**Project Design Phase-II**

**Solution Requirements (Functional & Non-functional)**

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| Date | 07 Agu 2025 |
| Team ID | LTVIP2025TMID49244 |
| Project Name | Heritage Treasures: An in-depth analysis of UNESCO World Heritage Sites In Tableau |
| Maximum Marks | 4 Marks |

**Functional Requirements:**

Following are the functional requirements of the proposed solution.

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| **FR No.** | **Functional Requirement (Epic)** | **Sub Requirement (Story / Sub-Task)** |
| FR-1 | **Data Management & Integration** | Data extraction from UNESCO API and CSV sources |
|  |  | Data validation and quality assurance |
|  |  | Data transformation and preprocessing |
|  |  | Automated data refresh and synchronization |
|  |  | Data backup and recovery mechanisms |
| FR-2 | **Interactive Visualization** | Interactive world map with heritage site markers |
|  |  | Dynamic filtering by country, region, type, and year |
|  |  | Drill-down capability for detailed site information |
|  |  | Multiple chart types (bar, line, treemap, pie charts) |
|  |  | Responsive design for different screen sizes |
| FR-3 | **Advanced Analytics** | Trend analysis of heritage site inscriptions over time |
|  |  | Regional distribution and comparative analysis |
|  |  | Risk assessment visualization for endangered sites |
|  |  | Statistical calculations and KPI generation |
|  |  | Pattern recognition and correlation analysis |
| FR-4 | **User Interface & Experience** | Intuitive dashboard navigation |
|  |  | Customizable dashboard layouts |
|  |  | Search and filter functionality |
|  |  | Tooltip and popup information displays |
|  |  | Consistent design theme and branding |
| FR-5 | **Reporting & Export** | Export functionality for charts and data |
|  |  | PDF report generation |
|  |  | Excel and CSV data export |
|  |  | High-resolution image export |
|  |  | Scheduled report generation |
| FR-6 | **User Management** | Role-based access control |
|  |  | User authentication and authorization |
|  |  | User preference storage |
|  |  | Activity logging and audit trails |
|  |  | Guest access for public users |

**Non-functional Requirements:**

Following are the non-functional requirements of the proposed solution.

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| **FR No.** | **Non-Functional Requirement** | **Description** |
| NFR-1 | **Usability** | - Dashboard should be intuitive and require minimal training<br>- Response time for user interactions should be under 3 seconds<br>- Compatible with major web browsers (Chrome, Firefox, Safari, Edge)<br>- Accessibility compliance with WCAG 2.1 standards<br>- Multi-language support capability |
| NFR-2 | **Security** | - Data encryption in transit and at rest using AES-256<br>- Secure authentication mechanisms (OAuth 2.0/SAML)<br>- Role-based access control with permission management<br>- API security with rate limiting and authentication tokens<br>- Regular security audits and vulnerability assessments<br>- Compliance with GDPR and data protection regulations |
| NFR-3 | **Reliability** | - System uptime of 99.5% availability<br>- Automated backup procedures with point-in-time recovery<br>- Error handling and graceful degradation<br>- Data consistency checks and validation<br>- Fault tolerance with automatic failover capabilities<br>- Comprehensive logging and monitoring |
| NFR-4 | **Performance** | - Dashboard loading time under 5 seconds<br>- Support for concurrent users (minimum 100 simultaneous users)<br>- Optimized query performance for large datasets<br>- Efficient memory usage and resource management<br>- Caching mechanisms for frequently accessed data<br>- CDN integration for global content delivery |
| NFR-5 | **Availability** | - 24/7 system availability with minimal planned downtime<br>- Load balancing across multiple servers<br>- Disaster recovery plan with RTO of 4 hours<br>- Health monitoring and automated alerts<br>- Redundant infrastructure and failover mechanisms<br>- Maintenance windows scheduled during low-usage periods |
| NFR-6 | **Scalability** | - Horizontal scaling capability to handle increased load<br>- Database partitioning and sharding support<br>- Auto-scaling infrastructure based on demand<br>- Support for growing data volumes (up to 10x current size)<br>- Microservices architecture for modular scaling<br>- Cloud-native deployment with container orchestration |
| NFR-7 | **Compatibility** | - Cross-platform compatibility (Windows, macOS, Linux)<br>- Mobile-responsive design for tablets and smartphones<br>- Integration capabilities with existing systems via APIs<br>- Support for various data formats (JSON, XML, CSV, Excel)<br>- Backward compatibility with previous versions<br>- Third-party tool integration capabilities |
| NFR-8 | **Maintainability** | - Modular code architecture for easy updates<br>- Comprehensive documentation and code comments<br>- Version control and change management<br>- Automated testing and continuous integration<br>- Configuration management and environment consistency<br>- Technical debt monitoring and code quality metrics |