# SOFTWARE DEVELOPMENT PROPOSAL

PREPARED FOR

## STRONG APE APPAREL

PREPARED BY

ABEL
ABEDLINE
SOPFIAN
WEE CHUAN

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| **PROJECT NAME** | E-Commerce Proposal for Strong Ape Apparel | | |
| **EST. START DATE** | 01 Mar 2025 | **EST. FINISH DATE** | 31 May 2025 |
| **SUBMITTED TO** | Dr. Bhanu | **COMPANY** | Strong Ape Apparel |
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| **SUBMITTED BY** | Ong Wee Chuan | **COMPANY** | BananaCloudDev Pte Ltd |
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## PROJECT OVERVIEW

This project outlines the functional requirements for our client, **Strong Ape Apparel's** e-commerce website and proposes a scalable, secure architecture tailored to its business goals. As part of the Client's digital transformation strategy to establish a strong online presence both locally and internationally, **Microsoft Azure** has been selected as the cloud platform of choice. The proposed architecture integrates a web app storefront with a robust backend system powered by Azure SQL Database and Blob Storage for efficient data management.

## PURPOSE / GOALS

Strong Ape Apparel is a well-established brand in Singapore with a strong physical retail presence. However, reliance on traditional store operations has reached a bottleneck, restricting market reach and scalability. To overcome this challenge, the company is exploring the digitalisation of its retail operations to establish a robust online presence.

1. **Expand Customer Reach**:
    - Establish an online presence to attract and engage a broader audience beyond in-store shoppers.
2. **Optimise Inventory Management:**
    - Improve stock forecasting to enhance stock control, reduce overstocking, and minimize stockouts.
3. **Enhance Scalability**:
    - Develop a robust infrastructure capable of handling demand fluctuations and supporting business growth.
4. **Increase Online Sales and Engagement**:
    - Leverage digital channels to connect with the growing e-commerce consumer base and drive revenue growth.

This strategic move aims to capitalise on Singapore's thriving e-commerce market, which accounted for 17.3% of the nation's GDP in 2022 and saw a year-on-year growth of 4.3% in the fourth quarter of 2024. By going digital, Strong Ape Apparel will be able to expand their customer reach into the online market.

## OBSTACLES (IF ANY)

**Data Sharing and Ownership Policies**

- **External Partner Integration:** Sharing data with external partners, such as payment processors and delivery services, introduces complexities in maintaining seamless operations while ensuring compliance with third-party requirements.
- **Data Security:** Safeguarding sensitive customer and business information, such as payment details and personal data, against unauthorised access and breaches is a critical concern.
- **Compliance with Data Protection Regulations:** Adhering to relevant regulations, such as Singapore's Personal Data Protection Act (PDPA) or GDPR (if applicable), is necessary to ensure legal compliance and maintain customer trust.
- **Ownership and Usage Rights:** Clearly defining data ownership and usage rights between the Client, external partners, and service providers to prevent disputes or misuse of shared data.

**Integration Challenges**

- **Technical Difficulties in Integration:** Connecting the e-commerce platform with the Client's current inventory management systems and third-party platforms like Stripe may involve complex technical processes.
- **Data Flow and Synchronization:** Ensuring seamless data flow between the e-commerce platform, inventory systems, and external platforms is critical to avoid discrepancies in stock levels, order processing, and customer information.
- **Compatibility Issues:** Existing systems may require updates or modifications to be compatible with the new e-commerce platform, potentially increasing project complexity and timelines.

## INDUSTRY / MARKET RISK FACTORS

**Market Competition & Saturation**

- Fashion e-commerce market in Singapore is highly competitive, with established global brands, fast fashion retailers, and local boutiques all competing for market share
- A strong brand identity with a unique UX is required for the brand to gain an advantage.

**Logistics & Delivery Challenges**

- High customer expectations for fast, reliable, and low-cost shipping may create logistical pressures, affecting order fulfillment efficiency and customer satisfaction.
- Delays, tracking issues, and mismanaged deliveries can negatively impact the brand's reputation.

**Return & Refund Policies**

- Fashion e-commerce typically has a higher return rate than other industries due to factors such as sizing issues, customer expectations, and product variations.
- A high volume of returns can impact profitability, increase logistics costs, and strain operational efficiency.

By proactively addressing these risk factors, the project can mitigate scope creep, maintain project constraints (scope, time, and cost), and ensure on-time delivery while adhering to standards and stakeholder expectations.

## BUDGET ASSUMPTIONS

Strong Ape Apparel has shown robust financial health with healthy revenue from its physical retail operations. In 2024, their customer retention rate saw an increase from 60% to 70%, and new customer rates have been rising steadily by 5% annually. Additionally, Singapore's e-commerce market is experiencing a year-on-year growth of 4.3%. Given these favorable conditions, Strong Ape Apparel is well-positioned to adopt an e-commerce platform and penetrate the online market, aiming to increase its market share from 25% to 40%.

## HARDWARE COMPATIBILITY

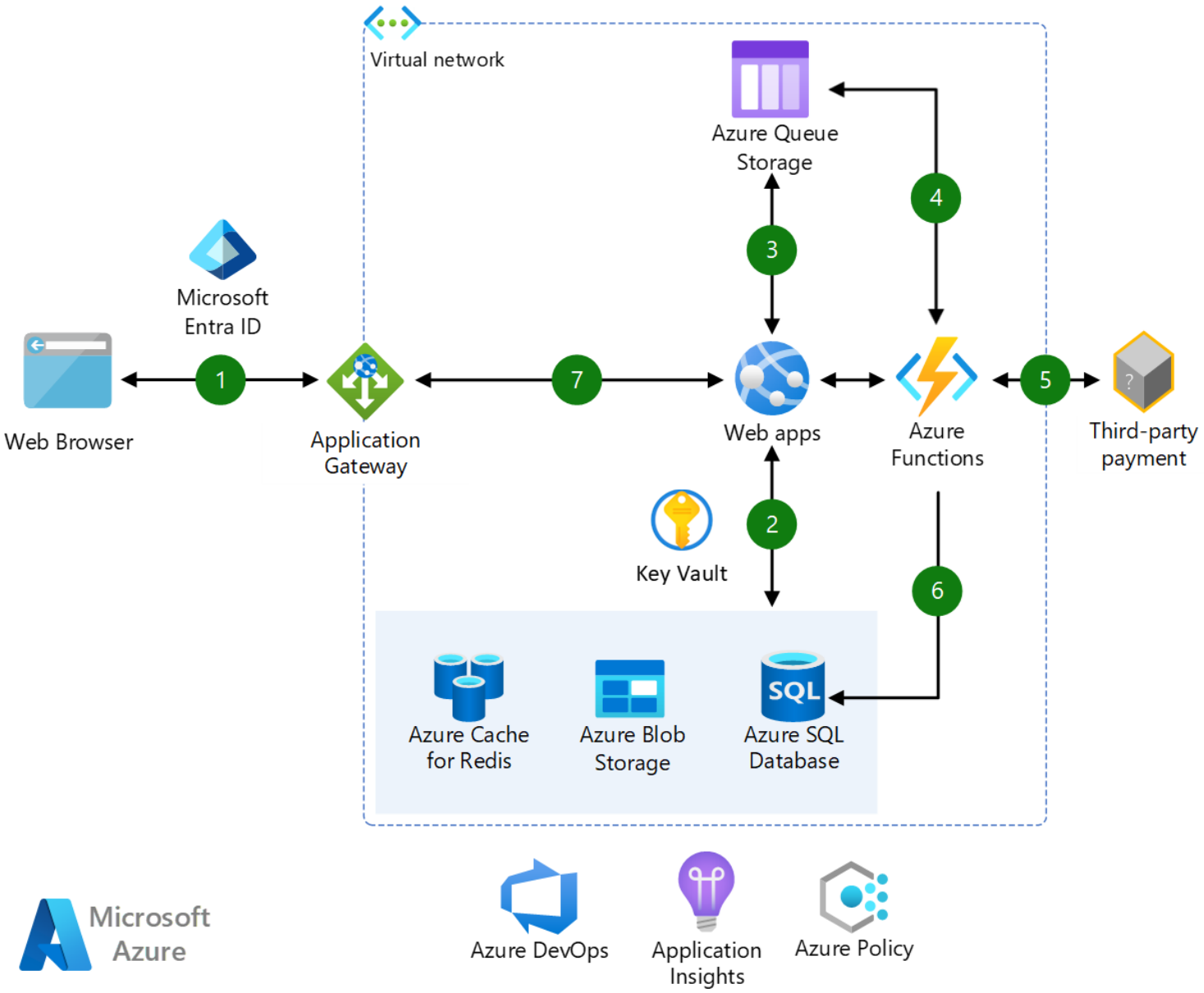
The proposed e-commerce platform is fully hosted on Microsoft Azure, which does not require any specialised on-premise hardware. Consequently, no additional hardware investment is needed. Strong Ape Apparel can access and manage the platform from any device, including desktops, laptops, tablets, and smartphones.

## SOFTWARE EMPLOYED

- **Frontend**: HTML, CSS, Bootstrap / Tailwind CSS
- **Backend**: Flask (Python Framework), SQLAlchemy (ORM for Flask)
- **Cloud Infrastructure & Scalability**: Microsoft Azure App Service, Azure Blob Storage, Azure Devops
- **Security & Authentication**: Microsoft Entra ID, Azure Key Vault
- **Database & Inventory Management**: Azure SQL Database, Azure Cache for Redis, Azure Monitor
- **E-Commerce API integration**: Azure Logic Apps, Azure API Management (Payment Gateway and 3rd Party logistics API)

## OVERALL SYSTEM ARCHITECTURE

The following diagram (see Figure 1) is the proposed Azure architecture for the implementation of an e-commerce store for Strong Ape Apparel.




1. User accesses the web app in browser/phone app and signs in with Entra.
2. User searches for products (queries SQL database)
   Web app pulls product catalog from Redis/SQL database.
   Web app pulls product images from Redis/Blob Storage.
   Page output is cached in Redis for faster retrieval.
3. User's cart items are queued in Redis and finalised in Queue Storage.
4. Azure Queue Storage pushes order event to Functions.
5. Azure Functions brokers payment with third-party gateway.
6. Azure Functions records order in SQL database.
7. When payment is successful, display an order confirmation screen in the web app.

| TIMELINE / MILESTONES (PREDICTIVE) | | | |
|---|---|---|---|
| **OVERVIEW** | A 14-week **timeline** is planned for this project, covering five key phases: **Project Scoping & Design, Development, Testing, Deployment, and Post-Deployment Support.** | | |
| **MILESTONE / ACTION ITEMS** | | **ACTIONEE** | **TIMELINE** |
| **PHASE 1: PROJECT SCOPING AND DESIGN** | | | |
| **Requirement Gathering**<br>- Conduct Focus Group Discussions with the client to finalize functional and non-functional requirements. | | Scrum Master, UX Designer, Technical Manager | Week 1 - 3 |
| **PHASE 2 : DEVELOPMENT** | | | |
| **Front End Development**<br>- Login / Register Page<br>- Shopping Cart<br>- Purchase Button<br>- Merchant Dashboard | | Front-End Developers | Week 4 - 8 |
| **Back End Development**<br>- Azure SQL Configuration (Products & Orders)<br>- Azure Redis Configuration<br>- Azure Blob Storage Configuration<br>- Integrate APIs for 3rd party payment gateway and logistics.<br>- Azure DevOps | | Back-End Developers | Week 4 - 10 |
| **PHASE 3: TESTING AND OPTIMISATION** | | | |
| **Testing and Optimization**<br>- Functional Testing<br>- Integration Testing<br>- Stress Testing<br>- Load Testing<br>- Bug Fix and Optimisation. | | Front-End & Back-End Developers, Technical Manager, DevOps Engineer | Week 9 - 12 |
| **PHASE 4: DEPLOYMENT AND TRAINING** | | | |
| **Deployment & Training**<br>- User Training<br>- Deployment Preparation<br>- Go-Live | | Scrum Master, UX Designer, DevOps Engineer | Week 11 - 13 |
| **PHASE 5: POST-DEPLOYMENT MONITORING** | | | |
| **Post-Deployment Support**<br>- System Performance Monitoring<br>- Feedback Collection & Improvements | | Technical Manager, Scrum Master, UX Designer | Week 13 -14 |

## DEPLOYMENT / DISTRIBUTION

After development and testing, the following activities are essential for successful deployment of the e-commerce platform:

- **Finalizing System Readiness** – Ensuring all components, including the storefront, payment processing, and inventory management, are fully functional and bug-free.
- **Reporting Milestone Completion** – Providing progress updates to confirm that the platform meets all success criteria.
- **Coordinating Deployment Activities** – Managing the transition from development to live operations, ensuring a seamless go-live process.
- **Project Sign-Off** – Officially completing the project once all functionalities work as expected with no critical issues.
- **Training & Support** – Providing essential reference materials to assist the client in navigating the platform effortlessly. Documentation and training will also be provided on the CI/CD to facilitate any future collaborations with third-party developers for further platform improvements.
- **Long-Term Support Handover** – Establishing a dedicated support channel for troubleshooting post-launch.

## TESTING

Our approach includes rigorous code testing, stress testing, and integration testing to validate system reliability and functionality before deployment:

1. **Code Testing**
    - Conduct multiple levels of code testing to detect and resolve issues early.
    - Includes unit testing to verify individual components and functional testing to ensure expected user interactions work correctly.
2. **Stress Testing**
    - Evaluate software stability and responsiveness under extreme conditions.
    - Components include:
        - **Load Testing** – Assess performance under expected and peak user loads.
        - **Spike Testing** – Measure system behavior when traffic surges suddenly.
        - **Resource Exhaustion Testing** – Identify potential failures under resource-heavy conditions.
3. **Integration Testing**
    - Validate the interactions between different e-commerce modules (e.g., product catalog, shopping cart, checkout, payment gateway).
    - Steps include:
        - **Top-down and Bottom-up Integration** – Ensure all features work cohesively.
        - **Interface Testing** – Verify seamless data flow between components, including payment and inventory management.

Overall, our testing approach ensures that Strong Ape Apparel receives a fully functional, user-ready e-commerce platform with minimal need for technical intervention. By proactively identifying and addressing issues, we aim to deliver a robust, scalable, and reliable solution that meets business requirements and customer expectations.

## DOCUMENTATION

In our proposal targeting end-users, we emphasize the importance of clear and minimal documentation to ensure seamless adoption of the e-commerce platform. Our documentation strategy is streamlined across key project phases:

- **Initial Phases**
    - Provide a high-level overview of the e-commerce solution, outlining key functionalities, user roles, and platform capabilities.
    - Define essential workflows, such as product management, order processing, and payment handling, to align with the customer's operational needs.
- **User Training & Guides**
    - Develop concise, easy-to-follow user manuals covering store management, order fulfillment, and customer service interactions.
    - Include step-by-step walkthroughs, screenshots, and tooltips for seamless onboarding.
- **System Operations & Troubleshooting**
    - Outline common troubleshooting steps for basic issues, such as payment failures, stock synchronization errors, and order discrepancies.
    - Provide a quick-reference FAQ section to address frequent user concerns.
- **DevOps**
    - Document the tools used for IAC, monitoring and logging, CI/CD, etc.
    - Deployment: release process, approval workflow, rollback procedure
    - Security and compliance: best practices, compliance requirements

By adopting this structured yet minimal documentation approach, we empower Strong Ape Apparel to efficiently manage their e-commerce platform with minimal training and technical support, ensuring a smooth transition to digital retail.

## TRAINING & SUPPORT

As the e-commerce front-end is designed to be highly user-friendly, tasks such as adding products, managing inventory, and processing orders can be performed intuitively with minimal effort. Additionally, this proposed e-commerce architecture is designed as a turn-key solution, eliminating the need for technical training and system maintenance.

For added convenience, basic reference materials such as quick-start guides and FAQs will be provided to address common questions. For issues on Microsoft Azure's end, dedicated technical support is available 24/7.

| COST STRUCTURE (PRELIMINARY) - CapEx | |
|---|---|
| **OVERVIEW** | These are the **one-off** costs for the initial setup and development of the platform<br><br>Key Components:<br>-Platform Development<br>-UX/UI Design<br>-Testing & Quality Assurance |

| NEEDS / INVESTMENT | COST |
|---|---|
| Cost for core system, backend and frontend development<br>• Backend & frontend development ($10,000)<br>• Database setup ($4,000)<br>• Core system architecture ($6,000) | $20,000 |
| Cost for user-friendly interface and experience design<br>• User interface and experience design ($2,500)<br>• Prototyping and user testing ($1,500) | $4,000 |
| Cost for ensuring functionality, security, and performance<br>• Functional & performance testing ($2,000)<br>• Security and compliance testing ($1,500) | $3,000 |
| **ESTIMATED TOTAL** | $27,000 |

| COST STRUCTURE (PRELIMINARY) - OpEx | |
|---|---|
| **OVERVIEW** | These are the **recurring annual** costs to maintain and run the platform<br><br>Key Components:<br>-Cloud Hosting Infrastructure<br>-Networking & Traffic Management<br>-Performance & Scalability<br>-Security & Compliance<br>-Monitoring & Support |

| NEEDS / INVESTMENT | COST |
|---|---|
| Cost for cloud hosting, database storage and scalable cloud storage solution<br>• Azure App Services ($985.92)<br>• Azure SQL Database ($534.60)<br>• Azure Storage Accounts - Block Blob ($50.04) | $1,570.56 |
| Cost for load balancing and traffic management<br>• Azure Application Gateway ($5,803.32) | $5,803.32 |
| Cost for improving performance with in-memory caching<br>• Azure Cache for Redis ($1,660.20) | $1,660.20 |
| Cost for secure storage, identity management and access control, compliance and governance enforcement<br>• Azure Key Vault ($33.24)<br>• Azure Policy ($0.00)<br>• Microsoft Entra ID - Identity Management ($0.00) | $33.24 |
| Cost for monitoring, performance tracking, technical support and issue resolution<br>• Azure Monitor - Includes Application Insights ($2,560.08)<br>• Azure Standard Support ($1,647.96) | $4208.04 |
| Cost for<br>• Azure DevOps - Includes Azure Pipelines and Azure Artifacts ($3239.16) | $3239.16 |
| **ESTIMATED TOTAL** | $16,514.52 |

## PAYMENT TERMS

Payment Phase
- 1st Payment: 20% of total project cost as an advance to start the project
- 2nd Payment: 30% of total project cost after completion of the website front end design
- 3rd Payment: 50% of total project cost after completion of the Development stage
- 4th Payment: 10% of total project cost at the time of project sign off

## TERMS & CONDITIONS

- Payment is due 30 days upon receipt of invoice.
- Please make payment to BananaCloudDev Pte Ltd (UEN: 1234567A)

| PROPOSAL MAY BE WITHDRAWN IF NOT ACCEPTED BY DATE OF | 27 Feb 2025 |
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## ACCEPTANCE OF PROPOSAL

| AUTHORIZED CLIENT SIGNATURE | | DATE OF ACCEPTANCE | |
|---|---|---|---|