Client Precondition Report Template

Each project team will consist of 8–10 senior Computer Science students. Each student contributes approximately 120 hours over the semester, resulting in about 960–1,200 total team hours. Students have around 13 weeks of active development time. Students possess strong general programming skills and Git/GitHub experience but should not be expected to have prior industry-level experience with specialized frameworks or technologies. Advanced tools should be listed as skills to be learned, not required prerequisites.

1. Company Information

- **Company Name: ARED Group Inc**
- **Primary Contact Person: Henri Nyakarundi**
- **Email Address: henri@aredgroup.com**
- **Website: aredgroup.com**
- **Location / Time Zone: Atlanta/East Africa**

2. Team Structure & Required Skills

Describe your expectations for how the student team will operate.

a. Team Composition

We propose one unified team working collaboratively on the ARED Marketplace Backend Optimization project. Students will collaborate weekly, share a single repo/org, and deliver code, documentation, and a final demo.

b. Required Baseline Skills

General programming
• Basic web/API concepts
• Basic databases
• Linux basics
• Git/GitHub

c. Skills to Be Developed During the Project

• Go/python backend engineering
• Postgres data modeling & migrations
• Marketplace workflow & entitlement logic
• Secure engineering practices
• Basic edge deployment concepts (K3s)

3. Project Title & Acronym

ARED Marketplace / App Store Backend Optimization (Go + Postgres) — ared-marketplace-v1

4. Project Overview & Problem Statement

ARED operates business applications entirely on edge gateways (K3s on Yocto/Balena). The Marketplace / App Store backend requires improvement to allow external developers and internal teams to submit, approve, distribute, and update applications for ARED edge gateways.

The goals for this project are to:
• Improve the app submission workflow (git/zip)
• Implement app versioning and approval paths
• Enable entitlement/subscription checks for SMEs and partners
• Track install/update requests and deployment states
• Provide audit logging for compliance and transparency

Target users: SMEs (restaurants/hotels), partners, app publishers, and ARED operations/admin teams.

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5. Solution Overview & Core System Components

Project 1

Marketplace Backend Optimization (Platform Track)

- **Optimization:** Implement/clean backend flow for **app submission (git/zip), versioning, ARED approval + partner approval path, install request tracking, entitlement/subscription checks**, and audit logs.
- **Stretch:** basic staged rollout fields, maintenance window fields, and minimal app manifest fields (resources/permissions).

6. Technical Considerations

• Preferred stack: Go backend (lightweight), Postgres (existing), Keycloak (existing), K3s runtime on gateway.
• Constraints: edge-first operation, low overhead, robust under weak internet/Wi-Fi; avoid heavy frameworks.
• Testing/quality: basic CI (lint/tests), schema migrations, reproducible documentation.
• Security/privacy: entitlement checks enforced in backend; no plaintext secrets in repos.

7. Innovation & Competitive Advantage

ARED's advantage is offering a business-focused edge platform designed for low-connectivity markets. This project enhances the marketplace workflow for app developers and operators, improving scalability, compliance, and overall ecosystem usability for SMEs and partners.

8. Proposed Implementation Timeline (12 Weeks)

Weeks 1–2: Onboarding, environment setup, requirements validation, architecture notes.
Weeks 3–5: Implement submission APIs, approval logic, versioning model, entitlement checks.
Weeks 6–9: Integration + deployment flow + audit logging + schema refinements.
Weeks 10–11: Testing, bug fixes, documentation, demo preparation.
Week 12: Final demo + handover package (code + docs + test steps).

9. Deployment & Support Expectations

ARED will provide a dev environment (gateway or equivalent), test accounts/roles, and guidance on integration points. Students deliver working code, setup instructions, and demo scripts.

10. Confidentiality & Intellectual Property

We do not require an NDA. *Work produced is intended for ARED use. Students may present high-level concepts publicly, but should not share proprietary code, credentials, internal URLs, or sensitive security implementation details without approval.*

11. Proposed Success Metrics

Project 1: keys/secrets not stored in plaintext; clear demo + reproducible steps

Project 2: end-to-end backend flow works (submit → approve → install tracking + entitlement checks)

Project 3: handles high concurrency without duplicate orders; perceived UX is “instant” (optimistic updates + SSE), with documented tests

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12. Mentorship & Communication Plan

Cadence: weekly meeting (professor preference) + weekly written update

Channels: Slack + email + Google meet

Mentor: Henri Nyakarundi (and an ARED engineer when available)

Response time: 24–48 hours for question

13. Additional Notes (Optional)

ARED prefers **simple, robust, lightweight** solutions suitable for edge deployments in Africa, with strong documentation and predictable testing.