

# Sample Project

## ACE INTERMOUNTAIN RECYCLING CENTER SCORECARD PROJECT: AUTOMATING DATA ANALYTICS

### Project Summary

The objective of this sponsored capstone project was to automate a monthly Excel scorecard used by staff and executives at Ace Intermountain Recycling. Previously, this scorecard was tabulated manually every month, requiring 5-10 work hours from employees. Tracking metrics this way was not only time-consuming for employees but meant the data was only as recent as when it was last collected manually.

The final result of this capstone project was an automated dashboard easily accessible via a web browser that displays the information and metrics originally calculated manually. It can be accessed at any time, continuously updates with new data, and is easy for management to maintain.

### Sponsoring Company Background

Ace Intermountain Recycling Center (AIRC) operates transfer stations for recycled materials, green waste, and other garbage, serving customers in the Salt Lake Valley and surrounding areas. Its purpose is to repackage waste to make it more transferable. The AIRC scorecard built by this project brings together many different metrics and allows management to view revenue, costs, and other productivity trends easily.

### Resources for Success

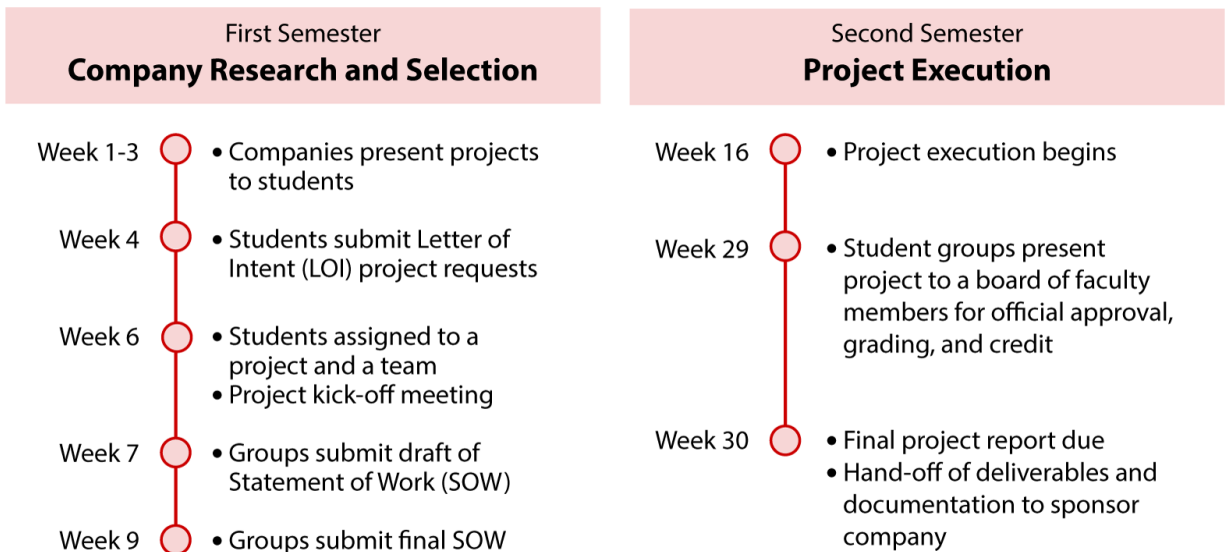
Faculty advisor - a faculty member who is a subject matter expert and can answer technical questions and provide direction for the students throughout the project.

Technologist in Residence (TIR) - the TIR is available to support both students and sponsors. The TIR can help resolve project management-related problems that stop project progress and cannot reasonably be solved by the students and/or the sponsor.

Marriott Library - the Marriott Library provides many valuable resources for researching project-related problems and technologies. Through the library, students can access valuable information and subscriptions to find solutions and learn new skills.

## Project Timeline

Sponsored capstone projects span two semesters. The first semester is used for project selection and planning. The project is executed in the next semester (about 30 weeks total).



## Project Planning and Execution

The student team consisted of three members, each with distinct technical and managerial roles. The main technologies used were SQL, Microsoft Power BI, Python, and REST APIs.

The project began with meetings between the student team and the sponsor to establish project objectives, scope, requirements, and timeline. The student team then met twice weekly to plan, review existing systems documentation, and determine what was needed to complete the requirements. The team collaborated via Microsoft Teams, using a Kanban approach to track project work and create accountability for teammates.

The first phase of the project execution was dedicated to creating data connections between the server and each data source. The next phase was cleaning and transforming the raw data into usable datasets with Power BI. Once datasets were ready, reports were built within Power BI desktop. The team worked extensively with sponsors to validate data and ensure accuracy. SharePoint was then utilized to present the dashboard with all its metrics in one central location.

## Challenges Faced

One of the biggest challenges the team faced was implementing the ManagerPlus API. This API was not publicly documented. It required many phone calls with Ace Disposal, ManagerPlus

sales representatives, and finally, an API developer at ManagerPlus. It took more than a month of communications and research to finally get the information needed to build the API, requiring much time to build.

Another challenge faced was an overestimate of work previously completed. It was soon determined that all of the existing data connections needed to be rebuilt and the Statement of Work was adjusted accordingly. This challenge was overcome by spending extra time on the project before the fall semester began.

## Project Results and Deliverables

The primary deliverable for this capstone was the Power BI dashboard accessible via SharePoint. Users can log in to SharePoint to securely and efficiently view the scorecard metrics. With these new tools and automated reports, AIRC employees will now be saving up to 10 person-hours per month. Generating the reports will no longer be a manual process, and the data will be timelier and more accurate for executives to analyze.

Employees of Ace Intermountain also have access to more historical data and to the Power BI service itself, allowing its users to gain a more granular understanding of the data in the SharePoint scorecard. It provides them with a platform to build new visualizations and find insights from the data. The company will be able to work internally and/or with future capstone teams to continue building and creating new ways to leverage this system's power.

## Student and Sponsor Feedback

### Student Team

“Personally, I just thought the project sounded interesting. I liked the company; they were very professional and, in their presentation, I could tell that they would be good people to work with - again just a gut feeling - but their presentation was very put together, very easy to understand for someone who wasn't super familiar with capstone projects or even big business projects or anything like that. ... Overseeing the project as a whole and getting some hands-on experience with all of those tools in one single project definitely helped to build my skills. I would strongly recommend the project. It offers so much experience, which is primarily what employers are looking for.”

– *Andy Adamson, project manager*

“Looking at Ace Intermountain’s project, from what they were describing and from what I understood, it was going to apply almost directly with some projects that I had coming up at work. I thought, ‘This will be perfect.’ That should help me a lot at work, personally, and career-wise in every sense. That’s kind of the ideal situation, right? You have a project that directly helps. So that's why I went with the project. ... I gained real-world technical skills with real-world situations and it's been benefitting my work projects.

We each had our own individual skills that we brought to the table, our own talents. Jared was super knowledgeable on the SQL stuff, Andy tackled the APIs really well, and I had previous experience with the Microsoft Power platform. Those were the three main things that our project included. We all were able to bring individual things that made the team successful.”

– *Connor Bryner, team member*

“It was definitely a good experience. Learning how to deal with a project, deal with things as they come up on the fly, dealing with sponsors and customers and that type of thing gave me some good experience. Most of it, for me, was dealing with my teammates and learning how to best communicate and plan and [help] manage the project.

You always learn new things and get put in environments that you are completely unfamiliar with. There's just a lot of learning to be done in that kind of space and it looks good on the resume to have a real project you worked on and completed. ... [I chose this project because] it seemed like a small company that I could really do a lot for, which I think also makes it fun. If you have a big, really technical company and they already know exactly what you're going to do, that's a very different project. Some people love that, to get really, really deep into one specific software. [But with this company's project] I felt like I could make a big difference; they would actually use what I did if I did it well. And to boot, Power BI was something I was interested in but hadn't really had a chance to do in my work.”

– *Jared Kujawa, team member*

## Sponsor

“I think every company should work with the MSIS program at least once. This program gives a chance for companies to get a fresh and broader perspective from students who are eager, motivated, and hungry to show what they've learned. We feel so lucky and are grateful to have been a part of this program. We love working with your students. We love working with your staff members. The whole process has been incredible.

When you think of hiring students as interns, there can be some hesitancy about who you are going to get. We knew that with the reputation that MSIS has, we would not have that problem. Both teams that we've worked with have been phenomenal. The biggest advantage of working with the MSIS program is the students. As they go through the program, they become critical thinkers. We're getting intelligent people who have exposure to a wide variety of technology and platforms. As we're working to accomplish these projects, they help us to see different alternatives and provide innovative ideas.

We don't like to talk money but we have to, right? We are a family-owned growing company in a traditional industry where there's not a lot of pre-built resources. We had to create some customized resources and we couldn't have done it without the support of MSIS. Being able to get a dedicated team was a game changer.

For the level commitment that was needed, to have such incredible people to work with and to see these projects come to life - it's a no-brainer. The numbers work, the math works. Just do it. It makes a lot of business sense.”

– *Cherie Anderson, Accounting and Communications Specialist, Ace Intermountain Recycling*