**D424 – Software Capstone**

**Task 2**



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| **Capstone Proposal Project Name:** | Inventory Management Web Application |
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# **Business Problem**

**The Customer**

The customer is a small-medium sized electronic component manufacturing company that produces PCB components such as capacitors, resistors, and transistors. The customer does not produce custom PCBs or chips. They have a staff of 75-100 employees, most in the manufacturing warehouse with approximately 10% management staff and 15% support staff such as HR and maintenance. Their mission is to provide American manufactured PCB components for tech manufacturers.

## **Business Case**

The customer has recently seen an upsurge in orders due to American local manufacturing economic policy and American tech manufacturing incentive programs. Their current system of tracking orders, products and customers via Outlook and Excel is not scaling with their demand, and needs a scalable, web-based, cloud hosted solution for sales and product tracking that will allow consolidated reporting, a centralized and secure Database, user authentication and role-based access, and availability without investing in large IT server stacks.

## **Fulfillment**

A web application will fulfill the needs of the customer by being cloud hosted in order to prevent additional hardware investment. The web application will be available from anywhere, ensuring scalability and off-site availability, as well as the availability uptime guarantee of cloud hosting. Written in ASP.NET and Blazor and using a SQL database, it will be scalable and easily modifiable if the company expands operations. It will be hosted on Azure services using Azure database, and track customers, orders, and products as well as relevant details for those items. It will host ad-hoc and automated reporting and report export, invoicing and customer relations tools.

# **SDLC Methodology**

The SDLC Methodology utilized in this project will be Agile modified Kanban methodology because it will allow the deployment of specific features over time rather than a single deliverable at the end of development. This will allow the development team to deliver, in order, an Azure database with appropriate tables and table relationships for the data tracked by the company. A migration tool to migrate from Excel to the database, populating their existing data into the new cloud-hosted system. A base application that allows secure log-in and role based permissions. Functionality deliverables in 3 stages for Product, Customer, and Order tracking, and final release of the application. Features can be tracked on a Trello board and modifications can be made at each iteration as I learn during my research.

Concept: Completed prior to inception of this document. Discussed technology stack to meet customer needs, customer budget and ongoing maintenance expenses associated with cloud usage and product upkeep.

Inception: Present phase, defining scope and project requirements, testing, and deliverables. Completed on approval of this document, features list, Trello board and initial timeline by stakeholders.

Iteration: Conducted in sprints, each releasing a new feature or component as development continues. At the end of each sprint a new deliverable will be submitted and bugs or issues will be added to the backlog.

Release: Upon product backlog completion, and all documentation written, proofed and delivered. Product is released to customer and all administration access is handed over.

Maintenance: Product will be maintained for 1 year inclusive to pricing of development, after which an ongoing annual maintenance cost will be assessed based on customer’s desired priority and projected development needs.

Retirement: At the end of the customer’s lifecycle product will be retired and new development will be negotiated if the customer desires.

# **Deliverables**

There are 3 major deliverable categories: Project Deliverables, Product Deliverables, and Documentation Deliverables.

## **Project Deliverables**

These items consist of agile project management documentation including Trello boards, timelines, features lists and backlogs. This will help ensure the customer is kept up to date with the most recent iteration of development and show that development is on track to be completed as scheduled.

* Project Timeline:
  + Will show the projected timeline of each sprint and each sprint’s goals
* Trello Board:
  + Will show planned, developing, and completed features in real time, as well as feature backlog
* Feature List:
  + Will show list of planned features within scope of project

## **Product Deliverables**

Product deliverables consist of the web application and all supporting software technologies

* Web Application
  + With all completed features
  + Rolled out feature by feature as sprints complete
* AzureSQL Database
  + With migration tool for migrating existing data
  + Data architected for customer’s needs
* Web Application Hosting
  + On Microsoft Azure for integration with AzureSQL and consolidation of corporate accounts

**Documentation Deliverables**

Deliverables regarding documentation on use, deployment, migration and testing of product

* User Guides
  + For deployment
  + For use
  + For migration
* Testing Plan and Matrix

# **Deployment Plan and Outcomes**

Project will be deployed in phases, using Microsoft Azure services. The first phase is deployment of the AzureSQL database, after table creation, and is coordinated by the Project Manager and the data engineer. The next phase is deployment of the authentication page of the application and migration tool, which users will upload their existing excel and contacts data for the program to parse into the database. This phase will be managed by the Project Manager, the web administrator, and development team. Following this phase will be the deployment, in four stages, of the application features. Customer, Product, Order and Reporting will each be deployed for testing and integration into the existing systems for adoption. The final phase will be final testing, bug fixes, and documentation release. Each phase will undergo testing before deployment as part of the Agile process and with users after deployment of the sprint, allowing for issues and bug reports to be added to the backlog before final release of product.

Documentation will be maintained at the end of each sprint, with a culminating user and deployment guide on the final sprint. A migration guide will be issued with the migration tool deployment for the host company to begin migrating data to the Azure database. An internal test plan will be maintained by the dev team and QA to track unit tests before sprint deployment.

During development tech support will be provided by the dev team with the project manager liaising. Each deployment phase will train one “Expert” at the host company to train other employees on usage and new features. After final release, tech support will be transferred to internal long-term support staff as dictated by contract.

# **Project Timeline**

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| Phase | Milestone/Task | Resources | Dependencies | Deliverable | Description | Dates w/ Duration |
| Concept | Contract negotiation and project sign-off  Task 1 Approval Form | Project Lead, Legal, Customer Stakeholder | None | Requirements, Project Contract | Contract negotiation and needs assessment | 05/05/2025 to 05/09/2025  1 week |
| Inception | Backlog/Trello, Features List, Task 2 Project Document | Project Lead, Dev Team | Task 1 Approval Form, Requirements Doc, Contract | Low fidelity wireframe  High fidelity mockup, Trello, Features List, ERD Diagram, Class Diagram, MVC Diagram | Design Data and Classes, UI and Interactivity Model | 05/12/2025 to 05/16/2025  1 week |
| Iteration | Project Deliverables in sprints, features rollout every week, Task 3 | Development Team | Task1, 2 forms. Project design documents | Final Application | Development sprints, releasing every week | 05/19/2025 to 06/15/2025 4 weeks |
| Release/ Deployment | Project Live, deployed to Azure Cloud in Production Environment | Development Team, Project Stakeholders | Task 3 complete, all features and backlog cleared | Project deployment to Azure Cloud | Finalize deployment environment to Azure cloud | 06/15/2025 to 06/20/2025 1 week |
| Project Buffer | All tasks | N/A | N/A | N/A | Buffer for grading time, issues | 06/23/2025 to 06/27/2025 1 week |

# **Environments and Costs**

## **Programming Environment**

* Microsoft Azure SQL server
* Microsoft Azure App Service
* Microsoft Azure Storage (for reports/files)
* Microsoft Azure Key Vault (For security)
* Microsoft Azure Monitor (For maintenance, application insights)
* Visual Studio 2022
* Github with Gitlab repository for version control
* …etc..

## **Environment Costs**

Cloud costs are totaled at an estimated 328.32 per month, with an up front cost of 81.98 per the Azure pricing tool. This includes Azure SQL Database at 251.73 for an East US Region, Single vCore database, standard series hardware, with 32gb storage and 5gb backup with 2 week retention for disaster mitigation. Hosted App service is 54.75 for basic tier, 1.75gb RAM, 1 core, 10GB Storage with 1 custom domain and SSL certificate. Storage is 21.84 for 1TB Block Blob General Purpose storage. Key Vault and Monitoring are free services with Azure. Other development costs such as IDE and version control are internal to development company and included with contract pricing.

## **Human Resource Requirements**

(For the purposes of this project, I will simulate a live team. The actual project will be produced by just myself.)

The primary human resources requirement will be the development team followed by the architects and project manager. Developers will consume 80% of the hours and dollars associated with project development throughout the primary lifecycle with architects consuming 10% at project inception before being released to other teams, and the Project Manager consuming 10% throughout development.

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# **Validation and Verification**

Testing will be done in three primary phases: pre-release testing, release testing, and deployment testing. Pre-release testing will be done by the development and quality assurance teams and include written tests with expected documented outcomes. Each test must pass before releasing a new version of the product. Release testing will be done by the customer as each sprint completes and releases, allowing the customer to use individual features in a real time environment and report any bugs or issues for addition to the backlog. This will allow both real-world functionalities testing as well as UI/UX adoption testing. Final tests will be on deployment by the QA team in conjunction with the customer, to ensure the product meets the customer’s expectations and to get the customer sign-off on product delivery. Deployment testing will also be known as Acceptance Testing.

Phase 1 testing during quality assurance will be logged directly to the Trello backlog for correction on the next cycle. The development team will work on the assigned feature for their present cycle and then move to bug fixes, releasing at the standard weekly release pace. Phase 2 testing will be run through the project manager, bug reports from the customer will be sent to the project manager for addition to the Trello backlog. The final test cycle will be conducted at the end of development and be in conjunction with the customer and development team to check product expectations and correct them before release of the project resources.

Each phase will specifically hunt for bugs, data validation failures, navigation issues, data loss and corruption, and connection failures. Severe bugs will be handled during off-hours to minimize application downtime for the customer, deploying ad-hoc patches for loss of service issues. Minor bugs will be fixed during regular development time and deployed with each major release.

E: Works Cited

**Microsoft.** (n.d.). *Azure for Students – Free account credit and services*. Microsoft Azure. <https://azure.microsoft.com/en-us/free/students>

**Microsoft.** (n.d.). *Azure pricing calculator*. Microsoft Azure. <https://azure.microsoft.com/en-us/pricing/calculator/>