Lemay.ai
1505 Laperriere Ave
Ottawa, ON K1Z 7T1
Canada

sales@lemay.ai
lemay.ai

Lemay.ai

Case Study:

Enterprise AI Adoption Within the Meriplex Datacenter

A review of constraints, solutions and outcomes of the digital transformation through adoption of artificial intelligence and machine learning pipelines

Prepared for:
General Public

Approved for Public Release

Version B
2022-04-12

Executive Summary

Enterprise adoption of artificial intelligence often faces constraints from multiple stakeholders. Meriplex, a nation-wide Managed IT and Security Services provider, was facing increasing workloads and labor costs due to their successful expansion and national growth. Although some level of automation had already been implemented, many more successful outcomes were realized after implementing a more thorough culture of digital transformation through artificial intelligence, with the Lemay.ai team acting as a key advisor and implementer.

The Meriplex team established early on their target measures of success for the project: reducing the staff's ever-increasing workload and improving customer response time. This provided guidance to the Lemay.ai team's directed data research efforts, clear project prioritization, and integration within the Meriplex ecosystem. Upon project completion, tangible improvements were measured and the target outcomes were accomplished.

In this case study, we explore the challenges and difficulties faced by the Meriplex team, the initial project scope developed and implemented by the Lemay.ai team, and the successful business outcomes from the implemented.

Background

Enterprise Growth at Meriplex

The endeavor to improve and scale processes simultaneously is complex and has many moving parts. These efforts often present the challenge of hitting a moving target, especially when the business is growing at record speed. This is true for Meriplex, which has grown through geographical expansion, sales revenue, and EBITDA consistently from 2020 through today.

This growth has created a need for greater optimization and automation of standard customer service tasks. Their operational teams had to quickly move from a single city and regional support model to a nationwide service model that blends operational practices from different managed service providers.

The Operational Support System (OSS) at Meriplex is a popular Professional Services Automation tool (PSA) used in small MSPs. This platform can provide businesses with Customer Relationship Management (CRM), Sales Quoting and Product Catalog Management, Service Orders, Ticketing, Project Management, Procurement, and Invoicing. As a swiss-army knife operational support tool, the platform does many things, but none of them exceptionally well. Meriplex needed a solution to address the inefficiencies of the PSA at scale.

Information Technology Environment

The Meriplex artificial intelligence (AI) project is a crucial part of an IT vision that introduces Meriplex to a mid-enterprise approach to managing data and leveraging information technology platforms at scale. This has been an ongoing effort to create the model, teams, and vision to sustain a national expansion and increased sophistication.

Meriplex has developed an aggressive ERP strategy going forward, but the plan requires extensive coordination and planning across many systems (CRM\HRIS\OSS\BSS) The plan is large in scope and while the final funding and planning needed to be finalized, Meriplex agreed that the AI portion of the program was low-hanging fruit and should be considered on its own as dependencies were minimal. Meriplex decided, based on industry trends, that adding an AI learning and automation solution to the PSA would create value for the business in several ways. The value of such a solution would be realized by reaching the following success criteria:

- Reduce dispatcher hours from over 80 to less than 20;
- At least 5% of tickets closed by customers without support personnel involvement; and
- Over 90% of daily support tickets successfully identified and routed.

Meriplex created the following problem statement and allocated budgetary funds for the project:

> *"Meriplex needs to scale operations as we grow organically and inorganically. Operations teams are inefficient in critical areas of dispatch and processing routine tickets. Our goal is to leverage AI and automation platforms to bring quality, stability, and scalability to the service ticket management process."*

Adopting AI

AI Partner Selection

Meriplex evaluated several partners and solutions to address the business's automation and scalability issues. These partners could be separated into two categories: artificial intelligence & machine learning consultants, and automation specialists. The decision team comprised of:

- SVP, Information Technology M&A and operational leadership;
- VP Operations;
- Director, Service Desk; and
- Director, NOC.

The automation-focused partners outlined how to create workflows using tools such as Robotic Process Automation (RPA) solutions but did not have a solution for handling exceptions or learning from the data. Meriplex wanted to ensure that the partner selected added value through automating tasks for employees and moving Meriplex towards supporting technology as a core competency and a company that uses technology to improve the bottom line. This requirement eliminated "automation only" partners.

The more focused AI partners were Amelia and Lemay.ai. Amelia is an AI-enabled chatbot that interacts with customers and technicians to address common support issues or route customers to the right support desk. The technology is delivered on the desktop through an application like Apple's Siri or Amazon's Alexa. The solution was marketed very well and appeared to solve many more issues than just dispatcher efficiency. The detractors from the Amelia solution were costs and time to implement, as it would have taken at least a year to implement.

Meriplex management first learned about Lemay.ai from an article authored by Daniel Shapiro, Ph.D., Lemay.ai's CTO. An introductory meeting was quickly scheduled for members of both companies to learn about Meriplex's goals and the approaches Lemay.ai had in mind. The diversity in Lemay.ai's prior work had familiarized the consultancy with challenges and effective solution patterns common to the MSP industry, and both parties agreed on the scope of a pilot project. This initial phase focused primarily on learning as much as possible about Meriplex's historical ticketing data and getting a sense of the predictive power contained in the dataset.

Project Execution: Solution Overview

Meriplex built a dedicated virtual server environment for the AI engine processing and placed the servers in the primary data center in Houston. A separate PSA development environment was created to ensure all testing was independent of any other testing within the platform. Once the infrastructure was in place, Lemay.ai began investigating and learning the PSA database and API capabilities. The Lemay.ai team demonstrated an outstanding ability to adapt to Meriplex's environment and quickly understand an entirely new platform for their team.

Meriplex partitions client support tickets over several ticket boards to organize and allow dispatchers to focus on a specific subset of incoming issues. When a client submits a support request, automated systems attempt to fill out the ticket's details (such as the company that sent the ticket, or the site experiencing the issue). These automated systems are constantly challenged by the acquisition of new companies, the onboarding of new clients, and the resulting addition of new tickets to the already substantial inflow of incidents. The native automated

systems often lack the information to fill out ticket details and leave the ticket on the landing board.

Lemay.ai designed intelligent decision-support systems for diving deeper into these difficult-to-resolve tickets and inferring missing details. Lemay.ai also developed the functionality required to automatically identify the board to which tickets should be moved (and perform that change), update ticket status, and create bundles from tickets received from the same company quickly. These intelligent automated systems were integrated into the PSA and put into production in the summer of 2021 as further development efforts continued.

Technical Detail: Exploratory Data Analysis

Exploratory Data Analysis (EDA), the first significant data phase, has two main goals: identifying preliminary trends and behaviors and uncovering surprising insights. This means that EDAs should not conclude after having found the insights pertinent to the tasks at hand, but instead continue to allow the assigned data scientists to examine the data from multiple viewpoints to find nuances, unforeseen patterns, and opportunities for future improvements.

Lemay.ai identified many informative patterns that guided the design and development of the Meriplex systems. The preliminary EDA phase also revealed several redundancies in how tickets were labeled. Although Meriplex was aware of these redundancies and the ticket labeling practices that evolved over the years, the Lemay.ai teams had not quantified the extent of this evolution or the negative impact on automation efforts in the past. These findings led Meriplex management to launch efforts to formalize and unify the ticket labeling practices, thereby paving the way for additional assistance from automation.

Technical Detail: Acknowledging the Pareto Principle

According to Lemay.ai, a common drive of machine learning development is the desire to increase a model's performance continuously. However, this pursuit for excellence is often met with the reality of diminishing returns. Lemay.ai's experience showed that these ventures must overcome the enormous efforts required to increase the performance of a model without any material gain (such as increasing an f1-score from 93% to 94%, an immaterial change once deployed).

Lemay.ai showed that a simple compromise solves this problem: developing, testing, and deploying an early solution to begin capturing business value quickly can be matched with iterative model improvements in the background; simple models first followed by complex models later. Doing so required the initial EDA to be carried out more thoughtfully, as the need to identify where the bulk of the problem lies was the priority. It also requires a means to record and report mistakes. Once these items and the initial solution were in place, the team was able to monitor the solution's performance and correct it as needed.

Lemay.ai's engineers tracked the systems' performance and established a protocol for dispatchers to report the mistakes they came across. They also instructed the intelligent automated systems to carry out a ticket handling operation only if it was sufficiently confident in its prediction. This confidence threshold allowed Meriplex to be comfortable with the solution and place it into production while beginning to capture business value by handling a significant portion of tickets, those that the intelligent systems could confidently handle while reserving the exceptions for the dispatchers. The system's performance was then monitored and adjusted as needed.

Challenges and Obstacles

Organizational Shifts

Meriplex's operational teams prioritize customer success and satisfaction. These company values were at the core of the decision to experiment with a re-organization of ticket boards and dispatcher assignments. This required the intelligent automated systems built using the previous board layout to be shut off during experimentation (approximately 90 days).

Meriplex design issues caused the delay in the project. The types and subtypes used in the database were concentrated in two or three areas of focus with far too many outlying categories. The "board clean-up project" was subsequently launched to address this issue. However, as the project moved forward, the impact of changing these boards became more than the operational teams could absorb. The decision was then made to finish the AI project with the existing bards and work to create fewer, more effective types and subtypes when the system is migrated to ServiceNow.

The lesson learned while addressing this challenge was that a well-intentioned reorganization project needs to be socialized with all key stakeholders. This initiative began with a department not familiar with the AI implementation. It was allowed to proceed without fully understanding the impact on the business or the investment in the dispatch process and was ultimately unsuccessful because the stakeholders were not aligned.

Scoping and Re-Scoping

The project team observed the need to refine and even re-define the project's scope during its early phase, and according to Lemay.ai, this is a common occurrence. This is often the case when the initial data science uncovers unexpected insights or a lack of predictive power for a specific task. However, re-scoping efforts are only successful if all parties agree with the new project direction, both in terms of business direction and technical requirements. The project team was always willing to re-examine the scope of the project's phases and clearly understood that these rescoping efforts were in the organization's best interests. Meriplex employees from all organizational levels were always involved in scoping and re-scoping discussions to provide their input and insights.

Project Successes

The LIAS intelligent ticket routing platform entered full production on July 6th, 2021. During its 53-day pilot period, Lemay.ai's intelligent automated systems reduced Meriplex dispatchers' workload by approximately half (See Figure 4 below). More importantly, the intelligent automated systems could scale and handle sudden spikes in inbound ticket volume; this traffic was anticipated after noticing the dynamic nature of inbound ticket traffic. These spikes were troublesome for dispatchers as they can easily overwhelm their immediate capabilities and create a significant and lasting ticket backlog.

Backlogs are a core issue as they can lead to a cascade of increases in failures to meet Service Level Agreements (SLAs), thereby affecting Meriplex customer satisfaction metrics and potentially increasing cost through credits issued due to SLA breach. The systems' scalability was therefore essential during the design and development phases. As shown in Figure 5 below, these efforts were worthwhile: the intelligent automated systems helped handle a flood of over 4,000 tickets on August 2nd, 2020, by handling nearly 3,000 tickets/hour (which is still far below its throughput capacity).

These highlights were the motivation for subsequent project phases; the intelligent automated systems' efficiency and the support they provided to Meriplex dispatchers demonstrated their added business value. The aftermath of spikes in inbound ticket traffic on boards that were not tracked by the intelligent automated systems was an additional reason to have them listening on more ticket boards. The second iteration of our intelligent automated systems also enabled them to carry out even more ticket handling tasks. Lemay.ai's conservative forecast estimated that they could have carried out approximately 400,000 additional ticket handling operations during the 46 days following the pilot phase.

Contributions to the Project's Success

Meriplex and Lemay.ai emphasized transparency and fostering a long-term partnership from the beginning of the project. Also, pursuing a project with insufficient predictive power in the data is detrimental to all parties, so the commitment to solid data collection led to higher success rates. No project is perfect, and while there were delays in schedule and re-scoping, the project team viewed these setbacks as a necessary part of the journey. The project remained under budget, and Meriplex and Lemay.ai recognized the project's benefit in many direct and ancillary ways.

> *"Ever since we implemented the AI platform, I spend more time solving real problems rather than just point and clicking in the system."*
>
> – Dispatcher, Meriplex

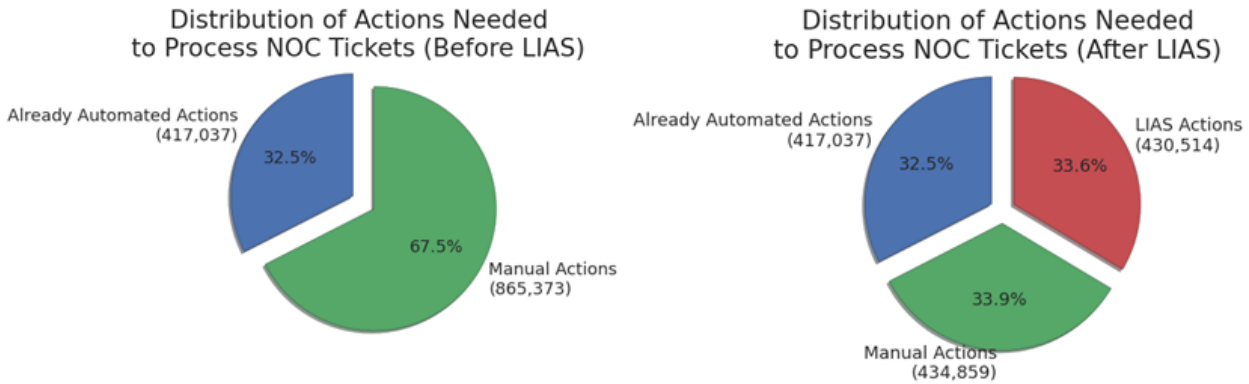

Figure 1: Distribution of the ticket-handling operations (actions) required to process NOC tickets during the 53-day pilot period before (left) and after (right) the integration of Lemay.ai's Intelligent Automated Systems (LIAS). Lemay.ai provided data reports.

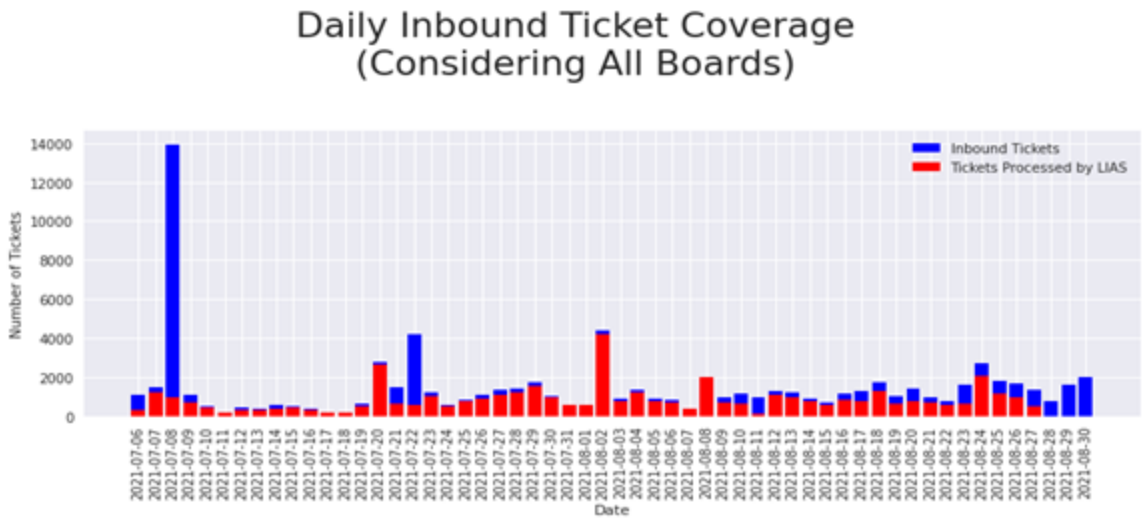

Figure 2: Number of tickets received on all of Meriplex's boards (blue) on a daily basis and the number of tickets landing on the single board that Lemay.ai's Intelligent Automated Systems (LIAS; red) automatically processed. Lemay.ai provided data reports.

Technical Success: The Predictive Power of Data

The initial alignment meetings served to identify the project's requirements and its desired business value; this component was expressed to Lemay.ai, and they tailored the solution architecture and system design. These meetings produced a list of solution patterns Lemay.ai has implemented during its years of work across various industries. Assessing these solution patterns' applicability was completed during the preliminary data science phase.

The initial assessment and investigation revealed that the data possessed considerable predictive power. Still, as mentioned in the challenges section, the initial project scope would not be as profitable from a business standpoint as some of the ideas brought forth by Meriplex's dispatchers. However, since the data's predictive power was well suited to address these opportunities, all parties agreed to re-scope the project. This decision contributed to the project's success.

AI and machine learning practitioners, such as Lemay.ai, are familiar with model-specific performance metrics like accuracy, precision, AUROC, and f1-score. It is essential to distinguish these metrics from a project's business KPIs. The former is used to describe the performance of a model in a training environment. In other words, these metrics represent the model's expected performance without considering the project's business context. On the other hand, measures of success focus on high-level, integrative aspects of the project and its deliverables. They are directly tied to the project's business goals.

Some of this project's measures of success, for instance, related to the number of accurate ticket handling operations and the portion of tickets that LIAS could confidently handle. But regardless of their specific definitions, a model's performance is only as good as the problems it solves. Perfect models are effectively worthless if it does not resolve a business need, and the LIAS platform was meeting those needs.

Project Success: Trust and Transparency

Meriplex and Lemay.ai shared the freedom to explore and benchmark different approaches from the start of the project. Lemay.ai reports this is not always the case; some of their past and present clients have suggested models considered during their projects, and they usually were forced to prioritize these approaches during development. Meriplex and Lemay.ai proved to remain open-minded. Lemay.ai's experience has taught them that comparing many solutions' performance (both in the lab and in the real world) is the most effective way to identify which model best suits the task at hand, and Meriplex was supportive of this approach.

Lemay.ai's methodology ultimately required Meriplex to consider models other than those initially suggested. Meriplex was keen to compare different solutions and trusted Lemay.ai's model testing and selection approach. Lemay.ai also provided many technical reports describing the implementation, mathematical foundation, assumptions, and expected performance of every solution pushed to production. These reports established significant trust and confidence in the science behind the technology while ensuring transparency.

Project Success: Engagement from all Organizational Levels

Meriplex's emphasis on including members from all organizational levels in the decision-making process was critical in this collaboration. Everyone - from Senior Vice President and Senior Operations Services Managers to newly hired Dispatchers - was encouraged to attend meetings and provide suggestions. Input from all attendees was always considered equally, and new team members

quickly received a debrief to bring them up to speed. These points demonstrated Meriplex's internal management practices, and our approach to innovation and collaboration proved crucial in this project's multiple phases.

> *"The AI platform helping dispatchers is just the beginning of how Meriplex can leverage new technologies to serve our customers better. I'm looking forward to the next stage of development where SLA tracking and the auto-response features keep our customers informed and happy."*
>
> – VP Managed Services, Meriplex

Project Success: Creating Value

The AI project at Meriplex proved to be a value creator, process improvement tool, and platform to launch many other value-building projects in the future. The areas of business that were positively impacted by the project are the following:

- Direct cost savings through reallocated headcount
- Error reduction and quicker response times (resulting in happier customers and reduced revenue churn)
- Improved employee value proposition by making work more meaningful and focused on helping customers while growing technical skills
- Created a private equity platform differentiator which will enhance the value of the business at PE exit
- LIAS leveraged to bring the same scalability across many other time-consuming processes such as resource assignment or scheduling

The ripple effect of creating systems that improve efficiency flows to the sales and marketing teams. Improving the services' perception shortens sales cycles, improves close rates, and increases the sales team's confidence. Even modest bumps in these important metrics result in greater value for the business at scale.

Meriplex and Lemay.ai are proud of the success and work put into this collaboration. A rapidly growing company looking to assist its employees with their ever-increasing and unpredictable workload can successfully leverage automation and AI to achieve its goals. Innovation is often overlooked in the MSP world as much of the software and tools are out-of-the-box, but with the emerging field of machine learning, a business that historically relied on manual data manipulation can scale quickly. The AI Project at Meriplex is a stepping stone for true enterprise growth. The contribution and participation across the many business units involved improved the culture of innovation at Meriplex and demonstrated how collaboration and support could result in better customer service and improved morale while positively impacting the bottom line.

Contact Information

For all enquiries, please contact:

Lemay.ai
1505 Laperriere Ave
Ottawa, ON K1Z 7T1
Canada
lemay.ai
sales@lemay.ai

Meriplex Communications, Ltd.
10111 Richmond Ave #500
Houston, TX 77042
United States
meriplex.com
+1 (281) 404-2300

Attn:
Macy Horne
mkirk@meriplex.com