point, we have talked about the master test plan and seven different types of tests for software applications. We haven't said very much about the process of testing itself. There are two important things to remember about testing information systems:

1. The purpose of testing is confirming that the system satisfies requirements, including finding errors.

2. Testing must be planned.

These two points have several implications for the testing process, regardless of the type of test being conducted. First, testing is not haphazard. You must pay attention to many different aspects of a system, such as response time, response to boundary data, response to no input, response to heavy volumes of input, and so on. You must test anything (within resource constraints) that could go wrong or be wrong about a system. At a minimum, you should test the most frequently used parts of the system and as many other paths through the system as time permits. Planning gives analysts and programmers an opportunity to think through all the potential problem areas, list these areas, and develop ways to test for problems. As indicated previously, one part of the master test plan is creating a set of test cases, each of which must be carefully documented (see Figure 19-4 for an outline of a test case description).

A test case is a specific scenario of transactions, queries, or navigation paths that represent a typical, critical, or abnormal use of the system. A test case should be repeatable, so that it can be rerun as new versions of the software are tested. Even though analysts often do not do the testing, systems analysts, because of their intimate knowledge of the application, often make up or find test data. The people who create the test cases should not be the same people as those who coded and tested the system. In addition to a description of each test case, there must also be a description of the test results, with an emphasis on how the actual results differed from the expected results (see Figure 19-5). This description will indicate why the results were different and what, if anything, should be done to change the software. This description will then suggest the need for retesting, possibly introducing new tests necessary to discover the source of the differences.

One important reason to keep such a thorough description of test cases and results is so that testing can be repeated for each revision of an application. Although

IV&V: STRESS TEST WITHOUT AMI

On September 13, 2022, the IV&V Team conducted a 5-hour Performance Test simulating Isaias conditions. This was conducted using PSEG Long Island developed input data and was intended to exercise PSEG's own stress test designs

- The IV&V Team did not observe any significant anomalies in any of the functional characteristics that were being observed during the tests

- LIPA plans to conduct another stress (performance) test during October using a different test design and test data to ensure that the OMS system responds predictably under different data and stress conditions

- So far, LIPA has not observed any red flags as a result of the IV&V stress tests

IV&V: STRESS TEST WITH OMS-AMI INTEGRATION

On September 9, 2022 PSEG Long Island conducted a "red storm" performance test on the AMI-OMS integration

- LIPA witnessed the test and did not observe any "visible" anomalies. On September 22, PSEG Long Island submitted the test results, and LIPA will be reviewing the data

- After LIPA's analysis of the test data and test logs, LIPA will determine if further IV&V is warranted