

Design and Evaluation of a Secure API-Based Data Validation Framework for School MIS Migration



Tash Halley
Bridgend County Borough Council

Bridgend County Borough Council
Cyngor Bwrdeistref Sirol Pen-y-bont ar Ogwr

Research Context

- Management Information Systems (MIS) underpin key school operations, including attendance, safeguarding, assessment and statutory reporting.
- 60 schools across Bridgend are transitioning from SIMS to the cloud-based Bromcom MIS.
- MIS migration presents challenges around data integrity, compatibility and security.
- Effective validation is essential to ensure migrated data remains complete, accurate and reliable.



Research Problem



- MIS migration presents challenges in maintaining data completeness, accuracy and integrity.
- Different source and target structures can complicate data validation.
- Existing validation approaches range from direct database access to more technically complex validation frameworks.
- There is a need to investigate a secure, automated and operationally feasible API-based validation approach.

Research Aim & Objectives



- Research Aim – To design, implement and evaluate a secure API-based data validation framework for verifying data integrity between School Management Information Systems (MIS).

Objective 1 - Analyse

Existing migration and validation techniques and their limitations.

Objective 2 - Define

Validation rules and security requirements for the framework.

Objective 3 – Design & Implement

A secure API-based framework to compare source and target MIS data.

Objective 4 - Evaluate

Framework effectiveness using controlled migration test scenarios.

Literature Review



- Migration has evolved from manual read-convert-write processes towards automated validation.
- Completeness, consistency and integrity are key measures of migration quality.
- Schema differences can require fields, data types and representations to be mapped or transformed.
- Scale and migration errors make manual verification increasingly impractical.

Literature Review



- Automated validation can identify mapping, transformation, duplication and integrity discrepancies.
- Combining complementary validation rules provides greater assurance than relying on a single check.
- APIs provide structured programmatic communication between separate systems.
- API validation requires security controls including authentication, authorisation and encrypted communication.

Research/Development Methodologies



<u>Research Philosophy</u>	<u>Approach</u>	<u>Strategy</u>	<u>Testing</u>	<u>Analysis</u>
Positivist	Deductive	Software Development	Controlled Test Scenarios	Quantitative / Descriptive

Resources/Materials



Hardware

- Standalone laptop
- Existing computing/network infrastructure

Software & Development

- Python
- Microsoft SQL Server/SSMS
- Postman

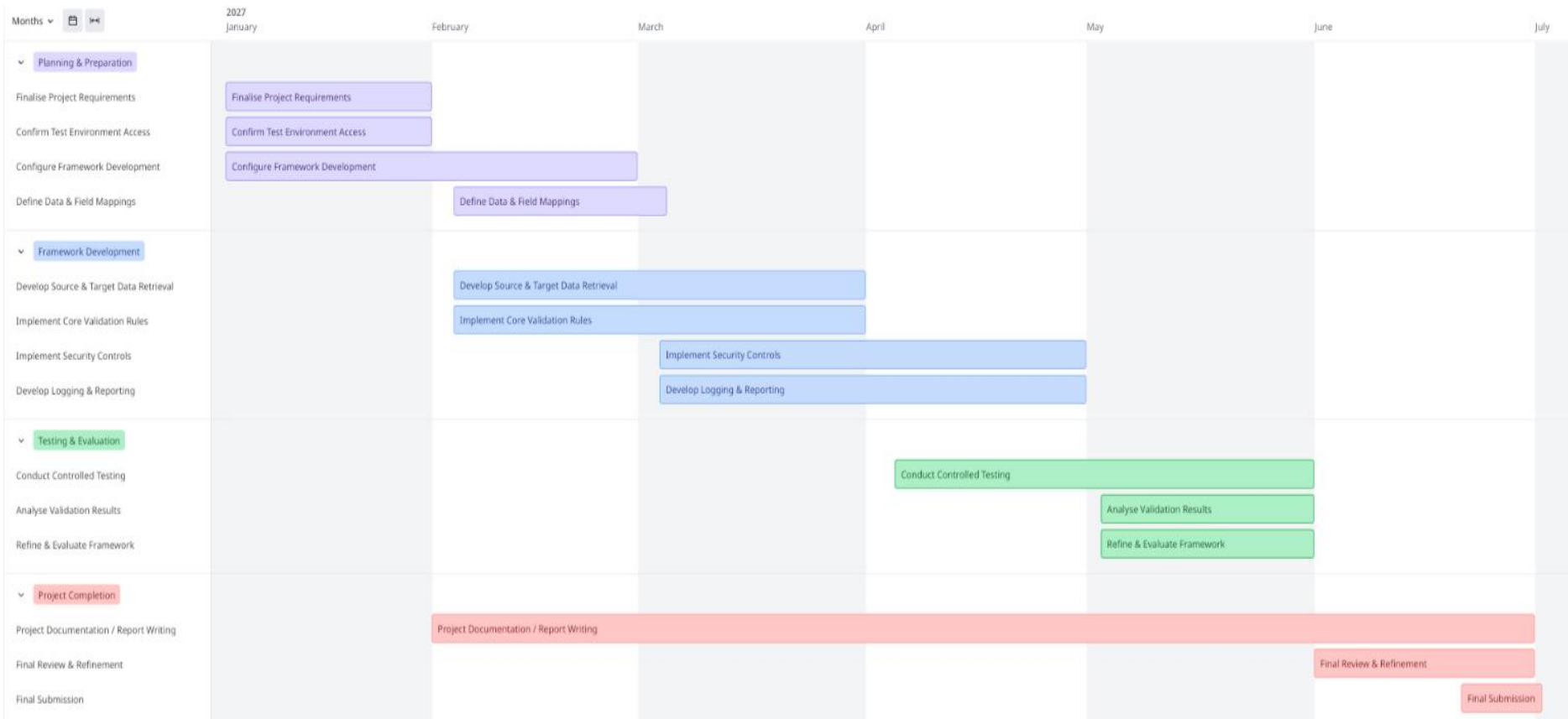
Test Environments

- Local SIMS source database
- Bromcom test environment
- Synthetic, fictional test datasets

Access & Security

- Authorised database access
 - Bromcom API access/permissions
- Secure authentication and HTTPS/TLS

Project Plan



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Any Questions?



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