ORBCAD SERVICE DELAYS PROCESS REVIEW (20-06)

Terry Follmer, VP of Internal Audit

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Table of Contents

EXECUTIVE SUMMARY

This OrbCAD Service Delays Process Review project was added to the Fiscal Year 2020 Internal Audit Plan at the request of management. We performed an audit of the OrbCAD Service Delay reporting process to evaluate the efficiency and effectiveness of internal controls to ensure the completeness and accuracy of the records, and compliance with contract and applicable policies/procedures. The audit results, including the objective, scope, and conclusion, are as follows.

Background

As of January 5th, 2020, MV Transportation (MV) is the sole service provider responsible for all bus operations and related maintenance. Before this date, MV was responsible for the north garage located at 9315 McNeil Road, and RATP Dev was responsible for the south garage located at 2910 East 5th Street. The MV contract for service delays requires the service provider to comply with the following:

1. Service Provider is expected to log all service delays in the CAD/AVL system OrbCAD within a maximum of fifteen (15) minutes following the start of the delay.
2. Failure to properly and accurately document an incident, including but not limited to failure to accurately reflect change out buses, lost time, or service delays, will result in a PDC of $100 per occurrence. The PDC will not apply until after the seventh day of the incident, which represents the time allowed to accurately reconcile and finalize incident entries.
3. On-Time Performance goal is 83%, and it is measured by 0 minutes early and no more than 5 minutes late.

MV is responsible for the personnel that records all service delays into the OrbCAD system. OrbCAD is a computer-aided dispatch application used for vehicle dispatching, automatic vehicle location and monitoring, real-time performance and incident management, two-way messaging, route schedule adherence, remote vehicle health monitoring, and analytics. At the Operations Control Center, the OrbCAD system automatically color codes all service delays. As part of this process, the performance queue will color code the event to allow the Dispatcher to select a problem code (see Appendix C) and subcategory code in OrbCAD describing the reason for the service delay, but completion of this field is not required by the system. Note, once a problem code is chosen, the incident cannot be deleted in OrbCAD.

On-time performance (OTP) is captured in two different systems, OrbCAD and Swiftly, but OrbCAD is the official system of record for external reporting. Swiftly is a transit data platform that captures real-time transit information to allow management to manage the transit fleet proactively. One of the key differences between the two systems is that OrbCAD captures (i.e., Polls) the bus GPS location every 30 seconds while Swiftly records the GPS location every 10 seconds (See Appendix A for more details). However, OrbCAD reports OTP in real-time for some of the stops that are classified as "time points," as the bus enters or departs the preset radius of the stop. As part of this project, Internal Audit performed a comparison of OTP performance on high-frequency routes using both OrbCAD and Swiftly, which can be found in Appendix D.

The on-time reporting process flowchart in Appendix B illustrates how data is captured in OrbCAD and finally reported to the public. Upon an Operator login into the bus, OrbCAD starts capturing the on-time performance data, and the Dispatchers simultaneously view notifications of the delays at the Operations Controls Center. Per the MV contract, the Dispatcher is supposed to create events in OrbCAD and identify a problem code and subcategories to describe the event. (See Appendix C for most common used codes) Once a month, the Strategic Planning Development Department produces the OTP reports using Infoview.

The CMTA Data Analyst uses the reports to review the on-time performance for each route and completes the Schedule Adherence Exceptions Report, which includes all exceptions for the month. The service provider must respond by the 12th of the month, and the results of the on-time performance goal are provided to Capital Metro Management. The IT Department obtains the result of the on-time performance and updates the route performance dashboard to allow customer access to this information. The Program Manager from Operations and Maintenance Oversight Department reviews several reports to calculate the service monthly performance deficiency credits (PDC). The monthly reports reviewed include lost time hours, block PDC, lost Q bus, OrbCAD logs, missed pullouts, and others. All documentation is submitted to Finance and included in the service provider's monthly invoice for potential incentives/disincentives to be included in the payment.

Audit Objective & Scope
The primary objective of this audit was to determine whether internal controls over the service delays reporting processes are sufficient to ensure the completeness and accuracy of the records and compliance with contract and applicable policies/procedures. The scope included completing a flowchart of the process, a review of OrbCAD vs. Swiftly data capture, analysis of high-frequency routes between OrbCAD and Swiftly, review of Capital Metro's policies, review of ITS System OrbCAD Operations Manual, review of contracts, invoices with monthly oversight reports reviewed, interviews and review of desk procedures. Testing included reviewing OrbCAD incidents data for December 2019 to January 2020, and on-time performance for January 2020.

Opinion
Our sample testing of service delay coding showed that Dispatchers are accurately coding service delays as the code selected agreed with the written narrative for almost all of the transactions tested. In our opinion, internal controls can be improved by making OrbCAD system and monitoring changes in the following two areas:

1. OTP Target Measurements Differ from MV Contract

2. Service Delay Records and Monitoring

More details regarding the issues/risks and recommendations can be found below in the detailed audit report. This audit was conducted in accordance with the U.S. Government Accountability Office's Generally Accepted Government Auditing Standards (GAGAS) and the Institute of Internal Auditor's International Professional Practices Framework (IPPF). These standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. The audit was conducted by the following staff members in the Capital Metro Internal Audit Department:

- Jeannette Lepe, Senior Auditor (Project Lead)
- Terry Follmer, VP of Internal Audit

Recommendations to strengthen internal controls and improve accountability were provided to management in the audit report. Management agrees with the internal audit recommendations and has provided target completion dates, which are included in the detailed audit report below. A follow-up audit is performed semi-annually (i.e., May and November) to ensure management action plans for all issued audit reports are completed timely. We appreciate the cooperation and assistance provided to us throughout this audit.

Issues & Risk	*Recommendation*	*Management Action Plan*
1. OTP TARGET MEASUREMENTS DIFFER FROM MV CONTRACT We reviewed the controls related to the calculation of OTP and noted the following discrepancies: • MV contract states 0 minutes early to no more than 5 minutes late, but OrbCAD is configured to calculate based on 0 minutes early to 6 minutes late. • Swiftly is more accurate in calculating GPS location because it captures the bus GPS locations every 10 seconds instead of every 30 seconds for OrbCAD (See Appendixes A & D). OTP metrics impact monthly payment amount to service providers, so differences noted above require further review and action.	The Director of Contract Oversight, Manager of Service Analysis, and IT Director of Transit Technology Systems will consider the following improvements: a) Ensure the OTP calculation programmed into the OrbCAD system agrees to the contract (i.e., 0 minutes early to no more than 5 minutes late). Alternatively, management may want to consider modifying the contract to agree with OrbCAD by changing the contract language to state late is after 5 minutes and 59 seconds. b) Evaluate and consider whether Swiftly should be used as the OTP contract monitoring tool to measure OTP performance.	Management agrees with the recommendations. **Target Completion Date**: a) 9/30/20 and b) 12/31/20

Issues & Risk	Recommendation	Management Action Plan
2. **SERVICE DELAY RECORDS & MONITORING** The MV contract requires them to record/code the reason for each service delay in OrbCAD within a maximum of 15 minutes from the occurrence. We reviewed the controls related to this process and noted the following weaknesses: • OrbCAD has not been set up to automatically capture the 15-minute requirement. • OrbCAD has not been set up to capture service delays that are missing a reason code. • The OCC Dispatcher had a guide that did not agree to the CMTA OrbCAD Operations Manual. Additionally, the CMTA OrbCAD Operations Manual contains 20 codes that should not be used. • We noted one situation whereby a new problem code was created, but the Dispatchers were not informed and trained. The purpose of the requirement to report 15-minute service delays is to ensure that key stakeholders (for example, Customer Care) have quick visibility into incidents which are impacting service. This intent suggests that contract language may need to be clarified and reporting adjusted accordingly.	The Director of Contract Oversight, Manager of Service Analysis, and the IT Director of Transit Technology Systems will consider the following improvements: a) Clarify contract language to meet the intent of reporting service delays impacting service. b) An OrbCAD report should be created to capture all incidents that are not coded by Dispatchers within 15 minutes of the occurrence, in accordance with the modified contract language per item a above. c) An OrbCAD report should be created to capture all incidents that are never recorded by Dispatchers with an explanation of the incident, in accordance with the modified contract language per item a above. d) The OrbCAD guide and manual should be reviewed and approved by CMTA. Training and communication protocols for OrbCAD manual updates should be developed. e) Using the new OrbCAD reports in recommendations b & c above, analyze results to help minimize service delays, and understand Dispatcher training and staffing needs.	Management agrees with the recommendations. **Target Completion Date**: 10/31/20

Appendix A: Swiftly vs. OrbCAD Comparison

Swiftly vs. OrbCAD			
#	Factor	Swiftly	OrbCAD
1	Arrival Vs. Departure	Departures Only	Departures Only ***
2	Selecting an official departure time	Extrapolates from multiple GPS pings for a more precise estimate of exact departure	Chooses the first GPS ping outside of stop radius of 100,250,500 feet diameter
3	GPS Reporting Rate (Polling)	10 seconds	30 seconds
4	Processing	No post-processing	Post-processed to remove false exceptions due to GPS location every 30 seconds and departure radius meters' applied.
5	End of Line Arrival before scheduled time	Counts as an early trip in OTP calculations	Uses departures only, so early arrivals ignored

For routes 801 and 803, OTP is captured on arrival time by OrbCAD, instead of departures times for all other routes.

Appendix B – OTP Reporting Process Flowchart

OTP Reporting Processing Chart
Yujin Pyun and Dan Bi Lee | April 17, 2020

BUS Operators

Operators logs in by swiping their badge in the Orbital System found in the bus

OrbCAD captures on-time performance as the route is running. Dispatchers identify the delays and can message operators

The incidents are sent to OCC

Operations Control Center (OCC)

OCC dispatchers receives incidents

Dispatchers have up to 10-15 minutes to make decisions regarding what operators should do regarding incidents

Dispatchers create the event in OrbCAD and identify problem code and subcategories to describe the event

OCC Manager

OCC Managaer completes the daily reports (pre-push report, post-push report) during their shift. And post-push report includes the vehicle and operator counts acheieved, total lost time, total number of change outs and OTP report. On-Time-Performance by Categories (Local, Expres, High Frequency, Rapid, UT Shuttle) on the AM/PM Post-Rush Service Report

AM/ PM Post-Rush reports are sent to CMTA Management Daily

Strategic Planning and Development Department

OTP reports are published in Infoview, which is the OrbCAD reporting system

Data Analyst uses the Infoview reports to review performance for each route in service

The monthly OTP report is sent to management and includes the Schedule Adherence Exception Report

All exceptions should be reported and reviewed by the 12th of the month. OTP Report is finalized and sent to I.T. Department by the 20th

Information Techontology Department

Application System Analyst gets tthe final monthly OTP report to include in the CapMetro Extranet

Route Performance which includes On-Time Performance is uploaded to the CMTA public website

Route performance data on the performance dashboard are available for the convenience of the public

Appendix C: Top 10 Codes Used from December 2019 to January 2020

Problem Code and Sub Code	Descriptions	Total Count	% Used
LF-ITEM	Lost&Found Item	954	13.31%
OP-EROR	Operator- Error	855	11.93%
DL-LTRF	Delay-late traffic	835	11.65%
OP-RELF	Operator- No Relief	540	7.54%
MR-FBOX	Mechanical- Farebox	481	6.71%
DL-LOTR	Delay-LateOther	475	6.63%
MR-ENGN	Mechanical -Engine	475	6.63%
IO-OTHR	Incident-Other	457	6.38%
SV-OTHR	Service-Other	441	6.15%
SC-DISC	Security- Disorderly Conduct	221	3.08%

Appendix D: OTP – Swiftly vs. OrbCAD on High-Frequency Routes

Swiftly OTP vs OrbCAD

Date Range: 1/05/20 - 1/31/20

Route	Swiftly OTP			OrbCAD		
	Early	On-Time	Late	Early	On-Time	Late
2	8.6%	80.3%	11.2%	3.4%	83.6%	13.1%
4	14.2%	75.1%	10.7%	6.1%	82.5%	11.3%
7	11.2%	71.1%	17.8%	7.4%	73.8%	18.8%
10	18.0%	69.9%	12.1%	9.4%	76.8%	13.8%
17	6.2%	87.3%	6.5%	5.1%	89.7%	5.2%
18	15.6%	73.1%	11.3%	4.5%	83.5%	12.0%
20	9.5%	70.3%	20.1%	7.4%	74.1%	18.5%
217	23.6%	71.0%	5.4%	4.7%	91.2%	4.1%
300	11.0%	71.4%	17.7%	5.9%	75.9%	18.3%
311	13.2%	73.1%	13.7%	5.4%	79.4%	15.2%
325	12.6%	81.5%	5.9%	8.6%	84.5%	7.0%
333	12.1%	79.7%	8.3%	6.9%	82.6%	10.5%
335	15.7%	78.9%	5.4%	10.6%	84.1%	5.4%
801	13.5%	47.2%	39.3%	18.9%	44.0%	37.2%
803	19.9%	52.7%	27.3%	27.7%	49.9%	22.5%
Average	13.7%	72.2%	14.2%	8.8%	77.0%	14.2%

OrbCAD Variance to Swiftly OTP

Route	Early	On-Time	Late
2	-5.2%	3.3%	1.9%
4	-8.1%	7.4%	0.6%
7	-3.8%	2.7%	1.0%
10	-8.6%	6.9%	1.7%
17	-1.1%	2.4%	-1.3%
18	-11.1%	10.4%	0.7%
20	-2.2%	3.8%	-1.6%
217	-18.9%	20.2%	-1.3%
300	-5.1%	4.5%	0.6%
311	-7.8%	6.3%	1.5%
325	-4.0%	3.0%	1.1%
333	-5.2%	2.9%	2.2%
335	-5.1%	5.2%	0.0%
801	5.4%	-3.2%	-2.1%
803	7.8%	-2.8%	-4.9%
Average	-4.9%	4.9%	0%

Note: Differences between Swiftly and OrbCAD are expected since Swiftly captures GPS location every 10 seconds versus OrbCAD's every 30 seconds. Additional reasons for differences can be found in Appendix A.
*** Route 801 and 803, OTP is captured on arrival time by OrbCAD, instead of departure times for all other routes.