Teaching Cases

David and Goliath Meet Again: The Case of Antelope Trucking

Amy J. Connolly
conno3aj@jmu.edu

Carey Cole
colecb@jmu.edu

Computer Information Systems & Business Analytics
James Madison University
Harrisonburg, VA 22807, USA

Abstract

This case presents a classic systems analysis and design conundrum: how to incorporate new technology into existing ongoing operations without hurting the bottom-line? Antelope Trucking and Logistics, a small regional trucking business, is struggling to adapt its aging IT systems to take advantage of GPS capability. Because of the company's size and relative inexperience with technology, they don't the most efficient way to go about making this change. In the past, they successfully relied on CIS faculty and students from the local university to act as consultants and developers for small projects, but this new desired functionality impacts their core advantage: deliveries. Should the company negotiate with the incumbent vendor and possibly pay more than they should, further customize a stalled student project and pay less money (or almost none) but maintain full control, or seek out another solution? This case takes students through the decision-making process from the point of view of a small company entrepreneur, from problem identification to researching unknown technologies and ultimately how to make the final decision. It also introduces students to the complex industry of freight and logistics.

Keywords: Freight and logistics, systems analysis and design, geotagging, small business enterprise, GPS

1. INTRODUCTION

Julie Ireland put down the phone and sighed. She had taken yet another call from a truck driver reporting in that a load had been delivered to its final destination. As the President of Antelope Trucking and Logistics, she shouldn't have to take such calls, but half her staff was out sick with flu – probably from that student intern down the hall! Julie knew very little about building or designing information systems, but she knew there had to be a better way than having the phone ring off the hook. This was the 21st century after all. If her phone could automatically keep track of her whereabouts, why couldn't she do the same with her truck drivers? And how could she quickly and easily make that happen, without interrupting operations or potentially bankrupting her private company? Could that kid down the hall get it done? Would she have to go through the current logistics software vendor or would that IT guy laugh at her (again)? He was so hard to deal with; why did he have to speak to her so rudely, as though she didn't know anything about IT? Every time they spoke, she wanted to hang up

on him, which made getting anything done truly infuriating. Maybe she could go through the faculty member she met from the local university and he could talk to the vendor on her behalf; he knew IT terminology better than she did and he spoke to her like she was a human being. He seemed to have a keen business sense for what her company needed, and their last project together had been a wild success. He might be able to help her company update their current workflows to add geo fencing or geo tagging, or whatever you call it, to cut down on the exorbitant phone bills, not to mention the constant interruptions to daily operations. Julie picked up the phone to call the university and set up a meeting.

2. BACKGROUND INFORMATION

Antelope Trucking and Logistics was a regional boutique-style logistics and trucking company. In business for approximately 25 years, the company's annual revenue had grown to just under $10 million, effectively on the cusp of becoming a medium sized enterprise. As shown in the organizational chart in Exhibit A of the Appendix, Antelope's corporate structure was less command-and-control and more service-oriented. Because the truck drivers were the lifeblood of the company, the President saw her role as supporting them, not vice-versa. Although Antelope drivers hauled Business-to-Business (B2B) goods all over the United States, the company employed fewer than 100 drivers (full time and owner-operators), although that could change. Antelope took great pride in its "team culture" and engagement with the local community. It donated to local charities and most of its drivers lived in the region.

Although they carried and used smart phones like most people in the U.S., neither Julie nor her drivers were particularly tech-savvy. To save money and support local growth and because they didn't have a full time IT person on staff, Antelope regularly hired college interns to build highly-customized, albeit minor IT projects. Last spring, Julie spent about 50 hours working with information systems and media arts students in a blended senior capstone course. Students carefully gathered requirements and designed a new Peer-to-Peer website and database system to allow employees to reward other employees for excellent work. The student teams used .NET, SQL Server, and AWS to build their solutions. Using an agile approach, the teams completed three sprints over the semester. Based on their final solutions and on competitive presentations to the school which were judged by faculty and industry experts, Antelope worked with several additional students to install the proposed system. These two partnerships saved the company around $20,000 in development fees – not to mention subscription costs that other providers of this type of software typically demand. Additionally, despite the upfront investment of time, the experience taught Antelope quite a lot about creating a system from scratch and the various requirement gathering steps as well as setting up websites, databases and IT security from a high-level user perspective. However, Antelope did not have a project manager on staff to manage future projects such as this one.

Reflecting on her experience with the capstone class, Julie compared it to today. Antelope used a number of different computer systems to run operations. Its core business – deliveries – was managed through a system provided by Goliath Enterprises, and most of the information related to deliveries was in Goliath's product. Antelope needed a system to help track its deliveries in real time without requiring drivers to make voice calls with their physical locations, but to date, none of Antelope's vendors offered a system that worked the way Antelope needed it to work.

Further, Julie did not have time to invest herself and her company in another semester-long project nor the six to nine months it would take to wait for the new semester to start. Antelope needed this new capability as soon as possible. On the other hand, that process worked once; it might work again. And another wrinkle: would their contract with Goliath allow it, since the data would come from their system? Would Goliath cooperate, since they claimed to offer similar functionality (for higher fees of course) but it didn't yet meet Antelope's needs? She might need to consult with the lawyer on that. Julie felt like a David getting ready to confront Goliath without a slingshot.

2.1. Business Logistics and Trucking

Considering the amount of goods ordered and shipped online today as well as increasing consumer demand for good delivery, the trucking and logistics industry was more important and busier than ever. Amazon.com for example, delivered enough packages to convince the federal post office and FedEx to deliver on Sundays and holidays. A "worldwide $1.45 trillion logistics industry makes sure finished products arrive on store shelves or on our doorsteps" (Premack 2018). Trucks moved 71% of U.S. freight; driver shortages threatened to increase consumer prices across the U.S. in

coming years (Premack 2018). As a result of these market trends, Antelope experienced no lack of business transporting goods for Fortune 500 companies and local, regional companies.
In its simplest form, the primary business model for a trucking company was to move freight from one location to another. Typically, a trucking company used drivers who were employees and owner-operator drivers. An owner-operator is a driver who owns their own truck and works as a contractor.

Antelope received trucking jobs from repeat customers as well as what the industry termed "load boards." A load board is a nationwide computer database system for finding and posting delivery jobs. Antelope subscribed to find jobs posted on the load board. When a business customer posted a delivery job on a load board, delivery companies such as Antelope would bid on the job. The business customer then assigned jobs primarily based on two factors: low cost and reliability. The dashboard of the load board identified shipments, locations, and payments from many different companies. Antelope used the system to select which shipments it wanted to deliver. Once selected for and assigned to Antelope, the job listed the company and contact person, origination and destination addresses, dates and amount of payment. For an example of the load board information as it was manually entered into the Goliath system, see Exhibit B in the Appendix.

In general, Antelope selected shipments in the geographic regions where it had available drivers for a given time period. Antelope tracked and avoided certain areas and routes that they deemed "high risk" due to traffic, weather and other criteria. These criteria were considered when selecting a shipment. In many cases Antelope would confirm with drivers beforehand if they could handle a specific trip (especially for the owner-operators), to avoid committing to a delivery it could not fulfill.

After Antelope received a job assignment, it was free to determine the best route. After assigning and accepting the job, Antelope dispatched the driver to pick up the trailer at the customer's business location. Upon delivery, Antelope received payment from the customer and at the same time, paid the driver. In order to better manage jobs, reduce the likelihood of losses, and plan for future jobs, Antelope's business required that it know every location of a given load from pickup to delivery.

In the current process, a driver called the dispatchers at the home office to report the status of the load at multiple points along the route to keep the office informed of the load's location. For obvious safety reasons, Antelope recommended its drivers call only when they were stopped. As a general rule, drivers were expected to call when completing a shipment and if a shipment was delayed; the home office then operated on the principle that "no news is good news." Pursuant to federal and state laws, Antelope required drivers to take mandatory breaks along the route and they were not allowed to drive too many hours in a particular time frame. Rather than drive hours in excess of legal limits, drivers transferred the remainder of the job to a relief driver to complete the job. However, transferring a job from one driver to another required special logistics, such as finding an available driver in the area and planning a location to swap the load from one driver to the other. This process could be made simpler if Antelope knew where to find all of its drivers and loads at a moment's notice.

However, to date, Antelope relied on whoever answered the phone to update load locations and status updates in the database. This method was the only way for Antelope to tell the customer where the load was at any time. However, as Julie realized at the beginning of this case, this old-fashioned way of working – however effective it had been for her company when it was smaller – would quickly become a liability as they continued to grow. This outdated process was already becoming burdensome to operations.

2.2. Geofencing, Geotagging & GPS

For a small company with limited IT experience in-house, selecting a solution to a given problem felt daunting and cost-prohibitive. Although several companies offered GPS solutions for the trucking industry, Julie struggled with selecting a cost-effective solution. Although she had approached the current system vendor about this functionality, their solution did not work for Antelope's needs. Julie had read about geofencing and geotagging in a trade magazine and the terms stuck in her mind. These services promised to help her grow her company, engage with customers, and locate people's locations (Blair, n.d.). On the face of it, they sounded exactly like what Antelope needed.

Geotagging attaches a person's GPS location to a picture, social media post, or other interaction online. As drivers pass through a checkpoint and want to update their location on a job, they

could push a button to automatically text their GPS coordinates to the home office rather than calling. Similarly but in the other direction, with geofencing, companies tracked customers' locations and sent a message when a customer's phone went near a specific geographic region. Julie wondered if geofencing services might be used to track drivers' phones, but how to implement it was another matter. Could these marketing- and social media-based solutions work for trucks?

Additionally, the use of these technologies raised privacy issues for drivers, not while at work, but rather, after they went home. Drivers used their personal phones for work. Although employees and drivers were assumed honest and treated as part of the corporate family team, Antelope had no legal or ethical right to know drivers' locations when off-duty. What about when drivers took reasonable meal breaks while on-duty? Did she have a right to know whether they took five minutes or 50? What if drivers turned off their phone's GPS or forgot to turn it back on? Would the system stop working? Although it would be better to put GPS on the load or on drivers' trucks, these technical solutions required buying expensive physical devices, installing them and then training and expecting drivers to use them. Could she impose physical devices on owner-operators if they refused them? Again, these possibilities seemed cost-prohibitive and fraught with legal and ethical concerns for her small- to medium-sized business.

3. POSSIBLE SOLUTIONS

As Julie reviewed the existing systems to evaluate her options, she reflected on which one might best fit Antelope's needs. Her company used a plethora of different computer systems, from different vendors, and these systems did not yet talk to each other. How could GPS functionality be incorporated into or piggybacked onto the delivery system without delaying deliveries?

3.1. Goliath: The Current System Vendor

The heart of Antelope's operations, its freight delivery jobs, were tracked through a proprietary database run by an outside software company named Goliath Enterprises. Goliath hosted and maintained the system and Antelope paid them a fair price to do so. However, Goliath's tech support person was difficult to deal with. When asked a question, his answers were curt and confusingly filled with technical jargon. He often acted as though he didn't understand what Antelope was asking or why it was asking him for anything at all. At one point, Antelope had briefly tried some of Goliath's add-on services, but they didn't work as promised. At this point, Julie was not sure whether to trust Goliath's system to do what Antelope needed it to do, but if they discontinued their relationship with Goliath, it would have a major impact on daily operations. Drivers and vendors might not get paid. Antelope might not get paid by its business customers. How would Antelope transition from one system to another? Would Goliath cooperate or continue delaying or trying to upsell Antelope to buy additional functionality they didn't want?

From a business standpoint, Julie understood that a major source of conflict with Goliath lay in the fact that Antelope was one small client among many and thus, not a top priority. Goliath's product was specialized for logistics companies of ALL sizes. Goliath's interface was as complex as an airplane cockpit panel, displaying all the information about a job on one screen. Logins were limited and costly to obtain, and errors difficult to back out. Therefore, only trained admins at Antelope were allowed to use the database, because a mistake in Goliath could directly impact Antelope's $10 million in revenues. However, by relying on Goliath's system, Antelope risked putting its competitive advantage in someone else's control. Antelope wanted to be more efficient and not grow too big, too quickly.

3.2. Fleetr: Stalled Side Project or Workable Solution?

Six months prior to Julie's dilemma, to support the local university and in an attempt to bolt-on GPS functionality, Antelope hired two IT students to build a new, standalone database. Thus, Fleetr was born. Based in PHP and MySQL and hosted in Google Cloud, Fleetr provided a simple login interface for drivers with smartphones to update their individual load status. Antelope owned the rights to Fleetr and paid approximately $50 per month to host it on Google Cloud. Fleetr was easily scalable for additional fees paid to host Google Cloud storage space. Example screens from Fleetr are shown in Exhibit D. The first figure identifies the loads available for a specific driver. The other figures show the critical check points that Antelope wanted to capture from the drivers with the idea being a driver had only to select the continue button to identify their location. Antelope knew this system was an incomplete solution for now, but they hoped it would provide a means to capture and display the most important information quickly.

Fleetr felt incomplete because there was no real time entry of data. In order to work, Fleetr required manual transfer of data from Goliath. Jobs could be entered in Fleetr in one of two ways: manually by an admin or by uploading a spreadsheet from the Goliath system. However, this spreadsheet from Goliath was proving impossible to acquire. As a result, load information had to be entered twice: once into Goliath and then again into Fleetr.

Fleetr was designed to use the same primary keys as Goliath, to facilitate matching and ease of updating. Fleetr assumed that the latest data from the vendor's system was accurate so any information input from the vendor's system overwrote what was in Fleetr. The cost to add jobs in Fleetr was minimal from a data storage perspective but costly from a human resources perspective.

Fleetr's workflows were incomplete and costly in that when a driver updated the job status in Fleetr, the system sent an e-mail to the home office with the driver's update message. This process saved time making and answering phone calls, but was only a half-measure. It still meant someone at the home office had to update the job in the Goliath system because Fleetr and Goliath did not talk to each other. Fleetr could not be used to update Goliath at all, because in addition to the legal ramifications, Antelope did not want to potentially open a backdoor into the Goliath system that could affect Goliath's other customers.

As part of a Phase 2 effort for Fleetr, Antelope hoped that there could be a real-time or close to real-time feed into Fleetr from Goliath. This option would allow the data to be input more quickly and easily and make the process and data more accurate and efficient. However, Antelope struggled to reliably get up-to-date job information from Goliath to update Fleetr. Fleetr was originally set up with partial data which was now out of date. Further, over the course of the past 3 months, communication with Goliath to create this sync process had broken down. Initially, Goliath stated they could provide the data via SQL queries, if Antelope provided the exact fields needed, which they did (see Exhibit C). Goliath later reversed its position and sent a partial list of data they would extract from the database. This incomplete data was useless to Antelope for making Fleetr work, and Goliath stated they would not provide any more data without charging fees. Julie suspected that Goliath's reluctance was a thinly veiled attempt to strong-arm her company into purchasing additional services.

4. DECISIONS

Julie firmly believed that Antelope could no longer operate effectively without GPS-tracking its loads. The current situation placed the company at a competitive disadvantage. With a new Amazon headquarters moving in practically next door and a volatile market predicted (Premack, 2019), Antelope wanted to be poised to meet future market demand. One concern with Fleetr was the relative inexperience of the student developers. Was it time for Antelope to hire a technical person to work for them full-time in order to create and support these types of systems? Maybe this person could also support their PCs and network (rather than outsourcing those services)? Would they be better served hiring a consultant or professional development company to finish the application? If so, how to support the finished product? Would Antelope be better off with a custom solution? How long would that take? Could Antelope afford this option? And wouldn't the consultant also butt heads with Goliath concerning access to the live data? This option might be an expensive exercise in futility. Or should Fleetr and Goliath be scrapped entirely in favor of another vendor with the needed functionality? How would Antelope transition to the new system? What would it cost?

5. REFERENCES

Blair, I. (n.d.). "What is geofencing? The best answer ever." BuildFire. Retrieved from https://buildfire.com/what-is-geofencing.

Premack, R. (2019, Aug. 29). "The leading industry group for truck drivers has declared we're hurtling toward a trucking 'bloodbath'." Business Insider. Retrieved from https://www.businessinsider.com/trucking-bloodbath-ata-truckers-potential-2019-8.

Premack, R. (2018, Nov. 13). "Household staples from Hershey's chocolate to Crest toothpaste will get more expensive next year, and executives are partially blaming the 'overrun' trucking industry." Business Insider. Retrieved from https://www.businessinsider.com/truck-driver-shortage-price-increase-amazon-prime-hersheys-2018-11.

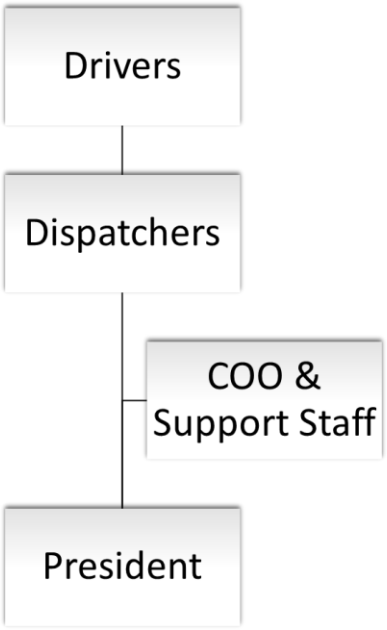
6. ACKNOWLEDGMENTS

This case is based on a real trucking company and an actual problem they faced, although we have taken some liberties with the details. Names have been changed to protect their identities.

ISSN: 2473-3857
v5 n5102

APPENDIX.

EXHIBIT A. Antelope Trucking Corporate Structure



ISSN: 2473-3857
v5 n5102

EXHIBIT B. Job Load Data Entered into Goliath Database

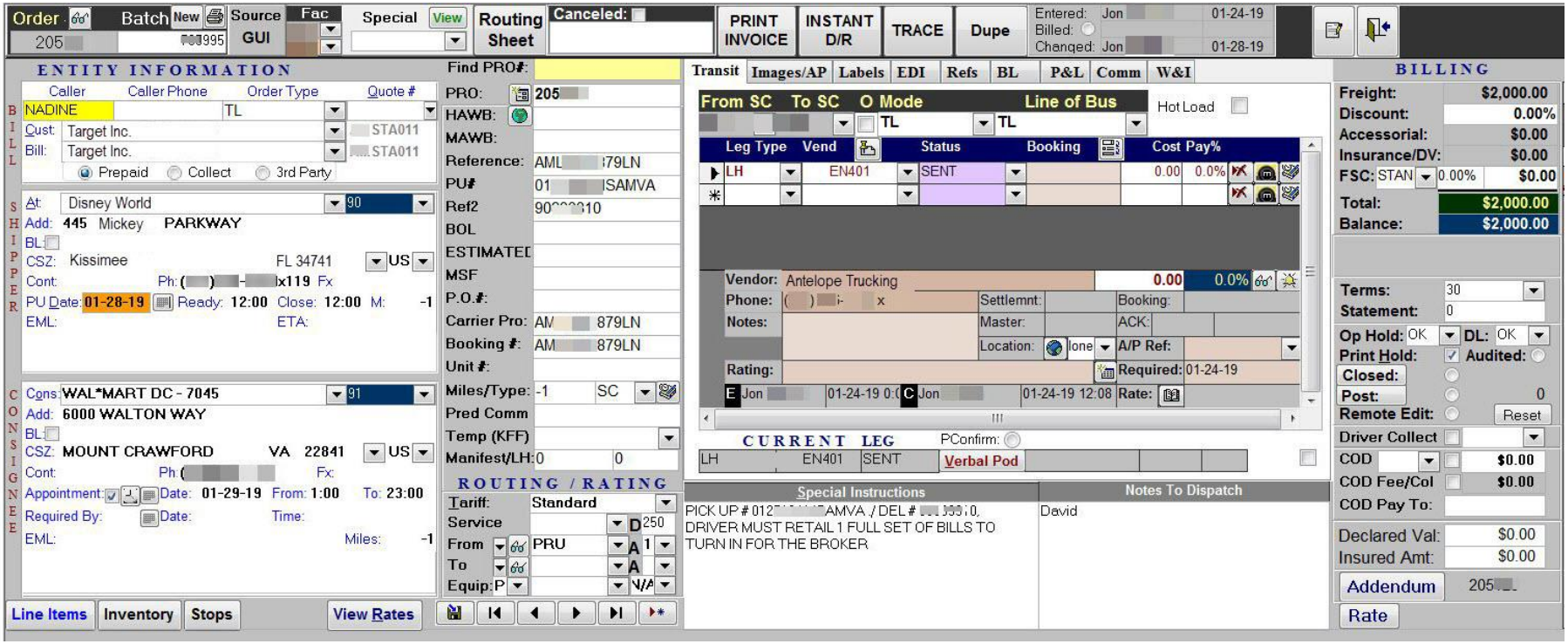


EXHIBIT C. Sample Data Extracted from Goliath Database

LoadID
CompanyID
DriverID
Origination Address
Origination Contact Person
Destination Address
Destination Contact Person
Special Instructions

Note: The LoadID is a unique identified used for this shipment. The DriverID provides the key to the Drivers information such as name and telephone number that is stored in another table. The CompanyID does the same thing as the DriverID except for a company.

ISSN: 2473-3857
v5 n5102

EXHIBIT D. Fleetr Documentation Examples

Driver Smartphone Application