Data Model Configuration Management with GeoData Modeler

Version 1.1

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Introduction

Data model changes are common when working with geodatabases. These changes involve how data is organized and managed in the system. The way these changes are requested, tracked, implemented, tested, and verified can differ from one organization to another. This document aims to provide the best practices for handling data model changes using GeoData Modeler, making the process more efficient and effective for your team.

Data Model Configuration Management Promotion Cycle

Managing the geodatabase involves essential tasks such as Data Model updates and their implementation. Although different organizations may have their own specific methods, the overall process follows a general pattern.

This diagram outlines the key steps involved in promoting a data model update to the production environment. The process begins with Requirements Gathering, where the next set of changes is identified. This includes discovering the necessary changes, analyzing them, and deciding when they are ready for development.

The Development phase comes next, where tasks are completed, and unit testing is conducted to determine the readiness of each item for testing.

Following that is the Test Promotion phase, which assesses whether the items are prepared for User Acceptance Testing (UAT) Quality Assurance (QA).

The UAT/QA Promotion phase thoroughly tests the changes to ensure they are production ready. At this point, the development team and business create release notes to communicate the updates.

Finally, in the Production Deployment phase, the approved changes are deployed to the production environment. The team confirms the consistency of these changes with the UAT/QA database, performs smoke testing for a quick validation, releases the updates to production, and shares the release notes with the users.

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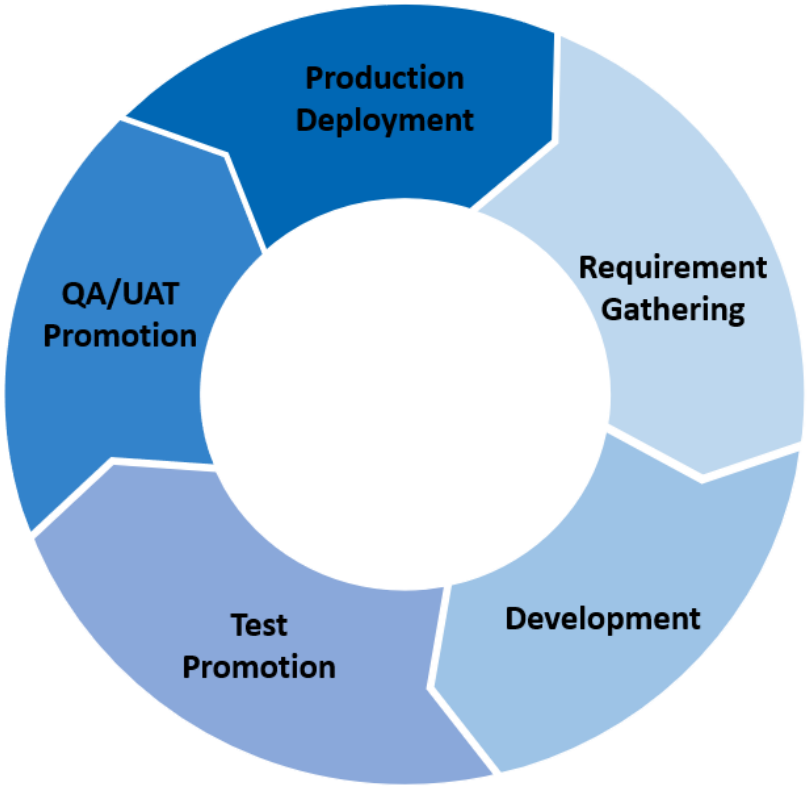


Requirements Gathering

Requirements Gathering, where the next set of changes is identified. This includes discovering the necessary changes, analyzing them, and deciding when they are ready for development.

Data Model Change requests can come from various sources, such as user defect tickets, user enhancement requests, and application development needs for new functionality. To effectively manage these changes, the first step is to keep track of the change requests. This can be achieved using web-based incident tracking tools, which help monitor the originator of the request, key decisions made, the chosen implementation strategy, as well as test cases and their results.

Application development likely has a larger set of requirements involving interface, data flow interaction, and integrations to other systems. Developers and business analysts work together to create a detailed design specification. The detailed design specification should include a section with data model change requirements.

Development Phase

During the Development phase, modeling tasks are accomplished, and unit testing is performed to assess the readiness of each item for further testing. In this section, we will introduce the best practices of utilizing GeoData Modeler to effectively manage changes in the development data model.

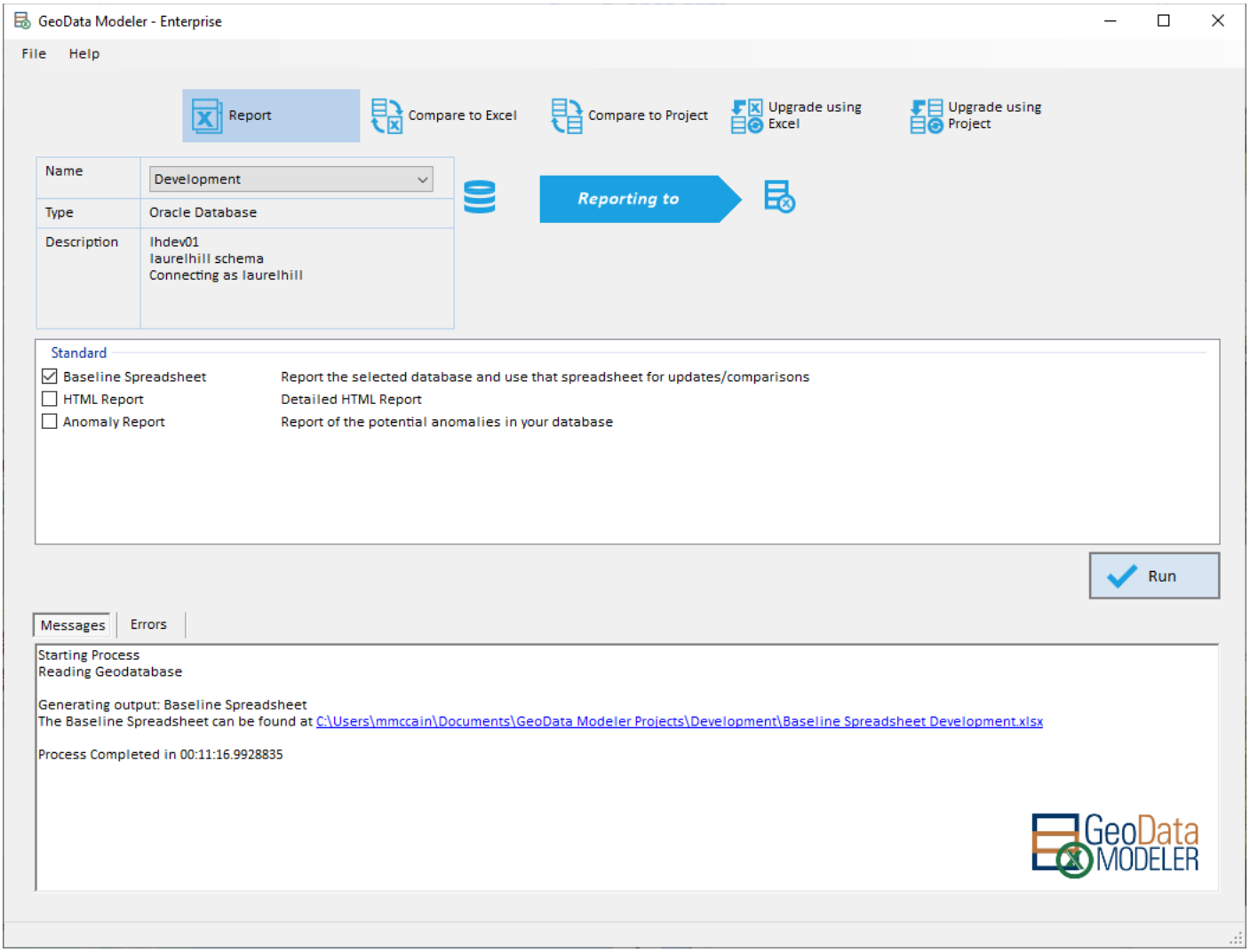
Data Model Change Request Triage

Each data model request is reviewed for consistency compared to the current data model. For instance consistency of naming conventions, columns types, domain values. The intent is to use existing precedent for naming conventions and column types to create a consistent geodatabase. Existing names can easily be viewed using the power of filtering and sorting within the Excel spreadsheet. If a request is inconsistent with the data model, then the request is modified, if possible to best fit the current naming conventions.

Similarly, if a model request adds a significant number of duplicate columns that exist in other tables of feature classes or adds annotation feature classes to a geodatabase that uses labeling exclusively, then the request will need to be modified to fit the current geodatabase precedence.

Create A Baseline Spreadsheet from the Development Database

GeoData Modeler reporting functions, enable the creation of a Baseline Spreadsheet, which captures a snapshot of the geodatabase schema. This baseline serves as the foundation for the Data Model spreadsheet during the update cycle. Any modifications or additions made will be incorporated into a copy of this baseline, ensuring a structured and organized approach to managing changes.



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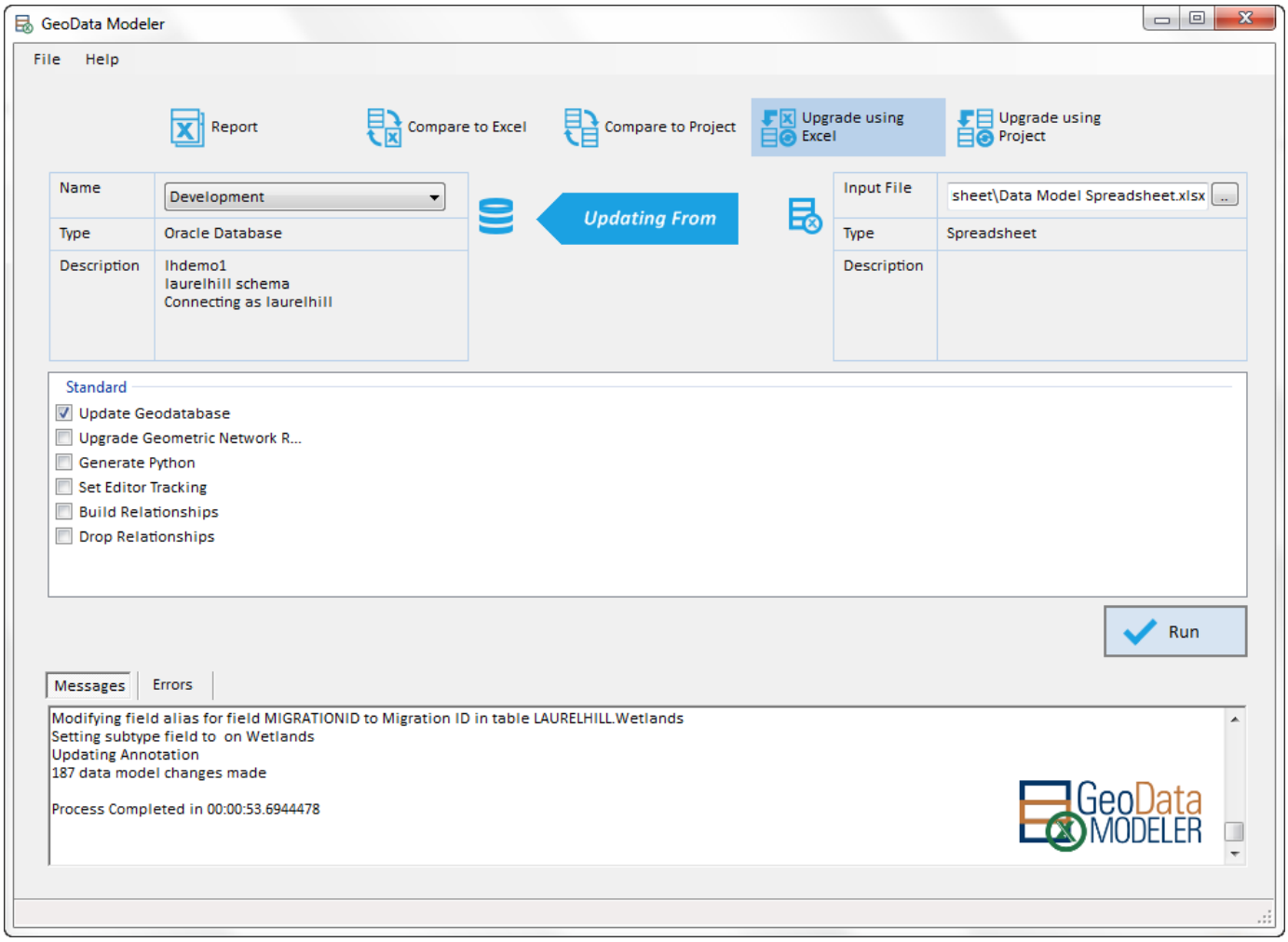
Data Model Spreadsheet Update

Each model change is entered into the data model spreadsheet. The information in the requirements tracking system should be enough to make the model change. A data model modification spreadsheet that mirrors the data model spreadsheet in tabs and columns is recommended to be attached to each requirement. Some requests may require multiple tabs to be modified, for instance if a column is to be added that has a domain and the domain has new values, then three tabs must be edited.

Apply Data Model Updates to Development Environment

Data Model updates are applied to the development geodatabase with GeoData Modeler. To apply the model updates, open GeoData Modeler, Choose the Development project, Chose Upgrade using Excel, Set the input file to the data model spreadsheet and check Update Geodatabase. Click Run to start making changes.



In the example above 187 model changes we made to the development geodatabase.

Unit Test Development Data Model Updates

Once the updates are applied, they must be tested. There are 2 methods for testing; confirm changes in ArcCatalog as a manual unit test, or run a comparison between the data model spreadsheet and the development geodatbase. Below is the comparison to the data model spreadsheet:

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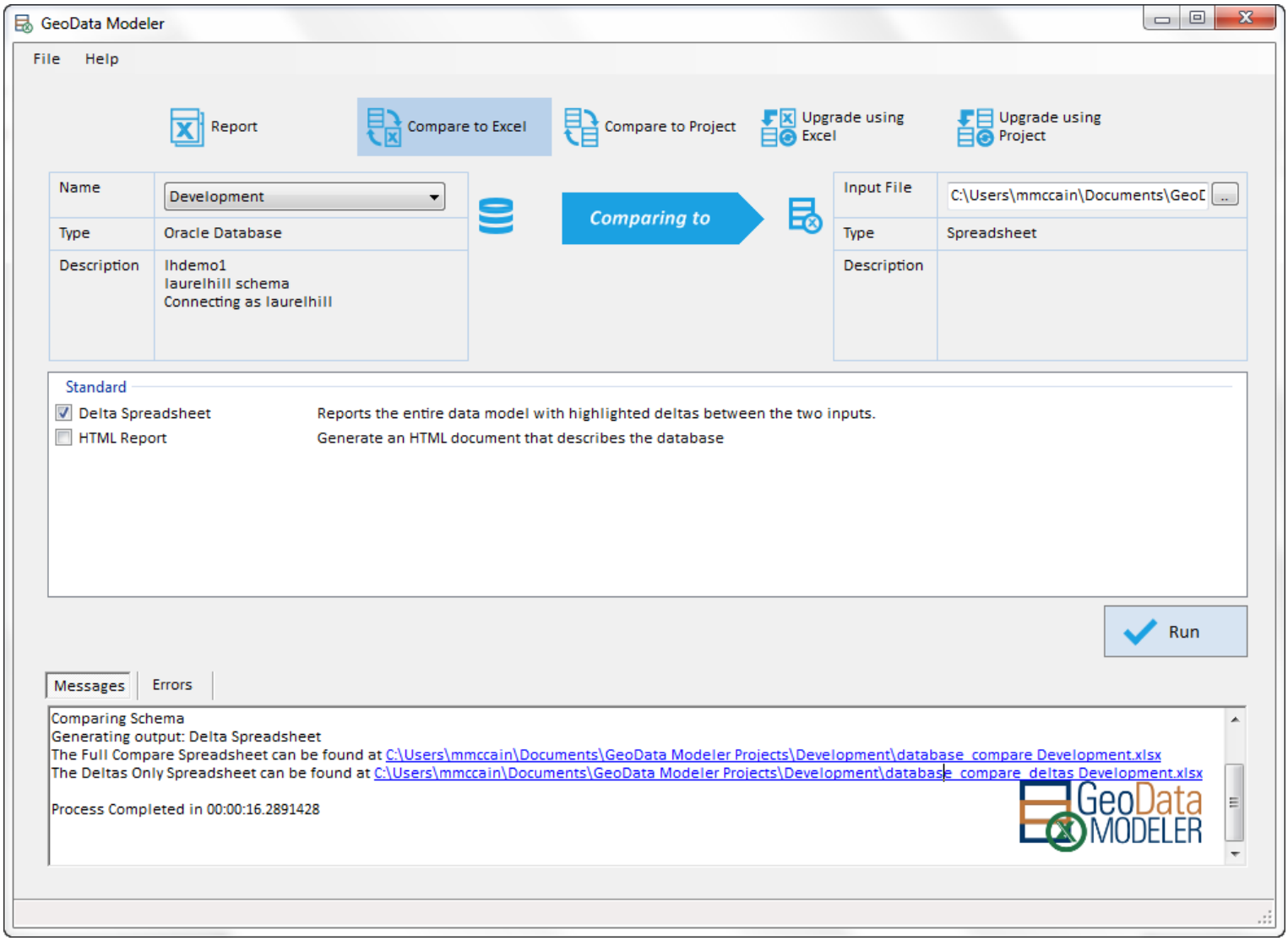

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The key tab in the compare deltas is the Summary tab. This tab summarizes the tabs that have deltas. Ideally, the summary should show 0 deltas for each tab on the left, or several deltas between the spreadsheet and the database on the right. All deltas should be cleared as part of the unit testing of the model updates.

Sheet	Delta Count
Spatial References	0
Feature Datasets	0
Tables	0
Fields	0
Domains	0
Domain Values	0
Relationships	0
Anno Feature Classes	0
Anno Classes	0
Subtypes	0
Field Subtypes	0
GN Junction Rules	0
GN Edge Rules	0
Table Model Names	0
Field Model Names	0
Table Programs	0
Field Programs	0
Indexes	0

OR

Sheet	Delta Count
Spatial References	0
Feature Datasets	1
Tables	2
Fields	68
Domains	2
Domain Values	9
Relationships	0
Anno Feature Classes	0
Anno Classes	0
Subtypes	0
Field Subtypes	2
GN Junction Rules	0
GN Edge Rules	0
Table Model Names	0
Field Model Names	0
Table Programs	0
Field Programs	0
Indexes	0

Promote Data Model Updates to Test Environment

During the Test Promotion phase, the focus is on evaluating whether the items are ready for User Acceptance Testing (UAT) in the Quality Assurance (QA) database. The Test environment resembles the development database but has limited developer access. It serves as a testing ground to validate model changes before they proceed to the next stage.

To apply the data model changes to the Test environment, open GeoData Modeler. Create a project for the Test database. Choose the Data Model Spreadsheet with the model modifications. Click run to apply the changes.

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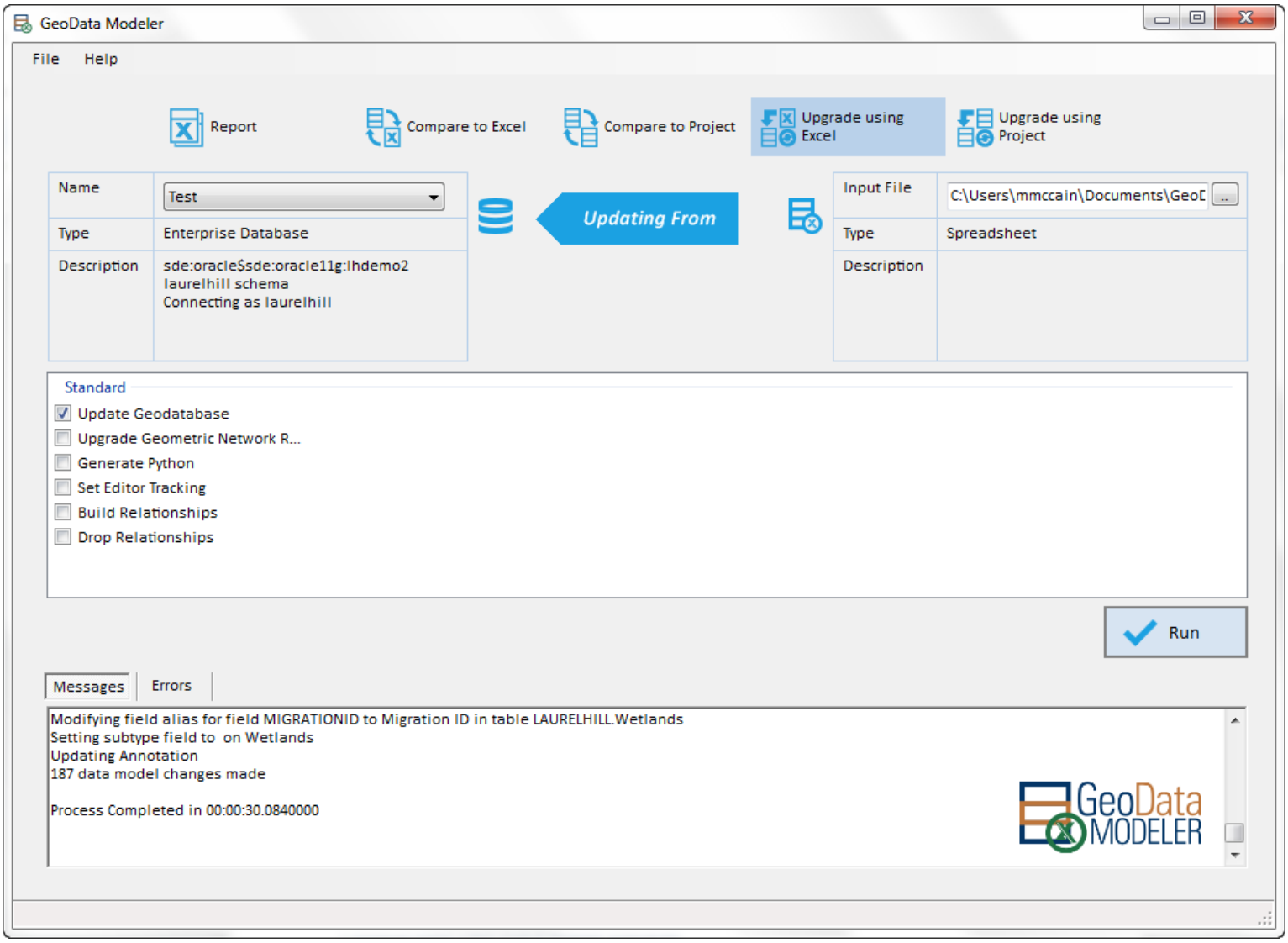

Unit Test data model updates

Once the updates are applied, run a comparison of the updated Test geodatabases and the spreadsheet. Review the delta spreadsheet to determine if there are any issues with the update. Perform manual data model updates if necessary.

It is recommended that the testing team manually review each of the data model changes that are applied to the Test environment. Once completed, the model updates are ready to be applied to the QA environment.

Promote Data Model Updates to UAT/QA

The UAT/QA Promotion phase involves comprehensive testing of the changes to ensure they are ready for production. During this stage, the development team and business collaborate to create release notes, which serve as a communication tool to inform others about the updates being implemented.

To apply the data model changes to UAT/QA, open GeoData Modeler. Create a project for UAT/QA. Choose the Data Model Spreadsheet with the model modifications. Click run to apply the changes.

Comparison Test Data Model updates

Once the updates are applied, run a comparison of the updated QA and the spreadsheet. Review the delta spreadsheet to determine if there are any issues with the update. Perform manual data model updates if necessary.

Once QA regression testing is complete, the data model updates can be applied to the production data model during a production cutover.

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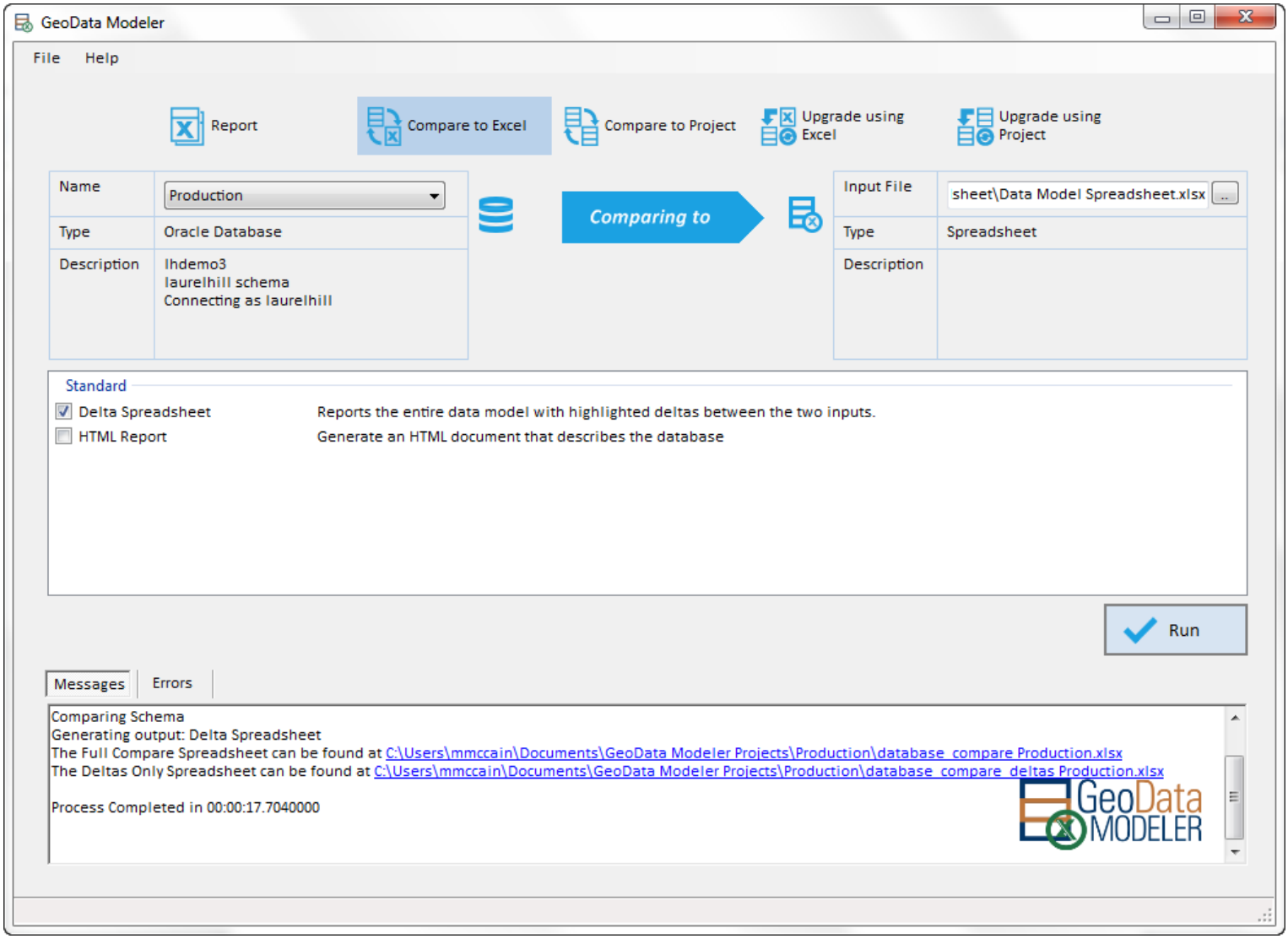
Run Comparison for Release Note Creation

To assist the line of business with release note creation for data model updates, a comparison is performed between the current production model and the Data Model Spreadsheet. This will show deltas for each change along with the change level meta data that was added for each change. This will greatly reduce the time necessary for the business lead to create release notes for the release.



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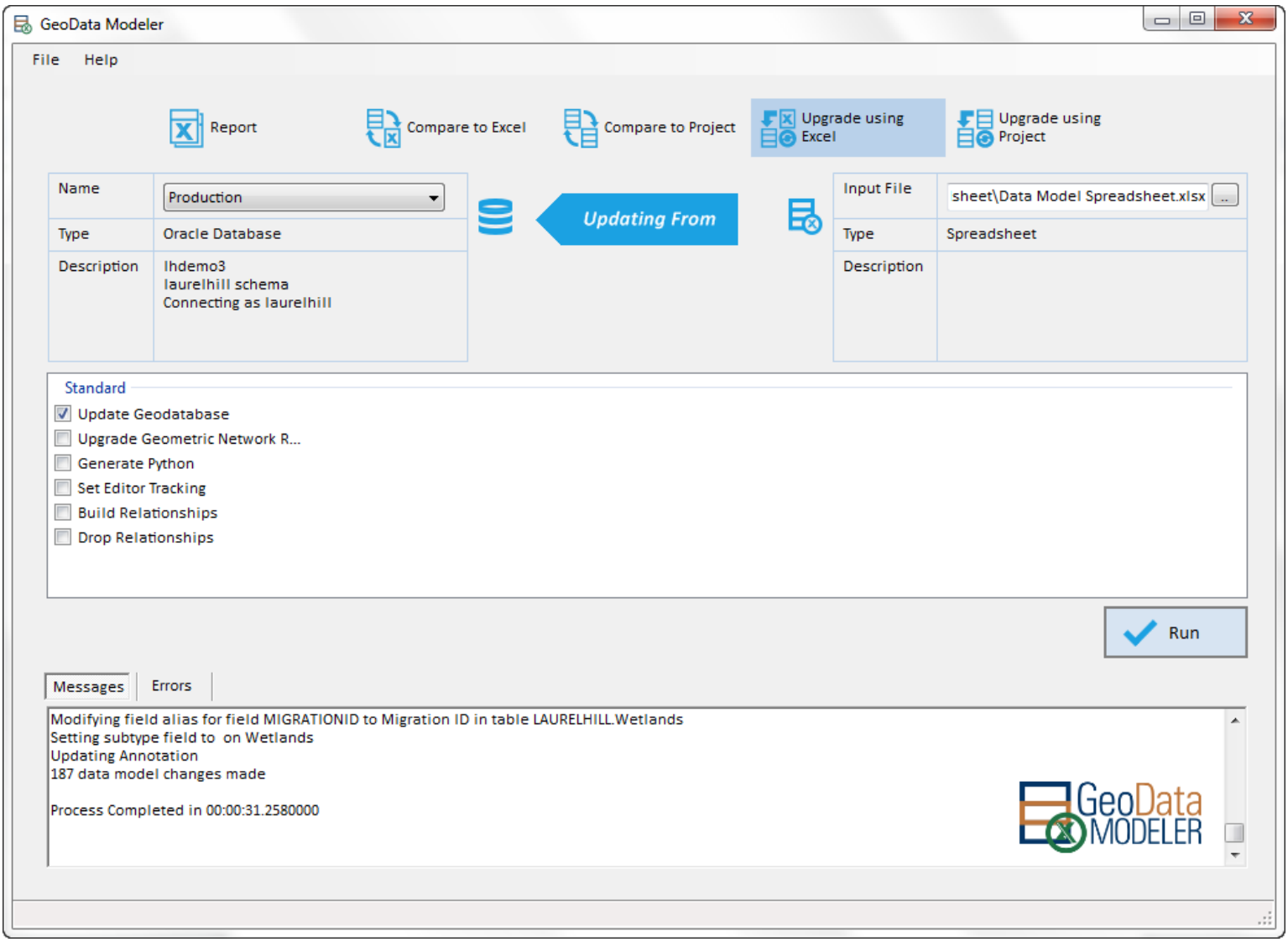
Deploy Data Model Updates to Production Environment

Production Deployment phase, the authorized changes are rolled out to the production environment. The team ensures the alignment of these modifications with the UAT/QA database and conducts a rapid smoke testing for validation. Once validated, the updates are released to production, and comprehensive release notes are shared with the users to keep them informed about the changes.

To perform this process, it's essential to schedule a database outage. During the outage, users should end their active sessions, and their access should be temporarily locked. To update the data model, the database owner must have the capability to create schema locks without causing table locks.

Furthermore, as part of a standard cutover procedure, it's important to create a full backup of the production geodatabase before applying the data model updates. This backup ensures the ability to revert any changes made during the cutover, providing a safety net for the update process.



Final Production Comparison

A final database to database comparison is required to confirm that all changes have been made correctly, and that the production environment matches the QA environment.

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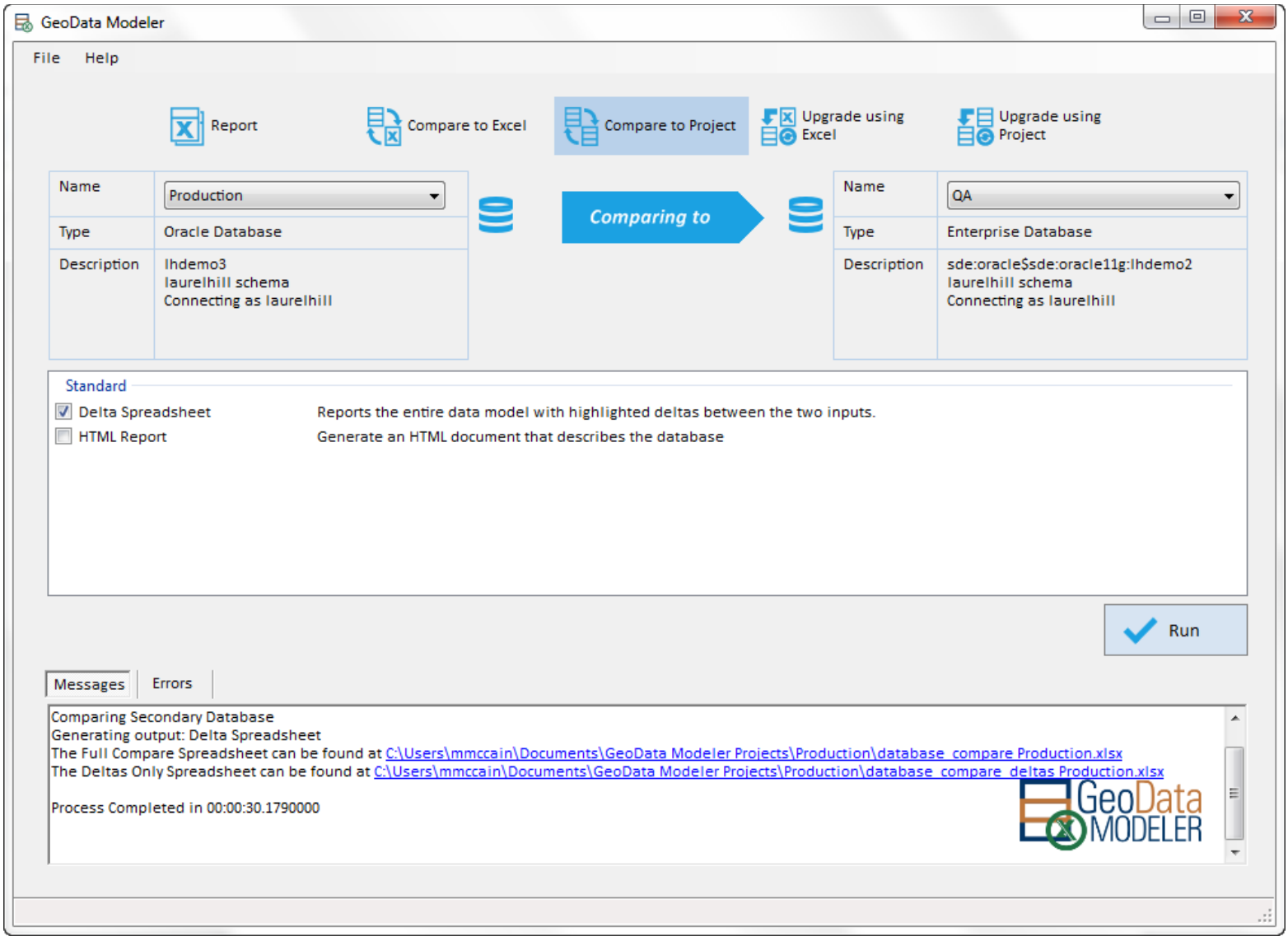
The final delta spreadsheet should not contain any deltas for ArcGIS or ArcFM properties. Any deltas should be carefully reviewed. If necessary, changes and modifications should be made to production to completely sync up with the QA environment.



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Data Model Update Process Flow

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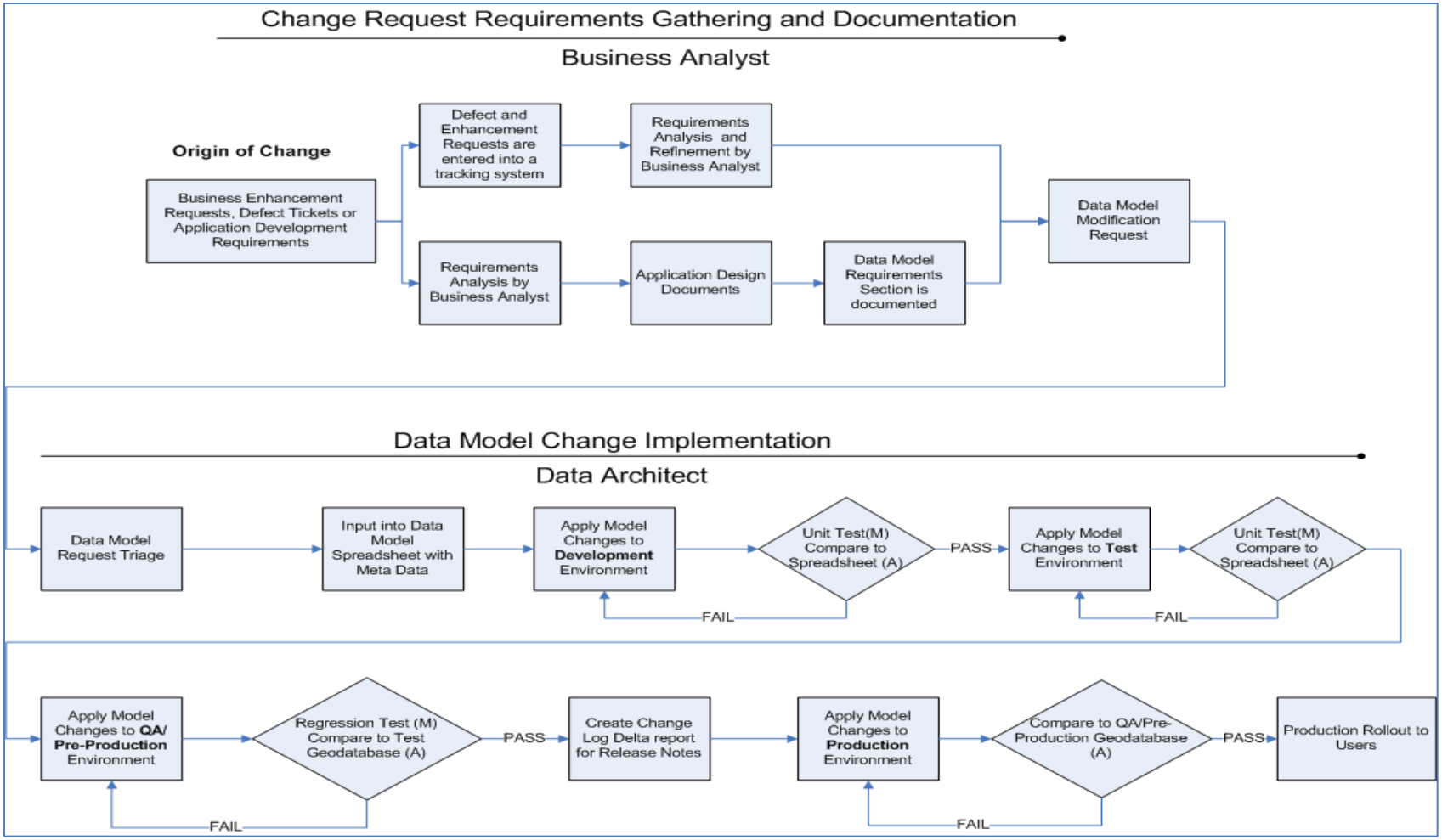

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