In order to trace every requirement back to its origin and purpose, we created a mapping between each system requirement and its corresponding **context object** and **requirement source**. The *context object* represents the broader area or component the requirement relates to like user authentication, gate control, or financial systems. On the other hand, the *requirement source* explains **why** that requirement exists whether it’s due to technical design constraints, integration with existing MMU infrastructure, compliance with legal regulations like Malaysia’s PDPA, or performance expectations such as handling thousands of users at peak times. This structured mapping helps us make sure that each feature in the system is not only necessary, but also grounded in either a real world limitation, a policy mandate, or a stakeholder need. It also supports traceability and accountability throughout the development process.

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| --- | --- | --- | --- |
| Requirement ID | Requirement | Context Object | Requirement Sources |
| REQ-3.6.1-01 | Mobile app must be built with a cross-platform framework (Flutter or React Native). | Platform & technology | Design constraints |
| REQ-3.6.1-02 | Support for Android 10+ and iOS 13+ is mandatory. | Platform Compatibility | Design constraints |
| REQ-3.6.1-03 | All communications must be conducted over HTTPS. | Security protocol | Design constraints |
| REQ-3.6.1-04 | RESTful API must use JSON and support standard HTTP methods. | API architecture | Design constraints |
| REQ-3.6.2-01 | Authentication must integrate with MMU LDAP-over-TLS system. | Campus SSO | Integration constraints |
| REQ-3.6.2-02 | Gate control system must support RFID or LPR integration. | Gate system | Integration constraints |
| REQ-3.6.2-03 | Payment systems must integrate with credit card, MMU account, and e-wallets. | Financial Integration | Integration constraints |
| REQ-3.6.3-01 | App must comply with Malaysian e-hailing laws (non-commercial ride-sharing). | Legal compliance | Regulatory Constraints |
| REQ-3.6.3-02 | All user data must be encrypted at rest and in transit. | Data Protection | PDPA compliance |
| REQ-3.6.4-01 | Application use is restricted to MMU campus only. | Geofencing | Operational constraints |
| REQ-3.7-01 | System must support up to 5,000 concurrent sessions. | Performance Load | Software System Attributes |
| REQ-3.7-02 | System availability must be at least 99.9% uptime. | Reliability | Software System Attributes |
| REQ-3.7-03 | Use role-based access control for system feature access. | Access control | Security requirements |