



Version 0.1 October | 2018

Ed-Fi to Generate

ETL Plug-In Documentation

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Contents

[Introduction 3](#_Toc523143014)

[Installation 4](#_Toc523143015)

[Installation Instructions – Single SQL Statement 4](#_Toc523143016)

[Installation Instructions – Incremental 5](#_Toc523143017)

[Configuration 5](#_Toc523143018)

[Configuring Generate 5](#_Toc523143019)

[Configuring Enumerations 6](#_Toc523143020)

[Configuring Stored Procedures 8](#_Toc523143021)

[Ed-Fi MetaEd Extension 9](#_Toc523143022)

[Implementation & Validation 9](#_Toc523143023)

[Supporting Documentation 10](#_Toc523143024)

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| **Version History** | | |
| **Version #** | **Author(s)** | **Version Date** |
| 0.1 | Duane Brown, Nathan Clinton | 10/3/2018 |
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# Introduction

The purpose of this document is to provide instructions and documentation for configuring and implementing the Ed-Fi to Generate ETL Plug In. The plug-in provides a standard way to migrate data from an Ed-Fi ODS into Generate databases (CEDS Integrated Data Store and CEDS Reporting Data Store). The Ed-Fi to Generate Plug In is available in the Ed-Fi Exchange located here: (need link). This plug-in provides the code necessary to implement the following ED*Facts* reports:

|  |  |
| --- | --- |
| **File Specification** | **Description** |
| FS002 | Children with Disabilities (IDEA) School-Age |
| FS005 | Children with Disabilities (IDEA) Removal to Interim Alternative Educational Setting |
| FS006 | Children with Disabilities (IDEA) Suspensions/Expulsions |
| FS007 | Children with Disabilities (IDEA) Reasons for Unilateral Removal |
| FS009 | Children with Disabilities (IDEA) Exiting Special Education |
| FS029 | Directory |
| FS032 | Dropouts |
| FS033 | Free and Reduced Price Lunch |
| FS037 | Title I Part A SWP/TAS Participation |
| FS039 | Grades Offered |
| FS040 | Graduates/Completers |
| FS052 | Membership |
| FS054 | MEP Students Served - 12 Months |
| FS059 | Staff FTE |
| FS070 | Special Education Teachers |
| FS088 | Children with Disabilities (IDEA) Disciplinary Removals |
| FS089 | Children with Disabilities (IDEA) Early Childhood |
| FS099 | Special Education Related Services Personnel |
| FS112 | Special Education Paraprofessionals |
| FS121 | Migrant Students Eligible - 12 Months |
| FS122 | MEP Students Eligible and Served - Summer/Intersession |
| FS129 | CCD School |
| FS134 | Title I Part A Participation |
| FS141 | EL Enrolled |
| FS143 | Children with Disabilities (IDEA) Total Disciplinary Removals |
| FS144 | Educational Services During Expulsion |
| FS145 | MEP Services |
| FS165 | Migrant Data |
| FS175 | Academic Achievement in Mathematics |
| FS178 | Academic Achievement in Reading/Language Arts |
| FS179 | Assessment Achievement in Science |
| FS185 | Assessment Participation in Mathematics |
| FS188 | Assessment Participation in Reading/Language Arts |
| FS189 | Assessment Participation in Science |
| FS193 | Title I Allocations |

This document is divided into 5 sections:

* **Documentation** – all documents and scripts related to this installation
* **Installation** – setting up the code necessary to migrate data from the Ed-Fi ODS to the Generate ODS
* **Configuration** – customization of the enumerations specific to your state
* **Ed-Fi MetaEd Extension** – extending the Ed-Fi 2.x ODS to included additional elements required for ED*Facts* reporting
* **Implementation & Validation** – executing the ETLs and discovering any issues in the process
* **Supporting Documentation** – additional resources and information about the Ed-Fi to Generate ETL Plug In.

# Documentation

The installation materials reside in the following location:

1. The [Ed-Fi GitHub location](https://github.com/Ed-Fi-Alliance/Ed-Fi-X-ETL-To-Generate) is specifically set aside for this project. Please check the repository for recent updates.

(!) Requires that you have a GitHub account to access the code. If you do not have access to Ed-Fi GitHub repositories, please [submit an access request](https://license.ed-fi.org/access-request-form/).

1. Sign-in to [GitHub](https://github.com/) if you are not currently logged in. Navigate to <https://github.com/Ed-Fi-Alliance/Ed-Fi-X-ETL-To-Generate> repository to access the documentation and the migration scripts.

The above repository contains the SQL scripts and documentation necessary to install and configure the Plug In. It contains the following File Folders and Resources:

* **Documentation**
  + **Ed-Fi to Generate Plug In Documentation v0.1** – This document that details out the installation and configuration requirements
  + **Ed-Fi Endpoints for Generate v0.1** – A list of all Ed-Fi endpoints and their CEDS counterparts necessary to populate the EDFacts Reports in scope for this package
  + **Ed-Fi Enumerations to CEDS v0.1** – A list of all Ed-Fi Enumerations and their CEDS counterparts necessary to populate the EDFacts Reports in scope for this package
* **Functions** – All of the functions that need to be added to Generate to execute the Stored Procedures
* **ODS**
  + **App.DataMigrationTasks\_CreateTasks\_EdFi** – Script that populates the App.DataMigrationTasks table with the list of stored procedures needed to run the migration from Ed-Fi to Generate prior to extending the model (Only Core Ed-Fi 2.x)
  + **App.DataMigrationTasks\_CreateTasks\_EdFi\_MetaEdExtension** – Script that populates the App.DataMigrationTasks table with the list of stored procedures needed to run the migration from Ed-Fi to Generate that also includes executing the stored procedures after Ed-Fi has been extended (Core Ed-Fi 2.x Plus Extensions)
  + **ODS.SourceSystemReferenceData** – This script creates the table necessary to house the enumeration mapping from Ed-Fi enumerations to CEDS enumerations
  + **ODS.SourceSystemReferenceData.Data** – This script populates the ODS.SourceSystemReferenceData table with the standard Ed-Fi enumerations to CEDS. This can be modified to reflect your own internal enumerations in use for Ed-Fi.
* **Package**
  + **1\_EdFi to Generate Plug In** – This script can be used in lieu of the Functions, ODS, Staging, Stored Procedures Encapsulated, and Stored Procedures Staging scripts as it contains all of the scripts in a single executable statement. This will stand up everything necessary to migrate the data from the Ed-Fi 2.x Core model (without extensions and with Ed-Fi enumerations) to Generate.
  + **2\_EdFi to Generate Plug In\_MetaEd EdFi ODS Extension** – This script extends the Ed-Fi ODS to include additional tables and elements necessary to populate Generate.
  + **3\_EdFi to Generate Plug In\_MetaEd Generate Update** – This script adds in the additional stored procedures in the Stored Procedures Staging folder that reference MetaEd and prepares Generate to migrate data that includes those tables.
* **Staging** – Contains scripts that build the Staging tables in Generate
* **Stored Procedures Encapsulated** – Contains the ETL scripts that move the data from the Staging Tables to the CEDS ODS tables in Generate
* **Stored Procedures Staging** – Contains the ETL scripts that move the data from the Ed-Fi ODS to the Staging Tables (contains both the Ed-Fi 2.x Core model scripts and scripts for the MetaEd Extended tables)
* **Testing**
  + **Ed-Fi to CEDS Comparison Script** – This contains an initial testing script that compares counts from the Ed-Fi ODS to the CEDS ODS after the migration has completed.

# Installation

Installation of the Ed-Fi to Generate Plug In can be done with the execution of one SQL statement + the Ed-Fi extensions provided in the package or it can be done incrementally by following the steps below. In both instances, there must be an existing Ed-Fi ODS and an existing Generate database called “generate.” The installation instructions below only impact the Generate database configuration. There is an additional step that extends the Ed-Fi ODS to account for data elements that do not exist in version 2.x of Ed-Fi. These instructions are provided in their own section.

## Installation Instructions – Single SQL Statement

1. From the Package folder, open the SQL statement “1\_EdFi to Generate Plug In” on the server which houses the Generate database.
2. Ensure that the Generate database is named “generate”.
3. If the Ed-Fi ODS is not on the same server as the generate database, ensure that a linked server exists for generate to be able to extract data from the Ed-Fi ODS.
4. Do a Find and Replace. The SQL statement will have several instances of the path below pointing to a test instance of the Ed-Fi ODS. Replace this with your path to the Ed-Fi ODS. Note that the example below assumes the Ed-Fi ODS to be on the same server as it does not include the server name. If they are on a different server, you will need to add the server name at the beginning of the path.
   1. [EdFi\_Sample\_ODS\_Data\_For\_Generate].[edfi]
5. Execute the SQL statement.
6. You can now move onto the Configuration section.

## Installation Instructions – Incremental

There are several file folders provided in addition to the “Package” folder. These have been combined to produce the Single SQL Statement “1\_EdFi to Generate Plug In”. Instead of executing t that statement, you can implement them individually. This provides a means for looking through the scripts based on their purpose and adjusting according to your need. This will be discussed further in the configuration section as well. To install these incrementally, run them in the following order on the server which houses the generate database.

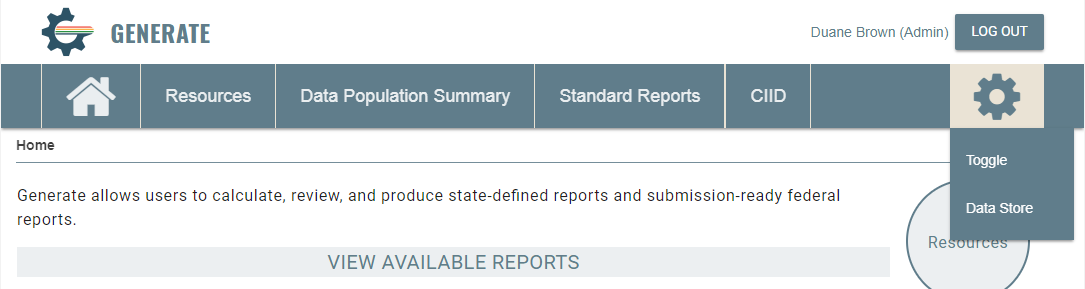
1. Ensure the generate database is named “generate”.
2. Functions Folder – First execute each of the functions provided in the file folder (Note: the order of execution does not matter)
3. Staging Folder – First execute the statement entitled “Staging Schema”. After this execute the remaining statements in any order.
4. ODS Folder – First execute the statement entitled “ODS.SourceSystemReferenceData”. After that, execute the statement entitled “ODS.SourceSystemReferenceData.Data”.  **DO NOT** execute the App.DataMigrationTasks\_CreateTasks\_Ed-Fi or the App.DataMigrationTasks\_CreateTasks\_EdFi\_MetaEdExtension. These will be run at the end to set up the sort order for the data migration.
5. Stored Procedures Encapsulated Folder – Execute all of the stored procedures in the folder being certain to run the App.Migrate\_Data\_Validation first, then the rest in any other order.
6. Stored Procedures Staging Folder – Do a Find and Replace. The SQL statements will have several instances of the path “[EdFi\_Sample\_ODS\_Data\_For\_Generate].[edfi]” pointing to a test instance of the Ed-Fi ODS. Replace this with your path to the Ed-Fi ODS. Note that the path assumes the Ed-Fi ODS to be on the same server as Generate as it does not include the server name. If they are on a different server, you will need to add the server name at the beginning of the path. Execute all of the stored procedures in any order (Note: If the Ed-Fi ODS is not extended, do not execute the stored procedures with the “\_MetaEd” extension; if the Ed-Fi ODS is extended with the exact table structure provided in this package, execute the additional scripts as well).
7. ODS Folder – Now run either the App.DataMigrationTasks\_CreateTasks\_Ed-Fi (if the Ed-Fi ODS is not extended) or the App.DataMigrationTasks\_CreateTasks\_EdFi\_MetaEdExtension (if the Ed-Fi ODS is extended)
8. You can now move on to the Configuration section.

# Configuration

The Ed-Fi to Generate Plug In is based on the core Ed-Fi ODS 2.x model with the standard Ed-Fi enumerations provided. The Plug In is extremely flexible as it relates to the adjustment of the enumerations and the location of data. The instructions below provide information for configuring Generate, your states custom enumerations, and any modification to the table structure for where data are provided in your instance of the Ed-Fi ODS

## Configuring Generate

Generate contains a section of questions that are very similar to the EMAPS questions states fill out prior to their yearly ED*Facts* reporting. These questions indicate metadata about their state that is unique to how they will report the data. Generate uses this information to produce the ED*Facts* reports based on how the state is configured. The Ed-Fi to Generate Plug In also takes advantage of some of this pre-filled data when determining which data to use in the Ed-Fi ODS for certain reports. The “Toggle” section of Generate will need to be filled out prior to executing the migration of data from Ed-Fi to Generate. The screen shot below shows the location of the “Toggle” section after logging in as an administrator.



## Configuring Enumerations

**Source System Reference Data**

The Ed-Fi to Generate Plug In comes with the standard Ed-Fi enumerations already mapped to the CEDS enumerations used in Generate. This information can be found in the script entitled ODS.SourceSystemReferenceData.Data and can also be found when querying the ODS.SourceSystemReferenceData table in the generate database. For each row, 5 columns are defined:

1. **SchoolYear** – The year for which this enumeration is valid. This allows for tracking variations in enumerations from year to year. Each year, a new set of enumerations needs to be copied applicable for the school year. The Stored Procedures each have a parameter for school year (@SchoolYear) which will refer to the applicable school year for that enumeration.
2. **TableName** – This is the name of the CEDS enumeration reference table. This column should NOT be adjusted.
3. **TableFilter** – At times, CEDS enumerations are based on a second set of enumerations. For instance, an Organization Identification System may vary depending on whether or not the Organization is an LEA or an SEA. The table filter indicates whether this is LEA or SEA or any other filter that is in place for the enumeration in CEDS. Do NOT adjust the TableFilter.
4. **InputCode** – This is your enumeration stored in the ed-fi.Descriptors or “Type” tables. This should always be the “CodeValue” as the Stored Procedures are by default pointed to this value.
5. **OutputCode** – This is the CEDS code the InputCode will be transformed into. Do NOT adjust the OutputCode.

Note: Many to one relationships can exist. There can be two input codes pointed to one output code by creating a new row. If, however, one output code could be transformed into two CEDS output codes, an additional breakdown of your enumerations is required so the end result is either a one to one relationship or a many to one relationship.

**Adjusting Parameters**

Each Stored Procedure is executed with parameters that point to the school year. Presently the @SchoolYear parameter is hard coded into the generate.App.DataMigrationTasks table. Generate has included in its roadmap, the ability to select the school year from the Generate User Interface when running the migration. This will eliminate the need to update this table and hard coding in the future to reflect the school year being migrated.

## Configuring Stored Procedures

By default, no adjustment to the Stored Procedures are necessary if the core Ed-Fi ODS is used with the provided MetaEd extensions. Also, no adjustments are needed if only enumerations are custom as those are handled in the ODS.SourceSystemReferenceData table in generate. If, however, an adjustment needs to be made for where data are located (tables & column names are different), then the stored procedures themselves need to be reconfigured. There are 11 Stored Procedures (these do not include the MetaEd Stored Procedures that pull data from the Ed-Fi extended tables) that can be adjusted which DO NOT contain the phrase “EncapsulatedCode”. They are listed here:

* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP01\_Organization
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP02\_Person
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP03\_Enrollment
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP04\_ProgramParticipationSpecialEducation
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP05\_MembershipChildCount
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP06\_Migrant
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP07\_ProgramParticipationTitleI
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP08\_Discipline
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP09\_StaffAssignment
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP10\_Assessments
* App.Migrate\_Data\_ETL\_IMPLEMENTATION\_STEP11\_PersonStatus

The purpose of these stored procedures is to move the data out of the Ed-Fi ODS and into the staging tables that were created earlier in the installation section. If data are in different locations than what was originally written, the SELECT statements will need to be modified to point to the correct location for the data to move it into the staging table in generate. The “EncapsulatedCode” stored procedures do not need to be adjusted. They move data out of the Staging tables and into Generate using the ODS.SourceSystemReferenceData to account for custom enumerations.

# Ed-Fi MetaEd Extension

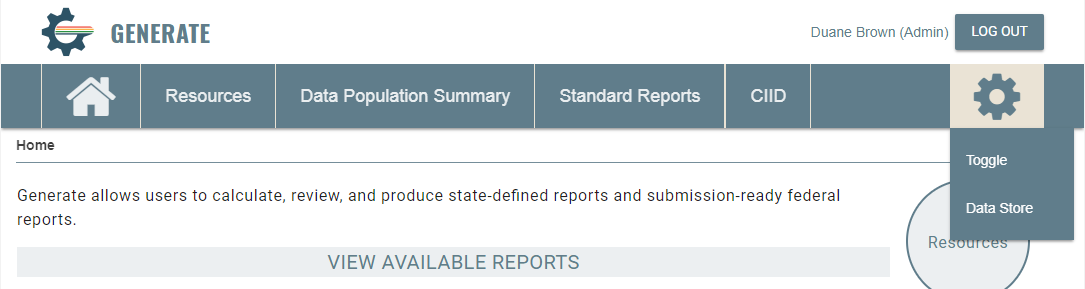
Ed-Fi version 2.x does not contain all of the elements needed to produce the ED*Facts* reports contained in Generate as part of this project. The MetaEd code provided will build the required extensions and enumerations to complete the model. If you have an existing Ed-Fi ODS implementation, you may have already extended the model to account for these additional elements or enumerations. Review the MetaEd documentation provided and determine what, if any, extensions you will want to implement.

Additional Stored Procedures are provided separately that pertain only to the extended data for the Ed-Fi ODS. These additional stored procedures point to the MetaEd extended version of the Ed-Fi ODS. They contain the text “MetaEd” on the end of their name.

Only running the core ETL Stored Procedures without extending Ed-Fi or adjusting the “MetaEd” stored procedures to point to your own custom locations will still result in several of the ED*Facts* reports populating successfully, but for all 35 to populate, additional data are required which do not exist in the core Ed-Fi model.

# Implementation & Validation

Navigate to the Generate website, log in as an administrator, and under the settings wheel, select Data Store. Click the “Migrate to Operational Data Store” button. When that completes, click the “Migrate to Reporting Data Store”. When that has completed, the migration of the data has finished and the ED*Facts* reports can now be viewed. This complete process should take no longer than 2 hours for an Ed-Fi ODS containing approximately 500,000 students and state assessment results for one year.



Each step can be run individually to check for issues by running the steps in correct order specified in the App.DataMigrationTasks section. Use the following query to pull the steps in order of execution:

SELECT 'exec ' + StoredProcedureName

FROM app.DataMigrationTasks

WHERE IsActive = 1

ORDER BY RunBeforeGenerateMigration DESC, DataMigrationTypeId, TaskSequence

The Ed-Fi to Generate Plug In also comes with an additional Validation process. At the end of each Stored Procedure that moves the data into the staging tables, a validation stored procedure is executed (App.Migrate\_Data\_Validation) which checks for missing elements and issues in the data. It places its results in the Staging.Validation table which can be queried to determine problems with the migration of data. Additional validation rules can be added to the App.Migrate\_Data\_Validation stored procedure as you find ways to improve error and validity checking. Locate each new error within the proper IF/THEN statement based on the Stored Procedure Name and the Staging Table Name it is validating.

In the Testing Folder, the script “Ed-Fi to CEDS Comparison Script” can be run to compare the counts in the Ed-Fi ODS with counts in the CEDS ODS to ensure the same number of records was moved from one database to the other. It also checks for total counts in the CEDS ODS for tables that should be populated with data because of the migration. This script will continue to be expanded for more thorough testing in the future.

# Supporting Documentation

Other resources available to you include:

**The Center for the Integration of IDEA Data (CIID)** – CIID is the creator of Generate and focuses specifically on areas related to Special Education Data. Their website is <https://ciidta.grads360.org/#program>. When working with Special Education Data and this ETL process, they may be able to provide you with technical assistance.

**The Common Education Data Standards (CEDS)** – Generate is built entirely on the CEDS Normalized Data Schema. Additional resources about the NDS can be found here: <https://ceds.ed.gov/dataModelNDS.aspx>. CEDS may also be able to provide additional technical assistance about the CEDS standard itself or transforming data into the CEDS standard. You can contact CEDS through this link: <https://ceds.ed.gov/ContactUs.aspx>.

**AEM Corporation** – AEM has created this Ed-Fi to Generate Plug In through a grant from the Michael and Susan Dell Foundation and in collaboration with the Ed-Fi Alliance. You can reach out directly to AEM by emailing Duane Brown ([duane.brown@aemcorp.com](mailto:duane.brown@aemcorp.com)).