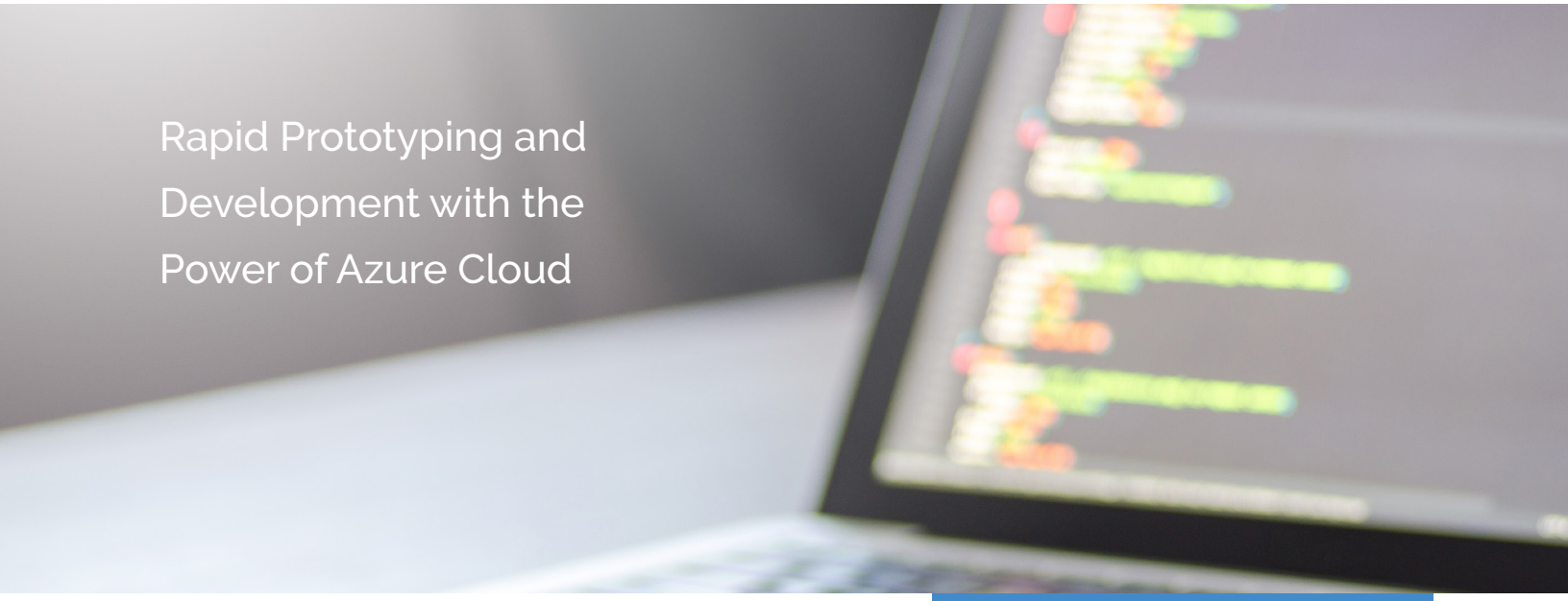
MONZA CLOUD

CASE STUDY:
Pratt Industries



Rapid Prototyping and Development with the Power of Azure Cloud

About Pratt Industries

Pratt Industries is the world's largest privately-held, 100% recycled paper and packaging company. This leader in green energy solutions employs more than 6,000 "green-collar" employees across their manufacturing facilities in 27 different states. While they are perhaps best known for their recycled paper processes, Pratt has a new clean energy facility in Conyers, Georgia that may augment that renown—this new facility is now part of Pratt's effort to power 100% of their manufacturing through renewable sources. In addition to paper recycling and renewable energy production, Pratt also maintains Pratt Plus, a specialty online store that markets packaging supplies sourced primarily from their recycled materials (namely, recycled corrugated cardboard boxes for resale).

"Using AzStudio, we rapidly prototyped new ways of managing our in-plant operations with a revolutionary IoT platform. The tools and practices really enhanced our ability to be innovative."

—Dennis Fleming
Sr. Director - IT
Pratt Industries USA

Over the past twenty years, Pratt Industries has seen significant growth both domestically and internationally as they have expanded their offerings to more broadly include manufacturing, energy production, logistics, and point-of-purchase retail displays. As a result, the company has been forced to rethink their operation logistics in attempts to streamline their processes and find more efficient solutions within their ever-evolving business model.

Pratt Industries' Challenges

More specifically, as their manufacturing initiatives grew, Pratt Industries recognized the importance of closely tracking their products from the factory floor, to the shipping vehicle, and beyond.

Despite having in-house tracking protocols in place, however, the IT team continued to encounter frequent errors in tracking shipments from the palletizing point to the loading zone, resulting in misplaced and lost items before the pallets had even left the manufacturing warehouse. Pratt's original tracking protocols required that, after each pallet was prepared for transport, the forklift driver would use a tablet to physically scan the tracking barcode affixed to each pallet. The issue with this method, however, was, if the tablet lost connectivity at any point during the scanning processes, then all scans performed during the "offline" portion were lost, and therefore left undocumented.

While there were temporary fixes that could be made in-house for the tablet connectivity issues specifically, Pratt recognized their need for a more sustainable solution that would deliver reliable results every time—allowing them to seamlessly track in real-time their products from the terminus of the manufacturing line, through the manufacturing facility, and finally onto the shipping vehicle itself. With limited developer time and a strict IT budget, the Pratt R&D team needed to perform an economical PoC through prototype testing before investing significant capital in any system or technology implementation.

What They Needed

With this new tracking system initiative, Pratt's primary concern was to increase the safety of its employees—especially those operating the forklifts—and to eliminate errors associated with shipping in an increasingly complex manufacturing environment.

Pratt needed this new tracking system to increase efficiency as well as reduce operational hazards on the warehouse floor (more accurate tracking and triangularization technology would mitigate the number of lost packages and pallets obstructing the forklifts' routes). Moreover, the R&D team needed to be guaranteed speed-to-delivery of the prototype itself. They needed to be able to architect, thoroughly test, and rapidly develop a workable prototype to remain competitive in a market where margins are thin and competitors are constantly advancing.

Ultimately, Pratt's R&D team understood how the tracking solution should work and what its capabilities needed to be, but they had little understanding of how to develop and implement the infrastructure and software necessary for the job.

What the team did determine was that they needed a system that would track their products in real-time. Most importantly, the system needed to be able to function offline, effectively storing tracking information on premises to be batch uploaded later at night. Again, they knew what they needed; they just didn't know how to get there from a development standpoint—not to mention the fact that, with their time and budgetary restrictions, custom coding was out of the question anyway.

They began searching for a tool that would enable them to get a minimally viable product (MVP) up quickly for their PoC.

What AzStudio Enabled

Eventually, the Pratt team decided to pit their challenges and all prototype demands against a theoretical Azure cloud environment, leveraging the intuitive developer tools of the Monza Cloud AzStudio suite to make it happen.

With the user-friendly construct of AzStudio software, the R&D team began the process of developing and testing the future software prototype for tracking their products using distributed beacons throughout their warehouses. After a short initial planning period, the R&D team determined that the entire process would involve three major steps that built off of one another sequentially:

1. RFID reading and positioning tests
2. Functional mockups and stress testing
3. Wettagging and bluetooth beacon (BLE) testing

Because the AzStudio development tool automatically provided 95% of what Pratt's team would need to perform the functional tests (without any additional coding necessary from their developers), the R&D team was able to begin work on the prototype with minimal research and preparation required.

Analyzing the Problem: AI Testing and Preparatory Work

From that intrinsic AzStudio foundation, the team began planning for necessary capabilities of the prototype to ensure that the system could function offline, even in the face of connectivity issues. Pratt needed to be sure that any tracking information stored off-line would then be batch-uploaded each evening—a guarantee made immediately possible by the AzStudio framework.

Next, in order to facilitate real-time tracking, Pratt's team decided to test a concept where they would have to strategically position RFID tags throughout their warehouse and on all major palletized products to create a virtualized map through a form of sensor triangulation. Scanners installed on each forklift would read the adjacent beacons and report back to the tracking system where the forklift itself was located within the warehouse, granting a real-time orientation display for the workers to navigate by. In congruence with this, the RFID tags on the pallets themselves would orient and direct the workers more efficiently towards the products that needed to be retrieved and shipped—with every tracking detail recorded for operational posterity.

Encouraged by the prototype design and the rapid software development enabled by the AzStudio framework, Pratt's team began the initial phase.

PHASE 1: RFID Proof of Concept

The first phase involved testing the hardware, the RFID wettags, and the linking system itself. Pratt needed proof that the RFID readers could be read in real-time while relaying accurate positioning information both to the documentation system and to the tablets on the floor.

After initial testing, Pratt's team determined that the RFID technology and AzStudio-enabled software could indeed support this initiative. Using AzStudio's intuitive GUI, the R&D team began directly linking pallet numbers with the RFID tags to then be delineated individually using the AzStudio entities module in the system with assigned tasks and then tying them together by using the AzStudio queue module to build workflows. Each entity defined which item the RFID tag was attached to, whether it be product, forklift, or warehouse structure (for positioning purposes). These product-specific RFID tags could be programmed to convey more specific details like what type of product was within the pallet, how much it weighed, where it was normally stored, its shipping requirements, etc. Moreover, the team would be able to accurately track workflow through the AzStudio-enabled queuing system and then record all of the information in a NoSQL database (for its massive storage capabilities).

Pratt's R&D team was satisfied with the positive results they achieved by using AzStudio as the foundation for their PoC. From there, it was AzStudio's modular architecture that allowed Pratt to rapidly push towards a functioning prototype. By structuring the application around modular plugins, Pratt could rapidly develop new ideas into functional packages for testing during the PoC, create a variety of functions, build modules for antenna reading APIs, and ensure that speed and security of the monitoring system would not be compromised if it went offline. AzStudio's framework would help to fight against appsprawl as well and would make development especially fast as developers did not need to rely on a webapp for delivery.

PHASE 2: Functional Forklift Mockup

Using AzStudio's intuitive GUI, Pratt's team then built a representative mockup of their main warehouse environment to test the real-world functionality of their newly developed application.

This scaled down runthrough of the software involved RFID-tagged boxes and pallets, a mock forklift, and active RFID readers. Team members simulated the process of picking up, transporting, and randomly dropping off the tagged boxes. After the demo concluded, Pratt's initial prototype system had proven itself fruitful: the application successfully interpreted data from the various RFID tags, locations, and movements that were demoed by the team. The prototyped system delineated in real-time the path of the product, even providing details for dropped or missing pallets, by accurately relaying the last "breadcrumb" data point within two feet of the pallet in question.

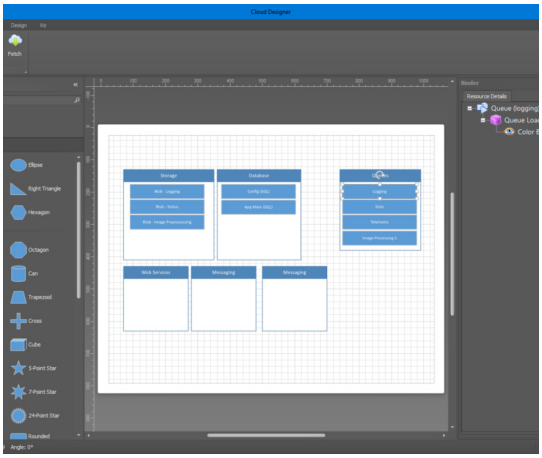
With AzStudio software tools and integrated GUI, Pratt's team was able to consolidate the RFID-based environment into an interactive, "gamified" map of the demo warehouse (e.g. the floorplan, the warehouse layout, key points of access, etc.). Pratt's team would be able to use the system as a test visualization tool to perform "what-if" scenarios and play them out in real-time. Using AzStudio's streamlined GUI, not only could the team watch the streaming data live, they also had the option to replay the documented data of the product movement for further review

However, the testing revealed some drawbacks to the proposed system. If Pratt Industries were to rely on the plugins and RFID tags alone, they would need wettags situated throughout the warehouse—every few feet—to provide viable results. They needed a more practical answer for deployment in their 100,000+ sqft warehouse environments..

PHASE 3: Wettagging and Bluetooth Beacon Testing

After some initial troubleshooting, the R&D team determined that they could, instead, use the active bluetooth beacons to denote the major areas of the factory—loading dock, doorways, and drop off points—to track the position of pallets without needing thousands of RFID tags.

Pratt's R&D team was pleased with the PoC that they had been able to complete through the intuitive framework offered by AzStudio's development tools. They knew that their plan could work in theory and practice; now, it was just a matter of rolling out the newly developed AzStudio system and beacon networks to each of Pratt's warehouses.



After deliberation, however, Pratt Industries concluded that implementing the AzStudio-driven solution in each of their factories worldwide would be too much of a logistical strain on their current IT workforces (who would be unable to facilitate the added RFID tag deployments in congruence with their day-to-day operations). Moreover, Pratt's upper management wisely determined that the tracking system should be identical in every factory for simplicity and consistency. As not all of their sites were configured in the same way, this initial PoC solution would ultimately require several of their warehouses to undergo major upgrades in order to bring all facilities up to the same level of system-readiness. And all of this would need to be accomplished before deployment could even begin; at that time, Pratt simply didn't have the time or the OPEX to make it happen.

Despite these decisions, the functional PoC application, built with AzStudio, had still resolved Pratt's primary concerns, but until the company pursued increased IT bandwidth throughout their entire enterprise, the RFID tracking solution would be infeasible to deploy.

What Pratt Industries Accomplished Through AzStudio

Not every research project results in a new deployment. Sometimes it's the information you gain during the PoC that prevents you from making a much larger tactical error. In this case, the AzStudio framework enabled Pratt Industries to establish a technical solution for their pallet tracking concerns, and uncover an issue with deployment (IT bandwidth) that would have caused them major headaches had they chosen to move forward blindly.

However, the efforts of Pratt's R&D team saved Pratt a considerable amount of time, effort, and expense.

The headstart provided by the pre-existing modules in the AzStudio framework gave Pratt Industries the confidence to undertake the research project, and the company's consequent rapid prototyping effectively saved Pratt Industries several million dollars in concept overhead. By recognizing relatively early in the process that their in-house IT teams did not have the resources to fully implement the solution facilitated by AzStudio, Pratt

saved capital that they would have spent blindly on full-scale RFID equipment and beacons, installation, and further development costs. In addition, AzStudio yielded a sustainable, functional prototype that could be used in the future should Pratt Industries wish to return to their original plan.

How AzStudio Made It Possible

Helping companies create functional cloud-based solutions faster is our passion, and this project provided an opportunity to test AzStudio with an industry leader. The AzStudio toolset made the entire research project viable because Pratt's development team was able to start at the 80% mark and quickly build a functional demo. Not only that, AzStudio enabled the development team to quickly transition through the various phases—from development, to prototyping, to PoC—and eventually, to full production as soon as the company is ready to implement it.

Are you looking for a fast, cost-effective way to develop solutions to business inefficiencies?

Contact Monza Cloud today to see how AzStudio can simplify and improve your rapid prototyping and development efforts.

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Monza Cloud is an Atlanta-based Microsoft Partner that focuses on Azure adoption and cloud best practices & standards. Monza was built after years of direct project work for a variety of clients, when it became clear that tools like AzStudio would be necessary to fully utilize the power of the Microsoft Cloud. Come visit us today, at www.monzacloud.com