ROYAL MELBOURNE INSTITUTION OF TECHNOLOGY

SGS CAMPUS

ISYS2128 – Digital Business Design and Innovation

ASSIGNMENT 3: Part B

PROTOTYPE REPORT

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EXECUTIVE SUMMARY

The design and implementation strategy for a centralized IT system that will improve APEC Water's operational effectiveness, quality assurance, and customer experience is described in this report. To solve important business issues and open up new growth prospects, the suggested solution incorporates cutting-edge technologies such as Oracle NetSuite ERP, AWS IoT Cloud, and Nyckel AI.

Business Challenges

APEC Water confronts considerable operating challenges:

- Inadequate training programs lead to high employee turnover and skill gaps.
- Inefficient manual processes result in errors, delays, and noncompliance with quality requirements.
- Limited IoT integration and automation, resulting in inefficient real-time inventory tracking and supply chain management.
- Customer dissatisfaction stems from a lack of openness in order tracking and post-sales service.

Proposed Solution

The solution focuses on automation, real-time data transparency, and enhanced collaboration across all operations:

- **Human Resource Optimization**:
  - Introducing a training platform to help staff improve their skills and job satisfaction.
  - The deployment of AI and IoT experts to manage new technologies.
- **Process Efficiency**:
  - Automated quality control using AI to spot defects.
  - Real-time inventory and system monitoring enabled by the Internet of Things.
- **Customer Experience**:
  - A user-friendly web gateway for tracking orders and monitoring gadget performance.
  - To boost client engagement, provide proactive notifications and provide real-time updates.

Benefits

- Over five years, the initiative is anticipated to achieve the following outcomes:
- Cost savings of $160,000 were achieved through improved inventory management and fewer manual errors.
- $376,650 in revenue was generated as a result of better customer satisfaction and operational efficiency.

- ROI of 5.93%, with room for improvement through cost-cutting and increased system applications.

Implementation Plan

The phased rollout begins in January 2025, with:

- Initial system configuration and pilot team training.
- Gradual integration of IoT and AI capabilities into industrial lines.
- Launch of a customer portal for real-time help and performance tracking.
- Comprehensive training programs will enable a smooth transition across all areas.

Technical Architecture

The proposed setup integrates:

- **Cloud-based ERP:** The main hub for workflow automation and data analysis is Oracle NetSuite.
- **IoT Integration:** Proactive maintenance and real-time monitoring are made possible by AWS IoT Cloud.
- **AI-powered Quality Control:** Nyckel AI accurately and automatically detects flaws.

Conclusion

With the help of this solution, APEC Water can accomplish its operational and customer satisfaction objectives in a scalable, secure, and effective framework, laying the groundwork for future expansion and a competitive edge.

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1. BUSINESS CASE

1.1. BUSINESS ISSUES

1.1.1. HUMAN RESOURCES

- **High Turnover Rate:**
  - Industry-specific challenge.
- **Skill Gap:**
  - Insufficient training programs.
  - Limited availability of experienced staff.
- **Communication Gaps:**
  - Poor inter-departmental communication.
  - Ineffective communication with customers.

1.1.2. INEFFICIENT PROCESSES

- **General Process Issues:**
  - Non-compliance with quality standards.
  - Lack of tools for water filtration system verification.
  - Reliance on manual data entry.
  - Absence of proactive notifications and real-time updates.
- **Technological Limitations:**
  - Minimal automation in operations.
  - Poor IoT integration.
- **Supply Chain Challenges:**
  - No in-house logistics infrastructure.
  - Dependence on external shipping services.
  - Lack of real-time inventory updates due to insufficient IoT adoption.

1.2. SOLUTIONS

For people and workplace issues: ***a centralized system*** (***Oracle NetSuite***) can fulfill the skills gaps by providing a unified training platform, where training materials will be provided based on their roles and responsibilities, automating tasks such as order processing or item inspecting would reduce the workload for aging workers, which would improve job satisfaction and potentially lower the turnover

rate. Improving communication efficiency between departments by integrating real-time update inventory tracking and automated low-stock alerts.

For inefficient Process:

- A centralized system can help customers keep track of their orders by allowing customers to gain visibility into order preparation and shipment progress, enabling real-time notification for any disruptions or possible delays in the processes, therefore enhancing customer engagement strategy and customer experience
- Complying with quality standards and packing orders processes can be streamlined by introducing automated error detection before packing and order verification capabilities to improve the matter of order processing practice.
- Optimize operational efficiency: introduce automation in manual tasks and any labor-intensive process.

1.3. PROJECT SCOPE CHECKLIST

Categories	Details
Project Objective	Implement a centralized IT solution that includes Oracle NetSuite, AWS IoT Cloud, and Nyckel AI to improve APEC Water's operational efficiency, quality control, and customer experience.
Deliverables	**1. System Setup and Configuration:** • Installation of Oracle NetSuite ERP with inventory management, order processing, and CRM modules. • Deployment of AWS IoT sensors on filtration systems for real-time monitoring. • Integration of Nyckel AI for automated quality control using computer vision. **2. Customized Applications:** • Mobile app for customer order tracking and filtration system monitoring. • Employee training portal with role-specific learning guides. **3. Process Automation Features:** • Real-time stock updates and automated low-stock notifications. • Automated order verification and error detection during packing. **4. Quality Control Enhancements:** • AI-based detection of defective products during manufacturing. • IoT-enabled monitoring of water quality metrics (pH, turbidity, etc.). **5. Documentation and Training Materials:** • Comprehensive system user manuals for all departments. • Training modules for employees on system operations and maintenance. **6. Testing and Deployment Reports:** • Test case results for functionality and integration.

	• Deployment performance reports and feedback documentation.
Milestones	**1. Project Initiation** *(January 2025)* • Approve project scope, budget, and timeline. • Assign project roles and responsibilities. • Conduct business process analysis and stakeholder consultations. • Identify key inefficiencies in current operations. • Finalize technical requirements and integration specifications. • Kick-off vendor coordination with Oracle, AWS, and Nyckel. **2. System Development and Configuration** *(February 2025 - April 2025)* • Install and configure Oracle NetSuite ERP, including CRM, inventory, and order processing modules. • Develop workflows for automated inventory management and order processing. • Deploy IoT-enabled sensors for water filtration systems. • Configure AWS IoT cloud infrastructure for real-time data processing. • Implement Nyckel AI models for product defect detection. • Train AI models on product-specific configurations (e.g., reverse osmosis systems). • Develop a customer-facing mobile app for order tracking and system performance monitoring. • Build the employee training portal integrated with Oracle NetSuite Guide Learning. • Conduct end-to-end system configuration and integration of all components. **3. Testing and Validation** *(April 2025 - May 2025)* • Perform functional testing of individual components (ERP, IoT, and AI). • Validate ERP workflows, IoT sensor outputs, and AI defect detection. • Conduct integration testing to ensure seamless operation across platforms. • Resolve any system compatibility or data synchronization issues. • Run user acceptance testing (UAT) with feedback from stakeholders. • Document and address any remaining issues. **4. Training and Documentation** *(May 2025)* • Conduct employee training sessions on Oracle NetSuite, AWS IoT, and Nyckel AI tools. • Provide role-specific guides and interactive tutorials. • Distribute user manuals and finalize training modules based on feedback. • Test employees' ability to use the system with practical simulations. **5. Deployment and Monitoring** *(June 2025 - July 2025)* • Deploy the centralized system across APEC Water's operations. • Provide on-site support to address deployment issues. • Monitor system performance and refine configurations as needed. • Collect initial feedback from employees and customers. • Implement adjustments based on feedback and performance data. • Prepare and deliver the final project report to stakeholders.
Technical Requirements	**- System Compatibility:** Seamless integration of Oracle NetSuite, AWS IoT, and Nyckel AI. **- Data Synchronization:** Minimally delayed real-time data exchange.

	- Cloud Infrastructure: Scalable and reliable. **- IoT Sensors:** High-precision metrics for turbidity, pH, and temperature. **- Computer Vision:** AI tailored to reverse osmosis system error detection.
Limits	**- Customization Constraints:** Limited to critical operational needs. **- Vendor Dependency:** Reliance on Oracle, AWS, and Nyckel for updates and maintenance. **- Data Privacy and Security:** Basic compliance measures only. **- Scope Limitation:** Excludes global expansion or regions outside core operations. **- Hardware Procurement:** IoT sensors sourced by APEC Water.

1.4. COST-BENEFIT ANALYSIS

Cost analysis						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Non-recurring costs						
ERP Initial Setup and Configuration	$47.000	$0	$0	$0	$0	$47.000
IoT Devices Setup	$10.000	$0	$0	$0	$0	$10.000
Consulting Services	$20.000	$0	$0	$0	$0	$20.000
Database Setup	$8.000	$0	$9.000	$0	$10.000	$27.000
Hardware purchase and install	$20.000	$0	$0	$0	$0	$20.000
Compliance Cost	$7.000	$0	$0	$0	$0	$7.000
Data Migration	$15.000	$0	$17.500	$0	$20.000	$52.500
Change Management Costs	$10.000	$0	$0	$0	$0	$10.000
Website Development Cost	$20.000	$0	$0	$0	$0	$20.000
Computer Vision Setup (Nyckel)	$15.000	$0	$0	$0	$0	$15.000
AWS IoT Cloud Integration	$15.000	$0	$0	$0	$0	$15.000
Total non-recurring costs	$187.000	$0	$26.500	$0	$30.000	$243.500
Recurring costs						
IoT Subscription Fees	$12.000	$12.000	$12.000	$12.000	$12.000	$60.000
ERP Subscription Fees	$10.000	$15.000	$15.000	$15.000	$15.000	$70.000
Employees' Salaries	$12.000	$12.000	$12.000	$12.000	$12.000	$60.000
Vendor Support	$5.000	$5.000	$5.000	$5.000	$5.000	$25.000
Continuous Training	$5.000	$5.000	$5.000	$5.000	$5.000	$25.000
AWS IoT Cloud Service Subscription	$8.000	$8.000	$8.000	$8.000	$8.000	$40.000
Nyckel Computer Vision Subscription	$6.000	$6.000	$6.000	$6.000	$6.000	$30.000
Wesite Maintenance	$5.000	$5.000	$5.000	$5.000	$5.000	$25.000
Deviation (10%)	$6.300	$6.800	$6.800	$6.800	$6.800	$33.500
Total recurring costs	$69.300	$74.800	$74.800	$74.800	$74.800	$368.500
TOTAL COSTS	$256.300	$74.800	$101.300	$74.800	$104.800	$612.000

Figure 1: Cost Analysis of the Project

Benefit/revenue analysis						
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Revenues						
Increased Revenue	$45.000	$49.500	$59.400	$89.100	$133.650	$376.650
Total revenues	$45.000	$49.500	$59.400	$89.100	$133.650	$376.650
Cost savings						
Reduction in manual errors	$10.000	$10.000	$10.000	$10.000	$10.000	$50.000
Proactive maintenance savings	$8.000	$8.000	$8.000	$8.000	$8.000	$40.000
Inventory management savings	$5.000	$6.000	$7.000	$8.000	$9.000	$35.000
Quality Control Cost Reduction (fro	$7.000	$7.000	$7.000	$7.000	$7.000	$35.000
Total cost savings	$30.000	$31.000	$32.000	$33.000	$34.000	$160.000
Other benefits						
Cloud Service Efficiency Gains	$6.000	$6.000	$6.000	$6.000	$6.000	$30.000
Customer Retention Improvement	$8.000	$9.000	$10.000	$10.000	$10.500	$47.500
Employee Productivity Gains	$5.000	$6.000	$7.000	$8.000	$9.000	$35.000
Total Other benefits	$19.000	$21.000	$23.000	$24.000	$25.500	$112.500
TOTAL BENEFITS/REVENUE	$94.000	$101.500	$114.400	$146.100	$193.150	$649.150
Total non-recurring costs	-$187.000	$0	-$26.500	$0	-$30.000	-$243.500
Total recurring costs	-$69.300	-$74.800	-$74.800	-$74.800	-$74.800	-$368.500
TOTAL COSTS	-$256.300	-$74.800	-$101.300	-$74.800	-$104.800	-$612.000

Figure 2: Benefit Analysis of the Project

Total non-recurring costs over 5 years amount to $243,500, following that the highest expense occurs in the first year ($187,000) due to: ERP system setup and configuration (the most cost of this catalog), Consulting services, Data migration, etc. In addition, total recurring costs over 5 years amount to $368,500 so the average annual recurring cost is $73,700.

Revenue is predicted to grow steadily from $45,000 in year 1 to $133,650 in year 5 also, with total cost savings of $160,000 over 5 years and total other benefits: of $112,500 (they include improved employee productivity and enhanced customer retention).

Payback period: 4.72 years. This indicates that net positive benefits are achieved by year 5.

Average annual ROI: 6.07%

The project provided positive financial outcomes with significant revenue increases and cost savings over the years. However, the high initial non-recurring costs in year 1 need to be taken into account in careful financial planning.

How to **mitigate risks**, the company can:

- Optimize initial costs by negotiating with vendors.
- Closely monitor annual benefits to ensure revenue targets are met.
- Invest further in employee training to maximize the project's potential benefits.

2. ARCHITECTURE DESIGN

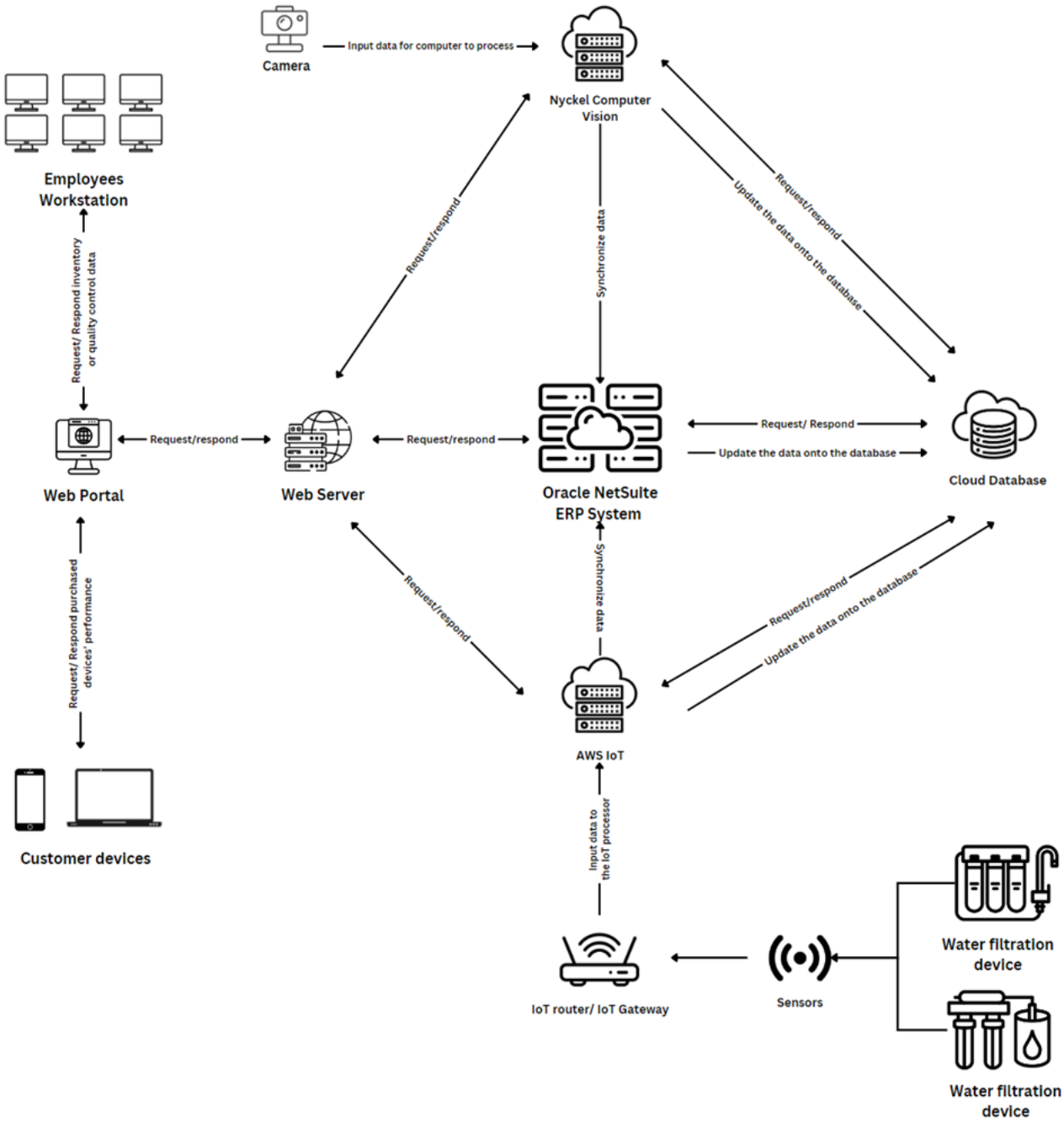


Figure 3: APEC Water proposed technology solution's system architecture design

2.1. OVERVIEW OF HARDWARE AND SOFTWARE FACILITATE THE SYSTEM

The system architecture for inventory tracking and quality control purposes comprises both hardware and software to effectively facilitate the system.

2.1.1. COMPUTER VISION CAPABILITIES

2.1.1.1. HARDWARE

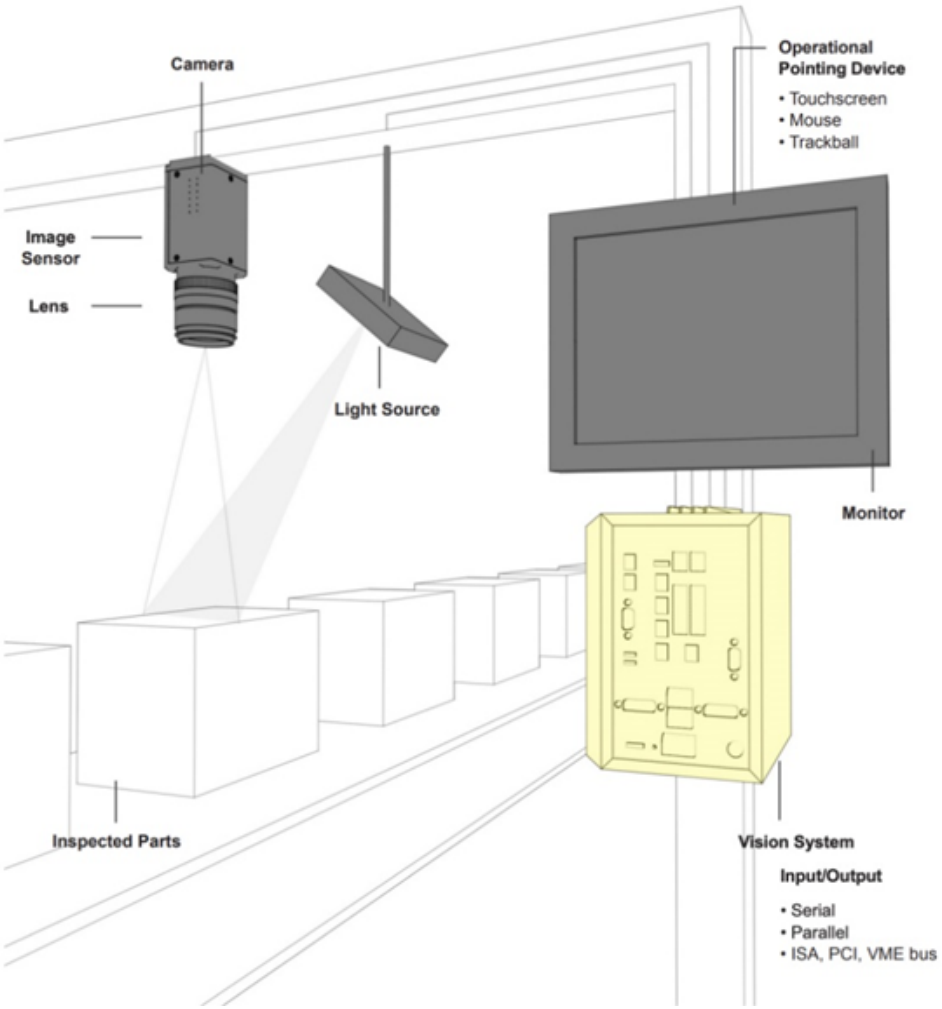


Figure 4: Hardware to facilitate computer vision (Source: EnCata 2024)

Regarding the necessary hardware to facilitate computer vision capabilities, industrial-grade cameras, and lenses are crucial hardware components. Moreover, as APEC Water's product line leads to the quality control processes being changed, a specific type of lens called liquid lens would be used as this allows lenses to autofocus by adjusting their shape on the fly to maintain focus (Cognex n.d.a). The industrial camera with a liquid lens, like the ITALA G.EL camera series, offers a reliable solution. The system doesn't necessities high-speed image capturing; a 60 frame-per-second (FPS) camera with a price range from $1,000 to $1,500 per unit offers a cost-effective solution; this enables high-resolution image capturing of products on the production lines to be inputted into the computer vision application server (Opto Engineering 2025; Iqbal et al. 2024; Opto Engineering n.d.).

The lighting system is also required for computer vision to function effectively. It helps illuminate the object being inspected to highlight its features (in this case, the water filtration system) so that the camera can capture it, enhancing the success rate of computer vision's object detection application. In the context of detecting APEC Water's product lines, diffuse machine vision lighting would be highly recommended as it minimizes the confusing reflections from the curve or shiny material of APEC

Water's devices, making it easier to detect necessary features (Cognex n.d.b). Another component that could be added is the display to monitor and control the inspected devices.

2.1.1.2. SOFTWARE

For computer vision to work effectively, numerous software services are provided. First, the main component of computer vision is the camera, as the provided camera software allows image transfer onto the Nyckel application server, camera network configuration, and firmware update (Opto Engineering n.d.b). For example, the ITALA G.EL camera series will connect with the ITALA Software Development Kit, which is the camera software. Additionally, image-processing software is needed for pre-processing the image before inputting it into the computer vision application server for analysis based on visual data, this pre-processing can involve extracting the features according to pixel luminance (Chaki and Dey 2018; Opt Machine Vision 2024; Technexion n.d.).

2.1.2. IOT CAPABILITIES

2.1.2.1. HARDWARE

To facilitate IoT capabilities in inventory tracking and quality control processes, high-performance sensors, and communication devices are essential. Temperature and humidity sensors, such as the Bosch BME280, play a critical role by continuously monitoring environmental factors to ensure the optimal functioning of water filtration systems (Bosch 2023). These sensors provide precise readings for temperatures between -40°C and 85°C and humidity levels ranging from 0% to 100% relative humidity, ensuring reliable performance under varying operational conditions. The cost of these sensors ranges from $20 to $30 per unit, making them both affordable and efficient for large-scale deployment (Digi-Key 2023).

Additionally, the system requires precise tracking tools to ensure operational transparency throughout the supply chain. The Siemens SIMATIC RF600 Series RFID readers are ideal for real-time tracking of product movements by scanning RFID tags on filtration system components and packaged products (Siemens 2023). With support for long-range identification and high scanning speeds, these readers significantly enhance operational efficiency. The investment for each reader is approximately $1,100 to $1,400, depending on configuration (Siemens 2023).

Seamless data transmission from sensors to cloud platforms is supported by IoT gateways such as the Advantech WISE-6610, which facilitates long-range communication using LoRaWAN technology (Advantech 2023). These gateways ensure secure and efficient transmission of large volumes of sensor

data for processing. Each gateway costs around $750 to $1,000, making it a scalable solution for IoT system expansion (Advantech 2023).

2.1.2.2. SOFTWARE

The IoT hardware components are supported by advanced software solutions that enable seamless data collection, monitoring, and analysis. Cloud-based platforms such as AWS IoT Core facilitate centralized management by securely connecting IoT devices, processing data streams in real-time, and automating alerts for operational anomalies *(AWS 2023)*. The system's integration capabilities are further enhanced through APIs that enable communication between sensors, gateways, and third-party enterprise resource planning (ERP) platforms such as Oracle NetSuite *(Oracle 2023)*.

To provide user-friendly interfaces for system monitoring and control, mobile applications and dashboards offer real-time data visualization and alert management. These interfaces allow technicians and operators to access system status updates remotely, reducing response times to potential issues *(Advantech 2023)*. The security of the IoT system is ensured through robust encryption protocols and firewall configurations embedded within device management software, safeguarding data integrity and privacy during both transmission and storage *(Bosch 2023)*.

The strategic integration of hardware and software components ensures that APEC Water's IoT system delivers precise monitoring, real-time data insights, and secure operations, driving increased efficiency and enhancing the quality of customer support.

2.1.3. WEBSITE SOFTWARE

To build a website for customer to track their purchased devices' performance, the web portal and web servers are the components needed for a website to function properly. For the front end of the website, WordPress will be utilized to design a comprehensive and user-centric website interface (WordPress n.d.a). Moreover, Content Management System (CMS) software provided by WordPress is recommended as it provides flexibility in creating and publishing content. This could also incorporate the IoT software through plugins, which could support the creation of dynamic dashboards displaying every IoT data for the customer to track their devices' performance (WordPress n.d.a). The WordPress CMS is offered through PaaS with a price range between $8 to $25 per month (WordPress n.d.b)

Regarding web servers for backend communication, the servers will act as a communication bridge between Oracle NetSuite, AWS IoT, and the cloud database, ensuring customer requests are processed efficiently. Therefore, the web hosting service recommended for APEC is AWS EC2 as this is a cost-

effective software, with ease of scalability, and high availability (GeeksforGeeks n.d.c). The price range for each gigabyte transfer out of Amazon EC2 is from $0.01 to $0.02 (Amazon n.d.d).

2.1.4. CLOUD PLATFORM SOFTWARE

2.1.4.1. ORACLE NETSUITE

Oracle NetSuite will serve as a central hub in the proposed system that offers a comprehensive Enterprise Resources Planning (ERP) solution. All of the requests coming from the thin clients through the web portal will be analyzed and responded to by the system. Its Software-as-a-Service (SaaS) delivery model ensures flexibility, cost-effectiveness, and on-demand scalability without the need to budget for infrastructure (IBM n.d.). The monthly subscription cost for the Oracle NetSuite SaaS Mid-market edition could cost approximately $1,000 to $3,000 (Terillium n.d.).

2.1.4.2. NYCKEL AI

Computer vision abilities will be provided by Nyckel AI to enhance APEC Water's quality control practices. After the industrial cameras capture the images, Nyckel AI will be the application server to receive and analyze these visual data to automate defect detection processes. The Platform-as-a-Service (PaaS) model enables AI customization and training to further adapt to APEC Water's product lines (IBM n.d.; Nyckel n.d.). With a cost-effective solution with monthly subscription costs ranging between $500 to $1,000, Nyckel AI can ensure the accuracy of defect detection and enhancement of quality control processes.

2.1.4.3. AWS IOT

Data collected through embedded IoT sensors and gateways from water filtration devices is sent to the AWS IoT application servers provided by Amazon. These key metrics such as filter condition, water flow rate, or water purity metrics collected by IoT-related devices will be analyzed and processed through the AWS IoT application server and then forwarded to Oracle NetSuite for enabling real-time performance tracking and maintenance. As the proposed system will utilize the PaaS delivery model of AWS IoT, it would cost APEC $0.08 per every million minutes of connection plus $1 per million messages (Amazon n.d.c).

2.2. SYSTEM ARCHITECTURE

The implementation of APEC Water's proposed technology solution incorporates a sophisticated client-server architecture as its core, which ensures an organized system structure for managing various involved processes. In this architectural design, the Oracle NetSuite ERP system will be a centralized

system to facilitate communication between clients (employees' workstations, customer devices, cameras, IoT sensors, and routers) and server components.

(Thin) client approach. As employees' workstations and customer devices rely on web servers to proceed with the request onto the Oracle NetSuite ERP system, this features them as the thin clients as every data processing and management practice will be processed through these remote application servers. This approach enhances the clients' accessibility through a lightweight interface, improves system recovery by minimizing vulnerable hardware parts, and provides a cost-effective and flexible solution that reduces the demand for technical assistance (Cimen et al. 2014). Meanwhile, several other specialized client components, including cameras, IoT sensors, and IoT routers will feed all critical data into the application servers for data collecting, processing, and storing GeeksforGeeks 2024).

Cloud-based server. To enhance functionality and flexibility, an internet-based architectural approach has complemented the traditional client-server architecture. This includes utilizing cloud platforms such as Oracle NetSuite ERP system for operations and resources management, AWS IoT for real-time visibility into products' performance, and Nyckel AI Computer Vision for advanced defect detection capabilities. In addition, some cloud services, including web portal, web server, and cloud database, are also leveraged whereas the web server and web portal serve as intermediaries for facilitating communication of requests and responses to the suitable cloud platform, while the cloud database stores all collected and analyzed data from Oracle NetSuite, AWS IoT, and Nyckel AI cloud platforms.

Technology	Connection with	Purpose	Type of communication/ connection
Computer Vision			
Industrial Camera	Nyckel AI	Transferring visual data for object detection	Computer vision API
Nyckel AI	Oracle NetSuite	Synchronize data, get the data to be responded to the client	Computer vision API (Nyckel n.d.)
Nyckel AI	Cloud Database	Store and retrieve data to train the AI models	Connect through API
Internet of Things (IoT)			
IoT sensors	AWS IoT	Capturing and transferring the device performance data to proceed data analysis	Following Message Queuing Telemetry Transport (MQTT) protocol for communicating over a network with limited bandwidth (Amazon n.d.a).

AWS IoT	Oracle NetSuite	Synchronize data, got the data to be responded to the client	Through AWS Glue connection (API) (Amazon n.d.b)
AWS IoT	Cloud Database	Store device performance data	Through AWS Glue connection (API)
Web Portal			
Web portal	Web server	Sending the client request	Configuring two systems follows the step-by-step guide (Lee 2023)
Web server	Oracle NetSuite	Processing customer requests	Through AWS Glue connection (API)
Oracle NetSuite	Cloud Database	Store data and retrieve for ERP functionalities	Correct through API

Table 1: Types of Connection between Systems

All of these cloud computing services are seamlessly connected to the centralized system which is Oracle NetSuite for analysis and data synchronization. And by effectively incorporating internet-based architecture with client-based architecture, allows APEC Water to solve its operational challenges in inventory management, quality control practices, and post-sales customer support. Furthermore, providing APEC Water with the scalability for future development.

2.3. DATA FLOW/ INFORMATION FLOW

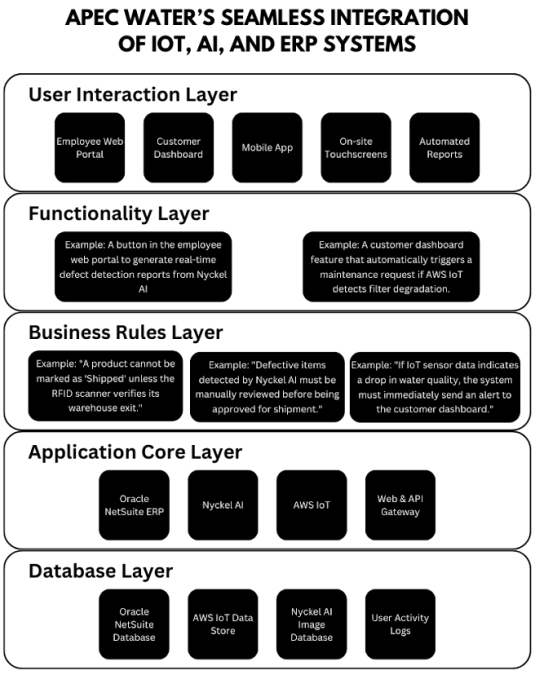


Figure 5: System Architecture Layer

Figure 1 indicates a clear layered architecture of APEC Water's system which ensures efficient data flow between users, business operations, and core applications. Specifically, information is seamlessly

processed through multiple layers, starting from user interaction points such as the employee web portal, customer dashboard, and IoT-enabled touchscreens. These inputs trigger system functionalities, such as generating defect detection reports, tracking inventory movement, or issuing maintenance alerts.

Business rules are embedded within the system to enforce operational logic, ensuring that inventory cannot be marked as shipped without RFID verification and that defective products flagged by Nyckel AI undergo mandatory review before approval. Once business rules validate these actions, core applications—including Oracle NetSuite ERP, AWS IoT, and Nyckel AI—process, store, and synchronize data in real-time. The final layer, the database, acts as a centralized repository for inventory logs, system performance data, image records, and customer interactions, ensuring a structured and traceable flow of information. This architecture optimizes efficiency, enhances decision-making, and maintains real-time visibility across APEC Water's operations.

2.4. DATA SECURITY

Given the reliance on IoT, AI-driven quality control, and cloud-based ERP solutions, APEC Water's system incorporates multiple security measures to protect data integrity, confidentiality, and availability. Encryption protocols, including AES-256 for stored data and TLS 1.3 for transmissions, ensure that sensitive business and customer information remains secure (IBM 2023). Access control mechanisms, such as role-based authentication and multi-factor authentication (MFA), restrict system access to authorized personnel only, preventing unauthorized modifications or breaches (NIST 2023).

To safeguard real-time data exchanges between IoT sensors, Nyckel AI, and Oracle NetSuite, AWS IoT employs the Message Queuing Telemetry Transport (MQTT) protocol, which minimizes vulnerabilities in low-bandwidth environments (AWS n.d.). Additionally, automated intrusion detection systems (IDS) monitor suspicious activities, while regular security audits ensure compliance with industry standards (Kaspersky 2023). Incident response and disaster recovery protocols are in place, guaranteeing system resilience in case of cyberattacks or unexpected failures (BIS Group n.d.). These robust security measures reinforce APEC Water's commitment to data protection while maintaining operational efficiency.

2.5. NETWORK TOPOLOGY

According to the system architecture of APEC Water's proposed technology solution, its suitable network topology will be the hybrid between the star and hierarchical pattern.

Regarding the star topology pattern in the hybrid network, clients including employee workstations and customer devices will be directly interacting with the centralized application server which is the Oracle NetSuite ERP system. The centralized nature of this pattern ensures every request and response will be analyzed and verified through a centralized system, which facilitates the traceability of faults and simplifies troubleshooting (GeeksforGeeks 2024b). Although the limitation of star topology is that it creates a single point of failure, this could be addressed as the cloud platform Oracle NetSuite has multiple servers (GeeksforGeeks 2024b; Holliday 2021). Therefore, if the servers that are processing APEC Water's data fail, other servers will continue to handle the data flow.

The hierarchical topology complements the network by organizing a hierarchical data flow from the cloud service to the cloud database in a layered structure. The first top level will be the Oracle NetSuite system that acts as the initial integration point that facilitates communication between cloud-based servers. The second layer will be the cloud-based servers which are provided by the external providers to directly communicate with IoT and computer vision-related devices. This structure can ensure that the data flows between modules, providing a seamless information flow between departments.

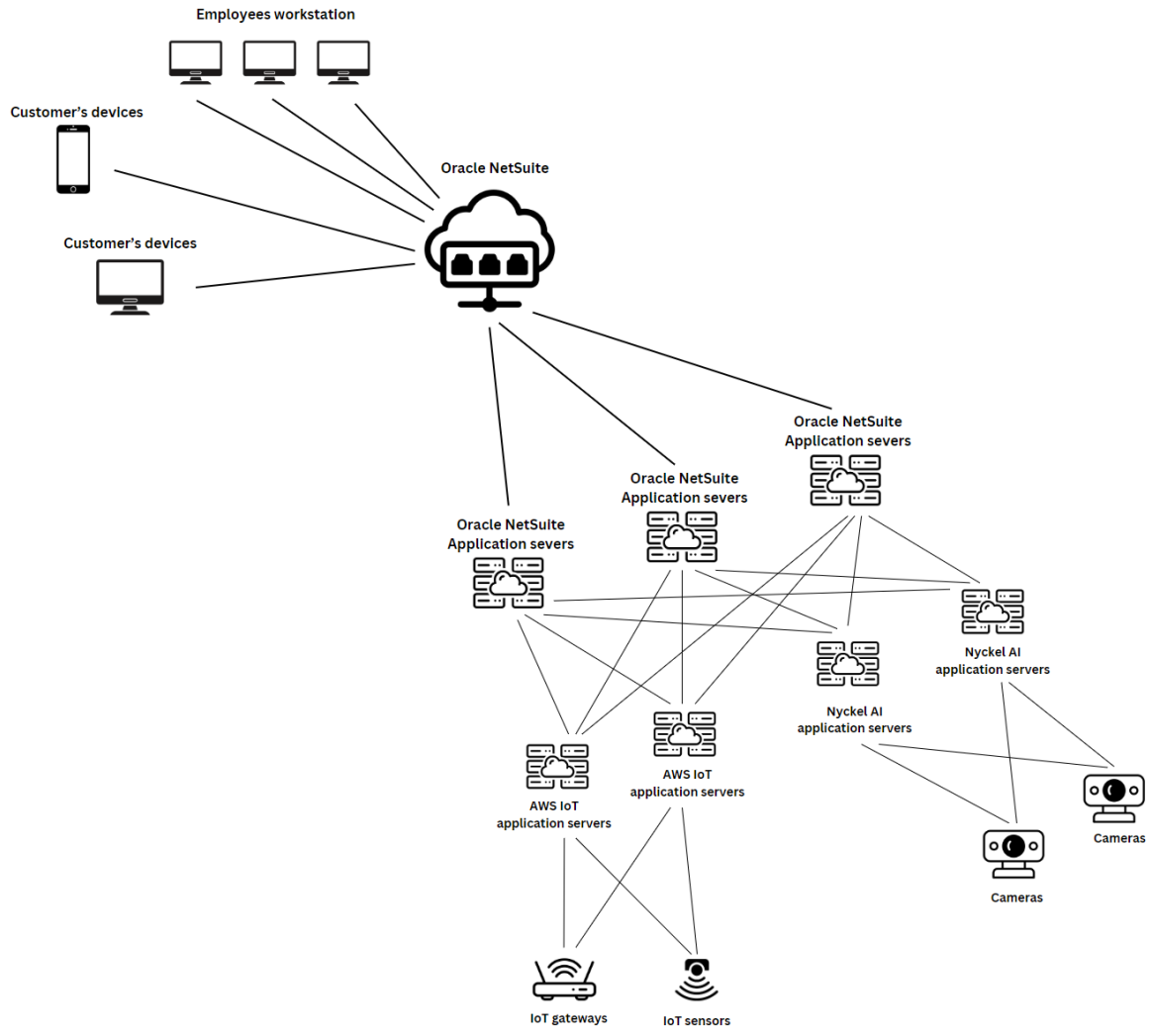


Figure 6: APEC Water's network Topology

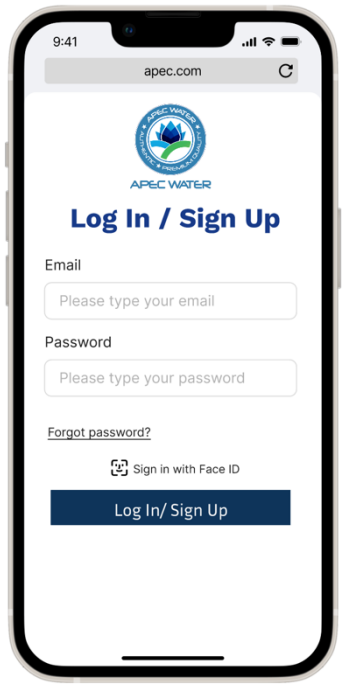
3. USER INTERFACES

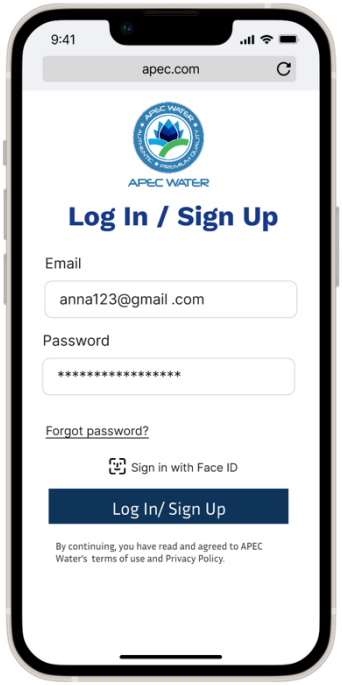
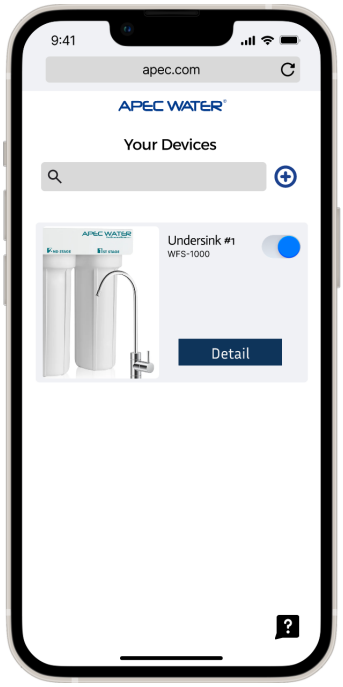
“apec.com” is a website designed to allow customers to track APEC Water equipment installations and monitor their performance.

A customer may have multiple "devices", each with different functions and used for multiple purposes.

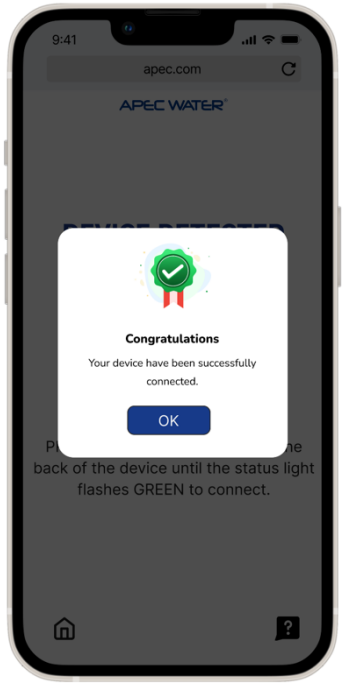
This website allows customers to organize and monitor the performance of their installations as required.

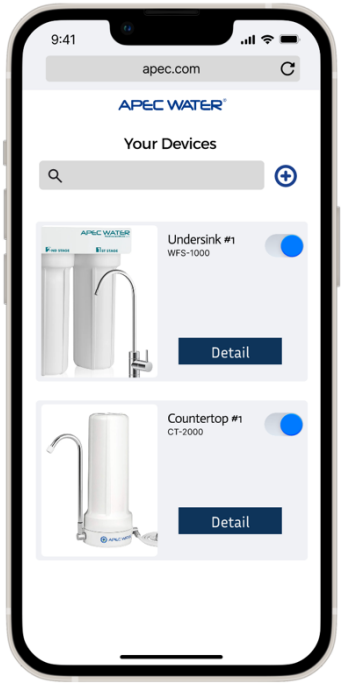
Link to Prototype: https://www.figma.com/proto/vykTPAfZw3L7xk8tR0LQCu/Customer-portal-for-tracking-purchased-devices'-performance?node-id=403-497&p=f&t=3RfYBRA3IozAsPqs-1&scaling=scale-down&content-scaling=fixed&page-id=401%3A18&starting-point-node-id=403%3A497

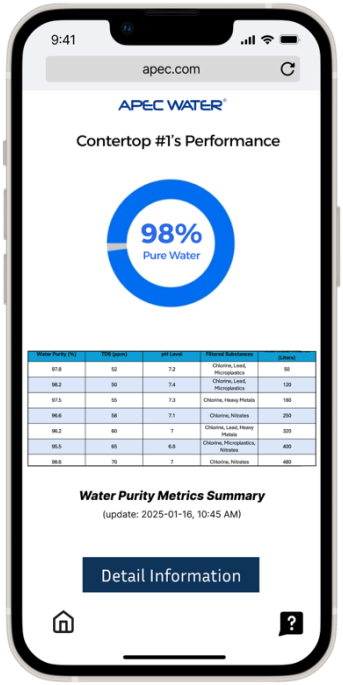
	After typing in the apec.com domain in the search bar, customers will be taken to the "LOG IN/ SIGN UP" page.

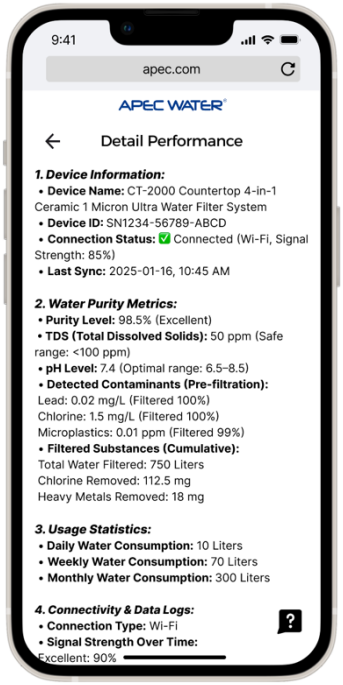
	Enter the email address and password registered with APEC Water.
	Once logged in, the home page will appear with a list of "Your Devices" showing the connected devices. The STATUS button in the upper right corner of each device shows whether the device is operating properly.

	To add a new device, click on the PLUS button in the upper right corner of the page, the customer will be taken to the "Add New Device" page.
	After filling in all the information including "Email"; "Phone number" and "Address", the CONTINUE button will take the customer to the page for providing the device information as well as the cable line so that the website can detect the device.

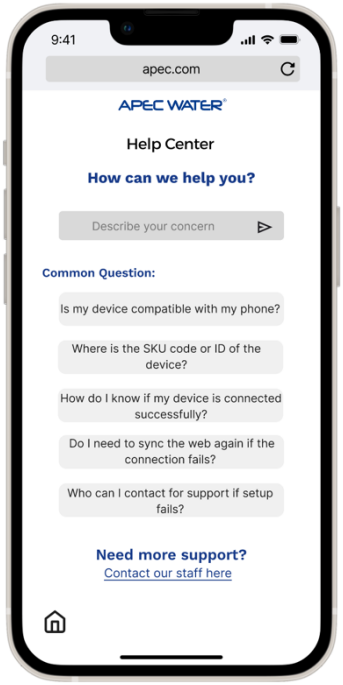
	Once the device has been detected, the customer needs to follow the command to be able to connect the device.
	The device has been successfully connected when the "Congratulations" frame appears on the website.

	After that, the home page will be updated with the "Your Devices" list showing the device that has just been connected.
	The "Detail" page of the device that has just been connected shows basic information as well as the TRACK PERFORMANCE button.





The customer can monitor the purity of the water as well as the indicators that the device has operated. These indicators can be seen more clearly by pressing the DETAIL INFORMATION button, here, customers can see the details of the device's operation and can evaluate whether the device's connection is running smoothly.

	apec.com also provides customers with support services if customers have questions or concerns. The website has many ways for customers to ask questions as well as many ways in which APEC Water can best support.

4. IMPLEMENTATION PLAN

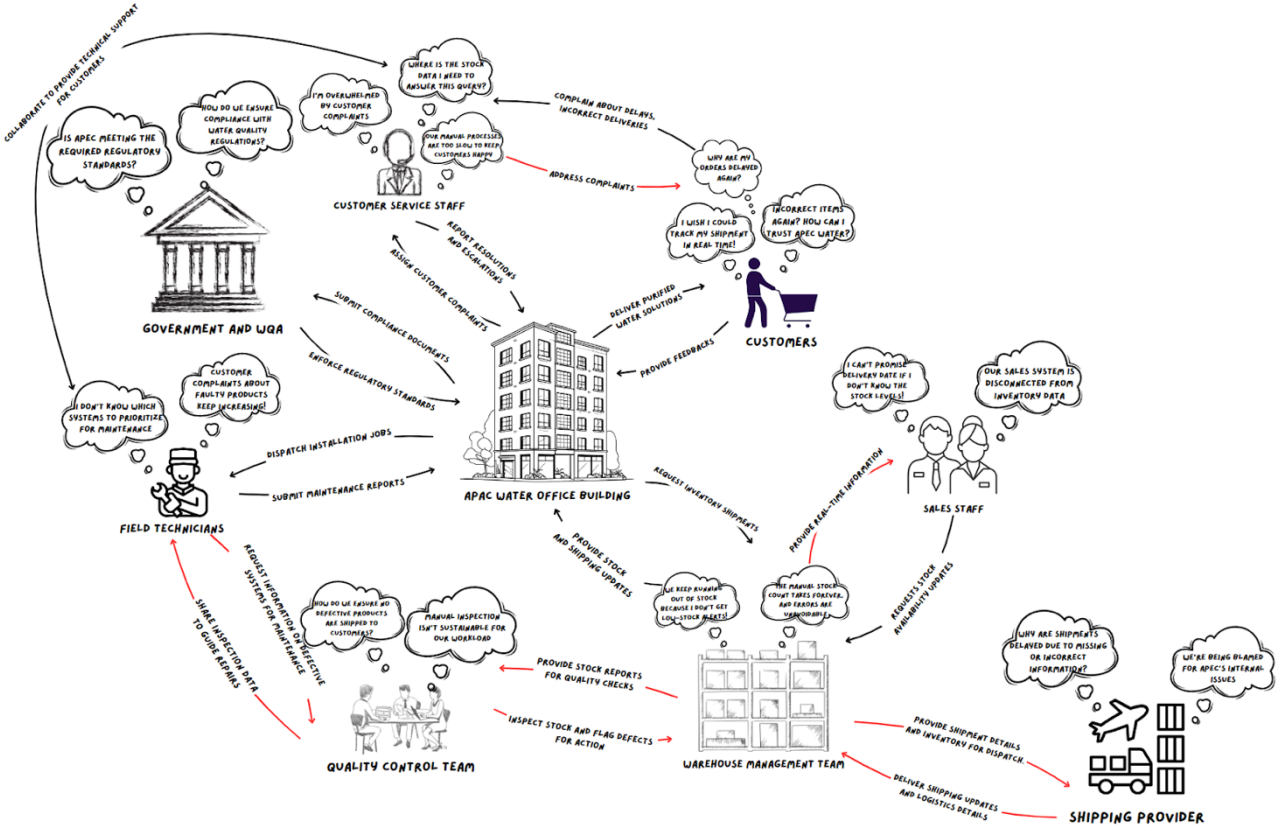


Figure 7: APEC Water's Current Operation Rich Picture

4.1. HUMAN RESOURCE MANAGEMENT

Regarding APEC Water's human resources, several IT-related new positions will be added to the operation lines. Firstly, the most important position that assists in the quality control process will be AI specialists as they will be responsible for creating development plans, training the AI, testing, and monitoring the AI performance. He/ She will ensure the accuracy rate's threshold of the AI computer vision technology to achieve 95% before putting it into the operation lines (Elias and Archie 2024). Therefore, to facilitate this process, two open positions for AI Specialists would be recommended.

Moreover, for developing a fully functional IoT system, IoT Specialists will also be the new position in the company. IoT Specialists will be in charge of the development, configuration, and maintenance of the IoT system and work directly with the inventory management, quality control, and customer support teams to provide them with instructions on how these IoT systems perform. One IoT specialist is required to maintain and troubleshoot the IoT system.

Furthermore, the IT support positions will be employed for technical assistance for hardware and software-related issues. They will proactively maintain the system, and troubleshoot workstations,

network connectivity, and cloud software connection if issues arise. These processes will be facilitated by two IT support staff.

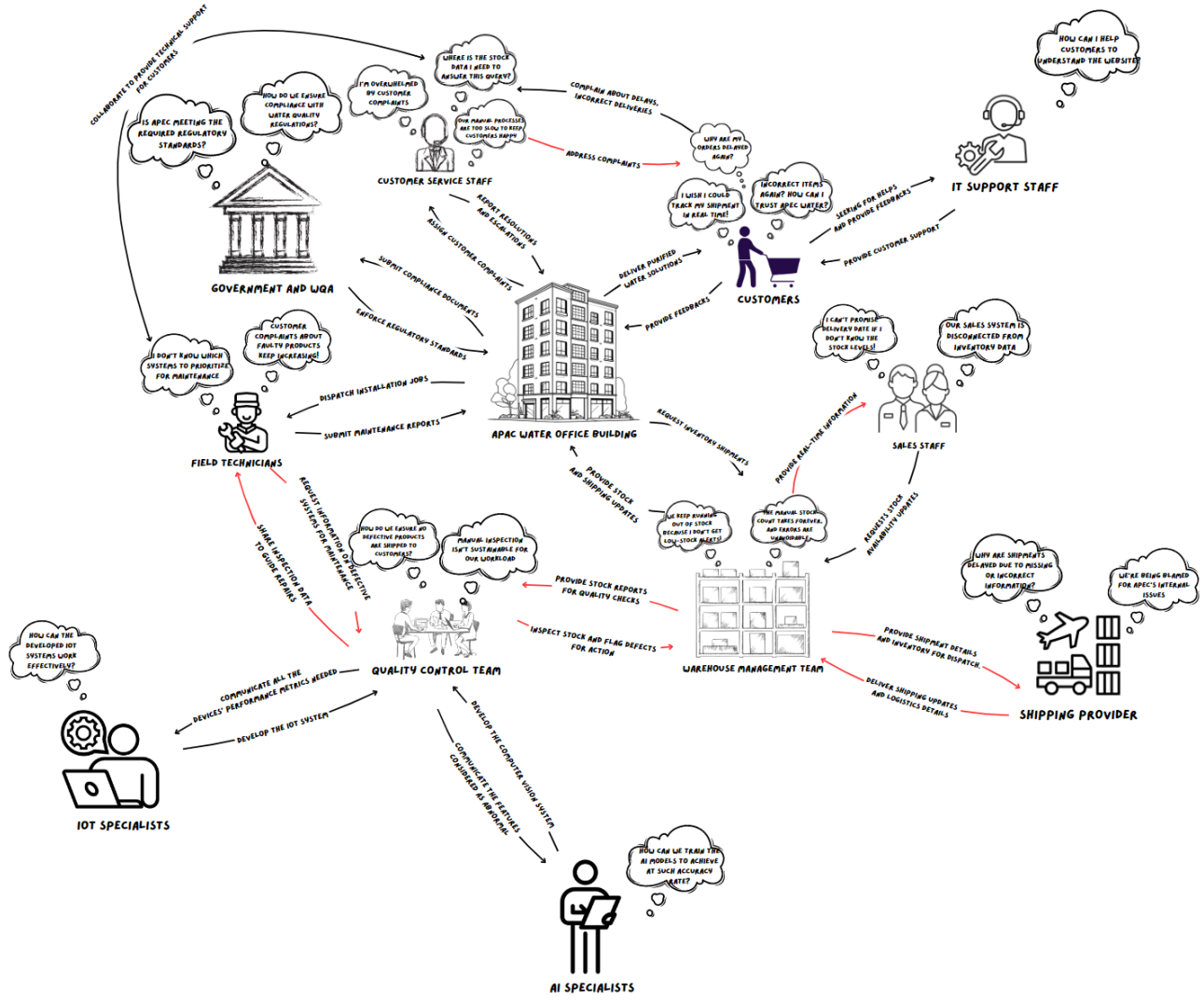


Figure 8: APEC Water's rich picture after applying the change in HRM

4.2. SYSTEM CONVERSION

The Phased Conversion method is recommended for implementing the Oracle NetSuite ERP system integrated with AWS IoT and Nyckel AI Computer Vision. This method will introduce one module of the new system one at a time while the rest of the old system remains in use, ensuring a gradual integration of the proposed system through phases (Mallach 2010). This brings APEC Water a cost-effective strategy while minimizing operational risks.

Specifically, a pilot-phase conversion approach will be utilized whereas there will be pilot groups for the quality control and inventory tracking practices (Mallach 2010).

The implementation will proceed as follows:

ERP System Integration Phase. The Oracle NetSuite system will be the first system to be introduced to the employees. This establishes a more effective means of communication channels between departments that automate and update all information flow in real time. Some practices that are involved in this phase will be data migration, system testing, and especially user training. The user training program will be conducted for a pilot team for further feedback and to refine the content continuously.

Quality Control Pilot Phase. The IoT capabilities and Nyckel AI computer vision ability will be developed and deployed on a single production line for a pilot team to test and give feedback for further improvement. The Nyckel AI will still be trained by the AI specialists till the accuracy rate/ successful rate is achieved minimum of 95% to ensure the defect detection ability works at its finest. For IoT capabilities, the necessary hardware and software for a single product line will be installed and tested. This phase will allow for system adjustment before scaling to full production lines.

Customer Portal for Performance Tracking and Post-sale Support Rollout. A website for customers to track their purchased devices' performance will be introduced after successfully integrating the ERP system, IoT components, and computer vision system. Moreover, this offers a means of communication between customers and the customer support team, providing customers with effective post-sale support and enhancing the customer experience shopping with APEC Water. This module will undergo various tests to ensure the data synchronization, data analysis, and user interface are user-centric.

4.3. SUB-CONCLUSION

Existing	New
Legacy System	
Data will be stored on the employee's computers and local database server	Migrating data into the cloud database server
Relies heavily on computing power to analyze the data	Data will be analyzed through cloud platform/ cloud application servers
Inventory management	
Manual stock tracking	IoT systems automate the stock tracking process.
Manual update stock onto the system	Every data generated by the IoT system regarding stock will be updated on Oracle NetSuite in real time.
Quality Control	
Manually inspect products to detect defects.	Automated defect detection through computer vision capabilities

The quality control team has to manually communicate with the warehouse team.	Data regarding defective products will be sent immediately to the warehouse team through Oracle.
N/A	The data from computer vision will be fully backed up and feedback for further system development.
Customer Post-sale support	
Customers have to track devices' performance manually	A website for customers to input their purchased devices and monitor their devices' performance
Customers call APEC Water's customer support team when the devices are in major damage.	Customers can proactively monitor and seek customer support to identify problems in the early stages and repair the devices.
Workforce Management	
Employee's skill gaps	Resolve the skill gaps through training content provided on Oracle NetSuite through NetSuite Guide Learning.
Lack of IT-related positions dedicated to technology implementation	Some positions related to IT, including AI specialists, IoT specialists, and IT support staff are being introduced

5. DOCUMENTATION AND OPERATION MANUAL

Regarding Documentation needed within this System Design and Analysis, as indicated by Gary et al. (2005), these are crucial records for tracking and serve as a means of communication for both internal and external stakeholders (such as managers, IT helpdesk, employees, and customers) to have a comprehensive technical understanding and guidelines about this report proposed solution. Specifically, 4 types of Documentation are thoroughly written including: Program Documentation, System Documentation, Operation Documentation, and Manual Users Documentation.

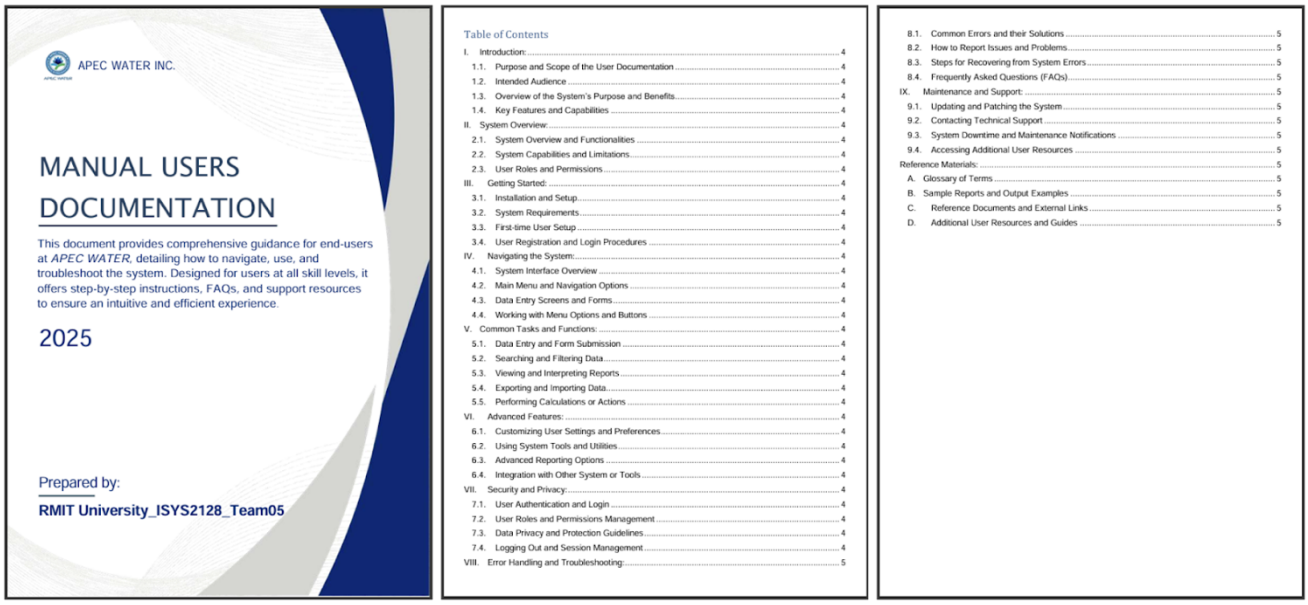


Figure 9: Manual User Documentation

As illustrated in Appendix A, Appendix 8.1-i; ii; iii; iv clearly show how these documentations are structured, what content they will cover, and who their targeted audience is. Each type of documentation serves a distinct purpose, ensuring that all stakeholders - ranging from technical teams to end-users - have access to the necessary resources for system implementation, maintenance, and usage. Below is a detailed breakdown of each documentation type, its intended function, mode of availability, and long-term maintenance strategy.

The Program Documentation is essential for *developers and IT personnel* responsible for maintaining and expanding the system. This documentation includes source code explanations, system architecture, algorithms, API references, and debugging guides, ensuring a structured approach to future system modifications and troubleshooting. Given its technical nature, this documentation will be hosted on an internal **Git repository**, accessible only to authorized personnel such as software engineers and system administrators. The IT department will be responsible for maintaining and updating this documentation to reflect system changes, code revisions, and new integrations. To facilitate **quick access**, **an online wiki-style knowledge** base will be maintained, providing an interactive platform for developers to contribute updates, document bug fixes, and ensure system consistency. Additionally, a version-

controlled PDF manual will be archived on the internal server, allowing for offline reference when necessary.

The System Documentation provides a holistic overview of the system's infrastructure, workflows, data flows, and integration points with external software. This document is primarily designed for *system architects, project managers, and IT support teams* who require an in-depth understanding of how different system components interact. The documentation will be available in both **digital and printed formats**, ensuring accessibility across multiple platforms. The digital version will be stored on the company's internal documentation portal, accessible through an encrypted enterprise resource planning (ERP) system, while physical copies will be distributed to department heads for reference during system audits and operational planning. The IT support team will be responsible for maintaining and updating this documentation as system enhancements or upgrades are introduced, ensuring alignment with current system capabilities.

The Operations Documentation focuses on the day-to-day management and maintenance of the system. Targeted toward *IT helpdesk staff and technical support engineers*, this document provides step-by-step instructions on system configurations, regular maintenance tasks, error resolution procedures, and escalation protocols. This documentation will be primarily **digital**, hosted on the organization's intranet and IT service management (ITSM) platform for real-time accessibility. IT administrators will maintain an interactive troubleshooting guide within this platform, enabling automated recommendations based on past issues and solutions. Regular updates will be conducted quarterly by the IT operations team to incorporate newly identified issues and their resolutions.

The Manual User Documentation is designed for *employees and end-users* interacting with the system daily. This document includes user guides, interface navigation instructions, frequently asked questions, and troubleshooting steps for common user issues. Given its widespread application, the documentation will be available in **both online and printed formats**. The digital version will be hosted on the company's internal knowledge base and customer support portal, allowing employees to search for specific queries and receive step-by-step assistance. To enhance accessibility, a mobile-responsive version will be developed, enabling employees to access guidance directly from their workstations or mobile devices. Printed versions of essential workflows, such as step-by-step login procedures and system access troubleshooting, will be placed near transaction terminals and workstations as posters and laminated quick-start guides. The HR and IT support teams will jointly manage updates to this documentation, ensuring that as system functionalities evolve, end-users are equipped with up-to-date information.

6. CHANGE MANAGEMENT

May 2025 is the time to train employees, so it is the most important phase of the change management tasks. Two main objects of this process are internal people as employees, and external people are customers.

JIRA is an out-of-the-box tool that fits for this task.

6.1. TOOLS FOR MANAGEMENT

- **Choose Between Kanban and Scrum:**

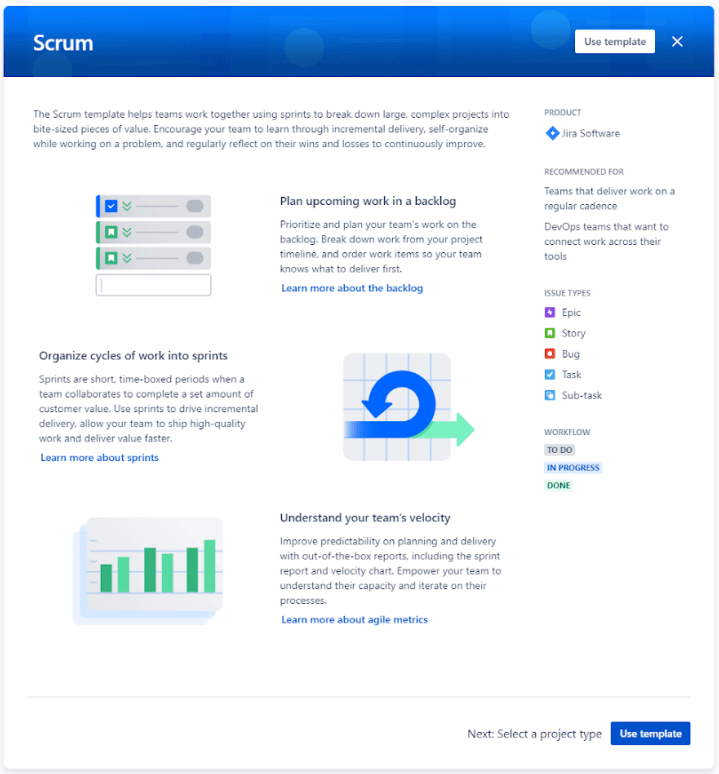
Scrum is the best way to choose because the company is currently entering a complex project and needs a development workflow that supports sprints, backlogs, and issues.

Scrum is an Agile project management methodology for this complex project that small cross-functional teams use to work toward an end goal. It has tools and processes that help teams deliver high-quality output quickly and efficiently. Its methods are flexible, allowing teams to self-manage and welcome client and stakeholder feedback throughout the development process.

- **Create a Special Workflow or Use a Template:**

The Atlassian Marketplace offers a wide range of templates tailored to various industries and project types. The company can choose a template and customize it to suit needs, and also can design its workflow from scratch to align perfectly with teams and project requirements.

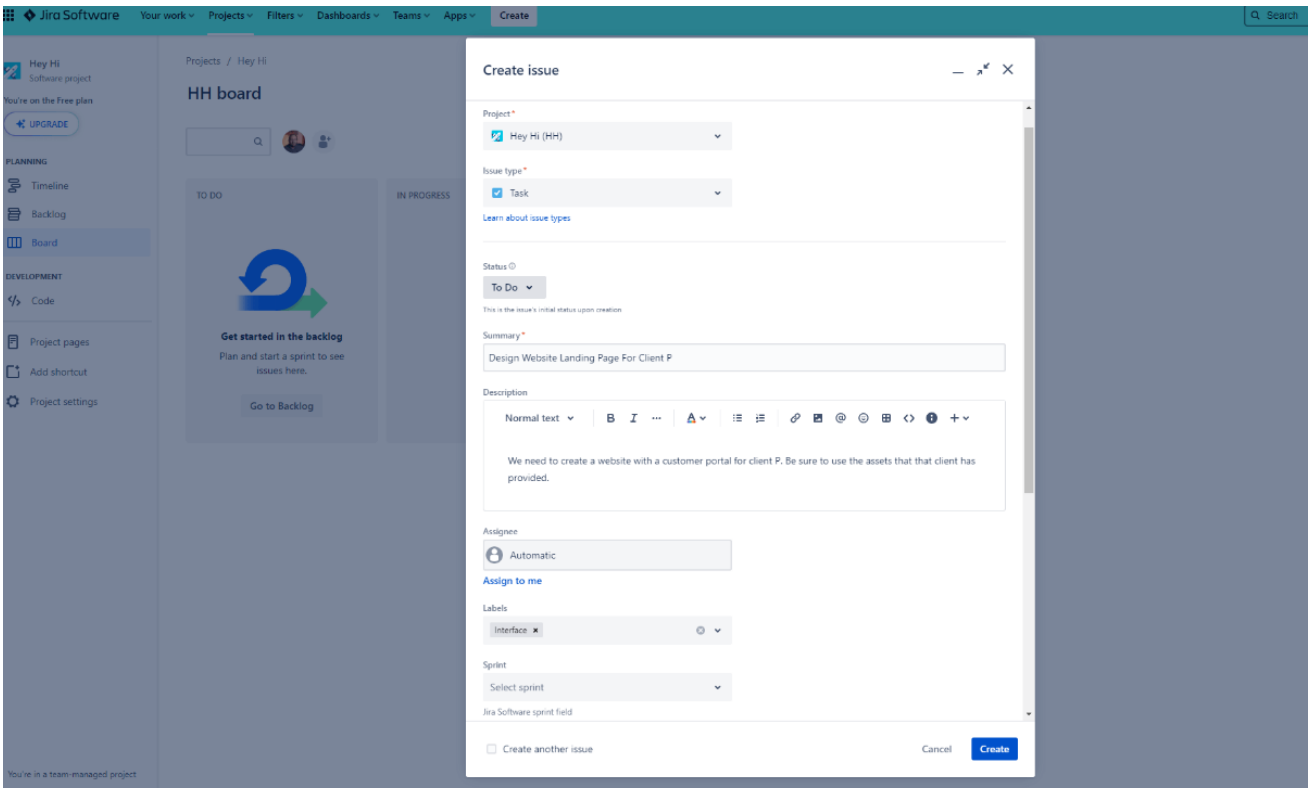
If the company has selected a template, simply enter a few details, such as the project's name, and Jira will provide a ready-to-use workspace. The flexibility to adapt or create workflows ensures that Jira works seamlessly for your unique project management needs.



- **Create Tasks, Issues, and Epics:**

Working within a Scrum framework typically begins with a sprint planning meeting where teams collaborate to generate tasks and user stories. During the meeting, the staff can populate the board and backlog with the tasks that need to be completed.

Clicking the Create button at the top of the Jira interface. This will open a form where the staff can provide the necessary details to define the task, issue, or epic.



- **Move Tasks Along:**

Progressing through tasks and issues, this step is essential to keep the status columns updated. Team members should move task cards through the columns (from left to right) as the status changes or the product owner can handle this responsibility.

- **Manage the Backlog:**

In addition to creating and moving tasks through various stages, one of the most critical aspects of task management is maintaining the backlog. A cluttered or outdated backlog can lead to significant challenges for the team.

The backlog to ensure that the most pressing issues are prioritized. This involves removing outdated tasks, updating user stories, assigning tasks, and adding any new items that have been included in the project scope.

For further assistance, Jira makes backlog management simple with its intuitive user interface and drag-and-drop functionality. These features make it easy to reorganize tasks, ensuring the team stays focused and aligned with project goals.

6.2. INTERNAL CHANGE

6.2.1. HR CHANGES

Customer service teams and sales employees on using the system directly. IT engineers control the technical system. Marketing staff and internal communication staff will need to communicate their strategies to incorporate the new system. In the Finance department, accountants will experience changes as they take on the responsibility of raising funds for the new system and may need to manage software contracts with providers. In addition, warehouse management and quality control teams will have more responsibility when the system enters running. Finally, managers will need to modify their approach to market analysis, leveraging the new system to adjust business plans in comparison with competitors.

Trained/ tasks	Pre-implementation the system	Post- implementation the system	Content
IT engineers	- Follow strictly the implementation	- Instruct relevant employees on using the system - Develop, apply and maintain the system	Advance knowledge - 2 month + Learn after working hours (1 hour session) + From monday to saturday
Customer services teams, sale employees	- Consult customers in exist process	- Consulting customers in shopping process - Guide customers how to use the System properly - Early errors detector of the system	Advance knowledge - 2 month + Learn after working hours (1 hour session) + From monday to saturday
Finance staff and accountant	- Ask loan from the bank - Loan and interests payment	- Ask loan from the bank - Loan and interests payment - Negotiating contracts with vendors for copyright registration	Basics knowledge - 1 month + Learn after working hours (1 hour session) + From monday to saturday
Manager	- Oversee the overall Business operations - Pitch business idea	- Oversee the overall business operations - Pitch business idea - Ensure to deliver the value of the new system for investors	Basics knowledge - 1 month + Learn after working hours (1 hour session) + From monday to saturday

6.2.2. INFRASTRUCTURE

In addition to the necessary hardware and software upgrades, several infrastructure improvements will be implemented. This includes establishing a new internet Connection, and other infrastructure for the process.

Besides the people's issues, the factor that affects the success of the project is the facilities that are provided for the project. More engineers and technicians who work on the project more the rooms or buildings, if by other actual needs, will change the layout of the company.

6.3. EXTERNAL CHANGES

The integration of the system will also influence various external factors.

Customers, who will be directly impacted by the new system, will need to adapt to new ones.

Compliance with local government regulations is crucial. The company must follow safety protocols that meet general government standards, including annual inspections to ensure ongoing compliance.

7. REFERENCES

Advantech (2023) *WISE-6610 Getting Started Guide for AWS IoT Core for LoRaWAN*, Advantech website, accessed 10 January 2025. https://www.advantech.com/en/support/details/faq?id=1-2BRBVVD

Amazon (n.d.a) *AWS IoT*, Amazon website, accessed 15 January 2025. https://docs.aws.amazon.com/iot/latest/apireference/Welcome.html

Amazon (n.d.b) *AWS::Glue::Connection ConnectionInput*, Amazon website, accessed 15 January 2025. https://docs.aws.amazon.com/AWSCloudFormation/latest/UserGuide/aws-properties-glue-connection-connectioninput.html

Amazon (n.d.c) *AWS IoT Core pricing*, Amazon website, accessed 15 January 2025. https://aws.amazon.com/iot-core/pricing/

Amazon (n.d.d) *Amazon EC2 On-Demand Pricing*, Amazon website, accessed 15 January 2025. https://aws.amazon.com/ec2/pricing/on-demand/

AWS (2021) *AWS Whitepaper - Securing Internet of Things (IoT) with AWS*, AWS website, accessed 10 January 2025. https://docs.aws.amazon.com/whitepapers/latest/securing-iot-with-aws/securing-iot-with-aws.html

AWS (n.d.) *Security Best Practices in AWS IoT Core*, AWS website, accessed 10 January 2025. https://docs.aws.amazon.com/iot/latest/developerguide/security-best-practices.html

BIS (n.d.) *ISO/IEC 27001:2022 Information Security - Your implementation guide*, BIS Group website, accessed 10 January 2025. https://www.bsigroup.com/globalassets/localfiles/en-gb/iso-27001/pdf/v2.0_27001_implementation_guide.pdf

Bosch (n.d.) *Humidity sensor BME280*, Bosch website, accessed 10 January 2025. https://www.bosch-sensortec.com/products/environmental-sensors/humidity-sensors-bme280/#documents

Chaki J and Dey N (2018) *A Beginner's Guide to Image Preprocessing Techniques*, CRC Press, doi:10.1201/9780429441134.

Cimen C, Kavurucu Y and Aydin H (2014) 'Usage of Thin-Client / Server Architecture in Computer Aided Education', *The Turkish Online Journal of Educational Technology*, 13(2):181-185, accessed 15 January 2025. http://www.tojet.net/articles/v13i2/13218.pdf

Cognex (n.d.) *Machine Vision Hardware Components*, Cognex website, accessed 14 January 2025. https://www.cognex.com/what-is/machine-vision/machine-vision-hardware-components

Cognex (n.d.b) *Lighting For Machine Vision Applications*, Cognex website, accessed 15 January 2025. https://www.cognex.com/what-is/machine-vision/the-importance-of-lighting

Elias D and Archie O (2024) 'Harnessing Computer Vision for SMEs: Enhancing Quality and Efficiency in Manufacturing and Retail', *Research Gate*, doi:10.13140/RG.2.2.20289.26728.

Encata (2024) *Machine Vision Hardware: Components & Selection Tips*, Encata website, accessed 14 January 2025. https://www.encata.net/blog/machine-vision-hardware-components-selection-tips

GeeksforGeeks (2024a) *Client-Server Architecture - System Design*, GeeksforGeeks website, accessed 15 January 2025. https://www.geeksforgeeks.org/client-server-architecture-system-design/

GeeksforGeeks (2024b) *What is Star Topology?*, GeeksforGeeks website, accessed 15 January 2025. https://www.geeksforgeeks.org/advantages-and-disadvantages-of-star-topology/

GeeksforGeeks (n.d.c) *Web Hosting Services on AWS*, GeeksforGeeks website, accessed 15 January 2025. https://www.geeksforgeeks.org/aws-cloud-architecture-for-web-hosting/

Harrison MA, Ruzzo WL, Ullman JD (1976) 'Protection in Operating Systems', *Communications of the ACM*, 19(8):1-11.

Holliday M (30 November 2021) 'Why Move to Cloud ERP? 12 Reasons & Benefits', *Netsuite*, accessed 15 January 2025. https://www.netsuite.com/portal/resource/articles/erp/why-move-to-cloud-erp.shtml

IBM (2023) *IBM Expands Cloud Security and Compliance Center to Help Clients Protect Data and Assess Risk Across Hybrid, Multicloud Environments*, IBM website, accessed 10 January 2025. https://newsroom.ibm.com/2023-09-06-IBM-Expands-Cloud-Security-and-Compliance-Center-to-Help-Clients-Protect-Data-and-Assess-Risk-Across-Hybrid,-Multicloud-Environments

IBM (n.d.) *What is software as a service (SaaS)?*, IBM website, accessed 15 January 2025. https://www.ibm.com/think/topics/saas

Iqbal U, Davies T and Perez P (2024) 'A Review of Recent Hardware and Software Advances in GPU-Accelerated Edge-Computing Single-Board Computers (SBCs) for Computer Vision', *Sensors*, 24(15), doi:10.3390/s24154830.

Lee DE (2023) *Creating a WordPress Website on AWS EC2 with EBS: A Step-by-Step Guide*, Medium website, accessed 15 January 2025. https://drlee.io/creating-a-wordpress-website-on-aws-ec2-with-ebs-a-step-by-step-guide-f024078a21ae

Machine Vision Direct (n.d.) *Opto Engineering Itala G. EL Cameras*, Machine Vision Direct website, accessed 14 January 2025. https://machinevisiondirect.com/collections/itala_gel?srsltid=AfmBOoptAWM5H_VQq4V09hutBnj7Wanab8acSSbhHT6NU2TTmnOzm_wO&usf_view=list

Nyckel (n.d.) *Easily deploy a custom computer vision model*, Nyckel website, accessed 15 January 2025. https://www.nyckel.com/products/computer-vision/

OPT Machine Vision (15 Jun 2024) 'OPT Overview of Machine Vision Applications', *Linkedin*, accessed 14 January 2025. https://www.linkedin.com/pulse/opt-overview-machine-vision-applications-4z4jc/

Opto Engineering (n.d.a) *ITALA G.EL series*, Opto Engineering website, accessed 14 January 2025. https://www.opto-e.com/en/products/itala-g-el-series

Opto Engineering (n.d.b) *ITALA G.EL series*, Opto Engineering website, accessed 14 January 2025. https://www.opto-e.com/en/products/itala-g-el-series#tech-info-2

Oracle (n.d.) *NetSuite Applications Suite*, Oracle website, accessed 10 January 2025. https://docs.oracle.com/en/cloud/saas/netsuite/ns-online-help/chapter_1534781311.html#subsect_1535662294

Salem AH, Azzam SM, Abohany AA (2024) 'Advancing cybersecurity: a comprehensive review of AI-driven detection techniques', *Journal of Big Data*, 11:105-143, doi:10.1186/s40537-024-00957-y.

Siemens (n.d.) *SIMATIC RF600: The powerful UHF-RFID system for transparent processes in the Digital Enterprise*, Siemens website, accessed 10 January 2025. https://cache.industry.siemens.com/dl/files/341/109766341/att_980958/v1/SIMATIC_RF600-EN.pdf

Technexion (n.d.) *Embedded Vision vs. Machine Vision – Everything You Need to Know*, Technexion website, accessed 14 January 2025. https://www.technexion.com/resources/embedded-vision-vs-machine-vision-everything-you-need-to-know/

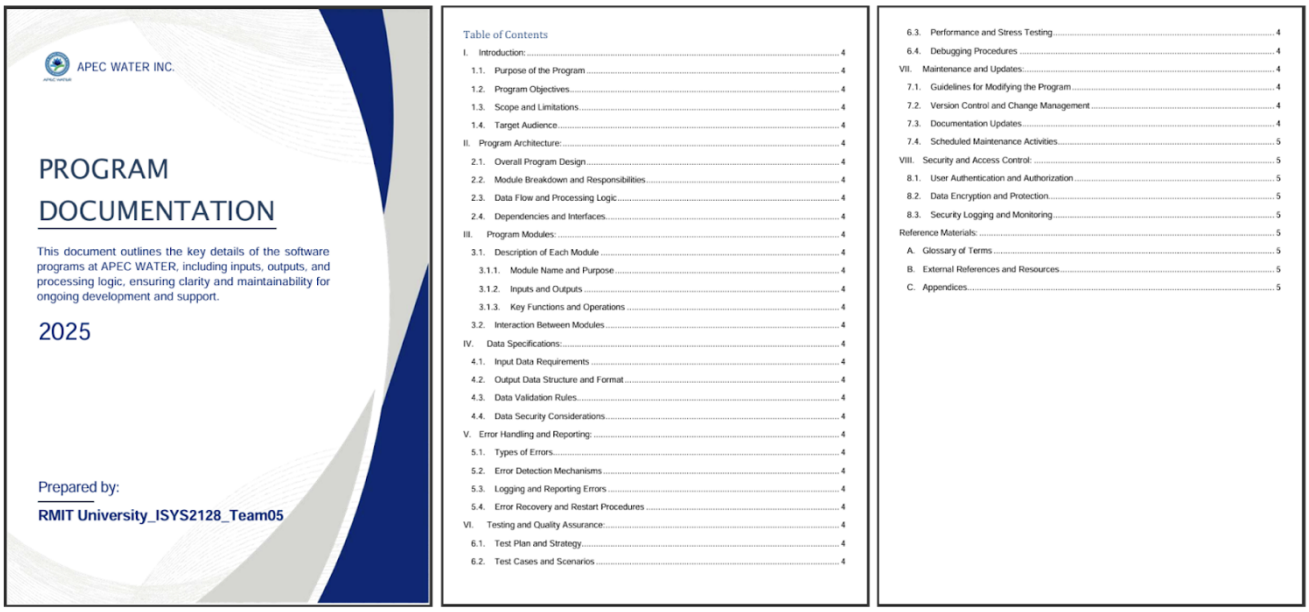
Terillium (n.d.) *Oracle NetSuite Pricing*, Terillium website, accessed 15 January 2025. https://terillium.com/netsuite-pricing/

WordPress (n.d.a) *What Is a Content Management System and How to Choose the Best CMS for Your Needs*, WordPress website, accessed 15 January 2025.https://wordpress.com/go/tutorials/what-is-a-cms/#what-is-a-content-management-system

WordPress (n.d.b) *There is a plan for you*, WordPress website, accessed 15 January 2025. https://wordpress.com/pricing/

8. APPENDIXES

8.1. Appendix A



APEC WATER INC.

PROGRAM DOCUMENTATION

This document outlines the key details of the software programs at APEC WATER, including inputs, outputs, and processing logic, ensuring clarity and maintainability for ongoing development and support.

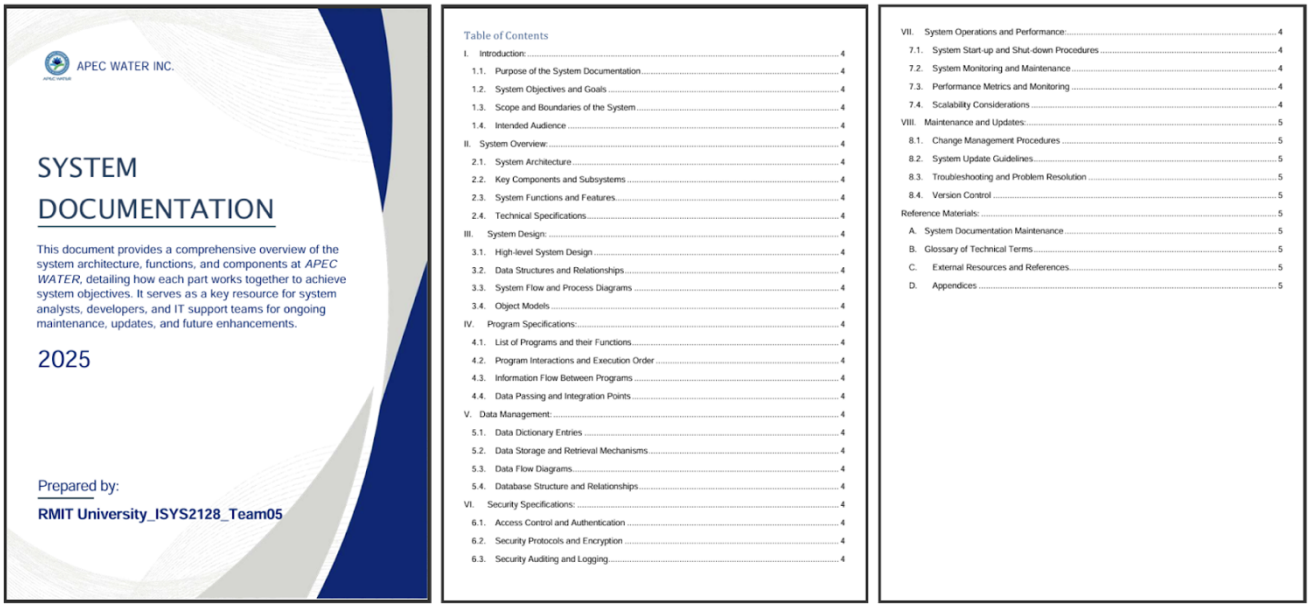
2025

Prepared by:

RMIT University_ISYS2128_Team05

Table of Contents

Appendix 8.1-i: Program Documentation



APEC WATER INC.

SYSTEM DOCUMENTATION

This document provides a comprehensive overview of the system architecture, functions, and components at *APEC WATER*, detailing how each part works together to achieve system objectives. It serves as a key resource for system analysts, developers, and IT support teams for ongoing maintenance, updates, and future enhancements.

2025

Prepared by:

RMIT University_ISYS2128_Team05

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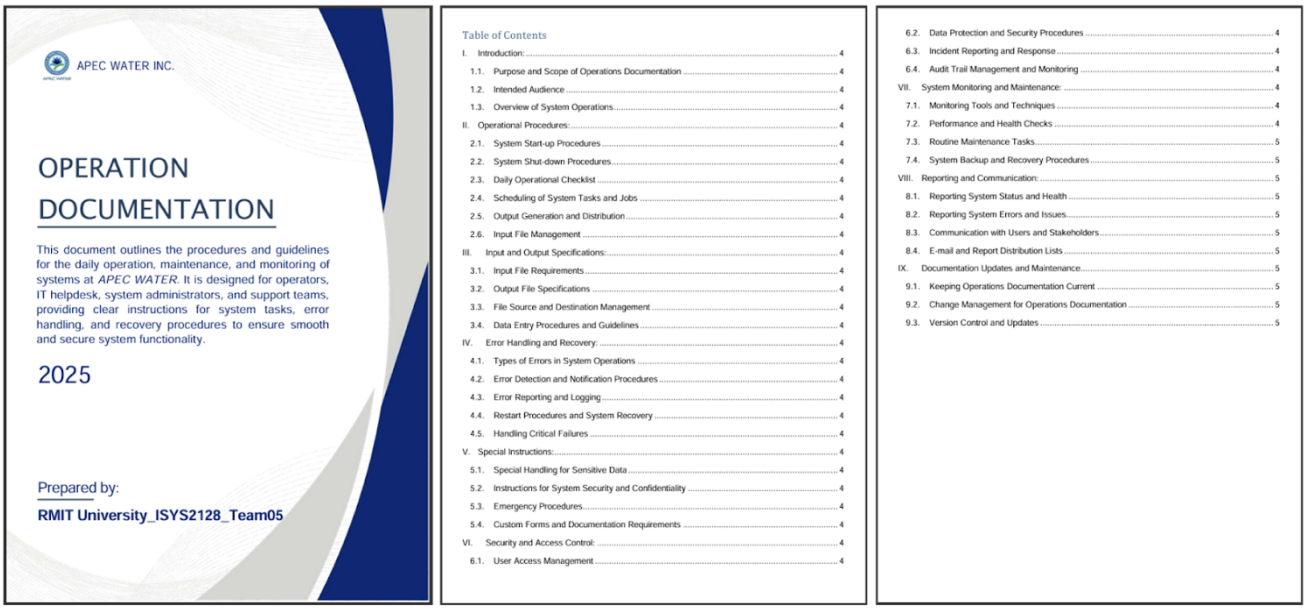
Appendix 8.1-ii: System Documentation



APEC WATER INC.

OPERATION DOCUMENTATION

This document outlines the procedures and guidelines for the daily operation, maintenance, and monitoring of systems at *APEC WATER*. It is designed for operators, IT helpdesk, system administrators, and support teams, providing clear instructions for system tasks, error handling, and recovery procedures to ensure smooth and secure system functionality.

2025

Prepared by:

RMIT University_ISYS2128_Team05

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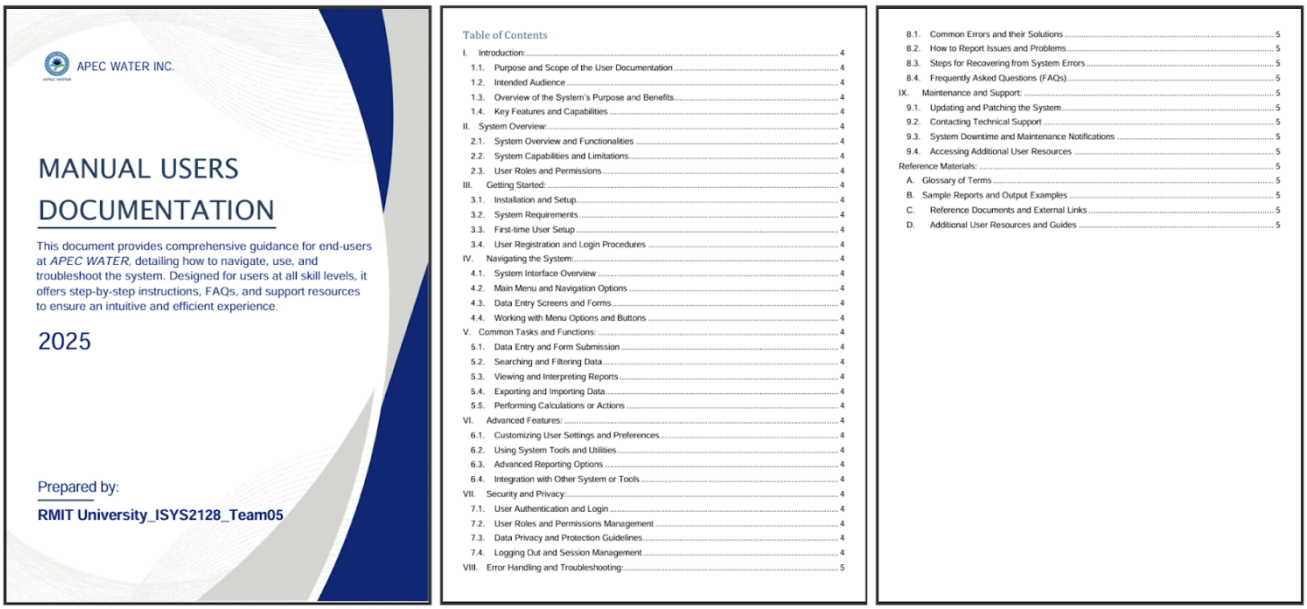
Appendix 8.1-iii: Operation Documentation



APEC WATER INC.

MANUAL USERS DOCUMENTATION

This document provides comprehensive guidance for end-users at *APEC WATER*, detailing how to navigate, use, and troubleshoot the system. Designed for users at all skill levels, it offers step-by-step instructions, FAQs, and support resources to ensure an intuitive and efficient experience.

2025

Prepared by:

RMIT University_ISYS2128_Team05

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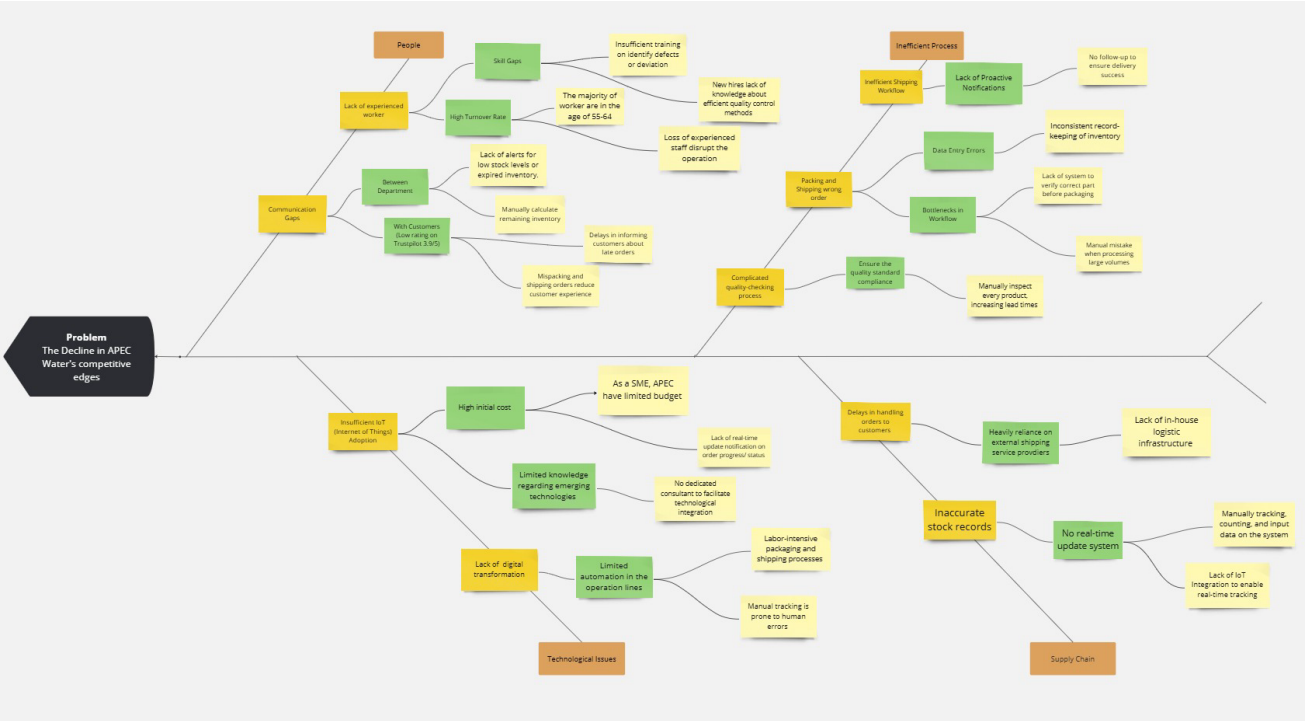
Appendix 8.1-iv: Manual Users Documentation

8.2. Appendix B



Appendix 8.2-i: APEC Fishbone Diagram (Link to external site: https://miro.com/app/board/uXjVLAUGAXQ=/?share_link_id=409119939790)

9. Functional Testing					
9.1. Test Oracle NetSuite modules	IT Department	0%	April 15, 2025	April 18, 2025	3
9.2. Test IoT sensor data integration	IT Department	0%	April 18, 2025	April 20, 2025	2
9.3. Test Nyckel AI workflows	IT Department	0%	April 20, 2025	April 22, 2025	2
10. Integration Testing					
10.1. Simulate end-to-end workflows	IT Department	0%	April 22, 2025	April 28, 2025	6
10.2. Validate communication between Oracle, AWS, and Nyckel	IT Department	0%	April 28, 2025	May 3, 2025	5
10.3. Fix bugs	IT Department	0%	May 3, 2025	May 6, 2025	3
11. User Acceptance Testing (UAT)					
11.1. Prepare test scenarios	IT Department, End Customers	0%	May 6, 2025	May 8, 2025	2
11.2. Conduct UAT with end-users	IT Department, End Customers	0%	May 8, 2025	May 12, 2025	4
11.3. Collect and analyze feedback	IT Department, End Customers	0%	May 12, 2025	May 13, 2025	1
12. Employee Training					
12.1. Develop training sessions	IT Department, Customer Service	0%	May 13, 2025	May 19, 2025	6
12.2. Conduct role-based training	IT Department, Customer Service	0%	May 19, 2025	May 25, 2025	6
12.3. Gather feedback from trainees	IT Department	0%	May 25, 2025	May 27, 2025	2
13. Documentation Distribution					
13.1. Create user manuals	IT Department	0%	May 27, 2025	May 31, 2025	4
13.2. Update system resources	IT Department	0%	May 31, 2025	June 2, 2025	2
13.3. Distribute to all departments	IT Department	0%	June 2, 2025	June 3, 2025	1
14. Post-Deployment Monitoring					
14.1. Monitor system performance in real-time	IT Department	0%	June 3, 2025	June 9, 2025	6
14.2. Address initial bugs and issues	IT Department, Technology Vendors	0%	June 9, 2025	June 15, 2025	6
14.3. Ensure IoT sensors provide accurate and timely updates	IT Department, Field Technicians	0%	June 15, 2025	June 21, 2025	6
15. Customer Portal Deployment					
15.1. Develop and test customer-facing portal	IT Department	0%	June 21, 2025	June 28, 2025	7
15.2. Launch portal and notify customers	IT Department, Customer Service	0%	June 28, 2025	July 1, 2025	3
15.3. Train customer support staff on portal features	IT Department, Customer Service	0%	July 1, 2025	July 4, 2025	3
16. Performance Review					
16.1. Collect customer feedback	Customer Service Staff	0%	July 4, 2025	July 11, 2025	7
16.2. Evaluate system performance against project goals	APEC Management Team, IT Department	0%	July 11, 2025	July 14, 2025	3
16.3. Document lessons learned	IT Department, APEC Management Team	0%	July 14, 2025	July 17, 2025	3
9. Functional Testing					
9.1. Test Oracle NetSuite modules	IT Department	0%	April 15, 2025	April 18, 2025	3
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9.3. Test Nyckel AI workflows	IT Department	0%	April 20, 2025	April 22, 2025	2
10. Integration Testing					
10.1. Simulate end-to-end workflows	IT Department	0%	April 22, 2025	April 28, 2025	6
10.2. Validate communication between Oracle, AWS, and Nyckel	IT Department	0%	April 28, 2025	May 3, 2025	5
10.3. Fix bugs	IT Department	0%	May 3, 2025	May 6, 2025	3
11. User Acceptance Testing (UAT)					
11.1. Prepare test scenarios	IT Department, End Customers	0%	May 6, 2025	May 8, 2025	2
11.2. Conduct UAT with end-users	IT Department, End Customers	0%	May 8, 2025	May 12, 2025	4
11.3. Collect and analyze feedback	IT Department, End Customers	0%	May 12, 2025	May 13, 2025	1
12. Employee Training					
12.1. Develop training sessions	IT Department, Customer Service	0%	May 13, 2025	May 19, 2025	6
12.2. Conduct role-based training	IT Department, Customer Service	0%	May 19, 2025	May 25, 2025	6
12.3. Gather feedback from trainees	IT Department	0%	May 25, 2025	May 27, 2025	2
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13.1. Create user manuals	IT Department	0%	May 27, 2025	May 31, 2025	4
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13.3. Distribute to all departments	IT Department	0%	June 2, 2025	June 3, 2025	1
14. Post-Deployment Monitoring					
14.1. Monitor system performance in real-time	IT Department	0%	June 3, 2025	June 9, 2025	6
14.2. Address initial bugs and issues	IT Department, Technology Vendors	0%	June 9, 2025	June 15, 2025	6
14.3. Ensure IoT sensors provide accurate and timely updates	IT Department, Field Technicians	0%	June 15, 2025	June 21, 2025	6
15. Customer Portal Deployment					
15.1. Develop and test customer-facing portal	IT Department	0%	June 21, 2025	June 28, 2025	7
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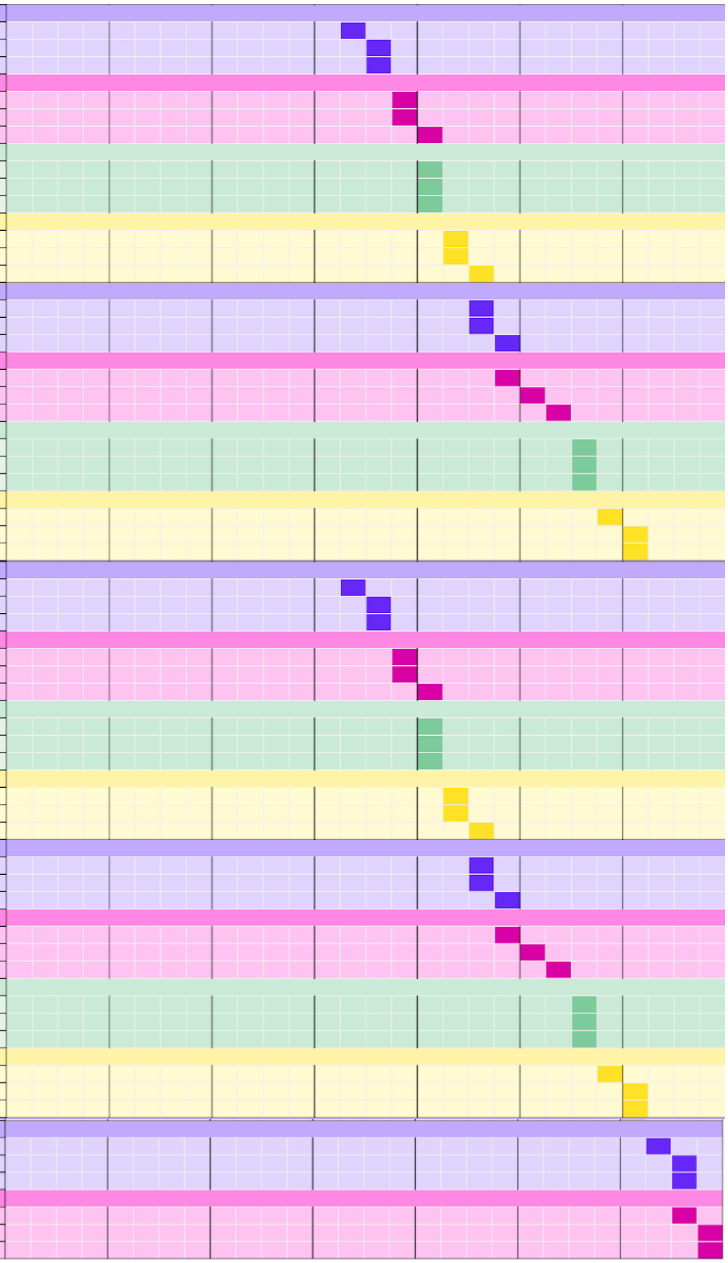
16. Performance Review					
16.1. Collect customer feedback	Customer Service Staff	0%	July 4, 2025	July 11, 2025	7
16.2. Evaluate system performance against project goals	APEC Management Team, IT Department	0%	July 11, 2025	July 14, 2025	3
16.3. Document lessons learned	IT Department, APEC Management Team	0%	July 14, 2025	July 17, 2025	3
17. Final Project Report					
17.1. Draft the final project report	IT Department	0%	July 17, 2025	July 21, 2025	4
17.2. Review and revise with input from all stakeholders	IT Department, APEC Management Team	0%	July 21, 2025	July 24, 2025	3
17.3. Submit the final report to management	APEC Management Team	0%	July 24, 2025	July 25, 2025	1
18. Official Project Handover					
18.1. Conduct formal handover to operations	APEC Management Team, IT Department	0%	July 25, 2025	July 27, 2025	2
18.2. Ensure all stakeholders have access to system documentation	IT Department	0%	July 27, 2025	July 28, 2025	1
18.3. Finalize project closure report	APEC Management Team	0%	July 28, 2025	July 29, 2025	1



Appendix 8.2-ii: Proposed system's Gantt chart