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## **STUDENT INFORMATION SYSTEM IMPLEMENTATION**

### **Performance Measures**

**April 12<sup>th</sup>, 2019**

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## **BACKGROUND**

Several years ago Orange County Public Schools embarked on a project to upgrade the Student Information System. The new system is designed to consolidate and replace several key systems. A vendor was selected and the work began, but it was cancelled well into the project. A second vendor was chosen and a new project team assembled. At present, the project is underway with a target go live date in July of this year.

The Internal Audit Department has undertaken to perform a series of strategic assessments designed to focus on specific areas of risk or concern where we could bring value to the district on this project by highlighting risks or suggesting improvements that would help achieve a successful project. By focusing on smaller areas, we can perform and complete our work and submit our findings in a timely manner while the project is still underway.

The second area of our focus addresses the performance measures used to test the Skyward system. These measures or “specs” were put together by a group formed of consultants<sup>1</sup> and representatives of stakeholder departments from OCPS and Skyward. The consultants performed the actual testing.

The computer simulation tests performed were:

- Load test – the process of putting demand (the number of clicks in a fixed amount of time under controlled conditions) on a system and measuring its response; the load test should be near the limits of the system’s capability; this is testing the system running the application;
- Stress test – this is designed to see how the system behaves under a heavy load (a high number of concurrent users); it tests if the system slows down, if it is stable, if users drop off; the testing can be above the threshold of the system’s capability;
- Performance test – this measures the response time of the system to a click; this is testing the efficiency of the application; this test is more from a user’s perspective, for example, if a response from the application takes too long, the user will become dissatisfied with the application.

Per the *Orange County Test Plan* prepared by Michael j. Punsy with FTL Metrics:

Once the proper amount of user activity has been simulated, we will stop increasing load and hold it steady. Response times will be recorded for the actions of each script in addition to all of the statistics being gathered by the software. Additionally, we will have some actual human users access the application and step through some activities in order to provide their subjective impressions.

While load is being applied to the application, Skyward will be gathering database statistics.

When testing is complete, a full load test report will be provided in PDF format. In addition, we will provide statements from the human testers. Finally, we will provide a short report showing response times for each action, or “page”, for each of the scripts. In addition, the software that FTL Metrics proposed to use was Apica ZebraTester.

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<sup>1</sup> Foulk Consulting and FTL Metrics

## **OBJECTIVE, SCOPE AND METHODOLOGY**

Our objective was to review how performance standards were selected; what performance standards were selected, how they were used to measure the system's performance on the initial load test, the results of the load test and the follow-up actions after the report.

To meet our objective, we performed the following:

- 1) examined the initial performance specifications established for the new SIS;
- 2) examined the input from Stakeholders<sup>2</sup>, Skyward and the consultants to develop a standard for the Load Test in order to measure the performance;
- 3) examined the criteria<sup>3</sup> to perform the Load Test and the results of it;
- 4) reviewed the changes implemented by Skyward and OCPS to improve performance; and
- 5) ascertained whether Stakeholders were informed of the results and if they acted to address them.

## **ASSESSMENT FINDINGS**

- 1) The performance test report<sup>4</sup> noted that Skyward did not achieve the performance test specifications and these were some of the performance issues they found:
  - a. As part of testing, Skyward was asked to provide resource monitor data. This data was not provided as part of the final test reporting. Skyward was asked to run tests for specific periods of time under full load. With the exception of the stress tests, none of the tests were executed by Skyward for the full period of time required under full load. The status of the stress tests could not be evaluated due to the lack of monitoring data.
  - b. The results noted a resource exhaustion issue involving database connections. The tested system didn't properly allocate the resources, eventually leading to the exhaustion of available resources.
  - c. An oversubscription of resources when requesting school and district level reports for the expected population of users for Orange County Public Schools.
  - d. The caching method for resources accessed by day-to-day users inside of schools and district offices resulted in 25% of user requests being dropped during the test.

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<sup>2</sup> According to Version 1.6 of the Business Case of the project, the Stakeholders are: Cabinet Level Administrators, Business Owners, School Administrators, School Support Staff, District Users, ITS Staff and Teachers

<sup>3</sup> Accepted by Skyward & OCPS

<sup>4</sup> On the document "Skyward Performance Testing Analysis and Recommendations"

- 2) The *Skyward Performance Testing: Risk Mitigation* report includes a recommendation by the Consulting Firm to Skyward to improve the system's performance by implementing a Content Delivery Network (CDN)<sup>5</sup>. In a meeting<sup>6</sup> with members of ITS Leadership, we were informed that this has been put in place by the district. Also, the Skyward Project Team has taken mitigation steps such as off-loading reporting to a replication server and not allowing emails to be communicated through the Skyward's system<sup>7</sup> as originally intended. We have not been provided any evidence that demonstrates that Skyward has taken any steps to improve their system's performance.
- 3) As a result of the project team's decision to install a replication server for daily reporting needs in order to mitigate Skyward's performance issues, this project could now be considered as a Platform as a Service (PaaS) instead of Software as a Service (SaaS). However, the contract, as written, is for a SaaS.

## **RECOMMENDATIONS**

We recommend that the OCPS SISP Team:

- 1) Ensure that Skyward follows and implements the Consultant Firm's recommendations in order to improve the system's performance.
- 2) Work together with ITS Leadership, before the system go-live<sup>8</sup> date<sup>9</sup>, to ensure that Skyward meets all of the *Performance Testing Service Level Requirements* as stated in *Section 4.0 of the Exhibit C – Service Level Agreement* of contract # ITX1708272 Student Information System, so that they at least have reasonable and factual proof that the Skyward SIS can handle the daily workload and issues of our District.

We wish to thank the staff of the OCPS Student Information System and Projects Department for their cooperation and assistance during the assessment.

Luis E. Aponte Santiago – IT Internal Auditor  
Jan N. Skjersaa, CPA – Internal Auditor

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<sup>5</sup> This works at the DNS (Domain Name Service) level by redirecting requests for an application, such as [www.ocps.net](http://www.ocps.net), to a local proxy for the site which also contains copies of static files as defined by the cache plan set in place. In this way Orange County Public Schools network management can set the caching policies independent of Skyward, ensuring the highest possible performance for both parents and in-school users of the solution set. This has the effect of removing load from the origin servers and improving the resource pool available for the remaining requests.

<sup>6</sup> With Robert Curran, John Dean and David Overton on April 4<sup>th</sup>, 2019.

<sup>7</sup> This hasn't been setup yet, but is in the works.

<sup>8</sup> When Skyward's Student Information System goes to the Production (PRD) environment

<sup>9</sup> As per John Davis, the date is July 22<sup>nd</sup>, 2019.



## MEMORANDUM

ITS  
Chief Information Office

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Date: May 29, 2019

To: Linda Lindsey, Sr. Director, District Internal Auditor

From: Robert Curran, Chief Information Officer

Subject: Management Response to Recommendations for the SIS Performance Measures Draft Assessment Report

**Recommendation 1:** Ensure that Skyward follows and implements the Consultant Firm's recommendations in order to improve the system's performance.

**Recommendation 2 :** Work together with ITS Leadership, before the system go-live<sup>1</sup> date<sup>2</sup>, to ensure that Skyward meets all of the *Performance Testing Service Level Requirements* as stated in *Section 4.0 of the Exhibit C – Service Level Agreement* of contract # ITX1708272 Student Information System, so that they at least have reasonable and factual proof that the Skyward SIS can handle the daily workload and issues of our District.

**Management Response:** ITS is engaged with Skyward and the SIS team and will start performance testing in June.

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<sup>1</sup> When Skyward's Student Information System goes to the Production (PRD) environment

<sup>2</sup> As per John Davis, the date is July 22<sup>nd</sup>, 2019.