NASCIO 2015

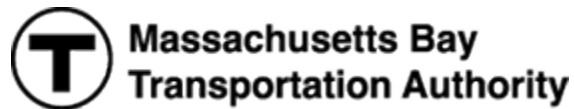## State IT Recognition Awards

***Data-Driven Decision-Making* for Improving Public Transit:**

How A 360' Employee View Leads to a Better Commute for Bostonians

Category: Open Government and Data, Information, and Knowledge Management

Massachusetts Bay Transportation Authority

Project initiated: April 2014

Project completed: October 2014

Contact:
Sandra Edler
Massachusetts Office of Information Technology
One Ashburton Place, Room 804
Boston, MA 02108
617.626.4620
sandra.edler@mass.gov

MassIT

Executive Summary

On a typical weekday, more than a million people ride the busses and subways of Boston. The Massachusetts Bay Transportation Authority (MBTA) operates this system, known locally as simply "the T." While ridership is high, satisfaction with the T varies…and this past winter of record-breaking snows pushed the system, the public, and our government leaders to the limit.

In response to widespread calls for improvement, Governor Baker created a panel to review and report on the system. The resulting report noted that, "A well-functioning MBTA is fundamental to the civic and economic life of the Commonwealth. Demand for MBTA service appears to be at an all-time high and growing. …A schedule is a promise: for MBTA passengers, a bus should appear when the schedule says it will." [1]

The report goes on to note that in 2014, however, "more than 31,000 trips were dropped, causing thousands of riders to be left on the curb, literally out in the cold," and "…unscheduled employee absenteeism is a major and increasing cause of dropped trips."

The MBTA 360' program plays an integral part in the agency's improvement efforts. The system leverages a business intelligence toolset to associate and correlate disparate internal data sets that were previously only available via manual collection – while incorporating additional critical data, such as weather, for a more thorough picture than has ever been available.

The result is robust, actionable information that is readily accessible to management. The tool provides interactive dashboards, drag and drop presentation options, and drill down capabilities, enabling quicker evaluation, analysis, and reporting than ever before.

The rich information made possible through MBTA 360' is already being used to respond to business needs. For example, employee availability information helps determine budgeted headcount for operations, and informs enhanced management of Family Medical Leave Act (FMLA) absences. FMLA absences constitute a significant portion of unscheduled absences, so the improved recording of critical case management information for human resource and compliance monitoring made possible by the MBTA 360' are key to more effective management in this important area.

As the Governor's special panel noted, "To reach the goal of running the entire MBTA schedule as promised, the MBTA must manage its workforce and operations in order to minimize dropped trips and specifically those due to unscheduled employee absenteeism."

The MBTA 360' system, designed to serve as a one-stop location for performance and compliance reporting by providing a 360-degree view of activity at MBTA, plays an integral part in the agency's response. In addition, kudos and bonus points go to the project team for delivering the system on-time and under budget!

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[1] *Back on Track: An Action Plan to Transform the MBTA, s*ubmitted by the Governor's Special Panel to Review the MBTA, April 8, 2015.
http://www.mass.gov/governor/docs/news/mbta-panel-report-04-08-2015.pdf

Business Problem

The MBTA did not have an automated or integrated recording and reporting system for employee availability. A variety of payroll, absence recording, incumbent reporting, and discipline tracking tools were in use, but they were in silos and each only provided one piece of a multi-sided absenteeism problem.

Calculating employee availability was a labor-intensive, time-consuming process. Results were not available in a timely way for use in setting targets, implementing hiring and staffing plans, monitoring operational performance, and reporting performance both internally and externally.

The T's problem with absenteeism was not new; it was cited in reports dating back to at least 1987. While gains in controlling some types of absences (e.g., sick time and worker's compensation) were made over the years, there was no unified visibility of what was occurring in other absence categories, including FMLA.

The T needed a new way to record and report on employee availability as a whole, in a way that would be useful to multiple stakeholders and common to the transit industry.

The Solution

A small group of staff from the newly formed Strategic Business Initiatives and Innovation Department within the MBTA was tasked by the General Manager to develop and implement a robust employee availability reporting system.

Baseline and Changes in Metrics

The team created a prototype integrated employee availability report – which was essentially a summary report by work title, by month. The primary constraint was the need for intensive manual manipulation of various data spreadsheets extracted from multiple systems, then "crashed" to create the (extremely limited) prototype.

That intensive manual effort had to be repeated monthly and, given data and/or timing differences in each of the systems that were employed, constant updating of prior monthly/year-to-date performance was required. Due to technical issues, such reports could not be reproduced on an individual cost center basis.

The prototype report was entirely dependent on manual manipulation of diverse spreadsheets which were often not in synch with one another. In addition, ad hoc reports comparing, for example, overtime usage or lost trips to availability could not be produced without adding additional sets of spreadsheets to the mix.

Finally, supervisors complained that aggregate information was not useful for improving their day-to-day operations. They needed insight down to the employee level.

To meet business needs, the MBTA 360' program was defined with executive-level sponsorship from the office of the T's General Manager in partnership with the Chief Information Officer, and executives representing human resources, finance, and

operations. In addition, the state's central IT agency, now called MassIT, was engaged with the T's team.

Evolution of reporting

- Before 2012 – scarce or none
- 2014 – Manual spreadsheet tabulation of extracts from multiple sources
- April 2014 – Development of data warehouse
- October 2014 – Launch of MBTA 360' and true employee availability reporting
- November to December 2014 – End-user training

The system uses Oracle Business Intelligence Enterprise Edition (OBIEE) in an architectural framework designed to accommodate addition of future data sets. As a living system, it continues to be refined and improved as more users access the information and continue to have their business questions answered.

The project cost slightly less than the anticipated $1.18M – and was completed several months ahead of schedule, in response to business needs.

Significance of the Project

As noted earlier, the panel assembled by Governor Baker to review and report on the system noted that, "A well-functioning MBTA is fundamental to the civic and economic life of the Commonwealth. [and] A schedule is a promise: for MBTA passengers, a bus should appear when the schedule says it will."

As of that report – and related news coverage[2] – tens of thousands of bus trips have been cancelled each year due to unplanned absences, and absenteeism causes substantial overtime costs for the T. In the 2014 fiscal year, the average absence rate across all MBTA positions was 11-12%. By comparison, the Bureau of Labor Statistics reports absenteeism in the transportation industry of approximately 3%, and peer agencies have reported rates of 5-6%.

One of the panel's recommendations was for the MBTA to "develop a plan to substantially reduce absenteeism." The MBTA 360' system is integral to this plan.

The beneficiaries and stakeholders interested in the outcome of this project are wide-ranging; from users of the T's service – including public and private sector entities in every area to businesses of every shape and size in the metro Boston area; citizens as taxpayers and commuters; as well as decision-makers across our Executive and Legislative branches of government.

Enhancing the T's operations and level of service is directly in line with the current Administration's priorities; the T's business plans, goals, and strategies; as well as the state's IT strategic plans and approach.

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[2] WCVB, Channel 5 News: *Excessive absences major problem at MBTA, report finds*, April 6, 2015; and The Boston Globe, *MBTA report faults worker abuse of Family Leave Act*, April 7, 2015.

Benefit of the Project

By providing analytics for managing the T's workforce and related budgeting, the system is delivering tangible benefits of increased efficiency, improved system availability, and quality of service.

Because there is always a correlation between T employee attendance and dropped trips, the rapid availability of user-friendly, easy-to-understand information that correlates those events is a huge boon to management of the T – and to T riders.

Metrics available through the MBTA360 dashboard include:

- Employee absences in days per employee
- Percent of trips completed versus goal
- Reasons for lost trips
- Overtime dollars by pay period (versus last year)
- Categories and reasons for OT (versus budget is planned by June 30)

Robust, timely information, presented in compelling visualizations, makes it easy for senior managers to quickly appreciate critical key information that informs their decision-making. For example, management can understand at a glance which areas are experiencing peaks in absenteeism and correlated overspending on overtime.

While the greater benefit comes from our new ability to quantify and document absences by category with timely, accurate numbers, it is worth noting that by simply eliminating manual compilation of the critical metric of employee availability, we estimate that the Commonwealth saves $216,000 annually.

Images below provide a glimpse of just a few views made possible by the dashboard.

Correlation of Employee Availability/Overtime/Dropped Trips at Sample Location:
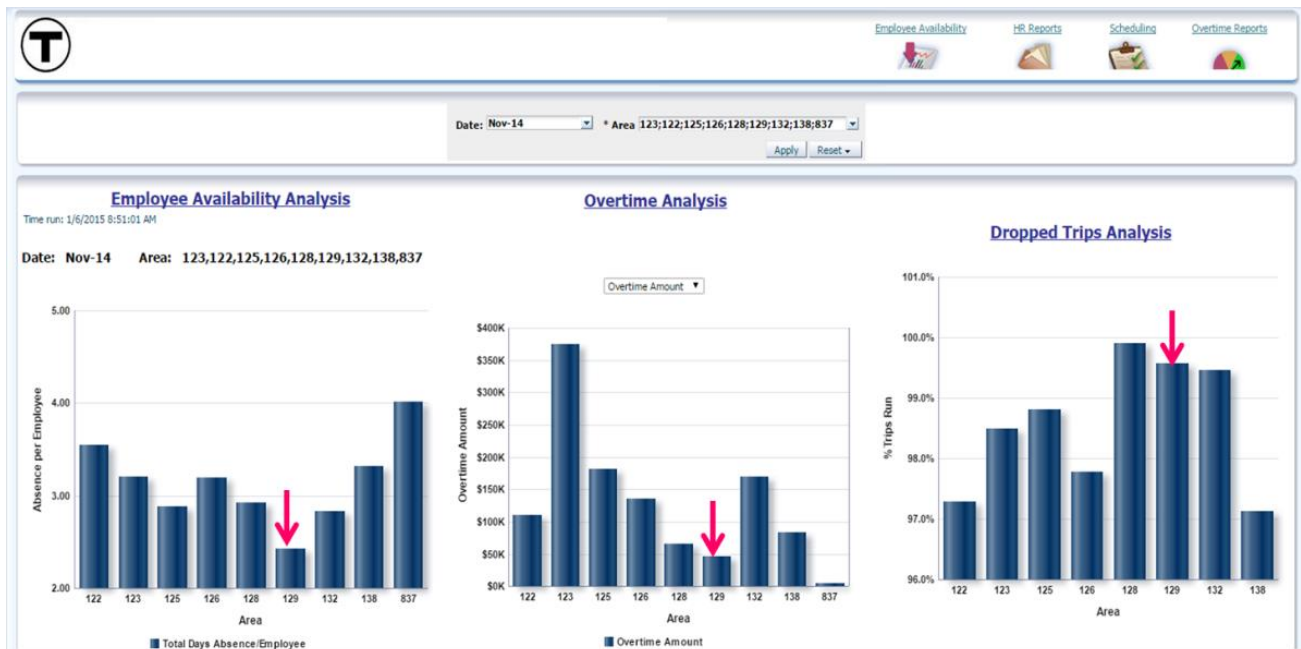
Dropped Trips by Reason at Sample Location – Nov 2014
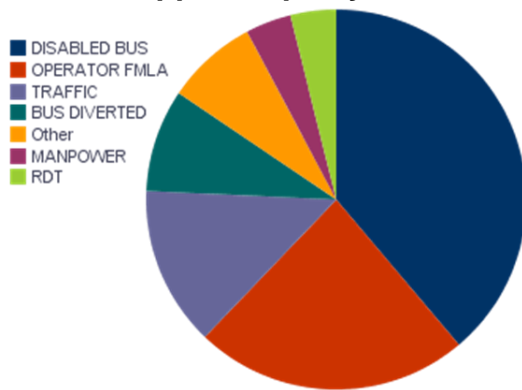
Area	Date	Lost Trip Reason Description	Lost Trips by Reason
129	Nov-14	DISABLED BUS	20
		OPERATOR FMLA	12
		TRAFFIC	7
		BUS DIVERTED	5
		MANPOWER	2
		RDT	2
		ACCIDENT	2
		OPERATOR SICK	1
		EXCUSED ABSENCE	1
		OPERATOR ERROR	1
		UNRULY PASSENGER	1
		Grand Total	**52**

Lost Trips by Reason

The heat map below provides several takeaways regarding FMLA leave:
- Saturdays have a significantly higher FMLA ratio than other days
- July and August have a higher FMLA ratio on average than other months
- A trend over years for increasing use of FMLA
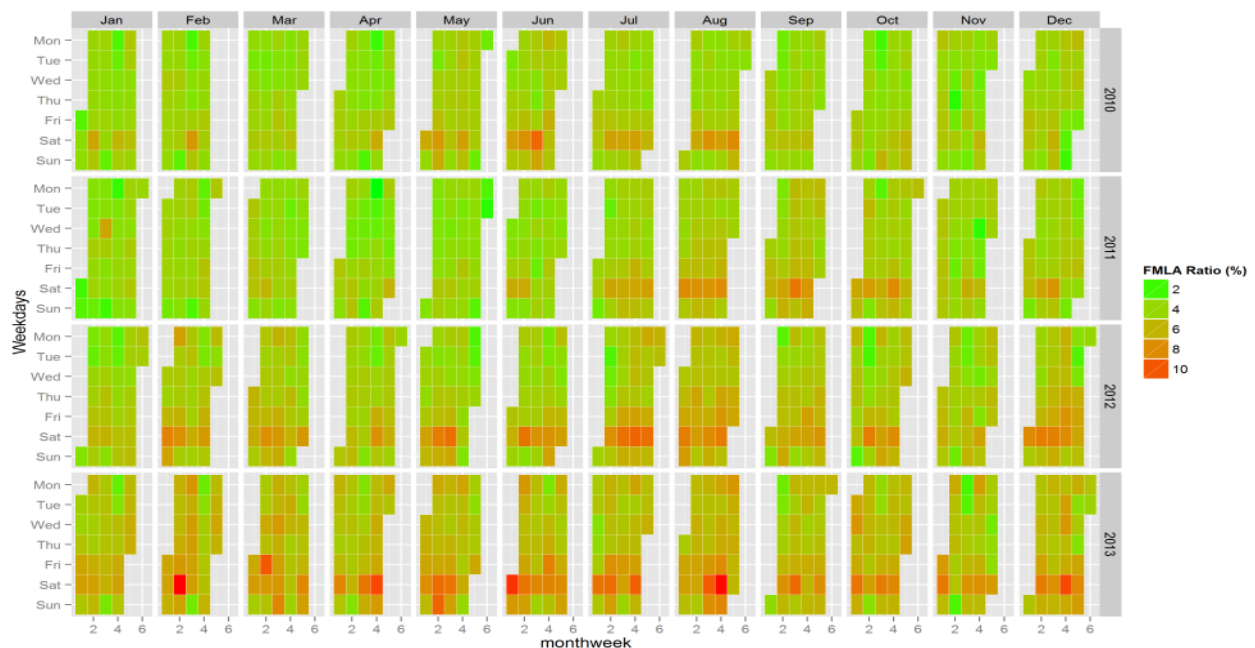
For the first time, policy and process decisions are informed by clearly defined evidence and supported by hard facts – instead of unconnected pieces of data and anecdotes. Big picture benefits include:

- Avoiding the problem of insufficient headcount due to unrealistic expectations.
- Quantifying the cost/savings of changes implemented throughout the year.

Using hard numbers, management has already enacted new measures including a support program for supervisors and HR for managing FMLA leave absences. Details regarding employees' FMLA certification, including start and end dates, whether it is continuous or intermittent, and its current status are available at-a-glance. In addition, leave balances are calculated and show the amount of FMLA hours remaining of the

benefit over a 365-day period for more than 2,100 employees. This robust absence data has led management to implement a proven model for case management where absence usage is not within program or policy guidelines.

The deeper level of understanding of overtime use and how human resource availability affects service availability is translating into better planning and budgeting. Because timely information is also broken down beyond department to individual people, supervisors are better informed and better able to manage their line staff.

The addition of weather data into the MBTA 360' system has provided another boon to planning at the T. The impact of weather goes beyond the obvious – such as when deep snows inhibit travel – to more subtle changes, like how temperature, pollen levels, or blue skies can be expected to affect operator absences, planned maintenance work, and rider demand. While we cannot change weather, being prepared for unscheduled absences and anticipating customer behavior enables better customer service.

The entire Commonwealth benefits from the increasingly greater transparency management have gained into T operations. Constituents are gaining improved availability, quality of service, and value. T management are experiencing operational gains of greater effectiveness and efficiencies, including process improvements, productivity, and meeting staffing requirements. Financial return is being realized through better up-front budgeting.

Alignment with Key Priorities Highlighted by NASCIO

The MBTA's *360' Employee View* project supports the vision outlined in NASCIO's *States Run on IT* by helping the Commonwealth in the key areas of budget and cost control, human resources/talent management, and customer relationship management.

Going beyond front-line business benefits to T managers, the success of the project has prompted additional tracks for further development. The most important one is a concerted focus on data governance. The data governance track of the program will address the processes and methods used by data stewards and data owners in order to improve data quality.

Today, T management is making more-well-informed decisions than ever before. Use of the system is directly affecting and changing the culture of MBTA for the better.

The MBTA 360' program is advancing public policy goals by driving proactive work to transform our public transit system.

As we look ahead, we will continue to assess outcomes and refine the system.

Happily, as the T's performance improves, rider satisfaction tends to as well.